



Keith G. Tidball  
Marianne E. Krasny  
*Editors*

# Greening in the Red Zone

Disaster, Resilience and  
Community Greening

 Springer

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Dr. Keith G. Tidball  
Department of Natural Resources  
Cornell University  
Fernow Hall, Ithaca, NY, USA

Dr. Marianne E. Krasny  
Department of Natural Resources  
Cornell University  
Fernow Hall, Ithaca, NY, USA

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*Cover image photographer:* Harry Shepherd

*Cover caption:* A bomb crater in 1942 London is transformed into a garden

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*I dedicate this book to the memory of my mother, who taught me the value of defying the limitations of the 'impossible' and of fighting the tyranny of apathy and indifference.*

Keith G. Tidball

*I dedicate this book to my father John Krasny, who experienced one of the great diasporas of the last century in escaping from Nazi Europe, returned to Europe with the US forces in Germany, and went on to create a long and productive life for himself and his family in the US.*

Marianne E. Krasny



# Foreword

I was intrigued when I saw the title *Greening in the Red Zone*, because I wasn't sure what the volume was about. I was pretty sure that greening referred to practices that were environmentally or ecologically friendly, but I didn't have a clue what the authors meant by a red zone. Indeed, I thought that it had something to do with the section of the field in the game of football as played in the United States. But I soon realized that it was about something much more serious, and refers to areas on the planet, from local to regional in scale, that have been subjected to, and recovering from, a variety of shocks or disturbances.

The current year (2011) has already been one of the most costly as a result of extreme weather events. The winter storms in the US and Europe, as well as the tsunami in Japan, all disrupted production and transportation systems. While the number of tornadoes in the US was not unusual this past spring, they occurred over heavily developed and populated regions of the US, destroying lives and homes. Flooding in the northern US and droughts in the south have also disrupted agricultural production and transportation systems, with direct and indirect economic losses. Because of this litany of environmental crises, economic losses have been estimated at around 35 billion US\$ for 2011, and the year is only two-thirds complete. But such assessments do not address the human dimensions of such events, nor do they include the costs of other types of disasters. While humans have dealt with these disasters for millennia, the rising costs of coping with these events have led to an increase in the need for understanding both the theory and the practice of crisis management, especially from a human perspective.

I write this foreword in late summer, which in the coastal regions of southeastern US is also known as hurricane season. Although I no longer live in Florida, I still clearly remember the childhood experience of living through a category four storm. Among my recollections of Hurricane Donna include the seemingly eternal howling winds, and afterwards, the unforeseen and incredible destruction. I remember at the height of the storm seeing our neighbor's roof being lifted up and carried away into the howling winds, later my mother struggling to seal a shattered window, listening for news on the radio of the car in the garage, and walking outside during the eye of



the storm. After the storm, I was amazed by the destruction to the vegetation. Many of the trees were completely defoliated. Tree trunks of the native pines had snapped like twigs, broken off in midair, while all of the non-native Australian pines (*Casuarinas* spp.) were blown over. I also remember marveling at how the palm trees had survived such ferocious winds, even though flying lumber had skewered many of their trunks. Such memories from my childhood, now over 50 years ago, were elicited while reading the contents of this volume about the recovery and restoration of social-ecological systems after such devastating events.

The editors and authors of this book use the phrase red zone to refer to areas that have been impacted by disasters. These include weather or geophysical disasters, such as earthquakes or cyclones (tornadoes, hurricanes and typhoons), which are relatively short-term events that result in losses of life, property and infrastructure. Many of the cases in this book also describe human caused crises, ranging from the terrible impacts of small-scale human violence from street gangs to the broader scale ravages caused by international wars. Many of the cases focus on the results of twentieth and more recent twenty-first century conflicts, such as World War II and others in Asia, Africa and Europe. Red zones that existed under oppressive political regimes, such as communism in Europe or apartheid in Africa, are also included.

The stories portray how people historically (and still do so in the present) assisted with the recovery and renewal of ecosystems in red zones around the world. The examples include the creation of a park in post-earthquake Haiti, community gardens in post-apartheid South Africa, the creation of a national park and the development of horticultural practices in war torn Afghanistan, and the restoration of forests following Hurricane Hugo in Charleston, South Carolina. Planting and cultivating are the physical acts by which people help restore ecosystem goods and services, such as provisioning of food, regulating biogeochemical cycles, and conserving biodiversity. The reflections and lessons also demonstrate how the practice of greening is therapeutic to humans as they restore the aesthetic and spiritual benefits lost from these systems, and the cultures and communities that build upon such benefits

One of the interdisciplinary concepts used throughout the volume is the notion of resilience. Indeed, this volume is one of an increasing number of scholarly works that are deepening our understanding of this concept. The term resilience has been around for decades and is generally used to describe how a system (from human beings to biotic communities) responds to external shocks or disturbances. Some define resilience in terms of recovery—how long it takes, what are factors that enhance recovery, and how to recover to a pre-disturbance condition. That is certainly important for human well-being, whether it is an individual who was traumatized by war or a hurricane or a collective society after a terrorist attack or a tsunami. Other scholars think about resilience in terms of the amount of disturbance that will transform the system into something new and different. That is the type of resilience that is discussed and presented in this volume, how humans use their deep connections with nature to shape change in ways that is transformative.

We live in a world that is changing in ways never before witnessed by humans. The scales of those changes are no longer at geographically local, manageable levels, but are occurring at the planetary scale. Even though ecological phenomena of fires, storms, earthquakes and tsunamis have happened for millennia, they are creating novel and unpredictable impacts, as human components of social-ecological systems are becoming more vulnerable and reactive to loss. The physical and cultural infrastructure that has developed over the last few centuries is threatened, as indicated by an erosion of resilience. But this volume provides an antidote against a dystopic future, by presenting scholarly, sage and thoroughly practical guidance. By bringing together different fields of scholarship and ideas, including resilience, biophilia and ecosystem stewardship among others, the authors effectively portray hard won lessons on how human and ecological systems effectively recover from disasters. In other words, this volume is in itself a garden of hope, showing that recovery, renewal, and rehabilitation of humans and ecosystems is critically co-dependent. The editors and authors should all be commended for showing us pathways to a greener future.

Mathematics and Science Center  
Emory University  
Atlanta, GA, USA

Lance Gunderson



# Preface and Acknowledgements

At the international conference *Resilience 2008*, which gathered more than 600 leading scientists, business leaders and politicians in Stockholm, Sweden, I was struck by the *Changing Matters* art exhibit that explored resilience themes. One of the artists, Jon Brunberg, shared a piece called *19 Years*, a 1-min Flash animation that depicts the more than 91 million people around the world who took part in mass demonstrations between 1989 and 2007, crying out for change.<sup>1</sup> Locational dots appear on a screen showing a world map, gradually at first, but increasing in intensity, accompanied by the jolting sounds of fire-crackers popping, each corresponding with the appearance of a new dot, a new mass demonstration. The dots and sounds crescendo to an alarming level as time passes, communicating the urgency and power of humanity's will and alluding to their capacity to change things, to shake their realities into new ones. Experiencing this art is a sublime experience, paradoxical in its inspiring yet disturbing spectacle. One is moved, somewhat overwhelmed, alarmed and yet optimistic.

Similarly, in post-disaster and post-conflict situations, I have seen equally overwhelming, alarming, and yet optimistic human responses, demonstrating the extraordinary resilience of our species. Some of the most intriguing and inspirational responses to disaster and conflict are found in the mysterious realms of altruism. One needs only to recall the week of September 11, 2001, to conjure images of selfless heroes and an understanding of this type of response. Another form of response is somewhat more muted, but in the end, perhaps equally, or even more profound. I am referring to the response by both individual and groups of humans to return to 'nature' when calamity strikes, to actively seek intimacy with other living things, to retreat (or advance!) to life-affirming interactions in verdant, alive contexts. I am highlighting how brave people combine their own fate with that of the animal, tree, flower, forest or garden that lives or dies. This type of response, the

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<sup>1</sup> See *Changing Matters- The Resilience Art Exhibition*, 2008. <http://resilience2008.org/resilience/?page=php/art> and <http://jonbrunberg.com/19y/>

many motives and explanations for how it comes about, and the implications of its presence and efficacy, is an area of inquiry that I call 'greening in the red zone' and is the name and subject of this book.

At the time of this writing, the conclusion of the first decade of the twenty-first century, the world is still reeling from what seems to many to be increasingly frequent perturbances; recent multiple earthquakes and disasters (Japan, Haiti, Chile, China, and others) have punctuated an already chaotic 10-year period that has seen buildings felled by terrorists from New York City to Nairobi, wars in the Middle East, catastrophic flooding in New Orleans, mudslides, typhoons, and the list goes on. But as troubling as these events are, they are not in themselves particularly new phenomena. Even in my own lifetime, I have noticed the predictable likelihood that disasters will happen.

I was raised the child of a minister in the prairie country of Minnesota. We were not strangers to natural disasters; every summer communities near us, and sometimes our own community, experienced the devastating power of tornadoes. I grew up with '70's era TV images of families weeping while standing where their trailer used to be, or where their barn used to be, or even standing where they last saw members of their family. These were terrifying images, but they were also fascinating. I was at an early age captivated by the human survival instinct in the wake of calamity, and motivated to gain an experiential understanding of these human traits.

Being a minister's child, I was exposed to different cultures around the world through missionaries. In the summer of 1988, between my junior and senior year of high school, I experienced my first international disaster. I traveled to Haiti to work with Mission Aviation Fellowship (MAF), a faith-based, nonprofit organization<sup>2</sup> founded by military pilots to use aircraft to help missionaries respond to disasters. We were assisting a community near Cap-Haïtien which had experienced damage to hillside buildings, including a school, during Hurricane Emily in 1987. It was here that I began to understand the links between people, the rest of nature, and the outcomes of surprise events like natural disasters or other catastrophes.

According to Jane Deren<sup>3</sup> of Education for Justice, during the 1980s, Haiti still had 25 % of its forests, which allowed the tropical island nation to endure rain events like 1987's Category 3 Hurricane Emily, with minimal loss of life. But, she says, as of 2004, only 1.4 % of Haiti's forests remained. The effects of this slow erosion of a source of Haitian social-ecological system resilience are now being felt. Storms Jeanne and Gordon were not even officially hurricanes when they descended upon Haiti, but the almost complete lack of tree cover has been pointed to as a major contributing factor to the devastating floods that killed thousands. And, according to

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<sup>2</sup> See [www.maf.org](http://www.maf.org). MAF currently operates 136 light aircraft to support their outreach and humanitarian relief and development activities in 38 nations, providing aviation support in a variety of settings.

<sup>3</sup> See Deren, J. 2008. Hurricanes and Haiti: A Tragic History. Education for Justice. [http://www.loyola.edu/ccsj/HaitiRelief/HaitiHurricanes08\\_0.pdf](http://www.loyola.edu/ccsj/HaitiRelief/HaitiHurricanes08_0.pdf)

some, it does not even take a tropical storm to seriously disrupt the Haitian system—in May of 2004, 3 days of heavy rains from a tropical disturbance dumped more than 18 in. of rain in the mountains, triggering floods that killed over 2,600 people. Tragically, the tens of thousands of Haitians who died as a result of the 2010 earthquake are further testimony to the loss of resilience within the Haitian social-ecological system.<sup>4</sup>

My own experience in disaster relief in Haiti over 20 years ago was extraordinary in many ways, but one experience stands out in particular. There was a small school perched precariously on a slope. The school had been closed since the storm of a year earlier, as it was deemed unsafe. Portions of the exterior showed signs of slumping down the hill. Every day, women and older men were planting small trees on the uphill side of the building. I asked someone one day what they were doing, and the person replied, in a rather condescending way, that they were wasting their time trying to save the school. About a week later, I heard a man yelling and whistling shrilly. I looked in the direction of the noise and saw the tree planters scurrying away from the school. Moments later, the building totally collapsed and slid a little ways down the hill. The entire community seemed to assemble at the site within minutes, and there could be heard great cries and wailing, yet thankfully, no one was injured. After about an hour of this, the women who were planting trees, and two or three of the old men, trudged up the slope and resumed their planting. Slowly, others climbed to assist, until there were maybe 30 people on the side of the hill above the rubble. I was greatly moved.

Later, I mustered the courage to ask our host to help me pose some questions to the tree planters. I asked them why they continued to plant trees when the school was destroyed. The interpreter asked my question in Creole, and there were many answers, and much hand waving. I thought I had offended the people. Then, the interpreter turned to me with tears in his eyes. He said, ‘We didn’t plant the trees to save the school. We planted the trees to save the children in the school. We are still planting the trees because we are still worried about our children. We are planting the trees because there is nothing else we can do. See? We are not crying here, we are planting trees’.

It is my hope that this edited volume will be useful to policy makers and planners in post-conflict and post-disaster contexts, and also affirming and inspiring to community greeners everywhere. I am optimistic that humanity can remember its collective connections to the rest of the biosphere, especially in times of crisis, and it is my desire that this impressive collection of authors and chapters will be of use in some way to us all on ever-changing planet earth.

I am indebted to my family, Moira, Victoria, and Charlotte, my father Seth, and to the mistress that is my farm, for encouragement and inspiration. I am grateful to my co-editor and friend Marianne Krasny for her role as my mentor, to my other PhD committee members Mark Bain, Max Pfeffer, Richard Stedman, and Kenneth Reardon, and to Cornell University for living up to its creed of being an institution

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<sup>4</sup> For an exhaustive body of work on Haiti and forestry, see anthropologist Gerald F. Murray’s research portfolio at: <http://www.clas.ufl.edu/users/murray/Research/Haiti/Haiti.index.html>

where any person can find instruction in any study. I must acknowledge the critical importance of the Resilience Alliance and the Stockholm Resilience Center, especially Carl Folke, Lance Gunderson, Thomas Elmqvist, Henrik Ernstson, and Stephan Barthel for their encouragement and inspiration, and most importantly, for the ‘lens to see the world’ called resilience thinking. Thanks to the Cornell Aikido Club family, especially Yukiko Katagiri, Larry Bieri, and Mark Reichert, for providing a source of grounding and examples of harmony of spirit. I must also thank Carol Kramer-LeBlanc, who believed in my ideas and work while I was employed with the United States Department of Agriculture Foreign Service in the International Cooperation and Development area, Research and Scientific Exchanges Division, allowing me the opportunity to observe and experience firsthand throughout the world the phenomena that are the subject of this book. I wish to acknowledge friends and colleagues from institutions that were especially important and formative in my training: from Albion College, Jack Padgett of the Philosophy Department and Kim Tunnicliff of the Gerald R. Ford Institute for Public Service, as well as Coaches Pete Schmidt and Len Vanden Bos of the Albion Football program; from the University of Kentucky, Christopher Toumey and Monica Udvardy of the Department of Anthropology, Vince Davis of the Patterson School of Diplomacy and International Commerce, and Rhonda Strouse of the Division of Student Affairs; from The George Washington University, David Gow and Patricia Delaney of the Elliott School for International Affairs; and from the United States Army Kentucky National Guard, LTC Allen Boone.

Thanks to the librarians and staff of Mann Library for the excellent reference assistance, and to the many helpers in the editorial efforts that went into this book, especially Margaret Diegnan.

Keith G. Tidball

In the late 1980s, I joined the faculty at Cornell University in Ithaca, New York. My position was unusual—rather than teach classes I was hired to provide leadership for a statewide 4-H youth program in natural resources. At the time I applied for the job, I had no idea what 4-H was. I shortly came to understand that 4-H—which stands for head, heart, hand, and health—was a youth program associated with the Cooperative Extension system, which was established at US land-grant universities over 100 years ago to disseminate the latest developments in agriculture, nutrition, and home finance to citizens outside the university. As a 4-H faculty member, I was expected to ‘extend’ the research of Cornell University (New York State’s land-grant university) to the youth and educators across the state.

When the Cooperative Extension system was established in the late nineteenth century, most Americans lived in rural farm communities. Still in the 1980s, extension at Cornell largely reached out to the rural people in upstate New York. In my department—Natural Resources—that meant programs to get young people involved in hunting, fishing, and forestry. Seeing that the majority of New York State’s residents lived in New York City and other urban areas, I set out to build a 4-H program that served all the youth of the state, including those in our major cities.

It was 10 years later, in the late 1990s, that I found myself at the Open Road Community Garden in the Lower East Side of Manhattan, New York City. I was visiting the community garden to learn about its composting system. At the time, I was writing and conducting workshops on composting for teachers and for educators working in after-school programs, summer camps, 4-H, and similar community settings. Students from the high school bordering the Open Road Community Garden had built a greenhouse heated by compost. Using a wheelbarrow, they transported organic wastes from a nearby juice bar down the city streets to add to their compost system. A large mural dominated the concrete wall bordering the garden and the students were constructing a small pond and stream using a solar panel to power the water flow.

Bordering the opposite side of the garden from the school was a building used by New York City's Bangladeshi community as a mosque. Men from the mosque, dressed in traditional kurtas, had created a raised bed garden reminiscent of an agricultural system from Bangladesh. They were cultivating pigeon peas, which added nitrogen to the soil, and amaranth to be used as a grain or a green, along with flowering coriander to attract beneficial insects and marigold to repel nematodes. The raised bed could be described as an intercropping system—plants growing together that complement each other and reduce the need for outside inputs such as fertilizer and pesticides.

My visit to Open Road Community Garden eventually led me to create Garden Mosaics,<sup>5</sup> a program that connects youth and elders to learn about the mosaic of plants, people, and cultures in gardens. Youth in Garden Mosaics learn about science from materials we produce at Cornell, and learn about growing practices and cultures from elder community gardeners. In 2003, I hired Keith Tidball to provide leadership for Garden Mosaics. He had worked in Washington DC for several years as a foreign service officer assigned to the United States Department of Agriculture, and had recently moved to upstate New York in search of alternative approaches to agricultural development. He discovered in community gardens and Garden Mosaics a participatory approach to learning and development, as well as a source of healing for gardeners and others in urban communities, many of whom have experienced traumatic events.

My work with Keith and with my Cornell graduate students has taken me to a number of red zones. At times, I saw evidence of greening as a source of resilience. For example, Keith and I toured the Cape Flats townships in South Africa, and were struck by how grassroots efforts have created a chain of green preserves, which were playing a role not only in conserving South Africa's unique biodiversity but also in fostering reconciliation among warring ethnic groups. I also traveled to Cambodia with Seng-Ly Kong, a graduate student who stood in front of the dyke he had built while living in a child labor camp, and told me that this was his contribution to Cambodia's rural development. My work in the US similarly has provided

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<sup>5</sup> [www.gardenmosiacs.org](http://www.gardenmosiacs.org)



opportunities to meet individuals who have suffered red zone conflict and diasporas, from the refugee gardeners in New York, Toronto, Sacramento, and other North American cities, to the military communities experiencing the stress of multiple and long-term overseas deployments in Iraq and Afghanistan.

In 2005, Hurricane Katrina struck New Orleans, and Keith was part of a team of urban planners who was asked to develop a recovery plan. He returned with stories of people turning to trees as a source of strength and recovery—remembering iconic live oaks, volunteering to care for surviving trees, and planting seedlings as symbols of hope. Enriched by Keith's experiences with such moving demonstrations of resilience following a disaster, our collaborative work in community gardens expanded to encompass other locally organized efforts to restore and steward the environment and community. These 'civic ecology practices' often arise following conflict or disaster, such as the urban community reforestation efforts Keith had seen in New Orleans. I asked Keith to think about a conceptual framework that would help us to understand these greening actions in post-disaster and other communities, often undertaken by individuals as an expression of hope and resilience. It was Keith who suggested the term civic ecology to describe not only these practices, but also their broader implications for cities, for communities having experienced disaster, and even for rural settings such as those where we live in upstate New York—where people come together to restore community, the environment, and their own sense of self through engaging in environmental stewardship. Keith also brought to our work the notions of resilience from the Resilience Alliance and Stockholm Resilience Centre, which is where the idea for this book sprung.

In addition to Keith, whose creative and daring scholarship and unflagging support have been instrumental in shaping my professional directions over the past 8 years, I would like to thank the community gardeners who have welcomed me into their gardens in New York City, Sacramento, Houston, Minneapolis, and Detroit, as well as in France, Germany, Malawi, and South Africa. I would also like to thank my graduate student Alex Kudryavtsev, who has enriched our discussions of civic ecology practices, and to my former PhD student Seng-Ly Kong, who demonstrated resilience in his life travels from Cambodia's bombing fields and child labor camps to his studies at Cornell. Finally, Cornell University has provided an open and stimulating environment, where not only the students but also faculty are free to pursue their interests, and to my colleagues in the Department of Natural Resources, who are not afraid to state publicly that they are committed to helping people and enhancing our shared environment. Finally, appreciation goes to my husband, Mark Whitmore, who provided a constant source of support during my long hours and obsession with work; to my children, Aleysia, Bjorn, and Sylvan, who are all immersed in the study of world cultures; and to our children's friends and our exchange students from Kenya, Russia, the Dominican Republic, Norway, Germany, and Brazil, who have shared and enriched our family life.

Marianne E. Krasny

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# Contributors

**Stephan Barthel** Department of History, Stockholm University, Stockholm, Sweden

Stockholm Resilience Center, Stockholm University, Stockholm, Sweden

**Louiza Boukharaeva** Department of Philosophy, Kazan Technical University, Kazan, Tatarstan, Russia

**Lindsay K. Campbell** NYC Urban Field Station, USDA Forest Service, Northern Research Station, Bayside, NY, USA

**Louise Chawla** College of Architecture and Planning, University of Colorado, Boulder, CO, USA

**Sheauchi Cheng** Department of Landscape Architecture and Environmental Planning, University of California, Berkeley, CA, USA

**Johan Colding** Stockholm Resilience Center, Stockholm University, Stockholm, Sweden

Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm, Sweden

**Ian Craig** Northern Rangelands Trust, Isiolo, Kenya

**Michael Cramer** European Parliament, Greens/European Free Alliance, Brussels, Belgium

**Sandra Dark** Weatherproofing Your Landscape, A Homeowner's Guide to Protecting and Rescuing Your Plants Norman, Norman, OK, USA

**Carl Folke** Stockholm Resilience Center, Stockholm University, Stockholm, Sweden

Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences, Stockholm, Sweden

**Charles Geisler** Department of Development Sociology, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY, USA

**Anna Grichting** Department of Architecture and Urban Planning, School of Engineering, Qatar University, Doha, Qatar

**Lance Gunderson** Mathematics and Science Center, Emory University, Atlanta, GA, USA

**Kenneth Helphand** Department of Landscape Architecture, University of Oregon, Eugene, OR, USA

**Christina Holder** Durham, NC, USA

**R. Bruce Hull** Center for Leadership in Global Sustainability, Virginia Tech, College of Natural Resources and Environment, Virginia Tech, Blacksburg, VA, USA

**Micah Ingalls** Department of Natural Resources, Cornell University, Ithaca, NY, USA

**Kwi Gon Kim** Department of Environmental Planning and Landscape Architecture, Seoul National University, Gwanak-gu, Seoul, Korea

**Marianne E. Krasny** Civic Ecology Lab, Department of Natural Resources, Cornell University, Ithaca, NY, USA

**Igor Laćan** University Honors Program, Portland State University, Portland, OR, USA

**Laura J. Lawson** Department of Landscape Architecture, Rutgers University, New Brunswick, NJ, USA

**Eunju Lee** Department of Natural Resources, Cornell University, Ithaca, NY, USA

**Amy L. Lindemuth** Swift Company LLC, Seattle, WA, USA

**Joe R. McBride** Department of Landscape Architecture and Environmental Planning, and Department of Environmental Science, Policy and Management, University of California, Berkeley, CA, USA

**Mandla Mentoer** Soweto Mountain of Hope (SOMOHO), Soweto, South Africa

**Elizabeth A. Moore** Department of Forest Resources and Environmental Conservation, College of Natural Resources and Environment, Virginia Tech, Blacksburg, VA, USA

**Heather A. Okvat** Institute for Complementary and Alternative Medicine, University of Medicine and Dentistry of New Jersey, Newark, NJ, USA

**Katherine Hess Pace** ISAIAH, Minneapolis, MN, USA

**John Parker** National Center for Ecological Analysis and Synthesis, University of California at Santa Barbara, Santa Barbara, CA, USA

Barrett Honors College, Arizona State University, Tempe, AZ, USA

**Michèle Duvivier Pierre-Louis** Fondation Connaissance et Liberté-FOKAL, Port-au-Prince, Haiti

**Soul Shava** College of Education, University of South Africa, Pretoria, South Africa

**Peter D. Smallwood** Department of Biology, University of Richmond, Richmond, VA, USA

**Richard C. Stedman** Department of Natural Resources, Cornell University, Ithaca, NY, USA

**Erika S. Svendsen** NYC Urban Field Station, USDA Forest Service, Northern Research Station, Bayside, NY, USA

**Maria Tengö** Stockholm Resilience Center, Stockholm University, Stockholm, Sweden

**Suzanne Thompson** Global Partnership for Afghanistan, New York, NY, USA

**Keith G. Tidball** Civic Ecology Lab, Department of Natural Resources, Cornell University, Ithaca, NY, USA

**Marlon E. van der Waal** Wageningen University, Wageningen, The Netherlands

**Jacob von Heland** Stockholm Resilience Center, Stockholm University, Stockholm, Sweden

**Arjen E.J. Wals** Wageningen University, Wageningen, The Netherlands

**Elon D. Weinstein** International Sustainable Systems (IS2), Washington, DC, USA

**Nancy M. Wells** Department of Design and Environmental Analysis, College of Human Ecology, Cornell University, Ithaca, NY, USA

**Daniel M. Winterbottom** Department of Landscape Architecture, College of Built Environments, University of Washington, Seattle, WA, USA

**Alex J. Zautra** Department of Psychology, Arizona State University, Tempe, AZ, USA





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**Part I**  
**Foundations**

# Chapter 1

## Introduction: Greening in the Red Zone

Keith G. Tidball and Marianne E. Krasny

**Abstract** ‘Greening in the red zone’ refers to post-catastrophe, community-based stewardship of nature, and how these often spontaneous, local stewardship actions serve as a source of social-ecological resilience in the face of severe hardship. In this introductory chapter, we provide the reader with the fundamentals needed to understand our argument for why and how greening in the red zone occurs and to what end. We begin with a brief introduction to the terms ‘greening’, ‘red zone’, and ‘resilience’. We then briefly introduce the two types of evidence presented in this book. First are explanations from a large body of research on the impacts of both passive contact with, and active stewardship of, nature, and from a growing network of social and ecological resilience scholars who subscribe to the notion that change is to be expected and planned for, and that identifying sources of resilience in the face of change—including the ability to adapt and to transform—is crucial to the long-term well-being of humans, their communities, and the environment. The second source of evidence are the long and short descriptions of greening in red zones from post-disaster and post-conflict settings around the world, ranging from highly visible and symbolic initiatives like the greening of the Berlin Wall, to smaller-scale efforts such as planting a community garden in a war zone. We summarize the research-based explanations and long and short case descriptions of greening in the red zone in three tables at the end of this chapter.

**Keywords** Greening • Red zones • Social-ecological systems • Resilience • Civic ecology

*Co-editors Keith Tidball and Marianne Krasny state the thesis underlying the chapters of this book: the actions of humans to steward nature can be a source of individual,*

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K.G. Tidball (✉) • M.E. Krasny  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: kgtidball@cornell.edu; mek2@cornell.edu

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*community, and social-ecological system resilience in chaotic post-disaster or post-conflict settings. After defining 'greening', 'red zone', and 'resilience', Tidball and Krasny introduce the theoretical and case description evidence for their thesis.*

## The Argument

Rising above the seemingly endless expanse of townships surrounding Johannesburg South Africa is the Soweto Mountain of Hope. During the turbulent years at the end of the apartheid era, this hill was a symbol of the violence brought about by ethnic conflict and hatred. Residents who ventured into this unmanaged landscape were subject to muggings and even murder by thugs concealed among the shrubs. 'Necklacing', in which victims were forced into the center of a tire and then set on fire as a form of punishment or reprisal, was not uncommon.<sup>1</sup>

After the collapse of the apartheid government, the hillside took on a different meaning. When we first visited in 2006, we were told the story of community leaders working with local residents to transform the hill into a site for renewal—renewal of the residents, of the community, and of the landscape. We were told about a dead tree from which 15 old tires and items of rubbish were said to be hanging. We heard how this symbolic dead tree was called 'The Tree of Life' because residents of Soweto believed that the dead wood shows how humans have destroyed the earth and the tires and rubbish show the means by which we have done so. The 15 tires, we heard, represent the 15 men hanged from the tree when it was living. They also represent the truly awful manner of their deaths, the aforementioned necklacing. Yet, through community members memorializing with metaphors, as well as through planting vegetable plots and gardens in memory of AIDS victims, inviting the public to install art objects telling the story of their struggle, and hosting drumming circles, cooking classes, and other community events, the site was transformed physically—and symbolically. It became a Mountain of Hope in South Africa's largest township.

The story of the Soweto Mountain of Hope is retold in this book in a short chapter by Soul Shava and the community leader who spearheaded the transformation, Mandla Mentoer. This story is one of many that are emerging from communities around the world. Stories of people who turn to greening during the most difficult of times—periods of violent conflict and of collapse of the social and economic fabric of their community, and in the aftermath of earthquakes, hurricanes, and other human-natural disasters. This book has brought together these stories in a series of short examples and longer case studies. We also have sought to understand why people turn to greening in the face of conflict and disaster. What motivates them, and what are the implications for themselves, their community, and their local environment? In so

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<sup>1</sup> See 'Earth Summit: Messages from the Mountain of Hope Summit Diary', The Birmingham Post (England), September 2, 2002.

doing, we have turned to explanations from a growing body of research on the impacts of more passive contact with nature, as well as a smaller literature on the outcomes of the act or active practice of nature stewardship. We also have drawn on a growing network of ‘resilience scholars’—social and ecological scientists who subscribe to the notion that change is to be expected and planned for, and that identifying sources of resilience in the face of change—including the ability to adapt and to transform—is crucial to the long-term well-being of humans, their communities, and the local environment.

According to resilience scholars Masten and Obradovic (2008), ‘It is often argued that ‘all disasters are local’ (Ganyard 2009), at least in the short term. In the same sense, it could be said that all human resilience is local, emerging from the actions of individuals and small groups of people, in relation to each other and powered by the adaptive systems of human life and development’. Heeding these words, this book starts with phenomena that take place at local levels—the small acts of greening that emerge, often spontaneously, following disaster. However, this is not to say that the questions addressed by the authors in this volume are irrelevant for government policy makers, larger non-governmental organizations (NGOs), and researchers working in the areas of natural resources management and peacemaking. To the contrary, taken as a whole, the theoretical and practical contributions of this book make an argument for why policy makers should take into account these local acts of greening or small-scale ‘sources of resilience’—an argument that we return to in the final chapter.

How might local greening practices become a source of resilience during difficult times? Although much of our thinking about individuals who have experienced catastrophe focuses on suffering and despair, studies have shown that not only are resilient people buffered from depression by positive emotions, they actually thrive through such emotions. To quote one such research paper, ‘finding positive meaning may be the most powerful leverage point for cultivating positive emotions during times of crisis’ (Fredrickson et al. 2003).

In a foundational chapter (Tidball, Chap. 4, this volume), this book argues that we should pay attention to the use of the term ‘cultivating’ in Frederickson’s writing. It makes the connection between cultivating positive emotions and cultivating plants, and suggests that the act of greening integrates both. As stated by Tidball, a series of ‘provocative studies provide an intriguing context and ‘jumping-off’ point for investigating the role not just of viewing or being around trees and green spaces, but also of *cultivating* such spaces. By cultivating, we refer to nurturing plants and animals, people and communities’.

Thus, the evidence accumulated in this edited volume focuses on community greeners (the people) and community greening (the practice), as well as the community green spaces these people and practices create (the places). The authors answer questions about the role of ‘greening’ people, practice, and places in building and demonstrating resilience in the face of catastrophic change. They explore how the act of people coming together around the renewal and stewardship of nature might enhance individual and community resilience, and perhaps even contribute to

social-ecological system (SES) resilience,<sup>2</sup> in chaotic post-disaster and post-conflict contexts. Because of the rapid growth of cities globally and their ever looming importance as sites of conflict and disaster, many of the case studies are from urban settings (e.g., the Berlin Wall, New Orleans post-Katrina, Monrovia after the Liberian civil war), although more rural (e.g., Korean village groves, community-based wildlife and park management in Kenya and Afghanistan), and region-wide examples (e.g., Cyprus Red Line, Korean Demilitarized Zone) also are included.

*In this book, we refer to post-catastrophe, community-based stewardship of nature that serves as a source of social-ecological resilience as ‘greening in red zones’.* We turn now to a brief introduction to the terms ‘greening’, ‘red zone’, and ‘resilience’. The next chapter delves more deeply into resilience scholarship as it relates to disaster. The notions of greening and red zones are examined and illustrated in-depth throughout the remaining chapters of this book.

## Greening

While recognizing the importance of green political thought<sup>3</sup> and of a growing interest in a ‘green economy’ (Pearce et al. 1992; Milani 2000), in this volume we focus on green initiatives that emerge in a context of self-organized community development and community-based natural resources management. In fact, perhaps a significant accomplishment of such grassroots greening practices, in particular the more participatory or activist forms embodied in many community gardens in New York and other large cities (Schmelzkopf 1995; Saldivar and Krasny 2004) and in tree-planting efforts in neighborhoods of post-Katrina New Orleans (Tidball et al. 2010; see also Tidball, Chap. 20, this volume), is the steady and growing mainstream acceptance of much of what was once fringe green political thought. The philosopher Andrew Light (2003) has captured this notion in his description of how grassroots environmental stewardship efforts in cities are defining a new environmental movement; this civic environmental movement finds its inspiration in the work of urban ‘community greeners’.

For the purposes of this book, we will not be dealing in much depth or detail with political or philosophical dimensions of greening. Nor will this book delve solely or too deeply into the broad field of horticulture, which concerns itself with growing

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<sup>2</sup> Following from the work of Berkes, Colding, and Folke, social systems of primary concern for this volume include myriad property rights, governance, access and use of resources systems in post-disaster and post-conflict contexts, as well as different systems of knowledge relative to the dynamics of environment and resource use, worldviews and the ethics systems concerning human and nature relationships. Ecological systems refer to self-regulating communities of organisms interacting one with another and with their environment. Our emphasis is on the integrated concept of ‘humans-in-nature’, so we use the term social-ecological systems, and agree that social and ecological systems are inextricably entwined, making delineations between social and natural systems artificial and arbitrary. See Berkes et al. (2003) and Berkes and Folke (1998).

<sup>3</sup> For an overview of green political thought, see <http://www.greenparty.org/> and [http://www.global.greens.org.au/charter/10values\(us\).html](http://www.global.greens.org.au/charter/10values(us).html)

plants in cities for ornamentation and other purposes (Tukey 1983). Rather than focus strictly on utilization of plants, we emphasize their active *cultivation* within a social-ecological or community context. And we go beyond the ornamental uses of plants and nature to suggest that human relationships with plants, animals, and landscapes have a role to play in urban and other settings faced with disaster and conflict.

Thus, we operationalize *greening as an active and integrated approach to the appreciation, stewardship and management of living elements of social-ecological systems*. Greening takes place in cities, towns, townships and informal settlements in urban and peri-urban areas, and in the battlefields of war and disaster. Greening sites vary—from small woodlands, public and private urban parks and gardens, urban natural areas, street tree and city square plantings, botanical gardens and cemeteries, to watersheds, whole forests and national or international parks. Greening involves *active participation* with nature and in human or civil society (Tidball and Krasny 2007)—and thus can be distinguished from notions of ‘nature contact’ (Ulrich 1993) that imply spending time in or viewing nature, but not necessarily active stewardship. The writers of this book explore how greening can enable or enhance recovery from disaster or conflict in situations where community members actively participate in greening, which in turn results in measurable benefits for themselves, their community, and the environment.

Whereas greening is a foundation of this book, several authors include other examples of active engagement with nature. For example, the short chapter by Smallwood describes the beginnings of civic engagement in helping to form and maintain a national park in Afghanistan, and the chapter by Krasny and colleagues includes examples of war veterans initiating hunting and fishing programs to help their fellow soldiers heal from the scars of war. And the chapter by Geisler describes how throughout multiple periods in history, governments have used greening, in the form of granting land rights to soldiers and settlers, for purposes of colonization. What unites all the chapters is a focus on efforts that have emerged in response to conflict and disaster, and that involve greening or other engagement in nature that integrates a community or civic, or in a few cases political, purpose.

## Red Zones

The term ‘red zone’ has a history dating back to at least the first part of the twentieth century. One of its first usages was in reference to the ‘*Zone rouge*’ (French for Red Zone), the name given to 465 square miles of northeastern France that were destroyed during the First World War (Clout 1996; Smith and Hill 1920). In more recent times, the term has been used to refer to unsafe areas in Iraq after the 2003 invasion of the US and its allies, the opposite of ‘Green Zone’, a presumably more safe area in Iraq. The term was also used by journalist Steven Vincent,<sup>4</sup> as part of the title of his

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<sup>4</sup> Vincent was tragically murdered in Basra, Iraq while reporting on the increasing infiltration of the Basra police force by Islamic extremists loyal to Muqtada al Sadr. See [http://www.nytimes.com/2005/08/03/international/middleeast/03cnd-iraq.html?\\_r=1](http://www.nytimes.com/2005/08/03/international/middleeast/03cnd-iraq.html?_r=1)

book *In the Red Zone: A Journey Into the Soul of Iraq* (2004), and has been used by others to describe lawless conditions such as those of the Rwandan genocide.<sup>5</sup>

An internet search for 'red zone' illuminates how the term is currently used in film and digital entertainment media to connote a war zone, a hostile zone, a contaminated zone, or a zone characterized by increased intensity and higher stakes, such as in the combative sport American football. The term has also been used to describe the disorientation phase in a second order learning process documented and conceptualized in a learning process model among adults (Taylor 1986). For our purposes, *we use the term red zone to refer to multiple settings (spatial and temporal) that may be characterized as intense, potentially or recently hostile or dangerous, including those in post-disaster situations caused by natural disasters such as hurricanes and earthquakes, as well as those associated with terrorist attacks and war.*

Within these red zones are people for whom the red zone represents a perturbation or disruption of their individual, family, and community patterns of living. For a herder in rural Afghanistan, a soldier occupying the herder's village, or a relief worker from an NGO, red zones represent both a time period and points on a landscape where ecological and social forces are disturbed suddenly, drastically, and with little warning. These situations are referred to as Stability, Security, Transition and Reconstruction (SSTR) contexts by aid, diplomacy, and military organizations. According to the US Department of Defense (2005):

...the immediate goal [in SSTR activities] is to provide the local populace with security, restore essential services, and meet humanitarian needs. The long-term goal is to help develop indigenous capacity for securing essential services, a viable market economy, rule of law, democratic institutions, and a robust civil society. Tasks include helping rebuild indigenous institutions including various types of security forces, correctional facilities, and judicial systems necessary to secure and stabilize the environment; reviving or building the private sector, including encouraging citizen-driven, bottom-up economic activity and constructing necessary infrastructure; and developing representative governmental institutions (pp. 2–3).

The chapters in this book suggest that those involved in SSTR go beyond their usual strategies to consider the question: 'How might greening play a role alongside other interventions in transforming red zones so that they become more secure, provide essential services, and meet humanitarian needs?' The chapter by Tidball entitled 'Urgent Biophilia' even goes so far as to suggest that a connection to nature as expressed in the act of greening may be an essential human need for some disaster survivors. In an important complement to the notion of urgent biophilia, the chapter by Stedman and Ingalls on topophilia considers people's greening reaction when a place they have learned to identify with is threatened by conflict. Whereas Chap. 2 (*Resilience and Transformation in the Red Zone*) presents evidence that providing spaces for individuals and communities to engage in greening will contribute to a community's ability to adapt and transform in the face of disaster, the final chapter more directly addresses SSTR concerns in arguing that providing opportunities for expressing this need to be in, and to steward, nature may contribute to stability and order post-conflict.

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<sup>5</sup> <http://www.pbs.org/wgbh/pages/frontline/shows/ghosts/interviews/power.html>

## Resilience

The contributors to this volume use the term resilience in multiple ways. Chapter authors Wells, Chawla, Helphand, and Winterbottom are primarily concerned with human resilience, i.e., the ability of individuals to maintain a stable equilibrium or to adapt in the face of trauma, loss, or adversity (Luthar et al. 2000; Bonanno 2004). The chapter by Okvat and Zautra adds to a discussion of human resilience the notion of community resilience, which is defined as a process facilitating the capacities existing in a community to contribute positively to functioning and adaptation after a disturbance (Norris et al. 2008, 131). The chapter by Tidball about community forestry in New Orleans focuses on resilience at the level of urban neighborhood social-ecological systems; it considers the interplay between disturbance, such as that represented in red zones, and renewal or reorganization of the broader social-ecological system through trees and tree meanings. Finally, a discussion of the term resilience would be incomplete without consideration of its use as a metaphor (Pickett et al. 2004); resilience as a metaphor across multiple levels of organization helps us to imagine the capacity not only to withstand or adapt to hardship, but also the possibility to transform into something better, stronger, and more flexible. Because resilience is foundational to a discussion of greening in the red zone, we devote an entire chapter to a discussion of its implications for disaster and conflict, with a focus on social-ecological systems resilience (see Tidball and Krasny, Chap. 2, this volume).

Scholars writing about social-ecological systems (SES) resilience have identified four factors as critical to fostering resilience during periods of change and reorganization: (1) learning to live with change and uncertainty; (2) nurturing biological and cultural diversity; (3) combining different types of knowledge for learning; and (4) creating opportunity for self-organization (Folke et al. 2002). In previous work we have proposed the term ‘civic ecology’ and associated ‘civic ecology practices’ (Tidball and Krasny, 2007; Krasny and Tidball 2010; Krasny and Tidball 2012) to describe community-based greening efforts such as those portrayed in the case studies and short chapters in this volume, which address these and other factors fostering SES resilience. We define civic ecology as the study of feedbacks and other interactions among four components of a SES: (1) community-based environmental stewardship (civic ecology practice); (2) education and learning situated in these practices (civic ecology education); (3) the people and institutions involved; and (4) the ecosystem services produced by the people, their stewardship, and educational practices (Tidball and Krasny 2007, 2011). Civic ecology practices integrate local stewardship activities, such as planting community gardens or monitoring local biodiversity, with learning from multiple forms of knowledge including that of community members and scientists or other experts. Such practices often lead to civic activism such as advocating for green spaces as a means to reduce crime and violence. Within the context of resilience, the goal of the study of civic ecology is to understand how people organize, learn, and act in ways that increase their capacity to withstand, and where appropriate to grow from, change and uncertainty, through



nurturing cultural and ecological diversity, through creating opportunities for civic participation and self-organization, and through fostering learning from different types of knowledge. From the perspective of greening in the red zone, civic ecology emphasizes creating conditions whereby existing community assets can be leveraged to foster SES resilience prior to and following disaster or conflict in cities and in other SES.

The SES resilience literature seeks to understand not only the dynamics of disturbance and reorganization within any one system or scale of organization (e.g., individual, community, SES) but also feedbacks and other interactions across systems and scales (Gunderson and Holling 2002). Drawing from the authors of this book, we can imagine resilient individuals who display positive emotions by leading a community effort to plant and care for trees damaged in a hurricane. As they work together, these residents build community capacity and the trees they care for foster a more resilient local ecosystem relative to the devastated state that followed the hurricane. The trees and the planting activities create opportunities for others to experience positive emotions, which can foster another cycle of resilience. Such trees and planting activities also may become symbolic of resilience at larger scales, such as is the case with the trees that survived the atomic bombing of Hiroshima, along with the subsequent reforestation efforts described in the chapter by Chen and McBride (Chap. 18).

Returning to Masten and Obradovic's (2008) argument that human resilience to disasters emerges from the actions of local individuals and small groups of people, and to the notion that processes inherent to resilience cross scales or levels of organization, what then is the role of government, non-profit organizations, and other institutions that may have more far-reaching impacts than the local efforts described in many of the chapters in this volume? According to Masten and Obradovic (2008), 'Larger systems facilitate this resilience, but are not likely to be directly available during an unfolding disaster on the scale of a flu pandemic or unfolding natural disaster, when some key communication, transportation, manufacturing, and other systems are likely to be disrupted or destroyed (Longstaff 2005). However, macro-systems such as governments, markets, media, and religions do have a functional presence in the expectations, values, hopes, training, and knowledge that individuals and local families in communities carry with them all the time, particularly in their memories and know-how'. This is reflected in the concept of environment shaping (Weinstein and Tidball 2007; Tidball and Weinstein 2011) where it is acknowledged that two important shifts in thinking in disaster and conflict response contexts have recently occurred: that asset-based participation is required, and that we must account for (usually perception-driven) self-reinforcing growth trends, or positive feedback loops.

In describing how local and regional self-organized greening efforts can become a source of resilience in post-disaster settings, the chapters of this book provide food for thought for the defense, security, development and relief, and other policy communities. Red zones are examples of where catastrophic changes have occurred and the SES has moved or is moving into a new, less desirable state. SSTR professionals, concerned with how one returns the system to an orderly state, often impose interventions that are directed from above or from outside local communities (Weinstein and Tidball 2007).

Scholars studying resilience in SES are more apt to explore how self-organized efforts, or initiatives that emerge from local communities, aid in the process of moving beyond an orderly state to one that has a number of attributes that predict its ability to adapt and renew in the face of further change and disturbance. How to bring these two perspectives together is explored in the final chapter of this book.

## About This Book

The goal of this book is to explore how the actions of humans to steward nature become a source of individual, community, and SES resilience in chaotic post-disaster or post-conflict settings. On a more theoretical level, the chapters in this book address several gaps in the resilience literature, including the lack of studies focused on cultural systems (Wright and Masten 2005), as well as the striking absence of ‘work that embeds human development in ecosystems that include interactions among species and nonhuman systems’ and that integrates the theory and science of individual human resilience with broader ecological systems theory and research exemplified by the SES resilience scholarship (Masten and Obradovic 2008).

This book is not intended to be the answer or the proverbial silver bullet for post-conflict and post-disaster situations, nor for advocates of community greening. We don’t portend to communicate that community greening is a ‘panacea’. At the same time we want to give voice to post conflict planners in military and development assistance agencies, in urban community development contexts, and among post-disaster first responders who recognize the role that humans’ relationship with nature plays in survival situations, when the threat of loss of life, of home and hearth is real and looms large, or after disaster strikes when one is trying to put the pieces back together again. We ask the reader to imagine what would it be like if an approach existed that one could implement in post-conflict or post-disaster scenarios that simultaneously restored individual and community morale, engaged survivors in collaborative asset-based community planning and development, put people on the path to food security, provisioned ecosystem services, and restored the social-ecological balance in symbolic and real ways, all while creating positive feedback loops and virtuous cycles that trend towards desirable resilient states? Impossible one might say. Yet there are examples of community greening in red zones doing exactly this in Sarajevo and Hiroshima, in New Orleans and New York City, and in smaller communities around the globe. Examples where the power of people acting together to restore their homes and neighborhoods with something alive, something green, has had seemingly transformative effects.

The evidence for our thesis about a role for greening in fostering resilience at multiple levels in red zones comes from two sources. First, we present a series of chapters grouped together as ‘motives and explanations’, which draw largely on existing theoretical and applied work to propose conceptual arguments for greening as a disaster response. This section includes Tidball’s chapter on urgent biophilia, which argues that there may be a genetic basis for turning to green during times of

insecurity, and Stedman and Ingall's chapter proposing that a greening response can also be explained by 'topophilia', as a reaction to destruction of a landscape that individuals and communities have developed an attachment to over time. Other chapters in this section outline greening in red zones from a historical perspective, including the chapter by Geisler (Chap. 16), which takes us all the way back to the granting of land as a means of empire building during Roman times, and the contribution by Lawson (Chap. 14) who finds that national gardening efforts during wars fought by the US can be explained not just as an effort to increase food production, but also as an expression of patriotism and the need for recreation and restoration during times of stress. We outline the core arguments in each of the motivations and explanations chapters in Table 1.1.

The second type of support for greening as a response to crisis comes from the section entitled case studies, and from the 11 short chapters scattered throughout the book. These examples range from highly visible and symbolic initiatives such as the greening of the Berlin Wall (Cramer, Chap. 34) and plans for converting the Korean Demilitarized Zone into a national biodiversity reserve (Grichting and Kim, Chap. 15), to smaller-scale efforts like planting a community garden as a means of community resilience following war (Winterbottom, Chap. 30). Some examples cross scales—the dacha gardens in post-Soviet Russia were an important source of human resilience and food security, whose community resilience implications were recognized by the Russian government when it enacted a law that converted ownership of the dacha plots from the state to the gardeners (Boukharaeva, Chap. 26). Importantly, a number of the descriptive chapters explore the boundaries between greening in the red zone and related environment-based responses to conflict and disaster. For example, efforts to use management of a common wildlife resource as a means to restore peace among warring ethnic groups in Kenya (Craig, Chap. 28), agroforestry programs in Afghanistan (Thompson, Chap. 9), and the efforts to create Afghanistan's first national park (Smallwood, Chap. 21), while encompassing the community and environmental values of greening, are perhaps first and foremost focused on sustaining livelihoods or creating protected areas in a fledgling or fragile democracy. Similarly, the green recreation activities described in the chapter by Krasny et al. (Chap. 13) are originally conceived of as a means to foster reintegration of American and British veterans following the Iraq and Afghanistan wars, yet have implications for community resilience. Taken together, the case study and short descriptions represent a wealth of post-disaster and post-conflict greening activities, which allows comparisons and opportunities for reflection about the appropriateness of various practices to the range of red zone settings with which we are confronted as citizens, scholars, and policy makers.

In summarizing these case study and short descriptive chapters, we draw from Carpenter et al.'s (2001) challenge to address the questions: 'resilience of what? to what?' For example, are we concerned about the psychological resilience of a child in a war zone? The ability of the forest embedded in a larger urban SES to respond to flooding? To these questions we add, what is the greening response? Thus, Table 1.2 (case studies) and Table 1.3 (short chapters), briefly describe the context and greening response for each chapter.

**Table 1.1** Motives and explanations for greening in red zones

Chapter number, title, and author	Theory/evidence drawn on	Motive/explanation
4. Urgent Biophilia: Human-Nature Interactions in Red Zone Recovery and Resilience Keith G. Tidball	Biophilia (Wilson and Kellert) Positive emotions (Frederickson) Restorative environments and nature contact (Kaplan, Ulrich)	Humans have an innate need to affiliate with nature, as captured in E. O. Wilson's notion of biophilia. During times of stress, some humans switch from ongoing low levels of biophilia to a more urgent biophilia as a resilience strategy. Consistent with the literature on restorative environments and nature contact, the urge to green or 'cultivate' may be further explained by the role of positive emotions in recovery from stress.
5. Sowing Seeds of Resilience: Community Gardening in a Post-disaster Context Heather Okvat and Alex Zautra	Dynamic Model of Affect (Zautra 2003) Social (Kuo et al. 1998), sense of community (Schmeltzopf 1996), and empowerment (Armstrong 2000) benefits of nature	The Dynamic Model of Affect, which predicts that engaging in positive activities under stressful conditions is associated with positive emotions that alleviate distress, explains how community gardening can bolster individual resilience after a disaster. Empirical evidence from studies of social connectivity, sense of community, and empowerment help to explain the role of community gardens in fostering community resilience. Resilience at the individual level has various psycho-social, cognitive, self-esteem, emotional, and meaning making explanations.
7. The Role of Nature in Children's Resilience: Cognitive and Social Processes Nancy Wells	Childhood resilience (Luthar 2006) including protective factors and processes Nature and human well-being (Ulrich 1984; Wells and Evans 2003) Nature and social-well-being (Kuo and colleagues) Cognitive benefits of nature as explained by Attention Restoration Theory (Kaplan and Kaplan 1989; Kaplan 1995)	The role of nature in fostering resilience in children can be explained by studies demonstrating how spending time in nature fosters social connectedness and cognitive functioning. Attention Restoration Theory suggests that natural settings enhance cognitive functioning through providing opportunities for fascination, being away from the everyday norm, immersion, and compatibility with one's psychological inclinations.

(continued)

**Table 1.1** (continued)

Chapter number, title, and author	Theory/evidence drawn on	Motive/explanation
8. Children's Engagement with the Natural World as a Ground for Healing Louise Chawla	Nature and human well-being (Kuo and colleagues) Childhood resilience (Bernard 2004; Masten and colleagues)	Evidence from stories and case studies of children who have experienced poverty, war, natural disaster, and other extreme conditions in countries around the world suggests that children are drawn to nature as a means of emotional resilience and recovery. Children's activities in nature include play, ecological restoration, and caring for animals and plants.
10. Topophilia, Biophilia and Greening in the Red Zone Richard Stedman and Micah Ingalls	Topophilia (Yuan) Slow decline in post-industrial cities (Pendall 1999)	Topophilia, or love of place, is a necessary condition for a greening response in disaster contexts. In 'rust belt' or post-industrial cities characterized by slow decline of economic, social, and natural capital, topophilia may erode over time, leading to a weaker greening response relative to that in crisis situations where one's sense of place is immediately threatened by a dramatic event.
11. Urban Gardens: Pockets of Social-Ecological Memory Stephan Barthel, John Parker, Carl Folke, and Johan Colding	Social memory (Coser 1992; Gunn 1994; Olick and Robbins 1998; McIntosh et al. 2000; Folke et al. 2003) Historical and ethnographic descriptions of Swedish allotment gardens	Allotment gardens function as 'pockets' of social-ecological memory by storing the knowledge and experience required to grow food and to attract pollinators and birds. Social-ecological memories about food production, including during times of crisis such as war, are retained and transmitted through habits, traditions, informal institutions, artifacts and the physical structure of the gardens themselves, and may serve as a source of resilience during future crises.

<p>13. Nature Engagement to Foster Resilience in Military Communities  Marianne E. Krasny, Katherine Hess Pace, Keith G. Tidball, and Kenneth Helphand</p>	<p>Sense of community (Bowen et al. 2001, 2003)  Community capacity (Huebner et al. 2009)  Descriptions of multiple nature-based programs for veterans</p>	<p>Existing informal social networks, a sense of shared responsibility, and capacity for collective action foster adaptation and resilience in communities disrupted by military deployment of family members. Nature-based programs to help in the reintegration of veterans of the US Iraq and Afghanistan wars are emerging across the US and in the UK, and provide evidence for the role of greening in individual resilience, as well as embody factors shown to foster community resilience.</p>
<p>14. Garden for Victory! The American Victory Garden Campaign of World War II  Laura Lawson</p>	<p>Government reports and historical documents</p>	<p>Historical analysis reveals the rise and fall of multiple community gardening movements in the US. Government efforts to promote community gardening often are related to war-time goals including food self-sufficiency and sense of national pride.</p>
<p>16. Green Zones from Above and Below: A Retrospective and Cautionary Tale  Charles Geisler</p>	<p>Theories of social and economic organization and historical accounts</p>	<p>Granting access to land historically has been used for empire building and as a response to negative aspects of industrialization.</p>
<p>17. Reflections on Defiant Gardens: Making Gardens in Wartime  Kenneth Helphand</p>	<p>Testimony from soldiers, veterans, and war-time survivors</p>	<p>Soldiers turn to gardening as a source of individual resilience during war.</p>

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**Table 1.2** Case studies

Chapter number, title, and author	Of what? (What are the systems that were impacted and responded?)	To what? (What is causing the red zone conditions?)	With what? (What is the greening response, including feedbacks and related processes?)
18. Restoration of the Urban Forests of Tokyo and Hiroshima Following World War II Sheauchi Cheng and Joe R. McBride	The urban forest as part of the larger urban social-ecological systems of Tokyo and Hiroshima. Resilience of these cities was also symbolic of the larger resilience of Japan as a nation. Hiroshima has emerged as a leader of a world peace movement; thus in the broadest sense Hiroshima represents resilience of peoples around the world to war.	War-time bombing, including atomic bomb and firestorm	Reestablishment of urban forest through city-led tree-planting. Trees that unexpectedly survived in the blast zone in Hiroshima created a will among survivors to restore other life, leading to a positive feedback and recovery of aspects of the social-ecological system.
19. Valuing Urban Forest: Lessons to Learn from Hurricanes R. Bruce Hull	The urban forest as part of the larger social-ecological system of the city of Charleston. Live oak trees are symbolic of Charleston as a place.	Hurricane	Chapter does not directly address reestablishment of the urban forest. However, in its original publication as a 1992 journal article, this paper was important as one of the first to demonstrate the value of trees post-disaster, spurring additional research in this area.
20. Trees and Rebirth: Social-ecological Symbols and Rituals in the Resilience of Post-Katrina New Orleans Keith G. Tidball	Urban forest as part of the larger social-ecological system of New Orleans. Even more so than in Charleston (see Chap. 19), live oak trees are symbolic of the place meaning of New Orleans. Thus, resilience of the urban forest had important implications for resilience of the people and of the social and ecological systems that comprise New Orleans.	Hurricane and flooding, negligence on the part of city, state, and federal government	Community-led efforts to replant and care for damaged trees. These civic ecology efforts led to feedbacks enhancing social connectivity and ecosystem structure, thus providing ecosystem services. Note that because of the symbolic importance of trees in New Orleans, not only the tree-planting and care, but also the presence of surviving and cared for trees were important in the overall response.

<p>22. Destruction and Replanting of the Urban Forest of Sarajevo, Bosnia and Herzegovina Igor Laćan and Joe R. McBride</p>	<p>Urban forest as part of Sarajevo social-ecological system.</p>	<p>War, including shelling and harvesting of trees for fuel</p>	<p>Reestablishment of urban forest through university and city led tree-planting.</p>
<p>23. The Re-greening of the Grey: Some Practical Considerations for the Urban Forest Sandra Gray</p>	<p>Urban forests and green infrastructure in cities. Chapter addresses urban trees more generally without reference to a particular place or system.</p>	<p>Tornadoes and other violent weather events</p>	<p>Collaborative efforts to restore damaged tree canopy, involving city government, local and national non-profit organizations, and community members.</p>
<p>25. Community-Based Memorials to September 11, 2001: Environmental Stewardship as Memory Work Erika S. Svendsen and Lindsay K. Campbell</p>	<p>Individuals who lost friends and family members. Social-ecological system of Manhattan. More broadly a sense of identity as a nation and world power.</p>	<p>Terrorist attacks to sites symbolic of global economic dominance and national pride</p>	<p>Almost immediately following the 9/11 attacks, individual and collaborative efforts to convert open space to memorial gardens and tree groves honoring victims of terrorism. Cited as an alternative to more formal, slow-moving official memorialization efforts, which 10 years later are still in the process of being established.</p>
<p>27. Beyond the Bars: Landscapes for Health and Healing in Corrections Amy L. Lindemuth</p>	<p>Prison population and prison guards' emotional well-being and connectedness to family and community. Rather than describing a particular place, this chapter addresses social issues related to prison populations in the US.</p>	<p>Negative psychological and societal effects of prison environments</p>	<p>Prisoners engage in gardening, which leads to positive feedbacks related to the value of green spaces in emotional well-being and healing.</p>
<p>29. Sustainability-Oriented Social Learning in Multi-Cultural Urban Areas: The Case of the Rotterdam Environmental Centre Arjen E.J. Wals and Marlon E. van der Waal</p>	<p>Immigrants and immigrant communities in city of Rotterdam seeking acceptance, emotional well-being, and sense of community.</p>	<p>Discrimination and psychological and social impacts of displacement, including potential for ethnic discrimination and violence</p>	<p>Immigrants engaged in greening of open space.</p>

(continued)



**Table 1.2** (continued)

Chapter number, title, and author	Of what? (What are the systems that were impacted and responded?)	To what? (What is causing the red zone conditions?)	With what? (What is the greening response, including feedbacks and related processes?)
30. Developing a Safe, Nurturing and Therapeutic Environment for the Families of the Garbage Pickers in Guatemala and for Disabled Children in Bosnia and Herzegovina Daniel Winterbottom	Children and adults in post-war conditions of extreme poverty and disruption seeking emotional and physical well-being.	Displacement, poverty, crime, war	Therapeutic and community gardening.
32. Growing Hope: How Urban Gardens are Empowering War-Affected Liberians and Harvesting a New Generation of City Farmers Christina Holder	Women, their families and communities seeking empowerment and food security. Urban social-ecological system of Monrovia. As a result of the inspirational practices of women who survived the violence of war, and of the importance of Monrovia as Liberia's major city, this case also addresses Liberia as a nation-state.	War	Urban gardening and small-scale agriculture. The stories of women engaged in providing for their families under extreme psychological, economic, and physical (soil) conditions, may feedback to inspire others and thus play a role in breaking the cycle of violence.
33. Cyprus: Greening in the Dead Zone Anna Grichting	Unique ecosystem, cultural sites, and symbolic landscape separating the island of Cyprus into two states.	War, ongoing conflict, division of country into two states	Planning for reestablishment of biodiversity and cultural sites in the 'dead zone' dividing the island of Cyprus.

**Table 1.3** Vignettes (short case study chapters)

Chapter number, title, and author	Resilience of what?	Resilience to what? (Red zone)	Greening response
3. A Daunting Challenge: Creating an Urban Park in an Impoverished Neighborhood of Port-au-Prince, Haiti Michèle Pierre-Louis	Poor neighborhood in Port-au-Prince.	Ongoing violence, exacerbated by chaos following earthquake.	Continued efforts to steward and convert urban green space to city park.
6. Turning Degraded Open Space into a Community Asset – The Soweto Mountain of Hope Greening Case Soul Shava and Mandla Mentoor	Large and prominent open space in Soweto township. More broadly a space symbolic of violence and hope for local township, nation of South Africa, and globally. Because this space is a large hill rising above a vast flat expanse of township housing, it stands out physically and visually, enhancing its symbolic value.	Violence during apartheid South Africa, and more recently devastation due to AIDS epidemic.	Conversion of open space to community garden, community and cultural center, and small tourist hostels, leading to opportunities for remembrance, sustaining rural food traditions, social connectivity, and livelihood enhancement.
9. 8,000 Trees: A Refuge from Ruins Suzanne Thompson	Livelihoods and self-reliance/self-esteem of women and their families.	War, poverty, oppression of women, and ongoing violence.	NGO-led tree-planting/agro-forestry effort.
12. Reconstructing Village Groves After a Typhoon in Korea Eunju Lee	Small groves of trees that provide important ecosystem services. More broadly, a rural life style encompassing sense of community and cultural traditions.	Disruption of rural life by industrialization, followed by typhoon.	Reestablishment and stewardship of village groves, leading to opportunities for participation in civil society alongside NGOs, and for cultural activities.

(continued)

Table 1.3 (continued)

Chapter number, title, and author	Resilience of what?	Resilience to what? (Red zone)	Greening response
15. The Korea DMZ: From a Red Zone to a Deeper Shade of Green Anna Grichting and Kwi Gon Kim	Demilitarized zone separating Korean Peninsula. More broadly, a landscape nationally and globally symbolic of Cold War divisions and ongoing conflict, and of hope for reunification and conservation of unique biodiversity.	Ongoing conflict on the Korean Peninsula. In terms of the ecosystem, the DMZ harbors a unique biodiversity and thus is more 'healthy' than surrounding areas on the Korean Peninsula.	Planning for post-reunification green zone harboring unique biodiversity and potential for eco-tourism based livelihoods.
21. The Risks of Greening in the Red Zone: Creating Afghanistan's First National Park in the Midst of Conflict Peter Smallwood	Large natural area. In broader sense, because of the commitment of Afghanistan's new government and the engagement of local people in advocating for the park, natural area has implications for broader nation-state.	War, poverty, and exploitation of wildlife, including rare species of cats.	Formation of national park. Park formation is looked to as opportunity for preserving wildlife species and their cultural values, and as future opportunity for economic development based on eco-tourism.
24. Trees and Tree-Planting in Southern Madagascar: Sacredness and Remembrance Maria Tengó and Jacob von Heland	Trees of symbolic and cultural importance.	Environmental degradation associated with war and changing demographics and values.	Tree-planting and care, creating opportunities for cultural expression and conservation of biological diversity.
26. Six Acres of Land: Resilience of City Dwellers in Russia Louiza Boukharava	Small open areas in cities and peri-urban areas, food security, and sense of national pride and citizenship. In a broader sense, post-Soviet cities as social-ecological systems.	Breakdown of Soviet communist economy and social myths.	Widespread planting of gardens, leading to increased food security and laws recognizing private property in post-Soviet Russia.

28. Conservation The Catalyst for Peace in Northern Kenya Ian Craig	Traditional social-ecological system of grazing and wildlife management, on which local livelihood was dependent	Drought and ethnic conflict and violence.	Establishment of cooperative, inter-ethnic grazing and wildlife management agreements, leading to reduction in violence and opportunities for enhanced livelihoods based on eco-tourism.
31. Refugee Camp Reforestation and Reconciliation Elizabeth A. Moore	Trees and broader refugee camp as social-ecological system. Additionally, local area and people surrounding refugee camp	Displacement due to war, conflict between refugees and local population, degradation of forest resource.	Tree-planting in refugee camp and surrounding area, creating opportunities for positive interactions among refugees and local population and for food security.
34. The Berlin Wall Trail – A Cycling and Hiking Route on the Traces of Berlin’s East–West Division During the Cold War Michael Cramer	Strip of land previously occupied by Berlin Wall and associated towers and other security installations. More broadly, site of national and global importance as symbolic of the Cold War conflict	In the immediate sense, tearing down of the Berlin Wall. More long-term, erosion of social, economic, individual, and natural capital as a result of communism and the division of East and West Germany.	Creation of bike trail and associated recreational opportunities, green spaces, and sites for cultural remembrance along the Berlin Wall corridor. Due to the symbolic importance of the Berlin Wall, and to involvement of community members and member of Parliament, greening actions contributed to broader-scale cultural resilience of Germany as nation-state.

We invite the reader to not only join in a consideration of the material shared by the contributors to this volume, but also to reflect on his or her own experiences with greening in the red zone. As authors and editors immersed in the discussion, we are constantly reminded of the role of greening in our own resilience and that of other human, social, and ecological systems. As individuals, we derive strength from gardening or tree-planting and from our work with neighbors and students to steward green spaces. As we travel, we are constantly reminded of greening in red zones—whether it be Keith’s recent trip to view the memorial to trees that survived the atomic bombing of Hiroshima, or Marianne’s visit to Anzac Cove in Turkey, where trees were recently planted next to stones memorializing the soldiers who lost their lives during the allied invasion at Gallipoli. As we all are faced with both small and larger red zones, we invite you to join in greening as a response.

## References

- Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health and Place*, 6(4), 319–327.
- Berkes, F., & Folke, C. (Eds.). (1998). *Linking social and ecological systems*. Cambridge: Cambridge University Press.
- Berkes, F., Colding, J., et al. (2003). *Navigating social-ecological systems*. Cambridge: Cambridge University Press.
- Bernard, B. (2004). *Resiliency: What have we learned?* San Francisco: WestEd Publishers.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: How we have underestimated the human capacity to thrive after extremely aversive events. *The American Psychologist*, 59(1), 20–28.
- Bowen, G. L., Martin, J. A., Mancini, J. A., & Nelson, J. P. (2001). Civic engagement and sense of community in the military. *Journal of Community Practice*, 2001(2), 71–93.
- Bowen, G. L., Mancini, J. A., Martin, J. A., Ware, W. B., & Nelson, J. P. (2003). Promoting adaptation of military families: an empirical test of a community practice model. *Family Relations*, 52(1), 33–44.
- Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, 4, 765–781.
- Clout, H. (1996). *After the ruins: Restoring the countryside of northern France after the Great War*. Exeter: Short Run Press.
- Coser, L. (1992). *Introduction on collective memory* (pp. 1–34). Chicago: University of Chicago Press.
- Department of Defense. (2005). Military support for stability, security, transition, and reconstruction (SSTR) operations 3000.05. D. o. Defense.
- Folke, C., Carpenter, S., et al. (2002). *Resilience and sustainable development: Building adaptive capacity in a world of transformations* (p. 34) The Environmental Advisory Council to the Swedish Government. Johannesburg, South Africa.
- Folke, C., Colding, J., & Berkes, F. (2003). Synthesis: Building resilience and adaptive capacity in social-ecological systems. In F. Berkes, J. Colding, & C. Folke (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge, UK: Cambridge University Press.
- Fredrickson, B., Tugade, M., et al. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84(2), 365–376.

- Ganyard, S. T. (2009, May 18). All disasters are local. *The New York Times*.
- Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Gunn, C. A. (1994). *Tourism planning: Basics, concepts, cases* (3rd ed.). Washington, D.C: Taylor & Francis.
- Huebner, A. J., Mancini, J. A., Bowen, G. L., & Orthner, D. K. (2009). Shadowed by war: Building community capacity to support military families. *Family Relations*, 58, 216–228.
- Kaplan, S. (1995). The restorative benefits of nature: Towards an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
- Krasny, M. E., & Tidball, K. G. (2010). Civic ecology: Linking social and ecological approaches in extension. *Journal of Extension*, 48(1).
- Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: A pathway for Earth Stewardship in cities. *Frontiers in Ecology and the Environment*, 10(5), 267–273.
- Kuo, F. E., Sullivan, W. C., Coley, R. L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823–851.
- Light, A. (2003). Urban ecological citizenship. *Journal of Social Philosophy*, 34(1), 44–63.
- Longstaff, P. H. (2005). *Security, resilience, and communication in unpredictable environments such as terrorism, natural disaster, and complex technology*. Cambridge, MA: Harvard University Program on Information Resources Policy.
- Luthar, S. S. (2006). Resilience in development: A synthesis of research across five decades. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (2nd ed., Vol. 3). New York: Wiley.
- Luthar, S. S., Cicchetti, D., et al. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society*, 13(1), 9.
- McIntosh, R. J., Tainter, J. A., & McIntosh, S. K. (Eds.). (2000). *The way the wind blows: Climate, history, and human action*. New York: Columbia University Press.
- Milani, B. (2000). *Designing the green economy: The post-industrial alternative to corporate globalization*. Lanham: Rowman & Littlefield Publishers, Inc.
- Norris, F. H., Stevens, S. P., et al. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150.
- Olick, K. J., & Robbins, J. (1998). Social memory studies: From collective memory to the historical sociology of mnemonic practices. *Annual Review of Sociology*, 24, 105–140.
- Pearce, D. W., Markandya, A., et al. (1992). *Blueprint for a green economy*. London: Earthscan.
- Pendall, R. (1999). Do land-use controls cause sprawl? *Environment and Planning B: Planning and Design*, 26(4), 555–571.
- Pickett, S. T. A., Cadenasso, M. L., et al. (2004). Resilient cities: Meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms. *Landscape and Urban Planning*, 69, 369–384.
- Saldívar, L., & Krasny, M. E. (2004). The role of NYC Latino community gardens in community development, open space, and civic agriculture. *Agriculture and Human Values*, 21, 399–412.
- Schmelzkopf, K. (1995). Urban community gardens as contested spaces. *Geographical Review*, 85(3), 364–381.
- Schmelzkopf, K. (1996). Urban community gardens as contested space. *The Geographical Review*, 85, 364–380.
- Smith, C. H., & Hill, C. R. (1920). *Rising above the ruins in France: An account of the progress made since the armistice in the devastated regions in re-establishing industrial activities and the normal life of the people*. New York: GP Putnam's Sons.

- Taylor, M. (1986). Learning for self-direction in the classroom: The pattern of a transition process. *Studies in Higher Education, 11*(1), 55–72.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. E. J. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere 2*:art21. <http://dx.doi.org/10.1890/ES10-00153.1>.
- Tidball, K. G., Krasny, M., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research, 16*, 591–609.
- Tidball, K. G., & Weinstein, E. D. (2011). Applying the environment shaping methodology: Conceptual and practical challenges. *Journal of Intervention and Statebuilding, 5*(4), 369–394.
- Tukey, H. B., Jr. (1983). Urban horticulture: Horticulture for populated areas. *Horticultural Science, 18*(1), 11–13.
- Ulrich, R. (1993). Effects of exposure to nature and abstract pictures on patients recovering from open heart surgery. *Journal of the Society for Psychophysiological Research, 30*, 204–221.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*, 420–421.
- Vincent, S. (2004). *In the red zone: A journey into the soul of Iraq*. Dalls: Spence Publishing Company.
- Weinstein, E., & Tidball, K. G. (2007). Environment-shaping: An alternative approach to applying foreign development assistance. *Journal of Intervention and Statebuilding, 1*(1), 67–85. doi:10.1080/17502970601075923.
- Wells, N., & Evans, G. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior, 35*(3), 311–330.
- Wright, M. O., & Masten, A. S. (2005). Resilience processes in development: Fostering positive adaptation in the context of adversity. In S. Goldstein & R. Brooks (Eds.), *Handbook of resilience in children* (pp. 17–37). New York: Kluwer Academic/Plenum.
- Zautra, A. J. (2003). *Emotions, stress, and health*. New York: Oxford University Press.

## Chapter 2

# Resilience and Transformation in the Red Zone

Keith G. Tidball and Marianne E. Krasny

**Abstract** Although not generally recognized in policy and research agendas, cases where humans who face disaster, conflict, or stress turn to greening as a source of resilience abound. Such examples cut across organizational scales, as demonstrated by the greening efforts of individuals and of groups of youth and adults who plant gardens and trees under the harshest of conditions, including during war, in communities approaching a threshold and at risk of becoming what Norton has referred to as ‘feral cities’, in refugee camps, in small villages, and in major cities. In some instances greening may have symbolic meaning and broad implications for the resilience of entire nation-states. We provide a brief overview of the term resilience as it has been used at the individual level and then go into more depth regarding its use at the scale of social-ecological systems, with particular reference to crisis settings that open up possibilities for transformation to more desirable states. Whereas we recognize the well-documented role of greening in adaptation to ongoing, relatively small changes at the individual level, we focus on how greening comes to the fore when social-ecological systems – a village, a city, a region dependent on a particular natural resource, or even a whole nation-state – undergo transformations following a major perturbation.

**Keywords** Resilience • Transformation • Greening in the red zone • Disaster • Conflict

*After stating that greening represents a critical source of resilience at multiple levels, co-authors Keith Tidball and Marianne Krasny present an overview of multiple constructs that help us understand individual and social-ecological systems resilience. They focus on resilience as both adaptation and transformation, and on the interactions of these and related processes across scales.*

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K.G. Tidball (✉) • M.E. Krasny  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: kgtidball@cornell.edu; mek2@cornell.edu



## Introduction

To understand the broader implications of humans turning to nature in times of disaster or crisis, we need working definitions of greening and red zones, as well as a conceptual or explanatory framework. Such a framework should describe the relationships between the act of greening and other components of the social-ecological system in which these actions are nested. We have chosen the notion of *resilience*, which we feel offers a strong foundation for understanding the role of greening following disaster and conflict at multiple, interrelated levels – individual, social, and ecosystem.

As used in this book, greening refers to the activities of humans, working alone or more commonly with others in their community, to restore local social-ecological systems<sup>1</sup> through such activities as community gardening, community forestry, and improving habitat for wildlife and aquatic biodiversity (Chap. 1, this volume; Tidball and Krasny 2007). We use the term red zone to refer to multiple settings (spatial and temporal) that may be characterized as intense, potentially or recently hostile or dangerous areas or times, including those in post-disaster situations caused by natural disasters such as hurricanes and earthquakes, as well as those associated with terrorist attacks and war (Chap. 1, this volume). *Resilience, in broad terms, refers to the ability of humans, communities and larger social-ecological systems to rebound and to reorganize in the face of outside stressors, including death of loved ones and full-blown war and conflict or disasters.* During such times of crisis, breakdown, and reorganization, existing and potential sources of resilience come to the fore; for this reason, discovering, building, and safeguarding those sources of resilience is critical to recovery from crisis (Walker et al. 2002). *We contend that greening, as a form of human agency and collective action applied to environmental stewardship, represents a critical source of resilience at multiple levels.*

Although not generally recognized in policy and research agendas, cases where humans who face disaster, conflict, or stress turn to greening as a source of resilience abound as evidenced by the chapters in this book. Such examples cut across organizational scales, as demonstrated by the greening efforts of individuals and of groups of youth and adults who plant gardens and trees under the harshest of conditions, including during war (Helphand<sup>2</sup>, Chap. 17), in communities approaching a threshold and at risk of becoming what Norton has referred to as ‘feral cities’ (see Norton 2003; see also Chap. 8 by Chawla), in refugee camps (Moore, Chap. 31), in small villages (Lee, Chap. 12), and in major cities (Cheng and McBride, Chap. 18; Tidball, Chap. 20; Laćan and McBride, Chap. 22; Cramer, Chap. 34). In some instances greening may have symbolic meaning and broad implications for the resilience of entire nation-states – witness the novel initiatives in Cyprus, Korea, and

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<sup>1</sup> We use the term ‘social-ecological systems’ to refer to ecosystems and the social systems nested therein. This is the terminology used by the Resilience Alliance network, and can be seen as a step toward envisioning humans as part of ecological systems, rather than as apart or separate from broader ecosystem processes.

<sup>2</sup> Where no date given, citations refer to chapters in this volume.

Germany to convert lines demarcating contested political boundaries into sites for biodiversity and outdoor recreation (Grichting, Chap. 33; Grichting and Lee, Chap. 15; Cramer, Chap. 34).

The fact that examples of greening as both a source and demonstration of resilience also cut across cultural, class, and national boundaries has important implications for post-conflict and post-disaster policy. Survivors of intense racial and political conflict turn to community gardening in Liberia (Holder, Chap. 32), South Africa (Shava and Mentoor, Chap. 6), and Serbia and Guatemala (Winterbottom, 30). Natural disasters, which have been referred to as ‘shorthand for a humanitarian disaster associated with a natural hazard event’ (Pelling and Dill 2009, p. 22), elicit a variety of greening responses, ranging from creating an urban park in Haiti (Pierre-Louis, Chap. 3) to planting trees in New Orleans (Tidball, Chap. 20) and Korean villages (Lee, Chap. 12). Given how greening responses often emerge spontaneously in conflict and disaster settings across multiple continents and cultures, the question arises of how such efforts could be leveraged by international rebuilding and development efforts sponsored by the UN, donor nations, and NGOs. We revisit this question in the concluding chapter of this volume.

Foundational to understanding the array of case examples in this book is a grounding in the human and social-ecological systems resilience literatures. Whereas we recognize the well-documented role of greening in adaptation to ongoing, relatively small changes at the individual level, we are particularly interested in how greening comes to the fore when social-ecological systems – a village, a city, a region dependent on a particular natural resource, or even a whole nation-state – undergo transformations following a major perturbation. Thus in this chapter, we provide a brief overview of the term resilience as it has been used at the individual level and then go into more depth regarding its use at the scale of social-ecological systems, with particular reference to crisis settings that open up possibilities for transformation to more desirable states. A review of the greening literature and how greening relates to human resilience can be found in the chapters by Tidball (Chap. 4), Okvat and Zautra (Chap. 5), and Wells (Chap. 7).

## Resilience

The notion of individual or human resilience helps us to understand how people who face overwhelming adversity sometimes exhibit not only the capacity to maintain stability, but also the potential for growth experiences, or positive adaptation to the challenges they face (Bonanno 2004; Luthar et al. 2000, see also Chap. 5 by Okvat and Zautra, this volume). Whereas scant attention is paid to the role of nature in the individual or human resilience literature, in talking to red zone survivors, whether they be war refugees taking up a new life in Toronto or residents of New Orleans’ 9th Ward after Hurricane Katrina, we often hear stories about how the act of planting – be it trees, vegetables, or flowers – has been critical to emotional survival and to engendering hope for the future. The recent emergence of multiple and

varied nature-based programs to help US and British soldiers and their families deal with the stress of overseas deployment (see Krasny et al. Chap. 13) provides another source of evidence for how people turn to nature as a resilience strategy in times of stress, a phenomenon Tidball (Chap. 4) has referred to as urgent biophilia. Empirical research reviewed in the chapters in this volume suggests cognitive (Wells, Chap. 7) and psychological (Okvat and Zautra, Chap. 5) mechanisms for how such expressions of urgent biophilia might aid in recovery of individuals facing disaster and other stressful situations. That connecting with nature plays a role in human resilience not only in red zone situations, but also for people encountering less profound challenges as they go about their daily lives, has been demonstrated by an impressive body of research on the role of nature in helping individuals cope with stresses ranging from attention hyperactive deficit disorder to recovering from surgery (Faber et al. 1998, 2001; Ulrich 1983, 1984) as well as in their daily work lives (Kahn et al. 2008). In short, interactions with nature play a role in maintaining well-being and in recovery among individuals facing a range of adversities.

Masten and Obradovic (2008) have called for an exploration of the intersection between resilience at the individual and social-ecological system levels. Similar to descriptions of resilience at the individual level, definitions of social-ecological systems resilience capture notions of recovery and reorganization following crisis. Social-ecological systems resilience has its roots in discussion among scholars about the distinctions between *engineering resilience*, emphasizing dynamics close to equilibrium and defined as the time required for a system to return to an equilibrium point following a disturbance event (Holling 1996), and *ecosystem resilience* (Gunderson and Holling 2002) or *ecological resilience* (Anderies et al. 2006; Gunderson 2000; Gunderson and Pritchard 2002; Holling 1996), which refers to dynamics *far* from any equilibrium steady state and is defined as the amount of disturbance that a system can absorb before changing to another stable state reflecting different variables and structure. In this chapter, we focus on *social-ecological systems resilience*, a hybrid concept from the social and ecological sciences (Brand and Jax 2007), which refers to the capacity of a social-ecological system to buffer perturbances and to renew and reorganize in response to change (Adger et al. 2005; Anderies et al. 2006; Folke 2006; Folke et al. 2002a; Gunderson and Holling 2002; Walker et al. 2006). The capacity of a system to adapt or to reorganize and renew in response to disturbance depends in part on the degree to which it is capable of self-organization (Levin 2005; Olsson et al. 2004), of learning through experience and through incorporating diverse forms of knowledge, and of adapting in the face of new information (Berkes 2004; Carpenter et al. 2001; Folke et al. 2002a). Self-organization refers to the emergence of larger-scale biological and social processes from smaller-scale phenomena or practices, for example, multiple gardening and tree-planting activities that spring up after disaster and that together form a city-wide urban community reforestation or greening program. Other attributes of resilient social-ecological systems include ecological variability, social capital, innovation, overlap in governance, and ecosystem services (Walker and Salt 2006).

Notably, resilience, as a buffering force, can be positive in cases where the social-ecological system is in a desirable state that a community would like to maintain

(e.g., the presence of green space can help buffer a livable neighborhood from social stresses). Resilience also can be thought of as a positive force in a system that is collapsing into an undesirable state (e.g., chaos following war) and is rebuilding back to a more positive state (e.g., peace and order). In contrast, resilience can be negative in the sense of an undesirable state that does not lend itself to change (e.g., a community that is in a vicious cycle of poverty, crime, and vandalized public spaces). While recognizing the multiple implications of the notion of resilience, in this and other chapters we focus largely on resilience as a positive force following a system's collapse, as implied by the notion of red zones.

Several factors can lead to loss of resilience and thus contribute to a system's collapse. One contributing factor is managing for maximum yield of a single resource, such as one tree or crop species, while ignoring the consequent slow erosion of other ecological, social, and cultural components of the system that confer resilience, such as biodiversity, landscape variability, social connectivity, and social memory (Davidson-Hunt and Berkes 2003; Holling et al. 2002a; McIntosh et al. 2000; Walker and Salt 2006). Once sources of resilience decline, a disturbance that may go relatively unnoticed in systems with high resilience can cause major impacts (Holling and Gunderson 2002; Yorque et al. 2002). Interestingly, even systems such as the rust belt cities of the northern US where change occurs more gradually (Stedman and Ingalls, Chap. 10, this volume), are often described in terms reminiscent of red zones. For example, Detroit is painted as a war zone,<sup>3</sup> or compared to the Ukrainian city that was evacuated following the nuclear disaster at Chernobyl: 'Unfortunately, the city of Detroit is starting to show similarities to this Ukrainian ghost town, as vacancies are on the rise and wildlife has overtaken some of the neighborhoods.... The desertion of Pripjat carries a certain, albeit radioactive, connection to the desertion of Detroit, and it will not be long until Detroit marks a stark resemblance to this lifeless city'.<sup>4</sup> Similarly, Wallace and Wallace (2008) refer to building-fire and building-abandonment 'epidemics' attributable to widespread dislocation and destruction of social capital in northeastern US cities as a result of urban 'renewal' policies in the 1970s. Stedman and Ingalls (Chap. 10, this volume) review literature depicting how the erosion of community capacity in rust belt cities leads to an inability to respond to sudden catastrophe.

### *Adaptive Cycle*

Fundamental to an understanding of social-ecological systems resilience, and of how social-ecological systems move from a maintenance to a rebuilding stage after disaster, is the notion of the adaptive cycle. First proposed by Holling (1973, 1986) to describe recovery of a forested system ravaged by insects, the notion of the adaptive

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<sup>3</sup>Genzlinger, Neil. Detroit Seeks Exit from Doom Highway. 4/16/10 <http://www.nytimes.com/2010/04/17/arts/television/17dateline.html>

<sup>4</sup><http://www.hnn.us/articles/124582.html>

cycle was later expanded by Gunderson and Holling (2002) to incorporate humans or social systems. A double (infinity) loop is used to depict this cycle, with phases of growth and stability followed by collapse, leading to reorganization and regrowth. According to the resilience scholars, 'Generally, the pattern of change is a sequence from a rapid growth phase through to a conservation phase in which resources are increasingly unavailable, locked up in existing structures that have little flexibility, followed by a release phase that quickly moves into a phase of reorganization, and thence into another growth phase.... The growth and conservation phases together constitute a relatively long developmental period with fairly predictable, constrained dynamics; the release and reorganization phases constitute a rapid, chaotic period during which capitals (natural, human, social, built and financial) tend to be lost and novelty can succeed'.<sup>5</sup> The conservation phase is further characterized by a brittleness in the face of disturbance (Berkes and Folke 2002), loss in problem-solving ability as institutions become increasingly more complex (Tainter 2000), and more broadly a loss in adaptive capacity; thus the conservation phase is particularly vulnerable to disturbances that may flip the system into a state of collapse or chaotic release in which ongoing processes are no longer recognizable (Folke et al. 2002b). Although in contrast to the conservation phase, the renewal phase is a period ripe for experimentation and novelty, it is also vulnerable to disturbance and disaster (Gunderson and Holling 2002; Holling et al. 2002b). According to Carpenter et al. (2002) and Gunderson and Holling (2002), the overwhelming majority of research has been conducted on the growth or exploitation (r) phase and how it leads to a conservative (K) period of increasingly inflexible systems followed by a system's collapse. This leaves us with relatively little understanding of the reorganization (omega) and regrowth (alpha) phases, in spite of widespread recognition of the prevalence of perturbances that have the potential to flip systems into less desirable states. For this reason, and because decisions made in the collapse phase of the adaptive cycle critically impact the future of the system, and may even set the stage for a future collapse (Carpenter et al. 2002), examining the dynamics of the omega and alpha phases is critical. Hence the importance of the chapters in this book – inherent to a discussion of red zone systems is a focus on collapse, whereas greening plays a role in the reorganization and regrowth of disturbed social-ecological systems.

The notion of the adaptive cycle allows us to re-envision hierarchies of social and ecological systems 'from fixed static structures to dynamic adaptive entities whose levels are sensitive to small disturbances at the transition from growth to collapse (omega phase) and from reorganization to rapid growth (alpha phase)' (Holling et al. 2002b). Of relevance to red zones, some disasters might be predictable because they occur after an extended phase of growth and conservation leading to loss of adaptive capacity (e.g., the collapse of the former Yugoslavia after a long period of stability and perhaps loss of flexibility under Tito). Other disasters occur during the vulnerable reorganization phase shortly after a previous collapse, and thus disrupt the hypothesized progression from reorganization to renewal. For example, recent turmoil

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<sup>5</sup> <http://www.resalliance.org/564.php> (accessed 23 November 23, 2010).

as a result of disputed elections in the Ivory Coast occurred after a period of conflict followed by only a short reorganization phase, and may have once again tipped the system into red zone conditions. Thus, whereas the adaptive cycle is useful in explaining a generalized pattern of change in social-ecological systems, in reality systems are often complex and do not always cycle through the four stages sequentially. Rather systems may skip or jump back and forth between different phases. Further, systems may experience different processes at various scales and in systems nested within one another (Walker et al. 2004), and disaster may strike during periods when the social and ecological systems are at different phases of the adaptive cycle. For example, the 2010 Gulf Coast oil spill in the southern US hit at a time when parts of New Orleans were showing significant signs of social and ecological reorganization following the 2005 hurricanes. However, efforts after the hurricane did not lead to successful or complete restoration of the nearby coastal social-ecological system, and the Gulf Coast continues to experience decline of protective wetlands (Carbonell and Meffert 2009; Ernstson et al. 2010b; Kida 2009).

### *Feedback Cycles*

Within an adaptive cycle, one may find multiple processes that operate at shorter time scales. One such process can be described as virtuous and vicious cycles or feedback (Matthews and Selman 2006; Powell et al. 2002; Selman and Knight 2006). Such cycles represent interactions that are typically self-sustaining in that they ‘feed’ themselves and constantly reinforce one another (Varis 1999). If their direction of influence is negative, they are considered vicious cycles, and if their direction is positive, they are known as virtuous cycles (ibid).

Virtuous and vicious cycles provide a means to visualize how greening might interact with other processes to help transform a social-ecological system. For example, in the short chapter describing wildlife management as a kind of greening in a red zone time period in northern Kenya (Craig, Chap. 28), drought and overgrazing led to a collapse of traditional sources of livelihood, which in turn led to conflict, further cutting off access to traditional tourism and grazing revenue. One can envision a further downward spiral leading to larger conflict and food shortage, in short a vicious cycle. In this case, however, the Northern Rangelands Trust was able to interrupt this vicious cycle through an intervention centered around management of shared resources, which led to a period of regrowth and access to traditional livelihoods. In contrast, a small greening intervention such as that described in the chapter on Port Au Prince, Haiti (Chap. 3), while important in terms of providing an outlet for biophilia (see Tidball, Chap. 4) and perhaps generating feelings of empowerment (see Westphal 2003), may be too little too late to break the vicious cycle of poverty, natural disturbance, disease, and localized violence. Vicious cycles, such as poverty traps (also referred to as ‘lock-in’ traps, see Allison and Hobbs 2004), have themselves been described as resilient in an undesirable sense of the term. One challenge the authors in this book face is how greening can play a role in transforming

such vicious cycle systems, enabling them to enter an alternate cycle leading to reorganization and regrowth (Tidball and Krasny 2008, 2010, 2011).

In addition to vicious feedback cycles in which negative conditions feed into an ever more negative state, we can recognize a virtuous cycle when, for example, social capital and economic entrepreneurship contribute to favorable social-ecological system characteristics, which leads to a situation of mutual reinforcement between human activity and environmental capital (Selman and Knight 2006). Tidball and colleagues (Tidball and Krasny 2008, 2010; Tidball et al. 2010) describe how feedbacks between individuals engaged in civic ecology practices – i.e., community gardening, watershed restoration, and other small-scale community-initiated greening efforts – can result in ecosystems that provide greater ecosystem services, creating the foundation for societal and individual well-being, which in turn provides opportunities for greater engagement in greening. Importantly, this feeding back between the biophysical and social systems may also cross levels of organization. For example, changes brought about by a tree-planting effort could initially be important at the scale of the local community or neighborhood, but eventually may foster significant changes in the ecosystem in which the community is embedded. The community and ecosystem might in turn be nested in and impact larger governance processes, leading to policies that favor greening. Such policy changes may in turn cascade back down to impact the ecosystem and community (see Ernstson et al. 2010a, b).

In the parlance of resilience scholars, vicious cycles (Gallopin 2002) represent one stable state within a landscape (see Beisner et al. 2003). Any one landscape also contains other possible stable states, such as virtuous cycles of people stewarding green space leading to greater access to nature and enhanced community and ecosystem well-being (Tidball and Krasny 2008). Depicted graphically, a vicious or virtuous cycle can be imagined as a ball that is constantly swirling around one basin within a landscape. To move the ball to a different basin, for example from a vicious to a virtuous cycle, requires either moving the ball itself through making changes within the basin (e.g., increasing the magnitude of the stewardship activities) or by changing features of the landscape. One can envision a ‘ridge’ or bifurcation zone separating the two basins, and that by reducing the height of the ridge it becomes easier to move from the vicious to virtuous cycle basin. This would require an input of resources from outside the vicious cycle, such as an influx of outside money or change in government policy. In systems language, in order to move from one stable state to another, the system must experience a large perturbation to one of the state variables (such as integrity of the urban forest canopy or density of one or more species) or a change in parameters that determine the behavior of state variables and their interactions (e.g., species migration, Beisner et al. 2003).

## Panarchy

In real systems, multiple adaptive cycles occur at varying temporal and spatial scales, nested within and interacting with one another – a concept referred to as panarchy (Gunderson and Holling 2002). At lower levels or adaptive cycles within

a panarchy, processes occur more rapidly and there is greater opportunity to ‘invent, experiment, and test’ (Holling et al. 2002b, p. 76). In contrast, the higher, slower levels ‘stabilize and conserve accumulated memory of past successful, surviving experiments’. Thus, the whole panarchy is ‘both creative and conserving’ (ibid). Because the different levels within a panarchy enable it to maintain the capacity to create and test new solutions, while also preserving and accumulating memory, transformations up and down panarchies are different from those within the adaptive cycle. Again Holling et al. (2002b) help us understand how this occurs:

Some developments emerge within adaptive cycles during the back loop (omega and alpha phases) of the cycle, when recombinations and external influences can generate unexpected new seeds of opportunity that can nucleate and modify the subsequent phase of growth. So long as connections with other levels are maintained, those innovations are contained and do not propagate to other levels. But as such recombinations and inventions independently accumulate in a number of adjacent levels, a time will come when the phases of several neighboring cycles become coincident, when each becomes poised as an accident waiting to happen in a shift from omega to alpha. Windows open that can allow those independent inventions and adaptations to interact to produce a cascade of novel self-organized patterns across a panarchy, creating fundamental new opportunity (p. 90).

Whereas efforts to assess the results of greening or management activities are relatively common, attempts to adapt and implement new practices based on assessments often become frustrated when they encounter entrenched interests and power (Holling et al. 2002b) sometimes leading to silencing and even violence (Pelling and Dill 2009). Even in relatively peaceful times, information that flows up through hierarchies may be ignored at upper policy levels, as for example when policy makers institute new agricultural incentives that destroy existing systems of agriculture that have persisted for generations or centuries (McIntosh et al. 2000). Thus, positive panarchical change cascading up the levels of nested adaptive cycles ‘can occur only when a triggering event unlocks the social and political gridlock of larger levels in the panarchy’ (Holling et al. 2002b, p. 91). Most of the chapters in this volume explore the role of greening in transformation at lower levels (neighborhoods, communities) of adaptive cycles in the panarchy, and thus do not address triggering events. However, several chapters focus on nation states where triggering events, such as the collapse of communism in eastern Europe or the potential reunification of North and South Korea or Greek and Turkish Cyprus, unlock larger levels and create vast opportunities for re-organization and re-growth of the social and ecological systems that are part of these nation-states (Cramer, Chap. 34; Grichting and Lee, Chap. 15; Grichting, Chap. 33).

Note that triggering events can also open space for negative social and political conditions and events to emerge, such as violence, property invasion, and crime (Pelling and Dill 2009). In their paper on disaster politics, Pelling and Dill (2000, p. 25) note that: ‘Those rarer cases where [positive] political change was identified were most likely when popular mobilization was sustained by discursive (ideological), organizational (social capital) and material (financial) support’. The institutions or movements that enable such successful transitions generally exist prior to the disaster or other triggering event. Drawing from this volume, both urban forestry (Lačan and McBride, Chap. 22) and agricultural (Holder, Chap. 32) traditions existed



prior to widespread violence in Sarajevo and Ivory Coast, and may have embodied some elements (e.g., social capital, provision of material benefits) that were drawn on or ‘remembered’ following intense conflict (Tidball et al. 2010).

## Adaptation and Transformation

The presence of two general phases in Holling’s adaptive cycle – growth/conservation and reorganization/regrowth – implies two different resilience processes: adaptation and transformation. Adaptation occurs when a social-ecological system is able to adjust its responses to changing external and internal conditions, and thereby continue maintaining its self-reinforcing configuration along a current trajectory (Folke et al. 2010; Löff 2010; Walker et al. 2004). Human agency, including foresight, communication, and technology (Holling et al. 2002b), as well as collective action play a critical role in the ability of a system to adapt; put simply ‘adaptive capacity can be increased through purposeful action’ (Adger et al. 2005, p. 1037; see also Chap. 10 by Stedman and Ingalls, this volume). Transformation occurs when a system that has crossed a threshold is able to give rise to new responses that enable it to reorganize and eventually enter into a new, fundamentally different stability domain and development trajectory (Folke et al. 2010). Here too human agency, for example, the ability to envision an alternative future through scenario planning and other means, plays a critical role (Adger et al. 2005; Davidson 2010; Peterson et al. 2003; Walker et al. 2004). A comparison of two ‘steel towns’ is illustrative of adaptive and transformative responses to an external disturbance. In the face of global competition (an outside disturbance), the city of Gary Indiana has struggled to maintain its steel industry as the basis for its local economy. In contrast, Pittsburgh Pennsylvania has transformed itself from Steel City to ‘med-ed’ city – where livelihoods are based on the health, higher education, and technology sectors.<sup>6</sup>

We can readily apply the two resilience processes implied by the adaptive cycle – maintenance or conservation, and reorganization and re-growth – to the chapters in this book. First, greening and related community-based natural resources management may play a role in ‘conservative’ resilience, or the capacity of a system to resist change and maintain itself in the conservation phase. For example, in the short chapter by Craig, the trust among rival ethnic groups built through jointly managing a common wildlife resource in Kenya, may have played a role in averting ethnic violence or constraining it to a relatively short time period and small region (Craig, Chap. 28, this volume), thus avoiding an all-out civil war. In resilience parlance, the collaborative wildlife management efforts were a source of resilience that may contribute to the maintenance of stability in the face of ethnic conflict.

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<sup>6</sup> From Steel To Tech, Pittsburgh Transforms Itself; <http://www.npr.org/2010/12/16/131907405/from-steel-to-tech-pittsburgh-transforms-itself>

How Gary, Ind., Hopes To Soften Its Steely Image; <http://www.npr.org/2010/12/16/132079113/how-gary-ind-hopes-to-soften-its-steely-image?ps=rs>

In other systems and at larger scales, existing sources of resilience may not be sufficient to maintain the system in the conservation phase so that a catastrophic disturbance, such as a hurricane or war, flips the system into a different and often chaotic or red zone state. During the ensuing reorganization phase, greening also may play a role. The chapters in this volume present numerous examples of the role of greening in this rebuilding phase of resilience, including reforestation in Japan (Cheng and McBride, Chap. 18), community or datcha gardens in Russia (Boukharaeva, Chap. 26), and conversion of 'red lines' to 'green lines' in Cyprus (Grichting, Chap. 33), Korea (Grichting and Kim, Chap. 15) and Berlin (Cramer, Chap. 34). Other contributions, such as the case of village groves in Korea (Lee, Chap. 12), describe how small-scale community-managed forests can play a role in both the conservative phase (through protecting against wind and erosion) and the rebuilding phase following a typhoon (through leveraging social memory to reassert cultural identity). Similarly, tree-planting may help to maintain stability among residents of a refugee camp in Cameroon (Moore, Chap. 31) and female heads of families in Afghanistan (Thompson, Chap. 9), who have previously suffered violence and displacement.

The attributes that enable systems to embark on a desirable path of re-growth or transformation following disturbance are similar to those of systems that are able to adapt to ongoing change, and include high levels of natural, social, and other forms of capital; biological, landscape, cultural, and institutional diversity; the ability to self-organize; the capacity to learn adaptively taking into account feedback from management actions; and support from networks and from higher scales in the governance structure (Adger et al. 2005; Folke et al. 2003, 2010; Walker and Salt 2006). Transformational change may require additional attributes, including the ability to question and when needed shift perceptions and meanings related to ongoing resource management practice (i.e., 'multiple loop learning', Armitage et al. 2008) as well as shifts in 'social network configurations, patterns of interactions among actors including leadership and political and power relations, and associated organizational and institutional arrangements' (multiple authors as synthesized in: Folke et al. 2010). Walker et al. (2004) emphasize 'diversity of functional types (kinds of education, expertise, and occupations); trust, strengths, and variety in institutions; speeds and kinds of cross-scale communication, both within the panarchy and between other systems elsewhere'. Adaptive governance, which captures the collaboration of a diverse set of stakeholders operating at different scales and institutions; individual actors who provide leadership, vision, and knowledge; and social networks that tie together people and governance system, also plays a critical role in transformability (Folke et al. 2005). Another source for innovation and renewal is memory – both biological (e.g., seeds and other propagules remaining after a disturbance, Nazarea 2005) and social (e.g., memories of traditional harvesting practices, Davidson-Hunt and Berkes 2003). McIntosh et al. (2000) compare two types of organization that respond differently in crises: hierarchies, in which a few people make decisions rapidly but which suffer from bureaucratic rigidity, and heterarchies, such as tribal councils, which are characterized by 'horizontal integration of multiple overlapping social lattices, each of which may have a different center', and

which are ‘agonizingly slow to make decisions because everyone has a voice in the process, [but] have the advantage that information is not lost in a streamlining process’ (p. 13).

McIntosh and colleagues (*ibid*) also emphasize the role of social memory in addressing environmental change. They present ‘social memory as a concept to describe the ways by which communities curate and transmit both past environmental states and possible responses to them (see Colding et al. 2003). Far from being a stagnant pool of knowledge, social memory often involves innovation in the form of experimental recycling or reinvention of curated knowledge... and its intergenerational transmission.... Social memory is thus the source of the metaphors, symbols, legends, and attitudes that crystallize social action’ (McIntosh et al. 2000, p. 24). Tengö and von Heland (Chap. 24, this volume) describe how social memories help to sustain rural societies in Madagascar, whereas Boukharaeva (Chap. 26) and Svendsen and Campbell (Chap. 25), and Tidball et al. (2010) have described how contemporary urban societies, such as communities responding to the collapse of the Soviet Union, 9/11 terrorist attacks, and Hurricane Katrina mobilize social memories in collective greening actions.

Social learning (see Blackmore et al. 2007; Pahl-Wostl 2006) as a result of impromptu actions taken in response to disaster can be incorporated into a community’s social memory and better prepare that community to address a subsequent disturbance or disaster (Cutter et al. 2008). Thus, systems that demonstrate experimentation and learning ‘feed back’ information that goes into preparing for disaster and mitigating future disaster impacts. In particular, social learning and knowledge on the part of whole communities allows beneficial innovations to become formalized into institutional policy through such actions as disaster preparedness plans or improvements; this form of learning differs from more traditional debriefings post-disaster with their focus on ‘lessons learned’ (Cutter et al. 2008).

Cutter et al.’s (2008) place-based model for community resilience to natural disasters offers a practice-based framework for determining the ability of a disaster-impacted system to both absorb disturbance and to re-grow following major disaster. Their ‘disaster resilience of place’ (DROP) model begins with antecedent conditions related to vulnerability and resilience of the social, natural, and built environment, which interact with characteristics of the hazard event (e.g., frequency, duration, intensity, magnitude, and rate of onset) to produce immediate effects. At this point, mitigating actions and coping responses on the part of the community that is being impacted come into play, and determine whether or not the system is able to recover and return to its pre-disaster state or becomes transformed into a usually less desirable state. The recovery of three New Orleans neighborhoods after Hurricane Katrina illustrates how differences among communities in their vulnerability and resilience prior to the disturbance influence their coping responses and ability to recover (Kida 2009). In the Vietnamese neighborhood, a sense of community cohesion based on a collective memory of war and resettlement, and institutional capital in the form of a strong and highly organized Catholic church, enabled more rapid re-organization and resistance to further outside disturbance in the form of a city government bent on razing remaining housing and resettling residents. In contrast,

the New Orleans neighborhoods with lower levels of social and institutional capital experienced greater difficulties in coping with the aftermath of the flooding (Kida 2009; see also Brunisma et al. 2007; Miller and Rivera 2007; United States 2006).

## Greening and Transformation

Although most often viewed from the perspective of their negative environmental, social, and cultural repercussions, shocks or crises that result in serious disruptions to normal processes also can help communities move beyond the state of denial and in so doing, ‘open up opportunities for reevaluating the current situation, trigger social mobilization, recombine sources of experience and knowledge for learning, and spark novelty and innovation’. Further, such changes may ‘lead to new kinds of adaptability or possibly to transformational change’ (quoted from Folke et al. 2010; see also Olsson et al. 2007). Whereas a number of more formal processes exist for fostering such transformational change (e.g., scenario planning among watershed stakeholders, Peterson et al. 2003), this book focuses largely on transformational changes that *emerge*, or are ‘self-organized’, following shock or crisis. In the cases presented in this volume, we find multiple examples of how a crisis – including natural disturbance, conflict, and slower decline, often acting in concert – has sparked reevaluation, social mobilization, the coming together of multiple experiences and knowledge, and innovation. One needn’t look far to find examples of self-organized greening that integrate components of transformation – whether in the creation of a community garden that brings together former enemies to create something of value and beauty on a site symbolic of devastating ethnic conflict in Soweto (Shava and Mentoor, Chap. 6, this volume), the construction of a first-of-its-kind national park in conflict-ridden Afghanistan (Smallwood, Chap. 21), or the coming together of war veterans in a fishing stream in upstate New York (Krasny et al., Chap. 13).

Even those greening responses that are initially self-organized with leadership from single community leaders or small groups of neighbors, soon grow to involve multiple levels of governance reflecting a network of community organizations, government institutions, NGOs, and sometimes business. Such connectivity enables those engaged in experimentation at small scales – the replanting of forests or reconstructing of wetlands – to learn across multiple experiments. The ability of actors from different levels of governance who are engaged in experimentation and learning to bridge from community to higher levels of social organization provides a means for what begins at a small scale to spark transformational change at increasingly higher scales (Folke et al. 2010). However, given barriers to transformational change embedded in existing policies and power structures (Pelling and Dill 2009), the challenge for proponents of greening’s transformative potential continues to lie in understanding the processes and sources of resilience and adaptive and transformative change at multiple levels. Although at times critiqued for its broad notions of social-ecological processes (Brand and Jax 2007), the growing body of resilience scholarship provides an important avenue for gaining such an understanding through

sharing results of experiments, observations, and reflections among an international network of scholars and practitioners concerned with social-ecological system change.

## **Resilience, Biophilia, and Topophilia**

How might we come to understand the relationship of individual resilience in post-crisis contexts to resilience at broader social-ecological scales? We start with the notion of biophilia, a term proposed by renowned socio-biologist E. O. Wilson to describe an innate human predisposition to affiliate with, or to love, life and nature more broadly (Wilson 1993). Tidball (Chap. 4, this volume) links biophilia to individual resilience, which may contribute to expansive virtuous cycles and therefore social-ecological systems resilience, in positing a switch from base-line biophilia during periods of relative stability, to urgent biophilia during times of collapse followed by reorganization. As captured in the notion of urgent biophilia, once war, hurricanes, or another disaster flips a social-ecological system into a less desirable state, humans may respond to a feeling of being threatened or to a sense of loss by seeking or remembering an emotional affiliation with other living organisms, and in so doing, may aid themselves as individuals and as societies in recovery and even re-growth (Tidball, Chap. 4). This biophilic response also may give rise to collective action to enhance local environments (e.g., through community forestry or community gardening), and, through the act of greening, humans may develop attachment to a particular place or to a representative ecosystem more broadly (Ryan and Grese 2005). Thus, biophilia may manifest itself in broader social and cultural behaviors, such as when humans who spend time in, restore, and steward nature develop feelings of attachment to a place, or ‘topophilia’ (Stedman and Ingalls, Chap. 10). Further, witnessing the destruction of a particular place or ecosystem to which one feels attached may elicit what Stedman and Ingalls have referred to as a topophilic response, such as greening to restore features of the place that was destroyed, including features that provide ecosystem services. Such topophilic responses may contribute, in the aggregate, to recovery and re-growth of the larger social-ecological system. Thus, through feedbacks among individual and collective action and ecosystem services (Tidball and Krasny 2008, 2010), both urgent biophilic and topophilic responses can play an important role in the adaptive and transformative capacity of social-ecological systems.

## **Conclusion**

Folke et al. (2010) distinguish between general resilience, which refers to coping with uncertainty and shocks more broadly, and specified resilience relating to particular aspects of a system and a particular set of sources or shocks. Carpenter et al.’s (2001)

now classic questions – ‘resilience of what? to what?’ – are consistent with the notion of specified resilience and beg us to define what we are most concerned about – e.g., the resilience of a system’s productivity, the species it contains, the livelihoods of its people? And what are the shocks that are the focus of our analysis – a drought, a fire, an economic downturn? In the context of this book, ‘of what’ in some chapters refers to the emotional, psychological and/or physical well-being of a specific set of actors, such as inmate populations (Lindemuth, Chap. 27, this volume), soldiers experiencing repeated deployment cycles (Krasny et al., Chap. 13), or the families of garbage pickers in Guatemala (Winterbottom, Chap. 30), whereas in other chapters, the ‘of what’ refers to a variety of indicators of the health of a social-ecological system, including biodiversity (Grichting, Chap. 33 and Grichting and Kim, Chap. 15), social connectivity (Smallwood, Chap. 21), and social-ecological memories, such as living memorials in New York City (Svendsen and Campbell, Chap. 25), and reforestation in Tokyo Hiroshima (Cheng and McBride, Chap. 18), and Sarajevo (Lačan and McBride, Chap. 22). The social-ecological systems similarly are diverse, encompassing a strip of land with symbolic and strategic importance for a nation or even globally (Cyprus Red Line, Korean Demilitarized Zone); cities emblematic or the focus of larger regional conflict (Berlin, Sarajevo, Hiroshima, Monrovia); cities with cultural and symbolic significance (New Orleans); as well as smaller communities that are replicated across a particular country, such as agricultural villages having undergone industrialization in Korea. The ‘to what’ is defined as a wide spectrum of red zones including war, ethnic conflict, political turmoil, hurricanes, typhoons, and earthquakes, or in some cases slow deterioration as in the declining industrial cities of the US.

In stark opposition to notions of providing space for adaptive governance, novelty and learning in post-crisis, and thus opening up opportunities for self-organized and collaborative transformations to emerge, governments often respond with increased rigidity following a conflict or other disturbance. This became all too evident when, after overthrowing the Saddam Hussein regime, the US fired all Iraqis who had played a role in the previous Iraqi government (Tidball et al. 2008; Tidball and Weinstein 2011; Weinstein and Tidball 2007). Chaos ensued as men with little opportunity to be engaged in meaningful activity and little hope for the future turned to violence. We suggest that while reestablishing order post-conflict is critical, greening is a next step in opening up possibilities for transforming a system that has collapsed. Engaging people in meaningful and collective action that draws on their knowledge and experience in growing things and their capacity as local leaders, and that provides opportunities to participate in local governance, to express biophilia and topophilia, and to transform often degraded ecosystems, may be an overlooked source of resilience in post-conflict and post-disaster settings.

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## References

- Adger, W. N., Hughes, T. P., Folke, C., Carpenter, S., & Rockström, J. (2005). Social-ecological resilience to coastal disasters. *Science*, *309*, 1036–1039.
- Allison, H., & Hobbs, R. J. (2004). Resilience, adaptive capacity, and the 'Lock-in Trap' of the Western Australian agricultural region. *Ecology and Society*, *9*: article 3.
- Anderies, J. M., Walker, B. H., & Kinzig, A. P. (2006). Fifteen weddings and a funeral: Case studies and resilience-based management. *Ecology and Society*, *11*, 21.
- Armitage, D., Marschke, M., & Plummer, R. (2008). Adaptive co-management and the paradox of learning. *Global Environmental Change*, *18*, 86–98.
- Beisner, B. E., Haydon, D. T., & Cuddington, K. (2003). Alternative stable states in ecology. *Frontiers in Ecology and the Environment*, *1*, 376–382.
- Berkes, F. (2004). Knowledge, learning and the resilience of social-ecological systems, knowledge for the development of adaptive co-management. In *Tenth biennial conference of the International Association for the Study of Common Property*, Oaxaca, MX.
- Berkes, F., & Folke, C. (2002). Back to the future: Ecosystem dynamics and local knowledge. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 121–146). Washington, DC: Island Press.
- Blackmore, C., Ison, R., & Jiggins, J. (2007). Social learning: An alternative policy instrument for managing in the context of Europe's water. *Environmental Science and Policy*, *10*, 493–498.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: How we have underestimated the human capacity to thrive after extremely aversive events. *The American Psychologist*, *59*, 20–28.
- Brand, F. S., & Jax, K. (2007). Focusing the meaning(s) of resilience: Resilience as a descriptive concept and a boundary object. *Ecology and Society*, *12*, 23.
- Brunson, D. L., Overfelt, D., & Picou, J. S. (Eds.). (2007). *The sociology of Katrina: Perspectives on a modern catastrophe* (pp. 23–33). Plymouth: Rowman & Littlefield Publishers, Inc.
- Carbonell, A., & Meffert, D. J. (2009). *Climate change and the resilience of New Orleans: The adaptation of deltaic urban form*. Commissioned Research Report for the World Bank 2009 Urban Research Symposium: 39, Marseilles.
- Carpenter, S., Walker, B., Anderies, J. M., & Abel, N. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, *4*, 765–781.
- Carpenter, S., Brock, W. A., & Ludwig, D. (2002). Collapse, learning, and renewal. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 173–193). Washington, DC: Island Press.
- Colding, J., Elmqvist, T., & Olsson, P. (2003). Living with disturbance: Building resilience in social-ecological systems. In F. Berkes et al. (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge: Cambridge University Press.
- Cutter, S. J., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, *18*, 596–606.
- Davidson, D. J. (2010). The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. *Society and Natural Resources*, *23*, 1135–1149.
- Davidson-Hunt, I., & Berkes, F. (2003). Learning as you journey: Anishinaabe perception of social-ecological environments and adaptive learning. *Conservation Ecology*, *8*, 5.
- Ernstson, H., Barthel, S., Andersson, E., & Borgström, S. T. (2010a). Scale-crossing brokers and network governance of urban ecosystem services: The case of Stockholm. *Ecology and Society*, *15*, 28.
- Ernstson, H., van der Leeuw, S. E., Redman, C. L., Meffert, D. J., Davis, G., Alfsen, C., & Elmqvist, T. (2010b). Urban transitions: On urban resilience and human-dominated ecosystems. *Ambio*, *39*, 531–545.
- Faber, T. A., Wiley, A., Kuo, F. E., & Sullivan, W. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behavior*, *30*, 3–27.

- Faber, T. A., Kuo, F. E., & Sullivan, W. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33, 54–77.
- Folke, C. (2006). Resilience: The emergence of a perspective for social–ecological systems analyses. *Global Environmental Change*, 16, 253–267.
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002a). Resilience and sustainable development: Building adaptive capacity in a world of transformations. *Ambio*, 31, 437–440.
- Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. R., Walker, B., Bengtsson, J., Berkes, F., Colding, J., Danell, K., Falkenmark, M., Gordon, L., Kasperson, R., Kautsky, N., Kinzig, A., Levin, S., Mäler, K.-G., Moberg, F., Ohlsson, L., Olsson, P., Ostrom, E., Reid, W., Rockström, J., Savenije, H., & Svedin, U. (2002b). *Resilience and sustainable development: Building adaptive capacity in a world of transformations* (p. 34). Johannesburg: The Environmental Advisory Council to the Swedish Government
- Folke, C., Colding, J., & Berkes, F. (2003). Synthesis: Building resilience and adaptive capacity in social-ecological systems. In F. Berkes et al. (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change* (pp. 352–365). New York: Cambridge University Press.
- Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30, 441–473.
- Folke, C., Carpenter, S. R., Walker, B., Scheffer, M., Chapin, T., & Rockström, J. (2010). Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society*, 15, 20.
- Gallopín, G. (2002). Planning for resilience: Scenarios, surprises, and branch points. In L. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Gunderson, L. (2000). Ecological resilience – In theory and application. *Annual Review of Ecological Systems*, 31, 425–439.
- Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press. 507 pp.
- Gunderson, L. H., & Pritchard, L. (Eds.). (2002). *Resilience and the behaviour of large-scale systems* (pp. 21–48). Washington, DC: Island Press.
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4, 1–23.
- Holling, C. S. (1986). The resilience of terrestrial ecosystems; local surprise and global change. In W. C. Clark & R. E. Munn (Eds.), *Sustainable development of the biosphere* (pp. 292–317). Cambridge: Cambridge University Press.
- Holling, C. S. (1996). Engineering resilience versus ecological resilience. In P. Schulze (Ed.), *Engineering within ecological constraints* (pp. 31–44). Washington, DC: National Academy Press.
- Holling, C. S., & Gunderson, L. H. (2002). Resilience and adaptive cycles. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 25–62). Washington, DC: Island Press.
- Holling, C. S., Gunderson, L. H., & Ludwig, D. (2002a). In quest of a theory of adaptive change. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 3–22). Washington, DC: Island Press.
- Holling, C. S., Gunderson, L. H., & Peterson, G. D. (2002b). Sustainability and panarchies. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems* (pp. 63–102). Washington, DC: Island Press.
- Kahn, P. H., Jr., Friedmanb, B., Gilic, B., Hagmanb, J., Seversona, R. L., Freierb, N. G., Feldmana, E. N., Carrèred, S., & Stolyare, A. (2008). A plasma display window? – The shifting baseline problem in a technologically mediated natural world. *Journal of Environmental Psychology*, 28, 192–199.
- Kida, T. C. (2009). *Going for synergy? Neighborhood resilience and the state in post-Katrina New Orleans* (p. 40). Brighton: Institute of Development Studies, University of Sussex.



- Levin, S. (2005). Self-organization and the emergence of complexity in ecological systems. *BioScience*, 55, 1075–1079.
- Löf, A. (2010). Exploring adaptability through learning layers and learning loops. *Environmental Education Research* (Special Issue on Resilience in social-ecological systems: The roles of learning and education; M. E. Krasny, C. Lundholm, & R. Plummer (Eds.)), 15, 529–543.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71, 543–562.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society*, 13, 9.
- Matthews, R., & Selman, P. (2006). Landscape as a focus for integrating human and environmental processes. *Journal of Agricultural Economics*, 57, 199–212. doi:<http://www3.interscience.wiley.com/journal/120775364/group/home/home.html>
- McIntosh, R. J., Tainter, J. A., & McIntosh, S. K. (2000). Climate, history, and human action. In R. J. McIntosh et al. (Eds.), *The way the wind blows: Climate, history, and human action* (pp. 1–42). New York: Columbia University Press.
- Miller, D. S., & Rivera, J. D. (2007). Landscapes of disaster and place orientation in the aftermath of hurricane Katrina. In D. L. Brunsma et al. (Eds.), *The sociology of Katrina*. New York: Rowman & Littlefield Publishers, Inc.
- Nazarea, V. D. (2005). *Heirloom seeds and their keepers: Marginality and memory in the conservation of biological diversity*. Tucson: University of Arizona Press.
- Norton, R. J. (2003). Feral cities. *Naval War College Review*, LVI, 98.
- Olsson, P., Folke, C., & Berkes, F. (2004). Adaptive co-management for building resilience in social-ecological systems. *Environmental Management*, 34, 75–90.
- Olsson, P., Folke, C., Galaz, V., Hahn, T., & Schultz, L. (2007). Enhancing the fit through adaptive comanagement: Creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve Sweden. *Ecology and Society*, 12, 28.
- Pahl-Wostl, C. (2006). The importance of social learning in restoring the multifunctionality of rivers and floodplains. *Ecology and Society*, 11, 10.
- Pelling, M., & Dill, K. (2009). Disaster politics: Tipping points for change in the adaptation of sociopolitical regimes. *Progress in Human Geography*, 34, 21–37.
- Pelling, M., & Dill, K. (2010). Disaster politics: Tipping points for change in the adaptation of sociopolitical regimes. *Progress in Human Geography*, 34, 21–37.
- Peterson, G. D., Cumming, G. S., & Carpenter, S. R. (2003). Scenario planning: A tool for conservation in an uncertain world. *Conservation Biology*, 17, 358–366.
- Powell, J., Selman, P., & Wragg, A. (2002). Protected areas: Reinforcing the virtuous circle. *Planning Practice and Research*, 17, 279–295.
- Ryan, R. L., & Grese, R. E. (2005). Urban volunteers and the environment: Forest and prairie restoration. In P. F. Barlett (Ed.), *Urban place: Reconnecting to the natural world* (pp. 173–188). Cambridge, MA: MIT Press.
- Selman, P., & Knight, M. (2006). On the nature of virtuous change in cultural landscapes: Exploring sustainability through qualitative models. *Landscape Research*, 31, 295–307.
- Tainter, J. A. (2000). Global change, history, and sustainability. In R. J. McIntosh et al. (Eds.), *The way the wind blows: Climate, history, and human action* (pp. 331–356). New York: Columbia University Press.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. E. J. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K. G. & Krasny, M. E. (2008). 'Raising' resilience: Urban community forestry in post-conflict and post-disaster contexts. Resilience 2008, Stockholm, Sweden.
- Tidball, K. G. & Krasny, M. E. (2010). Urban environmental education from a social-ecological perspective: Conceptual framework for civic ecology education. *Cities and the Environment*, 3: article 11.
- Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere*, 2: article 21.

- Tidball, K. G., & Weinstein, E. D. (2011). Applying the environment shaping methodology: Conceptual and practical challenges. *Journal of Intervention and Statebuilding*, 5, 369–394.
- Tidball, K., Weinstein, E., Kaisler, S., Grossman, R., & Tousley, S. (2008). *Stake-holder asset-based planning environment*. In Department of Defense and DOD/OSD 2007 STTR Topic 003 Final Technical Report (Eds.), Jointly published by Logos Technologies, Inc., Cornell University, and International Sustainable Systems, Washington, DC, p. 114.
- Tidball, K. G., Krasny, M., Svendsen, E., Campbell, L. & Helphand, K. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research* (Special Issue, Resilience in social-ecological systems: The role of learning and education), 16, 341–357.
- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 85–125). New York: Plenum.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- United States. (2006). *The federal response to Hurricane Katrina: Lessons learned*. In U. S. Executive Office of the President and Assistant to the President for Homeland Security and Counterterrorism (Eds.), Washington, DC. <http://www.amazon.com/The-Federal-Response-Hurricane-Katrina/dp/0160756006>
- Varis, Olli. (1999). Water resources development: Vicious and virtuous circles. *Ambio*, 28(7), 599–603.
- Walker, B. H., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Washington, DC: Island Press.
- Walker, B., Carpenter, S., Anderies, J., Abel, N., Cumming, G. S., Janssen, M., Lebel, L., Norberg, J., Peterson, G. D. (2002). Resilience management in social-ecological systems: A working hypothesis for a participatory approach. *Conservation Ecology*, 6, 14. <http://www.consecol.org/vol6/iss1/art14/P.R.o.U>
- Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, 9, 5.
- Walker, B. H., Gunderson, L. H., Kinzig, A. P., Folke, C., Carpenter, S. R., & Schultz, L. (2006). A handful of heuristics and some propositions for understanding resilience in social-ecological systems. *Ecology and Society*, 11, 13.
- Wallace, D., & Wallace, R. (2008). Urban systems during disasters: Factors for resilience. *Ecology and Society*, 13, 18.
- Weinstein, E., & Tidball, K. G. (2007). Environment shaping: An alternative approach to development and aid. *Journal of Intervention and Statebuilding*, 1, 67–85.
- Westphal, L. M. (2003). Urban greening and social benefits: A study of empowerment outcomes. *Journal of Arboriculture*, 29, 137–147.
- Wilson, E. O. (1993). Biophilia and the conservation ethic. In S. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis*. Washington, DC: Island Press.
- Yorque, R., Walker, B., Holling, C. S., Gunderson, L. H., Folke, C., Carpenter, S., & Brock, W. A. (2002). Toward an integrative synthesis. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in natural and human systems* (pp. 419–438). Washington, DC: Island Press.

## Chapter 3

# A Daunting Challenge: Creating an Urban Park in an Impoverished Neighborhood of Port-au-Prince, Haiti

Michèle Duvivier Pierre-Louis

**Abstract** In this the first of several ‘mini-chapters’ featuring short vignettes that exemplify aspects of greening in the red zone, former Prime Minister of Haiti Michèle Duvivier Pierre-Louis describes attempts to create a forested park in the midst of Port-au-Prince. The Martissant neighborhood greening efforts were initiated to save the last wooded area of Port-au-Prince in a gang ridden neighborhood and were renewed after the devastating earthquake of 2010.

**Keywords** Urban forest restoration • Haiti • Urban revitalization • Civil society • Parks and urban land use

It may seem utterly senseless to create a park in a country that is still labeled ‘the poorest in the hemisphere’ and even more so in a city devastated by an earthquake that left over 300,000 dead, nearly 500,000 injured, and over a million homeless. Why would hungry kids and desperate young men and women be willing to spend time in a green area when they live in shacks in a crime-ridden neighborhood? Why would women and little girls who spend 6 hours each day fetching water in distant and polluted springs be concerned with a green park and a botanical garden? These are questions that so many well-intentioned people ask in good faith – people who think they have answers more suited to the situation but who lack understanding of Haiti’s complex realities.

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M.D. Pierre-Louis (✉)  
Fondation Connaissance et Liberté-FOKAL, 143 Avenue Christophe,  
Port-au-Prince, Haiti  
e-mail: mpierrelouis@fokal.org



**Fig. 3.1** A view of the Martissant neighborhood

Yet, the answer, simple and profound, came from a young Martissant dweller, who at an early stage of the park project said: ‘...creating the park here in Martissant is for us a matter of dignity!’ Indeed, that said it all: ‘a matter of dignity.’ This statement alone stands as a radical refutation of the reductionist assumptions which so often underlie a certain vision of our country (Fig. 3.1).

Martissant is an impoverished neighborhood, abandoned by formal businesses and public institutions, and devastated by gang violence. In addition to poverty and violence, the population faces the myriad of problems that plague a neglected urban area: anarchic construction, absence of public services, poor access to water and electricity, overpopulation, degraded health and school systems, environmental risks, and frequent disasters.

Yet within Martissant, a cluster of private properties have been managed to preserve the integrity of the original environment. Through the restoration and preservation of this wooded site of high historical, cultural and ecological value, the Martissant Park project aims at creating a convivial urban park sensitive to the needs of the local population. It is Haiti’s first urban revitalization project and will house the first public botanical garden in the country (Fig. 3.2).



**Fig. 3.2** A view of Martissant Park

## The Legal Framework

FOKAL<sup>1</sup> along with other civil society institutions strongly advocated for the preservation of the wooded area in Martissant. Their first success in creating the park was a decree, issued in 2007 by President René Préal, to declare as state-owned the four major private properties constituting the last remaining urban forest in Port-au-Prince. Attached to the decree was a letter of support from the Mayor of Port-au-Prince. President Préal chose FOKAL as the civil society institution capable of carrying out the project. A contract was signed between the Prime Minister and FOKAL for the creation and management of the park.

## Implementing the Project

Once these legal actions were taken, FOKAL sought the financial and technical support necessary to implement the project: relocation of families squatting on the property; installing temporary fencing to secure the delineated area; creating a plant

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<sup>1</sup> FOKAL is an acronym for Fondation Connaissance et Liberté, or in Créole: Fondasyon Konesans ak Libète. See <http://www.fokal.org> and <http://fokalnews.blogspot.com>

nursery; conducting a social, economic, and demographic study of the neighborhood as well as a topographical survey of the park; engaging in discussion with local organizations around such issues as civic engagement, security, and the environment; and providing funding for small projects to improve the living condition of the neighborhood residents. Two major donors, the Open Society Institute (FOKAL's funder) and the European Union, supported the project.

## 2010 Earthquake

The January 12, 2010 earthquake destroyed much of the Martissant neighborhood. Although facing unimaginable hardship, or perhaps as a response to this hardship, FOKAL and its partners renewed their efforts to restore urban green space. One response was to begin work on an earthquake memorial in one of the properties of the Martissant Park.

FOKAL views the park as the anchor for future investments in housing, marketplace, public transport (bus), schools, health centers, and youth centers. It is now engaged in two major spin-off projects to try to expand the impact of the park: facilitating urban planning in partnership with the Haitian government and developing a master plan in collaboration with the US National Park Service (Fig. 3.3).



**Fig. 3.3** Views in the Park

## The Martissant Neighborhood Above the Park

The Martissant Park project has already created a major impact in the neighborhood and in the city. We are pursuing a utopia that connects greening to two fundamental values: engagement and responsibility. Engagement of all the stakeholders – public and private – in a project that focuses on the public interest, and responsibility as a key element of self esteem, accountability and engagement for the common good. Importantly, these fundamental social values are being pursued within the context of restoring an urban green space (Fig. 3.4).



**Fig. 3.4** Only a few minute walk above this urban neighborhood, inhabitants cultivate produce

**Part II**  
**Motives and Explanation**



# Chapter 4

## Urgent Biophilia: Human-Nature Interactions in Red Zone Recovery and Resilience

Keith G. Tidball

**Abstract** This contribution builds upon earlier work on the concept of biophilia while synthesizing literatures on restorative environments, community-based ecological restoration, and both community and social-ecological disaster resilience. It suggests that when humans, faced with a disaster, as individuals and as communities and populations, seek engagement with nature to further their efforts to summon and demonstrate resilience in the face of a crisis, they exemplify an urgent biophilia. This urgent biophilia represents an important set of human-nature interactions in social-ecological systems characterized by hazard, disaster, or vulnerability, often appearing in the ‘backloop’ of the adaptive cycle. The relationships that human-nature interactions have to other components within interdependent systems at many different scales may be one critical source of resilience in disaster and related contexts. In other words, the affinity we humans have for the rest of nature, the process of remembering that attraction, and the urge to express it through creation of restorative environments, which may also restore or increase ecological function, may confer resilience across multiple scales.

**Keywords** Urgent biophilia • Restorative environments • Human-nature interactions • Disaster resilience • Vulnerability

*Author Keith Tidball seeks an explanation for why people repeatedly turn to greening in the wake of catastrophe and disaster. He finds an answer to this foundational question in cultural-evolutionary arguments about human’s affinity to nature (‘biophilia’) and in the work of environmental psychologists demonstrating the healing power of nature.*

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K.G. Tidball (✉)  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: kgtidball@cornell.edu

## Introduction

Can greening in red zones be explained in ecological or perhaps even evolutionary terms? Human societies have been beset with disasters for thousands of years (Diamond 2005), and have had to adapt to survive them. More recently, Lewis and Sturgill (1979, p. 330) acknowledged that we are now living in ‘two worlds... within the envelope of our skin is a biological entity which, through evolution, has been tuned for survival in natural environments... [yet] around us lies not the green world in which we learned to survive and carry forward our species, but rather a world of our own creation, built of inert materials’. But do we remember in some way the lessons of that green world and deploy that memory when confronted with a crisis (Tidball et al. 2010)? This book argues that human-nature interactions represent a suite of human adaptations to disasters. Applying observations from the literatures on resilience in human development (Masten et al. 1990) and on resilience in social-ecological systems (SES) (Walker et al. 2004) may be useful in addressing diverse, massive-scale disaster situations, such as a flu pandemic, ethnic conflict and war, or natural disasters, where interdependent adaptive systems at multiple levels, from cellular to global, face destruction (Masten and Obradovic 2008).

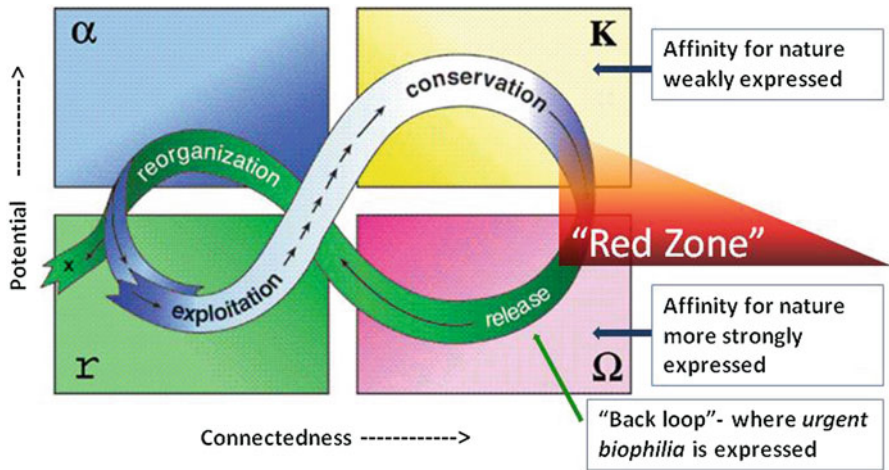
It is certainly true that personal safety and security are of paramount concern in these contexts, as are basic and fundamental services like food and water supplies, medical support, and basic infrastructure function (IFRC 2004). It is also well known that post-disaster planning brings its own set of challenges (Tidball et al. 2008). Like other events that radically affect communities (e.g., closing of a factory in a manufacturing town, see Stedman and Ingalls, Chap. 10, this volume), disasters are known to exacerbate existing inequalities (Peacock et al. 1997; Pelling 2003; Wisner et al. 2003; Drennan 2007). Sudden disasters often destroy the physical infrastructure of marginalized or vulnerable communities (Adger et al. 2005; Daniels et al. 2006) and can severely strain social networks (Walker and Meyers 2004). Furthermore, survivors of the disaster experience considerable psychological trauma that is difficult for responders to fully understand or skillfully negotiate (Sattler et al. 1997; Inter-Agency Standing Committee 2007). In light of these challenges, it is remarkable how often one hears of stories where people have had an almost immediate ‘green response’ to a crisis – forming a community garden in the case of war veterans and widows in Bosnia (Brdanovic 2009), growing a few flowers in the trenches of World War I (Helphand 2006), or tending to trees that survived in Hiroshima at the end of World War II (Cheng and McBride 2006).

Given the hardships and urgent safety issues faced by civilians, soldiers, and first-responders after a disaster or during war, it seems counter-intuitive that they would engage in the simple act of gardening, tree-planting, or other greening activities. Yet, intriguing and compelling examples exist of people, stunned by a crisis, benefitting from the therapeutic qualities of nature contact to ease trauma and to aid the process of recovery (Miavitz 1998; Hewson 2001). A large literature explains the benefits of horticulture therapy more generally (Markee and Janick 1979; People Plant Council 1993; Relf and Dorn 1995; Relf 2005), as well as in more specific

contexts such as among returning war veterans (Krasny et al., Chap. 13 and Helphand, Chap. 17, this volume), in refugee contexts (see Moore, Chap. 31), and in prisons (Lindemuth, Chap. 27) to name a few. Beyond the therapeutic value of plants themselves, others have researched the value of green places, or restorative environments (Hartig and Staats 2003) to ease trauma or discomfort (Ulrich 1983; Kaplan and Kaplan 1989).

But what might gardening, tree-planting, and other greening activities contribute to post-catastrophe individual or SES resilience? In much of the research and practice conducted under the rubric of horticultural therapy, the individual person in need of an intervention is considered a kind of patient who is prescribed horticultural interventions by a professional practitioner. Moving toward an ‘ecological’ approach, researchers in the field of systemic therapies have proposed alternative strategies for healing, conducted in creative ways in nature, that address the environment not merely as a setting but as a partner in the process (Berger and McLeod 2006). In the context of SES resilience with its focus on emergent or self-organized processes (see Tidball and Krasny, Chap. 2, this volume), in this chapter I move one step further towards linking consideration of individuals with consideration of groups of people, neighborhoods and communities, who find contact with nature of their own volition, a kind of self administered therapy, as a means to cope with the aftermath of a disaster, crisis, or conflict. In so doing, I hope to contribute to the literature connecting individual resilience to the adaptive functioning of larger social systems and networks, such as neighborhoods or socio-cultural systems (Masten and Obradovic 2008).

If it is true that, at least in the short term, ‘all disasters are local’, and that, similarly, as Masten and Obradovic (ibid) have argued, ‘all human resilience is local, emerging from the actions of individuals and small groups of people, in relation to each other and *powered by the adaptive systems of human life* and development’ (emphasis added), then we must look to that which human life has *adapted to* for clues about sources of emergent human resilience. Humans have adapted to both larger and smaller living systems and sub-systems with which we share interdependence, and according to E. O. Wilson (1984) we have an affinity for those living systems, as will be discussed later in this chapter. At the same time, some scholars claim that ‘there is substantial evidence to suggest that, as a species, our modern lifestyle may have strayed too far from that to which we have adapted’ (Gullone 2000, p. 315). Masten and Obradovic (2008) acknowledge that a variety of systems facilitate human resilience, especially in post-catastrophe contexts, but seem to agree with Longstaff (2005) that those systems are unlikely to be directly available during an unfolding disaster. Their description of these systems includes primarily manufactured ones, such as communication, transportation, manufacturing, and others, and not ecological systems. But what if we included in this list of systems that facilitate resilience, especially after a disaster, *locally available biological and ecological systems, subsystems and components*, from the smallest to the largest, from the most simple to the most complex? After all, at least according to Kurakin (2009, p. 21), ‘the structures and dynamics of all living organizations, from proteins and cells to societies and ecologies, embody their evolutionary histories [and] memories’. And what if,



**Fig. 4.1** As adapted from Holling and Gunderson (2002), a stylized depiction of the four ecosystem functions ( $r$ ,  $K$ ,  $\Omega$ ,  $\alpha$ ) and the flow of events among them. Arrows show flow speed in the cycle; closely spaced arrows represent slow change and long arrows represent rapid change. The cycle reflects change in two properties: (1) the Y axis is potential inherent in accumulated resources; (2) the X axis is the degree of connectedness among controlling variables. The transition from the  $K$  phase to the  $\Omega$  phase is depicted here as ‘The Red Zone’. Expression of biophilia is also represented, corresponding to the Y axis and potential. Low connectedness is associated with loosely connected elements whose behavior is dominated by external relations and variability. High connectedness is associated with elements whose behavior is dominated by internal relations that control or mediate external variability. The ‘back loop’, in green, represents the stages during which *urgent biophilia* is likely expressed. The exit from the cycle at the left of the figure suggests the stage where the potential can leak away and where a ‘flip’ into a less organized and desirable system is likely

in terms of human resilience, we focused on the nearly scale-free property of life itself, of the compulsion to live, of living (Kurakin 2007)?

In this chapter, I propose an urgent, nuanced addition to the idea of biophilia. I suggest that when humans faced with a disaster, as individuals and as communities and populations, seek out doses of contact and engagement with nature to further their efforts to summon and demonstrate resilience in the face of a crisis, they exemplify an *urgent biophilia*. This urgent biophilia represents an important set of human-nature interactions in SES perturbed by a catastrophe, often appearing in the ‘backloop’ (Fig. 4.1) of the adaptive cycle (Holling and Gunderson 2002). The relationships those human-nature interactions have to other components within interdependent systems at many different scales may be one critical source of resilience after a catastrophe. In other words, the affinity we humans have for the rest of nature, the process of remembering that affinity and the urge to express it through creation of restorative environments, which may also restore or increase ecological function, may confer resilience across multiple scales.

Thus, it is in examining people’s efforts to navigate journeys of resilience through urgent circumstances that we explore individual and community yearning for and

subsequent expression of an affinity for other living things. These doses of nature go beyond simply nature contact (Louv 2005) to encompass active engagement in restoring nature in concert with other members of one's community, for example through community gardening and urban community forestry. In previous work, my colleagues and I have described such local, self-organized stewardship practices as a kind of civic ecology (Tidball and Krasny 2007; Krasny and Tidball 2010; Tidball et al. 2010; Krasny and Tidball 2012), and have suggested that these civic-ecological stewardship practices play a role in creating opportunities for learning and building adaptive capacity in urban communities (see Svendsen and Campbell, Chap. 25, this volume). I acknowledge claims that not all people recognize or act upon this affinity for nature, and for those that do, such reactions may vary according to circumstance (Kellert 1997a).

Following Kellert in his book *Building for Life* (2005) and taking his ideas a step further into the realms of recovery and resilience post-crisis, in this chapter I explore how expressing biophilia through creating restorative environments might usher in and reinforce '... a respect for all values and benefits we derive from nature...' thereby reflecting '...a dependence [upon living systems] that extends far beyond a narrow materialistic and economic calculus to embrace a broader conception of human self-interest' (p. 180). This would enable recognition of 'the widest range of values derived from our dependence on nature, one that also includes emotional connection, intellectual competence, the experience of beauty, a sound moral compass, and a world of enduring meaning and relation' (ibid). Too often recognition of these values, and opportunities to express them, are in short supply in post-conflict or post-disaster contexts.

In order to build my argument about the importance of human-nature interaction in red zone recovery and resilience I briefly review the literature on restorative environments and biophilia, and deploy these notions in terms of horticultural or nature-based interventions and responses in disaster settings. After exploring linkages between the concept of biophilia and the notion of cultivating resilience, I turn to the SES resilience literature as it applies to expressing biophilia in disaster and conflict scenarios. I conclude with a synthesis in which I forward a hypothesis about the importance of urgent biophilia as it relates to SES resilience (for in-depth discussion of SES resilience, see Tidball and Krasny, Chap. 2, this volume). This chapter is intentionally exploratory rather than data-driven. My intent is to stimulate thinking about the origin and role of greening in building adaptive capacity during and after conflict or disaster, rather than to present results of studies attempting to prove this phenomenon.

## Restorative Environments

Frumkin (2001) and Hartig (2007) have traced the idea of human-nature relationships as contributing to human health from the writings of the ancient Greeks, to the New England transcendentalists (Nash 1982; McLuhan 1994; Murphy et al. 1998; Mazel 2000), and through the American landscape designers Andrew Jackson

Downing (1869) and Frederick Law Olmsted (1865/1952). Frumkin (2001) relates to us how, a century ago, the early American conservationist John Muir observed, ‘Thousands of tired, nerve-shaken, over-civilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity; and that mountain parks and reservations are useful not only as fountains of timber and irrigating rivers, but as fountains of life’ (Fox 1981, p. 116). Similarly, Hartig (2007) traces theories about how some natural environments promote restoration and in turn the health of individuals and populations to the writings of Andrew Jackson Downing (1869) and Frederick Law Olmsted (1865/1952).

Hartig and Staats (2003) noted that the idea of restorative environments has caught the attention of increasing numbers of environmental psychologists, as well as researchers in the environment–behavior–design (Betarbet 1996; Cooper Marcus and Barnes 1999) and public health fields (e.g., Frumkin 2001; King et al. 2002; Svendsen and Campbell 2005a). According to Hartig and Staats (2003), the study of restorative environments complements research on the conditions in which our functional resources and capabilities diminish, such as what we refer to as red zone contexts like natural disasters and war (see Tidball and Krasny, Chap. 1, this volume). Hartig and Staats (2003) argue that this complementarity has theoretical and practical aspects; the theoretical aspect involves specifying those qualities of person–environment transactions that promote restoration (precedents acknowledged by Hartig and Staats in this effort include work by Berlyne (1960), Driver and Knopf (1976), Kaplan and Kaplan (1989), Kaplan and Talbot (1983) and Ulrich (1983)). Hartig and Staats (2003) also call for further work that would reinforce the understanding that an absence of those demands or conditions that make a red zone a red zone, were that possible, would not necessarily make for an optimal restorative environment. In practical terms, they argue that the elimination of physical, social and temporal conditions that impose unwanted demands, red zone conditions if you will, does not necessarily leave us with a restorative environment. Rather, Hartig and Staats (ibid) claim that, following the lead of Frederick Law Olmsted, planners, landscape architects, land managers, public health workers, politicians and others can make efforts to modify, maintain, and regulate environments so that they not only present fewer unwanted demands, but also have physical, social, and temporal characteristics that promote restoration (see, e.g., Brett et al. 2007).

More recently, studies (Hartig and Staats 2006; Van Den Berg et al. 2007; Bell et al. 2008) have shown that the ability to see or actively experience plants and green spaces can, among other things, reduce domestic violence, quicken healing times, reduce stress, improve physical health, reduce poor birth outcomes, and bring about cognitive and psychological benefits in individuals (Ulrich 1984; Kaplan and Kaplan 1989; Hartig et al. 1991; Sullivan and Kuo 1996; Faber Taylor et al. 1998; Wells 2000; Donovan et al. 2011) and populations as a whole (Hartig et al. 1991). For example, in the 1989 National Gardening Survey of 2000 randomly selected households (Butterfield and Relf 1992), just over half of the respondents agreed with the statement, ‘The flowers and plants at theme parks, historic sites, golf courses, and restaurants are important to my enjoyment of visiting there’, and 40% agreed with the statement ‘Being around plants makes me feel calmer and more relaxed’.

Kuo et al. (1998) and Kuo and Sullivan (2001) further present research demonstrating that exposure to trees in urban settings can foster a sense of safety and reduce crime rates, thus contributing to social well-being. In short, considering the voluminous research reviewed above, the ‘seeing green’ implications for human health and well-being of so-called ‘plant-people interactions’ (Salick 1995; Elings 2006; Relf 2006) appear to be well documented.

But is there more to this story than the value of *seeing green*? What about *doing green*? Most relevant to my interests, and building on research on restorative environments (Ulrich 1983, 1984; Kaplan and Kaplan 1989), Helphand (2006; see also Helphand, Chap. 17, this volume) claims that *the act* of gardening historically has been a means for soldiers and victims of war to fight back for their own mental well-being, and for the disenfranchised to become involved in acts of defiance resisting ‘not only environmental difficulty but also social, psychological, political, or economic conditions’. This is consistent with what my colleagues and I have argued elsewhere, that civic ecology practices, including urban community forestry, community gardening, and other self-organized forms of stewardship of green spaces in cities (Tidball and Krasny 2007), are manifestations of how social and ecological memories can be instrumentalized through social learning to foster SES resilience following crisis and disaster (Tidball et al. 2010). We proposed that civic ecology communities of practice (see Wenger et al. 2002; Wenger 2003) that emerge within and across red zones help to leverage these social-ecological memories (for more on social-ecological memories, see Barthel et al., Chap. 11) into effective practices, and that such communities of practice serve as urban iterations of the collaborative and adaptive management practices that play a role in SES resilience in more rural communities (Berkes et al. 2003; Davidson-Hunt and Berkes 2003). Others have also highlighted various values of *doing green* for enhancing human health and well-being (Miles et al. 1998; Austin and Kaplan 2003; Ryan and Grese 2005); many examples of this are found in this book.

A question may arise at this point about the availability of the benefits of seeing green and doing green to more than just individual humans. Although therapy, rehabilitation, and restorative environments involve focusing, at least tacitly, on the specific needs of individuals, and working with the restorative environments proximate to individuals can serve the goals of therapy or rehabilitation specified by a health professional (Cimprich 1993), Hartig (2007) argues that by focusing on recurring human needs for restoration:

...our scope of application opens to the *population* (italics added) and, as with other public health interventions, changes the living environment of that population. It is not necessary to work with each and every individual in the population in some deliberate way. Improving the availability of settings that support restoration can have positive effects on the health of the population as a whole, if not on every individual within the population... Especially in the urban areas where populations have increasingly concentrated, we can promote the health of people by providing opportunities to quickly, easily and regularly access places that support restoration, including but not limited to gardens, parks and forests (p. 4).

This movement from the individual to the community or even the population level, is echoed in the social science sphere by Granovetter (1973), who in stating

'personal experience of individuals is closely bound up with larger-scale aspects of social structure, well beyond the purview or control of particular individuals' (p. 1377), provides further impetus for exploring the role of greening activities at the community and higher levels in post-crisis contexts. Further elaboration and analysis of this scaling up to the community level of the benefits of green space is found in two recent studies of green space in Stockholm (Barthel et al. 2005; Ernstson et al. 2008).

## Biophilia

Documentation of these notions of the benefits of seeing or doing green can be traced to the aforementioned early works of Stephen and Rachel Kaplan (1989) and Roger Ulrich (1983, 1984) in restorative environments, and seem to resonate with Wilson's (1984) biophilia hypothesis in which he suggests that biophilia describes 'the connections that human beings subconsciously seek with the rest of life'. In this domain, Wilson and his colleagues accomplished two things. First, they identified a phenomenon, i.e., that humans have an affinity for other living things. Second, they proposed the possibility that the phenomenon of humans having deep affiliations with nature is rooted in our biology (Kellert and Wilson 1993). These two observations should not be surprising given our evolutionary past, and may be useful in efforts to escape the problems and traps of the human-nature dichotomy (Reardon et al. 2009) and the mythology of human exemptionalism and exceptionalism (Dunlap 1980; Dunlap and Catton 1994; Vitousek et al. 1997; Williams 2007). The connection between Wilson's biophilia hypothesis and the work of the Kaplans and Ulrich is explicitly made by Ke-Tsung (2001), who argued that both Ulrich's and the Kaplans' theories are based on an evolutionary perspective. Wilson's hypothesis has been acknowledged (Born et al. 2001) to have found empirical support (for example, Kaplan 1995; Kahn 1999). Gullone (2000) argues that the research related to biophilia to date is consistent with the proposal that predispositions that evolved in our ancestral environment continue to be present today despite their more limited relevance for modern humans. Further, as Masten and Obradovic (2008) remind us, 'the adaptive systems for positive human adaptation and development, *legacies of biological and cultural evolution*, must be considered and enjoined to promote resilience' (emphasis added).

Wilson's (1984) notion of biophilia may provide an explanation for the restorative value of nature contact. First used by Erich Fromm (1964) to describe a psychological orientation of being attracted to all that is alive and vital, the term, and the book by the same name, attempt to shed light on 'how the human tendency to relate with life and natural processes might be the expression of a biological need' (Kellert 1993). Wilson suggested the possibility that the deep affiliations humans have with nature are part of our evolutionary past. As opposed to phobias, which are the aversions and fears that people have of things in the natural world,



**Table 4.1** The wide range of values derived from human biophilic dependence, as adapted by Gullone (2000) and Kellert (2005)

Kellert's typology of values in nature	
Aesthetic	Physical appeal of and attraction to nature
Dominionistic	Mastery and control of nature
Humanistic	Emotional attachment to nature
Moralistic	Moral and spiritual relation to nature
Naturalistic	Direct contact with and experience of nature
Negativistic	Fear of and aversion to nature
Scientific	Study and empirical observation of nature
Symbolic	Nature as a source of metaphorical and communicative thought
Utilitarian	Nature as a source of physical and material benefit

philias are the attractions and positive feelings that people have toward certain habitats, activities, and objects in their natural surroundings. Wilson elsewhere argued that some behaviors are at least partly inherited and can be affected by natural selection, and that these behaviors have evolved over time, similar to the way that physical traits are thought to have evolved (Wilson 1975). This sociobiological perspective has been hotly contested since its initial presentation by Wilson and his colleagues (Allen et al. 1975; Lewontin et al. 1984; Segerstråle 2000).

However, it is important to note that Wilson and others describe both an innate and a learned component of biophilia, suggesting that biophilia develops through a process of gene-culture evolution (Sideris 2003). Kahn (1997) points out that Kellert and others seem to argue that while evolutionary biology has an important place, 'it should not be construed as rigid or deterministic, but rather as setting loose parameters in human lives' (p. 11). So for example, humans may have an innate tendency to spend time tending plants, but this tendency is reinforced culturally through watching and then helping parents and other older, more experienced members of society care for plants.

Proponents of biophilia argue that, rather than referring to a single behavior, biophilia encompasses a broad complex of responses to nature, which include affinities to landscapes and domestic and wild animals, as well as aversions to snakes and cliffs or other high places that pose a threat to humans (Soule 1993). Kellert (2005) further describes the wide range of values derived from human biophilic dependence (see Table 4.1) and argues that individuals may vary in the types and degree of biophilic responses they express.

As briefly mentioned above, the implications for biophilia of Wilson's (1975, 1984) broader sociobiological project have been the source of years of debate (Allen et al. 1975; Lewontin et al. 1984; Segerstråle 2000). These debates tend to be over concern about this perspective's implied determinism (Kitcher 1987), and discomfort with its potentially dogmatic tone. The implication of these concerns is that those mired in urban poverty and cut off from nature may lead a less fulfilling existence; therefore the sociobiological thesis may be accused of cultural and class bias (Kellert and Wilson 1993). Sideris (2003) further notes two additional contradictions

inherent in the notion of biophilia; first, that despite their affinity for nature humans readily kill animals,<sup>1</sup> and second, that by proposing that humans have aversive reactions to dangerous animals such as snakes, biophilia may inadvertently serve as a basis for destroying certain groups of animals rather than for conservation of all biodiversity as originally intended by Wilson (1984).

Despite the furor caused by Wilson and what some deem as implied determinism in his sociobiological thesis (Kitcher 1987), notions of biophilia resurface regularly. Examples of works picking up on or elaborating upon the themes of Wilson's biophilia hypothesis include Kellert and Wilson's (1993) edited volume *The Biophilia Hypothesis*, Lewis's (1996) *Green Nature/Human Nature*, and Kellert's (1997a) *Kinship to Mastery* and (1997b) *The Value of Life*, as well as his more design oriented books (2008) *Biophilic Design* and (2005) *Building for Life*. More recently the Meristem Forum released a book entitled *Restorative Commons: Creating Health and Well-being through Urban Landscapes* (Campbell and Wiesen 2009), which invokes the concept biophilia frequently in examples of humans restoring landscapes. Other books incorporating the notion of biophilia into design and planning continue to appear, such as Beatley's (2010) *Biophilic Cities* and Almusaed's (2010) *Biophilic and Bioclimatic Architecture*.

Perhaps most recognizably in the popular press, Richard Louv (2005) introduced the world to the term nature-deficit disorder among children, which refers to the alleged trend that children are spending less time outdoors, resulting in a wide range of behavioral problems. One could argue that nature-deficit disorder is what happens when biophilia is suppressed among people, especially children. When interviewed for the *Why Files*, an online science magazine, Louv gave credence to the linkage between biophilia and nature-deficit disorder by noting that biologist E.O. Wilson and his colleagues have long talked about *the biophilia hypothesis* and that even as people are migrating to cities around the world, 'We are still hunter-gatherers biologically'. Louv adds, 'There is something in us that needs nature. When we don't get it, we don't do so well'.<sup>2</sup>

In short, a preponderance of evidence exists suggesting the restorative effects of seeing and doing green. Delving further into a potential mechanistic explanation for the source of these restorative effects, Wilson and colleagues' biophilia hypothesis provides one plausible and compelling explanation with a strong evolutionary bias. I leave to the reader the question of whether or not, in the wake of a crisis or catastrophe, the impetus to pursue a kind of horticultural or nature restorative intervention can be explained fully or in part by *the biophilia hypothesis*. However, regardless of the explanation, it is hard to ignore the accumulated evidence compiled in this chapter and the other chapters of this book that people continue to turn to greening in times of crisis.

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<sup>1</sup> The author does not believe that killing animals must necessarily indicate less affinity for life or nature; see Tantillo, J. (2001). Sport Hunting, Eudaimonia, and Tragic Wisdom. *Philosophy in the Contemporary World*, Vol 8, No. 2.

<sup>2</sup> See [http://whyfiles.org/shorties/211kid\\_nature/](http://whyfiles.org/shorties/211kid_nature/)

## From Biophilia to Cultivating Resilience?

Fredrickson et al. (2003) hypothesize that resilient people are buffered from depression by positive emotions, and that resilient people thrive through emotions (see also Okvat and Zautra, Chap. 5, this volume). In a study entitled ‘What Good are Positive Emotions in Crisis? A Prospective Study of Resilience and Emotions Following the Terrorist Attacks on the United States on September 11th, 2001’, Fredrickson et al. (2003) conclude that: (a) positive emotions do not disappear in times of acute and chronic stress but rather are present and functional during crisis, and (b):

efforts to cultivate and nurture positive emotions in the aftermath of crisis pay off both in the short-term, by improving subjective experiences, undoing physiological arousal, and enhancing broad-minded coping, and in the long-term, by minimizing depression and building enduring resources, the hallmark of thriving (p. 374).

They further suggest that ‘finding positive meaning may be the most powerful leverage point for cultivating positive emotions during times of crisis’ (ibid).

The use of the word cultivation in the passages above is appropriate at two levels, both explicit and metaphorical. The metaphoric level, and its nod towards biophilia which I link to both the *creation of* and *benefit from* restorative environments, appears more clearly with further study of the word’s many meanings. Cultivation has its roots in the transitive verb cultivate, which is defined<sup>3</sup> as:

1. (a) To improve and prepare (land), as by plowing or fertilizing, for raising crops; to till.  
(b) To loosen or dig soil around (growing plants).
2. To grow or tend (a plant or crop).
3. To promote the growth of (a biological culture).
4. To nurture; foster.
5. To form and refine, as by education.
6. To seek the acquaintance or goodwill of; make friends with.

Keeping in mind these definitions of cultivation, and recognizing their relationship to Kellert’s typology above, it is intriguing to contemplate aspects of cultivation within the literature on positive emotions and nature. In a study of positive emotions in residential environments in post-war settlements in Germany, Graff (2006) found a strong positive response to greenery, confirming yet again the work of Ulrich, Kaplan and others. Similarly, evolutionary psychologist Haviland-Jones and others (2005) have used language reminiscent of systems thinking’s use of positive feedback loops (Tidball and Stedman, 2013 Weinstein and Tidball 2007), which are

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<sup>3</sup>[http://education.yahoo.com/reference/dictionary/entry/cultivate;\\_ylt=A13kDE0jJEFvFFovLHdfB2CsgMMF](http://education.yahoo.com/reference/dictionary/entry/cultivate;_ylt=A13kDE0jJEFvFFovLHdfB2CsgMMF)

often important features of resilient systems, to describe the relationship between humans cultivating plants and cultivating positive emotions:

(C)ultivated flowers fit into an emotional niche – their sensory properties elicit human positive emotions. The flowering plants are thereby rewarding to humans and in return, the cultivated flowers receive propagation that only humans can provide. Demonstration of such a phenomenon fills several gaps in the literature. It supports the basic significance of emotion for survival. As a corollary it supports the adaptive function of positive as well as negative emotion...and opens an area of investigation into the psychological relationships between humans and other species through their sensory properties that have been relatively neglected (Haviland-Jones, J., Rosario, H., et al., 2005, p. 127).

Lohr and Pearson-Mims (2006) similarly report that people experience more positive emotions, such as friendliness and fewer negative emotions, such as sadness, when they are looking at urban scenes with trees than when looking at the same scenes containing inanimate objects (pp. 676–677).

Several other studies have pointed to the value individuals, as well as communities, place on trees and other aspects of nature immediately after a catastrophe, alluding to notions of cultivation's characteristics of nurturing and protection. An example can be found in Hull's work in which he identified urban forests as the most significant feature that was damaged by a hurricane, despite the fact that there was significant damage to buildings (Hull 1992; see also Hull, Chap. 19, this volume). According to residents, of the numerous values associated with the urban forest post-Hurricane Hugo, positive emotions evoked by trees were most important, followed by the importance of trees in defining Charleston as a community or place. According to Hull (1992), 'the role of urban forests as symbols of cherished meanings and memories needs to be emphasized as a major benefit deriving from urban forestry.... Trees symbolize spiritual values, personal memories, reminders of the past, preservation and endurance' (p. 3). This cultivation of trees as important symbolically as well as functionally is dealt with in greater depth in Tidball, Chap. 20, this volume.

## **Links Between Urgent Biophilia and Resilience**

This chapter has as one of its aims the examination of the linkages between urgent biophilia and resilience from individual, through family, neighborhood, community, and larger spatial and temporal scales in disaster and other crisis contexts. Urgent biophilia, or the idea that human-nature interactions and the positive emotions they elicit can rapidly and unexpectedly play an important role in conferring resilience across scales in post-disaster contexts, will undoubtedly be met with resistance, given such other equally urgent needs as personal safety and security, food, water, medical supplies, and re-building functional infrastructure. Despite this, and referring to resilience scholars Walker and colleagues (2002), understanding where resilience *resides* in the system, and when and how it can be lost or gained, is required to manage a system for resilience.

Here I hypothesize that one source of SES resilience after a catastrophe is humans' affinity for nature and the urge to express that affinity through creation of restorative environments, which may also restore ecological function. In other words, resilience in a perturbed red zone system may reside in places like memories of the value of interacting with plants (Tidball et al. 2010) or other life forms, in the *act* of expressing urgent biophilia as argued here, or in the planted, restored spaces themselves. I suspect that resilience in perturbed red zone systems likely resides in a combination of all of these. As it relates to the adaptive cycle (Holling and Gunderson 2002; for more on resilience and adaptive cycles, see Tidball and Krasny, Chap. 2, this volume) it would appear that the contribution of urgent biophilia to SES resilience resides or flourishes in the 'back loop', the time of greatest potential for the initiation of change in the system (Walker and Salt 2006, p. 82; see also Fig. 4.1). In this vein, I propose revisiting Folke et al.'s (2002) statement that '*erosion* of the sources of resilience leads to *fragile* social-ecological systems, with *consequences* for human livelihoods, vulnerability, security, and conflicts' (emphasis added, p. 51). Instead, tailoring the Folke et al. statement as a way of understanding urgent biophilia as a source of resilience, I posit that: *cultivation* of the sources of resilience may lead to *vital* social-ecological systems, with *positive implications* for human livelihoods, vulnerability, security and conflicts. Greening in the red zone, then, can be imagined as a manifestation of a conscious, urgent biophilia acting as and activating a source of resilience in post-conflict and post-disaster settings.

## Conclusion

In summary, integrating Wilson's (1984) notions of biophilia with more recent research on positive responses to plants and green spaces including in post-disaster settings, I have proposed the following explanation for an urgent biophilia. During more stable periods, humans exhibit varying degrees of affinity for nature at what Wilson and others argue is a mostly sub-conscious level. We often use gardening and other forms of nature stewardship to recover from personal hardship. However, in post-disaster contexts, plant-people interactions and the positive emotions they elicit may compellingly and suddenly come to the fore in heretofore unexpected ways, and be manifested in *immediate* and *conscious* actions, often beyond merely individuals to include neighborhoods, communities, and whole societies.

Further, such manifestations of affinity for nature after a disaster, *urgent biophilia*, may play a critical role in the ability of humans and larger social-ecological systems to recover post-disaster. This switch from base-line sub-conscious biophilia during times of growth and stability, to conscious urgent biophilia during times of collapse followed by reorganization reflects cyclic changes described as the adaptive cycle in SES resilience writings (see Gunderson and Holling 2002). Once war, hurricanes, or another disaster threatens to 'flip' a SES into a less desirable state, humans may respond to feeling threatened or a sense of loss by seeking physical and emotional affiliation with other living organisms, and in so doing, may aid themselves, as well

as other parts of the system, in recovery. Should this biophilic response also include individuals working collectively to enhance their local environment, e.g., through community forestry and community gardening, it may further contribute to recovery of other ecological elements of the larger SES. Although this urgent response does not necessarily take us in the direction that Wilson and others envisioned when proposing biophilia (i.e., furthering the claims of sociobiology or conservation of biodiversity), it may have implications for better understanding human-nature interactions in SES perturbed by catastrophe, and the relationship those human-nature interactions have to SES resilience. Such an understanding of human-nature interaction in terms of resilience can only help when disaster or war strikes, and it is my hope that future research into urgent biophilia as it is manifested in greening in red zones will contribute to efforts by governments, NGOs, and others to reduce pain and suffering of all citizens of social-ecological systems, human and non-human, in the aftermath of crisis.

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## References

- Adger, W. N., Hughes, T. P., et al. (2005). Social-ecological resilience to coastal disasters. *Science*, 309(5737), 1036–1039.
- Allen, E., Beckwith, J., et al. (1975). Against “sociobiology” letter. *The New York Review of Books*, 182, 184–186.
- Almusaed, A. (2010). *Biophilic and bioclimatic architecture: Analytical therapy for the next generation of passive sustainable architecture*. London: Springer.
- Austin, M. E., & Kaplan, R. (2003). Identity, involvement, and expertise in the inner city: Some benefits of tree-planting projects. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 205–225). Cambridge, MA: The MIT Press.
- Barthel, S., Colding, J., et al. (2005). History and local management of a biodiversity-rich, urban cultural landscape. *Ecology and Society*, 10(2), 10.
- Beatley, T. (2010). *Biophilic cities: Integrating nature into urban design and planning*. Washington, DC: Island Press.
- Bell, S., Hamilton, V., et al. (2008). *Greenspace and quality of life: A critical literature review*. Stirling: Greenspace Scotland.
- Berger, R., & McLeod, I. (2006). Incorporating nature into therapy: A framework for practice. *Journal of Systemic Therapies*, 25(2), 80–94.
- Berkes, F., Colding, J., et al. (2003). *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge: Cambridge University Press.
- Berlyne, D. E. (1960). *Conflict, arousal, and curiosity*. New York: McGraw-Hill.

- Betrabet, G. (1996). The garden as a restorative environment: A theoretical perspective. *Journal of Therapeutic Horticulture*, 8, 15–20.
- Born, R., Lenders, R., et al. (2001). The new biophilia: An exploration of visions of nature in Western countries. *Environmental Conservation*, 28(1), 65–75.
- Brdanovic, D. (2009). Gardens for peace and reconciliation. In L. Campbell & A. Wiesen (Eds.), *Restorative commons: Creating health and well-being through urban landscapes*. Newtown Square: USDA Forest Service.
- Brett, S., Bickford, L., et al. (2007). *Memorialization and democracy: State policy and civic action*. Santiago: Latin American School of Social Sciences, International Center for Transitional Justice, International Coalition of Historic Site Museums of Conscience, p. 44.
- Butterfield, B., & Relf, D. (1992). National survey of attitudes toward plants and gardening. In D. Relf (Ed.), *The role of horticulture in human well-being and social development: A national symposium, 19–21 April 1990, Arlington, Virginia* (pp. 211–212). Portland: Timber Press.
- Campbell, L., & Wiesen, A. (Eds.). (2009). *Restorative commons: Creating health and well-being through urban landscapes* (GTR NRS-P-239). Newtown Square: USDA Forest Service.
- Cheng, S., & McBride, J. R. (2006). Restoration of the urban forests of Tokyo and Hiroshima following World War II. *Urban Forestry and Urban Greening*, 5(4), 155–168.
- Cimprich, B. (1993). Development of an intervention to restore attention in cancer patients. *Cancer Nursing*, 16, 83–92.
- Cooper Marcus, C., & Barnes, M. (1999). *Healing gardens: Therapeutic benefits and design recommendations*. New York: Wiley.
- Daniels, R., Kettl, D., et al. (Eds.). (2006). *On risk and disaster: Lessons from Hurricane Katrina*. Philadelphia: University of Pennsylvania Press.
- Davidson-Hunt, I., & Berkes, F. (2003). Learning as you journey: Anishinaabe perception of social-ecological environments and adaptive learning. *Conservation Ecology*, 8(1), 5.
- Diamond, J. (2005). *Collapse: How societies choose to fail or succeed*. New York: Viking.
- Donovan, G., Michael, Y., et al. (2011). Urban trees and the risk of poor birth outcomes. *Health & Place*, 17, 390–393.
- Downing, A. J. (1869). A talk about public parks and gardens. In A. J. Downing & G. W. Curtis (Eds.), *Rural essays* (pp. 138–146). New York: George A Leavitt.
- Drennan, M. P. (2007). The economic cost of disasters—Permanent or ephemeral? In P. Gordon & H. Richardson (Eds.), *Economic costs and consequences of terrorism* (pp. 159–191). Cheltenham: Edward Elgar.
- Driver, B. L., & Knopf, R. C. (1976). Temporary escape: One product of sport fisheries management. *Fisheries*, 1, 24–29.
- Dunlap, R. E. (1980). From human exemptions to an ecological paradigm. *The American Behavioral Scientist*, 24(1), 5–14.
- Dunlap, R. E., & Catton, W. R., Jr. (1994). Struggling with human exemptionalism: The rise, decline and revitalization of environmental sociology. *The American Sociologist*, 25(1), 5–30.
- Elings, M. (2006). People–plant interaction: The physiological, psychological and sociological effects of plants on people. In J. Hassink & M. v. Dijk (Eds.), *Farming for health: Green-care farming across Europe and the United States of America* (pp. 43–55). Dordrecht: Springer.
- Ernstson, H., Sörlin, S., et al. (2008). Social movements and ecosystem services—The role of social network structure in protecting and managing urban green areas in Stockholm. *Ecology and Society*, 13(2), 39.
- Faber Taylor, A., Wiley, A., et al. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behavior*, 30(1), 3–27.
- Folke, C., Carpenter, S., et al. (2002). Resilience and sustainable development: Building adaptive capacity in a world of transformations. In *The world summit on sustainable development*. Paris: ICSU.
- Fox, S. (1981). *John Muir and his legacy*. Boston: Little, Brown.
- Fredrickson, B., Tugade, M., et al. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, 84(2), 365–376.
- Fromm, E. (1964). *The heart of man*. New York: Harper & Row.

- Frumkin, H. (2001). Beyond toxicity: Human health and the natural environment. *American Journal of Preventive Medicine*, 20(3), 234–240.
- Graff, B. (2006). Positive emotions in residential environments—part of a workshop entitled *The residential context of health at the European network for housing research housing in an expanding Europe: Theory, policy participation and implementation conference*. Ljubljana, Slovenia.
- Granovetter, M. (1973). The strength of weak ties. *The American Journal of Sociology*, 78(6), 1360–1380.
- Gullone, E. (2000). The biophilia hypothesis and life in the 21st century: Increasing mental health or increasing pathology? *Journal of Happiness Studies*, 1(3), 293–322.
- Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Hartig, T. (2007). Toward understanding the restorative environment as a health resource. In *Open space: People space 2 conference*. Edinburgh, Scotland.
- Hartig, T., & Staats, H. (2003). Guest editors' introduction: Restorative environments. *Journal of Environmental Psychology*, 23(2), 103–107.
- Hartig, T., & Staats, H. (2006). The need for psychological restoration as a determinant of environmental preferences. *Journal of Environmental Psychology*, 26(3), 215–226.
- Hartig, T., Mang, M., et al. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23(1), 3–26.
- Haviland-Jones, J., Rosario, H., et al. (2005). An environmental approach to positive emotion: Flowers. *Evolutionary Psychology*, 3, 104–132.
- Helphand, K. (2006). *Defiant gardens: Making gardens in wartime*. San Antonio: Trinity University Press.
- Hewson, M. (2001). Horticultural therapy and post traumatic stress recovery. *Journal of Therapeutic Horticulture*, 12, 44–47.
- Holling, C. S., & Gunderson, L. (2002). Resilience and adaptive cycles. In L. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Hull, R. B. (1992). How the public values urban forests. *Journal of Arboriculture*, 18(2), 98–101.
- IFRC (2004). *Focus on community resilience* (World Disasters Report). Geneva: International Federation of Red Cross and Red Crescent Societies 231.
- Inter-Agency Standing Committee. (2007). *IASC guidelines on mental health and psychosocial support in emergency settings*. Geneva: Author.
- Kahn, P. H. (1997). Developmental psychology and the biophilia hypothesis: Children's affiliation with nature. *Developmental Review*, 17(1), 1–61.
- Kahn, J. P. H. (1999). *The human relationship with nature*. Cambridge, MA: MIT Press.
- Kaplan, S. (1995). The restorative benefits of nature: Towards an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge, UK: Cambridge University Press.
- Kaplan, S., & Talbot, J. F. (1983). Psychological benefits of a wilderness experience. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 163–203). New York: Plenum Press.
- Kellert, S. (1993). Introduction. In S. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis*. Washington, DC: Island Press.
- Kellert, S. (1997a). *Kinship to mastery: Biophilia in human evolution and development*. Washington, DC: Island Press.
- Kellert, S. (1997b). *The value of life: Biological diversity and human society*. Washington, DC: Island Press.
- Kellert, S. R. (2005). *Building for life: Designing and understanding the human-nature connection*. Washington, DC: Island Press.
- Kellert, S., & Wilson, E. (Eds.). (1993). *The biophilia hypothesis*. Washington, DC: Island Press.



- Kellert, S., Heerwagen, J., et al. (Eds.). (2008). *Biophilic design: The theory, science and practice of bringing buildings to life*. Hoboken: Wiley.
- Ke-Tsung, H. (2001). A review: Theories of restorative environments. *Journal of Therapeutic Horticulture*, 12, 30–43.
- King, A. C., Stokols, D., et al. (2002). Theoretical approaches to the promotion of physical activity: Forging a transdisciplinary paradigm. *American Journal of Preventive Medicine*, 23(2S), 15–25.
- Kitcher, P. (1987). *Vaulting ambition: Sociobiology and the quest for human nature*. Boston: MIT Press.
- Krasny, M. E., & Tidball, K. G. (2010). Civic ecology: Linking social and ecological approaches in extension. *Journal of Extension*, 48(1).
- Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: A pathway for Earth Stewardship in cities. *Frontiers in Ecology and the Environment*, 10(5), 267–273.
- Kuo, F. E., & Sullivan, W. (2001). Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behavior*, 33, 343–367.
- Kuo, F. E., Bacaicoa, M., et al. (1998). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behavior*, 30, 28–59.
- Kurakin, A. (2007). *The universal principles of self-organization and the unity of nature and knowledge*. From website: <http://www.alexeikurakin.org/text/thesoft.pdf>
- Kurakin, A. (2009). Scale-free flow of life: On the biology, economics, and physics of the cell. *Theoretical Biology & Medical Modelling*, 6(6).
- Lewis, C. (1996). *Green nature/human nature*. Chicago: University of Illinois Press.
- Lewis, C. A., & Sturgill, S. (1979). Comment: Healing in the urban environment. *Journal of the American Planning Association*, 45(3), 330–338.
- Lewontin, R., Rose, S., et al. (1984). *Not in our genes: Biology, ideology and human nature*. New York: Pantheon.
- Lohr, V. I., & Pearson-Mims, C. H. (2006). Responses to scenes with spreading, rounded, and conical tree forms. *Environment and Behavior*, 38(5), 667–688.
- Longstaff, P. H. (2005). *Security, resilience, and communication in unpredictable environments such as terrorism, natural disaster, and complex technology*. Cambridge, MA: Harvard University Program on Information Resources Policy.
- Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill: Algonquin Books.
- Markee, K. M., & Janick, J. (1979). A bibliography for horticultural therapy (1970–1978): Comparison of literature search techniques in an interdisciplinary field. *Horticulture Science*, 6, 692–696.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society* 13(1), 9. Online: <http://www.ecologyandsociety.org/vol13/iss1/art19/>
- Masten, A. S., Best, K. M., et al. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology*, 2(04), 425–444.
- Mazel, D. (2000). *American literary environmentalism*. Athens: University of Georgia Press.
- McLuhan, T. (1994). *The way of the earth: Encounters with nature in ancient and contemporary thought*. New York: Simon & Schuster.
- Miavitz, E. M. (1998). Grief gardening. *Journal of Therapeutic Horticulture*, 9, 17–21.
- Miles, I., Sullivan, W., et al. (1998). Ecological restoration volunteers: The benefits of participation. *Urban Ecosystems*, 2, 27–41.
- Murphy, P., Gifford, T., et al. (1998). *Literature of nature: An international sourcebook*. Chicago: Fitzroy Dearborn Publishers.
- Nash, R. (1982). *Wilderness and the American mind*. New Haven: Yale University Press.
- Olmstead, F. L. (1865/1952). The Yosemite Valley and the Mariposa big trees: A preliminary report: With an introductory note by Laura Wood Roper. *Landscape Architecture*, 43, 12–25.

- Peacock, W., Morrow, B. H., et al. (1997). *Hurricane Andrew: Ethnicity, gender and the sociology of disasters*. New York: Routledge.
- Pelling, M. (2003). *The vulnerability of cities: Natural disasters and social resilience*. London: Earthscan.
- People Plant Council. (1993). *Annotated bibliography of horticultural therapy*. Blacksburg: Virginia Tech.
- Reardon, K. M., Green, R., et al. (2009). Overcoming the challenges of post-disaster planning in New Orleans: Lessons from the ACORN housing/University collaborative. *Journal of Planning Education and Research*, 28, 391–400.
- Relf, D. (2005). The therapeutic values of plants. *Pediatric Rehabilitation*, 8(3), 235–237.
- Relf, P. D. (2006). Agriculture and health care: The care of plants and animals for therapy and rehabilitation in the United States. In J. Hassink & M. v. Dijk (Eds.), *Farming for health: Green-care farming across Europe and the United States of America* (pp. 309–343). Dordrecht: Springer.
- Relf, D., & Dorn, S. (1995). Horticulture: Meeting the needs of special populations. *Horticulture Technology*, 2, 94–104.
- Ryan, R. L., & Grese, R. E. (2005). Urban volunteers and the environment: Forest and prairie restoration. In P. F. Barlett (Ed.), *Urban place: Reconnecting to the natural world* (pp. 173–188). Cambridge, MA: MIT Press.
- Salick, J. (1995). Toward an integration of evolutionary ecology and economic botany: Personal perspectives on plant/people interactions. *Annals of the Missouri Botanical Garden*, 82(1), 25–33.
- Sattler, D. N., Freedy, J. F., et al. (1997). Natural disasters and psychological adjustment: Implications of research for intervention efforts. *Journal of Psychological Practice*, 3, 113–127.
- Segerstråle, U. (2000). *Defenders of the truth: The battle for science in the sociobiology debate and beyond*. Oxford: Oxford University Press.
- Sideris, L. H. (2003). *Environmental ethics, ecological theology, and natural selection*. New York: Columbia University Press.
- Soule, M. E. (1993). Biophilia: Unanswered questions. In S. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis*. Washington, DC: Island Press.
- Sullivan, W. C., & Kuo, F. E. (1996). *Do trees strengthen urban communities, reduce domestic violence?* Atlanta: USDA Forest Service Southern Region.
- Svendsen, E., & Campbell, L. (2005a). *Living memorials project: Year 1 social and site assessment* (General Tech. Rep. NE-333). Newtown Square: USDA Forest Service.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K., & Stedman, R. (2013). Positive dependency and virtuous cycles: From resource dependence to resilience in urban social-ecological systems. *Ecological Economics*, 86(0), 292–299. doi:[10.1016/j.ecolecon.2012.10.004](https://doi.org/10.1016/j.ecolecon.2012.10.004).
- Tidball, K. G., Weinstein, E., et al. (2008). *Stakeholder asset-based planning environment*. Department of Defense and DOD/OSD 2007 STTR Topic 003 Final Technical Report (p. 114). Washington, DC: Jointly published by Logos Technologies, Inc., Cornell University, and International Sustainable Systems.
- Tidball, K. G., Krasny, M., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research* (Special Issue, Resilience in social-ecological systems: The role of learning and education), 16(5), 341–357.
- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 85–125). New York: Plenum.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- Van Den Berg, A. E., Hartig, T., et al. (2007). Preference for nature in urbanized societies: Stress, restoration, and the pursuit of sustainability. *Journal of Social Issues*, 63(1), 79–96.

- Vitousek, P. M., Mooney, H. A., et al. (1997). Human domination of Earth's ecosystems. *Science*, 277(5325), 494–499.
- Walker, B. H., & Meyers, J. A. (2004). Thresholds in ecological and social-ecological systems: A developing database. *Ecology and Society*, 9(2), 3. Online: <http://www.ecologyandsociety.org/vol9/iss2/art3/>
- Walker, B., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Washington, DC: Island Press.
- Walker, B., Carpenter, S., et al. (2002). Resilience management in social-ecological systems: A working hypothesis for a participatory approach. *Conservation Ecology*, 6(1), 14.
- Walker, B., Holling, C. S., et al. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, 9(2), 5.
- Weinstein, E., & Tidball, K. G. (2007). Environment shaping: An alternative approach to development and aid. *Journal of Intervention and Statebuilding*, 1(Spring).
- Wells, N. (2000). At home with nature: Effects of “greenness” on children’s cognitive functioning. *Environment and Behavior*, 32(6), 775–795.
- Wenger, E. (2003). Communities of practice and social learning systems. In D. Nicolini, S. Gherardi, & D. Yanow (Eds.), *Knowing in organizations: A practice-based approach* (pp. 75–99). New York: M.E. Sharpe.
- Wenger, E., McDermott, R., et al. (2002). *Cultivating communities of practice*. Cambridge, MA: Harvard Business School Press.
- Williams, J. (2007). Thinking as natural: Another look at human exemptionalism. *Human Ecology Review*, 14(2), 130–139.
- Wilson, E. (1975). *Sociobiology: The new synthesis*. Cambridge, MA: Harvard University Press.
- Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.
- Wisner, B., Blaikie, P., et al. (2003). *At risk: Natural hazards, people’s vulnerability, and disasters*. London: Routledge.

# Chapter 5

## Sowing Seeds of Resilience: Community Gardening in a Post-Disaster Context

Heather A. Okvat and Alex J. Zautra

**Abstract** Resilience is a natural capacity to recover from adversity, sustain well-being, and grow from the experience. To enhance resilience in a high-stress, post-disaster context, we argue that it is vital to introduce positive stimuli to buffer the effects of negative stimuli. We review empirical evidence for the positive effects of various forms of contact with green space and contend that community gardening has considerable potential for bolstering individual and community resilience in disaster zones. We propose that creating an extensive network of community gardens as part of a disaster preparedness plan would yield multi-level benefits and bolster resilience capacity before it is acutely needed, and we suggest that community gardens established after a disaster has occurred adopt targeted aims in order to maximize benefits.

**Keywords** Community gardening • Disaster • Green space • Resilience • Stress

*Psychologists Heather Okvat and Alex Zautra provide evidence that community gardening can bolster individual and community resilience after a disaster, by enhancing cognitive capacity, positive emotions, and community engagement. In addition to summarizing research studies, Okvat and Zautra explain the Dynamic Model of Affect, which predicts that engaging in positive activities, such as community gardening, is associated with positive emotions and decreased distress in high stress environments.*

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H.A. Okvat, Ph.D. (✉)

The Institute for Complementary and Alternative Medicine, Department of Primary Care,  
School of Health Related Professions, University of Medicine and Dentistry  
of New Jersey, 65 Bergen St, Suite 160, Newark NJ 07107, USA  
e-mail: heathero@alumni.duke.edu

A.J. Zautra, Ph.D.

Department of Psychology, Arizona State University,  
Box 871104, Tempe, AZ 85287-1104, USA  
e-mail: atajz@asu.edu

‘Don’t ignore your suffering, but don’t forget to enjoy the wonders of life’.  
—Thich Nhat Hanh, Vietnamese Buddhist monk and peace activist

## Introduction

One of the wonders of my life appeared deep in a dark cave in Belize, Central America. I was canoeing with a local guide, and from the mouth of the cave, we paddled into increasing darkness along a meandering river, until we were far from any natural light. Our guide used a powerful, battery-powered searchlight to allow us to continue. After drifting under bats’ nests and observing shards of ancient pottery from peoples who had inhabited the cave centuries earlier, our guide advised us that he was about to turn off the light so that we could experience total darkness. It was a sublime experience, but more impressive was the fact that when he turned the light on again, he illuminated a small tree growing on a ledge in the cave. How could it grow there, with no light? He explained that the cave-dwelling, fruit-eating bats would exit at night, and they had apparently brought fruit back to the cave. One seed had dropped close to the ancient pottery that various canoe guides illuminated with their searchlights several times a day. This infrequent light had been enough for the seed to take root and to grow in otherwise complete darkness.<sup>1</sup>

The tenacity of a tree growing in a dark cave exemplifies the inspiration that plants growing under difficult circumstances can provide and the resilience of life itself. We conceptualize *resilience* as a natural capacity to *recover* from adversity, *sustain* well-being, and *grow* from the experience, observable at multiple levels: biological, individual, human community, and ecosystem (Bonanno 2004; Masten 2001; Rutter 1987; Zautra et al. 2008). This chapter explores how to bolster resilience in red zones as defined by this book, focusing on post-disaster situations caused by natural events, such as hurricanes, or human-made events, such as terrorist attacks. We present the theoretical assertion, grounded in empirical research, that community gardening can support individual and community resilience in a post-disaster environment. We begin with an overview of the psychosocial effects of disasters and an introduction to the practice of community gardening. We then present a theoretical framework, the Dynamic Model of Affect, to help explain how bolstering positive emotion/engagement could counteract the negative impact of living in a red zone. We review empirical research on the psychosocial benefits of contact with plants, and we explore how community gardens could be utilized in a disaster area. We conclude with thoughts on future directions.

Although some researchers have contended that persons recover quickly after disasters (McFarlane 1988, 1989), reviews of disaster studies indicate that large-scale community traumas can result in a significant increase in psychological problems in the short-term and can have substantial effects on the physical and mental health of survivors over many years (Brewin et al. 2000; Bromet and Dew 1995; Rubonis and Bickman 1991). The psychosocial consequences of a disaster depend on a multitude of conditions, such as the economic and cultural context and the availability of rapid response plans and a developed medical infrastructure (Adams et al. 2006). Research concerning risk factors for psychological problems after

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<sup>1</sup> The above vignette is based on the experience of one of the authors (HAO) in April 2001.

disasters and other types of trauma suggests the importance of individual pre-trauma characteristics (e.g., age, gender), disaster-related factors (e.g., injury, relocation), and post-trauma factors (e.g., social support) (Brewin et al. 2000; Norris et al. 2002). Even under extreme stress, many people are resilient—they can regulate and recover from negative events, thoughts, and feelings, and sustain positive emotions, mental clarity, and a sense of purpose in life (see also Tidball, Chap. 4, this volume). Certain individuals also seek and often find a ‘silver lining’—gains in understanding or acceptance, or other forms of positive development that constitute psychological growth through adversity. How to bolster such resilience responses is the key question, and community gardens might provide an answer.

### *Community Gardening*

Throughout history, both gardening and more passive forms of contact with nature, such as taking a walk in a garden, have been utilized for mental health benefits (Davis 1998). During the past century, the profession of *horticultural therapy* was developed ‘as a process through which plants, gardening activities, and the innate closeness we all feel toward nature are used as vehicles in professionally conducted programs of therapy and rehabilitation’ (Davis 1998, p. 3). We propose that gardening activity, and specifically community gardening, could buffer against the negative effects of a disaster zone and enhance resilience.

Community gardens are plots of land available to people from different families for growing both edible and inedible plants that provide beauty, food, medicine, and respite. Unlike green spaces such as botanical gardens or city parks, which are designed by the top-down efforts of large, often governmental organizations, community gardens are often bottom-up, community-based, collaborative efforts (Tidball and Krasny 2007). Whether cultivated through a system of individual/family plots, or tended as a whole by a group of citizen volunteers, community gardens involve the leadership and active participation of area residents to plan and care for these socio-ecological spaces (Tidball and Krasny 2007, p. 4). For a review of the history of community gardens in the United States, see Lawson (2005, and Chap. 14, this volume).

An example of the role of community gardens in a disaster zone comes from New Orleans after Hurricane Katrina. A non-profit called Common Ground Relief was established to provide both short-term relief and long-term support in rebuilding the communities affected by the disaster. One focus of their efforts was to re-create historic levels of agricultural self-sufficiency through urban farming (Common Ground Relief 2009). This involved building new community gardens and restoring many that had been flooded, providing gardening advice, and organizing a local garden club. Those intimately involved in such efforts describe the importance of the gardens both to New Orleans residents affected by the disaster, and to the volunteers who poured in from around the country to help clean up and rebuild the city (M. Fry, personal communication, December 29, 2009). Their labors were taxing, both emotionally and physically. At times, they needed relief. Working on the community gardens project provided volunteers with fresh air and respite,

and the opportunity to continue contributing in a much more restorative environment. Community gardens also eased the recovery process for some residents affected by the disaster. For example, Vietnamese immigrants who had brought their own farming traditions to New Orleans community gardens in the 1980s were able to get fresh produce after Katrina long before grocery stores reopened (Lydersen 2009). As well, these gardens were credited with helping the Vietnamese population of New Orleans to ‘return and reestablish their close-knit community just weeks after Hurricane Katrina’ (Lydersen 2009). In sum, community gardens in red zones could have a significant role to play in bolstering resilience.

## **Resilience: Attending to the Dynamic Interplay of Positive and Negative Processes**

When clinical psychologists first noticed that many people were capable of adapting to incredibly stressful circumstances, their initial reaction was surprise, then disbelief. These reactions gradually gave way to a collective ‘aha’ and recognition that people were often quite able to endure disaster. What they observed was the ‘ordinary magic’ of resilience (Masten 2001). Even from the most troubled homes came children who exhibited none of the disturbances of mind and body that theories of trauma-induced psychopathology would predict. It became apparent that inquiry oriented toward disturbance often neglected positive expressions of mental health (Jahoda 1958). A reaction to these biased observations was a ‘positive psychology’ movement advocating a focus on strengths, talents, and happiness. However, to ignore the negative is also to govern the mind with illusions. What is needed is a framework that both acknowledges the negative impact of adverse events and also identifies models of resilience.

In our view, the three core aspects of resilience noted earlier—recovery, sustainability, and growth—are best promoted through attention to the dynamic interplay of both the positive and negative emotions that shape our responses to events (Reich et al. 2010; Zautra et al. 2008). Two complementary motivational processes are thought to underlie positive and negative emotional states: the need to move forward and reach toward positive aims, and the need to protect and defend against harm (Cacioppo et al. 1999). These motivational processes infuse a two-dimensional meaning structure to emotions, cognitions, and behaviors. Emotions may be separated into positive and negative dimensions, cognitions into hopeful and fearful thoughts, and behaviors into approach (e.g., problem-solving) or avoidance. Watson et al. (1999) have shown that emotion states are divisible into nearly independent dimensions of positive and negative emotional activation. Indeed, neurophysiological responses, as shown by both EEG and fMRI data, support distinct neural structures for the regulation of positive as opposed to negative emotion (Canli et al. 2001; Sutton and Davidson 1997; Reich et al. 2003). Cognitions of personal control and mastery also show two dimensions (Reich and Zautra 1991): one of agency, optimism, and hope, and another of helplessness, pessimism, and despair.

Social relations have similar bifurcated structures (Finch et al. 1989), and even within intimate spouse relations, the extent of negative social interaction does not explain the extent of positive exchanges between partners (Stone and Neale 1982).

When investigators in psychology constructed separate indices of positive and negative aspects of the individual and his or her social relations, they discovered a tremendous value of the positive aspects in prediction of good health, unaccounted for by measures of negative aspects (Cohen et al. 2003; Moskowitz 2003; Russek and Schwartz 1997; Seeman et al. 1995). However, a key question arises. If positive states are relatively independent of negative states, how is it that these positive states work to prevent harm and repair wounds from highly stressful experiences? We need a model of interaction between these co-occurring dimensions to assist in building a model of resilience to disaster.

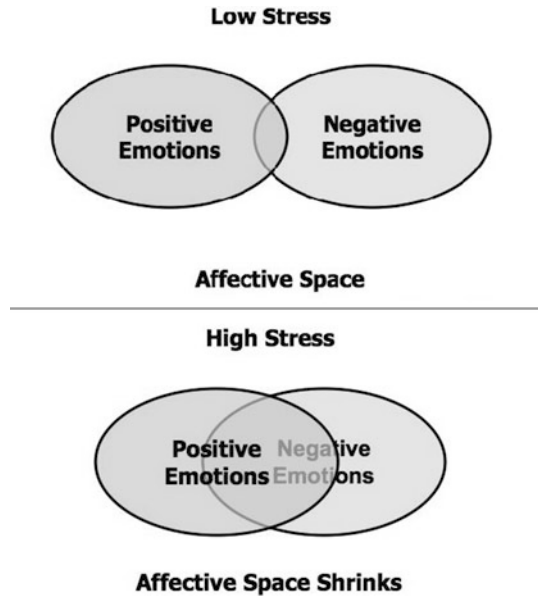
### *The Dynamic Model of Affect*

The Dynamic Model of Affect (DMA; Zautra 2003) describes the interaction between positive and negative dimensions under varying conditions of stress (Fig. 5.1). A stressful experience increases uncertainty, a state of mind that draws heavily upon cognitive resources to resolve the threat to understanding of the world. With the reduction in available cognitive resources under stress comes a narrowing of the perceptual field (Easterbrook 1959) and an inability to attend to the positive under threat of the negative. The DMA proposes that during times of low stress, there are two relatively independent dimensions of affective experience (positive and negative), and that during highly stressful experiences, the overlap between these positive and negative states increases substantially toward a single bipolar dimension (either positive or negative). Under low stress, the DMA suggests that engaging in positive activities predicts higher levels of positive emotion, but not lower levels of negative emotion. However, in a high stress environment, engaging in positive activities is also associated with decreased distress (Reich et al. 2003).

The magnitude, sudden impact, and wide-ranging effects of disasters provoke considerable uncertainty among the people affected, likely ‘coupling’ positive and negative emotional systems into one dimension. This in turn limits the options for careful appraisal and reasoned action in response to the challenges confronted. In a disaster zone, negative emotions are likely to dominate initially, in response to both the harm done and the dramatic increase in uncertainty about the future. Based on the DMA, we also predict that in such a high stress environment, engaging in activities that foster positive emotion, hopeful cognitions, and approach behaviors, would decrease negative emotion, fearful cognitions, and avoidance behaviors, thereby enhancing resilience. Indeed, positive emotions predicted increased resilience in a sample of college students, and the presence of negative emotions did not lessen this impact (Cohn et al. 2009).



**Fig. 5.1** Dynamic Model of Affect: affective space under conditions of low stress and high stress



Laboratory research has also demonstrated that the coupling of the emotional systems can be ‘undone’ by introducing positive stimuli to buffer the effects of negative stimuli. In an experimental study, high levels of stress were induced in research participants by presenting fear-eliciting stressors, which resulted in increased blood pressure, heart rate, and peripheral vasoconstriction (Fredrickson and Levenson 1998). These high levels of cardiovascular reactivity returned to resting levels significantly more rapidly among participants who immediately watched a short film that induced positive emotion, as opposed to a film that was either neutral or that induced sadness. This suggests the potential for bolstering the recovery element of resilience in a disaster zone through the introduction of stimuli that induce positive emotions, such as greener environments. The level of benefit garnered also depends on the type of positive stimulus. Kahn et al. (2009) report on several studies showing enhanced physiological benefits of direct contact with nature compared with viewing pleasing video displays of nature. In sum, there appears to be considerable potential for enhancing resilience through a variety of positive effects that come from community gardening.

## **Empirical Evidence of a Role for Community Gardening in Disaster Zones**

Due to limitations in the amount of research that has been conducted on community gardening per se, we review three main types of research in support of our contention that community gardening could bolster resilience in a disaster zone at both the

level of the individual and the community. First, there are carefully controlled studies that focus largely on the benefits of exposure to green environments. Second, there are natural experiments that provide further evidence of the benefits of green space. Third, there are descriptive, mostly uncontrolled studies of community gardens. We examine all of these types of research, highlighting how they lead to increases in positive emotion, cognition, and behavior.

## ***Individual Resilience***

### **Psycho-Physiological Benefits**

Although qualitatively different, disaster situations and medical situations can produce both physical and psychological pain. Several studies have assessed the effects of nature exposure on the psycho-physiological aspects of medical conditions and procedures. A rigorous, retrospective study based on hospital records of patients recovering from surgery found that those with a view of a deciduous tree from their window had shorter post-operative stays and used less pain medication than matched patients with a view of a brick wall (Ulrich 1984). In a clinical trial conducted in a hospital, Diette et al. (2003) examined the use of nature scene murals placed at the bedside, and tapes of nature sounds to listen to before, during, and after a painful procedure examining the throat, larynx, trachea, and lower airways. No difference was found between the treatment and control groups in terms of anxiety, but those listening to the sounds of nature and viewing nature scene murals reported less pain. In a post-disaster area with potentially limited supplies of pain-relieving medication, might those experiencing physical pain report less pain if they are taking in the sights and sounds of nature in a community garden?

The body's stress response is meant to aid in survival but is maladaptive if left 'on'. Elevated heart rate is an indicator of an engaged stress response. Wichrowski et al. (2005) examined the effects of horticultural therapy (HT) on the heart rates of cardiac rehabilitation inpatients. In a clinical trial comparing the effects of participation in a patient education class with those of a single 60-min HT session that involved a planting activity in a greenhouse, only the HT group showed significantly reduced heart rate (fell by  $4 \pm 9.6$  bpm). The implication for disaster areas is that community gardening could decrease stress responses that are left 'on' for too long, which has been causally implicated in a variety of stress-related diseases (Sapolsky 1998; Zautra 2003).

### **Cognitive Benefits**

In a post-disaster area, it is important to be able to think clearly in order to effectively problem-solve. Aspects of thinking clearly that have been well-studied in relation to exposure to green space are attention and working memory (WM).

WM is 'a multicomponent system responsible for active maintenance of information in the face of ongoing processing and/or distraction' (Conway et al. 2005, p. 770). This critical ability is necessary for coping with adversity (Klein and Boals 2001) and for pursuing activities that enhance life satisfaction and elicit positive emotion (Arnett et al. 1999).

Research on the cognitive benefits of contact with green space suggests that it enhances concentration and WM, which has clear implications for post-disaster resilience. Extending William James' work (1892), Kaplan (1995) described two kinds of attention: directed attention and fascination. Directed attention takes effort and is subject to voluntary control, whereas fascination is relatively effortless, and it might be difficult to turn one's attention away from something fascinating. Attention Restoration Theory (ART) posits that prolonged use of directed attention results in mental fatigue, characterized by irritability and difficulty with concentration, and that natural environments relieve mental fatigue because they elicit fascination, which allows directed attention to rest (Kaplan and Kaplan 1989; see also Chap. 7 by Wells, this volume).

A review of the empirical literature on ART prior to 2001 found persistent, positive results from contact with green space using diverse methodologies (Kuo 2001). In a study of low-income, public housing residents, Kuo (2001) found that living in greener surroundings, with pockets of trees and grass as opposed to pure concrete or asphalt, was associated with improved attentional performance. This in turn was linked to more effective management of major life issues, including coping with poverty, violence, and raising children. Additional research has documented the benefits of contact with greener environments on attention in children (Wells 2000; Kuo and Taylor 2004). Large, longitudinal studies of people aged 60 or older have demonstrated a significant association between gardening and reduced risk of dementia (Fabrigoule et al. 1995; Simons et al. 2006). Taken together, the literature indicates that community gardening could support cognitive vitality by enhancing WM, a critical faculty in coping with adversity and sustaining well-being.

### **Self-Esteem and Personal Mastery**

A study of over 1,000 adults living in New York City on the day of the World Trade Center disaster of September 11, 2001 showed that self-esteem was strongly related to mental well-being 2 years after the terrorist attacks (Adams et al. 2006). Of note, self-esteem was measured using items from Rosenberg's self-esteem scale, such as 'I certainly feel useless at times'. This likens self-esteem to making a contribution. In a disaster context, one might consider how to enhance self-esteem by providing opportunities to contribute. Community gardening is certainly one way to make a contribution and develop a sense of personal mastery. Milligan et al. (2004) note that gardening requires commitment, and the older, community gardening participants in their study commented on the 'satisfaction of the work', with one 79-year-old female describing her reaction to seeing things grow: 'I know I'm very limited in what I can do, but I think getting the results gives you a boost.... I take pride in

the results' (p. 1789). Older gardeners have described gardening as a mentally stimulating activity that provides opportunities for them to meet challenges—they report an interest in working with new plants and trying new techniques, which leads them to continuous learning and 'a sense of accomplishment, achievement, and recognition from successfully tending their gardens' (Infantino 2004, p. 14). In line with the DMA, this kind of positive engagement could help to offset some of the negative results of living in a red zone.

### **Emotional Benefits**

The DMA suggests that in stressful situations, it is important both to alleviate negative emotions and to engage in experiences that enhance positive emotions. Both pursuits seem to be facilitated by contact with green space. Patients recovering from surgery with a view from their hospital window of a deciduous tree had less negative affect than did patients with a view of a brick wall (Ulrich 1984). In children, high levels of natural vegetation in and near the home moderated the impact of life stress on the children's psychological well-being (Wells and Evans 2003). These findings imply that nature provides an important buffer of life stress and a potential mechanism of resilience.

In addition to research on the effects of nearby nature on mood and stress, the effects of gardening per se on mood have received some empirical assessment. Kaplan (1973) conducted pioneering research with 96 gardeners on the psychological benefits of gardening. Through interviews and questionnaires, she found that over and above the tangible benefits (e.g., cutting food expenses) and the desire for primary garden experiences (e.g., desire to be outside or to see things grow), people rated gardening most highly as a valuable way to spend time, relax, and feel a sense of accomplishment. A study of older leisure gardeners showed that gardening was seen as a harmonious sensory and aesthetic experience, which gardeners described with words like 'joyful' and 'peaceful' (Infantino 2004, p. 15). Wichrowski et al.'s (2005) study of hospital inpatients facing the stressful conditions of cardiac rehabilitation showed significant mood improvements among those who participated in horticultural therapy, compared to an education control group. This study is limited, however, by the possibility of selection bias due to a lack of random assignment and by only short-term follow-up.

Additional evidence of the effects of gardening on mood and stress comes from Stuart's (2005) program evaluation of California domestic violence shelters' community gardening programs. The investigator reported that she was prepared for the possibility that shelter residents' preoccupation with their trauma, their new surroundings, and the search for housing and jobs, would limit the effects they reported from the garden. Similar reservations could be entertained about the impact that community gardens might have in post-disaster areas. However, comments indicated that gardening soothed adjustment to the shelter, relieved stress, absorbed negativity, was motivating, provided a peaceful retreat, and engendered hope upon seeing new growth. The data also indicated that nurturing plants'

growth and producing food provided empowerment and a cross-cultural unifier (Stuart 2005). Others have also recorded improvements in well-being, psychological symptoms, tension, or distress following a gardening intervention (e.g., Austin et al. 2006; Heliker et al. 2000; Milligan et al. 2004; Richards and Kafami 1999).

### **Meaning-Making and Acceptance**

Meaning has been described as a frame of reference through which events may be interpreted (Marris 2002). This might be particularly important in a disaster context. Personal meaning has been found to contribute to sense of well-being and overall mental health, although some conceptualize it as a component of well-being rather than a contributing factor (Ryff and Singer 1998). In phenomenological research, leisure gardeners reported on their relationship with nature as one that involved caring, committed, mutual, and intimate connections, not only with other people, but also with nature and past memories (Infantino 2004). Such a sense of connection to nature could contribute to a larger framework of meaning in which people take comfort and make sense of life.

Research on mindful gardening—an intervention being developed by the authors in which participants learn mindfulness (or non-judgmental awareness) in the context of group gardening—has yielded fascinating comments about the ways that the garden helps people cope with adversity and make sense of, or simply accept, the difficult events of their lives (Okvat 2011). For example, one gardener facing the stressors of a chronically ill spouse, reduced work hours and pay, possible layoff, and depression stated, ‘Maybe there’s a cycle for things—the garden goes through cycles. And you can apply that to your life’. Another gardener, coping with family conflicts, bereavement, reduced work hours and pay, and depression, described how weeding impacted her coping:

Another thing that has helped me tremendously is weeding the garden...sometimes you have to weed things. These experiences that have happened with my family, I don’t understand, but I need to get the negativity out of my life. The negativity cannot continue to hold me down...[Weeding] helped me a lot...and I feel so much better. I’m going forward.

These comments demonstrate that gardening can contribute to decreased negative emotion, enhanced positive emotion, and a sense of connection with the larger cycles of life so that difficult times might be re-framed as natural, transitory periods. Meaning-making and acceptance are promising areas for research on gardening in disaster zones (see also Chap. 25 by Svendsen and Campbell, this volume).

### ***Community Resilience***

Kaplan and Kaplan (1989, 2005) describe the New York City Housing Authority’s flower competition for tenants, which began in the early 1960s. Most of the tenants in these public housing buildings had many problems, such as poverty, crime-ridden

environments, and health or substance abuse issues, and with many of their basic needs unmet, one would hardly expect them to dedicate themselves to raising flowers for competition. However, thousands participated, and one judge ‘recognized that much more was happening here than the growth of pretty blossoms’ (Kaplan and Kaplan 1989, p. 166). Neighbors came together cooperatively to protect their gardens from vandalism and ‘organized window watches with scheduled shifts so that upper-floor residents could mobilize ground-floor “coworkers” in the event that protective action was needed’ (Kaplan and Kaplan 1989, p. 166). The tenants also fixed up the surroundings, painting areas adjacent to the gardens to coordinate with the flowers. This kind of positive engagement through gardening, beautification, and community organizing reflects hope for better conditions and the agency to bring these conditions about, which might be quite important to demoralized or disenfranchised people in a disaster zone.

### **Social Network Benefits**

Social network analyses examine patterns of ties in social systems. Social networks affect problem-solving and goal attainment, and a rigorous, longitudinal social network analysis found that happiness can spread from person to person within social networks (Fowler and Christakis 2008). We feel that social networks are a critical element of resilience underlying social support and community development. Thus, before examining how community gardens can bring people together and lead to support and a sense of community, we first review the impact of green spaces on social networks.

In urban areas, availability and proximity of green spaces, especially trees and grass, have been found to correlate positively with social contact among neighbors (Sullivan et al. 2004) and to help older adults integrate into social networks in the inner city (Kweon et al. 1998). Research with low-income residents of inner city, high-rise buildings demonstrated that living adjacent to common spaces with higher levels of vegetation predicted lower ratings of general life stress, increased familiarity with nearby neighbors, more socializing with neighbors, higher ratings of local sense of community, and more frequent use of those common spaces, with the latter variable mediating the positive relation between greenness and neighborhood social ties (Kuo et al. 1998). Additionally, this study found a more distal benefit of green common spaces, i.e., that neighborhood social ties significantly predicted a greater sense of safety and sense of adjustment to living in the neighborhood. Overall, green space appears to provide an opportunity for social contact and expansion of neighborhood social networks, which serves as a foundation for building a sense of community and developing social support.

Indeed, enhancing social networks could be especially important to minimizing the level of disaster stemming from adverse natural conditions. For example, in a ‘social autopsy of the 1995 Chicago heat wave’ disaster, in which over 500 died directly from the heat—a mortality rate not attributable to the weather—one of the factors implicated was the social isolation of poor older adults (Klinenberg 1999). This kind of

social factor increases vulnerability and is critical in determining the damage that will be caused by a 'natural disaster'. Conversely, a strong social network was one of several conditions attributed to having enabled the 23 % of Chicagoans of Latino heritage to have only 2 % of the heat wave deaths (Klinenberg 1999).

Urban community gardens, in particular, bring residents together into a denser network than their urban roles normally allow (Glover 2003) and offer a participatory approach to community development (Saldivar-Tanaka and Krasny 2004). Research among older adults in England found that communal gardening decreased social isolation and aided in the development of social networks, which can act as a buffer to stressors (Milligan et al. 2004). Ideally, community gardens could be established prior to the occurrence of a disaster, so that strong social networks already exist in which people know their neighbors and their neighbors' resources—tools, knowledge, etc.—and can help one another more quickly and effectively.

### **Multicultural Relations**

Community gardens provide an opportunity for people of different cultures to interact socially and develop friendships (Sigelman et al. 1996). This could be particularly relevant in a post-conflict zone where opposing sides are in need of reconciliation. Based on previous empirical research, Jackman and Crane (1986) summarize four conditions to support beneficial outcomes of intergroup contact: (1) the context should be non-competitive, (2) contact should be personal, informal, and one-to-one, (3) any relevant authorities should approve the contact, and (4) the setting must confer equal status of different races rather than duplicating the usual racial status differential. All four conditions are frequently found in a community garden. For example, in St. Louis, African-American and white community gardeners reported in a survey that the gardens resulted in interracial contact and the potential for positive friendships, although those with higher levels of interracial contact did not show higher levels of trust for neighbors of different races (Glover et al. 2004).

### **Sense of Community and Social Support**

Social networks open the door for a sense of community and social support to be possible. Community gardeners report that the gardens foster a sense of community (Schmelzkopf 1996). In her study of community gardeners in tough, impoverished neighborhoods of New York City, Schmelzkopf (1996) commented that 'over and over, gardeners told of how gardening and the socializing in the gardens make them feel as though they are a part of the community and a part of the land...' (p. 373). More tangible forms of social support can also arise. For example, Milligan et al. (2004) found that community gardens led to more neighbor-to-neighbor assistance, e.g., when one member was ill, injured, or busy, other members would tend their plots. This kind of direct instrumental support would be especially important in a disaster context.

## Empowerment and Community Organizing

Disasters could be interpreted as overwhelming and provoke a sense of helplessness, which is particularly detrimental when the post-disaster context calls for the community to come together to organize recovery efforts. In these situations, empowerment is needed. Empowerment is ‘a process: the mechanism by which people, organizations, and communities gain mastery over their lives’ (Rappaport 1981, p. 3). Theoretically, community gardening could contribute to empowerment outcomes such as mastery and sense of control, largely via control of resources (food, land, tools) by disadvantaged people, and could enhance connections, health, and well-being, because community gardening involves multiple empowerment processes. For example, connecting with others, participation in decision-making, targeting local issues, and resisting globalization (of food production) might have empowering influences.

Additionally, community gardens in red zones bring together people who often organize to problem-solve around other important issues (Schrieber 1998). Survey research on 63 community gardens found that gardens in low-income neighborhoods were four times as likely as those in non-low-income areas to lead to community organizing around neighborhood issues other than the garden (Armstrong 2000), such as solving local crime problems. In times of adversity, ‘community organization can stimulate cooperation and local self-reliance, at little or no cost, thus cushioning and protecting the community from outside adversity’ (Berkowitz 2000, p. 332). Thus community organizing is especially relevant in the adverse context of a disaster, and again, it is this kind of positive engagement that the DMA suggests will lead to decreased negative emotion under conditions of high stress.

## Conclusions

Evidence suggests that community gardening has important implications for bolstering psychosocial resilience after a disaster, especially by enhancing cognitive capacity, positive emotions, and community engagement. At the same time, important investigations remain to be conducted to determine whether and how community gardening actually impacts resilience. Researchers need to identify valid, reliable indicators of resilience factors in a disaster context and design protocols to examine the utility of gardening as a means of enhancing resilience. For example, does community gardening in fact expand social networks or help people make meaning in the face of tragedy? Does community gardening help people reconstruct a sense of self-efficacy, maintain or establish a sense of social contribution, and support the ability to engage in rebuilding one’s life? Future research should consider the effects of community gardening in disaster contexts on all aspects of resilience—recovery from the negative, sustainability of purpose, and growth and transformation.



We believe that creating an extensive network of community gardens prior to disasters would reap multi-level benefits and bolster resilience capacity before it is acutely needed. If communities establish gardens after a disaster has occurred, their benefits could be maximized if they are developed with targeted aims. For example, survivors who are forced to relocate might be invited to establish a new garden or to participate in an existing community garden in order to protect or develop important social roles and relationships. Survivors with pre-existing psychological disorders could be invited to assist in a garden. These recommendations follow from research demonstrating a significant association between pre-existing psychological problems, and both psychological and physical post-disaster problems (Dirkzwager et al. 2006).

Resilience processes can be found in all systems. With human wounds, inflammation follows quickly after tissue damage as the body responds to remove bacteria, protect the site from further damage, and return the site to homeostasis (Christian et al. 2006). The red zone is also a wound under repair, except that in the case of disasters, it is on the surface of the earth, an area of land and people inflamed by events that disturb the natural balance of forces that sustain them. Healing is what it is called for in the body, and the term is an apt metaphor for what needs to take place on the land and in the community living there. Just as biodiversity can aid in the recovery of an ecosystem facing adversity, complexity of emotional experience can aid in the recovery of people facing disasters. It is vital to both assuage negative emotions and pursue engaging positive experiences. Community gardens offer a positive experience with the chance to reduce suffering and promote healing, while simultaneously strengthening the community and caring for the earth herself, opening a door to growth and transformation on multiple levels.

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## References

- Adams, R. E., Boscarino, J. A., & Galea, S. (2006). Social and psychological resources and health outcomes after the World Trade Center disaster. *Social Science & Medicine*, *62*, 176–188.
- Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health & Place*, *6*, 319–327.
- Arnett, P. A., Higginson, C. I., Voss, W. D., Bender, W. I., Wurst, J. M., & Tippin, J. M. (1999). Depression in multiple sclerosis: Relationship to working memory capacity. *Neuropsychology*, *13*, 546–556.
- Austin, E. N., Johnston, Y. A. M., & Morgan, L. L. (2006). Community gardening in a senior center: A therapeutic intervention to improve the health of older adults. *Therapeutic Recreation Journal*, *40*(1), 48–56.
- Berkowitz, B. (2000). Community and neighborhood organization. In J. Rappaport & E. Seidman (Eds.), *Handbook of community psychology* (pp. 331–357). New York: Kluwer Academic/Plenum Publishers.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *The American Psychologist*, *59*(1), 20–28.

- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–766.
- Bromet, E. J., & Dew, M. A. (1995). Review of psychiatric epidemiologic research on disasters. *Epidemiologic Reviews, 17*, 113–119.
- Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology, 76*, 839–855.
- Canli, T., Zhao, Z., Desmond, J. E., Kang, E., Gross, J., & Gabrieli, J. D. (2001). An fMRI study of personality influences on brain reactivity to emotional stimuli. *Behavioral Neuroscience, 115*, 33–42.
- Christian, L. M., Graham, J. E., Padgett, D. A., Glaser, R., & Kiecolt-Glaser, J. K. (2006). Stress and wound healing. *Neuroimmunomodulation, 13*, 337–346.
- Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2003). Emotional style and susceptibility to the common cold. *Psychosomatic Medicine, 65*, 652–657.
- Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion, 3*, 361–368.
- Common Ground Relief. (2009). *About us*. Retrieved December 6, 2009, from <http://www.commongroundrelief.org/?q=node/25>
- Conway, A. R. A., Kane, M. J., Bunting, M. F., Hambrick, D. Z., Wilhelm, O., & Engle, R. W. (2005). Working memory span tasks: A methodological review and user's guide. *Psychonomic Bulletin and Review, 12*, 769–786.
- Davis, S. (1998). Development of the profession of horticultural therapy. In S. P. Simson & M. C. Straus (Eds.), *Horticulture as therapy: Principles and practice* (pp. 3–18). New York: The Haworth Press.
- Diette, G. B., Lechtzin, N., Haponik, E., Devrotes, A., & Rubin, H. R. (2003). Distraction therapy with nature sights and sounds reduces pain during flexible bronchoscopy: A complementary approach to routine analgesia. *Chest, 123*, 941–948.
- Dirkzwager, A. J. E., Grievink, L., Van der Velden, P. G., & Yzermans, C. J. (2006). Risk factors for psychological and physical health problems after a man-made disaster. *The British Journal of Psychiatry, 189*, 144–149.
- Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review, 66*, 183–201.
- Fabrigoule, C., Letenneur, L., Dartigues, J. F., Zarrouk, M., Commenges, D., & Barberger-Gateau, P. (1995). Social and leisure activities and risk of dementia: A prospective longitudinal study. *Journal of the American Geriatrics Society, 43*, 485–490.
- Finch, J. F., Okun, M. A., Barrera, M., Jr., Zautra, A. J., & Reich, J. W. (1989). Positive and negative social ties among older adults: Measurement models and the prediction of psychological distress and well-being. *American Journal of Community Psychology, 17*, 585–605.
- Fowler, J. H., & Christakis, N. A. (2008). Dynamic spread of happiness in a large social network: Longitudinal analysis over 20 years in the Framingham Heart Study. *British Medical Journal, 337*, a2338.
- Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion, 12*, 191–220.
- Glover, T. D. (2003). The story of the Queen Anne Memorial Garden: Resisting a dominant cultural narrative. *Journal of Leisure Research, 35*, 190–212.
- Glover, T. D., Parry, D. C., & Shinew, K. J. (2004). Leisure spaces as potential sites for interracial interaction: Community gardens in urban areas. *Journal of Leisure Research, 36*, 336–355.
- Heliker, D., Chadwick, A., & O'Connell, T. (2000). The meaning of gardening and the effects on perceived well-being of a gardening project on diverse populations of elders. *Activities, Adaptation, & Aging, 24*, 35–56.
- Infantino, M. (2004). Gardening: A strategy for health promotion in older women. *The Journal of the New York State Nurses' Association, 35*, 10–17.

- Jackman, M. R., & Crane, M. (1986). Some of my best friends are black: Interracial friendships and whites' racial attitudes. *Public Opinion Quarterly*, *50*, 459–486.
- Jahoda, M. (1958). *Current concepts of positive mental health*. New York: Basic Books.
- James, W. (1892). *Psychology: The briefer course*. New York: Holt.
- Kahn, P. H., Jr., Severson, R. L., & Ruckert, J. H. (2009). The human relation with nature and technological nature. *Current Directions in Psychological Science*, *18*, 37–42.
- Kaplan, R. (1973). Some psychological benefits of gardening. *Environment and Behavior*, *5*, 145–162.
- Kaplan, S. (1995). The urban forest as a source of psychological well-being. In G. A. Bradley (Ed.), *Urban forest landscapes: Integrating multidisciplinary perspectives* (pp. 100–108). Seattle: University of Washington Press.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.
- Kaplan, R., & Kaplan, S. (2005). Preference, restoration, and meaningful action in the context of nearby nature. In P. F. Barlett (Ed.), *Urban place: Reconnecting with the natural world* (pp. 271–298). Cambridge, MA: MIT Press.
- Klein, K., & Boals, A. (2001). The relationship of life event stress and working memory capacity. *Applied Cognitive Psychology*, *15*, 565–579.
- Klinenberg, E. (1999). Denaturalizing disaster: A social autopsy of the 1995 Chicago heat wave. *Theory and Society*, *28*, 239–295.
- Kuo, F. E. (2001). Coping with poverty: Impacts of environment and attention in the inner city. *Environmental Behavior*, *33*, 5–34.
- Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health*, *94*, 1580–1586.
- Kuo, F. E., Sullivan, W. C., Coley, R. L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, *26*, 823–851.
- Kweon, B.-S., Sullivan, W. C., & Wiley, A. R. (1998). Green common spaces and the social integration of inner-city older adults. *Environment and Behavior*, *30*, 832–858.
- Lawson, L. J. (2005). *City bountiful: A century of community gardening in America*. Berkeley: University of California Press.
- Lydersen, K. (2009, July 4). Landfill worries cloud hopes for New Orleans gardens. *The Washington Post*. Retrieved December 14, 2009, from <http://www.washingtonpost.com/wp-dyn/content/article/2009/07/03/AR2009070302436.html?hpid=moreheadlines>
- Marris, P. (2002). Holding onto meaning through the life cycle. In R. S. Weiss & S. A. Bass (Eds.), *Challenges of the third age: Meaning and purpose in later life* (pp. 13–28). London: Oxford.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *The American Psychologist*, *56*(3), 227–238.
- McFarlane, A. C. (1988). Aetiology of post-traumatic stress disorders following a natural disaster. *The British Journal of Psychiatry*, *152*, 116–121.
- McFarlane, A. C. (1989). The aetiology of post-traumatic morbidity: Predisposing, precipitating and perpetuating factors. *The British Journal of Psychiatry*, *154*, 221–228.
- Milligan, C., Gatrell, A., & Bingley, A. (2004). 'Cultivating health': Therapeutic landscapes and older people in northern England. *Social Science & Medicine*, *58*, 1781–1793.
- Moskowitz, J. T. (2003). Positive affect predicts lower risk of AIDS mortality. *Psychosomatic Medicine*, *65*, 620–626.
- Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry*, *65*, 207–239.
- Okvat, H. A. (2011). A pilot study of the benefits of traditional and mindful community gardening for urban older adults' subjective well-being. Doctoral dissertation, Arizona State University, Tempe.

- Rappaport, J. (1981). In praise of paradox: A social policy of empowerment over prevention. *American Journal of Community Psychology*, 9, 1–25.
- Reich, J. W., & Zautra, A. J. (1991). Experimental and measurement approaches to internal control in older adults. *Journal of Social Issues*, 47, 143–188.
- Reich, J. W., Zautra, A. J., & Davis, M. C. (2003). Dimensions of affect relationships: Models and their integrative implications. *Review of General Psychology*, 7, 66–83.
- Reich, J. W., Zautra, A. J., & Hall, J. S. (Eds.). (2010). *Handbook of adult resilience*. New York: Guilford.
- Richards, H. J., & Kafami, D. M. (1999). Impact of horticultural therapy on vulnerability and resistance to substance abuse among incarcerated offenders. *Journal of Offender Rehabilitation*, 29, 183–193.
- Rubonis, A. V., & Bickman, L. (1991). Psychological impairment in the wake of disaster: The disaster–psychopathology relationship. *Psychological Bulletin*, 109, 384–399.
- Russek, L. G., & Schwartz, G. E. (1997). Perceptions of parental caring predict health status in midlife: A 35-year follow-up of the Harvard Mastery of Stress Study. *Psychosomatic Medicine*, 59, 144–149.
- Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *The American Journal of Orthopsychiatry*, 57(3), 316–331.
- Ryff, C. D., & Singer, B. (1998). The role of purpose in life and personal growth in positive human health. In P. T. P. Wong & P. S. Fry (Eds.), *The human quest for meaning: A handbook of psychological research and clinical applications* (pp. 213–235). Mahwah: Erlbaum.
- Saldivar-Tanaka, L., & Krasny, M. E. (2004). Culturing community development, neighborhood open space, and civil agriculture: The case of Latino community gardens in New York City. *Agriculture and Human Values*, 21, 399–412.
- Sapolsky, R. M. (1998). *Why zebras don't get ulcers: An updated guide to stress, stress related diseases, and coping*. New York: W. H. Freeman.
- Schmelzkopf, K. (1996). Urban community gardens as contested space. *Geographical Review*, 85, 364–381.
- Schrieber, P. (1998). Community gardening: Design, techniques, and tools. In S. P. Simson & M. C. Straus (Eds.), *Horticulture as therapy: Principles and practices* (pp. 377–397). Binghamton: Food Products Press/Haworth Press.
- Seeman, T. E., Berkman, L. F., Charpentier, P. A., Blazer, D. G., Albert, M. S., & Tinetti, M. E. (1995). Behavioral and psychosocial predictors of physical performance: MacArthur studies of successful aging. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 50, 177–183.
- Sigelman, L., Bledsae, T., Welch, S., & Combs, W. (1996). Making contact: Black-white social interaction in an urban setting. *The American Journal of Sociology*, 101, 1306–1332.
- Simons, L. A., Simons, J., McCallum, J., & Friedlander, Y. (2006). Lifestyle factors and risk of dementia: Dubbo study of the elderly. *The Medical Journal of Australia*, 184, 68–70.
- Stone, A. A., & Neale, J. M. (1982). Development of a methodology for assessing daily experiences. In A. Baum & J. Singer (Eds.), *Advances in environmental psychology: Environment and health* (Vol. 4, pp. 49–83). Hillsdale: Erlbaum.
- Stuart, S. M. (2005). Lifting spirits: Creating gardens in California domestic violence shelters. In P. F. Barlett (Ed.), *Urban place: Reconnecting with the natural world* (pp. 61–88). Cambridge, MA: MIT Press.
- Sullivan, W. C., Kuo, F. E., & DePooter, S. F. (2004). The fruit of urban nature: Vital neighborhood spaces. *Environment and Behavior*, 36, 678–700.
- Sutton, S. K., & Davidson, R. J. (1997). Prefrontal brain asymmetry: A biological substrate of the behavioral approach and inhibition systems. *Psychological Science*, 8, 204–210.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. E. J. Wals (Ed.), *Social learning towards a sustainable world: Principles, perspectives and praxis* (pp. 149–164). Wageningen: Wageningen Academic Publishers.

- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, *224*, 420–421.
- Watson, D., Wiese, D., Vaidya, J., & Tellegen, A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology*, *76*, 820–838.
- Wells, N. M. (2000). At home with nature: Effects of “greenness” on children’s cognitive functioning. *Environment and Behavior*, *32*, 775–795.
- Wells, N. M., & Evans, G. W. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior*, *35*, 311–330.
- Wichrowski, M., Whiteson, J., Haas, F., Mola, A., & Rey, M. J. (2005). Effects of horticultural therapy on mood and heart rate in patients participating in an inpatient cardiopulmonary rehabilitation program. *Journal of Cardiopulmonary Rehabilitation*, *25*, 270–274.
- Zautra, A. J. (2003). *Emotions, stress, and health*. New York: Oxford.
- Zautra, A. J., Hall, J. S., & Murray, K. E. (2008). Resilience: A new integrative approach to health and mental health research. *Health Psychology Review*, *2*, 41–64.

## Chapter 6

# Turning Degraded Open Space into a Community Asset – The Soweto Mountain of Hope Greening Case

**Soul Shava and Mandla Mentoorm**

**Abstract** Environmental and community educator Soul Shava and community greening activist Mandla Mentoorm recount the story of South Africa’s Soweto Mountain of Hope—a community garden that arose from the ashes of apartheid violence in Johannesburg’s largest township.

**Keywords** SOMOHO • Soweto • Tshiawelo kopje • Gauteng • Earth Summit 2002

Tshiawelo Kopje<sup>1</sup> is a 45-acre hill comprising a disused water tower and a surrounding ridge within Soweto Township, South Africa. Prior to 2001, it had become an unsightly illegal garbage dumping site characterized by violent crime. Its untended nature and the vegetation overgrowth made it easy for criminal elements within the community to operate without being seen. The frequency of violent crime, such as muggings, robberies, rapes and murder, turned the hill into a dangerous no-go area for the township community. Such urban rot has been typical of highly populated black townships in South Africa, reflecting the poor planning of high density urban settlements, and decades of political oppression, poverty and environmental neglect due to poor service delivery.

Soweto resident Mr. Mandla Mentoorm had since 1990 been working to clean up the local environment by recycling waste into art. He formed a local NGO to engage the youth called Amandla Waste. At the onset of independence in 1994,

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<sup>1</sup> A kopje is a local term derived from Afrikaans referring to a hill or small mountain.

S. Shava (✉)

Department of Science & Technology Education, University of South Africa,  
P.O. Box 392, Pretoria UNISA 0003, South Africa  
e-mail: shavas@unisa.ac.za

M. Mentoorm

Soweto Mountain of Hope (SOMOHO),  
562 Mandawana Street, Soweto, South Africa  
e-mail: mentoorm@vodamail.co.za

this effort was expanded through the Children Loving Nature Project, a community greening initiative aimed at school-age children. However, the sight of the neglected Tshiawelo Kopje, situated close to Mr. Mentoer's house, had always been a source of sorrow as it symbolized the negative aspects of the community in which he resided. Mr. Mentoer prayed about making a positive environmental change in his immediate vicinity. He then embarked on mobilizing the unemployed youth in the community to change their local surroundings from havens of crime and desolation into havens of happiness and social cohesion. Mr. Mentoer's action was driven by his strong conviction that if an open space within a community becomes dangerous, it is because the community allows it to be dangerous, and similarly it is the community members who can bring about meaningful change in their own living environment.

Tshiawelo Kopje was targeted for conversion into a community park that would serve as an Environment, Art and Culture Center under the name Soweto Mountain of Hope (SOMOHO). This work commenced in 2001. The resultant community agency was instrumental in clearing the once degraded mountain and turning it into a beautiful green terrace planted with vegetables, fruit trees, indigenous trees and medicinal plants. The planted area is dotted with dialogue circles (see Fig. 6.2) made of rocks beaded into circles that are used for discussions, as well as makeshift dance theatres. Other significant features include garden plots in the shape of AIDS ribbons to commemorate AIDS deaths in the community, given that SOHOMO is along the main thoroughfare to the local cemetery. The old three-story water tower has been painted with colorful murals and decorated with recycled metal that has been molded into peace symbols and AIDS ribbons among other features (Figs. 6.1 and 6.2).

The reclamation of the kopje has resulted in multiple benefits for the community:

- a functional and aesthetically pleasant neighborhood park;
- reduction in crime (there have been no incidents of crime in the park since its inception);
- active meaningful engagement of the unemployed community youth and an increase in job opportunities for these youth (poverty reduction and self-employment creation; Fig. 6.3);
- an increased sense of belonging and cohesion, and a realization by the community that they can effect positive change from their own local efforts and in the process bring healing to the physical and social community and renewed hope for a better future for themselves and the succeeding generations; and
- a center for community groups and activities, including recycling waste into economic assets (Amandla Waste Creation), theatre and music productions (Dzomo Performing Arts), internet café and other technology (Information Technology Organization), food catering for visitors and social functions, bike tours for tourists, and a sewing cooperative.

In 2002, SOMOHO was granted a 10-year lease by the municipality to officially develop the area for the community. Mr. Mentoer's house serves as the



**Fig. 6.1** Disused water tower decorated with art and dialogue circle in the forefront

headquarters of this community organization. SOMOHO has worked collaboratively with the Environmental Sector of the local Ward Committee towards greening of the whole township area. As a result of this collaborative effort, the Ward has successively won the yearly Clean and Green Program award for Gauteng from 2007 to 2009.

Shortly after SOMOHO's creation, Johannesburg hosted the 2002 Earth Summit. SOMOHO hosted a parallel Children's Earth Summit, emphasizing the role that the youth can play in greening their lived-in environment. Five-thousand visitors attended the SOMOHO Children's Earth Summit. Notably, it was graced by key international figures including then UN Secretary General, Mr. Kofi Annan, and the famed primatologist and UN Ambassador of Peace Janet Goodall, who appointed Mr. Mentoer as the South Africa Coordinator of Roots and Shoots, her international environmental and humanitarian organization for youth. A plaque commemorating the Summit and Mr. Annan's visit lies at the base of the kopje.

Following the success of the SOMOHO project, Mr. Mentoer has recently embarked on expanding the program of training the youth to value and have ownership and responsibility over their local environmental resources and culture to other areas in the Gauteng Province. These youth-driven environmental programs include those in the East Rand communities under Ekurhuleni Local Municipality in the greater Johannesburg area in Gauteng. Thanks to Mr. Mentoer's leadership and the efforts of thousands of Township youth and adult residents, the Soweto Mountain of Hope has become an international symbol of greening resilience, rebirth and re-growth.





**Fig. 6.2** Thatch umbrellas (within a dialogue circle) as resting sites for visitors and for dialogues with metal artwork from bicycle rim in the forefront



**Fig. 6.3** Youth working in gardening plots in the hill site

# Chapter 7

## The Role of Nature in Children's Resilience: Cognitive and Social Processes

Nancy M. Wells

**Abstract** This chapter examines the convergence of two literatures: one addressing human resilience, the other focused on the natural environment and human well-being. Research evidence suggests that views of and access to nearby nature serve as protective factors, bolstering the resilience of youth. However little effort has been made to explicitly integrate resilience or positive psychology with nature and well-being research and theory. First, a brief historical overview of childhood resilience literature is presented with a focus on the evolution from protective factors to protective mechanisms. Second, the chapter presents research connecting nature to positive outcomes, particularly in the context of stress, adversity, and other risk factors. Third, we consider two particularly viable, well-grounded mechanisms linking nature to resilience: social relationships and cognitive functioning. Lastly, directions for future research are presented. Further examination of the intersection of resilience and the natural environment holds promise for theory as well as practice, and has the potential to substantially influence the lives of children facing the challenges of life in a red zone.

**Keywords** Children • Nature • Resilience

*Environmental psychologist Nancy Wells integrates research on nature and children's well-being with the literature on children's psychological resilience. In so doing, she suggests cognitive and social interaction mechanisms for how interaction with nature might be a source of psychological resilience for children in red zones.*

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N.M. Wells (✉)

Department of Design and Environmental Analysis, College of Human Ecology,  
MVR Hall, Cornell University, Ithaca, NY 14853, USA  
e-mail: nmw2@cornell.edu

## Focus on Health and Wellness

In recent decades, a significant shift has occurred across many health and social science disciplines. Interest has re-oriented from a focus on disease and illness to an emphasis on health and well-being. This transition is rooted in the concept of health articulated by the World Health Organization:

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being ... (World Health Organization 1946).

This definition expresses a focus on wellness rather than illness and also conveys that health is not under the exclusive purview of healthcare practitioners, but rather, is relevant to a wide variety of disciplines. This broader conceptualization of health has been associated with a gradual movement away from the historical preoccupation with negative influences on human health and well-being, from questions such as: *What are the factors that make us sick? What experiences lead to dysfunction or depression? What environmental factors result in distress or illness?* to a focus on what promotes health and successful functioning: *What are characteristics of people, places, programs that enhance well-being?* This paradigm shift has occurred across disciplines, including psychology (Sheldon and King 2000; Zautra 2009), urban planning (Barton and Tsourou 2000; Wells et al. 2010), gerontology (Rowe and Kahn 1998), and public health (Srinivasan et al. 2003; Ozer 2006) bringing attention toward salutogenesis—the origins of health, rather than pathogenesis—the origins of disease and pathology (Barton and Tsourou 2000).

In the field of psychology, an interest in *resilience and positive psychology* has emerged after decades of focus on dysfunction and disorder. Many researchers are now concerned with what factors explain the patterns exhibited by people who, despite facing considerable ‘slings and arrows’ of challenge and adversity, defy the odds and overcome misfortune, not merely by surviving, but by thriving. More specifically within the subfield of environmental psychology, attention has increasingly focused on environmental features that enhance health (Stokols 1992; Taylor et al. 1997), beyond the environmental stressors and toxins that undermine health and function. One substantial area of inquiry examines the beneficial effects of the natural environment on human health and functioning (Frumkin 2001; Wells and Donofrio 2011). Researchers have studied how exposure to (e.g., views of, proximity to, walks in, images and videotapes of) nature (i.e., trees, vegetation, parks and open space) relates to a variety of outcomes including social, psychological, physical, cognitive, and physiological well-being (see also Okvat and Zautra, Chap. 5, Chawla, Chap. 8, and Tidball, Chap. 4, this volume).

Remarkably, despite the seemingly convergent foci of research on human resilience and studies of nature and well-being, relatively little attention has been given explicitly to the connection between the two literatures (for an exception, see Chawla, Chap. 8, this volume). By examining the role of nature as a resilience resource in the lives of children, this chapter provides a foundation for understanding the processes

that explain how greening might contribute to the well-being of youth living within a red zone. The paper will present a brief overview of childhood resilience research followed by an examination of the literature linking nature to children's well-being, with a focus on mechanisms that could plausibly explain *how* nature contributes to children's resilience. Lastly, directions for future research will be considered.

## Childhood Resilience

Biologists often talk about the 'ecology' of an organism: the tallest oak in the forest is the tallest not just because it grew from the hardest acorn; it is the tallest also because no other trees blocked its sunlight, the soil around it was deep and rich, no rabbit chewed through its bark as a sapling, and no lumberjack cut it down before it matured. We all know that successful people come from hardy seeds. But do we know enough about the sunlight that warmed them, the soil in which they put down the roots, and the rabbits and lumberjacks they were lucky enough to avoid? (Gladwell 2008, pp. 19–20).

This section presents a brief summary of the childhood resilience literature. This is not an exhaustive review, but rather a thumbnail sketch, emphasizing the key trends and themes.

### *Historical Overview: Protective Factors and Protective Mechanisms*

#### Protective Factors

A useful step to understanding resilience is to consider the historical origins of childhood resilience research. This has been presented in some detail by Luthar (2006) and is summarized here. Some of the earliest studies of resilience focused on the children of schizophrenic parents (Anthony 1974; Garnezy 1974; Rutter 1979). While prior research had examined the maladaptive behavior typically exhibited by the offspring of schizophrenics, researchers began to notice the remarkably healthy, adaptive pattern of behaviors exhibited by a subset of these children, who were referred to as 'resilient' or 'invulnerable'. Early studies focused on identifying the personal qualities of these youth. Characteristics such as creativity and competence were noted. Also in the 1970s, researchers studied children in the context of stressful life events (e.g., death, injury) and continued to identify characteristics of children who were able to cope effectively (Murphy and Moriarty 1976). These included charisma and the ability to regulate emotions, for example. Subsequently, the ground-breaking research of Werner and colleagues (Werner and Smith 1982) tracked an entire birth cohort on the island of Kauai, Hawaii. Examining a variety of risk factors ranging from poverty to family instability, additional protective factors were identified including dispositional attributes such as sociability, as well as factors outside the individual such as ties of affection within the family, and informal support outside the home.

**Table 7.1** Characteristics of resilient youth (Adapted from Masten and Coatsworth 1998)

Source	Characteristic
Individual	Good intellectual functioning
	Appealing, sociable, easygoing disposition
	Self-efficacy, self-confidence, high self-esteem
	Talents
	Faith
Family	Close relationship to caring parent figure
	Authoritative parenting: warmth, structure, high expectations
	Socioeconomic advantages
	Connections to extended supportive family networks
Wider social context	Bonds to prosocial adults outside the family
	Connections to prosocial organizations
	Attending effective schools

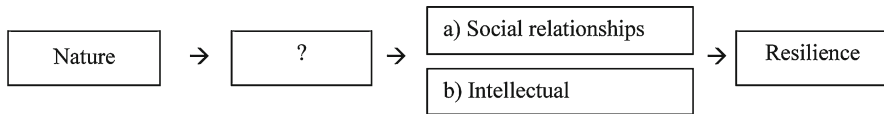
Although childhood resilience research began with a focus on identification of personal characteristics associated with resilience, over time it was increasingly recognized, beginning with the work of Emmy Werner and others, that resilience could originate from factors outside of the child. This yielded the articulation of three sets of factors related to the development of resilience: (1) individual attributes of the child, such as self-esteem, (2) characteristics of the child's family, and (3) features of the wider social environment (Rutter 1987; Luthar and Cicchetti 2000). Table 7.1, derived from Masten and Coatsworth (1998), provides a summary of these three groups of factors related to youth resilience.

### Protective Mechanisms

More recently, researchers have moved beyond the identification of protective *factors* per se toward an understanding of the *processes* that underlie resilience. Rutter (1987, p. 317) states: 'The search is not for broadly defined protective factors, but rather, for the developmental and situational mechanisms involved in protective processes'. Rutter suggests four types of mechanisms related to: (1) reduction of risk impact, (2) reduction of negative chain reactions, (3) establishment and maintenance of self-esteem and self-efficacy, and (4) opening of opportunities. An understanding of processes, Rutter argues, is particularly useful because it enables the formulation of preventive strategies and interventions.

### *Linking Resilience and Nature Research*

In an attempt to assess the plausible linkages between the resilience literature and the nature and well-being evidence, I first briefly present research connecting nature



**Fig. 7.1** Linking nature to children’s resilience

to positive outcomes, particularly in the context of stress, adversity, or other risk factors. Second, I consider the viable mechanisms linking nature to resilience. Interestingly, the two factors most solidly grounded as predictors of resilience are both particularly well-represented in the literature examining nature and human well-being. In reference to Table 7.1, Masten and Coatsworth (1998, p. 212) state ‘the two most widely reported predictors of resilience appear to be relationships with caring prosocial adults and good intellectual functioning’. Building on Rutter’s (1987) call for an understanding of *processes* through which protective factors are acquired, the following section reviews the nature and well-being evidence and considers the two most plausible linkages between nature exposure and resilience: how access to nature (1) supports social relationships and (2) bolsters intellectual (cognitive) functioning (Fig. 7.1).

## Nature: What Role in Youth Resilience?

Pharoah... crouched in the weeds nearby, his legs tucked underneath him, and picked at the vegetation, which now reached his neck. He was lost in his thoughts.... He didn’t want to leave this place, the sweet smell of wildflowers and the diving sparrow. There was a certain tranquility here, a peacefulness that extended into the horizon like the straight, silvery rails<sup>1</sup> (Kotlowitz 1992, p. 7).

In his book, *There are No Children Here*, author and journalist Alex Kotlowitz describes the experiences of two brothers, Pharoah and Lafayette, growing up in inner-city Chicago public housing. In this hostile urban environment, the boys face gang warfare, violence, poverty, and even the death of friends. For 9-year-old Pharoah, the small patch of nature offers a place to retreat from this threatening world—a safe haven amid the chaos. Pharoah’s experience may represent youth in a variety of ‘red zones’—ranging from military regions to areas stricken by natural disaster to treacherous urban neighborhoods like his own (see also Chap. 8 by Chawla, this volume). In this section, evidence is briefly reviewed suggesting that the natural environment might bolster functioning in the context of adversity.

Numerous studies have examined the effects of nature on individuals faced with stress or adversity. The variety of risks or stressful scenarios addressed has ranged from physical health crises to stressful life events to economic hardship

<sup>1</sup> ‘Rails’ refers to railroad tracks.

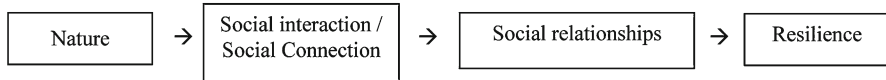
and the concomitant stressors of poverty. Although not all studies have examined youth, the findings provide insight into the influence of the natural environment on children. Researchers have explored, for example, how views of nature speed surgery recovery (Ulrich 1984); how contact with nature helps to buffer the impact of life stressors (Wells and Evans 2003); how nearby vegetation enhances the coping skills of women living in inner city poverty (Kuo 2001); and how activities in nature bolster functioning among women recently diagnosed with breast cancer (Cimprich and Ronis 2003). Although these studies all address how people faced with stress or adversity manage to cope or adapt effectively, they have not explicitly been linked to the resilience literature. Herein, we examine studies of nature and well-being in the context of resilience theory and explore plausible underlying mechanisms.

One study explicitly examining the role of nature as a buffer or moderator (i.e., effect modifier) of life stress among children studied more than 300 rural youth (Wells and Evans 2003). Findings indicated that access to nearby nature buffered the impact of stressful life events such as being picked on at school, being subject to peer pressure, fighting with siblings, moving to a new home, and the death of a grandparent. After controlling for family income, children with more nature near their homes were less affected by stressful life events in terms of both psychological distress and global self worth. This study, however, fails to examine the possible mediating mechanisms that could explain the buffering effect of nature. In the following section, we discuss plausible mediators, with particular focus on two themes: (1) social relationships and (2) cognitive functioning (Fig. 7.1).

## ***Social Relationships***

Various studies provide evidence that nature fosters social interaction and contributes to the development of social relationships. This clearly relates to both the ‘bond to prosocial adults outside the family’ and to ‘connections to extended supportive family networks’ (Masten and Coatsworth 1998) cited in Table 7.1 as key characteristics of resilient children and youth.

Several studies conducted within the Robert Taylor Homes public housing complex in Chicago provide the bulk of the evidence that nearby natural areas are frequently used, facilitate social interaction, and contribute to the development of social bonds. Coley et al. (1997) found that the outdoor public spaces with trees and vegetation were associated with greater use by both youth and adult residents. Using observational data, Sullivan et al. (2004) replicated these findings. They document that nearly twice as many people used the green spaces compared to the barren areas and that 83 % more social activities occurred in green versus barren spaces. With respect to children, Faber Taylor and colleagues (1998) documented that green spaces were both more supportive of children’s play and that children had more access to adults in green outdoor settings than in the more barren outdoor spaces.



**Fig. 7.2** Social relationships: the protective mechanism linking nature to resilience

The green spaces enabled more intergenerational interaction, including greater contact with family as well as non-family members. The evidence from these studies is reinforced by data from Eubanks Owen (1988) who found that natural areas are highly valued by adolescents—particularly as places to interact with peers.

Another group of Chicago public housing studies, rather than examining activities within outdoor spaces, examines differences between building residents. This work takes advantage of a natural experiment that allows researchers to compare residents of architecturally identical public housing buildings which differed only in the amount of nearby trees and vegetation. Some buildings were surrounded by trees, while others stood in a relatively barren landscape. Public housing residents were essentially randomly assigned to their housing units, thus reducing the likelihood that differences between the groups as a result of self-selection would play a role. In a study of older residents of the public housing complex (age 64–91), Kweon and colleagues (1998) found that those living in buildings surrounded by trees had higher levels of social integration than those with little nearby vegetation. They knew their neighbors well, had a greater sense of belonging, and experienced higher levels of social support and stronger social ties (Kweon et al. 1998). In addition, Kuo et al. (1998) studied 145 residents of Robert Taylor Homes and found that not only did residents of greener building complexes have stronger social ties than residents of the less green housing, but the relationship between vegetation and neighborhood social ties was mediated, or explained, by social interaction.

Together, the evidence strongly suggests that green settings serve as a social magnet, drawing people together and fostering social interaction, the development of friendships, and the formation of neighborhood social ties. This literature provides a clearer understanding of one plausible mechanism that might link nature access to childhood resilience (Fig. 7.2).

### ***Cognitive Functioning***

The second mechanism linking nature with resilience is cognitive functioning (or ‘intellectual functioning’ in Masten and Coatsworth’s (1998) list, see Table 7.1). Note that while it is common to consider the *trait* of intellectual ability as a relevant protective factor in one’s resilience or ability to adapt when confronted with risk and adversity, beyond that, the *state* of cognitive functioning is also relevant to coping and adaptation. For example, day-to-day cognitive functioning (attentional capacity



in particular) has been associated with management of major life issues (Kuo 2001). Considerable research, grounded in Attention Restoration Theory (Kaplan and Kaplan 1989; Kaplan 1995), has documented nature's beneficial effects on cognitive functioning. We will consider first the theory and then, related evidence.

### Attention Restoration Theory

Attention restoration theory (ART) is rooted in William James' (1892) proposal that humans have two types of attention: directed or voluntary attention and involuntary attention. Directed attention, defined as 'the ability to control distraction through the use of inhibitory mechanisms', requires effort. Directed attention is employed when we focus or concentrate on a task such as balancing a checkbook, studying for an exam, or writing a manuscript. When directed attention is used for prolonged periods with little rest, a state of directed attention fatigue (DAF) occurs. DAF is characterized by difficulty concentrating, distractibility, reduced inhibitory control, and often, irritability. ART posits that the inherently fascinating features of nature, such as a babbling brook or lush green leaves, easily and gently engage involuntary attention and thereby allow the mechanisms underlying the more effortful directed attention to rest and recharge (Kaplan 1995; Kaplan and Kaplan 1989).

Kaplan and Kaplan (1983) have suggested that four characteristics are necessary for an environment to facilitate recovery from DAF. *Fascination* is found in environments that draw one's attention effortlessly, thereby engaging involuntary attention. *Being away* is the experience of taking a mini-vacation from daily concerns. This may be provided by a very brief experience such as gazing out the window, or by a longer outing, such as a walk in the woods or a vacation in a national park. *Extent* is the depth or scope of the experience; an experience in which one can become immersed has extent. *Compatibility* refers to the match between the environment and one's purposes or inclinations, such that directed attention is not needed and is allowed to rest. Because these four characteristics are most commonly found in natural settings, nature proves to be the most reliable source of mentally restorative experiences (Kaplan and Kaplan 1989; Kaplan 1995).

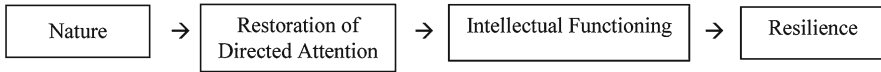
Several studies with adult participants have provided support for ART by documenting that views of, or access to nature enhances cognitive functioning. Studies have employed different operationalizations of nature ranging from the window view from one's residence, to exposure to nature images, to a walk in a natural setting. For example, Tennessen and Cimprich (1995) found that college students with views of nature (e.g., trees, a lake) from their dormitory rooms performed significantly better on cognitive tasks and reported functioning more effectively in daily life than students who had views of the built environment (e.g., streets and buildings). In a study by Hartig and colleagues (1991), backpacking enthusiasts were randomly assigned to: an urban vacation, a backpacking vacation, or no vacation. Those in the backpacking (nature) condition showed an improvement in cognitive performance (i.e., proofreading) following the trip, whereas those who went on an

urban vacation or no vacation showed no improvement. In a second study, the same authors compared the cognitive performance of participants who took a walk in a natural setting, others who took an urban walk, and a third group who engaged in passive relaxation following 40 min of attentionally fatiguing tasks. As with the first study, the group that engaged in the nature experience performed highest on the proofreading task (Hartig et al. 1991). More recently, in a laboratory study, Berto (2005) induced cognitive fatigue and then presented participants with nature images (e.g., fields, hills, lakes), built images (e.g., buildings, cars, streets), or geometric figures. Comparing pre- and post-tests of attentional capacity, only individuals in the nature condition showed improvement. In addition, Berman et al. (2008) conducted a pair of studies to examine the influence of nature on cognitive functioning. In the first study, participants were randomly assigned to walk either in a nearby park or in an urban area. People in the nature condition showed significantly greater improvement in performance from pre-walk to post-walk. The second study differentiated various aspects of cognitive functioning, showing that only those predicted to improve based on nature exposure (i.e., attention tasks involving executive functioning, which relates to planning, cognitive flexibility, initiating tasks and inhibiting inappropriate behaviors) improved following exposure to nature images compared to urban images, while other tasks (i.e., orienting and alerting tasks) remained relatively stable. These studies and others document the beneficial effects of nature on the cognitive functioning of adults.

Studies of children provide additional evidence linking nature to cognitive or intellectual functioning. In the first study to examine attention restoration theory with respect to children, Wells (2000) studied youth whose families relocated to new homes. Findings indicated that improvements in cognitive functioning from pre-move to post-move were explained by increases in nearby nature (and not by changes in housing quality). Subsequently, researchers examined the effects of nature exposure among children diagnosed with attention deficit hyperactivity disorder (ADHD) (formerly known as attention deficit disorder (ADD)). The premise underlying this line of research is that ADHD, though more chronic and persistent than DAF, may have some fundamental similarities with DAF in terms of brain functioning and symptoms. Both conditions are characterized by behaviors such as difficulty focusing or concentrating, inability to complete tasks, and impulsivity. Faber Taylor et al. (2001) examined a group of children diagnosed with ADHD. Based on a survey administered to parents of children with ADHD, children were reported to function better than usual after activities in green settings compared to activities in non-green settings. Moreover, the 'greener' the child's play area, the less severe his or her ADHD symptoms were reported to be. One participating parent who had recently begun taking her child to a nearby park for 30 min each morning prior to school noted:

Come to think of it, I have noticed his attitude toward going to school has been better, and his school work has been better this past week. I think it's because spending time at the park is pleasurable, quiet, calming.

Parent (Faber Taylor et al. 2001, p. 66)



**Fig. 7.3** Intellectual functioning: the protective mechanism linking nature to resilience

An online survey with a national sample of parents of ADHD children yielded similar findings (Kuo and Faber Taylor 2004). Most recently, a true experiment supported the findings of the survey research. Faber Taylor and Kuo (2009) conducted a within-subjects comparison of the cognitive performance of children diagnosed with ADHD following a nature walk, a neighborhood walk, or a downtown walk. Following the nature walk, children's cognitive performance was significantly better than following the downtown or neighborhood walks.

Another study, part of the program of research conducted within Chicago public housing discussed above, examined the influence of nearby nature on the self-discipline of children. Researchers examined three aspects of self-discipline: concentration, inhibition, and delayed gratification. Findings indicated that among girls, the amount of nature viewed from home was systematically related to all three measures of self-discipline, suggesting that exposure to nature bolsters the executive functioning of the brain. Among boys however, no such pattern was found. The absence of a relationship with respect to boys is presumably due to the fact that boys tend to spend less time in and near the home environment and have a larger territorial range (Faber Taylor et al. 2002).

Together, the evidence provides a compelling argument for the bolstering of cognitive functioning as a plausible protective mechanism explaining how exposure to the natural environment contributes to children's resilience (Fig. 7.3).

## **The Natural Environment and Children's Resilience: Future Research**

Further research is needed to consider the potential role of nature access in human resilience. Luthar (2006) suggests that researchers ought to examine the role of therapeutic intervention studies such as those involving music, art and pets. The natural environment should be added to this list. Although not typically studied within the resilience framework, the nature and well-being literature offers abundant evidence that nature enhances human functioning. Greater integration of these areas of inquiry is likely to be fruitful.

### ***Other Possible Mechanisms***

We have focused on the two most plausible and empirically-grounded connections linking nature access to children's resilience: social relationships and intellectual or

cognitive functioning. Other mechanisms are also possible although less clearly established. For example, drawing again from Masten and Coatsworth's (1998) list of characteristics of resilient youth, *self-efficacy*, *self-confidence* and *high self-esteem* might also be bolstered by experiences in nature. Active stewardship of the land (Svendsen 2009) and community gardening activities (Ober et al. 2008) have been linked to themes of empowerment and self-esteem. These topics merit further research attention.

In addition, the physiologically-oriented work of Roger Ulrich and colleagues regarding *recovery from stress* provides a link to the resilience theme of 'bouncing back' (Luthar 2006). For example, in a laboratory study, Parsons and colleagues (1998) found that participants who viewed nature-dominated videotapes experienced quicker and more complete recovery (i.e., heart period and skin conductance response magnitude) from induced stress than participants who viewed artifact-dominated scenes. Similarly, measuring physiological recovery with several indices (i.e., pulse transit time, electrocardiogram, and skin conductance response), Ulrich et al. (1991) found that subjects shown a videotape of natural settings following exposure to a stressful movie recovered more quickly and completely than individuals shown a videotape of an urban setting following the stressful movie. Future research might employ measures of physiological stress to further investigate nature as a resilience resource.

### ***Nature's Relation to Protection and Vulnerability***

Another area for future research concerns more clearly examining nature's presence as protective as well as nature's absence as a vulnerability factor. Some vulnerability indices are unipolar (for example child maltreatment or physical injury) in that they can lead to disorder or dysfunction when present, but do not lead to excellence when absent, or conversely, can bolster functioning when present, but are not associated with failure when absent. However, most vulnerability indices are bipolar, with effects occurring at both extremes—protection at one extreme and vulnerability at the other (Rutter 1987; Masten 2001; Luthar 2006). Thus, labeling a factor as 'protective' or 'vulnerability' is often somewhat arbitrary. With respect to the influence of the natural environment on children's resilience, the topic of bipolarity suggests fruitful avenues for future research aiming toward a clearer understanding of the dose–response effects of nature access. While the focus herein has been on the presence of nearby nature as a protective factor in the context of stress or adversity, future research could more explicitly examine the consequences of various levels of nature access including nature deprivation (Louv 2005). Theorists and practitioners alike would benefit from an understanding of the dose–response relation between the natural environment and resilience. From a theoretical standpoint, such information would help to clarify whether specific thresholds exist in terms of nature's capacity to bolster functioning and resilience and whether the requisite amounts of nature exposure differ for various types of benefits (e.g., social, cognitive, psychological, etc.). Moreover, from a practical standpoint, greater clarity regarding dose–response relations could translate into

the development and implementation of evidence-based ‘green’ intervention strategies aimed at children living within red zones such as post-natural disaster contexts, war zones, or impoverished inner-city neighborhoods. In these contexts, ‘shovel-ready’ strategies that can be efficiently implemented could significantly bolster resilience and thereby enhance the capacity of millions of youth to not merely survive, but potentially, to thrive, despite their perilous and hostile surroundings.

### *Nature as a Buffer*

Within the framework of resilience, more research is needed to explicitly examine the role of nature as a buffer or protective mechanism (Rutter 1987). Protective (or vulnerability) factors can be conceived in two ways. First, such factors may be viewed as simple additive models in which the protective factor has a main effect on the adaptive outcome or resilience indicator (e.g., people with more (versus less) nature access exhibit better social, physical, or cognitive well-being). Alternatively, protective (or vulnerability) factors may be characterized through interactive models in which the protective factor moderates<sup>2</sup> (interacts with) the risk or adversity exposure such that the detrimental impact of the risk factor is reduced (Luthar and Cicchetti 2000) (e.g., people with more (versus less) nature access exhibit less psychological or physiological effects of stress exposure). Most of the literature linking nature to resilience is of the first type in which nature is associated with resilience outcomes or with mediators plausibly linked to resilience. Relatively few studies have adopted the second model (Ulrich et al. 1991; Parsons et al. 1998; Wells and Evans 2003). Further research is needed to more explicitly look at the second type of model, in which nature, by interacting with the stress or adversity variable, serves a protective or buffering function, reducing the negative effects (e.g., a child living in poverty will have a less negative outcome in terms of academic performance, for example, if he or she has access to a nearby park or natural area. In other words nature access will moderate or buffer the effect of poverty on academic performance). Research examining moderators or interaction variables would be particularly relevant to the study of youth within red zones, where nature has the potential to enhance resilience. Investigations adopting an interaction model

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<sup>2</sup> **Moderators**, also known as ‘interaction variables’ or ‘effect modifiers’ address issues of *when, for whom, it depends, or under what circumstances*. For example, being raised in an abusive household may have less detrimental effects for children who have a positive relationship with an adult outside of the home (the protective factor) than for children who do not have such a relationship. In other words, the effect of an abusive household on child outcomes varies according to (or depends upon) positive adult relationship outside the home (the moderator). **Mediators**, in contrast, concern explanatory mechanisms or causal pathways linking variables. Mediators address questions of *how or why*. For example, why does access to nature enhance cognitive functioning?—by reducing directed attention fatigue. In this case, directed attention fatigue mediates the relation between nature and cognitive functioning. See Baron and Kenny (1986) and Wells et al. (2007).

will help to further integrate the resilience literature and the nature-well-being literature by more explicitly linking risk and vulnerability factors (e.g., poverty, maltreatment, etc.) with nature as a protective factor.

## Conclusion

This paper has attempted to initiate an integration of the childhood resilience literature with the natural environment and children's well-being research. Considerable evidence suggests that views of and access to nearby nature serve as a protective factor, bolstering the resilience of youth. Moreover, in keeping with the interest in the resilience field to move beyond the mere identification of resilience factors toward an understanding of processes, the extant literature provides considerable insight into plausible developmental mechanisms. Further examination of the intersection of these two areas of study holds promise for theory as well as practice, and has the potential to substantially influence the lives of children facing the profound challenges of life in a red zone.

## References

- Anthony, E. J. (1974). The syndrome of the psychologically invulnerable child. In E. J. Anthony & C. Koupernik (Eds.), *The child in his family: Children at psychiatric risk* (Vol. 3, pp. 3–10). New York: Wiley.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182.
- Barton, H., & Tsourou, C. (2000). *Health urban planning: A WHO guide to planning for people*. London/Copenhagen: Spon/WHO.
- Berman, M. G., Jonides, J., et al. (2008). The cognitive benefits of interacting with nature. *Psychological Science*, *19*(12), 1207–1212.
- Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology*, *25*(3), 249–259.
- Cimprich, B., & Ronis, D. L. (2003). An environmental intervention to restore attention in women with newly diagnosed breast cancer. *Cancer Nursing*, *26*(4), 284–292.
- Coley, R. L., Kuo, F. E., et al. (1997). Where does community grow? The social context created by nature in urban public housing. *Environment and Behavior*, *29*(4), 468–494.
- Faber Taylor, A., & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, *12*, 402–409.
- Faber Taylor, A., Wiley, A., et al. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behavior*, *30*(1), 3–27.
- Faber Taylor, A., Kuo, F. E., et al. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, *33*(1), 54–77.
- Faber Taylor, A., Kuo, F. E., et al. (2002). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology*, *22*(1–2), 49–63.
- Frumkin, H. (2001). Beyond toxicity: The greening of environmental health. *American Journal of Preventive Medicine*, *20*(3), 234–240.

- Garnezy, N. (1974). The study of competence in children at risk for severe psychopathology. In E. J. Anthony & C. Koupernik (Eds.), *The child in his family: Children at psychiatric risk III*. New York: Wiley.
- Gladwell, M. (2008). *Outliers: The story of success*. New York: Little, Brown and Company.
- Hartig, T., Mang, M., et al. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23, 3–26.
- James, W. (1892). *Psychology: The briefer course*. New York: Henry Holt.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.
- Kaplan, S., & Kaplan, R. (1983). *Cognition and environment: Functioning in an uncertain world*. Ann Arbor: Ulrich's.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.
- Kotlowitz, A. (1992). *There are no children here*. New York: Anchor.
- Kuo, F. E. (2001). Coping with poverty: Impacts of environment and attention in the inner city. *Environment and Behavior*, 33(1), 5–34.
- Kuo, F. E., & Faber Taylor, A. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580–1586.
- Kuo, F. E., Sullivan, W. C., et al. (1998). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823–851.
- Kweon, B., Sullivan, W. C., et al. (1998). Green common spaces and the social integration of inner-city older adults. *Environment and Behavior*, 30, 832–858.
- Louv, R. (2005). *Last child in the woods: Saving our children from nature-deficit disorder*. Chapel Hill: Algonquin Books.
- Luthar, S. S. (2006). Resilience in development: A synthesis of research across five decades. In D. Cicchetti & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (Vol. 3). Hoboken: Wiley.
- Luthar, S. S., & Cicchetti, D. (2000). The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology*, 12, 857–885.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *The American Psychologist*, 56(3), 227–238.
- Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments lessons from research on successful children. *The American Psychologist*, 53(2), 205–220.
- Murphy, L. B., & Moriarty, A. (1976). *Vulnerability, coping, and growth: From infancy to adolescence*. New Haven: Yale University Press.
- Ober, J. A., Alaimo, K., et al. (2008). Growing vegetables and values: Benefits of neighborhood-based community gardens for youth development and nutrition. *Journal of Hunger and Environmental Nutrition*, 3(4), 418–439.
- Owen, P. E. (1988). Natural landscapes, gathering places, and prospect refuges: Characteristics of outdoor places valued by teens. *Children's Environments Quarterly*, 5(2), 17–24.
- Ozer, E. J. (2006). The effects of school gardens on students and schools: Conceptualization and considerations for maximizing healthy development. *Health Education & Behavior*, 34(6), 846–863.
- Parsons, R., Tassinary, L. G., et al. (1998). The view from the road: Implications for stress recovery and immunization. *Journal of Environmental Psychology*, 18(2), 113–139.
- Rowe, J. W., & Kahn, R. L. (1998). *Successful aging: The MacArthur foundation study*. New York: Random House.
- Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M. Kent & J. Rolf (Eds.), *Primary prevention in psychopathology: Social competence in children* (pp. 49–74). Hanover: University Press of New England.
- Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *The American Journal of Orthopsychiatry*, 57, 316–331.

- Sheldon, K. M., & King, L. (2000). Why positive psychology is necessary. *The American Psychologist*, *56*(3), 216–217.
- Srinivasan, S., O'Fallon, L. R., et al. (2003). Creating healthy communities, healthy homes, healthy people: Initiating a research agenda on the built environment and public health. *American Journal of Public Health*, *93*(9), 1446–1450.
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *The American Psychologist*, *47*(1), 6–22.
- Sullivan, W. C., Kuo, F. E., et al. (2004). The fruit of urban nature: Vital neighborhood spaces. *Environment and Behavior*, *36*(5), 678–700.
- Swendsen, E. S. (2009). Cultivating resilience: Urban stewardship as a means to improving health and well-being. In L. Campbell & A. Wiesen (Eds.), *Restorative commons: Creating health and well-being through urban landscapes* (pp. 59–87). Newtown Square: USDA Forest Service.
- Taylor, S. E., Repetti, R. L., et al. (1997). Health psychology: What is an unhealthy environment and how does it get under the skin? *Annual Review of Psychology*, *48*, 411–447.
- Tennessen, C. M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology*, *15*, 77–85.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, *224*(4647), 420–421.
- Ulrich, R. S., Simons, R. F., et al. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, *11*(3), 201–230.
- Wells, N. (2000). At home with nature: Effects of “greenness” on children's cognitive functioning. *Environment and Behavior*, *32*(6), 775–795.
- Wells, N. M., & Donofrio, G. A. (2011). Urban planning, the natural environment, and public health. In J.O. Nriagu (Ed.), *Encyclopedia of environmental health*. Amsterdam/London: Elsevier.
- Wells, N. M., & Evans, G. W. (2003). Nature as a buffer: Life stress among rural children. *Environment and Behavior*, *35*(3), 311–330.
- Wells, N. M., Ashdown, S. P., et al. (2007). Environment, design and obesity: Opportunities for interdisciplinary collaborative research. *Environment and Behavior*, *39*(1), 6–33.
- Wells, N. M., Evans, G. W., et al. (2010). Environment and health: Planning decisions as public health decisions. *Journal of Architectural and Planning Research*, *27*(2), 124–143.
- Werner, E., & Smith, R. (1982). *Vulnerable but invincible: A study of resilient children*. New York: McGraw-Hill.
- World Health Organization. (1946). *Constitution of World Health Organization*, from [http://www.opbw.org/int\\_inst/health\\_docs/WHO-CONSTITUTION.pdf](http://www.opbw.org/int_inst/health_docs/WHO-CONSTITUTION.pdf)
- Zautra, A. J. (2009). Resilience: One part recovery, two parts sustainability. *Journal of Personality*, *77*(6), 1935–1943.



# Chapter 8

## Children's Engagement with the Natural World as a Ground for Healing

Louise Chawla

**Abstract** This chapter examines children's affinity for the natural world, benefits for children from contact with nature, and how programs for ecological restoration and caring for plants and animals can promote young people's resilience and recovery after conflict and disasters. Masten (2001, p. 228) defines resilience in childhood as 'good outcomes in spite of threats to adaptation or development'. It is not a special attribute that makes some children invulnerable to adversity, but what Masten calls the 'ordinary magic' that happens when children manage to find essential resources for healthy development even in difficult circumstances. The literature on resilience has emphasized the importance of caring social relationships and supportive institutions like effective schools, not recognizing that children can draw strength and healing from the natural world as well. Most of the literature on helping children affected by war and natural disasters also neglects this potential. This chapter demonstrates the value of children's relationships with nature and the importance of integrating healing green spaces into programs to help children recover after disasters and conflict.

**Keywords** Children • Nature • Gardening • Resilience • Recovery from trauma • Health

*Using examples from children displaced by war, poverty, and natural disaster in South Africa, Sri Lanka, and other countries, and studies of the responses of children under stress to animals and gardening, environmental psychologist and educator Louise Chawla demonstrates the healing value of children's interaction with nature. She suggests a list of green protective factors that promote children's resilience through reducing risks, building assets, and mobilizing others who connect with children through greening.*

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L. Chawla (✉)  
Environmental Design Program, University of Colorado,  
Campus Box 314, Boulder, CO 80309, USA  
e-mail: louise.chawla@colorado.edu

## Nature in Children's Lives and in Childhood Memories

Adult memories of childhood and children's own choices in ethnographic research show the importance of 'special places' (Sobel 2002) and 'secret spaces' (Goodenough 2003) where children can escape from adult surveillance and restrictions and the upsetting events that life sometimes brings. Often these special places are in nature: down in the woods, up in a tree, beside water. They are places where children can go to be alone or with playmates or a pet, to draw, read, write, muse, create miniature worlds, play house, play shop, or otherwise assimilate and transform their experience. In Goodenough's words, for children these places are 'essential to putting things together for themselves and becoming who they are' (2003, p. 2). Sobel (2002) draws on the ideas of Edith Cobb (1959, p. 540), who said that these places reflect a child's drive 'to make a world in which to find a place to discover a self': a self that is at once unique and related to the world. When relatedness to nature is an important dimension of a sense of self, Clayton (2003) calls it an environmental identity. It may be based, she notes, on personal history and emotional attachment to some part of nature, such as a tree or mountain, and it may or may not manifest itself in action to protect the environment, but it gives a sense of being part of a whole that is larger than any human creation.

In a review of autobiographies by diverse authors (Chawla 1990), the gifts that people most frequently attributed to memories of a connection with nature in childhood were a fund of calm that they could later draw upon, and a sense of the integration of nature and human life. This is eloquently expressed by Howard Thurman (1979), an African-American minister and leader of the civil rights movement in the United States, who grew up near the North Carolina coast. When his father died, he listened to the graveside minister preach his free-thinking father's soul into hell. Afterwards his mother was absent long days as she cooked and cleaned for white households. Thurman found that he could bring his feelings to the great oak tree that grew behind his family's home; and the tree, in its aliveness, listened. 'I could reach down in the quiet places of my spirit, take out my bruises and my joys, unfold them and talk about them. I could talk aloud to the oak tree and know that I was understood' (p. 9). He also found that he could put his troubles in perspective when he walked the seacoast, day or night. 'I had the sense that all things, the sand, the sea, the stars, the night, and I were one lung through which all of life breathed. Not only was I aware of a vast rhythm enveloping all, but I was a part of it and it was a part of me' (p. 226). These experiences, he learned, gave him 'a certain overriding immunity' against the pain in his life: 'I felt rooted in life, in nature, in existence' (p. 8). When two studies asked a broad spectrum of people if they recalled any experiences of a deep sense of harmony with the world in childhood, many responses echoed Thurman's words (Hoffman 1992; Robinson 1983). Many people described experiences of nature and observed that these memories formed a core of peace that they could return to later amid life's turmoil.

These are adult memories of childhood, but they are consistent with research with children themselves, which suggests that children highly value places in nature as long as they perceive them to be safe. This is true of many studies of children's favorite places (Chawla 1992), as well as ethnographic studies that use multiple methods to understand how children use their environment. These studies show that children seek out nature along creeks and riverbanks and in woods, parks, gardens and vacant lots, whether they live in rural towns in Vermont (Hart 1979) or Bolivia (Punch 2000), an old city or new town in England (Moore 1986), a Muslim slum in India (Chatterjee 2006), a low-income district of Montreal (Castonguay and Jutras 2009), or a Latino neighborhood among refineries and Superfund sites on the edge of Denver (Strife 2008). In the *Growing Up in Cities* project, which involves low-income urban children in documenting their communities and their priorities for improvements, children repeatedly identify safe natural areas as an important element of a good place to live. This was the case when the project was begun in four countries by Lynch (1977), revived in eight countries by Chawla (2002), and since then implemented in new sites in Johannesburg (Swart-Kruger and Chawla 2002), New York (Chawla and Driskell 2008), Nairobi (Driskell and Chawla 2009), Papua New Guinea, and the Cook Islands (Malone 2007).

The value of green spaces and gardens under even the starkest conditions is exemplified by the story of a *Growing Up in Cities* site in South Africa, where researchers followed 10 through 14-year-olds through the crisis of violent eviction (Swart-Kruger 2002). When the study began, the children lived in a squatter camp on the edge of downtown Johannesburg. When they led the researchers on tours of important places in their lives, they revealed that their territory was anchored on one end by the squatter camp and on the other end by a neighborhood school, but they took a circuitous route on the way home from school to visit an adjoining neighborhood named Fietas, which contained a park with trees, a sports field and a playground. Because they were expected to go straight home to do chores, the park was for them a special and secret space, where they were temporarily free from the control of either teachers or parents (Chawla 2003).

When the squatter camp was suddenly evicted on short notice, the researchers followed the children to their new location in dry veld 30 km outside the city. In their drawings of what they wanted in their new place, the children still identified a children's center and a playground, which were priorities before, but now they included trees and gardens—trees for shade and food producing gardens. In one of the drawings, a boy reproduced the park in Fietas, complete with its trees, green lawn and play equipment. His drawing suggested that this oasis for free play was not only a valued memory, but also raw material in his imagination for constructing a better life.

When Chatterjee (2007) described the participation of children in Delhi, India in fighting a forced eviction and improving their new settlement, their story was similar. The 8–16-year-olds decided that their first priority in their barren new location was to plant trees. They proceeded to get donations from a local nursery, plant 225 trees, and guard them from grazing cattle and the harsh sun with enough success to earn the respect of the nursery staff, who pledged plants for ongoing greening.

When Hinton (2000) did ethnographic research with families of Nepali origin who had fled Bhutan, she discovered that one of their ways of healing was to find spaces where they could imagine new futures—in contrast to the foreign approach introduced by aid agencies, which expected them to talk about their traumas. This is evident in the following account by Arati, a 17-year-old girl:

I used to wake early in the morning ... I was going for a morning walk, near the river Mai ... I enjoyed the chilly cold of fresh morning, while I was washing there my pleasure mind made me to go little far across the river ... This fresh environment brought some kind of pleasure that could make me dream of tomorrow and forget the sorrows in the life of a refugee (p. 203).

The ‘fresh environment’ of the river gave her space for solace and hope. This girl and the children in Johannesburg and Delhi had freedom of movement to discover opportunities for play, refuge, and sustenance for both body and spirit that green spaces, gardens and elements of nature afford. In her ethnographic study of war-affected children in Sri Lanka, Trawick (2007) found that loss of control over personal space and movement was one of the greatest hardships of war, along with separation from family and the loss of loved ones. Its importance was highlighted for her by Menan, a 16-year-old boy whose father had been killed in the war. Although he was strongly attached to his mother in the city of Batticaloa, he preferred to be on family land in the countryside where he had more freedom. One day he took Trawick with him on a long bicycle ride to the family farm. He confidently made his way along jungle paths and rice paddies, reconnecting with his grandfather in one of the thatched huts, and clambering up big rocks to show her the green expanse of the landscape.

After they returned to the city, Trawick brought Menan paper, crayons and water-colors. A few days later he gave her a picture and accompanying essay. The upper half of the picture was a landscape of tall trees, with someone planting another tree. Clear, clean water ran beside them. In the lower half, the bank of the water was littered with dead branches and a man was chopping a tree down. In his essay, Menan explained that the lower half represented both the environmental destruction of war and the fate of his people, who were being cut down like trees. In the upper half, he wrote, ‘A young boy is planting a tree. Therefore that environment grows with great flourishing. Therefore on that side all the species of creatures live freely’. Further in his essay he associated the tall trees with a government that would protect his people’s rights.

## **The Importance of Access to Nature for Children’s Well-Being**

Since the 1980s, research has been establishing empirical links between contact with nature and human well-being. In studies with adults, physiological measures demonstrate that when people walk in parks or nature reserves, have window views of nature, or look at pictures or films of natural landscapes, their heart beat slows, blood pressure drops, alpha brain waves deepen, and levels of stress fall (see reviews,

Okvat and Zautra, Chap. 5, and Wells, Chap. 7 this volume). Although immediate physiological measures of children's responses to nature are lacking, research with young people is consistent with these findings. Children's access to natural views and play areas is associated with better performance on tests of concentration, inhibiting impulses, and delaying gratification (Faber Taylor et al. 2002; Wells 2000), as well as reduced symptoms of attention deficit hyperactivity disorder (ADHD) attention deficit/hyperactivity disorder (Faber Taylor et al. 2001; Faber Taylor and Kuo 2009; Kuo and Faber Taylor 2004). Of particular relevance for children who face conflict and disasters, Wells and Evans (2003) found that the degree of natural surroundings around the home predicted the ability of 8 through 11-year-olds to successfully cope with life stresses, based on parents' reports of their children's behavior and children's own self-reports, and this buffering effect of nature was strongest for children who experienced the highest levels of stressful events. Also suggestive, a large Dutch study measured proximity to green spaces and incidences of disease, and found that people who lived within 1 km of a green space had significantly lower rates of 15 major illnesses; the biggest impact was on anxiety disorders and depression, and the effect on depression was strongest for children under 12 (Maas et al. 2009). All of these studies controlled for family income.

Investigations of children's direct engagement with nature through play, animal care and gardening reinforce these findings. In Sweden and Norway, comparisons of preschool children who differed only on the measure that they either had a traditional built playground, or a field, orchard or forest, for their play found that over the course of a school year, children with the natural play areas made the greatest advances in tests requiring concentration (Grahn et al. 1997) and motor coordination and agility (Fjortoft 2001; Grahn et al. 1997). These are important measures of children's developing self-control and competence.

Nature play is also associated with more cooperative and creative play. The Swedish preschoolers with access to the field and orchard developed more varied and elaborated patterns of play, including more complex make-believe stories (Grahn et al. 1997). In observations of United States preschools, children who played among trees and shrubbery in their schoolyard engaged in more creative social play than children on built equipment (Herrington and Studtmann 1998; Kirkby 1989). In observations of people's behavior in open spaces of a Chicago public housing project, children in outdoor spaces with trees and other vegetation engaged in more play and more creative forms of play than children in barren spaces, and had more positive interactions with adults (Faber Taylor et al. 1998). Chawla (2007) has reflected on features of the natural world which engage children's deep concentration, creativity and developing sense of competence, and which may help explain these results.

Animals are a special part of the natural world which children often come to know intimately as pets or farm animals in their care. Companion animals can convey a sense of nonjudgmental acceptance, allowing children to fill in both sides of the 'dialogue' when they talk to their pets, but still showing responses like nuzzling, purring and chirping (Melson 2008; Myers 1998). In controlled studies with children diagnosed with oppositional-defiant disorder, conduct disorder, autism, and severe ADHD,

Katcher and Wilkins (2000) and Katcher and Teumer (2006) found that when children in a residential treatment facility or special education classes had programs of nature study and animal care, they consistently showed significant decreases in disruptive behavior and improved social skills, compared to the way they behaved in traditional classroom settings. The positive effects were strongest for children diagnosed for aggression, hyperactivity, and lack of attention to the environment.

Gardens can also be healing places for children (Moore 1999). Extended gardening programs with children show many benefits (Blair 2009; Robinson-O'Brien et al. 2009), including an improved sense of self and social skills. When 8–11 year-olds in a 1-year gardening program were compared with non-participating peers, they showed significant gains in self-understanding and the ability to work in groups (Robinson and Zajicek 2005). Youth interns in community gardens in a low-income neighborhood of New York reported increases in maturity, responsibility and interpersonal skills (Hung 2004). Juvenile offenders who engaged in horticultural training and community landscaping gained more responsible environmental attitudes (Cammack et al. 2002a) and greater self-esteem (Cammack et al. 2002b). For children who had recently immigrated into Canada, creating multicultural school gardens increased their sense of belonging and connection to their new environment (Cutter-Mackenzie 2009).

None of these studies deal directly with children's recovery after armed conflict or disasters like floods or earthquakes. To a striking degree, however, they include populations of children who faced adversity, risk and special needs: children from backgrounds of poverty (Faber Taylor et al. 1998, 2002; Hung 2004; Wells 2000); children who face upsetting events (Wells and Evans 2003); children with learning disabilities (Faber Taylor et al. 2001; Faber Taylor and Kuo 2009; Kuo and Faber Taylor 2004) and behavior disorders (Katcher and Wilkins 2000; Katcher and Teumer 2006); new immigrants (Cutter-Mackenzie 2009); and juvenile offenders (Cammack et al. 2002a, b). A caution by Boyden and Mann (2005) needs to be kept in mind: that the severity of experiences should be understood from the perspective of children themselves. To a child, broken families, social stigma or poverty—'normal adversity' in adult eyes—may involve as much distress as events like floods or war that adults classify as major disasters. If contact with nature functions as an important resource for children under the conditions that have been studied, it is reasonable to expect that it will also be meaningful to children who face upheavals of other kinds.

## **Ingredients for Children's Resilience**

Most of the empirical studies that document positive outcomes for children from contact with nature have been done in fields outside developmental psychology—such as human ecology, landscape architecture or agricultural extension research—and most have been published since the late 1990s. Despite their relevance, they have failed to attract attention from people who investigate resilience in

childhood—an area of study that began around 1970. Besthorn (2005) noted that research on resilience in children and research on the effects of contact with nature for child development have evolved independently of each other. Masten and Obradovic (2008) came to a similar conclusion when they reviewed the scholarship on resilience and noticed that work that embeds human development in ecosystems is striking by its absence. It is also strikingly absent from a handbook for helping families and children respond to disasters of all kinds, including natural and technological disasters (Rosenfeld et al. 2005), and from recent reviews of research, programs and policies to help children reconstruct their lives in post-war settings (Boothby et al. 2006; United Nations Children's Fund 2009). One promising area for integrating gardening and greening, whenever possible, would be the Child-Centered Spaces which are being established in war zones, where aid workers and trained local caretakers offer a combination of protection, social support, and education in life skills (Kostelny and Wessells 2008).

Resilience reflects the dynamic, interactive process that occurs when children exhibit personal strengths by reaching out to find care and support, and people and places around them provide vital resources that they need for healthy development (Benard 2004; Masten 2001). These strengths include social competence, problem-solving abilities, initiative, self-efficacy, and a sense of positive meaning and purpose in life. In the words of Benard (2004, p. 14), they 'are what resilience looks like'. They are at once positive developmental outcomes that demonstrate the capacity for resilience, and capacities through which children connect with protective factors in their families and communities in order to continue on a positive path.

Research on protective factors has focused on the quality of social relationships in families and communities, along with the availability of supportive institutions like effective schools, social services, and prosocial organizations like church groups and youth clubs (Benard 2004). In all of these settings, protective factors include caring relationships, high expectations for children's achievement, and opportunities for young people to contribute to their society in valued and meaningful ways. The potential for children to benefit from engagement with nature remains almost completely unexplored. Leading theories of resilience, however, could accommodate the role of nature in children's lives.

Masten and Obradovic (2008) observe that theoretical frameworks for resilience at the level of individual children draw on developmental systems theory (Lerner 2006) and the ecological model of development of Bronfenbrenner (1979). According to these perspectives, resilience arises from adaptive processes across multiple levels of functioning: genes; neural systems; the immune system and other physical systems of health; relationships with family members, friends and neighbors; institutions like schools; and more distant systems where decisions and practices impact children's worlds, like parents' workplaces, or local and national governments. To these systems, it would be possible to add the different forms of nature experiences that have been connected to children's health and well-being, including special places for refuge and nature play, green views, bonds with pets, animal care and gardening, along with more distant systems that can sustain these experiences like departments of parks or regional ecosystems. A list of 'green

**Table 8.1** Natural environments as protective factors that support children's strengths and resilience

Environmental features	Benefits for children that increase strengths associated with resilience
Natural surroundings and views of nature	Better concentration (Faber Taylor et al. 2002; Wells 2000) Better ability to inhibit impulses and delay gratification (Faber Taylor et al. 2002)
Special places in nature	Better coping with upsetting events (Wells and Evans 2003) Opportunities to assimilate and transform experiences in places that are responsively alive (Goodenough 2003; Sobel 2002) Opportunities to feel connected to the larger universe of living things (Clayton 2003) Memories that form a reservoir of calm to draw upon (Chawla 1990; Hoffman 1992; Robinson 1983) Familiarity with nature as a favorite place that can be recreated in new places (Chawla 2003)
Nature play	Better concentration, ability to stay on task (Grahn et al. 1997; Faber Taylor et al. 2001; Faber Taylor and Kuo 2009; Kuo and Faber Taylor 2004) Better motor coordination and agility (Fjortoft 2001; Grahn et al. 1997) More cooperative, creative social play (Grahn et al. 1997; Herrington and Studtmann 1998; Faber Taylor et al. 1998; Kirkby 1989)
Animal companions	A feeling of acceptance by a responsive, nonjudgmental creature (Melson 2008)
Animal care	Better self-control (Katcher and Teumer 2006; Katcher and Wilkins 2000) Better social skills (Katcher and Teumer 2006; Katcher and Wilkins 2000)
Gardening	Greater self-understanding (Robinson and Zajicek 2005) Greater self-esteem (Cammack et al. 2002b) Better interpersonal skills and ability to work in groups (Hung 2004; Robinson and Zajicek 2005) Increased sense of connection and responsibility to the environment (Cammack et al. 2002a; Cutter-Mackenzie 2009)

protective factors' is proposed in Table 8.1. They cut across all three strategies for promoting resilience in children and youth that Masten and Reed (2002) identify: reducing risks (such as reducing impulsive behavior), building assets (such as improving concentration), and mobilizing the power of human adaptational systems (such as connecting children to mentors and friends through gardening).

Existing theories of resilience and recovery from trauma have heavily influenced programs for child protection and reconstruction after war and natural disasters. Boyden and Mann (2005) and Kostelny (2006) observe that this can be problematic, for these programs often fail to accommodate the diversity of social, cultural and environmental contexts in which children around the world respond to adversity, or to consider how young people make meaning out of their experiences. Like theories



of resilience, theories of child protection and reconstruction after wars and natural disasters need to be broadened to include the natural environment as an element with which children can meaningfully engage, and not just as a stock of resources. Kostelny (2006) includes 'environmental resources' in the background of her socio-ecological model of factors that influence children's well-being during and after war, but the evidence in this chapter suggests that nature often figures in the foreground of children's experience. The following section presents examples of exceptional initiatives which have recognized children's voice and agency and responsively included farming, gardening, animal care, green refuges, and nature play in integrated programs to support children's well-being under conditions of war, displacement, or natural calamities.

## Rooting New Life in Nature

When Malekoff (2007) worked with young adolescents who lost a parent in the attack on the World Trade Center, he concluded that the most vital forms of support that children need after a great loss are safe places to go, worthwhile things to do, and opportunities for belonging. Providing these resources requires respecting children's capacities and offering opportunities for action that represent triumph over helplessness and despair. Malekoff combined these ingredients by engaging the adolescents, siblings and surviving parents in contributing to the construction of a memorial garden for the victims of the attack. The young people and their families decorated large stones with images that they associated with their lost parent, and then joined in a ceremony to lay the stones in the garden, creating a place of peace and a testament to their shared work to which they could return.

This kind of decorative garden design represents a form of art therapy. For rural children and children in the developing world, however, gardening is often a necessity to meet basic needs. Gibbs (1994) recorded children's contributions to restoring farms and gardens when she documented post-war reconstruction in Mozambique. When she asked adults what was the most important thing that children needed to piece their lives together again after the war, they replied: 'The most important thing we can do for children if they don't know is to show them how to work ... that there is no food without work' (p. 272). This expectation corresponded to children's traditional role in agriculture, where they began digging in the fields by the age of 5 or 6. It also corresponded to a local view of children as particularly strong and resilient, in contrast to Western views of children as particularly vulnerable. In Mozambique, people said:

A child is like a banana tree .... Once you plant one they will reproduce themselves, after five or six years they will grow alone—independent of their parents. Children are the same, after some years they are independent and can grow on their own. They are survivors, like the banana tree; if there is a forest fire and you go away when you come back you can find a lot of trees burnt, but the banana trees are often alive (p. 271).

When Gibbs talked with children about the war and reconstruction, a boy told her that the most difficult part of displacement was losing his garden, and one of his greatest satisfactions was having his own field filled with sugar cane and cassava once again.

In this culture, children who had been in combat regained standing in their community by contributing to the hard work of planting and rebuilding. Along with adults, they also shared practices for healing that included traditional medicines, harvest rituals, and reacceptance into church communities. Gibbs noted that reengagement in the management of everyday life and community practices for healing may be vital everywhere, but the specific form this needs to take must be identified in the context of each country and culture.

When Save the Children developed guidelines for reconstruction after war or natural disasters, a model project in Cooks Nagar, South India demonstrated that when young people are listened to and trusted, they tend to steer their communities to a balanced respect for children's needs for both work and play (Bartlett and Iltus 2006; Bartlett 2008). When children engaged in participatory processes to rebuild their village after the Indian Ocean tsunami, they expressed a keen desire to replant trees and to receive training to establish a tree nursery. For them, trees promised safety as well as shade, as climbing trees had saved many lives when the wave hit. They also determined that they wanted a variety of green spaces so that everyone would have a play area nearby, and teenage girls would have quiet green places where they could sit with friends—rather than a single playground with expensive fixed play equipment.

Children can also protect their communities proactively. On the Camotes Islands of the Philippines, teams of children have restored degraded mangroves to control storm surges, buffer typhoon winds, capture greenhouse gases that cause climate change, and provide fish and shrimp spawning grounds (Tanner et al. 2009). Assembling information from a range of sources, they designed and led the restoration effort by collecting and replanting saplings in sanctuaries behind protective barriers.

Two programs in distant parts of the world demonstrate ways to fuse garden making with local needs and Western concepts of play therapy. In the midst of civil war, the Butterfly Garden opened in Batticaloa, Sri Lanka to establish a 'zone of peace' for children, as a partnership between McMaster University of Canada and a counseling center for war victims run by a local Jesuit priest. Constructed on the two-acre site of a former monastery garden and zoo, the garden is dedicated to 'earthwork, artwork, heartwork, and healing' (Santa Barbara 2004). It maintains long-term relationships with children who are referred from surrounding schools, usually because of difficulties at home or school associated with the effects of the war. A colorful Butterfly Bus collects 6–16-year-olds from the surrounding region—Tamil and Muslim, boys and girls—for after-school and weekend activities. The program is conceived of as three spirals that unfold in succession (Ashoka Fellows 2003; Santa Barbara 2004). The first focuses on caring for the garden and its animals, painting, singing and playing. The second uses art to explore emotions and themes like family and identity, culminating in a public offering in the form of a play, parade, opera or art exhibit. In the third spiral, the children carry what they

have learned back to their homes, including helping to create 'seedling gardens' in their communities. The activities are facilitated by artists and counselors who are often war victims themselves.

In Guatemala City, a Children's Garden of Hope has taken form on the edge of the city's main garbage dump to serve children from the surrounding shantytown whose families subsist on scavenging in the dump (Winterbottom 2008 and Chap. 30, this volume). Most of the families fled Mayan villages in the highlands, displaced by civil war and land evictions. Safe Passage, a nonprofit that supports education for the poorest of Guatemala's children, collaborated with the Landscape Architecture Design/Build Program of the University of Washington to lead a community design process with children, their mothers, teachers and child care providers to hear their ideas about what they wanted to see on the 1.2-acre site. The resulting complex includes a preschool and vocational school, paved plaza that doubles as an outdoor classroom rimmed with sensory and habitat gardens, small children's exploratory garden, adventure play garden for older children, shaded sitting areas, soccer field, extensive tree plantings to absorb soil toxins from the dump, and raised beds where mothers can pass on to their children traditional practices of cultivation and harvest fresh produce to supplement their families' nutrition. The garden program seeks to address children's social, physical, educational and emotional needs, so that they will have the resources and skills needed to grow beyond the poverty, violence and despair that define life next to the dump.

This chapter has shown that when we look for the value of nature in children's lives, we find evidence of its importance whether we turn to childhood memories, ethnographic fieldwork with children themselves, or research on the effects of contact with nature for children's health and competence. We can also find programs that have understood how to integrate nature into zones of peace and reconstruction. The evidence indicates that nature can be a vital protective factor in children's lives, and a feasible dimension of programs for reconstruction and risk reduction.

But the evidence in this chapter does not stop here. As Boyden and Mann (2005) note, 'conflict' and 'disasters' need to be understood from the perspective of children themselves, for whom everyday shocks like poverty, prejudice, illness, disability, a family death, domestic violence, or bullying at school—any number of adversities—may qualify as disasters in a child's experience. This chapter's focus on conflicts and disasters on a large scale should not draw attention away from the conclusion that access to nature and gardens of hope and peace are resources that have the potential to support the healthy development of all children everywhere.

## References

- Ashoka Fellows. Paul Hogan. Retrieved February 15, 2010 from <http://www.ashoka.org/node3573>
- Bartlett, S. (2008). After the tsunami in Cooks Nagar: The challenge of participatory rebuilding. *Children, Youth and Environments*, 18(1), 470–484.
- Bartlett, S., & Iltus, S. (2006). *Making space for children: Planning for post-disaster reconstruction with children and their families*. Stockholm: Save the Children Sweden.

- Benard, B. (2004). *Resiliency: What we have learned*. San Francisco: WestEd.
- Besthorn, F. H. (2005). Beetles, bullfrogs, and butterflies: Contributions of natural environment to childhood development and resilience. In M. Ungar (Ed.), *Handbook for working with children and youth* (pp. 121–132). Thousand Oaks: Sage Publications.
- Blair, D. (2009). The child in the garden: An evaluative review of the benefits of school gardening. *The Journal of Environmental Education*, 40(2), 15–38.
- Boothby, N., Strang, A., et al. (2006). *A world turned upside down: Social ecological approaches to children in war zones*. Bloomfield: Kumarian Press.
- Boydell, J., & Mann, G. (2005). Children's risk, resilience, and coping in extreme situations. In M. Ungar (Ed.), *Handbook for working with children and youth* (pp. 3–25). Thousand Oaks: Sage Publications.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Cammack, C., Waliczek, T. M., et al. (2002a). The Green Brigade: The educational effects of a community-based horticultural program on the horticultural knowledge and environmental attitude of juvenile offenders. *HortTechnology*, 12(1), 77–81.
- Cammack, C., Waliczek, T. M., et al. (2002b). The Green Brigade: The psychological effects of a community-based horticultural program on the self-development characteristics of juvenile offenders. *HortTechnology*, 12(1), 82–86.
- Castonguay, G., & Jutras, S. (2009). Children's appreciation of outdoor places in a poor neighborhood. *Journal of Environmental Psychology*, 29, 101–109.
- Chatterjee, S. (2006). Children's notions of environmental care: The case of a low-income Muslim neighborhood in India. In M. K. Chapin (Ed.), *EDRA 37: Beyond conflict* (pp. 41–54). Edmond, OK: Environmental Design Research Association.
- Chatterjee, S. (2007). Children's role in humanizing forced evictions and resettlements in Delhi. *Children, Youth and Environments*, 17(1), 198–221.
- Chawla, L. (1990). Ecstatic places. *Children's Environments Quarterly*, 7(4), 18–23.
- Chawla, L. (1992). Childhood place attachments. In I. Altman & S. Low (Eds.), *Place attachment* (pp. 63–86). New York: Plenum Press.
- Chawla, L. (2002). *Growing up in an urbanising world*. London: Earthscan Publications.
- Chawla, L. (2003). Special place—What is that? Significant and secret spaces in the lives of children in a Johannesburg squatter camp. In E. Goodenough (Ed.), *Secret spaces of childhood* (pp. 215–235). Ann Arbor: Michigan University Press.
- Chawla, L. (2007). Childhood experiences associated with care for the natural world. *Children, Youth and Environments*, 17(4), 144–170.
- Chawla, L., & Driskell, D. (2008). Having a say about where to play: A serious way to learn democracy. In E. Goodenough (Ed.), *A place for play* (pp. 65–81). Ann Arbor: National Institute for Play.
- Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment* (pp. 45–65). Cambridge, MA: M.I.T. Press.
- Cobb, E. (1959). The ecology of imagination in childhood. *Daedalus*, 88, 537–548.
- Cutter-MacKenzie, A. (2009). Multicultural school gardens. *Canadian Journal of Environmental Education*, 14, 122–135.
- Driskell, D., & Chawla, L. (2009). Learning by doing: Education for sustainable development through place-based action research. In P. B. Corcoran & P. M. Osano (Eds.), *Young people, education, and sustainable development* (pp. 91–98). Wageningen: Wageningen Academic Publishers.
- Faber Taylor, A., & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, 12(5), 402–409.
- Faber Taylor, A., Wiley, A., et al. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behavior*, 30(1), 3–27.
- Faber Taylor, A., Kuo, F. E., et al. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33(1), 54–77.

- Faber Taylor, A., Kuo, F. E., et al. (2002). Views of nature and self-discipline: Evidence from inner-city children. *Journal of Environmental Psychology*, 22, 49–63.
- Fjortoft, I. (2001). The natural environment as a playground for children. *Early Childhood Education Journal*, 29(3), 111–117.
- Gibbs, S. (1994). Post-war social reconstruction in Mozambique: Re-framing children's experience of trauma and healing. *Disasters*, 18(3), 268–276.
- Goodenough, E. (2003). *Secret spaces of childhood*. Ann Arbor: University of Michigan Press.
- Grahn, P., Martensson, F., et al. (1997). Ute pa dagis (Outdoors at daycare). *Stad and Land (City and country)*, 145.
- Hart, R. (1979). *Children's experience of place*. New York: Irvington.
- Herrington, S., & Studtmann, K. (1998). Landscape interventions: New directions for the design of children's outdoor play environments. *Landscape and Urban Planning*, 42, 191–205.
- Hinton, R. (2000). Seen but not heard: Refugee children and models for intervention. In C. Panter-Brick & M. T. Smith (Eds.), *Abandoned children* (pp. 199–212). Cambridge: Cambridge University Press.
- Hoffman, E. (1992). *Visions of innocence*. Boston: Shambhala.
- Hung, Y. (2004). East New York farms: Youth participation in community development and urban agriculture. *Children, Youth and Environments*, 14(1), 56–85.
- Katcher, A., & Teumer, S. (2006). A 4-year trial of animal-assisted therapy with public school special education students. In A. Fine (Ed.), *Handbook on animal-assisted therapy* (2nd ed., pp. 227–242). London: Academic.
- Katcher, A. H., & Wilkins, G. G. (2000). The centaur's lessons: Therapeutic education through care of animals and nature study. In A. H. Fine (Ed.), *Handbook of animal-assisted therapy* (pp. 153–177). New York: Academic.
- Kirkby, M. (1989). Nature as refuge in children's environments. *Children's Environments Quarterly*, 6(1), 7–12.
- Kostelny, K. (2006). A culture-based, integrative approach. In N. Boothby, A. Strang, & M. Wessells (Eds.), *A world turned upside down: Social ecological approaches to children in war zones* (pp. 19–37). Bloomfield: Kumarian Press.
- Kostelny, K., & Wessells, M. (2008). The protection and psychosocial well-being of young children following armed conflict: Outcome research on child-centered spaces in Northern Uganda. *Journal of Developmental Processes*, 3(2), 13–25.
- Kuo, F. E., & Faber Taylor, A. (2004). A potential natural treatment for attention deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580–1586.
- Lerner, R. M. (2006). Developmental science, developmental systems, and contemporary theories. In W. Damon & R. M. Lerner (Eds.), *Theoretical models of human development: Vol. 1. Handbook of child psychology* (6th ed., pp. 1–17). Hoboken: Wiley.
- Lynch, K. (1977). *Growing up in cities*. Cambridge, MA: M.I.T. Press.
- Maas, J., Verheij, R. A., et al. (2009). Morbidity is related to a green living environment. *Journal of Epidemiology and Community Health*, 63(12), 967–973.
- Malekoff, A. (2007). Transforming the trauma of September 11, 2001 with children and adolescents through group work. In M. Bussey & J. B. Wise (Eds.), *Trauma transformed* (pp. 194–214). New York: Columbia University Press.
- Malone, K. (2007). Consuming spaces: Growing up on an island in the Pacific Ocean. In K. Malone (Ed.), *Child space* (pp. 213–238). New Delhi: Concept Publishing Company.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *The American Psychologist*, 56, 227–238.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society*, 13(1), 9.
- Masten, A. S., & Reed, M.-G. J. (2002). Resilience in development. In C. Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 74–88). New York: Oxford University Press.

- Melson, G. F. (2008). Children in the living world: Why animals matter for children's development. In A. Fogel, B. J. King, & S. G. Shankar (Eds.), *Human development in the 21st century* (pp. 147–154). Cambridge: Cambridge University Press.
- Moore, R. C. (1986). *Childhood's domain*. London: Croom Helm.
- Moore, R. C. (1999). Healing gardens for children. In C. C. Marcus & M. Barnes (Eds.), *Healing gardens* (pp. 323–384). New York: Wiley.
- Myers, G. (1998). *Children and animals*. Boulder: Westview Press.
- Punch, S. (2000). Children's strategies for creating playspaces: Negotiating independence in rural Bolivia. In S. Holloway & G. Valentine (Eds.), *Children's geographies* (pp. 48–61). London: Routledge.
- Robinson, E. (1983). *The original vision*. New York: Seabury Press.
- Robinson, C. W., & Zajicek, J. M. (2005). Growing minds: The effects of a one-year school garden program on six constructs of life skills of elementary school children. *HortTechnology*, 15(3), 453–457.
- Robinson-O'Brien, R., Story, M., et al. (2009). Impact of garden-based youth nutrition intervention programs. *Journal of the American Dietetic Association*, 109(2), 273–280.
- Rosenfeld, L. B., Caye, J. S., et al. (2005). *When their worlds fall apart: Helping families and children manage the effects of disasters*. Washington, DC: National Association of Social Workers.
- Santa Barbara, J. (2004). The butterfly peace garden. *Croatian Medical Journal*, 45(2), 232–233.
- Sobel, D. (2002). *Children's special places*. Detroit: Wayne State University Press.
- Strife, S. (2008). Growing up in an environmental justice context: Children's environmental concerns. *Environmental Justice*, 1(4), 217–224.
- Swart-Kruger, J. (2002). Children in a South African squatter camp gain and lose a voice. In L. Chawla (Ed.), *Growing up in an urbanising world* (pp. 111–133). London: Earthscan Publications.
- Swart-Kruger, J., & Chawla, L. (2002). "We know something someone doesn't know": Children speak out on local conditions in Johannesburg. *Environment and Urbanization*, 14(2), 85–96.
- Tanner, T., Garcia, M., et al. (2009). Children's participation in community-based disaster risk reduction and adaptation to climate change. *Participatory Learning and Action*, 60, 54–64.
- Thurman, H. (1979). *With head and heart*. New York: Harcourt Brace Jovanovich.
- Trawick, M. (2007). Freedom to move: A bike trip with Menan. In K. Malone (Ed.), *Child space* (pp. 21–40). New Delhi: Concept Publishing Company.
- United Nations Children's Fund. (2009). *Children and conflict in a changing world*. New York: UNICEF.
- Wells, N. (2000). At home with nature: Effects of "greenness" on children's cognitive functioning. *Environment and Behavior*, 32(6), 775–795.
- Wells, N., & Evans, G. (2003). Nearby nature: A buffer of life stress among rural children. *Environment and Behavior*, 35(3), 311–330.
- Winterbottom, D. (2008). Garbage to garden: Developing a safe, nurturing and therapeutic environment for the children of the garbage pickers utilizing an academic design/build service learning model. *Children, Youth and Environments*, 18, 435–455.

# Chapter 9

## 8,000 Trees: A Refuge from Ruins

Suzanne Thompson

**Abstract** Suzanne Thompson describes an entrepreneurial version of greening in the red zone by telling the story of how Afghan women, historically excluded from horticultural activities, are adapting to the aftermath of the Afghan war by planting new cultivars. Though this case is more typical of traditional development approaches, it tells a unique story of how women in war-torn Afghanistan are recognizing and reaping the power of greening in their resilience journeys.

**Keywords** Deforestation • Reforestation • Livelihoods • Afghanistan • Green micro-lending

It was 2004 when the Global Partnership for Afghanistan (GPFA) first joined forces with village elders and family farmers in the war-torn plains of the Shomali Valley to help plant a few thousand trees. The landscape was dry and parched, homes were devastated, and the humanitarian situation was just as bleak. The Soviets and later the Taliban had declared a scorched earth policy on the country's orchards, vineyards and forests, making them red zones of the first order. War, compounded by internal strife, had forced millions of Afghans to flee their homes and country. Land—unattended and unwatered—fell into the vicious cycle of deforestation, further aggravated by drought.

Refugees longed for the sense of meaning and accomplishment provided by working with their land and were returning to their farms, relying on stopgaps—handouts and food-for-work programs—to survive. Orchards and vineyards, which had once made Afghanistan the second largest supplier of raisins in the world and a major producer of dried fruit and nuts, and supplied 60–80 % of its export income, were long depleted, and there was no reliable stock to replenish supplies.

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S. Thompson (✉)  
Global Partnership for Afghanistan, 33 West 93rd Street, 4N, New York, NY 10025, USA  
e-mail: sthompson@coronadoconsultants.com

Wood—urgently needed to rebuild destroyed homes—was in short supply. Poppy production for use in the illicit drug trade was increasing.

GPFA was determined to find practical, participatory methods to address deforestation—not just by planting trees but by identifying and empowering stakeholders acting in their *own* interests to improve their *own* livelihoods. The focus would be on small, green, entrepreneurial enterprises: commercial woodlots to rebuild timber production and perennial horticulture including orchards, vineyards, and nurseries. Fruit, nuts and timber could provide a stable income for years to come, far surpassing annual cash crops like wheat, and even more income than a farmer can get from poppies.

GPFA worked with the local population to launch its farm forestry enterprises with 40,000 poplar cuttings—10-in. sticks imported from a nursery that would become harvestable timber in 7 years. Afghanistan has a long tradition of cultivating poplars, and the wood is used for construction. While Afghanistan has been consumed with fighting, improved poplars have been developed elsewhere, with rapid growth and high volume timber yield. These new trees grow faster, taller and straighter than local poplars, and within the first year, they reach 3 m, three times the size of local poplars.

GPFA hammered out a business model with farmers that reflected the tremendous pressure for annual earnings. With each poplar the farmers planted, they would be able to harvest 3–5 cuttings. They would return one cutting back to GPFA for every one they received. The rest would be sold, generating as much as several thousand dollars. By the time the poplars matured in 7 years, they could be harvested and sold for around \$30,000 per half acre.

One of the first women to become a GPFA poplar enterprise farmer was Rabia of the Farza District in the Shomali Valley (see Fig. 9.1). A once thriving center of agriculture not far from Kabul, Farza suffered some of the worst devastation of lives and land on the frontline of the war against the Taliban. Rabia was a young, pregnant mother of two children when she and her injured husband escaped. ‘We were like barbarians fleeing in the wilderness, barefoot and with nothing to shield us from the bitter cold’. Wherever the family went, sadness was pervasive. They did odd jobs and labored on others’ land to earn enough for food and shelter. ‘We lived our days and nights in torment’, she recalls. They returned home to find her village in ruins and her house destroyed. Part of her land was washed away by floods, and the rest lacked water. ‘I simply sat down and cried’, she says.

Today, Rabia stands on her two acres of land amidst 8,000 newly planted poplars, with stability and hope for her six sons and one daughter. Working with community leaders, GPFA chose Rabia to participate in GPFA’s Farmer Field Schools. In Afghanistan, women do not traditionally engage in planting trees for farm forestry, but GPFA female extensionists Wasima and Belqis selected Rabia to receive a loan of 8,000 hybrid poplar cuttings, training and supplies that she could not buy for herself. While she plants, weeds and tends her trees, GPFA’s Wasima and Belqis visit frequently to troubleshoot and share their expertise on cultivation, pruning,





**Fig. 9.1** Rabia and family with young poplars. Photo courtesy of Global Partnership for Afghanistan

fertilization and other technical issues. Rabia in turn shares her experiences with other female farmers at GPFA Farmer Field Schools.

Rabia's entire family of nine depends on her. Her sons, now university students, work in the fields and as manual laborers after their lessons, earning just enough money to feed themselves and supplement the family's income a bit. With 8,000 poplars, her land is her hope. But she dreams that one day GPFA will expand its work in her village to help more families plant woodlots, orchards and vineyards, and to help her and others form an association of women woodlot owners.

When her trees are harvested, Rabia plans a pilgrimage to Mecca. There she intends to offer prayers for her country, for peace and development, for organizations like GPFA who are helping poor families like hers survive and prosper. 'But now', she asks with her face glowing, 'just let me stand here and look at my trees'.

Since 2004, GPFA has helped 29,000 families like Rabia's plant and revitalize woodlots, orchards, vineyards and vegetable plots in 2,500 villages. The income generated by the eight million trees these farmers have planted, this entrepreneurial greening of the red zone, has transformed destruction and hopelessness into renewal and progress.

But perhaps the greatest impact comes not from the planting stock and supplies, but the transfer of knowledge on modern horticulture and farm forestry. GPFA's staff of 40–200 Afghan horticulturalists, extensionists, and community workers provide technical support to Rabia and other men and women farmers.



**Fig. 9.2** Sakima and Hamida's apple trees. Photo courtesy of Global Partnership for Afghanistan

Hamida, a mother of 10, has benefited from GPFA's approach to sharing expertise. After joining GPFA's orchard revitalization program in 2008, Hamida saw production from her 200-tree orchard with six varieties of apple dwindle to a few diseased apples. Sakina, GPFA's female extensionist, helped her radically prune and fertilize her trees (see Fig. 9.2). By the end harvest season, Hamida sold her apples for \$4,000, in sharp contrast to the \$600 annual income of her 55-year old husband, Abdul Shakoor, a taxi driver in the volatile, conservative Paktya Province. But Abdul Shakoor beams with pride as Hamida tells how she expects better productivity this year. He smiled as Hamida grabbed his smooth hand to contrast her calloused palms. Her income is the primary support for the 16 people in their household.

Sakina says that Afghanistan is on the cusp of great change, but progress has its challenges. 'The women and the men of Paktya are strong', she says. 'They were on the front lines as Afghanistan resisted the Russians'. Hiding her lined and weathered face from the camera with her bright green chador, Hamida, like Rabia, personifies the character of a proud, resilient people working together to rebuild a country brick by brick, neighbor to neighbor, and tree by tree.

# Chapter 10

## Topophilia, Biophilia and Greening in the Red Zone

Richard C. Stedman and Micah Ingalls

**Abstract** This chapter presents a theoretical framework for integrating Wilson’s notion of biophilia (1984) with Tuan’s (1980) notion of topophilia (literally ‘love of place’). The natural biotic environment core to the biophilia hypothesis represents a crucial—and oft overlooked in urban areas—element of ‘place’ or neighborhood, but there are other elements—neighbors, relationships, memories, landmarks, the built environment—that are similarly emotion-laden and can serve as the basis for action that promotes community rebirth and recovery. As such, resilience in the face of both sudden disasters and slow erosion of communities requires examining these elements in tandem.

Topophilia emphasizes attachment to place and the symbolic meanings that underlie this attachment. Any place embodies a multiplicity of meanings, some nature-based and some not, although some places exhibit a wider range than others. Post-disaster reconstruction of place thus involves the re-building of attachment-affirming meanings that characterized the place pre-disaster and/or the freedom to rebuild spaces in such a way that new, desirable meanings are created and obsolete or threatening meanings jettisoned. It is crucial to remember that these meanings—including those that have biophilia and topophilia-based roots—are fundamentally social and cultural, and therefore often political, in that they vary across social groups possessing differing types and levels of power. In short, some sets of meanings will have an easier path to reconstruction than others. The implications of socioeconomic power differentials—and how they co-vary with symbolic meanings—are therefore significant in the re-creation of meanings.

The authors place red zone settings in a comparative framework. It is widely recognized that resilience is not a general principle, but must always be asked as ‘resilience of what to what?’ (Carpenter et al. 2001). Communities that have

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R.C. Stedman (✉) • M. Ingalls  
Department of Natural Resources, Cornell University,  
104 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: rcs6@cornell.edu; mli6@cornell.edu

faced slow erosion of community capacity through outmigration of industry, jobs, services, and youth face different immediate challenges vis-à-vis resilience than communities that have thus experienced violent conflict or catastrophic disaster. However, these challenges may shift over time in such a way as to be more consistent with those faced by communities which have been subjected to rapid devastation. Making comparisons across these community types may help us to gain a deeper understanding of the multiple manifestations of biophilia and topophilia, including how they are played out in activities such as greening, and their role as a source of resilience in social-ecological systems.

**Keywords** Topophilia • Place attachment • Urban decline • Restoration of place

*Environmental sociologists Richard Stedman and Micah Ingalls explore the dynamic interactions among greening, biophilia, and topophilia or attachment to place. They hypothesize that such interactions may differ in typical ‘sudden calamity’ red zones from those in more slowly declining ‘corrosive’ red zones such as the rust belt cities of the northeastern United States. Greening as a source of resilience may occur less noticeably or frequently in rust belt cities, yet may be a critical component of adaptive capacity as these cities approach a crisis or tipping point.*

## Introduction

We present several central elements underpinning greening in the red zone. First, we introduce a theoretical framework for integrating the innate personal and psychological responses to natural forms posited by the biophilia hypothesis (Wilson 1984) with a related (and potentially more inclusive, in that they are not directly based on the natural environment) set of positive emotions suggested by Tuan’s (1980) notion of *topophilia* (literally ‘love of place’). The natural biotic environment core to the biophilia hypothesis represents a critical element of ‘place’, but there are other elements—neighbors, social relationships, memories, landmarks, the built environment—that may be crucial as well. Although none of these would exist without the biophysical environment, this environment may not rise to the level of consciousness in attachment to them. Further, rather than being primarily innate psychological responses, these elements may be ‘learned’ through experience. In short, we envision biophilia as a potentially crucial aspect of topophilia, although there may be important elements of biophilia that are not captured by the topophilia concept. Moreover, we posit that the most salient innate responses of the biophilia position, namely, those responses to biological cues informing the individual of the livability of a particular environment, can be understood as mechanisms whereby the individual attaches to, and is enabled to love, place.

Second, we argue that the term red zone, which refers to settings (spatial and temporal) that may be characterized as intense, potentially or recently hostile or dangerous areas or times (Tidball and Krasny, Chap. 1, this volume), can be conceptualized

to include urban environments and communities that have suffered long-term erosion and decline through economic stagnation and the disintegration of meaningful social networks (e.g., Pelling 2003). We invoke American ‘rust belt’ cities as a prime example of such communities, where ‘rust’ evokes notions of the decline of a once flourishing manufacturing sector in cities across the industrial northeastern United States. Other contributions within this volume engage red zones as places that have experienced sudden, dramatic, unwanted change through natural disaster, warfare, environmental accidents and other such highly visible crisis phenomena. We offer the decline of rust belt cities as a crucial counterpoint that allows us to reflect on the comparative workings-out of the main arguments of this volume.

Third, we examine how biophilia and topophilia may be reflected in *greening* behavior. Strategies for the rejuvenation of particular red zone places all attempt, explicitly or implicitly, to build topophilia by constructing or reconstructing the places that people call home. If topophilia thus underpins locally based greening responses, it suggests potential links between the strict greening behavior (e.g., planting trees) and other forms of recovery that are not directly concerned with restoring nature. Through the process of greening, some forms of attachment can be built that are not directly tied to green *outcomes*, but to the *process* itself. For example, the process of coming together around greening activities builds breadth and depth of engagement with the physical neighborhood, and fosters social networks and social trust among participants. Greening that takes into account the concept of place-making or attachment as responses that incorporate the biophilic response, but that also embraces topophilic processes, may be particularly potent in renewing a degraded environment *and* in re-creating a resilient community with a strong sense of its own agency (see Tidball and Krasny 2008); forms of response that do not originate explicitly in biophilia might focus directly on (re)establishing severed social relations through such activities as the establishment of community meeting places, working groups, housing, and neighborhood landmarks that serve as key loci for community identity. Importantly, the re-creation of the social, infrastructural, and biological components of place in the red zone may be most potent where greening activities succeed in drawing on both biophilia-based instincts *and* topophilia-based commitments—rejuvenating the physical environment and, through collective action, binding members of the human community to one another and to the places they inhabit.

## **Biophilia and Topophilia: Broadening the Theoretical Framework**

The relationship between topophilia and biophilia remains largely unexplored. In a most basic sense, biophilia is an innate human instinct which aids the individual in site selection for habitation through diverse sign stimuli indicating healthful or abundant localities (Kellert and Wilson 1993). Adaptive biophilic responses, it is asserted, have been selected for during the long history of the human evolution. Some (e.g., Sideris 2003) have challenged the ‘innateness’ of biophilia, noting that

‘learning rules’ are reinforced both through the co-evolution of genetics and culture. Although important, we contend that this point still conveys a pre-consciousness regarding biophilia, whether strictly genetic, or co-evolved. Innateness thus remains at the core of many of the key discussions about biophilia and will be retained in this chapter.

Biophilia cannot easily be understood through simple mechanistic or functional explanations. It is also the emotionally-laden connection—which transcends instrumentality—between humans and diverse biotic forms. Biophilia, however conceptualized, seems to be a crucial driver in unconditioned human reactions to particular environments. Because of the ability of natural cues to communicate important messages regarding the livability of a particular landscape, the biophilic response to positive sign stimuli in the natural world affords a sense of psychological peace or comfort (Lohr and Pearson-Mims 2006; Graff 2006) in vegetated or otherwise biologically rich contexts. Conversely, the absence of these positive natural cues in urban contexts creates a subliminal sense of unease and intrapsychic anxiety exacerbated, perhaps, by over-stimulation from exposure to urban forms and a lack of rejuvenating or restorative natural features (Heerwagen and Orians 1993). The innate biophilic response to particular settings that informs the individual of the relative livability of that setting represents an important intersection with topophilia.

Topophilia, or ‘love of place’ (Tuan 1974) manifests as a deep affective relationship which ties the individual, the social group, and the community to a particular socio-physical landscape. The geophysical locality itself becomes imbued with meaning as the setting of positive social interactions and relationships. In this sense, the physical locality becomes a ‘landscape of memory’ (Ryden 1993), which, in its most potent form, creates a strong bond tying the individual and/or social group to place. We elaborate below on core principles of topophilia/place attachment.<sup>1</sup>

### *The Experiential Basis of Topophilia*

Conventional thinking, described above, emphasizes the evolutionarily-informed, innate nature of the biophilia concept. The attachment framework of topophilia stands, in contrast, as strongly experiential and ‘constructed’ rather than innate. Relph’s (1976: 141) oft-cited dictum emphasizes that places are ‘fusions of human and natural order ... significant centers of experience ... based on directly experienced phenomena of the lived world, full of meanings, with real objects, and ongoing activities, and become important sources of human existence with deep emotional and psychological ties’. Tuan (1977) further emphasizes the experiential essence of

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<sup>1</sup> We will move freely between the topophilia and place attachment language, as we do not see substantive differences between these terms. Much of the empirical research—including that conducted by the lead author in this chapter—has utilized the attachment terminology.

place, suggesting that what begins as undifferentiated space becomes place as we get to know it better and endow it with value. Simply put, we might be born loving nature, but we *learn* to love particular places.

### ***Topophilia Rests on Symbolic Meanings***

Most research and theoretical musings in this area rest on a symbolic interactionist frame: our attachment to places is based on the meanings we attribute to them (see also Stedman 2003b, 2008). The attribution of these meanings may be widely diverse and deeply symbolic: i.e., landscapes of ‘hope’, of ‘suffering’. Tuan wrote (1975: 23) ‘an object is taken as a symbol when it casts a penumbra of meanings’. The diverse and symbolic nature of these meanings has fostered a debate about whether these meanings are radically individualistic or are social and widely shared. Some (Relph 1976; Meinig 1979) go so far as to assert that a given setting will contain as many meanings as there are people within it. Others, however (e.g., Greider and Garkovich 1994), suggest that while a given setting embodies multiple meanings, they are based on social categories and potentially shared by others within these categories. An urban neighborhood may thus represent a ‘home’, a ‘workplace’, a ‘dangerous place’, etc., according to the role-based experiences that provide the lenses through which it is viewed. Conflict over these meanings may represent a barrier to collective action, even—or especially—when the parties holding them are strongly attached (Stedman 2003b; but see Cheng et al. 2003 for a contrasting view). Meanings, we assert, are primarily socially—rather than solely individually—constructed and shared; members’ shared understandings of reality contribute to a sense of place and connectedness (Alkon 2004). Although the symbolic interactionist frame can be critiqued as neglecting power relations in the creation of meaning, it is important to note that power is always present in the shaping of these meanings (Stokowski 2002; Pred 1984). Meanings are hardly freely constructed—social structure shapes the physical environment, the lenses through which the setting is encountered, and usually fosters some meanings at the expense of others. The influence of social structure is, of course, dynamic and fluctuating over time, rather than fixed.

### ***Nature Always Matters***

Whereas absolutely at the core of biophilia, nature also represents an important component in the development of place attachment. Sack (1997: 73) writes: ‘Any place draws together nature, meaning, and social relations. The character of that place depends on this mix, which is always in contention and changing ... as geographical beings, we negotiate the interconnections among the three on a daily basis in each and every place’. Empirical studies that have analyzed the relationship

between the quality of the biophysical environment and the strength of place attachment (e.g., Stedman 2003b) have identified a somewhat ambiguous relationship between the two. The biophysical components of place are important, in many cases necessary, but not sufficient alone to engender meaningful place-attachment. Some studies, for instance, have observed that the strength of positive interpersonal relationships outweigh other factors including the physical conditions of residence and urban infrastructure (Brown et al. 2003). Stedman's (2003b) work found that the relationship between environmental amenities and place attachment was mediated by the symbolic meanings ascribed to the setting. Matarrita-Cascante et al. (2010) found that this relationship varied across the different sets of social groups encountering the landscape.

### *The Intersection Between Biophilia and Topophilia*

The preceding discussion of topophilia now gives us firmer footing on which to stand while we relate topophilia to biophilia. How shall we conceive of the intersection of these two constructs? Figure 10.1 (below) is a simple schematic that demonstrates this relationship. The topophilia circle indicates the full realm of attachment to place. As discussed earlier, much—but not all—of this attachment may be embodied in attachment to the natural elements of place: the trees and flowerbeds of our neighborhood; the wildlife and fish in the streams; the view across the hills; even the cast of the light on a crisp autumn afternoon. However, we are also attached to elements of place that—at least on the surface—may not directly relate to the natural world: the locus of topophilia does not have to be strongly based in nature. Here we see the corner grocery store where we get the latest neighborhood news, the elementary school where we watch our children learn, and our own (and others') homes where we gather to create and recreate our relationships. Although nature is still present in these elements, it may play a relatively minor role in fostering attachment.

On the biophilia side of the diagram, we argue that not all of biophilia finds its root in a *particular* place. The innate nature of biophilia suggests connections to generalized, symbolic nature, or to landscape types (i.e., mountains or seashore). Personal experience with these places is not necessary for biophilia. One can have a



**Fig. 10.1** Nexus of topophilia and biophilia



‘symbolic’ love of nature that is not imbued in attachment to a particular setting: we have the innate need for nature that transcends its expression in any particular place. The overlap between the circles—‘nature in place’ is where we find our attachment to place keenly driven by our attachment to the natural elements that are present in this place.

A few additional elements of this schematic bear emphasis. First, although it is possible to examine the biophilia/topophilia nexus at multiple units of analysis, we introduce the intersection as expressed by the *individual* social actor (Fullilove 1996). Starting with the individual provides analytical clarity that can be used as a foundation for examining how the concepts interrelate at larger scales, such as social groups, communities (of place, of interest, and of practice) and beyond. Second, although we had to create circles of a certain size, we assert (as does Sack 1997) that the relative emphasis of these elements will be strongly variable between settings (nature will receive more emphasis in some places) as well as within settings (i.e., some people will place a greater focus on nature than will others). Thus, the reader should not infer that we believe these circles will tend to be of similar size, nor the overlap between them symmetrical.

## Rust Belt as Red Zone?

Much of this volume examines red zones as settings experiencing acute unwanted social and/or environmental change. We offer so-called rust belt areas as another type of setting in which the topophilia/biophilia nexus may be articulated. These settings—devastated by the decline and restructuring of the manufacturing industries, particularly from the 1970s onward—represent an example of eroded urban centers which are a unique kind of red zone that offers useful points of comparison with the other physical settings included in this volume. Rust belt communities suffer high rates of unemployment due to the steady outmigration of jobs and the mechanization of processes previously carried out by unskilled workers; poverty, crime and incivilities; low rates of educational attainment; increasing inequality; high incidence of single-parent homes; and physical and social fragmentation of communities through the abandonment of inner-city housing and the exodus of wealthy and mobile residents to ever-sprawling suburban areas (Pendall 2003). Such communities, which have faced slow erosion of community capacity (and the critical sense of collective agency), may experience different challenges vis-à-vis resilience than communities that have experienced violent conflict or catastrophic disaster. Such places have not suffered acute catastrophes, but rather chronic, creeping declines and the slow erosion of capacity and human agency (Wilson and Kelling 1982), through pervasive and steady degradation of both the physical environment and the human communities that inhabit them (Thomas and Smith 2009). We feel that important comparisons may be made across these community types, including comparisons that increase

our understanding of greening as a community response. For example, slow erosion of capacity may lend itself to multiple interpretations or frames of the problem (Kroll-Smith and Couch 1990), which can foster contention rather than cooperation (see Erikson 1976). The term 'corrosive community' (Freudenburg 1993, 1997, 2000; Freudenburg and Jones 1991; Picou et al. 2004; Miller 2006) is used in contrast to common images of cohesive communities (Quarantelli and Dynes 1977) coming together to respond quickly and collectively in the aftermath of a disaster. We feel the corrosive community imagery is useful for understanding social response to prolonged urban decline, as such declines are often characterized by diverse attributions of cause and solution. If left to decline over a period of time, rust belt cities may acquire many of the features of red zones, as suggested in this description of Detroit:

Empty lots, derelict buildings, and homes overrun with trees are effortless to find today in Pripjat, the Ukrainian city that was evacuated within two days of the nuclear disaster at Chernobyl in 1986. Unfortunately, the city of Detroit is starting to show similarities to this Ukrainian ghost town, as vacancies are on the rise and wildlife has overtaken some of the neighborhoods.<sup>2</sup>

Importantly, this form of chronic decline is not divorced from that in more acute red zones (i.e., those characterized elsewhere in this volume). This is because the erosion of capacity speaks volumes to a community's ability to respond to sudden catastrophe (Pelling 2003), as everyday hazards incrementally lower individuals' thresholds of resilience (Kasperson et al. 1996; Blaikie et al. 1994).

Especially because we have only the earliest glimmerings about the conjoining of topophilia and biophilia, we believe it is worth opening up a parallel series of questions about the setting in which the interplay between the concepts is examined. In addition to the potential for coupling identified above, where the chronic may accentuate the acute, we can ask whether chronic red zones differ from acute red zones in the relationship between topophilia and biophilia. If so, what sorts of differences might we expect?

The negative effects of prolonged urban decline on topophilia are myriad, including the potential disruption of place-based identity, the erosion of positive self-evaluation and of individual and collective feelings of efficacy, the loss of community capacity including skills and human assets, loss of meaning and purpose, and pervasive feelings of loss of control in environments and systems which threaten to overwhelm the individual and the community (Winterbottom 2007). In Sack's (1997) terminology, long-term decline changes nature, social relations, and meanings. The physical environment may become degraded, social ties may be severed as cherished friends and family migrate in search of better work or living conditions, and meanings of community may be seriously threatened and bitterly contested between groups positioned differently vis-à-vis these changes. Due to the duration and breadth of these impacts, the chronic and systemic psychosocial damage which is incurred by the individual and the community is tantamount to, and potentially even more difficult to ameliorate, than the acute impacts of conflict and natural disaster (Brown et al. 2003). Furthermore, the degradation of the social fabric and attachment-based ties

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<sup>2</sup><http://www.hnn.us/articles/124582.html>

to place brought about through progressive decline positions the community to be vulnerable to catastrophe (Pelling 2003). The chronic accentuates the impacts of the acute.

## Topophilia, Biophilia, and Greening

The intersection of topophilia and biophilia may result in a particular set of behaviors described as greening, or collective attempts to restore nature in places that serve as loci for attachment. From the point of view of biophilia, greening is a mechanism that is based in an innate love of nature (Kaplan 1995). According to Tidball and Krasny (2008), community greening actions, especially in red zone settings, can create both social well-being and restore the natural environment, thus further fostering opportunities to express a biophilic response (Tidball, Chap. 20, this volume). In a parallel fashion, topophilia suggests that greening is based in attachment and reinforces attachment, and thus represents an important conjoining mechanism: attachment is further facilitated by the individual and collective *action* of greening. Greening may powerfully and directly foster attachment among participants (i.e., those involved in the act of planting trees or other activities), but also indirectly, for those who are networked with the participants and/or hold place meanings that are consistent with the goals or outcomes of the greening process (Granovetter 1973).

We emphasize the power of greening as a crucial, and undeniably *social*, response to the emergence of acute and chronic red zones. Because we articulate the intersection between topophilia and biophilia at the individual level, greening requires the translation of individual impulse to collective behavior, a *coming together* of people to heal a physical space (Fried 2000). As people engage in greening activities they are themselves rejuvenated through an intimate engagement with their natural setting and bound more closely to it and to one another (Barthel et al. 2005; Tidball and Krasny 2008; Tidball et al. 2010). As Tidball and colleagues (Tidball and Krasny 2007; Tidball et al. 2010) have pointed out, even if greening emphasizes rebuilding ‘nature’, the act of greening may also (re)build social relationships—shared meanings and trust—that form the cornerstones of place attachment and may also become a source of resilience. Greening of the urban environment through the creation or conservation of natural areas and communal gardens has the potential to alleviate individual psychological discomfort and, more broadly, to increase the desirability of a particular environment by recreating natural visual cues and sign stimuli. Thus, the *process* of restoration of the physical and/or social environment can birth powerful new meanings (Tidball and Krasny 2008)—a place of hope, of renewal—that will be shared among those active in the efforts, yet bearing important secondary benefits for the community at large.

A number of crucial questions must be addressed in relating greening, i.e., the action of creating green space for both social and ecological ends, to the intersection of biophilia and topophilia (‘nature in place’, in Fig. 10.1). We address several of these below.

## *Issues of Scale and Units of Analysis*

Biophilia and topophilia, though socially mediated, are essentially psychological constructs, conceptualized and understood most intuitively at the individual level. A resident feels attached to *her* community and holds an innate desire to connect to nature in her context. Crucial meanings—home, away, danger, opportunity—are likewise experienced as individual constructs, even as many social scientists recognize the strong role that social influence plays in their creation. Although we view the relationship between individual and collective behavior as a continuum, rather than a dichotomy, we argue that greening as a *behavior* is most potent—and relevant to resilience—when conceptualized and operationalized on a communal level. Although an individual can—and will—engage in green restoration activities (e.g., planting a tree), the greening efforts at the core of this volume place greater relative emphasis on people coming together to engage in collective behavior. This is equally true at the local level (e.g., a small neighborhood garden) as it is more broadly.

## *Power and Conflict in Place-Creation Through Greening*

Power interests play an important role in augmenting, attenuating, or altering the gap between nature in place and greening, and the relationship between individual sentiment and the possibility of meaningful collective action. Power acts in a number of crucial ways. At the most basic level, decisions about how to allocate resources are related to competing claims about the nature of the problem (in the case of rust belt communities, where have all the people and jobs gone and why is main street empty?) and the proposed trajectory of the community (how shall we respond?) (Kroll-Smith and Couch 1990). Claims do not compete equally: pre-existing power structures play a strong role in allocating resources in the direction of particular stratagems (Molotch et al. 2000). Strong place attachments, where coupled with an ideology of place by which one segment of a community feels an inherent right to their locale (i.e., ‘our meanings are the *right* meanings’), may create conflict in the face of competing claims.

Exogenous threats to place give rise to diverse psychosocial responses, including the strengthening of place-based identity and the concomitant solidification of community identity united against a common (external) threat (Hogg and Terry 2000). Endogenous threats to place (more characteristic of the corrosive community) by contrast, may further fragment the social fabric of a community and be more likely to give rise to oppositional identity formation and intra-community conflict. Community greening, whether through gardening or planting trees, typically involves the use of space or other limited resources which may be a premium commodity in the urban environment, potentially escalating tension (why are we wasting our time and money on planting trees when people are out of work?) in the context of competing place-claims, which also may better characterize red zone communities. As diverse and competing place claims are mapped out on the urban landscape, expressed as decisions regarding the use of spaces, conflict may arise, subverting the opportunity

for collective place-making and constructive engagement so crucial to attachment and a sense of collective agency. This may be particularly the case in non-red zone communities, where people do not experience the acute threat that leads to an urgent biophilic response. For example, in NYC in the late 1990s, conflicts arose between long-term community gardeners and the city government, which wanted to convert the gardens to commercial properties. By contrast, after 9/11, the New York City community rallied in a myriad of expressions of urgent biophilia, as described in the chapter in this volume on living memorials (see Svendsen and Campbell, Chap. 25, this volume). Such expressions of biophilia may over time lead to a different sort of expression of topophilia (Tidball 2010)—today New Yorkers, urged on by Mayor Bloomberg and such public figures as Bette Midler, brag, perhaps deservedly, about their green city, its community gardens, and such high profile greening initiatives as MillionTreesNYC. In another example, Detroit has for years experienced the decline and accompanying erosion of social cohesion and incivilities of a rust belt city. With the recent economic downturn, which some consider as a tipping point for Detroit from a corrosive to a red zone community, the city has witnessed a renewed interest in community gardening and greening, which Tidball (Chap. 4, this volume) would suggest is the result of an urgent biophilia, and we posit has the potential to create new symbolic meanings and place attachments for the residents of Detroit. In a word of caution, one must also be mindful that any meaningful action toward greening will need to take seriously conflicting claims and the power structures which privilege some place meanings above others.

Further, a community, as an interactional social unit representing the interactional manifestation of place (Wilkinson 1991), is negotiated and contested in various ways by various actors, but the boundaries of the community—the critical border between ‘them’ and ‘us’—is typically drawn by those who are in power. As such, inclusion and exclusion are the remit of the powerful center over and against the comparatively weak on the sociopolitical margins of the community. Seen in this way, inclusion in the community may be understood, even expressed, as gradations along a spectrum varying by the degree to which the individual reflects the normative values or the racial, ethnic, and socioeconomic criteria of the socially and politically powerful (Massey 1993). This bears critically on place attachment for those who are marginalized by the centers of power—that segment of society most in need of renewal.

Corresponding implications exist vis-à-vis greening: is greening seen—and by whom—as a marginal activity, or is there widespread agreement on its efficacy as a response to disaster, whether chronic or acute? The relation of greening to power interests is an area deserving of additional inquiry. In the context of urban communities, power relations may be manifested in the design and creation of green spaces such as public parks, which reflect the aesthetic and functional valuations of the community elite (Winterbottom 2007). Community green spaces which reflect these power centers may alienate, rather than embrace, and hence may not be meaningful to marginal or minority members of the community. Would-be responses and responders rooted in a commitment to bolster marginalized actors in the community should tread with caution. The direction from which place-creating greening agendas originate has important practical implications. The potency of community greening

which elicits the support of marginalized or impoverished communities lies in its origination ‘from below’, a fact which may be overlooked in centralized or ‘top-down’ urban regeneration initiatives (Tidball and Krasny 2008). The brokers and arbiters of power in this context ought to seek to create space (whether in the physical spaces of the degraded urban community, or in the policy sphere) that allows for the organic emergence of community-led greening. For example, the grassroots-driven development of ethnic urban gardens and allotments has been shown to provide meaningful spaces for engagement with nature in a way which engenders deep place attachment through intimate engagement with nature (e.g., through planting vegetables used in a particular culture, Saldivar-Tanaka and Krasny 2004). Such grassroots greening may also engender deep place attachment through intimate engagement with nature. Community gardening and other grassroots greening or ‘civic ecology’ initiatives (Tidball and Krasny 2007) are potent along at least two dimensions: first, it is important to recognize that the nature and symbolic forms of the initiative will reflect the *a priori* symbolic associations of the community. Second, the activities themselves strengthen the creative sense of agency and place-making of the marginalized community (Ingalls 2009).

## Conclusion

We have suggested an organizing framework that relates biophilia to topophilia. There is nothing necessarily hierarchical about the relationships between these concepts. However, when we are talking about *real neighborhoods*, we can conceive of topophilia that lacks a strong biophilic basis (at least consciously, someone might be strongly attached to a neighborhood on the basis of elements other than nature, such as friends, history, good restaurants, etc.). It is far harder to conceive of the converse (one being drawn to local nature without this connection fostering attachment to the setting). Although we suggest that it is possible to imagine each in the absence of the other, we believe that effective greening is most possible at the point of intersection between biophilia and topophilia. Here is where people will come together to restore nature in the places they care about. This is a fortuitous convergence: innate, positive responses to biological forms within the environment that are most salient for the re-creation of place in the red zone are precisely those instincts which engender meaningful place attachment.

We have also attempted to explore the notion of the red zone to include not only those environments that have been catastrophically impacted by sudden perturbations of war or disaster, but also those environments which have been systematically and chronically eroded through economic stagnation, social fragmentation, and the loss of meaningful relationships and community symbols. It is important to at least consider in this early stage of thinking potential setting-based differences in the topography of the relationship between biophilia and topophilia, *and* in how the greening response may manifest accordingly. Conceptualized through the lens of these two positions, we have argued for a critical engagement of red zone and resilience thinkers in examining greening processes in the eroded, corrosive community

of the rust belt (as an archetype of similar contexts in many parts of the world) in such a way that allows for the re-creation of place. Is it possible for greening as collective action that creates meaningful and positive symbols of community agency to become a source of social-ecological system resilience before a corrosive community reaches the tipping point and falls into a red zone?

This chapter has likely raised more questions than it has answered. We feel this is appropriate given the nascent nature of discussions of the relationship between topophilia and biophilia, and of the potential significance of greening in the red zone. Three domains of questions are particularly important to address. First, the importance of biophilic impulses in undergirding topophilia remains an open question to us, and one richly deserving of additional research. Prosaically, we ask: how important is the presence of green space, or even people's attempts to create green space, to expressed levels of attachment? We must also ask 'for whom': is the biophilia-topophilia relationship (assuming it exists) equally shared across a broad swath of the local society, or does it vary (for example) by gender, race, class, ethnicity, or other meaningful experiential groups that transcend these broad categories? How do these meaningfully align or misalign with important power interests? Further, the phenomenologists are correct to gently remind those of us with more of a hypothesis-testing bent that every person-place intersection is its own beast: we must be careful about drawing sweeping conclusions about relationships between concepts from the study of a particular setting. As such, we ask 'under what set of conditions' is the presence of, and opportunities for connections to, nature more or less likely to play a strong role in topophilia?

This leads to a second class of questions, which address the manifestations of this relationship in red zone urban settings with degraded natural settings. It seems likely that in long-term declining urban areas in particular, the natural environment may be historically neglected as a locus of attachment (at least in comparison to a sudden loss of natural elements in an acute red zone site). Chronic rust belt sites may be especially open to competing claims which may hinder the development of greening activities. Finally, the difference between 'green' and 'greening' (Tidball 2010) is richly deserving of additional attention: the former refers to the crucial presence of nature in underpinning key meanings and attachment; the latter conveys collective action. Deep attachment sometimes fosters effective action, and in other instances does not, and collective action may lead to deep attachment. The constellation of factors that may help explain the connections between the presence of nature, collective action, meanings, and place attachment is crucial to understand if we are to help foster more effective community greening that responds to diverse threats across a wide spectrum of communities.

## References

- Alkon, A. (2004). Place, stories and consequences. *Organization and Environment*, 17, 145–169.
- Barthel, S., Colding, J., et al. (2005). History and local management of a biodiversity-rich, urban cultural landscape. *Ecology and Society*, 10(2), 352–387.

- Blaikie, P., Cannon, T., Davis, I., & Weisner, B. (1994). *At risk; natural hazards, people's vulnerability, and disasters*. New York: Routledge.
- Brown, B., Perkins, D. P., & Brown, G. (2003). Place attachment in a revitalizing neighborhood: Individual and block-level analysis. *Journal of Environmental Psychology, 23*, 259–271.
- Cheng, A. S., Kruger, L. E., & Daniels, S. E. (2003). 'Place' as an integrating concept in natural resource politics: Propositions for a social research agenda. *Society and Natural Resources, 16*, 87–104.
- Erikson, K. T. (1976). *Everything in its path: Destruction of community in the Buffalo Creek flood*. New York: Touchstone.
- Freudenburg, W. R. (1993). Risk and recreancy: Weber, the division of labor, and the rationality of risk perception. *Social Forces, 71*, 909–932.
- Freudenburg, W. R. (1997). Contamination, corrosion and the social order: An overview? *Current Sociology, 45*.
- Freudenburg, W. R. (2000). The 'Risk Society' reconsidered: Recreancy, the Division of Labor and the Social Fabric. In M. J. Cohen (Ed.), *Risk in the modern age: Social theory, science and environmental decision-making* (pp. 107–120). London: St. Martin's Press.
- Freudenburg, W. R., & Jones, T. R. (1991). Attitudes and stress in the presence of technological risk: A test of the Supreme Court hypothesis. *Social Forces, 69*, 1143–1169.
- Fried, M. (2000). Continuities and discontinuities of place. *Journal of Environmental Psychology, 20*, 193–205.
- Fullilove, M. T. (1996). Psychiatric implication of displacement: Contributions from the psychology of place. *The American Journal of Psychology, 153*, 1516–1523.
- Graff, B. (2006). Positive emotions in residential environments. The residential context of health at the European network for housing research. In *Workshop at 'Housing in an expanding Europe: Theory, policy, participation and implementation' conference*, Ljubljana, Slovenia.
- Granovetter, M. (1973). The strength of weak ties. *The American Journal of Sociology, 78*(6), 1360–1380.
- Greider, T., & Garkovich, L. (1994). Landscapes: The social construction of nature and the environment. *Rural Sociology, 59*(1), 1–2.
- Heerwagen, J. H., & Orians, G. H. (1993). Humans, habitats and aesthetics. In S. R. Kellert & E. O. Wilson (Eds.), *The biophilia hypothesis*. Washington, DC: Island Press.
- Hogg, M. A., & Terry, D. J. (2000). Social-identity and self-categorization processes in organizational contexts. *Academy of Management Review, 25*(1), 121–140.
- Ingalls, M. L. (2009). *Growing home: Displaced communities, urban gardening and the re-creation of place-based identity*. Ithaca: Department of Natural Resources, Cornell University.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology, 15*, 169–182.
- Kasperson, J., Kasperson, R., & Turner, B. L. (1996). *Regions at risk: Comparisons of threatened environments*. Washington, DC: United Nations University Press.
- Kellert, S. R., & Wilson, E. O. (1993). *The biophilia hypothesis*. Washington, DC: Island Press.
- Kroll-Smith, J. S., & Couch, S. R. (1990). *The real disaster is above ground: A mine fire and social conflict*. Lexington: University Press of Kentucky.
- Lohr, V. I., & Pearson-Mims, C. H. (2006). Responses to scenes with spreading, rounded, and conical tree forms. *Environment and Behavior, 38*(5), 667–688.
- Massey, D. (1993). Power geometry and a progressive sense of place. In J. Bird, B. Curtis, T. Putnam, G. Robertson, & L. Tickner (Eds.), *Mapping the futures* (pp. 59–69). London/New York: Routledge.
- Matarrita-Cascante, D., Stedman, R., & Luloff, A. E. (2010). Permanent and seasonal residents' attachment in natural-amenity rich areas: Exploring the contribution of landscape factors. *Environment and Behavior, 42*, 197–220.
- Meinig, D. W. (1979). Symbolic landscapes: Models of American community. In D. W. Meinig (Ed.), *Interpretation of ordinary landscapes* (pp. 164–192). New York: Oxford University Press.



- Miller, D. S. (2006). Visualizing the corrosive community: Looting in the aftermath of Hurricane Katrina. *Space and Culture*, 9(1), 71–73.
- Molotch, H., Freudenburg, W. R., & Paulsen, K. E. (2000). History repeats itself, but how? City character, urban tradition and the accomplishment of place. *American Sociological Review*, 65(6), 791–823.
- Pelling, M. (2003). *The vulnerability of cities: Natural disasters and social resilience*. London: Earthscan.
- Pendall, R. (2003). Do land use controls cause sprawl? *Environment and Planning B*, 26, 555–571.
- Picou, J. S., Marshall, B. K., & Gill, D. A. (2004). Disaster, litigation, and the corrosive community. *Social Forces*, 82, 1493–1522.
- Pred, A. (1984). Place as a historically contingent process: Structuration and the time-geography of becoming places. *Annals of the Association of American Geographers*, 74(2), 279–297.
- Quarantelli, E. L., & Dynes, R. R. (1977). Response to social crisis and disaster. *Annual Review of Sociology*, 3, 23–49.
- Relph, E. (1976). *Place and placelessness*. London: Pion Limited.
- Ryden, K. C. (1993). *Mapping the invisible landscape: Folklore, writing and a sense of place*. Iowa City: University of Iowa Press.
- Sack, R. D. (1997). *Homo geographicus: A framework for action, awareness and moral concern*. Baltimore: Johns Hopkins University Press.
- Saldívar-Tanaka, L., & Krasny, M. E. (2004). Culturing community development, neighborhood open space and civic agriculture: The case of Latino community gardens in New York City. *Agriculture and Human Values*, 21, 399–412.
- Sideris, L. H. (2003). *Environmental ethics, ecological theology, and natural selection*. New York: Columbia University Press.
- Stedman, R. C. (2003a). Sense of place and forest science: Toward a program of quantitative research. *Forest Science*, 49(6), 1–8.
- Stedman, R. C. (2003b). Is it really just a social construction: The contribution of the physical environment to a sense of place. *Society and Natural Resources*, 16(8), 1–8.
- Stedman, R. C. (2008). *What do we “mean” by place-meanings? Implications of place-meanings for managers and practitioners. Understanding concepts of place in recreation research and management*. In T. Hall, L. E. Kruger, & M. C. Stiefel (Eds.) (General Technical Report. PNW-GTR-744 U.S). Portland: Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Stokowski, P. A. (2002). Languages of places and discourses of power: Constructing a new sense of place. *Journal of Leisure Research*, 22, 233–257.
- Thomas, A. R., & Smith, P. J. (2009). *Upstate down: Thinking about New York and its discontents*. Maryland: United Press of America.
- Tidball, K. G. (2010, October). Community based natural resource management in disaster relief contexts. *Anthropology News*.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), *Social learning towards and more sustainable world*. Wageningen: Wageningen Academic Press.
- Tidball, K. G., & Krasny, M. E. (2008). “Raising” urban resilience: Community forestry and greening in cities post-disaster/conflict. In *Resilience, adaptation and transformation in turbulent times, resilience alliance conference*, Stockholm, Sweden.
- Tidball, K. G., Krasny, M. E., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research*, 16(5), 341–357. Special Issue, Resilience in social-ecological systems: The Role of learning and education.
- Tuan, Y. F. (1974). *Topophilia*. New York: Columbia University Press.
- Tuan, Y. F. (1975). Place: An experiential perspective. *Geographical Review*, 65, 151–165.
- Tuan, Y. F. (1977). *Space and place: The perspectives of experience*. Minneapolis: University of Minnesota Press.

- Tuan, Y. F. (1980). Rootedness versus sense of place. *Landscape, 24*, 3–8.
- Wilkinson, K. P. (1991). *The community in rural America*. Middleton: Social Ecological Press.
- Wilson, E. O. (1984). *Biophilia*. Cambridge: Cambridge University Press.
- Wilson, J. Q., & Kelling, G. L. (1982). The police and neighborhood safety: Broken windows. *Atlantic Monthly, 127*, 29–38.
- Winterbottom, D. (2007). Casitas, healing the wounds of displacement. *Journal of Mediterranean Ecology, 8*, 77–86.

# Chapter 11

## Urban Gardens: Pockets of Social-Ecological Memory

Stephan Barthel, John Parker, Carl Folke, and Johan Colding

**Abstract** It is well known that urban allotment gardens provide important ecosystem services. Their potential to act as sources of local resilience during times of crisis is less appreciated, despite the role they have played as areas of food security during times of crisis in history. Their ability to provide such relief, however, requires that the skills and knowledge needed for effective gardening can be transmitted over time and across social groups. In short, some portion of urban society must remember how to grow food. This chapter proposes that collectively managed gardens function as ‘pockets’ of social-ecological memory in urban landscapes by storing the knowledge and experience required to grow food. Allotment gardeners operate as ‘communities of practice’ with ecosystem stewardship reflecting long-term, dynamic interactions between community members and gardening sites. Social-ecological memories about food production and past crises are retained and transmitted through habits, traditions, informal institutions, artifacts and the physi-

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S. Barthel (✉)

Department of History, Stockholm University, 10691 Stockholm, Sweden

Stockholm Resilience Center, Stockholm University, 10691 Stockholm, Sweden

e-mail: [Stephan.barthel@historia.su.se](mailto:Stephan.barthel@historia.su.se)

J. Parker

National Center for Ecological Analysis and Synthesis, University of California, Santa Barbara, 735 State Street, Suite 300, Santa Barbara, CA 93101, USA

Barrett Honors College, Arizona State University, P.O. Box 871612,

Tempe, AZ 85287, USA

e-mail: [parker@nceas.ucsb.edu](mailto:parker@nceas.ucsb.edu)

C. Folke • J. Colding

Stockholm Resilience Center, Stockholm University, 10691 Stockholm, Sweden

Beijer Institute of Ecological Economics, Royal Swedish Academy of Sciences,

P.O. Box 5005, 10405 Stockholm, Sweden

e-mail: [carl.folke@beijer.kva.se](mailto:carl.folke@beijer.kva.se); [Johanc@beijer.kva.se](mailto:Johanc@beijer.kva.se)

cal structure of the gardens themselves. Allotment gardens thus serve as incubators of social-ecological knowledge with experiences that can be accessed and transferred to other land uses in times of crisis, contributing to urban resilience. Conversely, failure to protect these pockets of social-ecological memory could result in a collective ‘forgetting’ of important social-ecological knowledge and reduce social-ecological resilience.

**Keywords** Ecosystem services • Social-ecological memory • Resilience • Urban gardens • Allotment gardens • Community of practice • Food production

*In this chapter, social and ecological scientists from the Stockholm Resilience Centre and National Center for Ecological Analysis and Synthesis in the United States, propose that allotment gardens function as ‘pockets’ of social-ecological memory by storing the knowledge and experience required to grow food and to attract pollinators and birds. Such social-ecological memories about food production, including during times of crisis such as war, are retained and transmitted through habits, traditions, informal institutions, artifacts and the physical structure of the gardens themselves, and may serve as a source of urban resilience during future crises.*

## Introduction

Currently, around three million allotment gardens are found across Europe, 10,000 of which are found in Stockholm, Sweden, occupying 210 ha of land and involving about 24,000 people (Barthel et al. 2010; Nolin 2003). In a built-up urban environment, allotment garden areas appear as lush, well-managed, flower-rich landscapes. In Stockholm, allotment gardens are often considerably old, some in existence for a century. The size of these allotment areas can differ significantly (3,450–70,000 m<sup>2</sup>) as can their elements, ranging from areas devoted strictly to horticulture to plots with small chalets surrounded by kitchen gardens and fruit trees. Individual plots are often leased on 25 year contracts from the City of Stockholm, and while the common grounds of allotment area communities, such as pathways and lawns, are open to the public, individual garden plots in the community are not (Barthel et al. 2010). Property rights are organized hierarchically, with individual or familial management rights for each plot embedded in the self-organized rules-in-use of local allotment communities, themselves embedded in the regulations of the city wide allotment union (ibid).

Allotment gardens can be broadly described as representing legacies of traditional household gardening practices where the users’ knowledge of gardening has been passed on and socially retained for considerable time, often over several generations (Nolin 2003). In this sense, allotment gardens represent social arenas for present-day household gardening in urban landscapes. During times of prosperity the strongest motivator for allotment gardening appears to be enjoying a sense of

place (see Stedman and Ingalls, Chap. 10, this volume) rather than economic returns in the form of cheap food (Andersson et al. 2007, see also Okvat and Zautra, Chap. 5, this volume, for other non-food benefits of community gardening). Experienced allotment gardeners have higher quality local ecological knowledge, compared to city park employees (Andersson et al. 2007). Additionally, gardeners work to create and protect species diversity in their plots, practices demonstrated to provide valuable ecosystem services benefiting urban citizens outside of those gardens (Barthel et al. 2010).

While allotment gardens are appreciated for the leisure they provide, their esthetics and their contributions to urban biodiversity (Davis et al. 2009; Goddard et al. 2010; Kendal et al. 2010), they have also been important contributors to human well-being in times of crisis (Humphries 1996; Select Committee 1998). However, as strong urbanization continues metropolitan landscapes are constantly transformed (Cox 2005), which puts pressure on remaining urban green space and on physical sites that allow for civic ecology practices (Krasny and Tidball 2009; Barthel 2008; Krasny and Tidball 2010). Such transformations constantly challenge places that urbanites have utilized for sustenance in the past, and with the loss of those places, social memories of urban food production could easily dissolve (Barthel et al. 2010, 2013). Drawing on lessons from Europe generally and Stockholm in particular, this chapter proposes that urban allotment gardens function as ‘pockets’ of social-ecological memory preserving knowledge and providing local resilience to urban areas in times of crisis.<sup>1</sup> We further consider social interactions in allotment gardening associations and various ways in which gardens can serve as repositories of ecological practices, experiences and knowledge.

In the next section, we present a brief history of allotment gardening in Europe, synthesizing findings from historical investigations to demonstrate the gardens’ ability to act as pockets of social-ecological memory in times of crisis. We next review past research on social memory and define the concept of social-ecological memory. Drawing on Barthel et al. (2010), we then analyze social-ecological memories among urban gardeners and describe the features by which such memories are stored and transmitted over time, before offering concluding remarks.

## Allotment Gardens as Pockets of Social-Ecological Memory

The uses to which European allotment gardens have been put have shifted in relation to societal changes, transitioning from leisure gardens in prosperous times to important providers of alternate food sources during periods of societal crisis. In fact, European allotment gardens have their origins in such crises, arising in large part from the enclosure and privatization of common lands during the transition

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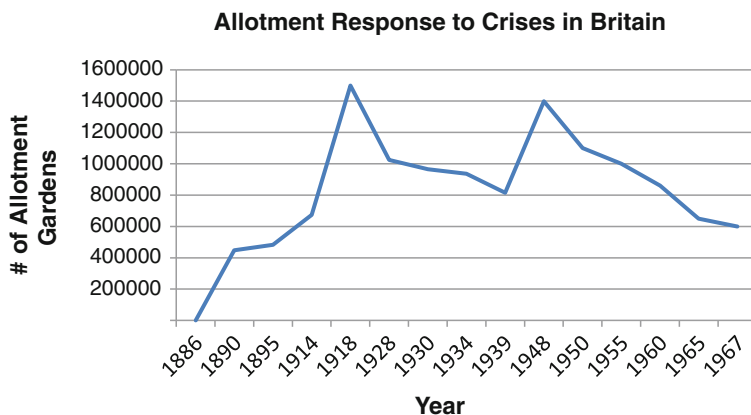
<sup>1</sup> Local resilience refers to the capability of people on a local level to absorb change and surprise, reorganize and continue to live on without tipping over critical thresholds (Carpenter and Folke 2006). See also Tidball and Krasny, Chap. 2, this volume.

from feudal agrarianism to industrial urbanism (see Crouch and Ward 1988; Moran 1990). The origins of Swedish allotment gardens follow a similar pattern. In the 1800s, Stockholm, like many European cities, faced social problems such as mass migration from the countryside, unhealthy and meager living conditions of the working class, and a loss rural identity (Engels [1844] 2009; Lindhagen 1916). As in other nations, the social movement promoting allotment gardens in Sweden was driven by the work of relatively small, dedicated groups of social activists who garnered support from various governmental bodies to construct allotment areas (Lindhagen 1916; Nolin 2003).

Allotment gardens were an important source of resilience during the transition from feudal to urban social life. They proved equally important during the ‘great wars’ in Europe. The British experience is illustrative. During WWI supply connections to outside food sources were cut. Acknowledging the national threat of starvation, the government permitted local authorities to transform unoccupied urban lots into vegetable gardens. Parks, sport fields and even portions of Buckingham Palace were converted into gardens as part of the *Every Man a Gardener Campaign* (Crouch and Ward 1988; Select Committee 1998). The number of allotment gardens surged from 600,000 to 1,500,000, with one garden per five households. By 1918 allotment gardens had provided Britons with 2,000,000 tons of fresh vegetables (see also Lawson, Chap. 14, this volume).

Allotment gardening declined precipitously after the war, with many plots returning to their original purposes as places of leisure. Two major allotment acts were passed during this time. The Land Settlement Facilities Act (1919) assisted returning service men by allowing all citizens to possess allotment gardens, not just laborers (see also Geisler, Chap. 16, this volume). The Allotments Act (1922) provided more security to allotment tenants, creating representative associations and ownership protections (Select Committee 1998). World War II sparked a second explosion in allotment gardening similar to the WWI campaign. British citizens were urged to ‘Dig for Victory’. By 1942, ten million sets of allotment gardening instructions were being distributed annually (Fig. 11.1 for examples of propaganda posters). One out of every two manual workers had either an allotment or a private garden (Crouch and Ward 1988). The number of allotment gardens increased from 800,000 before the war began to 1,400,000, with gardeners producing 1,300,000 tons of food. After the end of World War II the number of allotment gardens declined steadily, decreasing to around 600,000 in the 1960s (Humphries 1996, Fig. 11.1).

Similar boom and bust cycles of urban allotment gardens occurred in many other nations during WWII. Germany’s 450,000 allotment gardens rose to 800,000 by the close of the war (Gröning 1996). In France the number of urban allotment gardens rose to 600,000, and during the war’s peak 20 million household gardens supplied 40 % of the vegetables consumed in the United States (Basset 1979, see also Lawson, Chap. 14, this volume). While Sweden was not directly involved in the war, related food shortages sparked an explosion in allotment gardens, rising from 30,000 prior to the war to 130,000 during its peak, producing approximately 10 % of all the vegetables consumed in Sweden (Barthel et al. 2010).



**Fig. 11.1** Allotment gardening responding to societal crises in Britain (Sources: Moran (1990); Select Committee (1998); Barthel et al. (2013))

It is evident that allotment gardens have been important sources of local resilience in times of crisis in European cities. However, their continued ability to provide this resilience requires that past experiences of such crises and how they were addressed remain present in living social memory. We turn now to a discussion of such social memories and their relation to local ecosystem stewardship.

## Social Memories

Supra-individual memory that stores experiences of living pasts and influences future group behavior is often referred to as collective or social memory (Coser 1992; Gunn 1994; Olick and Robbins 1998; McIntosh et al. 2000; Crumley 2002; Gongaware 2003; Folke et al. 2003; Nazarea 2006). This line of thought originates from Halbwachs, a protégée of pioneering sociologist Emile Durkheim. Durkheim's work posited the concept of 'collective excitement' as fertile ground for understanding cultural creativity (Durkheim [1915] 2001; Coser 1992). Halbwachs' work showed how this excitement was kept alive and transmitted between creative periods (Coser 1992). He argued that whereas only individuals remember, individual memory processes derive from social interaction and are facilitated through supra-individual means shared with others, such as language, symbols, events, and cultural contexts (see also Misztal 2003). Accordingly, social groups construct their own images of the world through agreed-upon versions of the past – versions constructed through negotiation, not private remembrance. It is in this sense that there exists a *social memory* (Coser 1992).

Halbwachs (1926 [1950]) further maintained that social memory can be divided into two major types: (1) autobiographical memories, which are narratives of identity based on individual experiences; and (2) historical memories, which are experiences

stored in institutions, objects, places and written accounts. Oral tradition is stressed as central for re-producing collective memory and meaning (e.g., Halbwachs 1926 [1950]; Stein 1995; Olick and Robbins 1998; Wertsch 2002; Misztal 2003; Tidball et al. 2010). The fact that memories are often organized around landscapes suggests they are strongly connected to physical places and intimately linked to sensory perceptions (Misztal 2003), which is why experiences may modify social memory in relation to a constantly changing environment (Gunn 1994; Scott 1998). Spatial morphology, ruins, landscapes, monuments, and architecture provide social cues for interpersonal relations and for relations to non-humans (Hollis 2002; Murdoch 2006). Through habits, past experiences may be passed on, often tacitly, in embodied, non-textual and non-cognitive ways (Misztal 2003). This phenomenon is sometimes referred to as *habit memory*, and it is reflected in bodily postures, activities, techniques and gestures, and through practice it brings the past into the present (Nazarea 1998; Crumley 2000).

The social memory of communities, then, constitutes the variety of forms through which behaviors of people are shaped by collective remembrances of the past, and functions as collectively shared mental maps for dealing with a complex world (Olick and Robbins 1998; Crumley 2002; Misztal 2003; Rothstein 2005; North 2005). Many scholars argue that memories are not strict factual representations of events, but rather constitute interpretations used in narrative constructions, tightly connected to emotions (Misztal 2003). Memories of everyday experience are therefore frequently distorted. However, traumatic (or ‘light bulb’) memories such as of environmental crises are more likely to be accurate (Schacter 1995; Misztal 2003). Generally, the ingredients of social memory are neither a purely social construction nor historical facts established once and for all, but rather exist along the continuum between those polarities (Rothstein 2005).

Our use of the term *social-ecological* memory connotes the fact that our focus here is exclusively on remembrance processes of communities involved in ecosystem management. Drawing on Barthel et al. (2010), we use allotment gardens in the Stockholm urban landscape as a case study to focus our attention on the means by which knowledge, experience and practice about how to manage a local garden ecosystem are retained in a community, and modified, revived and transmitted through time.

## Remembering in Allotment Gardens

Barthel (2008) found that social groups involved in allotment gardening in Stockholm can be characterized as *communities of practice* (Wenger 1998; Krasny and Tidball 2009), as they hold characteristics such as mutual engagement, mutual enterprise and shared repertoire, including routines, words, tools and stories by which members interact and socially construct shared understanding about the world (Lawrence 2009; Barthel et al. 2010). According to Wenger (1998), and empirically observed



**Table 11.1** Social-ecological memory in allotment gardens of Stockholm

Repositories of knowledge and practices	Examples
Habits/rituals	Imitation of practices, communal spring/fall cleaning and exchange of seeds
Oral tradition	Narratives, teachings, phrases and proverbs
Rules-in-use (institutions)	Protection of various organisms, property rights and proportion of space used for food production
Physical forms/artifacts	Meeting protocols, booklets, photographs, and the physical gardens
External sources of support	Media and written accord, regulations, social networks

Modified from Barthel (2008) and Barthel et al. (2010)

in Stockholm, social practice evolves in garden communities through the interplay of *participation* (a process of taking part or sharing with others) and *reification* (making an abstraction into an enduring object). Such a dual process involves continuous social learning (Armitage et al. 2008; McKenna et al. 2008; Krasny and Tidball 2009) and also creates objects, artifacts and metaphors which tend to outlive the repertoires of practices that first shaped them. These then come to form part of shared memories of the community (Wenger 1998; Misztal 2003).

Results from studies in Stockholm show that participation transmits and modifies ecological practices and knowledge related to allotment gardening, and that the most important repositories are oral tradition and collective rituals/habits, as well as the reification processes as an outcome of those (Table 11.1). Habits include exchange of seeds and recipes, as well as mimicking of bodily postures and practices. Elderly respondents stated that such mimicking started during their childhood years, as they grew up or spent summers in the Swedish countryside (Barthel 2008). Important rituals are the compulsory spring and fall planting and harvesting events, which are repeated every year, as well as every day coffee breaks and ongoing board meetings. An example is democratically elected boards of allotment gardens, which hold ongoing meetings where they negotiate the governance of the association, such as how to handle rule breakers and how to share the water resources. These meetings are always documented (Barthel et al. 2010). We found that oral traditions include teachings by elected mentors, every day exchange of experiences, and ordinary gossip, which continuously result in a shared jargon, metaphors and proverbs. Newcomers of all ages, mostly Swedes but also people from different ethnic backgrounds, tap into the garden practices primarily through taking part in such rituals (Barthel 2008; Barthel et al. 2010).

Even if not framed as participation, these findings are in line with the literature on rural community-based conservation, which has focused primarily on the roles of oral traditions, beliefs, ceremonies and ritual practices in transferring sound ecological management practices (Hanna et al. 1996; Berkes and Folke 1998; Berkes 1999; Berkes and Turner 2006; Pilgrim et al. 2007). Our findings complement this research by showing that participation involves not only interactions

between people, but also between people, soils, plants, animals and other physical objects in their gardens, and that it always involves reification processes (Barthel et al. 2010). Such interactions with living ecosystems are constantly modified, since allotment gardeners daily adjust to multiple subtly differing situations. They also incorporate, by monitoring, often in a tacit fashion, ecological feedbacks, i.e., many small, almost imperceptible variations that a constantly changing context creates (ibid). As a result their practices must be revived and reinvented, even as they remain 'the same practices'. Participation hence generates lived experience of the local ecosystem, and creates things (or at least perceived as things) which persist, including physical objects as well as artifacts and rules-in-use. These are the reification processes described by Wenger (1998), and in allotment gardens such processes result in booklets, photos, proverbs, metaphors, and self-organized rules as well as the physical gardens themselves.

The spatial morphology of allotment gardens, consisting of small chalets, hedges, nesting-boxes, vegetable plots, fruit trees, flowers, and other elements, are outcomes of reification processes, and central for guiding ecological practices and for storing experiences (Barthel et al. 2010). For instance, the open character of the allotment gardens, with low hedges or fences, enables gardeners to engage in spontaneous daily conversations and mimicking of management practices, but it also constrains them from gardening on the wrong side of the border. Chalets enable gardeners to garden on rainy days. Fruit trees, raspberry hedges and flowers inherited from relatives all demand special treatment and they all function as support for recalling experiences of past garden practices.

Also self-organized institutions (rules-in-use, Ostrom 1990) in allotment gardens are a result of reification that constrain, enable and construct further participation. Examples of rules-in-use are norms that urge gardeners to use at least one-third of the space for food production and also protective norms related to wild bees and small birds (Andersson et al. 2007). For instance, empirical research on 534 individual garden-plots in four allotment areas showed that gardeners chose some flowers with their only intent being to feed pollinators, and many gardeners improved nesting opportunities for wild bees (ibid). Once in place these flowers and nests steer future garden practices that improve the habitat quality of wild bees, which in turn benefits the gardeners since pollination underlies the generative capacity of the garden ecosystem to produce flowers, fruits and many vegetables. Hence the positive feedback sign for the gardeners is increased abundance of pollinating bees, which gives gardeners a sense of a healthy garden. Continued participation reproduces these rules-in-use via habits, rituals and oral tradition, and habitat improving practices are hence carried forward in the community in interplay with the local ecosystem (see Mahoney 2000; Barthel et al. 2010). Interestingly, such social-ecological memory supports not only the allotment communities, but also the ecosystem service of pollination over large areas of the urban landscape (Osborne et al. 2001; Greenleaf et al. 2007).

Part of the ecological knowledge carried in social-ecological memory seems to be tacit knowledge expressed in habits and behavior to fit the particular environmental situations of the gardeners. Examples are the protection of, and the habitat improvement for, insectivorous birds, which are common in allotment gardens.

These practices increase abundance of many bird species and support the ecosystem service of pest regulation (Franz 1961; Mols and Visser 2002; Ellis et al. 2005). In so called habit memory (Misztal 2003; Nazarea 2006), these management practices are tacitly carried forward in time, supporting small birds that regulate disturbances acting on longer time scales than those perceived by most gardeners, which are a couple of decades at the most (Andersson et al. 2007). These aspects of social-ecological memory are ecologically important particularly during times of disturbance events, such as pest outbreaks. It seems as if allotment gardeners engage in reducing risk and preparing for up-coming disturbances even though such risk lies in the subconscious, beyond the cognitive and what gardeners rationally can discuss. However, rational or not, such memory contributes to resilience building.

Although social-ecological memory may be rather inert as described above, it is simultaneously constantly metamorphosed (Nazarea 2006), not only because we forget and remember partially, but also because our forms of participation and perspectives change, and we experience life in new ways. Also, fast-acting external carriers of information (e.g., media and scientific knowledge), continuously modify local ecological practices and knowledge.

Social-ecological memory of urban gardening also is embedded in a wider social context (e.g., internet, books, garden markets and legal frameworks) that may support or erode it. The citywide allotment union, garden magazines and enabling regulations are examples of external memory support (Table 11.1). For instance, property rights regulations determined by the city are important. In contrast to the situation for many community gardens in the United States where leaseholds are often on a 1 year basis, leaseholds of allotment gardens in Stockholm are usually written on long-term basis; up to 25 years is common. These long-term leaseholds may better enable allotment gardeners to freely self-organize, and to invest in physical structures and in perennials, such as fruit trees, but they also better enable people to dwell long enough to more fully experience and capture the complex and site specific processes that underlie garden production (Barthel et al. 2010).

Based on the findings, we propose that social-ecological memory is an evolving feature of the urban garden communities that is both emergent and persistent – a source of resilience in times of crisis. Reification and participation function as distinct but interrelated modes, as a dual process, which with time generates a ‘shared living memory’ that retains and creates ecological practices, experiences and knowledge. Such social-ecological memory allows gardeners to proceed without needing to know everything, and it helps newcomers to join the community by linking into retained practices, reviving and reinventing them (Barthel 2008; Barthel et al. 2010).

## Conclusion

Metaphorically, one may view social-ecological memory as a knowledge repository akin to a library, involving physical infrastructures, social interactions, and well-prescribed protocols structuring the storage and future use of information. Ecological

knowledge and gardening practices reflect the construction and organization of this library by previous generations as new information is continuously added. Social-ecological memories are critical components of social-ecological systems, providing potential sources of resilience to cope with abrupt and often surprising change (Folke et al. 2003).

A sustainable flow of desirable ecosystem services depends on the resilience of social-ecological systems (Berkes et al. 2003). According to Carpenter et al. (2001), management needs to address slow changing processes, for instance nutrient content in soil or water, because those are of significance in relation to thresholds. In this context, social-ecological memory as a carrier of practices, experiences and knowledge becomes important, since memory also is a slowly evolving, cumulative feature of social-ecological systems and it has potential to carry experiences from the distant past that can be revived and recombined into novelty (Folke et al. 2003). Combining the notion that acquisition of new practices typically follows resource crises such as might be encountered in the red zones that are the subject of this volume, with what is known about the dynamic learning of communities of practice (Berkes and Turner 2006; Wenger 1998), it is reasonable to hypothesize that traces of experiences of crisis events are retained in social-ecological memory of many allotment gardeners, perhaps tacitly reflected in the norm of using a portion of the garden space for food production.

Ornamental flowers are dominating the visual appearance in allotment gardens nowadays; however empirical studies show that practices of food production are present even though few individuals actually experienced the earlier described periods of food shortage. Rules-in-use and habits urge gardeners to use about one-third of space in their garden plot for crop production, which reflects experiences of when these urban gardens were important for sustenance, such as during WW I and WW II (Barthel 2008). The social-ecological memory steers gardening practices towards producing fertile black soils, edible plants, and habitat improvement for pollinators and insectivorous birds, and thus indirect ecosystem services that regulate the performance of crop production, such as pollination and pest regulation (Barthel et al. 2010).

Interestingly, as noted above, gardeners are not necessarily cognizant of the ecological significance of some of the practices resulting from their shared social-ecological memory. The younger generation of gardeners has never experienced starvation, and most are not economically dependent on their produce. Still, practical knowledge of food production is present in those gardens, inscribed in rituals, rules, practices and artifacts, and can be mobilized and transmitted to the broader urban population in times of food shortage. Those with no gardening knowledge can link to such communities of practice and produce food without much previous experience, just as occurred in London's parks and abandoned lots during WW I and WW II.

The European experience during the world wars illustrates the importance of urban gardens and the social-ecological memory stored therein for maintaining resilience in urban systems. A more recent example described from Havana by Altieri et al. (1999) is also telling. After the fall of the USSR in 1989, the Cuban economy

collapsed. Imports (including food) fell 75 % and there was a 50 % reduction in fertilizer availability. This caused a catastrophic food shortage, particularly among urbanites. The Cuban government responded by relaxing rules regulating the sale of excess produce, initiating an urban gardening boom. Ten years later, Havana had 400 horticulture clubs producing 8,500 tons of vegetables, 7.5 million eggs and 3,650 tons of meat via organic gardening, and urban gardens became a key element of Cuban national food strategy (Altieri et al. 1999).

However, current urbanization processes constantly erode the proportion of green space due to new construction (Barthel et al. 2005), and hence the potential of expanding allotment gardens over a larger proportion of the landscape in times of crisis diminishes. Crises, like disease outbreaks, trade disruptions, political conflict or wars cut connections. Scholars and policy makers should therefore counteract the illusion that distance has lost its significance for food security and start integrating local gardens when planning for urban resilience (Barthel et al. 2013).

Resilience planning for metropolitan landscapes is about engaging in insurance strategies that maintain as many future options as possible (Folke et al. 2003). Food security is no exception. Urban populations are vulnerable to food shortages due to limited green space and the ease with which they can be cut off from trade networks of food (Steel 2009). Urban gardens and the social-ecological memory that they retain should become explicit elements of planning for post-disaster scenarios in urban areas. These gardens serve as ‘pockets’ that retain social-ecological memories in urban landscapes, generate ecosystem services, and counteract ecological illiteracy (Kaplan et al. 1998; McDaniel and Alley 2005). Without these gardens there arises the risk of a social ‘forgetting’ in metropolitan landscapes, and the disappearance of the knowledge, practices and experiences that these gardens store.

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## References

- Altieri, M. A., Companioni, N., Cañizares, K., Murphy, C., Rosset, P., Bourque, M., & Nicholls, C. I. (1999). Greening of the ‘barrios’: Urban agriculture for food security in Cuba. *Agriculture and Human Values*, 16, 131–140.
- Andersson, E., Barthel, S., & Ahrné, K. (2007). Measuring social-ecological dynamics behind the generation of ecosystem services. *Ecological Applications*, 17, 1267–1278.
- Armitage, D., Marschke, M., & Plummer, R. (2008). Adaptive co-management and the paradox of learning. *Global Environmental Change*, 18, 86–98.
- Barthel, S. (2008). Recalling urban nature-linking city people to ecosystem services. Ph.D. dissertation thesis, Stockholm University, Stockholm, ISBN 978-91-7155-741-4.
- Barthel, S., Colding, J., Folke, C., & Elmqvist, T. (2005). History and local management of a biodiversity rich urban cultural landscape. *Ecology and Society*, 10 (2), 10. <http://www.ecologyandsociety.org/vol10/iss2/art10/>.

- Barthel, S., Folke, C., & Colding, J. (2010). Social-ecological memory in urban gardens -retaining the capacity for management of ecosystem services. *Global Environmental Change*, *20*, 255–256.
- Barthel, S., Parker, J., & Ernstson, H. (2013). Food and green space in cities: A resilience lens on gardens and urban environmental movements. *Urban Studies* (in press). doi:10.1177/0042098012472744.
- Basset, T. (1979). Reaping on the margins: A century of community gardening in America. *Landscape*, *25*(2), 1–8.
- Berkes, F. (1999). *Sacred ecology: Traditional ecological knowledge and resource management*. Philadelphia/London: Taylor & Francis.
- Berkes, F., & Folke, C. (Eds.). (1998). *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge: Cambridge University Press.
- Berkes, F., Colding, J., & Folke, C. (Eds.). (2003). *Navigating social-ecological systems. Building resilience for complexity and change*. Cambridge, UK: Cambridge University Press.
- Berkes, F., & Turner, N. J. (2006). Knowledge, learning and the evolution of conservation practice for social-ecological resilience. *Human Ecology* *34*, 479–494. <http://www.ecologyandsociety.org/vol11/iss2/resp2/>.
- Carpenter, S. R., & Folke, C. (2006). Ecology for transformation. *Trends in Ecology and Evolution*, *21*, 309–315.
- Carpenter, S. R., Walker, B. H., Andries, J. M., & Abel, N. (2001). From metaphor to measurement: resilience of what to what. *Ecosystems*, *4*, 765–781.
- Colding, J., Lundberg, J., & Folke, C. (2006). Incorporating green-area user groups in urban ecosystem management. *AMBIO: A Journal of the Human Environment*, *35*(5), 237–244.
- Coser, L. A. (1992). The revival of the sociology of culture: The case of collective memory. *Sociological Forum*, *7*(2), 365–373.
- Cox, P. (2005). The restless urban landscape: Economic and socio-cultural change and the transformation of metropolitan Washington DC. In R. N. Fyfe & T. J. Kenny (Eds.), *The urban geography reader*. New York: Routledge.
- Crouch, D., & Ward, C. (1988). *The allotment: Its landscape and culture*. London: Faber and Faber.
- Crumley, L. C. (2000). From the garden to the globe: Linking time and space to meaning and memory. In R. J. McIntosh, J. A. Tainter, & S. K. McIntosh (Eds.), *The way the wind blows: Climate, history and human action*. New York: Columbia University Press.
- Crumley, C. L. (2002). Exploring venues of social memory. In J. J. Climo & M. G. Cattell (Eds.), *Social memory and history: Anthropological perspectives*. Walnut Creek: AltaMira Press.
- Davis, Z. G., Fuller, R. A., Loram, A., Irvine, K. N., Sims, V., & Gaston, K. J. (2009). A national scale inventory of resource provision for biodiversity within domestic gardens. *Biological Conservation*, *142*, 761–771.
- Durkheim, E. ([1915] 2001). *The elementary forms of religious life*. New York: The Free Press.
- Ellis, J. A., Walter, A. D., Tooker, J. F., Ginzler, M. D., Reagel, P. F., Lacey, E. S., Bennett, A. B., Grossman, E. M., & Hanks, L. M. (2005). Conservation biological control in urban landscapes: Manipulating parasitoids of bagworm (Lepidoptera, Psychidae) with flowering forbs. *Biological Control*, *34*, 99–107.
- Engels, F. ([1844] 2009). *The condition of the working class in England in 1844*. Oxford Paperbacks, UK.
- Folke, C., Colding, J., & Berkes, F. (2003). Synthesis: Building resilience and adaptive capacity in social-ecological systems. In F. Berkes, J. Colding, & C. Folke (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge: Cambridge University Press.
- Franz, J. M. (1961). Biological control of pest insects in Europe. *Annual Review of Entomology*, *6*, 183–200.
- Goddard, M. A., Dougill, A. J., & Benton, T. G. (2010). Scaling up from gardens: Biodiversity conservation in urban environments. *Trends in Ecology and Evolution*, *25*(2), 90–98.
- Gongaware, B. T. (2003). Collective memories and collective identities. *Journal in Contemporary Ethnography*, *32*, 483–520.
- Greenleaf, S. S., Williams, N. M., Winfree, R., & Kremen, C. (2007). Bee foraging ranges and their relationship to body size. *Oecologia*, *153*, 589–596.

- Gröning, G. (1996, September 26–29). *Branching out: Linking communities through gardening*. Paper presented at the 1996 Annual Conference of the American Gardening Association (ACGA). Montreal, Canada.
- Gunn, J. D. (1994). Climate and biocultural diversity. In C. Crumley (Ed.), *Historical ecology: Cultural knowledge and changing landscapes*. Santa Fe: School of American Research Press.
- Halbwachs, M. (1926 [1950]). *On collective memory*. Chicago: University of Chicago Press.
- Hanna, S., Folke, C., & Mäler, K.-G. (Eds.). (1996). *Rights to nature: Ecological, economic, cultural, and political principles of institutions for the environment*. Washington, DC: Island Press.
- Hollis, M. (2002). *The philosophy of social science*. Cambridge: Cambridge University Press.
- Humphries, D. J. (1996). The allotment movement in England and Wales, allotment and Leisure Gardener, (3).
- Kaplan, R., Ryan, R. L., & Kaplan, S. (1998). *With people in mind: Design and management of everyday nature*. Washington, DC: Island Press.
- Kendal, D., Williams, N. S. G., & Williams, K. J. H. (2010). Harnessing diversity in gardens through individual decision makers. *Trends in Ecology and Evolution*, 25(4), 201–202.
- Krasny, M. E., & Tidball, K. (2009). Community gardens as contexts for science, stewardship, and civic action learning. *Cities and the Environment*, 2, 8.
- Krasny, M. E., & Tidball, K. G. (2010). Civic ecology: Linking social and ecological approaches in extension. *Journal of Extension* 48(1):1IAW1. <http://www.joe.org/joe/2010february/iw1.php>
- Lawrence, A. (2009). The first cuckoo in winter, phenology, recording, credibility and meaning in Britain. *Global Environmental Change*, 19, 173–179.
- Lindhagen, A. (1916). *Koloniträdgårdar och Planterade Gårdar*. Stockholm: Rekolid.
- Mahoney, J. (2000). Path dependence in historical sociology. *Theory and Society*, 29, 507–548.
- McDaniel, J., & Alley, K. D. (2005). Connecting local environmental knowledge and land use practices: A human ecosystem approach to urbanization in West Georgia. *Urban Ecosystems*, 8, 23–38.
- McIntosh, R. J., Tainter, J. A., & McIntosh, S. K. (Eds.). (2000). *The way the wind blows: Climate, history, and human action*. New York: Columbia University Press.
- McKenna, J., Quinn, R. J., Donnelly, D. J., & Cooper, J. A. G. (2008). Accurate mental maps as an aspect of local ecological knowledge (LEK): A case study from Lough Neagh, Northern Ireland. *Ecology and Society* 13(1), 13. <http://www.ecologyandsociety.org/vol13/iss1/art13/>.
- Misztal, A. B. (2003). *Theories of social remembering*. Berkshire: Open University Press.
- Mols, C. M. M., & Visser, M. E. (2002). Great tits can reduce caterpillar damage in apple orchards. *Journal of Applied Ecology*, 39, 888–899.
- Moran, D. (1990). *The allotment movement in Britain*. New York: Peter Lang.
- Murdoch, J. (2006). *Post-structuralism geography*. London: Sage Publications.
- Nazarea, D. V. (1998). *Cultural memory and biodiversity*. Tucson: Arizona University Press.
- Nazarea, D. V. (2006). Local knowledge and memory in biodiversity conservation. *Annual Review of Anthropology*, 35, 317–335.
- Nolin, C. (2003). Koloniträdgårdsrörelsen i Stockholm: dess förutsättningar och uppkomst vid 1900-talets början. In Nordiska Museets & Skansens årsbok (Eds.), *Stadens odlare*. Värnamo: Nordiska museets förlag.
- North, C. D. (2005). *Understanding the process of economic change*. Princeton: Princeton University Press.
- Olick, K. J., & Robbins, J. (1998). Social memory studies: From collective memory to the historical sociology of mnemonic practices. *Annual Review of Sociology*, 24, 105–140.
- Osborne, J. L., Clark, S. J., Morris, R. J., Williams, I. H., Riley, J. R., Smith, A. D., Reynolds, D. R., & Edwards, A. S. (2001). A landscape-scale study of bumble bee foraging range and constancy, using harmonic radar. *Journal of Applied Ecology*, 36, 519–533.
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.
- Pilgrim, S., Smith, D., & Pretty, J. (2007). A cross-regional assessment of the factors affecting ecoliteracy: Implications for policy and practice. *Ecological Applications*, 17, 1742–1751.

- Rothstein, B. (2005). *Social traps and the problem of trust*. Cambridge: Cambridge University Press.
- Schacter, D. L. (1995). *Memory distortion, history: How minds, brains, and societies reconstruct the past*. Cambridge: Cambridge University Press.
- Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Select Committee to The House of Commons (1998) Fifth Report to The House of Commons, by the Select Committee on Environmental, Transport, and Regional Affairs.
- Steel, C. (2009). *Hungry city-how food shapes our lives*. London: Vintage.
- Stein, E. W. (1995). Organizational memory: Review of concepts and recommendations for management. *International Journal of Information Management*, 15, 17–32.
- Tidball, K. G., Krasny, M. E., Svendsen, E., Campbell, L., & Helphand, K. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research*, 16(5–6), 591–609, Special Issue.
- Wenger, E. (1998). *Community of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Wertsch, V. J. (2002). *Voices of collective remembering*. Cambridge: Cambridge University Press.



# Chapter 12

## Reconstructing Village Groves After a Typhoon in Korea

Eunju Lee

**Abstract** Resource management scholar Eunju Lee describes how Koreans' social memory of the ecological and cultural importance of small village groves was leveraged to replant these small forested areas following years of decline and a devastating typhoon. In Korea, villagers traditionally planted 'village groves' (*Maeul-sup*) when they founded a new community, following special guidelines in Korean culture (e.g., native beliefs, Feng-shui, Confucianism) and using traditional ecological knowledge. These village groves were cooperatively owned, managed, and conserved by villagers and played an important role in villages' social activities. Rural Koreans used to regard village groves as the symbol of their hometown and even their fate. Although many village groves have been degraded and even destroyed during the past several decades of industrialization, more than a thousand village groves remain in South Korea today providing ecosystem services to the nearby community.

**Keywords** Korean village groves • Social memory • Social-ecological resilience • Natural disaster • Village groves restoration project

In Korea, villagers traditionally planted village groves (*Maeul-sup*) when they founded a new community. The village groves were planted following special guidelines based on Korean culture (e.g., native beliefs, Feng-shui, Confucianism) and traditional ecological knowledge. For example, some village groves were planted at the mouth of the village's watershed or along the coast to protect water supplies and to break strong winds. The groves of trees were small, typically ranging in size from 0.1 to 3 ha (Fig. 12.1).

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E. Lee (✉)  
Department of Natural Resources, Cornell University,  
Ithaca, NY 14853, USA  
e-mail: el372@cornell.edu



**Fig. 12.1** Inside of traditional village groves at Yecheon in South Korea (Photo by Eunju Lee)

Although many village groves have been degraded and even destroyed during the past several decades of industrialization, they continue to protect against natural disaster, help mediate local micro-climate, and serve as patches to conserve biodiversity (Lee et al. 2007). They are cooperatively owned, managed, and conserved by villagers, and play an important role in villages' social activities, serving as a meeting and resting place. Some village groves are considered sacred places where important cultural practices take place. Rural Koreans used to regard village groves as the symbol of their hometown and even their fate. More than a thousand village groves remain in South Korea today.

Bugok village is located in the city of Dong-hae along the eastern coast of Korea. It lost its traditional village groves under Japanese rule and following economic development. But local residents remember how the village groves had once served to protect against wind and tide. When Typhoon Rusa struck the coast of Korea in 2002, Bugok village was severely damaged. The Korean government declared the surroundings as a 'Disaster Prone Area' and evacuated all the houses and buildings near the seashore (Fig. 12.2, 12.3).

In 2007, citizens in Dong-hae planted trees in the empty space left by the evacuation, thus reconstructing a seaside village grove. This local effort was coincident with a wider interest at the national and regional levels in village groves restoration. Its success was due to the efforts of Dong-hae residents and the local NGO Forest for Life taking an active leadership role, coupled with financial support from the Korean government. The restoration effort aimed not only to replant trees, but also to revive the connections



**Fig. 12.2** Last remaining buildings in Bugok village. The houses had to be evacuated following Typhoon Rusa in 2002 (Photo by the Korean NGO *Forest for Life*)



**Fig. 12.3** Building village groves through citizen participation in an empty space left by the evacuation (Photo by the Korean NGO *Forest for Life*)



**Fig. 12.4** Reconstructed village groves as a place for holding an annual cultural festival (Photo by the Korean NGO *Forest for Life*)

between village groves and the lives of local residents by holding an annual cultural festival in the village grove (Fig. 12.4).

In addition to serving as buffer zones to protect against wind and tides, village groves can work as a reservoir of social memory and maintain cultural connections to the land. In the process of restoring the Bugok village grove, without any specific documentation or records, villagers used their social memory of traditional village groves. The project also built on the partnerships formed between local residents, the NGO, and the Korean government in recovering from the natural disaster. The experience of Bugok villagers with the natural disaster shows how aspects of social and ecological resilience can be intertwined.

## Reference

- Lee, D., Koh, I., & Park, R. (2007). *Ecosystem services of traditional Korean village groves*. Seoul: Seoul National University Press (Korean with English abstract).

## Chapter 13

# Nature Engagement to Foster Resilience in Military Communities

Marianne E. Krasny, Katherine Hess Pace, Keith G. Tidball,  
and Kenneth Helphand

**Abstract** Stress associated with overseas military service is a major concern for soldiers, their families, and communities. Whereas actual deployment is the most obvious disruption, pre-deployment (preparing to go overseas) and post-deployment (re-integration into family and community) also cause significant stress. Several authors have suggested that when considering interventions to ease military service related stress, it is critical to take into account not only the individual as a 'client' but also how military families are embedded in larger communities, and how interventions can build on existing informal and social networks and other community assets. Although largely absent from the research literature focusing on individual therapy and on community capacity in military communities, individual veterans, conservation organizations, and government agencies across the US and in the UK are initiating projects that connect returning soldiers to nature, through gardening, farming, job skills, hunting, fishing, retreat centers, camps, and outdoor adventure experiences. These initiatives are perhaps not surprising, given that extensive research from the fields of horticultural therapy and conservation psychology has demonstrated the positive outcomes of contact with nature for individual and community well-being and healing. In this chapter, we present a case for integrating nature-based and community capacity building interventions designed to foster resilience in military communities facing deployment.

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M.E. Krasny (✉) • K.G. Tidball  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: Mek2@cornell.edu; kgtidball@cornell.edu

K.H. Pace  
ISAIAH, 2720 East 22nd Street, Minneapolis, MN 55406, USA  
e-mail: isaiah@isaiahmn.org

K. Helphand  
Department of Landscape Architecture, University of Oregon,  
Eugene, OR 97405, USA  
e-mail: Helphand@uoregon.edu

**Keywords** Community capacity • Military communities • Nature-based therapy • Veterans • Community resilience

*Using evidence from the community capacity, nature stewardship, and nature contact literatures, and from the myriad of nature-based programs for veterans emerging across the United States and in Great Britain, the authors of this chapter make a case for consideration of greening and other nature-based activities in helping military communities recover from the stress of deployment.*

## Introduction

For military families and communities, war means not just the loss of fallen soldiers, but also the disruptions to daily life brought about by a cycle of preparing for loved ones to leave, months or years of their absence, and hoped for reintegration into the family and community. The Iraq and Afghanistan Wars, with their longer, repeated, and more frequent deployments, have brought the issues of military family and community stress to the fore in the United States and allied nations (Chandra et al. 2008, 2009; Atkinson 2009; Manos 2010). The US Department of Defense has responded by putting significant resources into the Army Family Readiness Support Group,<sup>1</sup> 4-H Military Partnership,<sup>2</sup> Operation Military Kids,<sup>3</sup> Army Child, Youth and School Services,<sup>4</sup> and other initiatives created to address the issues of soldier, family, and community resilience and well-being during wartime. At least two general types of interventions are being implemented: therapeutic programs designed for individual soldiers or family members (Novotney 2009), and community capacity approaches that support soldiers and their families through integrating them into their community's existing formal organizational and informal social networks, and through creating a sense of shared responsibility and collective competencies (Bowen et al. 2000, 2003; Huebner et al. 2009).

Largely absent from either the therapeutic or community capacity research on military family and community resilience is consideration of a role for engagement of soldiers and family members with nature (for an exception, see Hyer et al. 1996). This is surprising in that local, nature-based efforts to address the needs of soldiers attempting to reintegrate into society, often initiated by war veterans themselves, are sprouting up in the United States as well as in the Great Britain. Many of these programs implicitly recognize what Tidball (2012; Chap. 4, this volume) has referred to as urgent biophilia, i.e., during times of war and other crises people often remember the role of gardening, planting trees, hunting, fishing, and other forms of nature

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<sup>1</sup> <http://www.armyfrg.org/skins/frg/home.aspx?AllowSSL=true>

<sup>2</sup> <http://www.4-hmilitarypartnerships.org/DesktopDefault.aspx>

<sup>3</sup> <http://www.operationmilitarykids.org/public/home.aspx>

<sup>4</sup> <http://www.armymwr.com/family/childandyouth/default.aspx>

contact in helping to foster feelings of well-being and recovery (Tidball et al. 2010). The potential healing impacts of such activities are backed up by an extensive literature in horticultural therapy and conservation psychology on the therapeutic value of gardening and green spaces, including in easing trauma and aiding in the process of recovery in individuals stunned by a crisis (Ulrich 1983, 1984; Kaplan and Kaplan 1989; Kaplan and Peterson 1993; Miavitz 1998; Hewson 2001; Campbell and Wiesen 2009; see also Okvat and Zautra, Chap. 5, Wells, Chap. 7, and Chawla, Chap. 8, this volume).

Despite these locally-organized initiatives and the supporting evidence from several lines of inquiry, not only researchers but also policy makers dealing with the impacts of deployment have largely ignored the role of nature contact and nature stewardship in soldier, family and community resilience. It is with this gap between emergent practices and research and policy in mind that we write our chapter, hoping to present an argument for integrating nature contact and stewardship into community-based interventions to support military communities.<sup>5</sup> Although we recognize that direct evidence to support our contentions about the outcomes of nature contact and stewardship for military communities is lacking, we feel that given the wealth of circumstantial evidence, the research and policy communities may want to seriously examine the arguments presented in this chapter.

In order to build our argument, we first present an overview of the ways in which deployment stress is impacting military families and communities, and of interventions drawing on existing community capacity to address negative outcomes of deployment. We next briefly review literature from conservation psychology that suggests a role for contact with and active stewardship of nature in individual and community level resilience, following which we describe examples of nature-based programs designed to help soldiers and their families deal with the deployment cycle. Community resilience is defined as a process linking a community's capacities to positive functioning and adaptation after a disturbance (Norris et al. 2008). Although many of the examples presented below are primarily concerned with individual resilience, i.e., the ability of individuals to maintain a stable equilibrium or to adapt in the face of trauma, loss, or adversity (Luthar et al. 2000; Bonanno 2004), we point out elements of these programs that also have the potential to foster community resilience. We conclude with several reflections and questions that emerge from applying the existing literature on community capacity to these nature-based initiatives.

## **Military Deployment: Families and Communities Under Stress**

A recent Rand Corporation study concluded that nearly 1 out of every 5 military service members on combat tours in Iraq and Afghanistan returns home with symptoms of post-traumatic stress disorder (PTSD) or major depression (Tanielian and Jaycox 2008). Yet many cases of PTSD go untreated because of the stigma that the military and

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<sup>5</sup>While recognizing the importance of individual therapeutic interventions, we focus more on community-based interventions in this chapter.

civilian society attach to mental disorders (Hoge et al. 2004; Tanielian and Jaycox 2008; Dingfelder 2009). The stress endured by active-duty and reserve soldiers has manifested itself in tragic ways, including increased incidents of aggression, domestic violence, and suicide (Department of Defense 2009). Deployments also take a toll on the loved ones of military personnel. During separation and particularly when a parent is in a combat situation, children in military families display higher rates of physical ailments and of a range of behavioral and emotional problems, including anxiety, sleep disturbances, and phobias, compared to non-military family children (Drummet et al. 2003; Chandra et al. 2008, 2009; Lester et al. 2010; Manos 2010). A study examining the impact of deployments of mothers on adolescent health found that 25 % of the adolescents exhibited risk factors prior to deployment, including drop in school grades, poor nutrition and decreased exercise, compared to 75 % exhibiting such factors during and after deployment (Ternus 2009). A separate study of nearly 200 military families revealed that even a year after parents returned from combat, 30 % of the children exhibited clinical levels of anxiety requiring possible treatment (Zoroya 2009).

Whereas therapy is often the first line of defense against stress and illness related to deployment, social support systems, including friends, relatives, work colleagues, church members, and support groups, can be a critical component of a family's ability to adapt to the day-to-day realities of deployment (Drummet et al. 2003). Similarly, for adolescents, interventions that bolster involvement in social support networks, along with those that help build the parenting skills of their parents and that engage youth in positive activities, are likely to be most effective in fostering the adolescents' resilience to stress associated with deployment of family members (MacDermid et al. 2008; Wong and Gerras 2010). Recognizing the need for community support, the military created a national system of Family Readiness Groups, although studies in the early years of the war on terrorism questioned their effectiveness (Drummet et al. 2003).

Research into community-based approaches to supporting military families helps to elucidate specific factors that may aid in recovery. In a study of over 17,000 married Air Force members, Bowen et al. (2003) compared the ability of three factors to predict family adaptation, defined as the ability of family members to work together in dealing with problems, to manage family responsibilities, and to demonstrate commitment and cohesion. The factors examined included: formal unit support from leaders and peers in the military; informal community support through clubs and mutual support groups as well as through more casual networks of friends, neighbors, and work colleagues; and sense of community, defined as the degree to which members feel positively attached to the military organization and view the base community as a source of support and of connections to others and to the military as an institution. These authors found that sense of community was the best predictor of adaptation, and that informal networks were somewhat important, with formal networks not showing any significant correlation with adaptation. In a related study, Bowen et al. (2001) found that participation in community activities and to a lesser extent community connections had an indirect positive effect on sense of community through their direct effect on community capacity. According to Bowen et al. (2001, p. 86), 'These findings suggest that a sense of shared responsibility and collective competence among community members (*i.e.*, *community capacity*) is facilitated when members and families are more active in their community and experience greater ease in making connections with one another'.



Building on a number of earlier studies of military communities, Huebner et al. (2009) proposed a community capacity building approach to supporting military families. Community capacity is composed of two elements: shared responsibility for the general welfare of the community and its members, and collective competence demonstrating the ability to take advantage of opportunities for addressing community needs and for confronting situations that threaten the safety and well-being of community members. In this model, collective concern and action are activated through existing formal and informal networks, which generate social capital, which in turn leads to family well-being and adaptation. According to Huebner et al. (2009, p. 222), ‘Capacity building is about resilience and in particular capturing the resilience possessed by military families’. Furthermore, research by advocates of community-based approaches to supporting families facing deployment suggests that interventions should view community members as partners and community assets rather than as clients and beneficiaries of services, and should be designed around building formal networks that support informal social networks, should include opportunities for collective action, and should involve community members in developing interventions based on principles of shared responsibility and accountability (Bowen et al. 2000, 2003; Huebner et al. 2009).

## Nature-Based Interventions

In a rare study of nature-based interventions in a military setting, Hyer et al. (1996) found that the impact of removing a random sample of Vietnam veterans suffering from PTSD from their normal therapy sessions to participate in a 5 day Outward Bound course had neither a positive nor negative impact on alleviating psychological symptoms relative to staying in the normal therapy program for that week. Whereas the results of the quantitative aspect of this study were inconclusive, Hyer et al. (1996) also conducted open-ended interviews, which revealed that the veterans were overwhelmingly positive about the Outward Bound experience in terms of increasing enjoyment of the outdoors and trust in the treatment staff, being more in control of their behavior and of their depression, and being able to do more physically. These results are similar to a qualitative study of veterans in the United Kingdom who participated in a community gardening program; veterans talked about gaining a sense of purpose, having something to anticipate, feeling relaxed, secure and safe, learning new skills, being part of growing something, being somewhere where problems are understood, and being able to share knowledge and skills with others, as benefits of participation (Atkinson 2009). Similarly, in researching his widely-acclaimed book, *Defiant Gardens*, Helphand (2006) collected significant evidence from historical documents and interviews about how gardens are critical to psychological survival during wartime; Helphand’s findings have since been corroborated during numerous conversations, blog contributions, and letters from veterans and others impacted by war (Helphand, Chap. 17, this volume). Such findings are supported by the large literature on horticultural therapy pointing to the psychological benefits of spending time in nature (see Okvat and Zautra, Chap. 5 and Wells, Chap. 7, this volume). However, further quantitative and qualitative studies are needed to document more fully the impacts of various types of nature contact on veterans.

Over the last 10 years, researchers in the field of environmental psychology have attempted to understand the impacts of exposure to nature on humans in community settings. This work draws heavily from the pioneering work of Rachel and Stephen Kaplan who proposed the Reasonable Person Model<sup>6</sup> to explain the value of nature contact to humans. This model suggests that people are more healthy psychologically and thus more reasonable if they have opportunities to explore new environments and learn new information, act in meaningful ways (e.g., volunteer to help others), and experience the restorative value of nature (Kaplan and Kaplan 2001). Building on this work, Kuo and others (Kuo et al. 1998a, b; Kuo and Sullivan 2001; Sullivan et al. 2004; Kaplan and Kaplan 2005) have conducted a series of controlled studies in low-income, public housing in Chicago comparing the behaviors of residents who do and do not have access to trees. Their research provides compelling evidence that being around trees in urban, crime-ridden neighborhoods has a number of benefits for residents that lead to more pro-social behaviors, including more social interaction, greater sense of community, greater neighborhood social ties, greater sense of safety and feelings of belonging, and lower levels of fear, incivilities, and aggressive and violent behavior. The relationship between common green space and neighborhood ties is mediated through use of common spaces, rather than by stress, mental fatigue, or mood, as one might have predicted based on the horticultural therapy literature or on the suggestions of the need for mental restoration after mental fatigue proposed in the Reasonable Person Model. Further, studies of the benefits of engaging in nature stewardship (rather than simply nature contact), such as urban prairie restoration and tree-planting, have found additional outcomes for humans, including a sense of satisfaction from engaging in meaningful action (Miles et al. 1998), a sense of attachment to the neighborhood or ecosystem (Austin and Kaplan 2003; Ryan and Grese 2005), and a sense of pride and of competence that lead to further participation in neighborhood improvement (Austin and Kaplan 2003; Kaplan and Kaplan 2005). Nature stewardship or civic ecology activities have the added benefit that they create more healthy local ecosystems, which in turn provide further opportunities for contact with nature (Tidball et al. 2010).

Interestingly, these documented outcomes of spending time in and restoring nature have much in common with recommendations about designing programs to foster adaptations and well-being among veterans, their families, and military communities, and more generally among communities facing disaster or conflict. In particular, time spent in nature may foster a sense of community, which Bowen et al. (2003) found was associated with the capacity of military families for adaptation. Further, community gardening, community forestry, and related nature restoration activities allow individuals to demonstrate collective concern and action through existing informal and formal networks, generating social capital, which in turn leads to family well-being and adaptation, and community resilience (see Bowen et al. 2000; Drummet et al. 2003; Norris et al. 2008; Huebner et al. 2009; Okvat and Zautra, Chap. 5 and Wells, Chap. 7, this volume). In short, the restorative effect of nature, coupled with the sense of community and social connectedness that emerge from contact with and restoring nature in the

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<sup>6</sup> <http://ajph.aphapublications.org/cgi/content/abstract/93/9/1484>

presence of fellow human beings, would support the inclusion of nature contact and stewardship in designing programs to foster well-being among veterans, military families, and military communities during the deployment cycle. Whereas we recognize that other community activities may lead to similar outcomes, research and practice have largely ignored the role of nature in family adaptation and community resilience; we suggest here that nature and environmental stewardship should be included in research and practice along with other interventions.

## **Nature-Based Programs for Veterans and Military Communities**

Over the last several years, a growing number of community gardening, green jobs, outdoor recreation, nature therapy, and other nature-based programs for veterans and their families have emerged, often initiated by veterans themselves. Whereas much of the research on plants and healing has focused on exposure to green (e.g., through a hospital window, Ulrich 1984; or through trees in a courtyard, Sullivan et al. 2004), the programs we uncovered during the course of writing this paper involve more active participation in gardening, hunting, nature adventure, and related activities. This participation among veterans and community members includes initiating programs (e.g., a community gardening or hunting program for veterans); serving as a guide or leader for others engaged in hunting, fishing, agriculture, and other nature-based activities; as well as partaking of nature-based recreation and related activities. Below we describe a sample of these programs drawing on our own experiences and on information compiled from program websites and informal interviews. These efforts are recent; thus for many of them we have only limited information and controlled studies are lacking. However, the fact that veterans, including those with PTSD and war injuries, are initiating many of these programs, and that participants cite benefits, suggest their value in helping some veterans, families and communities to deal with the deployment cycle.

### ***Gardening***

#### **Defiant Gardens: 4-H Military Families Program<sup>7</sup>**

4-H, a youth development organization associated with land-grant universities and Cooperative Extension in the United States, has teamed up with the Department of Defense to conduct programs for military children and their families, a number of which include gardening (e.g., at Fort Irwin Army Base,<sup>8</sup> Port Heuneme Naval Base<sup>9</sup>). One such community gardening program taking place at Fort Drum Army Base and

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<sup>7</sup> <http://www.news.cornell.edu/stories/June09/DefiantGardens.html>

<sup>8</sup> <http://groups.ucanr.org/freedadmin/impact/impactview.cfm?impactnum=705>

<sup>9</sup> <http://www.vcstar.com/news/2009/aug/03/military-base-kids-enjoy-coaxing-food-from/>

neighboring communities in New York State, seeks to link youth with soldiers overseas by planting seeds from Afghanistan in the United States, and by sending containerized gardening systems to deployed soldiers so that they can garden when not on patrol or otherwise mobilized away from post. By engaging children and soldiers in a common activity that they can share with each other during phone calls and through email, the *Defiant Gardens* program hopes to address a persistent problem in military families, i.e., how to foster positive communication among children with parents who are deployed soldiers overseas. The program is expanding to encompass additional environmental stewardship or civic ecology activities (Tidball and Krasny 2007; Krasny and Tidball 2010), including riverbank restoration and tree-planting, and hopes to leverage existing informal and formal networks (e.g., the Hearts Apart group of Army spouses, Trout Unlimited). A related research project is measuring changes in sense of place and social capital among youth as a result of participation.

### **Go Grow Green Community Gardening<sup>10</sup>**

At Peterson Air Force Base in Colorado, the Health and Wellness Center launched the *Go Grow Green* community initiative to encourage military families to spend time together. It includes adopt-a-plant, adopt-a-plot, and gardening programs for adults and children, a Community Supported Agriculture initiative, and incentives at a farmers market to promote local food consumption.

### **Gardening at Veterans Administration Hospitals and Other Treatment Centers<sup>11</sup>**

Two veterans started a gardening program at the Veterans Affairs Medical Center near Newark, New Jersey. According to a veteran with PTSD, who started his own landscaping company as a result of his experience:

When I got here I was completely isolated. But being with the plants gives me time to think and meditate, to feel the soil or clay or whatever you're working in. I talk to my plants. Maybe it's crazy, but it's given me a chance to get out, work with others, grow something and do something that's right, not just for myself, but for the whole community.<sup>12</sup>

This program, which is part of a larger effort of the Department of Veterans Affairs to offer more holistic health care, offers veterans an opportunity to befriend other veterans suffering similar problems. According to a newspaper article about the program,

For many of the veterans, the experience has been less about growing food and more about learning about themselves. So Mr. Mourning (a Vietnam vet) has felt a special kinship with

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<sup>10</sup> <http://www.peterson.af.mil/news/story.asp?id=123147734>

<sup>11</sup> [http://www.nytimes.com/2009/11/30/nyregion/30towns.html?\\_r=1&emc=eta1](http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1)

<sup>12</sup> [http://www.nytimes.com/2009/11/30/nyregion/30towns.html?\\_r=1&emc=eta1](http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1)

Josh Urban, a 30-year-old Iraq and Afghanistan veteran who also suffers from post-traumatic stress disorder. He had also found himself isolated, unable to fully reintegrate into the world outside the war zone, until tilling the soil with his fellow veterans helped him make his peace with life back home.<sup>13</sup>

### **Gardening Leave, United Kingdom<sup>14</sup>**

Gardening Leave seeks to enhance the therapeutic experience of ex-military personnel with combat-related mental health problems in Great Britain. Activities include maintaining the National Poppy Collection, planting and growing flowers and vegetables, making plant and bird boxes, and fishing classes initiated by veterans. Participants in the program reported gaining a sense of purpose; feeling they had something to anticipate; feeling relaxed, secure and safe; learning new skills; being part of growing something; being somewhere where problems are understood; and being able to share knowledge and skills with others (Atkinson 2009).

### ***Farming***

#### **Farmer-Veteran Coalition<sup>15</sup>**

The Farmer-Veteran Coalition in California seeks to identify ‘employment, training, and places to heal on America’s farms’ for veterans who may be dealing with drug, alcohol or other behavioral problems that may make traditional employment difficult, and those who have suffered physical or brain injury and need vocational rehabilitation. The Coalition also supports projects such as Veterans Village, Operation Recovery, and Veteran Victory Farm that work to integrate housing and farming with emotional and spiritual guidance for veterans.

#### **Archi’s Acres<sup>16</sup>**

Archi’s Acres is a three-acre, high-tech organic farm owned by an Iraq War veteran who is trying to help other combat veterans ‘shake the trauma of war by turning swords to plowshares’. Whereas about 20 Veterans Affairs centers have gardening programs, Archi’s Acres may be the only commercial agricultural enterprise directed toward veterans. University of California psychiatry professor C. Scott Saunders, who specializes

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<sup>13</sup>[http://www.nytimes.com/2009/11/30/nyregion/30towns.html?\\_r=1&emc=eta1](http://www.nytimes.com/2009/11/30/nyregion/30towns.html?_r=1&emc=eta1)

<sup>14</sup><http://www.gardeningleave.org/index.php/digging-for-victory-gardening-helps-former-soldiers-with-stress>

<sup>15</sup>[http://www.farmvetco.org/?page\\_id=172](http://www.farmvetco.org/?page_id=172)

<sup>16</sup><http://www.fresnobee.com/559/story/1753378.html?storylink=mirelated>

in treating PTSD among combat veterans, commented: 'How much better can one feel about themselves than if you can make a meal out of things that you grew?'<sup>17</sup>

## *Green Jobs*

### **Veterans Green Jobs<sup>18</sup>**

Veterans Green Jobs trains veterans to work in all aspects of the green economy, from forest fire management, to planting urban trees, to improving energy efficiency. It builds on the special skills of veterans, including team work, the ability to persevere under extreme situations, and dedication to a cause. Although the program is focused first on jobs and only marginally on nature as a therapeutic environment, testimony from a participant engaged in a trail building assignment suggests the emotional importance of work experiences in nature.

Upon completion of the 2009 season, I've received six certifications, six months of critical job experience, over \$2,000 in AmeriCorps College Awards, and invaluable experiences, relationships and personal growth. The therapy of wilderness also works in ways that would only be diminished were I to attempt to articulate further. However, I believe the transformative and healing properties I witnessed of the space which we held, will never be lost or forgotten.

## *Hunting*

### **Liberty Lodge Outfitting<sup>19</sup>**

Started by a wounded Iraq War veteran, Liberty Lodge Outfitting is a non-profit group that seeks to promote emotional and physical rehabilitation of veterans and their families through hunting and other outdoor activities at its 650-acre camp in rural New York State. The director draws on his childhood outdoor experiences in describing his motivation and inspiration: 'I can remember when my dad would take us out and teach us the types of trees that were around... It's not about killing. It's about being together, remembering the good times'.<sup>20</sup> A participant in the program writes:

On November 17, 2009 I was invited to the Liberty Lodge Outfitters in upstate New York for a hunting trip where there was only the guarantee of a good time. Not only was it a good time, but, the hunt of a lifetime. Didn't get the chance to harvest the buck of a lifetime, but I sure got a chance to watch him coming down the mountain like he owned the whole mountain side. Never did get him to come in close enough to shoot, but close enough to watch with a post card background. It was unbelievable. This is just one of the many memories

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<sup>17</sup> [http://www.marinecorpstimes.com/news/2009/12/ap\\_veterans\\_farming\\_121809/](http://www.marinecorpstimes.com/news/2009/12/ap_veterans_farming_121809/)

<sup>18</sup> <http://veteransgreenjobs.org/>

<sup>19</sup> <http://www.libertylodgeoutfitters.com/index.html>

<sup>20</sup> [http://www.libertylodgeoutfitters.com/II\\_article\\_1\\_.pdf](http://www.libertylodgeoutfitters.com/II_article_1_.pdf)

of my week long hunting trip. One good time of many. Amy's good cooking. JT's humor. And Kevin and Brandon trying to outthink the deer. Gregg never did say much, other than for me to remember where I was at.<sup>21</sup>

## Ducks Unlimited

Two prior servicemen in Seneca Falls, New York, have initiated the SF for SF concept – Seneca Falls Ducks Unlimited for Special Forces – as a way to encourage Special Forces soldiers on leave to enjoy a waterfowl hunt at almost no cost and with little preparation. According to one of the program organizers, this local effort of a major conservation organization demonstrates the ‘importance of time spent outdoors in pursuit of recreation, in fellowship with like-minded people, and in familiar places with special significance – especially for men and women in service to our country who are under immense stress and pressure’.<sup>22</sup>

## Wounded Warriors in Action

Wounded Warriors in Action (WWIA) provides wounded soldiers with the opportunity to participate in hunting and fishing, with the multiple goals of helping soldiers re-integrate back into society; re-enforcing the communal aspect of life; increasing soldiers' self-reliance and self-confidence; and helping them enjoy and experience the healing – physical, emotional and spiritual – of the wonderful aspects of the great outdoors. WWIA aims to create regional outdoor sporting Centers of Excellence run by wounded soldiers across the United States, which will serve as wildlife conservation models, employment for wounded veterans, and retreats for other soldiers.

A wounded soldier from Kentucky described the opportunity WWIA provided for him to go duck hunting in California:

When you called, inviting me to CA, I nearly jumped to the ceiling – And I only have one leg! A real dream-come-true was mine; all I had to do was be where I was told to be and on time.

The hunting was better than I imagined and the folks I met in CA made the trip even better. I made friends that I continue to talk with and saw things that I'll never see in KY. An added bonus was getting to hunt with my friend, battle buddy, and former platoon sergeant, Derek Duplisea.

I came away from the WWIA waterfowl hunting trip stronger and more independent yet. I mentioned earlier that words will not provide the feelings I want to express. WWIA allowed me to pursue a dream-hunt and further provided the therapy that no sterile Dr.'s office will ever do.

A Wisconsin participant appeared to translate a feeling of humbleness gained from spending time in the woods to a feeling of being part of something larger as a soldier:

The Wounded Warriors in Action have humbled me, and showed me once again that I can be proud of what I have done, and also help us to realize that we just did our part, our part in a long line of parts.

<sup>21</sup> <http://www.libertylodgeoutfitters.com/index.html>

<sup>22</sup> Keith Tidball, personal observation.

## ***Fishing***

### **Healing on the Rogue<sup>23</sup>**

The nonprofit Wounded Warrior Project is dedicated to helping severely injured veterans get on with their lives. Their partnership with Trout Unlimited, a local veteran, and fishing lodge operators along the Rogue River in Oregon resulted in: *Healing on the Rogue: Wounded Iraq War vets spend 4 days on the river, where harsh memories fade into the scenery*. Participating veterans include those with leg and arm amputations and PTSD. Their comments suggest the value of overcoming the physical challenges of walking along rocky riverbed terrain and catching and landing large fish, as well as the camaraderie that comes from spending time outdoors with veterans who have faced similar challenges. According to one participant, getting outdoors with others who have survived combat helps them all ‘work it out’. ‘It doesn’t matter whether you can see the wound or not ... We were all in this together ... In the military, we slept in the dirt and the sand. To come out here with these great guys on the Rogue and catch these fish ... oh, man. We’re getting memories of a lifetime’.

### **Project Healing Waters Fly Fishing<sup>24</sup>**

Project Healing Waters Fly Fishing for wounded veterans was started by a retired Navy Captain, and has since spread to chapters across the United States. The volunteers go to veterans hospitals to teach fly casting and fly tying on a long-term basis, in addition to guiding veterans on fly fishing expeditions. According to the project website, ‘For many participants, particularly disabled veterans, the socialization and camaraderie of the classes are just as important as the fishing outings’. Whereas each program must include at a minimum a local military hospital and a fly fishing club, the program in Oswego County New York (home of Fort Drum Army Base) is a partnership of the New York State Department of Environmental Conservation, a volunteer fishing guide and numerous other local volunteers, charter boat captains, a Veterans Affairs Hospital, and a wealth of conservation, veterans, and health service organizations. According to the leader for the Oswego County program,

I volunteered to become the Oswego County Chapter Coordinator because I’ve always had a special place in my heart for our vets. Project Healing Waters is a win-win situation for everyone. The biggest winners are the veterans and soldiers, then the people and community who volunteer their time and support the program.

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<sup>23</sup><http://www.mailtribune.com/apps/pbcs.dll/article?AID=/20071111/NEWS/711110315>

<sup>24</sup><http://www.projecthealingwaters.org/index.html>; <http://www.co.oswego.ny.us/info/news/2008/110708-1.html>



## *Nature Therapy Retreats and Camps*

### **Coming Home Project<sup>25</sup>**

Through the Coming Home Project, a multidisciplinary team of veterans, family members, psychotherapists and interfaith leaders offer free, confidential group support and stress management retreats for Iraq and Afghanistan veterans and families. Participants share experiences and stories, struggles and breakthroughs; learn new skills for reducing stress and anxiety and enhancing well-being; improve communication and relationships; and enjoy invigorating outdoor recreational activities in scenic, peaceful settings.

### **Operation Purple<sup>26</sup>**

Operation Purple offers free camp programs for military children and their families to help them develop and maintain healthy and connected relationships. Campers participate in hiking, canoeing, and beach explorations, as well as structured activities that highlight areas of strength and resilience in the family. An initial evaluation of this program has focused on the military and leadership aspects but has not addressed the nature related components (Chandra et al. 2008).

## *Outdoor Adventure*

### **Outward Bound<sup>27</sup>**

In addition to the more recent initiatives mentioned above, for over 20 years Outward Bound has offered wilderness expeditions specifically designed for war veterans at no cost to participants. Goals include helping veterans build a supportive community with other war veterans, facilitating discussions on readjustment and transition challenges, and re-energizing and reinvigorating veterans' spirits with adventures and challenges in the outdoors.

### **Glencree Sustainable Peace Project<sup>28</sup>**

Glencree Centre for Peace and Reconciliation is a non-governmental organization that is devoted to peace-building and reconciliation in Ireland and other countries. In partnership with the Wilderness Leadership School, which has experience using wilderness

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<sup>25</sup> <http://www.cominghomeproject.net/retreats>

<sup>26</sup> <http://www.militaryfamily.org/our-programs/operation-purple/>

<sup>27</sup> <http://www.outwardbound.org/index.cfm/do/cp.veterans>

<sup>28</sup> <http://www.glencree.ie/site/sustainable.htm>; [http://www.glencree.ie/site/documents/Glencree\\_A1.pdf](http://www.glencree.ie/site/documents/Glencree_A1.pdf)

to bring together South African ex-combatants, Glencree created the Ex-combatants Programme in 2001, which in 2005 grew into the Glencree Sustainable Peace Project. Former enemies from both sides of the Irish conflict, including combatants and prisoners as well as women and children, hike through the South African wilderness together, crossing crocodile infested rivers, sleeping on the ground, and protecting each other while on guard duty against dangerous animals. Quotes from the participants testify to the role of this wilderness experience in creating community among former foes.

And then he started telling me about his own life...my whole mind started to change... seeing beyond the banners...beyond the flags...beyond the uniforms...I started to see the human being.

What I found most challenging was meeting and sharing time with people that I hated and despised as ignorant, wicked, cruel and evil...I was surprised at how quickly I adapted to many members of the group. I was very skeptical about certain people and was profoundly moved by the method used to get us to use the 'third space' (wild nature) to share the 'things', attitudes, values, whatever that we had in common.

Seeing the human side is very difficult...they were perceived as enemies, but were also human beings; it was human beings you were killing, it is human beings who are grieving, that's hard to see...that's a big mountain to climb.

## Synthesis and Moving Forward

During the course of writing this chapter, we continually encountered new nature-based initiatives for veterans to add to our list. Thus, as we move forward with work in this area, we plan to expand the above catalog on a continuous basis. We also plan to create opportunities for programs to link with each other, and to expand on our initial research to provide the evidence that will help these efforts grow in ways that foster both veteran and military community resilience.

The use of nature for both therapeutic and civic purposes in times of war is rooted in history (see Chap. 14 by Lawson and Chap. 16 by Geisler, this volume). The recent support by Veterans Affairs hospitals and other arms of the US Department of Defense for community gardening and fishing programs suggests an initial recognition of the potential for nature-based activities to help in the healing process for soldiers. However, based on our review of the research literature, nature-based activities have not been considered in research on interventions that foster community resilience and adaptation in military communities (Bowen et al. 2000, 2001, 2003; Drummet et al. 2003; Huebner et al. 2009), and are only minimally addressed in the research literature on individual resilience among veterans (Hyer et al. 1996). This is despite research-based evidence of the positive impacts of engagement with nature on community and individual well-being in non-military settings (Ulrich 1983, 1984; Kuo et al. 1998a, b; Austin and Kaplan 2003; Sullivan et al. 2004; Kaplan and Kaplan 2005; Tidball et al. 2010); numerous accounts by veterans and civilians in war settings about the importance of gardening to emotional and psychological survival (Helphand 2006, Chap. 17); and the recent emergence of nature-based efforts, many of which are initiated by veterans, that use gardening, hunting, fishing, outdoor adventure, and other forms of nature

contact and stewardship to foster recovery and resilience among veterans and their families.

Focusing on post-disaster rather than more narrowly on war-impacted communities, Norris et al. (2008) proposed a set of factors that foster community resilience, two of which bear similarities to the community capacity factors proposed for promoting adaptations and well-being in military communities (Bowen et al. 2003; Huebner et al. 2009). According to Norris et al. (2008, p. 127): ‘Community resilience emerges from four primary sets of adaptive capacities – Economic Development, Social Capital, Information and Communication, and Community Competence – that together provide a strategy for disaster readiness’. More specifically, these authors describe the importance of social capital, including social support, informal ties, citizen participation, sense of community, and attachment to place; and of community competence described as ‘the networked equivalent of human agency’, which encompasses ‘collective action and decision-making, capacities that may stem from collective efficacy and empowerment’ (Norris et al. 2008, 141). They go on to suggest five principles for post-disaster interventions to promote community resilience, including engaging local people in planning and implementing interventions, mobilizing pre-existing formal organizational networks and informal relationships, and bolstering existing social supports.

The work of Kaplan, Kuo, Tidball, Krasny, and others cited earlier has demonstrated the potential for nature-based interventions, including those involving active engagement of community members such as community gardening and community forestry, to address these social factors integral to community resilience. For example, many of the programs described in this chapter are based on volunteerism, including by hunting and fishing guides (many of whom are veterans themselves) who take veterans into the outdoors, and by soldiers or veterans suffering from PTSD who plant gardens at Veterans Affairs hospitals. Volunteerism among veterans and other members of the community are demonstrations of shared responsibility for the general welfare of the community, and of collective competence that takes advantage of opportunities for addressing community needs and for confronting situations that threaten the well-being of community members, as outlined in the military community capacity model of Huebner et al. (2009). These programs also often entail extensive partnerships with non-profit and government conservation, health, and community organizations, and thus represent a means of building networks that foster community capacity in military (Bowen et al. 2000, 2003) and post-disaster communities (Norris et al. 2008). In short, although many of the nature-based interventions have been positioned within an individual therapeutic model of resilience, they include elements known to build community capacity, and therefore have the potential to contribute to resilience at the level of broader military communities.

Further, even though many existing programs focus on nature-based ‘healing’, testimony reported in the program descriptions above indicates an awareness of the importance of the camaraderie formed among ex-combatants (e.g., Glen Cree Sustainable Peace Project, Project Healing Waters Fly Fishing) and between soldiers and their families (e.g., Defiant Gardens). A quote from the Liberty Lodge website illustrates how nature and social connectedness can be integrated in such

programs: ‘Not all wounds are physical, and nothing heals better than mother nature, friendship and time away’.<sup>29</sup> Thus, connections formed during a nature-based experience may foster the informal networks that play a role in community capacity (see Bowen et al. 2003).

Our own experience with the Defiant Gardens program near Fort Drum Army Base is illustrative of some of the challenges and potential ways of moving forward with nature-based interventions designed to build resilience in military communities. In designing the program, we recognized the potential for community gardening to connect children with older community members (Krasny and Tidball 2009), and with parents who were deployed yet had the opportunity to garden on base. However, the Fort Drum community in which we worked lacked a history of community gardening, and our attempts during the first year to engage formal networks such as veterans groups or local museums met with mixed success. Part way through the first year of the program, we realized that there were other networks, e.g., of military spouses, already engaged in gardening and other nature activities that promote social connectedness. We plan to explore the potential to engage individuals in such networks and activities in planning Defiant Gardens activities in subsequent years, paying particular attention to how nature-based activities might provide opportunities to build community capacity including a shared sense of responsibility and collective competence. We have adapted existing research instruments to measure factors such as social capital and place attachment for the audiences with whom we are working, and intend to examine these and other outcomes (e.g., sense of community, ecosystem services) of this civic ecology program, which seeks to foster not only community resilience but also resilience of the local ecosystem (Tidball and Krasny 2007).

Not surprisingly, the above discussion leaves many questions unanswered. How do we balance the need for ‘time away’ or solitude that might allow veterans to experience the healing power of nature, with the need for interventions that build on existing community assets and foster informal networking, a sense of shared responsibility, and collective action? How do nature-based interventions compare to other types of interventions aimed at building community capacity? How might the unique combination of civic volunteerism and the restorative effects of nature that are evident in community gardening and other civic ecology programs play a role in building community capacity? How can we design research that will test the propositions we put forth about integrating nature-based interventions with existing efforts to foster community capacity and sense of community? And finally, how might we develop a typology of nature-based activities, including programs that emphasize reflection in nature, training and skill building, overcoming physical challenges, and volunteer stewardship? In spite or perhaps in light of these questions, we hope that this chapter will stimulate discussion about ways to connect the nature-based initiatives that are emerging across the United States and in Great Britain with more established efforts to foster resilience in communities impacted by deployment.

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<sup>29</sup> <http://www.libertylodgeoutfitters.com/index.html>

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## References

- Atkinson, J. (2009). *An evaluation of the gardening leave project for ex-military personnel with PTSD and other combat related mental health problems* (p. 6). Glasgow: The Pears Foundation.
- Austin, M. E., & Kaplan, R. (2003). Identity, involvement, and expertise in the inner city: Some benefits of tree-planting projects. In S. Clayton & S. Opatow (Eds.), *Identity and the natural environment: The psychological significance of nature* (pp. 205–225). Cambridge, MA: The MIT Press.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: How we have underestimated the human capacity to thrive after extremely aversive events. *American Psychologist*, *59*(1), 20–28.
- Bowen, G. L., Martin, J. A., et al. (2000). Community capacity: Antecedents and consequences. *Journal of Community Practice*, *8*(2), 1–22.
- Bowen, G. L., Martin, J. A., et al. (2001). Civic engagement and sense of community in the military. *Journal of Community Practice*, *9*(2), 71–93.
- Bowen, G. L., Mancini, J. A., et al. (2003). Promoting adaptation of military families: An empirical test of a community practice model. *Family Relations*, *52*(1), 33–44.
- Campbell, L., & Wiesen, A. (Eds.). (2009). *Restorative commons: Creating health and well-being through urban landscapes*. Newtown Square: US Forest Service, Northern Research Station.
- Chandra, A., Burns, R. M., et al. (2008). *Understanding the impact of deployment on children and families: Findings from a pilot study of Operation Purple camp participants* (Rand Health Working Papers, p. 69). Santa Monica: Rand Center for Military Health Policy Research.
- Chandra, A., Lara-Cinisomo, S., et al. (2009). Children on the homefront: The experience of children from military families. *Pediatrics*, *125*(1), 13–22. doi:10.1542/peds.2009-1180.
- Department of Defense. (2009). *Army releases September suicide data*. Retrieved December 9, 2009, from <http://www.defense.gov/releases/release.aspx?releaseid=13033>
- Dingfelder, S. F. (2009). The military's war on stigma. *Monitor on Psychology*, *40*(6), 52.
- Drummet, A. R., Coleman, M., et al. (2003). Military families under stress: Implications for family life education. *Family Relations*, *52*(3), 279–287.
- Helphand, K. (2006). *Defiant gardens: Making gardens in wartime*. San Antonio: Trinity University Press.
- Hewson, M. (2001). Horticultural therapy and post traumatic stress recovery. *Journal of Therapeutic Horticulture*, *12*, 44–47.
- Hoge, C. W., Castro, C. A., et al. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *The New England Journal of Medicine*, *351*(1), 13–22.
- Huebner, A. J., Mancini, J. A., et al. (2009). Shadowed by war: Building community capacity to support military families. *Family Relations*, *58*, 216–228.
- Hyer, L., Boyd, S., et al. (1996). Effects of Outward Bound experience as an adjunct to inpatient PTSD treatment of war veterans. *Journal of Clinical Psychology*, *52*(3), 263–278.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge: Cambridge University Press.
- Kaplan, S., & Kaplan, R. (2001). Health, supportive environments, and the reasonable person model. *American Journal of Public Health*, *93*(9), 1484–1489.
- Kaplan, R., & Kaplan, S. (2005). Preference, restoration, and meaningful action in the context of nearby nature. In P. F. Barlett (Ed.), *Urban place: Reconnecting with the natural world* (pp. 271–298). Cambridge, MA: The MIT Press.

- Kaplan, S., & Peterson, C. (1993). Health and environment: A psychological analysis. *Landscape and Urban Planning*, 26, 17–23.
- Krasny, M. E., & Tidball, K. G. (2009). Community gardens as contexts for science, stewardship, and civic action learning. *Cities and the Environment*, 2(1), 8.
- Krasny, M. E., & Tidball, K. G. (2010, February). Civic ecology: Linking social and ecological approaches in extension. *Journal of Extension*, 48(1), 1–5.
- Kuo, F. E., & Sullivan, W. (2001). Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behavior*, 33, 343–367.
- Kuo, F. E., Bacaicoa, M., et al. (1998a). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behavior*, 30, 28–59.
- Kuo, F. E., Sullivan, W. C., et al. (1998b). Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology*, 26(6), 823–855.
- Lester, P., Peterson, K., et al. (2010). The long war and parental combat deployment: Effects on military children and at-home spouses. *Journal of the American Academy of Adolescent and Child Psychiatry*, 49(4), 310–320.
- Luthar, S. S., Cicchetti, D., et al. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562.
- MacDermid, S., Samper, M. R., et al. (2008). *Understanding and promoting resilience in military families* (p. 28). West Lafayette: Military Family Research Institute.
- Manos, G. H. (2010). War and the military family. *Journal of the American Academy of Adolescent and Child Psychiatry*, 49(4), 297–299.
- Miavitz, E. M. (1998). Grief gardening. *Journal of Therapeutic Horticulture*, 9, 17–21.
- Miles, I., Sullivan, W., et al. (1998). Ecological restoration volunteers: The benefits of participation. *Urban Ecosystems*, 2, 27–41.
- Norris, F. H., Stevens, S. P., et al. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150.
- Novotney, A. (2009). Strong in mind and body. *Monitor on Psychology*, 40(11), 40.
- Ryan, R. L., & Grese, R. E. (2005). Urban volunteers and the environment: Forest and prairie restoration. In P. F. Barlett (Ed.), *Urban place: Reconnecting to the natural world* (pp. 173–188). Cambridge, MA: MIT Press.
- Sullivan, W., Kuo, F., et al. (2004). The fruit of urban nature: Vital neighborhood spaces. *Environment and Behavior*, 36(5), 678–700.
- Tanielian, T., & Jaycox, J. H. (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery* (p. 492). Santa Monica: RAND Corporation.
- Ternus, M. (2009). Military women's perceptions of the effect of deployment on their role as mothers and on adolescents' health. In M. Musick (Ed.), *Mason Gazette*. Fairfax: George Mason University.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. E. J. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K. G., Krasny, M., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research*, 16(5–6), 591–609.
- Tidball, K. G. (2012). Urgent biophilia: human-nature interactions and biological attractions in disaster resilience. *Ecology and Society*, 17(2), 5. doi: <http://dx.doi.org/10.5751/ES-04596-170205>.
- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 85–125). New York: Plenum.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- Wong, L., & Gerras, S. (2010). *The effect of multiple deployments on army adolescents* (p. 39). Carlisle: Strategic Studies Institute.
- Zoroya, G. (2009). *Troops' kids feel war toll*. Washington, DC: USA Today.

# Chapter 14

## Garden for Victory! The American Victory Garden Campaign of World War II

Laura J. Lawson

**Abstract** Remembered as a positive and widely popular effort, the American victory garden campaign of World War II illustrates a successful effort to encourage gardening as a response to the needs of a country in crisis. The popularity, effectiveness, and temporality of the victory garden campaign all reveal important aspects to ‘greening the red zone’. Although many people have simplified the intention to be primarily about increasing household food production, in truth it was a broad-based effort that envisioned gardening as an expression of patriotism and as a resource for recreation and restoration during a stressful time. The campaign also gives insight into what it takes to support a national, albeit a temporary, garden campaign and may shed light on what is necessary in addition if the goal is to sustain gardens permanently. The victory garden campaign is first contextualized in light of previous gardening campaigns that date back to the 1890s and typically arose in times of social or economic turmoil. In particular, comparison to the World War I war garden campaign reveals the acknowledgment of gardening as beneficial to broad social and emotional needs in time of war. The chapter then describes the campaign’s organizational structure, promotion, and participation. Description of the gardens reveals the complementary balance of social and personal benefits. The chapter concludes with a description of the end of the program and its legacy to community gardening efforts today.

**Keywords** War garden • Victory garden • World War I • World War II • Vegetable gardening

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L.J. Lawson (✉)

Department of Landscape Architecture, Rutgers University,  
112 Blake Hall, 93 Lipman Drive, New Brunswick, NJ 08901, USA  
e-mail: ljlawson@sebs.rutgers.edu

*Laura Lawson describes how the government, private industry, and citizens turned to gardening as a source of sustenance, pride, recreation, and solace during World War II. Such widespread gardening movements have emerged periodically during times of war, depression, and other stresses, with important lessons for current and future red zone scenarios.*

Experienced gardener and novice alike answered the call to garden as part of the US domestic strategy during World War II. In 1942, Americans established an estimated 15 million gardens that produced 7.5 billion pounds of food, and in 1944, it was reported that between 18 and 20 million families had gardens that collectively provided 40 % of the total domestic vegetable supply (Wilson 1945). In cities, towns, and rural areas throughout the nation, garden advice was made readily available via newspapers, magazines, and radio. Vegetables, fruits, and flowers were cultivated in backyards, vacant lots, playgrounds, company grounds, schools, and parks. While acknowledging the stress and uncertainty of the world war, organizers and advocates of the garden campaign conveyed an organized, easy contribution to the war effort that not only showed patriotism but also reaped personal and social benefits as well. Aptly named ‘victory garden’, this campaign stressed positive outcomes, with the gardens presenting a tangible success when so much else in daily life and relationships was uncertain.

Spurred on by the national campaign, each community forged forward with its own approach to victory gardening. In San Francisco, for instance, demonstration gardens were set up in highly visible public spaces like Union Square and the Civic Center, and the city’s large pastoral Golden Gate Park provided space for victory garden plots on a first-come basis (1942). These efforts were led by the San Francisco Victory Garden Advisory Committee that included experts from local colleges and representatives from multiple public commissions, public departments, garden clubs, and local newspapers. Thousands attended the 1943 Victory Garden Fair in Golden Gate Park, with exhibits, entertainment, and experts on hand to provide advice. At the 1945 Victory Garden Show, the mayor crowned the Victory Garden Queen with a crown of parsley and radishes, and the mayor in turned received a ‘radish of monumental proportions, grown in San Francisco’, which he dutifully ate (1945b) (Fig. 14.1).

In Washington, DC, the 1943 season began with over 650 acres made available and over 35,000 applications filed by March 9 (1943a). Some of this land was public land, including along Rock Creek Park, as well as temporarily donated private property. Taking advantage of the resources available in the nation’s capital, residents could take gardening courses from extension agents and feel connected to political leaders who also gardened, as evidenced by newspaper photographs of Vice President Wallace next to 11-foot Bolivian corn (1943e). One local newspaper article encouraged participation by noting that ‘Three generals and a Senator have obtained garden plots on the Glover Estate and are preparing to get a bit of exercise and to get away from the war by chopping away at weeds during the late daylight hours of this spring and summer’ (1943d). But the campaign was not without conflict, including a debate, ultimately successful, to allow victory gardens in front





**Fig. 14.1** A victory garden on a vacant lot in San Francisco, 1945 (Courtesy of the San Francisco History Center, San Francisco Public Library)

yards, and a later request, this time unsuccessful, to continue the extension education opportunities for gardening after the war (1943b, 1946b).

As the war neared its end, gardeners were urged to continue to garden even as the supportive campaign was being dismantled. In San Francisco, gardeners were urged to continue their gardens – reframing them as ‘survival gardens – to address the grim international food picture (n.a 1946c). With soldiers coming home and the return to normal work schedules, some promoters foresaw increased demand for gardening, however they also realized that the removal of building restrictions and the demand for housing and other civic improvements would threaten gardens that existed on temporarily donated sites. In Washington, DC, even as garden supporters scrambled to assure ongoing education opportunities and access to community garden land, newspaper articles started listing garden relocations and the pending closure of the staffed victory garden office (1946a) (Fig. 14.2). Although the demand for garden space was still high, the district’s commission reportedly stated that ‘[victory] gardening has no place as a ‘proper peacetime municipal function’ (n.a 1945a). Yet, while much of the top-down support dwindled, people continued to garden in backyards and in victory gardens that turned into community gardens. In DC today, some of the remnant victory gardens still exist along Rock Creek Park, as does the Glover Community Garden where senators and generals once gardened. And though no remnant of the victory garden remains in San Francisco’s Golden Gate Park, in July 2008, a group of volunteer gardeners, led by the artist studio Rebar, installed a victory garden at the San Francisco’s Civic Center Plaza to express the need and opportunities for local food production (Sullivan and Eaton 2008).



**Fig. 14.2** A woman starting her garden in Northwest Washington DC, May 1943 (Photograph by Louise Roskam, US Office of War Information. Courtesy of the Library of Congress, photo LC-USW-3-28088-D)

Remembered as a positive and widely popular effort that got many people to garden, it is not surprising that many people today consider the victory garden campaign to be the precursor to contemporary community gardens. However, the success of the victory garden effort over 65 years ago and the current increased popularity of gardening both reiterate a recurring appeal to garden in times of social and economic crisis that has spurred a range of gardening campaigns since the 1890s (Lawson 2005). Specific campaigns include the vacant lot cultivation associations during the 1893–1897 depression to subsidize income for unemployed laborers; the school garden movement from the 1890s to 1920s that established gardens for educational purposes; a civic gardening campaign from the 1890s to 1910s to promote beautification; the war garden campaign of World War I; the subsistence and work relief gardens during the 1930s depression; victory gardens of World War II; and current community gardens. Each of these campaigns is shaped by its social, economic, and political context, yet they share many of the same beliefs about gardening as a way to promote health and nutrition, psychological restoration, social engagement, and environmental restoration. The episodic interest intensifies during periods of societal crisis – war, economic depression, civic unrest – when people are thrust into the red zone, either spatially or temporally, and turn to gardening as a direct, tangible means to address the local manifestation of larger crises (Bassett 1981; Lawson 2005). Gardens and gardening appeal during these times because they show results, are participatory, and are relatively inexpensive

when compared to larger structural change. Gardening is something that individuals can do to express engagement, and when hundreds, thousands, or millions of individual gardeners are seen working together under a shared movement, the results – the amount of food, the acreage of gardens, the social interaction, etc. – can be very impressive.

The victory garden campaign of World War II illustrates a successful effort to encourage gardening as a response to the needs of a country in crisis. The popularity, effectiveness, and temporality of the victory garden campaign all reveal important aspects to greening the red zone. Although many people have simplified the intention to be primarily about increasing household food production, in truth it was a broad-based effort that envisioned gardening as an expression of patriotism and as a resource for recreation and restoration during a stressful time. The campaign also gives insight into what it takes to support a national, albeit a temporary, garden campaign and may shed light on what is necessary in addition if the goal is to sustain gardens permanently. The remainder of this chapter will first contextualize the victory garden campaign in light of the previous World War I war garden campaign to reveal key shifts in justifying gardening as a domestic response to the war. It will then describe the World War II victory garden campaign's organizational structure, promotion, and participation. Description of the gardens reveals the complementary balance of social and personal benefits. The chapter concludes with a description of the end of the program and its legacy for community gardening efforts today.

## From War Garden to Victory Garden

*Everyone who creates or cultivates a garden helps, and helps greatly, to solve the problem of the feeding of nations...* Woodrow Wilson (1917)

To understand the context that led to the victory garden campaign, it is useful to first look at its predecessor during the previous world war, the war garden campaigns of World War I. The United States' entry into World War I in 1917 came at a point when Europe faced a severe food crisis due to cut off supplies, destroyed crops, lack of farm labor, and increased demand from armed forces.<sup>1</sup> Within a larger volunteer conservation drive, civilian gardening was intended to supplement domestic food needs so that more food could be exported to Europe. The war garden campaign grew into a national effort that relied on the organizational capacity of involved government agencies, educational institutions, civic and gardening organizations, and local clubs to reach out to communities and individuals. Particularly influential were the volunteer organizations – those created specifically in response to the campaign like the National War Garden Commission, those reframed from

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<sup>1</sup> Victory gardens were also significant to the war effort in Europe. For a general history, see Sherley Buswell, 'Victory Gardens: The Garden Warriors of 1942, Winning through 1943'. *City Farmer* <http://www.cityfarmer.org/victgarA57.html#vict%20garden1>

previous gardening programs like the federal Bureau of Education's school garden program solidifying into the US School Garden Army, and the national women's, civic, and gardening clubs that provided leadership to thousands of volunteers and activists at the local level. Any land not gardened was considered 'slacker land', pests were framed as enemies, and poor garden care was disparaged with language equivalent to having committed treason. Rallying to such slogans as 'hoe for liberty' and 'plant for freedom', five million gardeners grew \$520 million worth of food in 1918 alone (Pack 1919, p. 23). Given the success of the campaign, advocates hoped to continue to promote gardening for its health and civic benefits after the war, strategically renaming war gardens as 'victory gardens' (Pack 1918). But with the end of war also came an end to the promotion, borrowed organizational structure, and borrowed land. Interest dwindled and land was reclaimed for previous uses. Even garden programs that had existed prior to the war did not rebound to their previous levels of activity. For instance, though the US School Garden Army evolved from a popular school garden movement, interest in school gardening dwindled after the war ended and the Federal Office of School and Home Gardens closed in 1920 (Trelstad 1997).

In the fervor for action after the bombing of Pearl Harbor, leaders and citizens remembered the war gardens and again proposed gardening as part of the domestic war campaign. However, while in World War I food scarcity had been a concern to federal experts who urged citizens to grow food for household consumption, by the 1940s technological improvements in agriculture and transportation – plus the instituting of food ration stamps – suggested to agricultural experts and national leaders that gardening was an inefficient effort with little impact on national food security (Dickson 1944; United States Office of Civilian Defense n.d.). Instead, experts and government officials directing war food preparedness initially looked to increase farm productivity, rural gardening, and conservation and downplayed citizen gardening, particularly in denser suburban and urban areas. A 1941 report developed by subcommittees of the Department of Agriculture and the Federal Security Agency expressed many of the experts' concerns about the inefficiency of small individual gardens, particularly related to the waste of seed supplies, fertilizers, and insecticides. However, representatives of garden clubs and horticultural interests quickly urged expansion of the domestic food production program so that urban and suburban households could participate. Promoters of a new garden campaign cited similar benefits as had been used to validate the World War I war garden program, such as increasing domestic food supply, reducing pressure on transportation, and building morale. In addition, it was justified as a way to satisfy household tastes while also putting less demand on resources needed for the war effort. Not only could households enjoy more food diversity on their plates, but growing fresh foods at home also meant that more tin, labor, power, and machinery currently being used by the food industries could be directed to the war effort.

To discuss the benefits of a war garden program and to strategize the best means to orchestrate a national campaign, a National Defense Gardening Conference was held in Washington DC on December 19, 1941, and attended by over 300 horticultural experts, business leaders, educators, newspaper editors, and representatives of

garden clubs, youth organizations, and federal and state agencies. The resulting goals for the victory garden campaign included: increasing production and consumption of fresh fruit and vegetables through home, school, and community gardens; encouraging proper storage and preservation of surplus for use by families, local school lunches, and welfare agencies, and to meet local emergency food needs; enabling families and institutions to save on the cost of vegetables so that other foods could be purchased; providing community gardens for people without land; and improving morale and spiritual well-being of individuals, family, and nation (United States Office of Civilian Defense 1943, 3).

## **Orchestrating the Victory Garden Campaign**

Gardening was included as part of the Food Fights for Freedom campaign to encourage compliance with national policies and to promote local engagement. This federal campaign provided national publicity while also linking individual programs to each other so that everyone involved could see the larger impact of their work. Campaign organizers relied on state and local institutions to implement policies, acknowledging that ‘Better than anyone else the people in the community itself will know what can and should be done’ (United States Office of Program Coordination, Office of War Information et al. 1943, 32). The campaign was conceptually structured along four general guides to action: produce, conserve, play square, and share. To meet production needs, the campaign urged citizens to volunteer as farm laborers and grow food for the household. To conserve, community groups were encouraged to promote nutritious eating habits, economical food substitutions, and food preservation through canning and to avoid wasting food and resources. Playing square referred to cooperation with rationing and pricing rules. Lastly, citizens were reminded that they were rationing their food in order to share with the armed forces and allied countries. The ultimate goal was conservation and self-production so that domestic demand on resources could be reduced. The campaign also organized nine individual informational programs on the following topics: farm production goals, victory gardens, home food preservation, nutrition, food conservation, farm labor programs, rationing, food price controls, and home front pledges.

The effort required coordination at the federal, state, and local level. A National Advisory Garden Committee was organized to coordinate multiple federal agencies, including the Office of Defense, Health, and Welfare Services; Department of Agriculture; Office of Civilian Defense; and Office of Education. These agencies offered support through their existing communication channels, educational materials, and technical assistance programs. An annual National Victory Garden Conference provided an opportunity to share information and develop national policies to direct federal agencies as well as guide state and local planning. Each year, a goal was set for the number of gardens to be cultivated. For example, in 1942, the target was 15 million gardens – five million on farms and ten million in towns, which was accomplished during that growing season.

In 1943, the goal was to increase to six million farm gardens and 12 million nonfarm gardens, which was again met. Based on federal guidelines but attentive to state conditions, each state then developed its own victory garden program and established goals for the desired number of gardens statewide. In similar fashion, the state victory garden councils then directed county committees to coordinate local efforts and distribute information.

Local victory garden committees usually included influential community members from real estate boards, chambers of commerce, and service clubs, as well as municipal agency directors, educators, and other advocates. They supported individual gardeners and school garden programs and operated community gardens, demonstration gardens, and canning centers. Many groups organized neighborhoods through block captains who supervised community and vacant-lot gardens and provided individual encouragement to residents in a neighborhood. Through registration campaigns, the local committees kept records of civilian contributions to the national food supply. These activities also relied on the participation of civic, women's, and garden clubs that provided advice, established demonstration gardens, assisted school gardens, and sponsored garden shows and contests.

Victory gardens received a boost through participation by businesses and industries. Florists', nurserymen's, and seedsmen's associations encouraged their members to provide land, greenhouses, seed, and technical assistance to local campaigns. Some companies, industries, utilities, and railroads encouraged their workers to garden by providing land, seeds, technical assistance, and incentives. Participation by industries and companies was buoyed by the work of the National Victory Garden Institute, a nonprofit educational enterprise financed entirely by industry to promote victory gardening through information, contests, and publicity. The National Victory Garden Institute encouraged companies to initiate garden programs not only as an act of patriotism but also as a way to improve employee morale and performance. An exemplary company was the Firestone Tire Company that encouraged workers to garden at home and in company-provided community gardens, and provided seeds sufficient to plant half the plot, insecticides, and fertilizers (Lyons 1943). Approximately 2,500 employees gardened on 150 acres either owned or leased by Firestone. The company also offered cash prizes for model gardens, a demonstration garden, and harvest show, and loaned pressure cookers for canning (Fig. 14.3).

## **The Broad Appeal and Promotion of Victory Gardens**

Whereas much of the World War I promotion of gardening appealed to American selflessness in the face of the European food crisis, the World War II campaign often highlighted the tangible benefits to individuals and households who gardened as part of the campaign. For instance, M. L. Wilson of the Federal Security Agency, equated war-preparedness with personal health for every man, woman and child: '[One] cannot expect to be physically fit, mentally alert, and ready to 'take it' unless a well-balanced diet, including plenty of fruits and vegetables, has provided that

**Fig. 14.3** Victory garden poster by artist Robert Gwathney (Courtesy of National Archives, photo NWDNS-44-PA-368)



energy and fuel which is necessary to keep in topnotch condition all of the time' (Condon 1943, 11). With newspapers and bulletins popularizing recent scientific reports that found Americans had poor eating habits, and with the National Draft Board reporting that 40 % of youth did not pass their physical examinations because of undernourishment, Americans were encouraged to increase their intake of minerals and vitamins by consuming fresh fruits and vegetables (Roberts 1943; Mack et al. 1944). This campaign was intended to not only help the war effort but also encourage better long-term eating habits.

Besides good food, civilians needed activities that would reinvigorate body and soul so they could keep up with the demands of the domestic war effort. Because gas and rubber restrictions limited the ability to travel to recreational outlets, Americans needed local leisure activities. Victory gardening was promoted as a pleasant preoccupation rather than a burden. While growing food was important, so was the enjoyment of gardening as recreation and respite. Promotional materials would often include light-hearted comments about the growing preference among office workers for the rake and hoe over the golf club and tennis racket. Judge Marvin Jones, War Food Administrator, characterized the symbiotic relationship of gardening to the war economy and personal needs in a speech before the National Victory Garden Conference in 1944.

The Victory garden program is one of the finest illustrations we have had in this war of a job that civilians at home can do to back up the boys who are fighting. Working in a garden for an hour or two at the end of a busy day spent in an office or factory has provided

a wonderful balance wheel to millions who have worked day after day at war jobs with little or no vacation or recreation. Contact with the earth, and with growing things, is good for all of us, especially in times like these when we are all working so hard in the jobs assigned to us (Jones 1944, p. 5).

In addition to nutritional health and physical exercise, gardening also promoted psychological health. Statements regarding the therapeutic nature of gardening by Fredrick P. Moersch of the Mayo Clinic in Rochester, Minnesota, were frequently cited in promotional literature. He asserted that gardening eased the emotional unrest caused by war and uncertainty and that physical and mental health went together: 'For the person who is on edge, anxious and sleepless, and has a heavy heart, there is no more hope-inspiring, restful, healthful recreation than gardening. One might speak properly of gardening as a work cure' (Moersch 1943, 75). As a restorative hobby, gardening occupied the mind and body and thus relieved stress felt by families who had loved ones in the war. Illinois Food Director Lester Norris noted that 'many parents with sons somewhere in foxholes in the South Pacific or North Africa have found solace by working in their gardens—close to nature—feeling that they too were contributing something personally to the effort to win the war' (Norris 1943, 3). Gardening also provided an outlet for patriotism as well as rehabilitation for those injured in the war. For example, concerning her work at Camp Kilmer in New Jersey, Mrs. Stephen Van Hoesen reported that men with mental and physical disabilities were frequently sent to the garden where they could casually talk about their problems while occupied in gardening activities (Van Hoesen 1944).

The public learned about victory gardens through written materials, film, and public events. Participating federal, state, and local agencies and organizations produced a proliferation of books, reports, pamphlets, and mimeographed handouts. Garden and home magazines along with local newspapers published advice columns and special interest stories. For example, the popular magazine *House and Garden* produced two victory garden supplements in 1942 and regularly included monthly calendars of garden activities, garden stories, and pictures of gardens. Posters with mottoes such as 'Vegetables for Victory' and 'Food for Freedom' were displayed in store windows, libraries, gardens, and homes to encourage support. Radio and film were also used to promote participation. One short film that might have been seen before a feature film was a humorous lesson in proper gardening that featured comic Jimmy Durante and his straight-man son. Potential gardeners were also encouraged through demonstration gardens, classes, and events. Boston Commons and other popular parks and plazas were plowed for demonstration gardens that provided visual information and classes. Harvest shows were a popular forum for publicity and fundraising. Contests and exhibitions were organized to spark friendly competition.

Everyone was encouraged to participate. Garden advocates often lauded victory gardens as democratizing experience that brought together people from all walks of life. In addition to photo displays showing the gardens of movie stars and millionaires and accounts of the office secretaries and factory workers stopping by their gardens after work, the public also heard about victory gardens tended by the military stationed in the Pacific Rim, by Japanese Americans in relocation camps, and by Native





**Fig. 14.4** A 1943 photograph used in a San Francisco paper showing how women starting a victory garden in San Francisco had improvised child supervision so they could work (Courtesy of the San Francisco History Center, San Francisco Public Library)

Americans on reservations. Victory gardening was praised as an important family pastime. One piece of radio advertising described the garden as a family training ground where a child ‘learned fascinating lessons about Nature and developed healthful ways of occupying his time that is denied kids who never had the opportunity to work and play with their elders in a family garden’ (United States Department of Agriculture [USDA] 1945, n.p.). In addition to participating in family gardens, children also had gardening opportunities through their churches, 4-H clubs, boys and girls scouts, parks and recreation programs, and other venues (Fig. 14.4).

## The Victory Garden Itself

The desire to encourage efficient gardens during wartime is encapsulated in the title of a 1942 article in the USDA’s *Land Policy Review*: ‘Gardens, Yes, But with Discretion’. The goal was to promote gardens, but as temporary and not at the sacrifice of established ornamental spaces. Most promotional literature emphasized larger suburban home gardens and community gardens. For those who wanted to start gardens in their backyards, USDA experts advised to start small in an inconspicuous location that did not destroy existing lawns or flowerbeds. For those who did not have adequate private space or lived in apartments, experts

urged participation in community gardens, vacant-lot gardens, school gardens, and company-run industrial gardens.

Victory garden promoters were quick to realize the advantages of community gardens because of their efficiency, centrality for instruction and materials, and their social aspect. Community gardens were typically located on larger pieces of property, often at the city's edge or on underutilized public land. The gardens, managed by municipalities, victory garden committees, colleges, or voluntary organizations, were organized so that urban and suburban families could acquire a plot of land easily and efficiently. Specific management varied for each garden in terms of how applications were processed, size of gardens, access to water and tools, and so on. But along with these benefits, community gardens also posed some risks, particularly theft and vandalism. To deter theft, some garden committees organized volunteer watches during key harvest times and some cities set up fines for trespass, willful damage, or theft from a community garden.

Vacant-lot gardens were arranged on a case-by-case basis in a more informal manner than community gardens. Typically, a vacant-lot garden was the project of one or more households who claimed a lot near their homes for gardening. Advocates often validated both community gardens and vacant-lot gardens as means to beautify otherwise neglected land. At the 1943 National Victory Garden Conference in Chicago, Fred Heuchling, assistant director to Chicago's program, was eager to show conference participants the transformation of 'ugly weed-infested, rock and brick-strewn' vacant lots through volunteer efforts into 'neat, orderly, and productive gardens' (Heuchling 1943, 19). Not only were these gardens good for food production, but they also facilitated general community beautification.

To keep the individual victory garden manageable and to discourage waste, most sources advised gardeners to plan their gardens based on nutritional value, anticipated shortages of certain foods, family tastes, and how much time could be devoted to gardening. Gardeners were encouraged not to 'bite off more than they can chew'. Instead of being laborious, victory gardening was intended to fit into the busy lives of war workers and be enjoyable. Not all memories from the World War I campaign were positive, and many sources tried to avoid the overzealousness remembered from the earlier era that had resulted in wasted seed, sore backs, poor harvests, and bad memories of gardening as a chore. H.W. Hochbaum, chairman of USDA's committee on victory gardens, considered an hour a day to be adequate for maintaining a backyard garden (Hochbaum 1943, 3). Community gardeners were encouraged to work in gardens that were convenient to their homes so they could tend them two or three times a week, either after work or on weekends.

With the aim of minimizing waste and maximizing nutritional output, USDA's 1943 *Victory Garden Leader's Handbook* provided guidelines for calculating a family's nutritional needs and planning a garden accordingly. Many manuals and articles in popular magazines provided information on planting based on experience and household composition and suggested plant varieties for nutrition, taste, variety, and utility. In order to encourage new eating habits, cooking advice, recipes, and storage tips were frequently included in victory garden literature.

## Victory Gardens After the War

As the war progressed and victory seemed just around the corner, government and civilian groups urged the public to continue gardening as part of the postwar reconstruction. At the 1945 National Victory Gardening Conference, experts acknowledged the continued need for 20 million victory gardens. There was a note of urgency in the postwar appeals that had been largely absent from the victory garden campaign during the war. President Harry Truman was quoted as stressing the need for victory gardens after the war:

The United States and other countries have moved food into war-torn countries in record amounts, but there has been a constantly widening gap between essential minimum needs and available supplies. The threat of starvation in many parts of the world and the urgent need for food from this country emphasize the importance of continued effort to add to our total food supply this year. A continuing program of gardening will be of a great benefit to our people (United States Department of Agriculture 1946, 1).

Advocates also hoped that Americans would continue to garden for health, recreation, and beautification. Even before the war ended, garden writer Richardson Wright pressed gardening as a hobby and part of a balanced home life, stating, 'Let us not, come peace, drop this effort to produce bodily and spiritual food, considering it merely an emergency measure. We can never go back to the old ways' (Wright 1942, 5).

However, as the government-directed campaign diminished, so too did resources associated with it, particularly the organizational capacity, technical assistance, and access to land. Most of the land made available for community gardens and vacant lot gardens reverted to previous uses. In some communities, community victory garden sites evolved to serve as community gardens that persist today, such as the Fenway Victory Gardens in Boston or Rainbow Beach Victory Garden in South Chicago. For some people, the desire to continue gardening was satisfied by the postwar expansion of suburban housing that made backyard gardening a possible hobby and avocation.

## Conclusion: The Victory Garden Legacy

The victory garden campaign is warmly remembered by many people as a national effort that blended patriotism with personal motivation. For many Americans who did not experience the immediate war zone, the garden served as a physical space of purpose and local action, but also of refuge and resource. Not only did gardening provide an outlet for citizens to aid in the war effort, it also provided a local solution to recreation, health, and morale needs. The structure of the national program formed around the efficient dispersal of information. Instead of starting anew, the campaign made use of existing governmental agencies, institutions, and organizations to orchestrate local gardening efforts. Designed to address the immediate war crisis, the organization that supported victory gardening was not

meant to be permanent. By getting millions of households to garden, however, the victory garden campaign did reinforce an interest in gardening.

Everyone was encouraged to participate to the extent that they could, with positive attitudes about the multiple personal, communal, and national benefits achieved through their engagement. This acknowledgment of gardening as both a resource for essential needs and as an enjoyable avocation was a subtle yet significant shift from previous gardening campaigns that tended to stress food production, education and character building, or economic incentives (Lawson 2005). As we see in the current community garden movement, gardening is advocated for multiple benefits that overlap and blend together personal, community, and environmental improvements. Various and simultaneous needs or opportunities may catalyze involvement, but if gardening is not enjoyable it is hard to sustain the effort.

At the same time that the victory garden campaign could garner support through its justification of many social and personal benefits to be derived, it was framed as a temporary program. Through the orchestrated tiers of support, the victory garden campaign was able to provide access to land and resources through public means to those with or without private means. But with peace and prosperity the agents of the campaign shifted to other priorities and access to public land and resources diminished. The challenge for current and future garden campaigns is to acknowledge the benefits associated with gardening, to garner a broad range of support from the grassroots to federal policy, and to instill a sense of permanence to this effort that will be sustained in times of peace as well as crisis.

## References

- Bassett, T. J. (1981). Reaping the margins: A century of community gardening in America. *Landscape Journal*, 25(2), 1–8.
- Condon, E. J. (1943). Victory gardens in industry – A third front. In *Gardening for victory: A digest of the proceedings of the national victory garden conference* (pp. 10–12). New York: National Victory Gardening Institute.
- Dickson, M. R. (1944). *The food front in World War I*. Washington, DC: American Council on Public Affairs.
- Heuchling, F. G. (1943). Victory gardening in Chicago. In *Gardening for victory* (pp. 17–20). Washington, DC: National Victory Garden Institute.
- Hochbaum, H. W. (1943). *1943 victory garden program* (p. 3). Washington, DC: U.S. Office of Civilian Defense.
- Jones, M. (1944). Victory gardens in 1945. In *Report national victory garden conference* (pp. 4–5). W. F. Administration. Washington, DC: Government Printing Office.
- Lawson, L. (2005). *City bountiful: A century of community gardening in America*. Berkeley: University of California Press.
- Lyons, W. E. (1943). Running a successful company garden. In *Gardening for victory: A digest of the proceedings of the national victory garden conference* (pp. 33–34). New York: National Victory Garden Institute.
- Mack, W. B., & Eliason, H. M., et al. (1944). *Victory gardens handbook of the Victory Garden Committee, War Services, Pennsylvania State Council of Defense*. n.p: Pennsylvania State Council of Defense.
- Moersch, F. P. (1943). Health and contentment in gardening. *Minnesota Horticulturist*, 75–76.

- n.a. (1942). City takes up rake and hoe. *San Francisco Chronicle*, San Francisco.
- n.a. (1943a). 650 acres available in D.C. for gardens. *Washington Daily News*, Washington, DC.
- n.a. (1943b). Commissioners rescind ban on lawns for gardens. *Star*, Washington, DC.
- n.a. (1943c). New garden ordered dug up; D.C. heads may change ruling. *Star*, Washington, DC.
- n.a. (1943d). Three generals and a senator to work own victory gardens. *Star*, Washington, DC.
- n.a. (1943e). Wallace proud of his victory garden. *Star*, Washington, DC.
- n.a. (1945a). Rule victory gardens out for peacetime. *Times Herald*, Washington, DC.
- n.a. (1945b). S.F. crowns a queen – With vegetables. *San Francisco Chronicle*, San Francisco.
- n.a. (1946a). D.C. gardeners plan to ask congress for county agent aid. *Star*, Washington, DC.
- n.a. (1946b). District gardens. *Washington Post*, Washington, DC.
- n.a. (1946c). ‘Survival gardens’ may replace ‘victories’; Backyard gardens can resume plots. *San Francisco Chronicle*, San Francisco.
- Norris, L. (1943). Address of welcome. In *Gardening for victory: Digest of proceedings of the national victory garden conference* (p. 3). New York: National Victory Garden Institute
- Pack, C. L. (1918). The biggest ‘victory gardens’ year ahead. *Garden Magazine*, 28, 140–141.
- Pack, C. L. (1919). *The war garden victorious*. Philadelphia: J.B. Lippincott Company.
- Roberts, L. J. (1943). Nutrition from the victory garden. In *Gardening for victory: A digest of the proceedings of the national victory garden conference*. New York: National Victory Gardening Institute.
- Sullivan, R., & Eaton, J. (2008). The victory garden sprouts anew. *San Francisco Chronicle*, San Francisco.
- Trelstad, B. (1997). Little machines in their gardens: A history of school gardens in America, 1891–1920. *Landscape Journal*, 16(2), 161–174.
- United States Department of Agriculture. (1945). *Victory garden kit: Your victory program, 1945*. Washington, DC: Government Printing Office.
- United States Department of Agriculture. (1946). *Garden and conserve to save what we’ve won: Victory garden program for 1946*. Washington, DC: Government Printing Office.
- United States Office of Civilian Defense. (1943). *Garden for victory: Guide for planning the local victory garden program*. Washington, DC: Government Printing Office.
- United States Office of Civilian Defense. (n.d.). *Garden for victory: Guide for planning the local victory garden program*. Washington, DC: Government Printing Office.
- United States Office of Program Coordination, Office of War Information, et al. (1943). *Food fights for freedom*. Washington, DC: Government Printing Office.
- Van Hoesen, M. S. G. (1944). Gardening in an Army Hospital. In *National victory garden conference* (pp. 22–25). W. F. Administration. Washington, DC: Government Printing Office.
- Wilson, W. (1917). The president to the people. *Garden Magazine*, 25, 220.
- Wilson, M. L. (1945, June 15). *Progress Reports of State Directors of Cooperative Extension Work on the Victory Garden and Home Food Production Programs*. Washington, DC: Government Printing Office.
- Wright, R. (1942). The land and our survival. *House and Garden*, 81, 5.

# Chapter 15

## The Korea DMZ: From a Red Zone to a Deeper Shade of Green

Anna Grichting and Kwi Gon Kim

**Abstract** The Demilitarized Zone (DMZ) that has divided the Korean peninsula since 1953 is in fact one of the most highly militarized borders in the world, and continues to be a line of tension between North and South Korea. Crossing the peninsula from East to West, the linear enclave represents a cross section of Korean landscapes and cuts through a variety of ecosystems and topographies from the sacred mountain of Keumsangang to the delta of the Han and Imjin Rivers. Embodying the dichotomy of the boundary as the ‘space of the worst and the best’, the DMZ has been described as a Garden of Eden, a Walled-off Paradise, or an Involuntary Park, in reference to the untamed nature that has developed within the cease-fire lines and in the adjacent military areas. The de-territorializing forces of war – destruction, deforestation, mining, human loss – have also engendered the re-territorializations of nature, transforming the DMZ into a precious reserve of biodiversity in the rapidly expanding and urbanizing context of the Korean Peninsula. These valuable ecosystems have been confirmed by an international coalition of scientists, activists and peace-builders, who all agree that a future reconciliation between the two Koreas would undoubtedly threaten the fragile ecosystems and endangered species of the DMZ. This chapter advocates the importance of recognizing and planning the DMZ as a specific and singular territory – through

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A. Grichting (✉)  
Department of Architecture and Urban Planning, School of Engineering,  
Qatar University, P.O. Box 2713, Doha, Qatar  
e-mail: anna.grichting@qu.edu.qa

K.G. Kim  
Department of Environmental Planning and Landscape Architecture,  
Seoul National University, Gwanak-gu, Seoul, Korea  
e-mail: kwigon@snu.ac.kr

a series of prereunification strategies – ensuring that future reunification scenarios will respect the natural balance of the site, and developing an ecological matrix as the foundation for future development and conservation plans.

**Keywords** Buffer zones • No-man’s land • Peace-building • Environmental cooperation • Third landscapes

## **Korea: A Divided Peninsula**

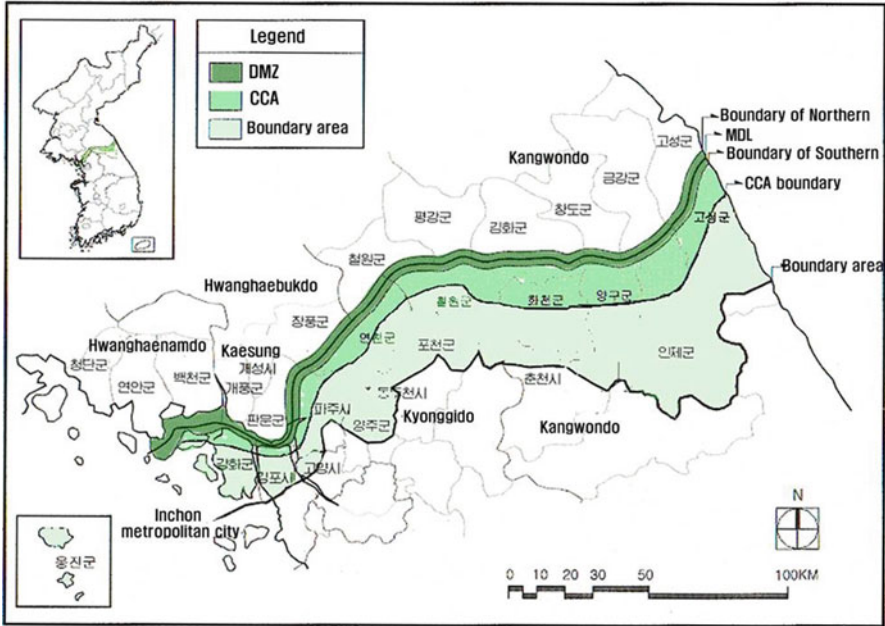
Since the 1953 Armistice Agreement, the Demilitarized Zone (DMZ) has cut across the Korean peninsula, inscribing a physical rift and a psychological wound in the landscape and its people. Extending for 2 km on either side of the Military Demarcation Line between the Democratic People’s Republic of North Korea and the Republic of South Korea, the buffer zone stretches for 248 km along the 38th parallel, covering 600 square miles. This geopolitical fault line disconnects geographies, ecosystems, networks and societies, and reflects the divergent political ideologies and economic systems on both sides. The linear enclave represents a cross-section of Korean landscapes and cuts through a variety of ecosystems and topographies, crossing the peninsula from East to West, from the sacred mountain of Keumsangang to the delta of the Han and Imjin Rivers, traversing five rivers and many ecosystems.

### **The DMZ: A Highly Militarized Red Zone and a Deep Green Garden of Eden**

The DMZ is considered as one of the most dangerous and highly militarized borders in the world. This bright red zone is also a deep shade of green.<sup>1</sup> Embodying the dichotomy of the boundary as the ‘space of the worst and the best’, the DMZ has been described as a Garden of Eden, a Walled-off Paradise, or an Involuntary Park, in reference to the untamed nature that has developed within the cease-fire lines and in the adjacent military areas. The de-territorializing forces of war – destruction, deforestation, mining, human loss, – have also engendered the re-territorializations of nature, transforming the DMZ into a precious reserve of biodiversity in the rapidly expanding and urbanizing context of the Korean Peninsula. As an example, one-third of all red-crowned cranes, the world’s rarest crane species, depend on the DMZ’s wetlands and nearby agricultural fields while

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<sup>1</sup>The authors make reference to Deep Ecology, a holistic philosophy that emphasizes the importance of the ecosystem and natural processes. See Naess and Rothenberg (1990). See also Sessions (1995).



**Fig. 15.1** Map of the Korean Demilitarized Zone (DMZ) showing the Military Demarcation Line (MDL) and the civilian control areas (Represented for the Republic of Korea only) (Map: Kwi-Gon Kim)

migrating. These positive developments have been confirmed by an international coalition of scientists, activists and peace-builders, and research has identified over 1,200 plant, 50 mammal, 80 fish, and hundreds of bird species, many of which are on the International Union for Conservation of Nature Red List of endangered species (Kim and Cho 2005, Fig. 15.1).

**An Ecological Matrix for a Future Landscape of Memory**

A future reconciliation between the two Koreas would undoubtedly threaten the fragile ecosystems and endangered species of the DMZ, as a result of disruptions to the landscape brought about by construction and other development linking the North and the South. This is why it is important that the DMZ be recognized and planned as a specific and singular territory – ensuring that future scenarios will respect the natural balance of the site – through a series of pre-unification strategies that will establish an ecological matrix as the foundation for future plans.

Future visions for the DMZ integrate historical and memorial sites relating to the recent and more distant pasts of the peninsula, including the unexcavated site of



Gungye's Kingdom, Korea's first capital city and a highly symbolic locus for a unified Korea, as well as sites of commemoration to the many Korean and international victims of the Korean War and Cold War. The five rivers that cross the boundary as well as the wetlands enclaved in the DMZ will be integrated into landscape and environmental planning to form the backbone of a conservation scheme for the DMZ. Ecotourism and organic farming projects will ensure sustainable economic activities compatible with nature preservation and ecosystem conservation. The patrol path that runs along the entire length of the DMZ will become the connector of all these landscapes, creating a Memory and Nature Trail for bicycles, pedestrians and low impact vehicles (Grichting 2009).

### **Wetlands and Sacred Cranes: A Joint Project for Conservation in the DMZ**

Research conducted in the DMZ has confirmed the ecological values of this red zone. Today, a number of governmental and non-governmental organizations are working on the project to transform the DMZ into a natural Peace Park, attempting to reunite the two countries along what is left of their common natural heritage and to ensure that future scenarios will respect the natural balance of the site.

We have founded the DMZ International Research Institute to conduct demonstration projects between North and South Korea. Our first project attempts to bring together the two Koreas to designate a wetland as a UNESCO Transboundary Man and Biosphere Reserve (Fig. 15.2).

Wetlands provide habitat for endangered migratory bird species, such as the red-crowned and white-naped cranes. The crane has both a biological and cultural importance within Asia; it is considered a sacred bird of peace that is accompanied



**Fig. 15.2** Wetland in the DMZ (Photo: Kwi-Gon Kim)



**Fig. 15.3** White-naped cranes in the Korean DMZ Civilian Control Area – Cholwon Plains (Photo: Anna Grichting 2009)

by prosperity and friendship. Therefore it could become an important flagship species and a symbol of peace for both North and South Koreans (Fig. 15.3).

This greening in the red zone project, based on scientific research and institutional collaborations, could become a prototype for further scientific and cultural collaborations in the DMZ. Our vision is that it will result in a common landscape of memory and biodiversity that helps foster reconciliation and reunification of a once divided Korean peninsula.

## References

- Naess, A., & Rothenberg, D. (1990). *Ecology, community, and lifestyle: Outline of an ecosophy*. Cambridge/New York: Cambridge University Press.
- Sessions, G. (1995). *Deep ecology for the twenty-first century*. Boston/New York: Shambhala/ Distributed in the United States by Random House.
- Kim, K.-G., & Cho, D.-G. (2005). Status and ecological resource value of the Republic of Korea's De-militarized zone. *Landscape and Ecological Engineering*, 1(1), 3–15.
- Grichting, A. (2009). The Korea DMZ. A ready-made paradise park or a laboratory of ecological planning? *SPACE Magazine*, 494, 16–21.

# Chapter 16

## Green Zones from Above and Below: A Retrospective and Cautionary Tale

Charles Geisler

**Abstract** This chapter acknowledges the antipodal nature of red and green zones while cautioning against casting green zones as a uniform response to human or ‘natural’ disturbances. Land allotments for gardening and farming are staple green zone behaviors and have deep historical roots. Carefully considered, these roots reveal that green zones originate from above, as social control, as well as from below to protect citizens and subjects against state misadventures, industrial dystopias, land enclosures, and environmental crises. The chapter seeks to show that green zone land policies can be top-down or bottom-up, are historically contingent, and will continue to evolve and hybridize as they have done in the past.

**Keywords** Homesteading • Military allotments • Resistance • Green zones • Anarchism

*Sociologist Charles Geisler provokes us to place ‘green zone’ and red zone movements in a historical context, dating back from the Roman Empire, which used land allotments to garner loyalty as part of its expansionist policies, and continuing up to nineteenth century British and twentieth century American back-to-the-land movements as a response to rampant industrialization. He shows how green zones can originate from above, as social control, and from below as attempts to protect citizens and subjects against industrial dystopias and environmental crises.*

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C. Geisler (✉)

Department of Development Sociology, College of Agriculture and Life Sciences, Cornell University, 237 Warren Hall, Ithaca, NY 14853, USA  
e-mail: ccg2@cornell.edu

## Introduction

To a large extent, red zones and green zones are antipodal. The former refers to places characterized by danger and disturbance in the aftermath of disasters, war, or accumulating unsustainable lifestyles. In the latter, people struggle to create ‘green’ niches of resistance and resilience. They are informed by biophilia and commitments to self-sufficiency and sustainability. Today, green zone constituents regard land as a capital resource that, with wise management, can generate ‘interest’, meet basic needs and aesthetics, and protect them against dangers and excesses of the red zone. Homesteading, broadly understood, might be thought of as a green zone experiment and a response to social crisis. This chapter will consider homesteading over several historical periods with the goal of more fully appreciating the different forms and meanings of ‘back to the land’ green zones.

A year or two ago a friend working with immigrants in Toronto told me of a man who arrived from Eastern Europe with only the proverbial clothes on his back. With much determination he set about looking for a small amount of land to garden. The clothes on his back, it happened, were his key to survival. Prior to leaving his homeland he sewed familiar seeds into his garment hems as an insurance policy. If all else failed, he intended to plant this modest collection of seeds in the patch of land, gambling that Toronto’s rain and sun would invigorate his small green zone. The lesson here, seemingly about perseverance, is about survival in alien places. Immigrants and other vulnerable people across the globe have warded off the slings and arrows of adversity by returning to the soil in these all but invisible ways.

Useful as such examples are, they perhaps dull critical inquiry into where green zone activism originated and to what ends. What we label ‘green zone’ may have significant variability and come from elites complicit in red zone activity and adept at social control. Or green zones may arise from below, from victims or reformers committed to transforming red zone control and hegemony. Using homesteading as a green zone analogue, I review four distinct historical cases in which land allotments ‘green the red zone’, sometimes from above and sometimes from below. The first two—the late Roman Empire and the post-Westphalian era of nation-building—showcase homesteading as social control; the latter two are responses to capitalism, both its early industrial dystopia form and its later, much celebrated ‘Fordist’ variation. In each era, land becomes a shield against calamity—empire overextension, nation-state insolvency in war time, and urban squalor and alienation associated with burgeoning capitalism. In each instance large populations are allotted land on which to settle and live. The first two examples are decidedly top-down—elites making land concessions to placate masses and avert social disorder. The latter two chronicle a more complicated restructuring of society-nature relations and, as we shall see, force us to think beyond the top-down, bottom-up simplification with which we started.

## Homeland Security, Roman Style

Not infrequently accounts of societal evolution contain homesteading narratives. In the grand narrative of post-Pleistocene survival, nomadic people surviving the ice-age find sedentary life-ways that include crop domestication and primitive private property (North and Thomas 1973). As these settlements spawn surpluses and a complex division of labor, subsets of the population are weaned from agriculture and construct ever more complex settlements. Civilized life comes eventually to mean city life; to remain rural is to be a rube or rustic. And so, in much western thought, homesteading and farming are a point of departure, of initial surplus generation, and of eventual accumulation. Modernization becomes indexed by the proportion of people clustered in cities and divorced from the toils of the countryside.

Yet this recurring narrative is inattentive to existential crises (and red zone inclinations) of the metropolis in history (Wallerstein 1983). A telling example is Roman civilization which, during the Republic, experienced its share of urban problems and concentration in ownership and, during the Empire, outgrew its ability to police its growing realm.<sup>1</sup> The *Imperium Romanum* eventually grew to 6.5 million km<sup>2</sup>, the protection of which eventually fell to military generals whose legions were being reduced (Goldsworthy 2003). The wisdom of these reductions was tested in the year 9 AD, when Germanic tribes annihilated the Romans in the Battle of the Teutoburg Forest and unleashed an internal crisis in governance. Thereafter, Rome rebuilt its legions using land allotments as a lure.<sup>2</sup> Land allotments in the provinces were an important tool of frontier pacification and integration—intentional social control. The crisis of homeland overextension was met with a homesteading solution calculated to re-secure the Empire (Weber 1947).

So the green zone logic is more complicated than it might seem. In times of crisis Rome used a land allotment strategy to settle, sedentarize, and pacify the frayed edges of its realm. In the process, it assimilated certain Germanic adversaries and established land as an early cornerstone in treaties and social contracts. It was a logic that would evolve further in feudal and post-feudal Europe.

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<sup>1</sup>Though some commoners held land during the Republic, much of it passed into patrician hands. Roman elites also usurped public lands, causing further tensions between the two classes and eventual civil war in the last century of the Republic (Hopkins 1978).

<sup>2</sup>Max Weber wrote his doctoral thesis at the University of Berlin on Roman agrarian law and land policy in the Empire, exploring Rome's strategy to use land surveys and ownership opportunities to stabilize peripheral areas (Weber 1891). Inspiration for this thesis came in part from August Meitzen (see Roth and Wittich 1978: 3).

## Land as Green Gold for Soldiers

Land allotments for military service, an emergency measure in the late Roman Empire, would become a hallmark of European feudalism. The Roman practice of *commendation* was an early version of knighthood wherein a Roman soldier gave himself to a superior officer or liege-lord, promising service in return for support in the form of a land allotment known as a *benefice*, complete with serfs (Ganshof 1964). In return, each warrior would use the land to empower himself and elevate his status, until he himself had retainers with fealty to him. Thus, feudalism grew on itself, devouring land to support a military pyramid that survived thanks to reciprocal responsibilities and layers of expanding land allotments.<sup>3</sup>

Feudalism was decidedly top-down, resting on the hierarchical control of subjects through complex land obligations—a hive of self-sufficient ‘green zones’ consisting of castles and commons, knights obedient to a lord, and serfs working the lord’s lands. Its land needs produced constant skirmishes and protracted wars. Life happened behind walls in villages and on fortified homesteads; cities tended to be trade centers and were less of a ‘red zone’ than were the menacing nobles of neighboring kingdoms.

This changed markedly in the Seventeenth Century. The Treaty of Westphalia in 1648 ended the 30 Years War, the Holy Roman Empire, and much of the architecture of feudalism. Governance shifted to state-centric rule and monarchies began their decline. Yet the land-for-service customs of feudalism died slowly. The states that emerged from Westphalia often compensated their militias and officers with bounty lands seized in military campaigns (Bockstruck 1996, 2007). Land and spoils were an inducement for armies to dispossess other nations and homestead their lands (Tilly 1985). Though such ‘green zone’ instigation came from above, in the absence of victory, states released crown or public lands at home to pay their armies, thus avoiding disaffection or mutiny.

*Quid pro quo* land arrangements of this sort found their way into both British and American history in the New World. From Nova Scotia to Florida, the British Crown awarded land to approximately 6,500 soldiers and sailors for service in its colonial wars. Grants of land were generally made on the basis of rank and at times sparked migrations (when veterans’ allotments were in distant colonies). After losing its American colonies, Britain established the Swan River Colony in Australia in 1829, and used land grants to attract military and non-military settlers alike (Appleyard and Manford 1979). Settlers were granted land in proportion to their assets and labor potential; full title was often withheld until they had sufficiently ‘improved’ their allotment and created a revenue base for colonial administrators. Starting in 1803 in Tasmania, land allotments were given to free settlers, convicts whose sentences were completed, and military personnel in such places as Sullivan’s Cove, Hobart Town, Port Dalrymple and Launceston.<sup>4</sup>

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<sup>3</sup> <http://historymedren.about.com/cs/knightsarmor/a/kl2origins.htm>

<sup>4</sup> The Tasmanian Archive and Heritage Office holds indexes for these early land grants (see <http://www.statelibrary.tas.gov.au/familyhistory/fillinggaps/land>).

With its vast endowment of frontier lands in North America, the United States established military districts as land banks from which to pay officers and soldiers of the Revolutionary War. Connecticut, the Carolinas, Virginia, Rhode Island, Georgia, and New York all met their war debts to soldiers through military bounty lands (Orfield 1915). The first Continental Congress framed the federal government's land disposal policies within the Articles of Confederation and the Land Ordinance of 1785, and in 1796 Congress provided 2.5 million acres for veteran settlement.<sup>5</sup> The parallel between American handling of land on contested frontiers and that of the late Roman Empire was probably not accidental. Jefferson read widely about Roman land survey and allotment practices in their *Imperium* during his ambassadorship to France in 1784 and may well have imported this crisis management strategy—the new nation was deeply in debt after the Revolution—into US law upon his return (Marschner 1959; Kennedy 2003). Military districts were later used in Minnesota and Illinois to accommodate the land needs of soldiers following the War of 1812 (Chenoweth and Semonis 1992).

As late as World War I nations continued to use land allotments as an enticement to would-be soldiers. But by now the red-green complexion had begun to change and, perhaps because of the bottom-up green zone agitation rippling across Europe (more on this below), allotments were becoming a means of pushing back, especially when those allotted land had military training. For example, in 1916 Britain passed the Gifts for Land Settlement Act for Scots volunteering to serve in His Majesty's Forces against Germany. The urgency of such a law was heightened by persisting agitation for land reform in the Highlands (Leneman 1989). The government's commitment slowed following the war, however, in part because promised allotments were to come from large estates. Yet when war veterans protested, reminding the government that they had experience with weapons, the government complied. Between 1915 and 1930 some 3,600 new holdings were created in Scotland for veterans (Mather 1978; Leneman 1989). In the United States land allotments for military service all but ceased in the twentieth century, though the GI Bill of 1944 (granting World War II veterans mortgage subsidies) was a stepchild of earlier allotment policies.

The lens of history, then, suggests that green zones have often been mobilized from above for reasons of social control, land allotments being a relevant and recurrent tool. For the Romans and their successors, such land policy and military expansion went hand-in-hand. In bestowing land to soldiers, knights, and veterans, elites got allegiance, new recruits, and the spoils of war. Those receiving land got sustenance, protection, new rights to the realm, and land for their heirs. Land allotments were more instrumental than aesthetic, more linked to control from above than to agitation from below, and largely unrelated to biophilia and conservation as we currently understand these terms.<sup>6</sup> This was soon to change, however, with the spread

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<sup>5</sup> <http://www.ohiohistorycentral.org/entry.php?rec=1312>

<sup>6</sup> If Simon Schama (1995) is correct, the Romans associated the German tribes—their esteemed but mortal enemies—with nature and forest and viewed them as all the more barbarian for it.

of the urban-industrial capitalism. In the hands of artisans, laborers, and civil society organizations awakening to the value of forests, soil, water, open space, and plants and animals green zone dynamics would take a profound new turn.

## Land Is the People's Farm

Late eighteenth century Britain bore witness to yet another 'army' yearning for land and born of expanding industrialization and proletarianization. Time and again, working people and their bourgeoisie spokespersons (including capitalists such as Robert Owen and Henry Ford) proffered new community blueprints that combined 'factories and fields'. Land allotments were organic to these blueprints. Now the red zone became the factory floor, the squalid city, and the scarred environment. From its inception, the industrial revolution and related enclosures of rural landscapes were reproached by poets, artists, and intellectuals lamenting the disappearance of nature and the alienation of working people. Green zone allotments became the grail of the artisans, proletarians, and those dispossessed of their landed birthrights. Their land reform prophets included William Godwin and William Morris, Robert Owen and Thomas Spence, Peter Kropotkin and George Henry Evans, and their followers extended to Chartists, Zionists, utopians, and social engineers of many descriptions (Sakolski 1957).

In contrast to the top-down resettlement schemes granting homesteads to soldiers, these 'factory in the fields' proposals tended to be bottom-up, self-styled, and deeply normative—questing for the moral economy of an Edenic past. Their advocates shared communitarian visions of horticultural-industrial harmony in which artisans and working people met their creature needs through a factory system interspersed with gardens and farms. This back-to-the-land crusade had complicated roots. Early factory sites, many of which were in cities, produced brown-fields with tragic social consequences.<sup>7</sup> Commentators of the era noted the high incidence of cholera, urban epidemics, and poor nutrition. Factory smoke and smog assaulted public health and prevented adequate intake of vitamin D. Noting that the working man was 'most sadly cheated of his fair proportions', Gaskell (1833: 161–62) wrote that London inhabitants were of lower height and stature than their country counterparts by several inches, in part due to bowing of their legs. Such diagnoses caused due alarm and gave reformers a new logic for urban exodus. Gould (1988: 5) summaries these urban-rural tensions:

The rise of London pointed up the contrast between town and country in Britain more clearly than ever. It was widely held that the sense of social responsibility found in the country was absent in the metropolis. It was commonly regarded as a place of debauchery

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<sup>7</sup> Of the many depictions of this era, few capture it better than the British-Irish author, Oliver Goldsmith in these words in *The Deserted Village* (1770): 'Ill fares the land, to hast'ning ills a prey, where wealth accumulates, and men decay'.



and danger. The view that London existed primarily as a place of the rich for luxury and entertainment and as a commercial centre that produced little of tangible benefit was reflected in William Cobbett's accusation that London was the 'great Wen'. Friedrich Engels drew attention to some of the more pleasant aspects of rural life: permanent settlement, leisure for healthful work in garden and field, recreation and games.

The idea that self-reliant small-plot farming was a defense against squalor was eloquently articulated by Thomas Spence, who moved to London as industrialism was unfolding. More than once Spence would go to prison for his radical postulations, among them the principle that 'the land is the people's farm'. Though an advocate of land nationalization (Rudkin [1927]1966), Spence viewed the local parish in green zone terms—the potential embodiment of democracy and an arena for social ownership and reform. The parish itself would become the 'landlord' and its lands would be equally divided among parishioners, with rents to cover maintenance and defense. This national blueprint, which Spence immodestly christened 'Spenconia', gained such traction among commoners that in 1817 the government passed an Act of Parliament suppressing Spencean societies as conspiratorial (Dickinson 1982).

Within a generation, similar thrusts 'from below' produced the Chartist Co-operative Land Society, a legacy of Spence, Godwin, and other reformers (Goodway 1982). The Chartists proposed agricultural allotments for urban laborers sick of fetid hovels and unemployment. At its height, the plan had 70,000 subscribers and 600 branches across England (Walton 1999). Energized by the ideas of Fergus O'Connor, the Society generated the National Land Company and a proposal that the government establish 40 estates totaling 20,000 acres (5,000 families with 4-acre allotments each) that in time would multiply across the whole of England (Chase 1988). This was not to be. Among other reasons, socialist supporters were internally divided over the allotment plan (some viewed back-to-the-land as archaic), non-socialists threw their support to private tenure alternatives, and still other reformers redefined 'the land question' as fundamentally a tenancy or taxation issue (Gould 1988).

Late in the nineteenth century green zone leadership passed to William Morris and his critique of urban-industrial culture. Morris, whose thinking about *refugia* for artisans and workers was influenced by Ruskin, saw artisans as the soul of humanity and the guardians of art-in-nature (Gould 1988). His contempt for urban existence was clear in his attacks on both capitalism and parliamentary democracy ('dung heaps'). Like Edward Carpenter, whom he much admired, Morris developed a quasi-religious attachment to artisan communities where poetry, art, and architecture would nourish enlightened design and human fraternity (Goodway 2006). Though his land-based experiment near Sheffield, England (a guild in which simplicity and human labor were valued over complexity and steam power) was a disappointment, he forged ties between socialists and anarchists, thus inflecting green zones of the day with hues of red and black.

Although Morris personally rejected anarchism, he valued and disseminated the writings of Peter Kropotkin and thereby influenced the land ideas of urban reformers such as Ebenezer Howard, Patrick Geddes, and Lewis Mumford. Kropotkin's

*Fields, Factories and Workshops* (1888/1912) and *The Conquest of Bread* (1907) were landmark texts among anarchists and many others. In the introduction to the former, Kropotkin states that people show their best ideas when they have joint pursuits in farms, factories, workshops, and studios, instead of any one of these (Girardet 1976; Payne 2000: 50). His emphasis on radically localized social organization with a significant reliance on land evoked a practical harmony between town/country, work/leisure, discipline/autonomy, and production/consumption. One can only marvel at Kropotkin's synthetic abilities, his premonition of ecological modernization applied to small farms,<sup>8</sup> and his pervasive influence on contemporary social planning and decentralized land use planning.

Ebenezer Howard, an intellectual son and soul-mate of Kropotkin, took green zone thinking to new levels of respectability. He was known for his seminal contributions to the garden city movement and his bridging role between centuries and continents (Britain and United States). A land allotment experience in his early life marked his later thinking. Howard was born in 1850 in Britain and emigrated to Nebraska at 21 to try his hand at homesteading.<sup>9</sup> While in the US, he read and then met both Whitman and Emerson. Once again in England, Howard set about imagining ways in which cities could escape their modernist contradictions and revealed his answer in a single text in 1902: *To-Morrow: A Peaceful Path to Real Reform* (later re-titled, *Garden Cities of To-morrow*). Echoing others, he wrote that the answer to slums and their social pathologies was the beauty, health, and low rents of rural living and that such existence could be brought to urban edges through urban design interventions. Howard integrated these amenities in his famous *Three Magnets* imagery and operationalized them in his well-known spherical landscape plan for society.

Howard also depoliticized what for two centuries had been a self-conscious resistance movement to land (mis)use and industrial dystopia. Former enclaves of green resistance now became suburbs with meticulous planning, density guidelines, municipally-owned agricultural belts, and decentralized management (Howard 1965). They were environmentally precocious: green zone lands ('green belts') would receive and recycle the organic refuse from elsewhere in the suburb; each garden city would determine the mix of large or small allotments and their ownership—cooperative, corporate, or individual. Garden city thinking infected green belt planning laws in England after World War II, influenced planning curricula

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<sup>8</sup>To these ends Kropotkin advocated irrigation and growing under glass to boost local food production ability. Today, his work has a progressive ring in its critique of industrial reliance on fossil fuels and the need for clean energy alternatives.

<sup>9</sup>Space does not allow treatment of the Free Soil and Homestead movements in the United States nor the great debates about the western frontier as a safety valve for the eastern working class—an image made famous by Frederick Jackson Turner in his famous paper read in Chicago in 1893 (Turner 1920). At base, this continental campaign by labor, abolitionists, nationalists and others was a protest against slavery, both racially and occupationally defined. The role played by working mechanics such as George Henry Evans and journalists such as Horace Greeley is astutely summarized in Zahler (1941).

world-wide, and, with some modifications, found suburban expression in the United States, Argentina, Australia, Canada, and Israel. Such institutionalization signaled broad social acceptance, green zone professionalization, and a blurring of the lines between top-down and bottom-up green zone directionality.

Among the people captivated by Howard's vision in the twentieth century was Henry Ford. Chastened by the recession of 1920, Ford rededicated himself to an earlier dream of harmonizing industry and agriculture, famously saying: 'When it comes to sustaining life we go the fields. With one foot in agriculture and the other in industry, America is safe' (Grandin 2009: 58). Like Morris, Kropotkin, Howard and others, Ford believed that returning to the land would solve urban poverty problems and set about establishing a model town in Michigan (Greenfield) and another in the Brazilian Amazon State of Para (Fordlandia). Unlike the communities and garden enclaves of his predecessors, both communities were company towns run by professionals chosen autocratically by Ford. Both communities were financially whiplashed by the Great Depression and their patron's revulsion for the New Deal. But both incorporated gardening and enthroned the belief that working the land was ennobling and ultimately the solution to urban decay.

This brief chapter leaves untold many additional 'back-to-the-land' episodes wherein the interests from above and below mixed, evolved, and energized a 'revolutionary middle' in society—educators, local governments, professional planners and lawyers, nongovernmental volunteers, and other catalysts for greening the red zone. The heterogeneity is intriguing, extending to nineteenth century Zionists seeking a homeland, to members of groups dedicated to saving nature, and eventually to military strategists seeking 'green zone' safe-havens in war zones. Besides their high profile community experiments, Howard and Ford promoted school curricula that incorporated their integrative visions; the latter gave his employees garden plots, created a private Garden Education Service, and sponsored home garden competitions among his employees (Booton 1970; Grandin 2009). In the aftermath of World War II, as rubber production shifted to Asian plantations and non-plantation synthetics, Ford withdrew from Fordlandia and granted severance pay to its Brazilian workforce. Though an abrupt ending to his famous project, the workers there survived for years on their subsistence plots (Grandin 2009: 335), a testimonial to the sustained buffering green zones can offer in the face of capital flight.

## Conclusion

This chapter has construed land allotments and related back-to-the-land impulses as an abiding expression of green zones. The antipodes of red and green zones, useful in thinking about social and environmental resilience today, have a complicated, non-linear history. This longer view suggests that green zones are not a uniform response to human or 'natural' disturbances, and at times have originated from above in pursuit of social order and control. The rise of capitalism and industrial dystopia seems to have changed this agenda. In recent centuries green zone activism

has migrated from the hands of elites to those of reformers who see land policies in liberatory terms. By the nineteenth century, ‘land as the people’s farm’ became a shorthand for resisting modernity, particularly high urban-industrialism with its heavy tolls on human and natural communities.

Clearly, the red zone-green zone dialectic is fluid and evolving. It can be top-down or bottom up, the dominance of one over the other being historically contingent. And at times the two intertwine, mediated by groups and forces that are neither subaltern nor elite. Green zone proponents must guard against thinking that the era of social control and manipulation from above is a relic of history. At least when construed as land allotments, attempts by red zone managers to orchestrate the green zone are on-going and ever-present.

## References

- Appleyard, R. T., & Manford, T. (1979). *The beginning: European discovery and early settlement of Swan River Western Australia*. Nedlands: University of Western Australia Press.
- Bockstruck, L. D. (1996). *Revolutionary war bounty land grants awarded by state governments*. Baltimore: Genealogical Publishing Co.
- Bockstruck, L. D. (2007). *Bounty and donation land grants in British colonial America*. Baltimore: Genealogical Pub Co.
- Booton, H. (1970). *Ford: An unconventional biography of the men and their times*. London: Cassell.
- Chase, M. (1988). *The people’s farm. English radical agrarianism, 1775–1840*. Oxford: Clarendon.
- Chenoweth, R., & Semonis, S. W. (1992). *The history of McDonough county, Illinois*. Dallas: Curtis Media Corp.
- Dickinson, H. T. (Ed.). (1982). *The political work of Thomas Spence*. Newcastle Upon Tyne: Avero Publications, Ltd.
- Ganshof, F. L. (1964). *Feudalism*. Toronto: University of Toronto Press.
- Gaskell, P. (1833). *The manufacturing population of England*. London: Baldwin and Cradock.
- Girardet, H. (1976). *Land for the people*. London: Crescent Books.
- Goldsworthy, A. (2003). *The complete Roman army*. London: Thames and Hudson.
- Goodway, D. (1982). *London Chartism 1838–1848*. London: Cambridge University Press.
- Goodway, D. (2006). *Anarchist seeds beneath the snow: Left libertarian thought and English writers from William Morris to Colin Ward*. Liverpool: Liverpool University Press.
- Gould, P. (1988). *Early green politics: Back to nature, back to the land, and socialism in Britain 1880–1900*. New York: St. Martin’s Press.
- Grandin, G. (2009). *Fordlandia: The rise and fall of Henry Ford’s forgotten jungle city*. New York: Metropolitan Books.
- Hopkins, K. (1978). *Conquerors and slaves*. Cambridge: Cambridge University Press.
- Howard, E. (1965). *Garden cities of to-morrow*. Cambridge, MA: MIT Press.
- Kennedy, R. G. (2003). *Mr. Jefferson’s lost cause*. Oxford: Oxford University Press.
- Kropotkin, P. (1888/1912). *Fields, factories, and workshops*. New York: Harper Torchbooks.
- Kropotkin, P. (1907). *The conquest of bread*. New York: G.P. Putnam’s Sons.
- Leneman, L. (1989). *Fit for heroes?: Land settlement in Scotland after World War I*. Aberdeen: Aberdeen University Press.
- Marschner, F. J. (1959). *Land use and its patterns in the United States* (Agricultural handbook, no. 153). Washington, DC: USDA.

- Mather, A. S. (1978). *State-aided land settlement in Scotland*. Aberdeen: University of Aberdeen Press.
- North, D., & Thomas, R. P. (1973). *The rise of the western world*. London: Cambridge University Press.
- Orfield, M. N. (1915). *Federal land grants to the states: With special reference to Minnesota*. Minneapolis: Bulletin of the University of Minnesota.
- Payne, L. (2000). *Uncivil movements: The armed right wing and democracy in Latin America*. Baltimore, MD: John Hopkins University Press.
- Roth, G., & Wittich, C. (1978). *Max Weber: Economy and society. An outline of interpretive sociology*. Berkeley: University of California Press.
- Rudkin, O. D. ([1927]1966). *Thomas Spence and his connections*. London: Kelly.
- Sakolski, A. (1957). *Land tenure and land taxation in America*. New York: Robert Schalkenbach Foundation.
- Schama, S. (1995). *Landscape and memory*. New York: A.A. Knopf.
- Special feature: The greening of Homeland Security. (2009, October). *Homeland Security Today*, 16(10), 25–29.
- Tilly, C. (1985). War making and state making as organized crime. In P. Evans, D. Reuschmeyer, & T. Skocpol (Eds.), *Bringing the state back in* (pp. 25–39). Cambridge: Cambridge University Press.
- Turner, F. J. (1920). *The frontier in American history*. New York: Henry Holt & Co.
- Wallerstein, E. (1983). Nationalism and the world transition to socialism: Is there a crisis? *Third World Quarterly*, 5(1), 95–102.
- Walton, J. K. (1999). *Chartism*. London: Routledge.
- Weber, M. (1891). *Roman agrarian history* (trans: Frank, R.I.). Claremont: Regina Books.
- Weber, M. (1947). *The theory of social and economic organization*. Oxford/New York: Free Press.
- Zahler, H. A. (1941). *Eastern workingmen and national land policy, 1829–1862*. New York: Columbia University Press.

# Chapter 17

## Reflections on Defiant Gardens: Making Gardens in Wartime

**Kenneth Helphand**

**Abstract** Why is it that in the midst of a war, perhaps the reddest of red zones, one can still find some green, some gardens? Wartime gardens are dramatic examples of defiant gardens—gardens created in extreme social, psychological, political, economic, or cultural conditions. The book *Defiant Gardens: Making Gardens in Wartime* (San Antonio: Trinity University Press 2006) examined gardens of war in the twentieth century—including gardens soldiers built inside and behind the trenches in World War I; gardens built in the Warsaw and other ghettos under the Nazis during World War II; gardens in the Prisoner of War (POW) and civilian internment camps of both world wars; and gardens created by Japanese Americans held at US internment camps during World War II. The commonplace but profound meanings and experience of the garden are magnified in wartime. War gardens domesticate and humanize dehumanized situations. They offer a rejection of suffering and are an inherent affirmation and sign of human perseverance. They assert the dignity of life, human and nonhuman, and celebrate it. *Defiant Gardens* brought to light a history that has never been studied and moving stories never before told. This chapter includes stories the author encountered since the book's publication, including gardens made by soldiers in Vietnam, squatters in settlements in Colombia, soldiers and civilians in Iraq and Afghanistan, prisoners in the United States, and the winner of the Bronze Star for gardening during World War II. *Defiant Gardens* has inspired projects for military families and veterans and by artists, designers and performers, demonstrating the power of greening in the red zone.

**Keywords** Garden • War • Defiance • Hope • Ghetto

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K. Helphand (✉)  
Department of Landscape Architecture, University of Oregon,  
Eugene, OR 97405, USA  
e-mail: Helphand@uoregon.edu

*We asked landscape architect Kenneth Helphand to share with us in essay form his experiences and the response he has received to his groundbreaking and award-winning book *Defiant Gardens*. The following reflects the author's personal journey through the defiant gardens and among the defiant gardeners that have come to light since the release of his book, bringing a unique perspective to the notion of greening in the red zone. Portions of this essay are adapted from material found in the book *Defiant Gardens: Making Gardens in Wartime* and in an article in *Sightlines 2010*, and appear with permission from the respective publishers.*

Why is it that in the midst of a war, perhaps the reddest of red zones, one can still find some green, some gardens? Wartime gardens are dramatic examples of what I call *defiant gardens*—gardens created in extreme social, psychological, political, economic, or cultural conditions. Psychologists and philosophers learn about human behavior by examining people in extreme circumstances of deprivation and hardship. In the same way, gardens in extreme situations may reveal essential aspects of garden character and ideology. Gardens are always defined by their context. Perhaps the more difficult the context, the more accentuated the meaning. The book *Defiant Gardens: Making Gardens in Wartime* (Helphand 2006) examines gardens of war in the twentieth century—a period of the deadliest wars in human history—including gardens soldiers built inside and behind the trenches in World War I; gardens created in the Warsaw and other ghettos under the Nazis during World War II; gardens in the prisoner-of-war (POW) and civilian internment camps of both world wars; and gardens created by Japanese Americans held at US internment camps during World War II.

The garden's hidden or repressed possibilities may emerge in extreme situations. In a sense, the garden assumes a character or even responsibilities we didn't imagine it had but that it is willing to bear under extraordinary circumstances. In defiant situations, humans display a surprising resourcefulness in garden design and function, in formal arrangement, and in the appropriation of, gathering, and use of materials. Recognition of our own creativity under adverse conditions heightens our satisfaction in being in such a garden. As we know, the seeds of certain plants will germinate only when exposed to the heat of fire. The horrible inhumane conditions of the trenches of the Western Front, ghettos, and internment and POW camps that unlocked something dormant, allowing it to sprout as a defiant garden, are analogous to botany's fire-triggered seed germination. Defiant gardens can be of any scale, from that of a window box to a valley. The life span of most are short, but their duration is not at all proportional to their meaning. In fact, their brief life spans may magnify their significance.

Gardens embody a paradox. We associate gardens with nature, but they are a manifestation of human dominion over the natural world. Garden writer Henry Mitchell explains the inherent temerity that is required of all gardeners, these people who wrestle with weather, soil, and pestilence to make something grow. 'Defiance', he says, 'is what makes gardeners' (Mitchell 1981). In an extreme situation beyond an individual's control, such as is common during war, the

**Table 17.1** Wartime gardens accentuate the multiple meanings of gardens. These *five* attributes lie dormant in gardens and await the catalyst that propels them to germinate, allowing us to recognize them as defiant gardens

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- **Life:** As living beings we display biophilia, which E. O. Wilson argues is an indisputable, innate affinity for the natural world and especially for its life forms, flora and fauna. The products of the garden sustain us as both food for our bodies and food for our psyches.
  - **Home:** We have deep attachments to the places we call home. Gardens can be mnemonic devices, conjuring reminders of homes we have inhabited and all the associations we make with home, people, experiences, and history. A garden can be a way of transforming a place into a home, of creating an attachment to a new place and also establishing a connection to our former place.
  - **Work:** Garden is a verb as well as a noun. As both physical and mental labor, garden work can provide the particular sense of identity, dignity and satisfaction that comes from manual labor.
  - **Hope:** Hope is embodied in the temporal dimension and in the seeming miracle of the transformation from seed to plant to fruit, food, flower, and fragrance. Gardens promise beauty where there is none, hope over despair, optimism over pessimism, and finally life in the face of death.
  - **Beauty:** Gardens are beautiful, yet the beauty of the garden may mask its deeper messages. In war, the antithesis of the beautiful, the common garden may become the highest art. As individual soldiers can engage in heroic acts, so can there be heroic gardens and gardeners.
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manifestation of the human ability to wield power over something is a potent reminder of our ability to withstand emotional despair and the forces of chaos. Gardens domesticate and humanize dehumanized situations. They offer a way to reject suffering, an inherent affirmation and sign of human perseverance. In contrast to war, gardens assert the dignity of life, human and nonhuman, and celebrate it (Table 17.1).

Defiant gardens speak to us. They all testify to a depth of garden meaning amplified through hardship, a meaning that may lie latent in all garden creation, awaiting a catalyst to bring it to conscious awareness. *Defiant Gardens* brought to light a history that has never been studied and moving stories never before told. The experience of researching and writing the book was extraordinary, but the reception to the book was far beyond my expectations. Even while doing research at archives such as the Imperial War Museum in London and the US Holocaust Museum and Memorial, when I returned for a second day of investigation I became known as ‘the garden guy’, for heretofore the topic had never been addressed, and the archivists provided hints of where to look and places to visit. The response to the book was from diverse quarters: landscape architects, libraries, horticultural societies, botanic gardens, arboreta, garden writers and radio shows, a testament to the breadth of interest in gardens and their meaning. I have received many letters and emails, and often after lectures about the book an individual has presented me with more material that has only served to validate my conclusions concerning defiant gardens and the centrality of the garden experience.



I continued to hear stories and be told of extraordinary garden exploits. At the North Carolina Arboretum I met Dr. John Creech (1920–2009), a renowned horticulturalist and former Director of the National Arboretum, who shared his story with me. During World War II Captain Creech was captured by the Germans in North Africa. At a POW camp in Poland there was a derelict greenhouse. A fellow prisoner convinced the authorities that Creech should be allowed to refurbish it. They received seeds from the Red Cross and the Royal Horticultural Society and grew food that helped sustain the prisoners. His fellow prisoners nicknamed him ‘Carrot Creech’ and years later one wrote that Creech ‘in his quiet, unselfish, industrious way brought comfort, food, and beauty under the most difficult circumstances to more than 1,500 POWs in their time of depraved imprisonment’. For this effort Captain Creech was awarded the Bronze Star, perhaps the sole American soldier to be decorated for gardening. Right after the war he wrote an article about his experiences for *Better Homes and Gardens* magazine entitled ‘I Gardened for my Life’ (Creech 1946). Another former POW, retired Colonel John E. Olson, gave me a copy of his memoir about his imprisonment experience in the Philippines during World War II. He recounted a litany of camps where he was imprisoned, noting that in each of them the prisoners had created garden plots.

Bill Beardall now lives in North Carolina, but in 1970 he was a helicopter pilot in Vietnam. He sent a photograph of his garden and wrote that during the war he planted a garden at the doorway to his hooch (a Quonset hut used to house soldiers). There he planted bananas, watermelons and periwinkles. The bananas were a reminder of his childhood in Panama, while the colorful periwinkles satisfied his ‘artistic need’ and created a contrast with the omnipresent military olive drab. Of the garden, Beardall said that ‘it had a calming effect on me... after a long day of flying missions in the I Corps area to see a little bit of green growing by my doorway’. He added, ‘As small as it was, it was my oasis. Many a day or late evening I would sit on my ‘patio’ drink a ‘cocktail’ and enjoy the setting of the sun in the West. I could almost block out the medevac choppers going out and the sound of the artillery in the distance. I have never forgotten much from that war and never my oasis. ... Thank you for reminding me that even one small little garden can create a sense of peace and hope in the midst of a war and a warrior’s heart’.

The book included stories of gardens made by soldiers in Iraq and I have continued to receive more images of gardens in Iraq and Afghanistan created by both soldiers and civilians. Tom Denis, a civilian pilot who flew soldiers home from Iraq told me about a ceremony that was performed on many of the flights. ‘The flight attendants on those trips would bring along a strip of sod from America and would lay it on the threshold of the aircraft entry door. As the servicemen boarded the aircraft for their long awaited flight back home from war they were told of this strip of grass upon which they were about to step. It was American soil! The men always smiled and some stepped over it, some planted two feet directly on the strip and others bent down to kiss it. Reactions varied, but this small strip of living, growing, green grass from America had an overpowering effect on each of the men’.

In December 2006, newspapers reported on the remarkable work of Jaafar Hamid al Ali, the parks supervisor of Baghdad whose ‘principle is, for every drop of Iraqi blood, we must plant something green’. Over 30 of his workers have been killed, but he considers them ‘fallen martyrs’ in the struggle to beautify Baghdad (Allam 2006). His workers persist in dangerous districts and report that ‘when we see nobody is around, we run in, plant and escape’ (ibid). He sees their work as a true resistance and that wartime ‘is the right time for flowers’ (ibid). The situation in Iraq has improved and in November of 2009 the *New York Times* reported that nurseries were again doing business and that ‘gardens remain one of the few flourishes of public ornament on Baghdad’s otherwise brown streets, defiant displays of foliage amid concrete blast walls and security checkpoints’. In many areas topiary has become fashionable. The gardens are displays of order and care and reinforce the meanings of garden work. As one worker noted, ‘When you take care of the gardens, you forget the war’ (Leland 2009).

In 2006 during Israel’s war with Hezbollah, rockets reached the northern city of Haifa. I was told that the only people on the street during the first days of the war were the gardeners who woke up to irrigate their gardens, despite the threat of rocket fire.

A mother sent a copy of the book *Defiant Gardens* to her daughter at the Coffee Creek Correctional Facility in Oregon. She reported that the book was an inspiration and that ‘other inmates are lined up to read it after she’s shared passages out loud with them’. She echoed Nelson Mandela’s reflections on his long-term prison experience, ‘To plant a seed, watch it grow, to tend it and then harvest it, offered a simple but enduring satisfaction. The sense of being the custodian of this small patch of earth offered a small taste of freedom’ (Mandela 2006).

The most powerful experiences have been speaking engagements at garden sites where I had done research. I had the opportunity to speak about Ghetto Gardens at two conferences in Germany, one on ‘Jewish Topographies’, the other on ‘Parks and Gardens and the Jewish Community 1933–1945’. I returned to Manzanar in the eastern California desert to speak about gardens created by Japanese-American internees and then walk the site with other conference attendees. In 2008 the grandchildren of internees who had built Manzanar’s remarkable Merritt Park returned to participate in its archeological excavation.

In Bogota and Medellin, Colombia hundreds of persons attended defiant garden presentations at the library and Botanic Garden, where the director made a special point of inviting the garden workers. I was moved and surprised by the profound response to the distant events I described. Then I realized that the audience understood the power of gardens in times of war, because Colombia has been the scene of civil warfare and violence for 40 years. I also met with gardeners in Bogota squatter settlements, who are refugees from violence in the countryside. In the squatter community of San Cristobol de Sur in the hills surrounding Bogota, Señor Luis Antonio Medina proudly showed us his rooftop garden. The garden is replete with plants from his rural upbringing in his native province of Boyaca, which he had left due to the violence in the countryside. His garden is both a reminder of his former home as well as a place of solace and activity in the city. Señor Medina now also works in a community garden project near his home.

In Medellin, I was asked why the kidnapers didn't even allow their victims a garden, a rhetorical question that only served to underscore the kidnapers' cruelty (this was shortly after the rescue of former presidential candidate Ingrid Betancourt from captivity). I could only respond that the United States had not allowed gardens in Guantanamo, although some prisoners are said to have managed to create gardens from seeds gathered at mealtime and produced melons, peppers, and even a miniature lemon tree (paradoxically, the United States reportedly had allowed Saddam Hussein a garden plot.)

Particularly satisfying has been the opportunity to tell stories that might have been lost. I have been privileged to tell inspiring stories and meet remarkable individuals. In my book I had noted that the life of ghetto gardens, like the ghettos themselves and their prisoners, were short lived, but they had still supplied important respites for those around them who were suffering; the brevity of their existence did not lessen their significance. Roman Kent, a survivor of the Lodz Ghetto whose experiences I recounted, attended my talk in Connecticut. I asked him to address the audience and he moved me by saying that yes, the gardens were short lived, but that my book had given them a kind of immortality.

Today, only a few remnants of the Warsaw ghetto's brick walls remain in place, hidden in courtyards and behind parked cars. The wall is not high, but it is a powerful reminder of the basic division of inside and out, and for most persons it was the boundary between death and life. It is the extreme opposite of a garden wall that is intended to circumscribe a paradisiacal and idealized environment. The ghetto wall was an inversion; the other side held at least a potential of life, all that gardens signify. A view out over the wall was a view to hope.

While giving voice to feelings about gardens is incredibly gratifying, inspiring projects is even more fulfilling. In Jefferson County, New York, the site of Fort Drum, a Defiant Gardens project has been established, a collaboration between 4-H clubs with the Cornell Cooperative Extension and local civic organizations involved in restoration and other environmental work, including gardening. The project was instigated by Keith Tidball and Marianne Krasny of the Cornell Civic Ecology Lab (see Krasny et al., Chap. 13, this volume). One of the project goals is to enhance the resiliency of military families and communities dealing with the deployment cycle as well as assisting with reunion and reintegration into the community. The project is building upon the defiant gardens idea that gardens can be sites of assertion and affirmation.

Similar projects have been established elsewhere. At the Veteran's Affairs Medical center in East Orange, New Jersey, a garden produced over 1,000 pounds of vegetables, but equally important has been the therapeutic effect of gardening upon former soldiers (Applebome 2009). The Gardening Leave program at Auchincruive, site of the Scottish Agricultural College, is a horticulture therapy program for those with mental health problems living in veteran's homes, but it is also a place to take a leave, a form of gardening rest and relaxation. George Collins, injured by a roadside bomb in Northern Ireland, says that coming to the garden helps him 'think more clearly...What I really enjoy here is actually doing some physical work, it helps me mentally. It gets the brain to tick over'. There is a symbolic connection as well, for Auchincruive is the site the National Poppy Collection, and in Britain the red poppy is the symbolic reminder of soldiers who died in wartime (Donald 2009).

In September 2009 Colleen Sheehy, the director of the Plains Art Museum, organized a Defiant Gardening Symposium in Fargo, North Dakota, to inaugurate a multi-year project. A dozen writers, artists, landscape architects, and public artists spent several days discussing the concept of defiant gardens, listening to talks about Fargo and its history, and experiencing the dramatic and harsh landscape of the northern Plains. We then toured the city looking for sites for potential defiant gardens projects, which could be proposed—and, hopefully, constructed—in the near future. In addition, a group of students at North Dakota State University under the direction of landscape architecture professor Stevie Famulari came up with their own proposals for defiant gardens in Fargo.

Because I have received so many responses from individuals that I felt should be shared with a wider audience—about everything from the Civil War to the Gulag—I set up a website<sup>1</sup> to collect and communicate this material. The book and the website have also become the subject of numerous blogs written by garden aficionados, urban activists, therapists, and artists. It is a testament to the depth of the meaning of gardens for individuals as places of work and hope, especially in red zones. One blogger wrote:

What I saw, in some of the pictures of these soldiers, and holocaust survivors was our will to exist, our ability to truly grow beauty out of chaos, despair, adversity, and pain. This is grace in action. Why a garden? Why would growing a garden, be an act of defiance? From the depths of these people's hearts, as they were taken to their most primordial essence in light of heinous devilry, as they went into the depth of darkness, as they then looked out from within, they saw clearly the beauty of culture, and the refined reflection of nature, as an expression of the depths of their hearts. The expression of these gardens, the work, the watch, the tending of them, was pure defiance, a need to create beauty from the baseness of unacceptable behavior.

Not surprisingly many bloggers address the defiant gardens concept in the context of community gardening, guerilla gardening, and school gardens programs. They celebrate gardeners' resourcefulness, imagination and creativity as well as the impact of gardens on individuals and communities. The book has even been the subject of sermons.

I have asked myself why *Defiant Gardens* has had this exceptional range of responses and from such diverse quarters? The book articulates deeply felt emotions and feelings that people have about gardens and gardening, but are unable to express. It validates an activity that is too often trivialized, but in fact has profound meaning for those who plant, maintain and even just appreciate gardens. Gardens are alive, they are a connection to home, they embody hope, and they are places of work and the sites of artistry. These are commonplace themes, but the meaning of each is magnified in wartime. Surely the response has also been conditioned by the context of our time; the burgeoning concern for the environment from the most intimate to the grandest scale, a time of economic crisis and the fact that there is a daily diet of war. At this historical moment there is a yearning for optimism in a troubled time, and examples from the past may offer direction, models for action and inspiration for whatever challenges lie ahead.

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<sup>1</sup>[www.defiantgardens.com](http://www.defiantgardens.com)

## References

- Allam, H. (2006, December 26). Gardeners shed blood to beautify Baghdad. *Mercury News*.
- Applebome, P. (2009, November 30). After war, finding peace and calm in a garden. *New York Times*, p. A22.
- Creech, J (1946, October). I gardened for my life. *Better Homes and Gardens*, p. 150.
- Donald, C. (2009, October 18). Gardening leave: Seeds of recovery. *The Sunday Times* (London). [http://www.thesundaytimes.co.uk/sto/style/homes\\_and\\_gardens/gardening/article187478.ece](http://www.thesundaytimes.co.uk/sto/style/homes_and_gardens/gardening/article187478.ece)
- Helphand, K. (2006). *Defiant gardens: Making gardens in wartime*. San Antonio: Trinity University Press.
- Leland, J. (2009, November 1). Fanciful gardens emerge in a City of Tan and Gray. *New York Times*, p. A 14.
- Mandela, N. (2006). *A prisoner in the garden*. New York: Penguin Publishing Group.
- Mitchell, H. (1981). *The essential earthman: Henry Mitchell on gardening*. Bloomington: Indiana University Press.

**Part III**  
**Cases and Practices**

# Chapter 18

## Restoration of the Urban Forests of Tokyo and Hiroshima Following World War II

Sheauchi Cheng and Joe R. McBride

**Abstract** The urban forests of Tokyo and Hiroshima were devastated by American bombing during World War II. Approximately 160 km<sup>2</sup> of Tokyo were burned by more than 100 fire bombings, while an area of 12 km<sup>2</sup> was leveled and burned by one atomic bomb in Hiroshima. Tokyo's street tree population was reduced from 105,000 to approximately 42,000 by the end of the war. In the years immediately following the war, the street tree population dropped to 35,000 in Tokyo due to a combination of further tree mortality and the cutting of trees for fire wood. No estimates of pre-war street tree populations are available for Hiroshima. Examination of pre-and post-atomic bombing photographs of Hiroshima suggests an even higher percentage of the trees in the city were destroyed. Post-war reconstruction of the urban forests of each city developed along different pathways. Plans for the redevelopment of Tokyo were rejected by the general public who wanted a return to pre-war conditions. Few streets were widened to accommodate traffic and allow for new street tree-planting. Plans for new parks were shelved or only partially achieved. Some streets were replanted by private citizens. Initial survival rates of replanting were low. Trees in Tokyo's municipal tree nurseries, which had not been converted to vegetable gardens during the war, were often larger than the optimal size for transplanting, but were used as no other trees were available. A more concerted effort to reconstruct the urban forest came following the 1959 decision to site the 1964 Olympic Games in

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S. Cheng (✉)

Department of Landscape Architecture and Environmental Planning,  
University of California, Berkeley, CA, USA  
e-mail: jrm2@berkeley.edu

J.R. McBride

Department of Landscape Architecture and Environmental Planning,  
and Department of Environmental Science, Policy and Management,  
University of California, Berkeley, 230 Wurster Hall #1820,  
Berkeley, CA 94720-1820, USA  
e-mail: Jrm2@berkeley.edu

Tokyo. Many streets were widened and planted with trees. New tree-lined boulevards were also created. In contrast, Hiroshima sponsored an international competition for the design of a Peace Park and a major tree-lined boulevard. Several wide streets were built with space for street trees. Major plans were also drawn to create greenways along the rivers and to build additional parks. Trees were initially donated by local farmers and nearby towns for planting the parks and the boulevard since municipal tree nurseries had been converted to vegetable gardens during the war. Survival rates were very low due to the rubble content of the soil and difficulties in watering the transplanted trees. Strong support from the mayors of Hiroshima contributed to the success of urban forest reconstruction in Hiroshima. The historical significance of the destruction caused by the first atomic bomb to be dropped on an urban area also contributed to Hiroshima citizens' will to reconstruct both the city and its urban forest. Species and location of trees determined the survival of trees after war in both cities. Species with strong resprouting ability and thick bark survived the bombing and fire. In Tokyo trees located in open areas avoided the fire, while in Hiroshima trees standing behind tall concrete buildings were shielded from radiation and the heat wave. In addition to the difficulties faced during the city-wide replanning process, constraints of urban forest recovery included severe financial restriction, short supply of proper large-sized trees for planting and lack of labor for planting and post-planting tree care. Hiroshima used public participation and community involvement to restore the urban greenery successfully and, until today, has maintained a program to conserve the trees that survived the atomic bomb.

**Keywords** History • Japan • Post war-city planning • Replanting • Trees • Urban forest

*Sheauchi Cheng of the US Department of Agriculture and American forest ecologist Joe McBride compare destruction and rebuilding of the urban forest in Tokyo and Hiroshima after World War II. They note that whereas Tokyo focused more on reconstructing the built environment, Hiroshima, which suffered the immense destruction of the atomic bomb and whose reconstruction became a symbolic rallying point for the Japanese and for the international peace movement, was successfully able to restore and recreate an urban forest. This chapter has been adapted for this book from an earlier version in Urban Forestry and Urban Greening,<sup>1</sup> with permission.*

## Introduction

This study presents a case of greening in the red zone by documenting the restoration of the urban forests of Tokyo and Hiroshima following the destructive bombing of these cities during World War II. The study will contrast the impacts of fire bombing

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in Tokyo with the atomic bombing of Hiroshima on urban forest composition and structure. It will explore the planning processes used in each city for rehabilitation following the war, the replanting of trees, and the management of surviving trees. Information for this study was obtained through library research, review of city-planning documents, discussions with city planners and arborists in Tokyo and Hiroshima, and surveys in both cities to locate and observe the conditions of trees that survived the American bombings in World War II and the characteristics of the reconstructed urban forests.

Cities have been subject to destructive events of both natural and human origin throughout history (Mitchell 1999; Tung 2001; Ockman 2002; Pelling 2003; Vale and Campanella 2005). These events include volcanic eruptions, earthquakes, fires, hurricanes, typhoons, floods, landslides, tsunamis, terrorism, urban riots, and warfare. The nature and extent of the rebuilding of a city after a destructive event has varied with the type of destruction, resources available, and political leadership. The eruption of Vesuvius so completely destroyed the city of Pompeii in 79 AD that no attempt was made to rebuild it. In contrast, the city of St. Pierre on the Island of Martinique was rebuilt after its destruction by the eruption on Mount Pelee in 1902. The rebuilding of cities after natural disasters has not necessarily resulted in improved urban designs. Following the famous London fire in 1666, both Sir Christopher Wren and John Evelyn produced innovative plans for the rebuilding of London. The plans were rejected by Charles II as too extensive and impractical (Waller 2004). Destructive events in the twentieth century have continued to impact urban areas. Regrettably, twentieth century warfare led to levels of urban destruction rivaled by the destruction of cities in the Kwarazmian Empire by Mongol armies in the thirteenth century AD (Weatherford 2004) or the destruction of Atlanta and other southern cities by the Union Army during the American Civil War (Hirshson 1997).

Studies devoted to the rebuilding of cities after both natural and man-made events have focused primarily on urban planning and architecture (Rosen 1986; Bullock 2002; Hein et al. 2003; Vale and Campanella 2005). These works, with the notable exception of the studies presented in this volume, have paid little attention to the reconstruction of urban forests following the destruction of cities, although some works address open space and park planning (Morris 1997). The replacement of portions of urban forests destroyed by either natural or man-made forces has been part of large scale urban rehabilitation plans, and has also involved the actions of individuals in the restoration of trees in both public and private spaces.

The degree to which trees have been destroyed and damaged is dependent upon the nature of the destructive force and the tree species involved. How surviving trees have been treated in the restoration of urban forests has varied with the nature of the disaster, degree of injury to the trees, and the level of urban planning.

The end of the twentieth century and the beginning of the twenty-first century has not seen the end of the destruction of urban areas by natural forces or war. Extensive areas of New Orleans were damaged by winds and flooding resulting in the loss of trees (Nossiter 2005; see also Tidball Chap. 20, this volume). Trees in Sarajevo (Bosnia-Herzegovina), Grozny (Chechnya, Russian Federation) and in cities

in Iraq, Afghanistan, Palestine, and Lebanon have recently been subjected to bombing and artillery fire (see Laćan and McBride, Chap. 22, this volume). It is hoped that this study can identify patterns that can inform the discourse around greening in the red zone and the process of urban forest restoration following the current conflicts in the Middle East and other parts of the world. The results of this study will also be applicable to the restoration of urban forests following destructive natural events.

## The Bombing of Tokyo and Hiroshima

The American aerial bombing of Japanese cities began on April 18, 1942 with an attack on Tokyo known as the Doolittle Raid. The bombs dropped during this raid were conventional bombs, not designed to create urban fires. Once the US forces had captured various Pacific islands close to Japan, they were able to initiate regular bombing raids on Japanese cities without the limits faced in the Doolittle Raid. The development of the B-29 bomber also facilitated bombing of Japan by allowing larger bombs to be carried from greater distances. In 1945 Colonel Curtis LeMay successfully experimented with a low-altitude fire bombing raid. Subsequently, most of Japan's large cities were subjected to intensive fire bombing.

Tokyo suffered about 100 air raids following its first bombing on April 18, 1942. Extensive areas of Tokyo were fire bombed in 1944 and 1945. The most destructive of these occurred on March 10, 1945 when an area of 40 km<sup>2</sup> was burned and approximately 84,000 people were killed (Nagasaki 1998).

The areas burned during the war included parks, shrines, temples, and cemeteries that supported a diverse population of trees, as well as extensive areas of housing, industrial facilities and transportation infrastructure. Many street trees, such as those lining Omotesando Avenue leading to the Meiji Shrine, and countless numbers of trees on private properties in the city were destroyed or damaged during the fire bombing. Estimation based on a 1941 street map (Jinbunsha 2004) of Tokyo showed there were 80 parks, 50 large private estates, 27 shrines/temples, 25 unidentified open spaces, 4 large Imperial properties, 4 cemeteries, 2 military grounds, and 1 nursery within the bombed area. The charred remains of many trees can be seen in photographs taken after fire bombings (Fig. 18.1, Ishikawa 1995).

The degree to which trees in Tokyo were destroyed depended upon their proximity to bomb detonation and to wooden structures that burned during the fire. Nagasaki (1998) identified 56 Second World War (WW II) relict sites in Tokyo. Thirty of these locations (23 are either temple or shrine grounds) have fire-scarred trees or stumps as a result of fire bombing. These trees were assumed to have survived the fire because of their tissue moisture content and absence of structures burning adjacent them. Such adjacent fires would have provided sustained heat necessary to dry leaf and wood tissue to the point that it would burn. Many of the species commonly planted in temple or shrine grounds, such as ginkgo (*Ginkgo biloba* L.), *Castanopsis cuspidata* (Thunb.) Schottky. var. *sieboldii* (Makino) Nakai, and camphor (*Cinnamomum camphora* (L) Sieb.), are fire resistant and capable of resprouting after fire.



**Fig. 18.1** A view of Kaen-cho, Shinjuku-ku, Tokyo, on April 14, 1945 (Ishikawa 1995)

Street maps of Tokyo prepared prior to WW II do not indicate the presence of trees along streets and there are few detailed accounts of individual trees in the Tokyo area. However, based on landscaping contractors' historical contract records, it is estimated that about 63,000 street trees were lost during the war in the Tokyo area. Tokyo had 105,000 street trees in 1943; there were approximately 42,000 street trees reported in 1945 after the war. These street trees were further damaged or illegally cut in the following few years due to fuel shortage and in 1947 the number of street trees declined to 35,000. Some local residents also recalled that trees in parks and streets were cut to make coffins to bury the dead (Tokyo Zoen Kensetsugyo Kyodoukumiai (Tokyo Landscape Construction Industry Co-operation) 1994).

In contrast to the extensive bombing of Tokyo, only the harbor area of Hiroshima was bombed prior to August 6, 1945, when the atomic bomb was dropped. A 4.5 ton uranium bomb was detonated at an altitude of 610 m near the center of the city at 8:15 AM. The shock wave of the detonation destroyed most structures within a 2.4 km radius of the point of detonation. The intense heat of the nuclear explosion created a fire storm that spread over a radius of 4 km. Based on the 1953 war damage survey report, 50 % of the trees within the 2 km zone had stems broken off by the blast; wind damage of trees beyond 2 km radius was not observed. However, trees that were not ripped from the ground or broken off were consumed by the fire. These included trees in parks, along the rivers and streets, as well as at temples and shrines. The impressive trees along the moat of the Hiroshima castle were among the trees that were destroyed.

As was the case in Tokyo, some areas of the vegetation within the parks were not entirely consumed by the firestorm. Hersey (1989) reports that some survivors of the shock wave took refuge in a grove of bamboo in Asano Park (a heavily vegetated privately owned large estate, now called Shukkei-en) to avoid the fire. Like trees at the edge of the forest at Meiji Shrine in Tokyo, the outer margins of the bamboo grove were scorched by fire, but fire did not penetrate into the interior of the grove.

Within the firestorm radius, street trees were destroyed. No maps recorded the distribution of street trees in Hiroshima prior to the bombing of the city. However, interviewees in Hiroshima indicated that weeping willows (*Salix babyloinca* L.) were commonly planted as street trees and along rivers. Photographs show the broken and burned remains of trees along some streets after the bombing. A 1953 atomic bomb damage report mentioned that the weeping willows near the old western parade ground (located southwest of Hiroshima Castle) were resprouting while other species planted among the weeping willows were not (Arboriculture Hiroshima (compiled by Horikuji) 2001).

The question of how many trees in Hiroshima were killed due to exposure to radiation released by the atomic bomb has never been answered. No systematic study of radiation caused tree mortality took place in Hiroshima or Nagasaki following the war. Trees nearest to the hypocenter were exposed to the highest levels of radiation as well as to the highest temperatures and strongest physical shock. In this core of death one cannot single out any one of these factors as the cause of tree mortality. The initial amount of radiation emanating immediately by the bomb's detonation that could potentially be absorbed by trees varied with their distance from the hypocenter. Radiation doses (free-in air gamma rays) ranged from 35 gy (3,500 rad) at 500 m, 3.9 gy (390 rad) at 1,000 m to 0.49 gy (49 rad) at 1,500 m from the detonated bomb (Radiation Effects Research Foundation 2006). The bomb was detonated at an altitude of approximately 610 m above the ground so that maximum initial radiation levels reaching any trees near the hypocenter would have been somewhat less than 3,000 rad. The average exposure of people who were not killed immediately by the detonation has been estimated to be between 220 and 250 rad (Morton and Solomon 1986; USDHHS 2003).

Experiments conducted on tree seedlings indicate the sensitivity to gamma radiation (measured in rad) varies with tree species as follows: pine, 600; fir, 730; hemlock, 750; spruce, 790; arborvitae, 1,700; poplar, 3,000; magnolia, 3,700; oak, 3,700; birch, 4,300; maple, 4,800; beech, 6,400; hickory, 6,400 (Sparrow et al. 1971). Whicker and Fraley (1974) explained the range of sensitivity of different plant species to radiation was a function of chromosome size. Plants with large chromosomes are relatively sensitive to ionizing radiation while plants with small chromosomes are less sensitive. The levels reported by Sparrow et al. (1971) that are necessary to damage tree seedlings are greater than the initial radiation dose at 1,000 m from the point of detonation. Experimental studies involving the release of gamma radiation in natural forests in the United States (Platt 1963) and observations of tree mortality following the Chernobyl accident in Ukraine (Sokolov et al. 1983) suggest that exposure to 3,000–6,000 rad is sufficient to cause mortality in mature pines trees while exposure to 10,000–20,000 rad is

required to kill mature hardwood trees. Hardwood trees exposed to the higher levels of radiation were observed to recover by sprouting in the year following exposure as long as exposure levels were below 50,000 rad. A case study of tree rings of one WW II surviving *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai in Hiroshima indicated that the impact of the atomic bomb on the reduction of tree growth lasted only 2 or 3 years (Shinada et al. 1985). It may be concluded from these studies that trees in Hiroshima did not initially receive radiations levels sufficient to kill them. The smaller branches of trees within slightly more than 500 m from the hypocenter could have been killed by the initial radiation level, as were the smaller branches of trees in the experiments in the United States and near the Chernobyl site. However, trees at this close distance to the point of detonation would surely have been killed by the shock wave and heat emanating from the detonation of the bomb. Surviving trees currently located within 500 m from the hypocenter in Hiroshima are either resprouts from the roots of trees damaged by the bombing or were transplanted to the site. It is believed that a few trees survived radiation exposure by being located next to tall brick/stone buildings or high walls that shielded them from radiation and initial blast. The *Ilex rotunda* Thunb. in Rai San-Yo Shiseki Museum's garden was behind a tall bank building and the ginkgo tree in Josaiji Temple was next to the brick wall of a factory when Hiroshima was bombed.

Additional radiation fell to the ground from the mushroom cloud created by the atomic bomb. Particulate matter dusted portions of the city while 'black rain' carried radioactive particles to the ground in some areas farther from the hypocenter. The dust and the black rain exposed many people who had survived the initial blast to levels of radiation that caused skin damage and subsequently various forms of cancer. No estimates of the radiation levels in the dust or 'black rain' are available and no information could be found as to the exposure of trees to this radiation.

## Pre-war Planning

Prior to WW II, city planning in Japan was conducted by planning departments staffed by experts trained in city and regional planning, architecture, landscape architecture, and civil engineering. Planning efforts to modernize Tokyo began in late nineteenth century, while plans to modernize Hiroshima did not develop until the twentieth century. Comprehensive plans for Tokyo were adopted in 1884, while plans for Hiroshima were not adopted until 1925 (Hiroshima City 1985). These plans modernized the streets and infrastructure of older parts of the cities by straightening and widening streets and installing modern sewage and water systems. However, the plans proposed few measures to change the basic fabric of Tokyo or Hiroshima (Hein 2002, 2005). Natural disasters, such as the great Meireki fire of 1675 in Edo had destroyed large portions of Tokyo in the past. Planning responses to these disasters were primarily focused on systems of fire breaks and expansion of housing into adjacent undeveloped areas (Waley 1984).

## *Tokyo Pre-war Planning*

In Tokyo the first parks were established after the Meiji Reform. Five parks (Asakusa, Ueno, Shiba, Fukagawa, and Asukayama) were created by the conversion of temples, shrines, or feudal lords' gardens under the Cabinet Decree (1873). Western style street trees were first planted about the same time (1873) in the Ginza District using native black pines (*Pinus thunbergii* Parl.) and cherry (*Prunus* sp.). Later in 1875 an introduced species (*Robinia pseudoacacia* L.) was used for streets along the outer moat on the eastside of the Imperial Palace. Weeping willow, cherry and black pine were popular species for street trees and along water courses.

Urban park planning for Tokyo started in 1885. City Block Reform (1888) planned to create 49 parks, about 333 ha total area, in Tokyo. This plan was not fully carried out, with only four small parks (1889–1891) and one big park, Hibiya Park (1903), being established. In 1902 a new City Block Reform plan was issued which reduced the number of parks from the previous plan to 22 parks (about 221 ha). A large urban forest (about 68 ha, 120,000 trees of 365 species) was designed and planted for the Meiji Shrine to commemorate Emperor Meiji who died in 1912. It included large areas of gardens, forests, and street trees. The design combined western and Japanese landscape style underscored with theories of forest ecology (such as succession). The construction lasted 11 years, from 1915 to 1926.

The importance of urban parks as open spaces was recognized during the 1923 Kanto earthquake. At that time Tokyo had 35 parks and open space areas. All but three of these were damaged by the earthquake. However, these parks and urban open spaces saved thousands of people's lives by providing fire breaks and sheltering up to 1.5 million refugees (about 70 % of the population of Tokyo then). The Capital Reconstruction Plan (1924) planned 3 large parks (Sumita, Kinshi, and Hamacho; about 20 ha) and 52 small parks (about 15 ha) for the earthquake damaged area. The Capital Reconstruction Plan also formally started the planting of western style street trees in Tokyo (Yoshinaga 1975). The street from Tokyo Train Station to the Imperial Palace (Gyoko Dori) was designed following examples of the Mall of Buckingham Palace in London and Paris's Champs Elysées. Four rows of ginkgo were planted on this 73-m wide road (Koshizawa 1991).

From 1932 to 1939, a city greenery plan was formed, which originated from the Europeans' regional planning movement in the 1920s. Tokyo's regional planning was the first in Japan, in which The Negotiation Committee for Tokyo Green Areas conducted surveys and policy studies. The plan covered a 50 km radius of Tokyo metropolitan area, 962,059 ha, and included a wide range of greenery concepts, from agriculture to scenic areas and later, as Japan was more engaged in war, to fire breaks and evacuation areas. Facilities being planned included large parks, green belts, natural parks, recreational parks, streets, and scenic areas (Koshizawa 1991).

After the Greenery Plan was finalized in 1939, the city government started purchasing land. In 1940, six large pieces of land (about 100 ha each) were purchased for large green areas in the then suburb, and up to 1945, 22 more pieces of land were purchased for green space. In the urban area after 1938, the city, using the Law of

Anti-Air Raid (1937–1946), started purchasing five pieces of land for parks, total 9.8 ha. Between 1940 and 1942, more than 20 urban parks were constructed (Koshizawa 1991). A 1941 Tokyo map showed there were at least 77 parks in the city of Tokyo (Jinbunsha 2004).

By the end of WW II Tokyo had 816.6 ha of land purchased for nine green belts and 30.7 ha of land was set-aside for 19 urban parks (Koshizawa 1991). The number of street trees reached 105,300 in 1944, more than ten times of the number after the earthquake in 1923 (10,262) (Cheng et al. 2000).

### ***Hiroshima Pre-war Planning***

In Hiroshima, under the Cabinet Decree (1873), two shrine sites were converted to parks in 1874 (one of them was removed in 1898) and in 1903 two more parks (on hills) were added. However, there were no comprehensive plans to develop these parks or to plan more parks until 1932, when Hiroshima hosted an economic promotion exposition. For the exposition one of the existing three parks (Hijiyama) received assistance from the central government and site improvements were made. The first planting of street trees by the city was in 1937 for a newly built 20-m wide street leading to the recently constructed Ujina Harbor. *Platanus* was planted. The first plan for urban parks in Hiroshima was written in 1941. The plan included 35 small parks, totaling 13.33 ha, and 4 green areas, totaling 62.02 ha. Since Japan was fully engaged in war, the planning of urban parks and green belts emphasized combating air raids. Site improvement and planting of trees started right after the plan was approved, but none of the parks or green areas was completed before the atomic bombing of the city in 1945.

In both Hiroshima and Tokyo these new parks sought to introduce amenities of lawn areas, flower beds, tennis courts, fountains, and other recreational facilities not common to traditional Japanese gardens (Yoshinaga 1975). The use of introduced species started to gain popularity, but exotic species were not widely used for parks and streets at that time. Supplies of large quantities of trees became necessary and commercialization of tree production began.

### **Post-war Planning**

City planning was carried out on a military basis during the war. Army officers were in charge of urban planning activities as they affected the war effort. Many of the usual planning activities of the city planning departments were curtailed. Planning during war time involved improvement of the transport infrastructure of cities to serve the war effort, expansion of industrial facilities for the production of war materials, and the conversion and creation of city parks as staging areas for soldiers and equipment and for firebreaks. In some city parks, trees were cut down

to build barracks, to install anti-aircraft guns, and to marshal military equipment. Houses along streets or lanes were torn down to create fire breaks. In Hiroshima one such firebreak running in an east–west direction near the center of the city was straightened and converted into the present-day Peace Boulevard (Hiroshima City 1985). Many small parks and portions of larger parks were used for food production to support the civilian populations of cities. About 30 parks in Tokyo were used as temporary burial grounds for victims of the 1945 air raid. The city tree nurseries in Hiroshima were converted to community gardens to support the local population. City tree nurseries that supplied trees for streets and parks in Tokyo were not converted into community gardens because of their distance from the city. However, normal maintenance activities and the annual cycle of planting and the lifting of trees for planting in the city were suspended as manpower was needed for the war effort and urban forest expansion was put on hold.

The Japanese government started planning the restoration of cities as early as December 1945, when the ‘Fundamental Guidelines for Postwar Recovery Planning’ were issued. The recovery strategy was mainly based on land readjustment, acquiring land from private citizens for public open space and infrastructure.

### *Tokyo Post-war Planning*

In Tokyo the 1946 plan intended to readjust 20,165 ha of land, build wide (more than 50-m wide) boulevards, set up green strips, secure 10 % urban lands for green areas, and set green belts in suburbs. This plan was severely set back by the economic measures proposed by the American banker/economist, Joseph M. Dodge, in 1949 to fight inflation and balance the government budget. This reduced the land readjustment area to 1,652 ha and eliminated all the plans for boulevards and urban green areas.

The idea of land adjustment was also not carried out because of the desire of private property owners to re-obtain control over their property. During the war the military government had exercised nearly complete control of private property. Once the war was over property owners were generally opposed to centralized control of rebuilding. In an attempt to nurture the democratization of city government in Tokyo, the American Army of Occupation under the leadership of General MacArthur curtailed any comprehensive planning that would infringe on the rights of private property owners. Sixty-two percent of the 746 ha of land purchased for green belt and four pieces of land purchased for urban parks were returned to private ownership.

Large urban parks were created as a result of the war as large parcels of land became available from the Imperial and military ownerships. The new Constitution transferred several Imperial properties to the public. Reconstruction of Shinjuku Gyoen (58.7 ha) and Kogyo Gaien as public parks started in 1948. Hamarikyu Onshi Teien (25 ha) was given to Tokyo Prefecture in November 1945 and later opened to the public in April 1946. Some of the areas that had been used by the Japanese



military in Tokyo were commandeered by the US military to house their own personnel and store equipment after the war. These sites became available later for public use when the US Army withdrew from Japan in 1952. When Tokyo was selected as a site for the 1964 Olympic Games in 1959, wide scale urban planning addressed again new tree-planting and the establishment of new parks. Yoyoki Park (the fourth largest park in central Tokyo) was a military parade ground prior to the war and was used to house US forces after the war. The Americans referred to the site as Washington Heights. It was changed to the Tokyo Olympic village and became a park after the Olympics. Shinku Gaien, the gardens surrounding Meiji Shrine, was also used as one of the venues of the Olympic Games.

Restoration of street trees in Tokyo was not fully launched until about 1948, when new supplies of trees became available from the city owned nurseries. In 1954 the number of street trees reached 80,300 and in 1959 the number reached 99,700. There were 112,637 trees in 1965, and 237,402 in 1980 (Cheng et al. 2000). Streets noted for their trees prior to the war were replanted after the war in an attempt to restore them to their pre-war condition. Notably among these is Omotesando Avenue where *Zelkova serrata* (Thunb.) Makino was restored through the efforts of Mr. Tokitaro Kasuga, a Tokyo landscape contractor. The *Zelkova* were initially planted around 1918 and 1919 while Meiji Shrine was being constructed. One hundred and fifty-one (92 %) of the pre-war population of 164 trees were severely damaged by American fire bombing. In 1948 Mr. Kasuga volunteered to replant the street trees along the Avenue. Trees of proper size (about 10 cm diameter) were not available nearby; he found his trees from northern Tama Hills, about 100 km west of Tokyo. In his first attempt only 4 % of the replanted trees survived due to unusual weather conditions (dry wind, high temperature) and shortage of labor. In a subsequent planting he was able to restore the entire street (Maeda 1996).

Streets in other parts of the city were initially replanted with trees growing in the city's tree nurseries at the end of the war. Many of these trees exceeded the size of trees usually planted (7–10 cm caliper) because nursery operations and city tree-planting had been suspended during the war. Trees in the nurseries grew to diameters often exceeding 20 cm during the war years (M. Maeda, 1996 personal communication). As no other trees were available these larger trees were planted with low survival rate. Mr. Munemasa Maeda, a retired landscape contractor who was employed immediately after the war to plant trees in Tokyo and interviewed in 2004, believes that all of the large trees transplanted into the city were replaced by the end of the 1950s (M. Maeda, 1996, personal communication).

From 1945 to 1981, members of the Tokyo Landscaping Contractors Association had contracts from the city to plant 127 parks in the burned area. The efforts of landscape contractors, like Kasuga Landscaping Company, dedicated to restoring certain avenues and the activities of Tokyo's departments of city planning and urban gardening, resulted in the replanting of many if not all of the street that formerly supported street trees.

The city parks and the Japanese army bases occupied by the US Army in Tokyo took on the appearance of American suburbs following the war. Construction of houses for Army officers and the planting of street trees at these sites was intended

to provide familiar housing areas for American servicemen and their families (Gilliss, personal communication). Many landscaping contractors made it through the difficult time by doing landscaping work for the Americans and gained the practical experience of western style landscaping (Maeda, personal communication). When the US Army withdrew from Japan in 1952 the temporary housing was taken down and many of the American-planted street trees were transplanted to the new parks.

Due to the financial difficulties and rapid increase of the population in Tokyo, the urban greenery, along with other urban reconstruction plans, stagnated until 1959 when Tokyo was selected to host the 1964 Olympics. Ironically, many streets were widened and street trees were planted for this event (Koshizawa 1991), in spite of the earlier abandonment of the original reconstruction plan to build wide, tree-lined boulevards. Approximately 11,000 street trees were planted in 1962, about three times the amount of regular plantings (2,145 trees planted in 1956, 3,238 in 1957; 3,592 in 1958). This brought the street tree population back to the pre-fire bombed level (Cheng et al. 2000).

### ***Hiroshima Post-war Planning***

The post-war reconstruction of the urban forest in Hiroshima followed a different path. The wide scale destruction of the city, the loss of about 1/3 of the city's population, and the unique nature of the atomic bomb's destruction stimulated a more comprehensive approach to re-planning the city and creating new urban forests.

In 1946 a park restoration plan was proposed to establish three large (104 ha total) and 32 small (67 ha total) parks in Hiroshima. The three large parks were located at former military sites. This plan was not carried out because of budget limitations, the release of some of the lands intended for parks for agriculture due to food shortages after the war, and the need of new government buildings and other public facilities. The initial replanting of Hiroshima started with a reforestation project (using cherry and acacia) for Hijiyama Park in the southeast of the city to prevent erosion in 1948.

The current urban greenery plan was based on the 1949 Hiroshima Peace Memorial City Construction Law, which made crucial decisions concerning the urban forest. Included in the law were: (1) set aside 12.21 ha of land near the hypocenter, the center of Hiroshima, for a Peace Park to memorialize the people killed in the bombing and to make a statement against the use of nuclear weapons in the future; (2) set aside an area of 58.74 ha (later reduced to 44.1 ha), including the Hiroshima Castle for Chuo Koen (Central Park) to provide cultural and recreational facilities for citizens; (3) beautification and planting of green belts along river banks (7 rivers, 21.4 ha) and hills (6 areas, 376.2 ha) and (4) including the Peace Park, establish 7 large parks (165 ha) and 74 small parks (66 ha) throughout the city (Hiroshima Koen Gyokai (Hiroshima Park Association) 1978).

In 1950 the city sponsored a design competition for the Peace Park. The design competition also included a 100-m wide, tree-lined, major boulevard (Peace Boulevard), leading from the central business district to the Peace Park. The competition was won by Tange Kenzo Group, a Tokyo design firm. Street tree-plantings started in 1950 by using a particular species for a district, such as cherry (*Prunus yedoensis* Matsum) trees for Kyobashi-cho District, wingnut (*Pterocarya rhoifolia* Sieb. et Zucc.) for Shinsenba District, and sweet gum (*Liquidambar styraciflua* L.) for Ushita-cho District (Hiroshima Koen Gyokai (Hiroshima Park Association) 1978). By 1953, 3,619 single-strip street trees and 468 multiple-strip street trees, including Peace Boulevard, were planted.

The mayors of Hiroshima provided important leadership in the reconstruction of the city and its urban forests. They continued to push for a comprehensive redevelopment plan that at times was not fully supported by local residents, many of whom were unemployed and in need of housing. Public open spaces were occupied by tens of thousands of illegal squatters. The Peace Park site had 400 squatting households. The city not only spent considerable political capital in convincing landowners to exchange land for parks and the Peace Boulevard, but also initiated a successful urban greenery movement. In 1954 the then mayor, Shinzo Hamai, appealed to all mayors in Japan to donate trees to plant in Peace Park. As a result, flowers, seeds, seedlings, trees and money flowed into the city from all over Japan and overseas. Later in 1957, in order to get the needed quantity of large size trees for Peace Park, Central Park, and Peace Boulevard, the succeeding mayor, Tadao Watanabe, started a tree donation campaign focused on communities neighboring Hiroshima. More than 7,000 large size trees were donated from hills in the countryside and private gardens and thousands of citizens participated in the planting. These large trees were cut at 6-m height to facilitate transportation (Fig. 18.2, Hiroshima City 1985). By 1958, about 3,100 tall trees and many smaller trees were planted on Peace Boulevard. Due to the harsh site conditions and the size of trees, which were not optimal for transplanting, the survival rate was only about 55 % (Hiroshima Koen Gyokai (Hiroshima Park Association) 1978; Ishikawa, personal communication). But because of community involvement in the planting, awareness of urban greenery increased and Hiroshima was made a symbol of the anti-nuclear war movement both locally and internationally (Fig. 18.2).

Trees were brought into the city through the efforts of Mr. Ishikawa Tatsuo, an arborist who had worked in Hiroshima prior to the war and owned the only truck available after the war that could be used to bring trees to the city. He was given the responsibility of judging the potential success of trees offered to Hiroshima, the transportation of these trees, and their planting. Although the plans for the Peace Park and the Peace Boulevard prescribed certain species for planting based on the design concept and the aesthetic characteristics of the species, Mr. Ishikawa and his crew were only able to plant the species that were offered to the city. These trees were planted at the locations designated on the new plans, but seldom were the trees planted of the same species as the planting plans called for. Planting conditions were very bad during the initial planting period. The atomic bomb had created a rubble land of ash, charcoal, fractured



**Fig. 18.2** Planting trees on Peace Avenue Greenbelt, November 27, 1957 (Hiroshima City 1985)

roof tiles, twisted steel, and broken concrete. No planting soil was available for back filling tree pits dug in the rubble. The city also had limited manpower for watering newly planted trees and water had to be hand carried initially from the nearby rivers. Many trees died and those that did survive were replaced later as trees of the species designated in the designs for the Peace Park and Peace Boulevard became available from re-instituted city nurseries.

As for the residual radiation of the atomic bomb in Hiroshima, surprisingly, it was not as threatening as expected. Even at the hypocenter, the radiation level declined to an unthreatening level within days. Plant and animal life were little affected. Some plants near the hypocenter resprouted within 2 months. Malformations of plants were observed, but the abnormalities ceased 3–4 years after the bombing. New colonies of various plants appeared in ruins in the next year after the bombing; 24 species were recorded in June 1946. Animal and insect populations at the hypocenter had fully recovered in October 1947 (Tsutsui 2004).

## Surviving Trees

In both Tokyo and Hiroshima some individual trees survived the bombing. Many of these on private property were so disfigured by burning that they were removed to be replaced with new trees or to provide space for enlarged or new structures. Fire-damaged trees in shrines, temple gardens, and cemeteries were less likely to be cut down, although pruning of these trees for safety was often undertaken.

The city of Tokyo does not have a collective list of all of the surviving trees. Sightings of surviving trees are scattered among reports of individual tree-lovers and travelers (Nagasaki 1998; Yomiuri On-Line 2001, 2002). In 1998 Seizou Nagasaki published a book tracing the relicts of WW II in the city of Tokyo; among them are 42 trees in 30 locations and four standing stumps. The majority of the surviving trees are ginkgos (28), followed by *Castanopsis cuspidata* (Thunb.) Schottky. var. *sieboldii* (Makino) Nakai (4), camphor (2), *Platanus* sp. (2), *Aphananthe aspera* (Thunb.) Planch. (2), *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai (1), *Torreya nucifera* (L.) Sieb. et Zucc. (1), *Z. serrata* (Thunb.) Makino (1), and *Lagerstroemia indica* L. (1) (Nagasaki 1998). We located nine of these relicts and examined the trees in 2004. Figure 18.3 shows a surviving ginkgo tree at Asakusa Sensoji Temple in Tokyo.

Most of the trees examined were situated in temple gardens, shrines, and cemeteries. These were locations where the reconstruction of structures burned by the fire bombing was intended as architectural restoration rather than new construction that may have required tree removal. Some trees at these sites had spiritual significance prior to the war that contributed to their protection. These trees included a large (about 2 m dbh) ginkgo located at the Shiba Toshogu Shrine that is a designated National Natural Heritage tree and less well-known trees such as a 40 cm diameter ginkgo tree located at the Kandameishin Shrine. This tree is not listed in any national register, but it was not cut down for the expansion of a building on the site. Instead an alcove was placed in the building to accommodate the tree. Although some of the trees in Tokyo that survived World War II fire bombing have signs on or adjacent to them, none of these signs designate these trees as having survived the fire bombing. The signs usually indicate their old age or status on a national record.

The degree of fire damage to the trees varied considerably. Many trees had basal fire scars typical of what might be seen occurring in fire prone areas of natural forests. Others were significantly disfigured with fire charred trunks and major portions of their crowns missing. Some were only stumps. Their fire killed trunks and branches were removed after the war. These stumps exhibited varying degrees of sprouting. In one case a tall stump of ginkgo tree resulting from the fire bombing was not removed and is now covered with ivy at the corner of Kandameishin Shrine's entrance.

The trees that survived fire bombing in Tokyo were difficult to locate and often unknown as trees that had survived the war to the people responsible for their management. In our search for these trees we were assisted by four students from the



**Fig. 18.3** One of the four ginkgo trees that survived the WWII fire bombing at Asakusa Sensoji Temple in Tokyo (May, 2004)

Laboratory of Landscape Ecology and Planning, Department of Ecosystem Studies of Tokyo University. They were invaluable in helping us to navigate Tokyo, a city in which few of the streets are named. None of these students were aware of the locations of any of these trees, nor of their existence. They had never been taken to see any of them as school children nor recalled any mention of them on the part of their teachers, youth leaders, or family members.

In Hiroshima about 150 surviving trees in 52 locations have been listed within the 2 km radius of the hypocenter (Hiroshima City 1985). Unlike Tokyo, Hiroshima started to collect information on surviving trees in 1974 after a group of elementary students tried to preserve a *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai tree in

their school yard. Each tree known to have survived the atomic bombing was marked by a sign attached to its trunk. The signs indicate the species of the trees, the distance the tree was from ground zero, and usually some comments about their condition after the bombing. A map showing the location of most of the trees is available at the Peace Museum.

We were able to collect information on 136 surviving trees in 50 locations; 22 of the locations are temples or shrines. The species composition is very diverse with 25 different species. Forty-five percent (61) of the trees are camphor which includes two large groves of 22 and 12 trees each. Others include *Ilex rotunda* Thunb. (11), ginkgo (8) *Pinus thunbergii* Parl. (8), cherry (*Prunus* × *yessoensis* cv. *Yedoensis*) (7), weeping willow (6), *Celtis sinensis* Pers. var. *japonica* (Planch.) Nakai (5) *A. aspera* (Thunb.) Planch. (5), *Platanus* sp. (4), *Wisteria* sp. (3), *Juniperus chinensis* Linn. cv. *pyramidalis* (3), *Firmiana simplex* (L.) W. Wight (2), and 1 tree each of *Camellia* sp., *Catalpa speciosa* (Warder ex Barney) Engelm., *Citrus natsudaidai* (Tanaka) Hayata, *Diospyros* sp., *Elaeagnus* sp., *Eucalyptus* sp., *L. indica* L., *Machilus thunbergii* Hayata, *Melia azedarach* L. var. *subtripinnata* Miq., tree peony (*Paeonia* sp.), *Prunus mume* Sieb. et Zucc., *Salix yezoalpina* Koidz. and *Tilia miqelianiana* Maxim. Many of these trees were broken off at the base of their trunks by the initial blast of the bomb. They have resprouted and are somewhat difficult to recognize as formerly damaged trees. The weeping willow in Fig. 18.4 is a resprout whose above ground part was destroyed by the atomic bomb. This willow is located 370 m from the hypocenter and is the closest surviving tree to the hypocenter. Others exhibit extreme fire scars such as a willow (*Salix yezoalpina* Koidz.) tree in Hiroshima Castle, the trunk of which is a semicircle of wood no more than 6 cm thick. The extreme heat released by the detonation of the atomic bomb dried out the bark, cambium, and sapwood on the side of the tree facing the detonation. Fire then consumed the naturally drier heart wood until the burning reached the more moist sapwood on the opposite side of the tree. The top of this tree had been snapped off by the initial shock wave from the bomb's explosion. Sprouting took place at the broken top and the tree now resembles a semicircle supporting a live crown of new branches and foliage.

Trees that survived the atomic bombing in Hiroshima can be found in a variety of locations. Their sites are not limited to temple gardens, shrines, and parks, but include locations along the rivers and along streets, as well as on private land (NHK 2007). Some of the surviving trees located on private land were donated to the city and replanted in city parks to make them more accessible to the public or because the private land owners wanted to develop the property on which the trees occurred. It was evident that surviving trees were being looked after very carefully regardless of where they were located. People living in Hiroshima are aware of these trees. We asked young boys if they could tell us where a particular tree was located and they were able to direct us even though the tree might have been several blocks away.

Reverence for the surviving trees was evident in Hiroshima. The people who survived the atomic bomb were so overcome by the destruction of their city that they believed nothing would grow in Hiroshima for 75 years. However, within



**Fig. 18.4** Located about 370 m from the hypocenter, the above ground part of this weeping willow was destroyed by the atomic bomb. The resprout has grown into a tree with 30 in. diameter at breast height (May, 2004)

weeks of the bombing, extensive areas of the city were covered with a growth of various herbaceous plants; even at a place near the hypocenter a circle of sickle-senna (*Senna tora* (L.) Roxb.) with extraordinary vigor was observed (Hersey 1989). Trees resprouted from injured trunks or their roots within 2 months (Hiroshima Peace Memorial Museum 1999; Tsutsui 2004). The ginkgo tree in Hosenbo Temple sent out new buds in September 1945. A new hope of survival spread through Hiroshima. The surviving trees of Hiroshima have been maintained as powerful symbols of both the destruction and survival of the city and its people (Tsuchida and Tredici 1993; Hiroshima Peace Memorial Museum 1999).



## Discussion and Conclusions

Two different patterns of restoring urban forests following their destruction by war emerged in Tokyo and Hiroshima. Tokyo originally had a large-scale urban greenery plan but it was reduced to a much smaller plan, while Hiroshima expanded the original urban greenery plan and turned the city into a green city.

Tokyo followed a path taken by Oakland, California that rejected the opportunity to adopt comprehensive planning approaches that would have reshaped the burned portions of the city and its urban forests after the destructive fire in 1991 (Blonski and Morales 2002). Politicians in Oakland opted, under pressure from local residents whose houses had been destroyed, for returning to conditions prevailing prior to the fire. They were unable to embrace new planning proposals that called for significant changes in the structure and composition of parts of their city (Platt 1998). The fire insurance policies protecting most of the over 3,300 houses destroyed by the fire covered the cost of rebuilding the structures, but would not compensate home owners for abandoning their properties. Furthermore, the City of Oakland did not want to forego the loss of tax revenues from the high end residential neighborhoods that were destroyed in the fire. In Tokyo people wanted a return to conditions that existed prior to the war and they wanted little interference by public planners in the way they restored their private property. Hein (2005) points out a tradition of rapid rebuilding of homes and businesses in Tokyo following repeated natural disasters in the last 300 years. Private owners wanted to do just that after the war was over. There was no public support for significant change. The Governor of Tokyo was not enthusiastic about the plan prepared prior to the end of the war. City planners did not push for carrying out the plan, and with limited budget and lack of financial strategies, only 6.2 % of the area planned for restoration (1,274 ha out of 20,165 ha) was completed. The process of restoration of the urban forest in Tokyo began slowly after the war and did not result in much innovative planning until the 1964 Olympics. This follows a pattern for urban resilience described by Vale and Campanella (2005) as the Reconstruction II period. This period is characterized by major construction that often replaces post-disaster construction to return a city to its pre-disaster functions of housing and transportation. The initiation of work on a new Civic Center complex that started 6 years after the 1906 San Francisco earthquake is cited by Vale and Campanella (2005) as an example of Reconstruction II period resilience. Development of a new Civic Center complex along with new housing developments associated with the Panama Pacific Exposition, like the work in Tokyo for the 1964 Olympics, made important contributions to the San Francisco urban forest.

In contrast, Hiroshima rebuilt itself with considerable innovation in design and community involvement of its streets, parks, and waterways. These new plans called for the planting of many trees in places not previously supporting trees. Design competitions provided plans for new parks, boulevards, and the incorporation of more trees into the city. Proactive leadership was exhibited by Kenzo Tange, whose firm won the design competition for the Peace Center, and

the mayors in Hiroshima. The city planning department avoided the interests on the part of many private landowners to rebuild the city as it had been before the bombing. This effort was aided by the unique nature of the atomic bomb that destroyed such a large portion of the city's population and left little of the city's former architecture, infrastructure, or urban forest.

There is a strong human tendency to want to return to the conditions of one's past environment (Cooper-Marcus 1995). This tendency has been demonstrated in public resistance to post-disaster city planning throughout history (Vale and Campanella 2005). Several factors contributing to this desire to reconstruct the pre-disaster environment include a need to reconstruct the social fabric, the power of property rights, and construction costs that may be substantially reduced if building can take place on existing foundations. A portion of this desire to return to one's past environment also includes a desire for lost trees. This can be seen in the individual efforts of men like Mr. Ishikawa Tatsuo in Hiroshima and Mr. Takitaro Kasuga in Tokyo. Similar personal efforts in the replanting of war-damaged trees have been reported in European cities following World War II (Akers, personal communication; Ivanovna, personal communication; Schroder, personal communication; von Ehren, personal communication). This also demonstrates that the quality of the pre-disaster urban forest is very important. It determines the possibility of its restoration after disaster. It may take events of immense destruction, like the atomic bombing of Hiroshima, to jar citizens and planners into thinking about new ways to rebuild destroyed cities and their urban forests. Hiroshima's reconstruction was fostered by its symbolic meaning as a 'rallying point for Japanese aspirations for nation-building' (Orr 2001) and international support for its meaningful Peace Park (Hein 2002). Innovative political leadership was also an important ingredient of the successful planning and redevelopment of Hiroshima and will be required in the future to promote new directions in the rebuilding of cities devastated by both natural and man-made destruction. In conclusion, the differences between Tokyo and Hiroshima on the urban forests reconstruction after the war are summarized in Table 18.1.

There is a growing literature on the rebuilding of cities following natural and man-made destruction; several examples have been mentioned in this article. In contrast to the treatment of urban forest in this volume, the main focus of these and other publications has been on architecture and urban planning, with little or no attention to the urban forest. Different scenarios for urban reconstruction fall into two major categories. These are (1) a return to the past or (2) rebuilding along new designs that use the disaster as an opportunity for innovation (Gunderson 2010). Both scenarios have led to a rebirth of urban forests. The rebuilding of Tokyo followed the first category until plans for the 1964 Olympics were adopted. Until that time the reconstruction of the urban forest was primarily limited to tree replacement. Similar patterns are to be seen in the reconstruction of London (Akers, personal communication), Stalingrad (Spebenna, personal communication), Hamburg (von Ehren, personal communication), and portions of Berlin (Ladd 2005, but see also Cramer, Chap. 34, this volume). Hiroshima reconstruction falls into the second category that is characterized by more far reaching, and innovative planning. The new planning directions in Hiroshima expanded and enriched urban tree-planting.

**Table 18.1** Comparison of Tokyo and Hiroshima's war damage and urban forest recovery

Characteristics	Tokyo	Hiroshima
Area destroyed	15,867 ha <sup>a</sup>	1,200 ha <sup>b</sup>
Number of people killed	148,279 (Dec. 1944–Aug. 1945)	80,000–140,000
Financial restriction on reconstruction	Severe	Severe
Number of parks before war in war-damaged area	1941: 80 large and small parks (about 202 ha) <sup>d</sup>	1941: 35 small parks (total 13.33 ha) and 4 green space areas (62.02 ha) planned, not completed
Number of street trees before war	1943: 105,000	Unknown
Initial plan after war	20,165 ha for block readjustment; build 7 (100-m), 2 (80-m) wide boulevards with green strips, other radial, and loop roads; secure 10 % of urban areas for green space; establish green belts around the city	1,322.5 ha for block readjustment; build 24 roads (two 100-m wide roads), 3 large parks (104 ha total), 32 small parks (67 ha total), 4 green areas; secure 10 % of urban areas for greeneries
Source of land	Military, imperial, land exchange	Mostly military, small amount land exchange
Changes in the initial plan after the war	1947: 9,918 ha for block adjustment; 1950: 4,958 ha for block adjustment; a network of 25-m wide roads	1952: One 100-m road, 7 large (165 ha total), 74 small (66 ha total) parks, 7 green belts along rivers (21.4 ha total) and 6 green belts on hills (3,762 ha total); among these are the Peace Park (12.21 ha) and Chuo Park (44.1 ha)
Post war street trees	1953: 76,600 1963: 108,717	1953: 3,619 plus 468 trees on Peace Boulevard. 1958: 1,300 large trees on Peace Boulevard. 1970: 4,445 (not including Peace Boulevard)
Public involvement	1948: Mr. Tokitaro Kasuga voluntarily donated and planted 151 trees along Omotesando Ave	1954–1956: plants and money donated from Japan and overseas for the planting of Peace Park. 1957–1958: about 7,000 trees donated from neighboring counties
Surviving trees	42 in 30 locations (23 are shrine/temple); 9 different species	136 in 50 different locations (22 are shrine/temple); 25 different species

<sup>a</sup>From March to May 1945 (Koshizawa 1991)<sup>b</sup>Hiroshima City 1985<sup>c</sup>The United States strategic bombing survey, summary report (Pacific War 1946)<sup>d</sup>Estimated from 1941 Tokyo map (Jinbunsha 2004)

Similar patterns of rebuilding and redesigning portions of urban forests can be seen in the post-disaster reconstruction of Lisbon (Maxwell 2002), Chicago (Miller 2002), Dresden (Schroder, personal communication), and portions of Berlin (Ladd 2005).

In both cases, the lack of proper size trees for large-scale replanting after the disaster of war was a common problem. Forested areas surrounding both Tokyo and Hiroshima provided sources of trees for planting. The demand for labor for tree-planting and post-planting care such as watering posed another challenge. Community participation, both within and outside the city, is a useful tool for urban forest recovery as we learned from Hiroshima (see also Tidball, Chap. 20, this volume).

We found that the species and locations of urban trees determine the survival of trees after disaster or war. In both Tokyo and Hiroshima, species with thick bark and strong resprouting ability survived the war. In Tokyo, trees in open ground had a better chance to be spared from fire, while in Hiroshima, trees behind tall concrete constructions were shielded from radiation and the heat wave.

Like most cities around the world (Vale and Campanella 2005), both Tokyo and Hiroshima's urban reconstruction and urban forest recovery were restrained by land ownership. The creation of large urban parks in Tokyo and Hiroshima was only possible because of the transfer of military and Imperial owned lands. With increasing individual power of property rights, high price of urban real estate, and the fragmentation of urban land ownership, it is difficult to allocate lands for new urban parks or forests. Politicians, policy makers, urban planners, developers, and insurance industries may need to get together and develop strategies to enable and encourage greening in the red zone by providing incentives for post-disaster urban open space or urban forestry development.

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## References

- Arboriculture Hiroshima (compiled by Horikuji, J). (2001). *A- bombed trees survey report*. Unpublished report on file at the City of Hiroshima (in Japanese).
- Blonski, K.S., & Morales, T.J. (2002). In *Proceedings of the California's 2001 wildfire conference: Ten years after the East Bay Hills fire*. October 10–12, 2001, Oakland. Technical Report 35.01.462. Richmond: University of California Forest Products Laboratory.
- Bullock, N. (2002). *Building the post-war world: Modern architecture and the reconstruction in Britain*. London: Routledge.

- Cheng, S., McBride, J. R., & Fukunari, K. (2000). The urban forest of Tokyo. *Arboricultural Journal*, 23(4), 379–392.
- Cooper-Marcus, C. (1995). *House as a mirror of self: Exploring the deeper meaning of home*. Berkeley: Conrai Press.
- Gunderson, L. (2010). Ecological and human community resilience in response to natural disasters. *Ecology and Society* 15(2), 18. <http://www.ecologyandsociety.org/vol15/iss2/art18/>
- Hein, C. (2002). Hiroshima: The atomic bomb and Kenzo Tange's Hiroshima Peace Center. In J. Ockman (Ed.), *Out of ground zero: Case studies in urban reinvention* (pp. 61–83). Munich/New York: Temple Hoyne Buell Center for the Study of American Architecture. Columbia University/Prestel.
- Hein, C. (2005). Resilient Tokyo: Disaster and transformation in the Japanese city. In L. J. Vale & T. J. Campanella (Eds.), *The resilient city: How modern cities recover from disaster* (pp. 213–234). New York: Oxford University Press.
- Hein, C., Diefendorf, J., & Ishida, Y. (Eds.). (2003). *Rebuilding urban Japan after 1945*. London: Palgrave Macmillan.
- Hersey, J. (1989). *Hiroshima*. New York: Vintage Books.
- Hiroshima City. (1985). *Toshi no fukko* (Reconstruction of Hiroshima—Pictorial history of forty years since atomic bombing). Hiroshima: City Government Publication (in Japanese). Available from <http://www.city.hiroshima.jp/>. Accessed 14 Sept, and 5 Oct 2005.
- Hiroshima Koen Gyokai (Hiroshima Park Association). (1978). *Hiroshima no koen (Hiroshima's Parks)* (Vol. 1, pp. 3–6). Hiroshima: Hiroshima Koen Gyokai (Hiroshima Park Association) Publishers (in Japanese).
- Hiroshima Peace Memorial Museum. (1999). *The spirit of Hiroshima*. Hiroshima: Hiroshima Peace Memorial Museum.
- Hirshson, S. P. (1997). *The white Tecumseh*. New York: Vintage Books.
- Ishikawa, K. (1995). *Tokyo daikūshū no zenkiroku (Graphic report, the whole document of Tokyo air raid)*. Tokyo: Iwanami Shoten, Publishers (in Japanese).
- Jinbunsha (Ed.). (2004). *Kochizu, gendaizu de aruku, Showa Tokyo sanbo (with old map and new map, a walk of Tokyo in Showa period)*. Tokyo: Jinbunsha Publishers (in Japanese).
- Koshizawa, A. (1991). *Tokyo doshikekaku monogatari (The story of Tokyo's urban planning)*. Tokyo: Nihhon Keizai Hyoron-Sha Publishers (in Japanese).
- Ladd, B. (2005). Double restoration: rebuilding Berlin after 1945. In L. J. Vale & T. J. Campanella (Eds.), *The resilient city: How modern cities recover from disaster* (pp. 117–134). New York: Oxford University Press.
- Maeda, M. (1996). Tokitaro Kasuga: the greatest foreman for Meiji Shrine gardening. *Journal of Japanese Institute of Landscape Architecture*, 60(1), 5–8 (in Japanese).
- Maxwell, K. (2002). Lisbon: the earthquake of 1755 and urban recovery under the Marquês de Pombal. In J. Ockman (Ed.), *Out of ground zero: Case studies in urban reinvention* (pp. 20–45). New York/Munich: Temple Hoyne Buell Center for the Study of American Architecture, Columbia University/Prestel.
- Miller, R. (2002). Chicago: out of the blue: the great Chicago fire of 1871. In J. Ockman (Ed.), *Out of ground zero: Case studies in urban reinvention* (pp. 46–61). Munich/New York: Temple Hoyne Buell Center for the Study of American Architecture. Columbia University/Prestel.
- Mitchell, J. (Ed.). (1999). *Crucibles of hazard: Mega-cities and disasters in transition*. New York: United Nations University Press.
- Morris, E. S. (1997). *British town planning and urban design*. Harlow: Longman.
- Morton, R. Q., & Solomon, F. (1986). *The medical implications of nuclear war*. Washington, DC: National Academy Press.
- Nagasaki, S. (1998). *Sensai no ato tazunete-Tokyo o aruku (Searching the traces of war-walk in Tokyo)*. Tokyo: Agane Gijutsu Senta Publishers (in Japanese).
- NHK (Japan Broadcasting Corporation). (2007). *Explore Hiroshima: A people's map of areas affected by the atomic bomb*. <http://www.nhk.or.jp/hiroshima/hibakumap/e/spot/index.html>. Accessed 16 Aug 2010.

- Nossiter, A. (2005). *Trees in New Orleans: Down but not out*. New Orleans: Associated Press Release, Friday, October 21, 2005, 10:38 am.
- Ockman, J. (Ed.). (2002). *Out of ground zero: Case studies in urban reinvention*. Munich/New York: Prestel.
- Orr, J. (2001). *The victim as hero: Ideologies of peace and national identity in postwar Japan*. Honolulu: University of Hawaii Press.
- Pelling, M. (2003). *The vulnerability of cities: Natural disasters and social resilience*. London: Earthscan.
- Platt, R. B. (1963). Ionizing radiation and homeostasis in ecosystems. In G. M. Woodwell (Ed.), *Ecological effects of nuclear war*. Upton: Brookhaven National Laboratory.
- Platt, R. H. (1998). Planning and land use adjustments in historical perspective. In J. B. Raymond (Ed.), *Cooperating with nature: Confronting natural hazards with land-use planning for sustainable communities* (pp. 27–56). Washington, DC: Joseph Henry Press.
- Radiation Effects Research Foundation. (2006). <http://www.ref.or.jp>. Accessed 7 Feb 2006.
- Rosen, C. M. (1986). *The limits of power: Great fires and the process of city growth in America*. New York: Cambridge University Press.
- Shinada, Y., Tanaka, R., & Oginuma, K. (1985). *Morphological and ecological observations on tree rings of an old hackberry survived near the center of the atomic air-raided area in Hiroshima City* (Central Research Institute of Electric Power Industry Report no. 485001). Biological Laboratory (in Japanese, with English summary). Tokyo, Japan.
- Sokolov, V. E., Rjabov, I. N., Ryabtev, I. A., Tikhomirov, F. A., Shevchenko, V. A., & Taskaev, A. I. (1983). Ecological and genetic consequences of the Chernobyl atomic power plant accident. *Plant Ecology*, 109(1), 91–99.
- Sparrow, A. H., Schwemmer, S. C., & Bottino, P. J. (1971). The effects of external gamma radiation from radioactive fallout on plants, with special reference to crop production. In D. W. Bensen & A. H. Sparrow (Eds.), *US atomic energy commission symposium survival of food crops and livestock in the event of nuclear War* (AEC symposium series no. 24, CONF-700909, pp. 670–671). Springfield: National Technical Information Service.
- Tokyo-to Zoen Kensetsugyo Kyodoukumiai (Tokyo Landscape Construction Industry Co-operation). (1994). *Tsutsuku "Midori no Tokyo shi" (Continued "The green of Tokyo's history")*. Tokyo: Tokyo-to Zoen Kensetsugyo Kyodoukumiai (Tokyo Landscape Construction Industry Cooperation) (in Japanese).
- Tsuchida, H., & Tredici, P. D. (1993). Hibaku trees of Hiroshima. *Arnoldia*, 53(3), 24–29.
- Tsutsui, W. (2004). Landscapes in the dark valley: Toward an environmental history of wartime Japan. In R. Tucker & E. Russell (Eds.), *Natural enemy, natural ally: Toward an environmental history of warfare* (pp. 195–217). Corvallis: State University Press.
- Tung, A. M. (2001). *Preserving the world's great cities: The destruction and renewal of the historic metropolis*. New York: Clarkson Potter.
- USDHHS. (2003, June). *Final report on X radiation and gamma radiation and neutrons*. Research Triangle Park: US Department of Health and Human Services, National Toxicology Program.
- Vale, L. J., & Campanella, T. J. (Eds.). (2005). *The resilient city, How modern cities recover from disaster*. New York: Oxford University Press.
- Waley, P. (1984). *Tokyo: Now and then*. New York: Weatherhill.
- Waller, M. (2004). *London 1945, life in the debris of war*. New York: St. Martin's Press.
- Weatherford, J. (2004). *Genghis Khan and the making of the modern world*. New York: Crown.
- Whicker, F. W., & Fraley, L., Jr. (1974). Effects of ionizing radiation on terrestrial plant communities. *Advances in Radiation Biology*, 4, 317–366.
- Yomiuri On-Line. (2001, 2002). Website of *Yomiuri Shinbun* (newspaper). September 13, 2001; February 15, August 29, November 14, November 28, 2002. Available from <http://www.yomiuri.co.jp/tokyo/>. Accessed 10 Mar 2004 (in Japanese).
- Yoshinaga, Y. (1975). Nihhon kindai zoenshi (The history of modern Japanese landscape architecture). In Nihhon Enei Chuokai (Japan Horticulture Central Committee) (Ed.), *Nihhon enei haddatsushi (History of Japanese Horticulture)* (pp. 345–400). Tokyo: Ariaka Shouhou Publishers (in Japanese).

## Chapter 19

# Valuing Urban Forest: Lessons to Learn from Hurricanes

R. Bruce Hull

**Abstract** In addition to their more recognized ecosystem service functions, urban forests are valued for the cherished meanings and memories they symbolize. Residents draw emotional strength from the stories, people, and events associated with trees. Disaster and disturbance events that destroy the urban forest therefore threaten and damage residents' attachment to place, and perhaps even their sense of identity. The symbolic qualities of the urban forest even may motivate community response and resilience to hazards. Implications for planning and maintenance of urban tree canopy are discussed.

**Keywords** Urban forest • Arboriculture • Identity • Place attachment

*Perhaps one of the first contemporary scholars to document the importance of urban forests in post-disaster contexts, Bruce Hull presents an important study documenting the importance of place, memory, and meaning in this post-disaster case study. This chapter is an updated and revised version of a previously published paper that appeared in the Journal of Arboriculture.<sup>1</sup>*

Angel Oak may be over 1,400 years old, and thus one of the most ancient living things east of the Mississippi River. Like most live oaks, it grows out, not up. Only 65 ft tall, its massive limbs span over 17,100 ft<sup>2</sup> of Charleston, South Carolina. Locals call it 'The Tree'. Its value, like the value of all urban forests, cannot be captured by the common denominator of money. The Tree reminds residents of their history, linking them back to the earliest land grant of the area, dated 1717. It has

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<sup>1</sup> Journal of Arboriculture 18(2): March 1992 and is used by permission.

R.B. Hull (✉)

Center for Leadership in Global Sustainability,  
Virginia Tech College of Natural Resources and Environment,  
310-D Cheatham Hall, Mail code: 0324, Blacksburg, VA 24061, USA  
e-mail: hullrb@vt.edu

value to the Judeo-Christian God, who created trees and other vegetation on the third day and declared them 'good'. It is habitat to countless insects, bacteria, and other forms of life, as well as woven into the ecology of the region. It has economic value for the wood that could be used to build houses and for the heat it could produce if burned. It retains water, sequesters carbon, purifies air, and performs countless other ecological services that support human society. It may host genes or chemicals that cure debilitating diseases. It evokes awe and humility in most that see it. It is photographed and commemorated in countless family albums. People sit beneath its branches and ponder deep thoughts about life, ecology, and their place in the universe. They search for lessons about how to live a worthy life. Moreover, it is alive. It grows. It seeks resources. It resists infections. By these actions it demonstrates a will to live. Angel Oak illustrates the plurality of value associated with urban forests, a plurality we must respect, for it motivates people to care, act, and recover from disaster (Hull 2006).

Winds of 130 miles/h battered Angel Oak and the rest of Charleston around midnight on September 21, 1989 when Hurricane Hugo made landfall. The 20 foot storm surge was the highest ever recorded on the East Coast. One of the most intense hurricanes to strike the US this century, Hugo killed 82 people, caused over \$7 billion of property damages including countless roofs, church steeples and whole buildings, and toppled much of Charleston's treasured urban forest. Angel Oak was damaged, but survived.

The purpose of this chapter is to identify the values residents of Charleston, South Carolina ascribed to their urban forest after Hugo blew down much of it. Numerous scientific studies document these values, which include aesthetics, community identity, human stress reduction, energy and water conservation, wildlife habitat, enhanced property values, improved commerce, and much more (McPherson et al. 2005; Mole and Ebenreck 1989; Nowak and Dwyer 2007; Smardon 1988; Wolf 2005). Since there was considerable damage to Charleston's forests, we expected residents to be acutely aware of what they had lost. For the purposes of this chapter we focus particularly on the symbols and meanings that make a place special and contribute to place and self-identity.

Self-identity is rooted in many facets of daily life: the roles we play (e.g., mother, teacher, Colonel, son), the groups to which we belong (church, democrats, USA), the things we wear (trendy clothes, perfume, hair style), the items we purchase (fast, sexy and expensive automobiles, nice homes in high status areas, books, art, landscaping), and the places we frequent or remember (home town, historic church, commercial district, wilderness area) (Belk 1988; Sack 1988). 'Place identity' refers to the contribution attributes of place make to one's self-identity (Korpela 1989; Proshansky et al. 1983; Rivlin 1987; Shumaker and Taylor 1983). Places, and the meanings and values symbolized by place features, contribute to self-identity. Stokols (1981) refers to these place-based meanings as the 'glue' that binds people to place. They tell us something about who we are and who we are not, how we have changed and into what we are changing (see also Lynch 1960; Tuan 1980, Stedman and Ingalls, Chap. 10, this volume). Importantly, these sorts of meaning and identity enhancing qualities may foster resilience following crisis and disaster (Tidball et al. 2010). To the extent that the urban forest significantly contributes to place identity and thus self-identity, it should also contribute to the resilience and capacity of people to respond to life disturbances such as Hurricane Hugo.



## Methods

To determine how residents experience losses after a hurricane, a research team from Texas A&M University completed 185 telephone interviews with residents in ten neighborhoods of Charleston several months after Hugo hit Charleston. A neighborhood was defined as approximately 100 residential units located within a four to five contiguous street block area. An attempt was made to select neighborhoods that were approximately equal in the type of damage caused by Hugo (but not in cost of damage), and were homogeneous within themselves but varied from one another in socioeconomic status, age of buildings and density of houses. All neighborhoods had some forest canopy prior to Hugo.

Approximately one-third of the residents from each neighborhood were randomly selected from a city directory and mailed a letter explaining that they would be contacted by phone with regards to this study. In total, 346 households were telephoned; 63 refused to participate, 185 fully participated. The balance (98) was businesses or people that had moved or could not be reached even after 15 recalls. Thirty-three percent of the respondents were male. Three trained interviewers conducted the 20-min interview. The interview consisted of an introduction, questions about evacuation, recovery, socioeconomic status, place attachment, and several open-ended questions about the values associated with physical features damaged or lost due to Hugo. The latter questions generated the data reported in this chapter.

Residents were asked during the interview to identify a physical feature of Charleston damaged by Hugo that was special to them. They were also asked to explain why it was special. The interview was designed to elicit the values people associated with physical features, i.e., Why was it special? What did it mean to you? How did it make you feel? Three persons guided in part by a similar study (Czikszenmihalyi and Rochberg-Halton 1981) categorized the 2,213 responses. Intercoder agreement was 87 %. (See Hull et al. 1994 for discussion of other findings from this study.)

## Results and Discussion

Any mention of trees, forested parks, or urban forests was combined into a category called 'urban forest'. Thirty percent of residents mentioned damaged urban forest as being *the* thing damaged by Hugo that mattered the most to them. This figure itself is remarkable, given the extent of damage to buildings and other places of value. The remainder of people said they were most concerned about damage to architectural elements such as churches (27 %), their own homes (13 %), public buildings (6 %), historic structures (6 %), retail structures (5 %), homes of friends or neighbors (3 %, this despite approximately 80 % of roofs needing repair of some type), places of employment (1 %), and a general 'other' category that included cars (8 %).

**Table 19.1** Values associated with urban forests

Values	% of all responses
Evoke positive feelings and emotions	11.0
Provide economic and energy benefits	6.4
Add general environmental quality	3.4
Provide place for leisure and escape	2.3
Function to reduce noise and increase privacy	1.0
Contribute to place and self-identity	
Make place distinctive	9.5
Symbolize something spiritual	1.0
Symbolize endurance	2.0
Connections to history	1.0
Personal memories	2.0

Even though forests were identified as the damaged object of concern by 30 %, over 44 % of all codeable explanations about why a damaged object was valued were ascribed to urban forests, almost double the next two categories, historic structures (23 %) and churches (16 %). Over 10 % of respondents mentioned that they had previously taken for granted how much they valued the urban forest. Interestingly, no one said that they took for granted the values and benefits associated with any other feature. Taken together, these findings suggest that trees are a valued if under-appreciated component of Charleston and that the extensive damage to the urban forest made residents aware of these values: ‘you don’t know what you’ve got until it’s gone’.

What follows is a discussion of the reasons residents gave for valuing urban forests (Table 19.1). We report the number and percent of total responses that fell within each category.

*Positive feelings or emotions* associated with urban forests were mentioned most often (11 % of the total responses), and were categorized based on the scheme offered by Shaver et al. (1987): love (2.4 %), delight (4.4 %), relaxed or reflective (3 %), other positive feelings (1.8%). *Negative feelings* were mentioned only twice and these were concerns about safety. These findings support research which suggests that nature evokes positive and relaxing emotions, even in urban areas (Hull and Michael 1994; Hull et al. 1996) and reduces symptoms of stress (see Wells, Chap. 7, this volume). Other common responses included trees being special because they *provided economic or energy related benefits* (6.4 %, specific examples included shade, temperature moderation, savings in cooling costs, raising property values, and general economic reasons, such as bringing in tourists) and because they contributed to general *environmental quality* (3.4 %, examples included statements about a healthy environment, ecology, clean air and wildlife habitat). These public perceptions of value are consistent with findings from McPherson et al. (2005). Fewer respondents mentioned opportunities for *leisure and escape from city pressures* including places for picnicking and socializing, for contemplation, and for exercise (2.3 %), and trees as providing *functional benefits* such as reducing perceived noise and increasing privacy (1 %).

A large group of responses had some bearing on place identity. More specifically, respondents explained that the urban forest mattered because it: (a) made their place distinctive, (b) symbolized something spiritual, (c) symbolized endurance, (d) provided connections to other people, (e) connected them to local history, and/or (f) evoked memories of their personal past. The remainder of this chapter drills deeper into these responses, the relationship to place identity, and perhaps the inspiration of resilience.

More specifically, respondents mentioned that the urban forest was special because it served to *characterize, differentiate or beautify space and create a distinct community image* (9.5 %, including references to beauty, scenery, charm and symbol of Charleston). Community image is important because it helps differentiate one place from another by defining a visual character (Hull 1992; Lynch 1960). Clearly demarcated territory promotes feelings of membership and increases awareness that one belongs and also promotes a sense of community (McMillan and Chavis 1986).

Reasons associated with one's *spiritual belief* represented less than 1 % of all reasons given, but also occurred during some of our most poignant interviews. Examples include salvation, something to live for, hope, beauty of life, God's work, and trees symbolize nature nourishment of soul. Similarly, respect for *things that have endured* occurred in about 1 % of all reasons. A tree is considered special because it has endured and survived storms and time, while other things have faded and are forgotten. Example statements included: rare, lasted a long time, survived storms, and it did not give up. Respondents specifically mentioned that they valued the urban forest because it has been preserved or symbolized that preservation had taken place.

Jacobi and Stokols (1983) suggest that things are valued because they provide *connections with the past*. Responses of this type also represented less than 1 % of all reasons given. Example statements included: early American way of life, George Washington was there, black history, and represents early Charleston. Most responses referred to parks and gardens rather than to particular trees.

Residents also valued trees because of the *personal memories* that they symbolized. Some respondents were moved to tears by thinking about memories damaged by Hugo. Trees were associated with family gatherings, with parents or grandparents who had planted them, and with the long investment of the property owner who cared for them (1 %). One particularly potent memory, recounted by a middle-aged man, is paraphrased below:

That damn storm! My father planted that tree before I was born. He watered it. Cared for it. Mowed around it. Taught me to climb it. Put a swing in it. That was his tree. I used to sit in it and think about things when I was a kid. He died a few years back, but every time I saw that tree, I remembered him. That damn storm: it took my father from me a second time.

## Conclusions and Implications

Over 30 % of respondents in this study identified some aspect of the urban forest as being the most significant physical features of Charleston damaged by the hurricane, an impressive statistic given that these same people also had first hand experiences

with damage to their churches, local historical structures, and even their own homes (Hull et al. 1994). Also impressive are the depth and breadth of values associated with the urban forest. People valued urban forests for a plurality of reasons; many reasons were mundane, instrumental and interchangeable (such as lost cooling effects and higher air-conditioning bills), but other reasons were deeply personal, highly motivating, and non-substitutable—values contributing to identity.

The role of urban forests as symbols of cherished meanings and memories needs greater attention, especially in post-disaster contexts. According to Tidball et al. (2010) ‘memories of trees and other living things that have died or been left behind, or that in symbolic terms represent place, hope, life, and rebirth, seem to play an important role in resilience at multiple levels following disaster...plants as well as interacting with plants (e.g., through gardening, tree-planting) appear to aid in resistance and resilience not only through therapeutic effects linked to psychology, but also through eliciting memories’. The symbols urban forests represent can be valued and powerful sources of meaning as people draw strength in attempts to rebound and recover from the disturbance of a damaging hurricane. We can speculate that valued urban forests increase commitment to place, motivate behaviors that protect and restore, and thus enhance resilience. More research is needed to better understand how the urban forest should be managed to realize these essential values, and to better enable planners and policy makers to include urban forestry in pre- and post-disaster planning.

## References

- Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research*, 15, 139–168.
- Czikszentmihalyi, M., & Rochberg-Halton, E. (1981). *The meaning of things: domestic symbols and the self*. Cambridge: Cambridge University Press.
- Hull, R. B. (1992). Image congruity, place attachment and community design. *Journal of Architecture and Planning Research*, 9, 181–192.
- Hull, R. B. (2006). *Infinite nature*. Chicago: University of Chicago Press.
- Hull, R. B., & Michael, S. E. (1994). Nature based recreation, mood change, and stress restoration. *Leisure Sciences*, 17, 1–14.
- Hull, R. B., Lam, M., & Vigo, G. (1994). Place identity: Symbols of self in the urban fabric. *Landscape and Urban Planning*, 28, 109–120.
- Hull, R. B., Michael, S. E., Walker, G. J., & Roggenbuck, J. W. (1996). Ebb and flow of brief leisure experiences. *Leisure Sciences*, 18, 299–314.
- Jacobi, M., & Stokols, D. (1983). The role of tradition in group environment situations. In N. R. Feimer & E. S. Geller (Eds.), *Environmental psychology: Directions and perspectives*. New York: Praeger Press.
- Korpela, K. M. (1989). Place-identity as a product of environmental self-regulation. *Journal of Environmental Psychology*, 9, 241–256.
- Lynch, K. (1960). *The image of the city*. Cambridge, MA: MIT Press.
- McMillan, D. W., & Chavis, D. (1986). Sense of a community: A definition and theory. *Journal of Community Psychology*, 14(1), 6–23.
- McPherson, E. G., James, R., Peper, P., Maco, S., & Xiao, Q. (2005). Municipal forest benefits and costs in five US cities. *Journal of Forestry*, 103(8), 411–416.

- Mole, G., & Ebenreck, S. (1989). *Shading our cities: A resource guide for urban and community forests*. Washington, DC: Island Press.
- Nowak, D. J., & Dwyer, J. F. (2007). Understanding the benefits and costs of urban forest ecosystems. In J. E. Kuser (Ed.), *Urban and community forestry in the northeast*. Netherlands: Springer.
- Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place identity: Physical world socialization of the self. *Journal of Environmental Psychology*, 3, 57–83.
- Rivlin, L. G. (1987). The neighborhood, personal identity, and group affiliations. In I. Altman & A. Wandersman (Eds.), *Neighborhood and community environments*. New York: Plenum Press.
- Sack, R. D. (1988). The consumer's world: Place as context. *Annals of the Association of American Geographers*, 78, 642–666.
- Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology*, 52, 1061–1086.
- Shumaker, S. A., & Taylor, R. B. (1983). Towards a clarification of people-place relationships: A model of attachment to place. In N. R. Feimer & E. S. Geller (Eds.), *Environmental psychology: Directions and perspectives*. New York: Praeger Press.
- Smardon, R. C. (1988). Perception and aesthetics of the urban environment: Review of the role of vegetation. *Landscape and Urban Planning*, 15, 85–106.
- Stokols, D. (1981). Group x place transactions: Some neglected issues in psychological research on settings. In D. Magnusson (Ed.), *Towards a psychology of situations: An interactional perspective*. Hillsdale: Lawrence Erlbaum.
- Tidball, K. G., Krasny, M. E., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research (Special Issue, Resilience in social-ecological systems: The role of learning and education)*, 16(5), 341–357.
- Tuan, Y. (1980). The significance of artifact. *Geographical Review*, 70, 462–472.
- Wolf, K. L. (2005). Business district streetscapes, trees, and consumer response. *Journal of Forestry*, 8(December), 396–400.

## Chapter 20

# Trees and Rebirth: Social-ecological Symbols and Rituals in the Resilience of Post-Katrina New Orleans

**Keith G. Tidball**

**Abstract** Following from earlier work on ‘memorialization mechanisms in disaster resilience’, I posit that tree symbols and rituals, and how tree symbols and rituals are remembered, re-constituted, and reproduced, represent a cluster of social mechanisms that can be viewed as ‘tangible evidence of social mechanisms behind social-ecological practices that deal with disturbance and maintain system resilience’. I continue to draw upon Berkes and Folke’s argument that some social-ecological systems build resilience through the experience of disturbance, but for this to occur, sufficient memory from both ecological and social sources for reorganization must be present. Thus, I argue, the constellation of social-ecological memories, social-ecological symbols and rituals, and the resulting relationships between human actors and other system components, feedbacks and cycles catalyzed by these relationships, all contribute to system memory, processes involved in ‘regeneration and renewal that connect that system’s present to its past’ and aid in conferring resilience.

**Keywords** Sources of resilience • Social-ecological symbols • Social-ecological rituals • Social-ecological icons • Memorialization mechanisms

*Author Keith Tidball draws on his background in cultural anthropology to interpret what he saw while working in New Orleans following Hurricane Katrina. Residents talked about live oak trees as symbols of New Orleans as a place. Through rituals developed around the act of planting trees, residents demonstrated their role in ensuring that trees remained an important symbol of New Orleans, as well as their determination to recover in the face of widely broadcast doubts about the future of their city.*

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K.G. Tidball (✉)  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: kgtidball@cornell.edu

The morning after the storm, hundreds of live oaks still stood among the rubble along the coast. They held in their branches a car, a boat, pages torn from books, furniture. Some people who managed to climb out of the windows had clung to the oaks for survival as the waters rose. These ancient trees, some as many as five hundred years old, remain as monuments not only to the storm but to something beyond Katrina as well – sentries, standing guard, they witness the history of the coast. Stripped of leaves, haggard, twisted, and leaning, the trees suggest a narrative of survival and resilience. In the years after the storm, as the leaves have begun to return, the trees seem a monument to the very idea of recovery.

Natasha Trethewey, Poet and Author

From her book (2010) *Beyond Katrina: A Meditation on the Mississippi Gulf Coast*

## Introduction and Background

Hurricane Katrina made landfall in New Orleans, Louisiana, USA on August 29th, 2005. The story of New Orleans' struggle to endure weeks of inundation and devastation, and months of disorganized efforts to recover from the disaster, is well-known (United States 2006; Waugh 2006; Brunsmma et al. 2007). However, the important symbolic roles of trees and the act of tree-planting in post-Katrina New Orleans as part of the disaster and recovery discourse are less well-known.

Returning residents related to me many stories about the New Orleans landscape before Hurricane Katrina, the role that trees played in their lives, how after the storm they used trees as landmarks to find the place where their home once stood, and how the surviving trees gave them hope that they too would persist, would persevere, and would maintain their roots in New Orleans. This relationship between humans and trees, their symbolic meanings as objects and the meanings associated with their planting and care in the wake of a disaster, and the implication of these symbols and interactions on the resilience of perturbed social-ecological systems (SES) is the subject of this chapter. Central is the argument put forward by Berkes and Folke (1998) that systems that demonstrate resilience appear to have learned to recognize feedback, and therefore possess 'mechanisms by which information from the environment can be received, processed, and interpreted' (p. 21, emphasis added). In this sense, these scholars go further than simply recognizing that people are part of ecological systems by attempting to explore the means, or social mechanisms, that bring about the conditions needed for adaptation in the face of a disturbance and therefore resilience. One such resilience-conferring social mechanism extensively documented by Berkes and colleagues is traditional ecological knowledge (Berkes et al. 2000; Davidson-Hunt and Berkes 2003; Berkes 2004; Berkes and Turner 2006). Perhaps, as I submit herein, there are other resilience-conferring social mechanisms, such as social-ecological rituals and symbols.

In this chapter, following from earlier work on 'memorialization mechanisms in disaster resilience' (Tidball et al. 2010), I posit that tree symbols and rituals, and how tree symbols and rituals are remembered, re-constituted, and reproduced,

represent a cluster of social mechanisms that can be viewed as ‘tangible evidence of *social* mechanisms behind social-ecological practices that deal with disturbance and maintain system resilience’ (Berkes and Folke 1998, pp. 21–22). I continue to draw upon Berkes and Folke’s (2002) argument that some SES build resilience through the experience of disturbance, but for this to occur, sufficient memory from both ecological and social sources for reorganization must be present. Thus, I argue, the constellation of social-ecological memories, social-ecological symbols and rituals, and the resulting relationships between human actors and other system components, feedbacks and cycles catalyzed by these relationships, all contribute to system memory, processes involved in ‘regeneration and renewal that connect that system’s present to its past’ (Gunderson et al. 2002, p. 264) and aid in conferring resilience.

Shortly after the floods subsided in New Orleans, community organizers in the city reached out to universities with planning and other related expertise (Foley et al. 2005), including Cornell University’s Department of City and Regional Planning, which created the New Orleans Planning Initiative (NOPI). The Cornell NOPI team, of which I was a member, looked at environmental and open space issues in New Orleans’ 9th Ward using highly-participatory forms of resident-led assessment, planning, design, and development (Reardon et al. 2009). In this chapter I rely on the above experiences and subsequent observations to attempt initial integration of theories of symbol, ritual, ecological anthropology, and SES resilience, following from Van Gennep (1960), Turner (1967), Rappaport (1984), and Berkes and Folke (1998). In so doing I posit that the social-ecological symbol of the tree, the ritual of tree-planting as a form of recovery, and the resulting feedbacks and virtuous cycles (see Tidball et al., Chap. 35, this volume) contributed to SES resilience at multiple scales in post-Katrina New Orleans.

I explore this position in three steps. First, I provide brief and general reviews of the extensive research on the individual and community aspects of exposure to and interaction with trees and other plants as a foundation for this exploration. Second, I present a selective discussion of theories about symbols and rituals, especially related to trees. Third, with these literature reviews and theoretical concepts in hand, I provide elaboration from my New Orleans field study of the use of trees and tree-planting as symbolic and ritual sources and demonstrations of resilience in perturbed SES. Finally, I conclude with a discussion of the importance of tree symbols and rituals in post-catastrophe resilience, with potential implications for other red zones.

## **Background and Literature Review: Human Interaction with Trees**

This inquiry is informed by the anthropological work of Roy Rappaport (1984), who applied a cybernetics or environmental feedback system to the ritual regulation of the Tsembaga people of New Guinea (McGee and Warms 2004, p. 297). In his seminal work, Rappaport applies the ecological concepts of ‘regulatory mechanism’ and ‘negative feedback’ to analyze cyclical behavior among the Tsembaga, and



other Maring-speaking peoples of New Guinea (Rappaport 1984). In this work, Rappaport launches the integration of anthropological and ecological analysis, and reframes ritual as an ecosystem regulatory mechanism (Brown 2008), a foundation I attempt to expand upon in the following pages.

The tree is said to be one of humankind's most potent symbols (Fontana 2003, p. 167). According to Davies (1989), the tree presents itself as a medium of thought through its possession of trunk, roots, and branches, and because it serves as a habitat for other creatures. Further, Davies argued that a tree may stand as 'a living entity spanning many generations and therefore avails itself as a historical marker and social focus of events' (ibid). The life of a tree lasting longer than human generations may provide an analogical resemblance between long lived trees and big families, and the life of a tree spanning from one generation to another facilitates trees being identified with the concept of 'stability/immortality' (Daniels 1989). It is therefore easy to imagine how a tree could symbolize both loss and rebirth.

Frazer, in his seminal work *The Golden Bough* (1915), was among the first to devote significant effort to understanding the symbolic use of trees by humans, though his understanding was later called in to question by other anthropologists (see Wittgenstein 2002). Other important figures in the field of anthropology, such as Victor Turner (1967), have also explored trees in symbol and ritual, because '... trees are used symbolically to make concrete and material the abstract notion of life [and are] ... ideal supports for such symbolic purpose precisely because their status as living organisms is ambiguous' (Rival 1998a, b).

Trees as symbols are employed in multiple ways: to depict life cycle rituals, to make sense of the human body, to visualize kinship, and to express solidarity, continuity and vitality of a community, among others (Rival 1998a, b). Trees as symbols often stand in opposition to the symbols of death and decay. It is this last expression I am focusing on here, how the symbolic elements of tree presence and tree-planting contribute to the solidarity, continuity, vitality, and I would add, resilience, of a community and the social-ecological system within which it resides.

From my own work in New Orleans, I recorded a community member involved in the Tree Trooper course offered by New Orleans greening organization Parkway Partners after the storm, speaking about the importance of being involved in planting trees after Katrina. This person said that trees represent. '...a symbol of our recovery – of re-birth. Every time I pass a place where trees have been replanted it gives me hope'. Another Tree Trooper, who later formed a successful planting operation in New Orleans, said, regarding trees and tree-planting:

to plant trees is to give body and life to one's dreams of a better world. I like that [statement] a lot. What I realized...doing this is that you don't plant trees where there's no hope for a better future... if there's no hope for a future you're not going to put a tree there. What would be the point? ...so if we're not going to be around to see it, then why, why would we plant it?

Whereas these and many other statements from survivors provide testimony of the critical symbolic role of trees in the weeks and months immediately following disaster, research-based evidence for the role of trees in helping people and communities recover from disaster is limited. In a study of residents affected by Hurricane Hugo

(see Hull, Chap. 19, this volume), 30 % of survey respondents identified trees as the most significant feature that was damaged by the hurricane, and cited positive emotions evoked by the urban forest, followed by the importance of trees in defining Charleston as a community or 'place', as being particularly important. Hull (1992) concluded that the role of urban forests as *symbols of cherished meanings and memories* needs to be emphasized as a major benefit deriving from urban forestry. However, research studies that focus specifically on the role of trees and tree-planting and care in post-disaster recovery appear to be lacking.

Despite the paucity of studies specifically on the role of trees and tree-planting in post-crisis ritual, symbol, or resilience, there is a considerable literature documenting people's opinions and attitudes regarding the meanings and values of trees generally (Gorman 2004). Studies have focused on attitudes toward specific species of trees (Sommer et al. 1990; Schroeder and Ruffolo 1996; Anderson 2004), and residents' attitudes and behavior regarding tree-planting and care (Summit and McPherson 1998). Based on the results of research in Chicago IL, Dwyer et al. (1991) argued for an approach to urban forestry that 'takes into consideration the deep psychological ties between people and urban trees and forests'. Similarly, Appleyard (1980) characterized trees as 'anchors of stability in the urban scene'. Perceived economic benefits (Daily 1997), social benefits (Coley et al. 1997; Westphal 2003), symbolic importance (Smardon 1988), and psychological value (Ulrich 1984; Hull 1992; Perlman 1994) of trees and other greenery also have been documented.

The research-based evidence for the role of trees and other greenery or plants in human and community well-being is particularly well-documented. On an individual level, gardening or the ability to see or experience green space is reported to help people recover from grief (Relf 1998), deal with the trauma of war (Helphand 2006; see also Helphand, Chap. 17, this volume), reduce domestic violence (Sullivan and Kuo 1996), quicken healing times and reduce stress (Ulrich 1984), improve physical health (Ulrich 1984; Tennessen and Cimprich 1995), reduce poor birth outcomes (Donovan et al. 2011), and bring about cognitive and psychological benefits for children and adults (Kaplan 1973; Kaplan and Kaplan 1989; Faber Taylor et al. 1998, 2001; Wells 2000). These individual benefits may result in positive impacts on organizations and communities including increased worker productivity (Kaplan 1993), potentially increased consumer traffic and thus purchases in business districts (Wolf 2003), increased property values resulting in greater municipal revenues (Wachter 2004), and creating a sense of connectedness to the community and thus reducing crime (Kuo et al. 1998).

Dwyer et al. (1991) distinguished between the meanings or impacts of trees per se and the act of tree-planting in their study of urban residents in Chicago. According to Dwyer et al. (1991), 'commitment to tree-planting suggests that it has benefits in and of itself that go beyond the expected benefits of the resulting trees' (p. 282). Possible explanations for this strong commitment to tree-planting include: (1) the value of tree-planting as a demonstration of commitment to the future, (2) the act of tree-planting as a significant impact on the landscape over time, and (3) tree-planting as a means of improving the environment (Dwyer et al. 1991). Similarly, Miles et al. (1998) examined the individual level impacts of engagement with nature through

participation in volunteer natural area restoration efforts in Chicago, and found that those volunteers who were more active experienced greater satisfaction. According to Miles et al. (1998), 'restoration is a form of involvement with nature that combines the benefits usually associated with nature activities with the benefits associated with volunteer conservation and leisure activities' (p. 59). Lohr and Pearson-Mims conclude their study of urban tree preference with the boldly unequivocal statement 'Human well-being can be improved by planting trees of any form' (2006, p. 685).

Lest there appear to be naïveté in this argument, a caveat here is appropriate. There are examples of symbols such as trees and forests and their planting or removal being used for less than benevolent purposes or contributing *to* red zones rather than ameliorating them (Guha 1989; Fairhead and Leach 1996; Scott 1998; Cronon 2003; Prudham 2004). For the purposes of this book on greening activities in red zones, perhaps a most salient example exists in the Israel/Palestine territorial conflict. Here, according to Braverman (2009) there are two dominant and highly symbolic tree landscapes: pine forests and olive groves. The pine tree is associated with Zionist afforestation of the Promised Land, while the olive tree symbolizes the long agricultural connection to the land held by Palestinians (ibid). In his book Braverman describes in great depth the story of trees through the narratives of military and government officials, architects, lawyers, Palestinian and Israeli farmers, and Jewish settlers, including cases of trees actually being targeted by military forces, removed, and destroyed, in some cases repeatedly. He says succinctly:

...in this pitting of the pine tree and its people against the olive tree and its people, a discursive and material split is constructed with dogged determination by the two national ideologies that compete in and over the landscape of Israel/Palestine, so that these two tree types assume the totemic quality of their people, reflecting and reifying the standing conflict' (p. 165).

In this conflict the tree's role as an 'ultimate connotator of land' is indisputable, because 'anything connected to land in Israel/Palestine is also strongly aligned with national affiliations' (p. 218); in such a case it is not surprising that trees hold such tremendous national symbolic power. Similarly Perlman (1994) concludes:

... the connection between trees and the military imagination needn't always lead to an embrace of literal militarism and national chauvinism ...yet the presence of trees...can be involved with and invoked by reactionary nationalistic and political movements and lend vitality to authoritarianism and mass violence (p. 108).

The above caveats notwithstanding, the testimony of disaster survivors reported by the media, and studies on the symbolic power, health, and community value of trees and other greenery, together provide strong support for a hypothesis regarding the importance of trees and tree-planting in societal, and ecological, responses and recovery from disaster. Recalling the recognition by the Resilience Alliance (2010) that 'resilience in social systems has the added capacity of humans to anticipate and plan for the future', it is important to keep in mind that though people do not have the ability to decide what is destroyed by a disaster, they do have the ability to decide what is reconstructed (Miller and Rivera 2007). Therefore, that which is reconstructed, like green spaces or an urban forest, symbolizes the cultural, social, political, and ecological ideals that the society values and wants to transmit (Foote 1997;

Baker 2003; Tidball et al. 2010). I invite the reader to continue on in this exploration of how trees and tree-planting reflect and communicate the aforementioned ideals.

## On Symbols, Rituals, and Trees: Theoretical Considerations

The origins of studies of symbols and rituals are found for the most part in the field of anthropology. Since its inception, the field of anthropology has concerned itself ‘as much with the ways in which natural processes are conceptualized and the natural world classified, as with the ways in which human societies interact with their natural environments and use natural resources’ (Rival 1998a, b). The relationship between natural environments that feature trees and rituals and symbols is well described in anthropology, from classics like Victor Turner’s milk tree in *The Forest of Symbols* (1967) to more recent explorations by Rival, Brosse, and others in *The Social Life of Trees* (1998a, b). Trees as symbols often appear in life cycle rituals or are used as kinship models, and are frequently seen deployed as images of continuity and reproduction as contrasted to images of change and destruction (ibid). Trees can also be used to symbolize other values within the built environment (Egenter 1981; Nute 2004). For example, current research in fields of horticultural therapy, natural resources management, city and regional planning, and SES resilience acknowledge both biophysical and cultural aspects (such as ritual, symbol, sense of place, etc.) to trees in urban contexts (see Tidball, Chap. 4 and Stedman and Ingalls, Chap. 10, this volume).

Renowned social scientist and founder of American anthropology Franz Boaz (1935) characterized the symbolic use of trees in Kwakiutl mythology succinctly with his observation that ‘the trees appear personified’ (p. 169). But as Perlman (1994) points out, applying Boaz’s observation to tree symbolism more broadly does not necessarily imply literal animism. Instead, as Perlman indicates, we can think in James Hillman’s (1975) terms, in that speaking of trees as persons is part of giving a place to the psyche’s propensity to personify as a way of defining what or whom is felt as valuable, powerful – ‘as a necessary mode of understanding the world and of being in it’ (p. 13).

New Orleans is said to be home to some of the largest collections of mature trees in the world, containing nearly 50 species, including magnolia, pine, live oak,<sup>1</sup> bald cypress (Louisiana’s official state tree), and red maple (Goudarzi 2006). Historically trees have held special symbolic significance to residents of New Orleans, contributing to identity and sense of place (Anderson 2004; Nell Greenfield Boyce 2005; Kearns 2006; Chamlee-Wright and Storr 2009). City Park in New Orleans boasts the largest collection of live oak trees (*Quercus virginiana*) in the world,<sup>2</sup> 249 of which are registered with The Live Oak Society,<sup>3</sup> an organization founded in 1934 to promote the ‘culture, distribution, preservation and appreciation of the live oak tree’. The

<sup>1</sup> Live oak (1992)

<sup>2</sup> [http://neworleanscitypark.com/live\\_oaks.html](http://neworleanscitypark.com/live_oaks.html)

<sup>3</sup> <http://www.louisianagardenclubs.org/los.html>

Live Oak Society epitomizes the importance of trees to New Orleans, and perhaps to cities more generally. The Live Oak Society began with 43 member trees and as of 2011, boasts 6,698 members in 14 states. There is only one human member of the society at a time according to the by-laws of the Society. That person is the chairman, who is responsible for registering and recording the Live Oak Society member trees. The special significance and appreciation of trees in New Orleans is perhaps best described by the residents themselves, one of whom I interviewed said:

I live 2 blocks from Napoleon and 3 from St. Charles, and the trees are a major reason I first fell in love with New Orleans.

I now begin a turn toward exploration of observations of how, in the wake of Hurricane Katrina, trees as symbols have been observed to take on additional and more explicit meanings related to determination to recover from the disaster and demonstrate community resilience in New Orleans. Further, I describe observation of a kind of ritualization of the act of planting trees, which may result in deepening individual and community commitment to demonstrating and enhancing New Orleans's resilience. But first, some concepts.

## *Symbols*

In a previous study of ritual and symbol in rural Appalachia involving other flora or fauna, my colleague and I describe how the study of symbols and symbolism is both interesting and problematic because a symbol is, by definition, something which stands for something else (Tidball and Toumey 2003, 2007). The following few paragraphs borrow heavily from this earlier work to equip the reader with a general background in symbols and ritual as they relate to trees and tree-planting in red zone contexts.

The field of study dealing with rituals and symbols asks many questions, but the two most prominent remain: (1) *what* does a particular symbol stand for, that is, what is the idea or the thing behind the symbol?; and (2) *how* does a symbol represent something else? Raymond Firth describes the systematic and empirical features of twentieth-century anthropological studies (1973, pp. 92–106) in his historical account of theories concerning symbols and symbolism. Two characteristics are especially important. The first is that the study of symbols is usually centered on ritual, defined here as patterned (or routine) collective symbolic behavior. With this understanding, one can observe and describe the repetitive and predictable aspects of a ritual, and avoid dealing with isolated or idiosyncratic symbols. Given that a ritual is an instance of collective behavior, one expects some common understanding among participants of what the various symbols are supposed to represent. By treating a symbol as a phenomenon that occurs repeatedly and systemically in a regular pattern, and by deriving the abstract signified from the interpretations of multiple participants, the ritual-centered approach gives a good empirical grounding to the study of symbols and symbolism.

The second important characteristic is that anthropological approaches to understanding symbols rely on Ferdinand de Saussure's linguistic theories from his book, *Course in General Linguistics* (1966). Saussure taught that a symbolic relationship includes 'signifieds', that is, ideas that are best expressed by devices such as words, and 'signifiers', which are the devices used to represent an idea. Ideally, the signifier constitutes a clear, direct, and faithful representation of the signified, in which case the two together are called a sign. More commonly, however, sensory signifiers – words, emblems, images, slogans, objects, and so forth – cannot entirely represent abstract thoughts, if only because the sensory can never be equivalent to the abstract.

### *From Symbols to Social-Ecological Symbols and Rituals*

Going deeper into theories of ritual and symbols related to trees requires an understanding of ritual and symbolic analysis. I will limit discussion on ritual and symbolic analysis to that of the approach developed by Victor Turner. Turner's (1967, p. 19) oft-cited definition of ritual is a 'prescribed formal behavior for occasions not given over to technological routine, having reference to beliefs in mystical beings and powers'. Elsewhere he elaborates that a symbol is 'the smallest unit of ritual which still retains the specific properties of ritual behavior' (Deflem 1991) or a 'storage unit' filled with a vast amount of information (Turner and International African Institute 1968, pp. 1–2). Symbols can be located in objects, activities, words, relationships, events, gestures, or spatial units (Turner 1967, p. 19). So then, rituals can be understood as storehouses of meaningful symbols by which information is revealed and regarded as authoritative, as dealing with the crucial values of the community (Turner and International African Institute 1968, p. 2; Deflem 1991). But symbols reveal more than crucial social and religious values. They are also transformative for human attitudes and behavior, and therefore the handling of symbols in ritual exposes the power of symbols to act upon and change the persons involved in ritual performance (Deflem 1991).

Here I put forward a special category of symbols, *social-ecological symbols*, which are related to the concept 'nested ecologies' (Wimberley 2009) and are a natural outgrowth of social-ecological systems, the concept of integrated 'humans-in-nature' systems (Berkes and Folke 1998). Environmental or ecological symbols (Appleyard 1979; Kroll-Smith and Couch 1993), a subset of symbols generally speaking, use biophysical elements in nature to represent an idea. For example, a tree may represent rootedness. I define a social-ecological symbol as a symbol or 'storage unit' containing both social and ecological meanings, and also, more importantly, social and ecological interactions. Tree-planting events or activities are social-ecological symbols. There is an ecological entity, trees, and a social activity, planting trees, which together communicate an idea. Social-ecological symbols, such as communities planting trees after their city is destroyed by a hurricane, can then, in the aggregate, be thought of as social-ecological rituals, storehouses of meaningful social-ecological

symbols by which interrelated social and ecological information is revealed and regarded as authoritative, and is thought of as dealing with the crucial values of the community. These social-ecological symbols and social-ecological rituals can then be seen as sources of resilience and catalytic in the aforementioned resilient systems that appear to have learned to recognize feedback, and therefore show promise to act as '*mechanisms* by which information from the environment can be received, processed, and interpreted' (Berkes and Folke 1998, p. 21, emphasis added).

In contrast to many anthropological symbol and ritual studies that focus on a geographically bound or an ethnically homogenous indigenous group, or a specific neighborhood, in New Orleans I have come to understand the participants or actors in my study of post-Katrina reforestation as members of a distributed community of practice (Lave and Wenger 1991; Wenger 1998a; Smith 2003, 2009), which embodies most predominately symbols and ritual around the act of planting and caring for trees. Tree symbols and tree-planting rituals spanned geographically dispersed neighborhoods and included multiple ethnic groups.

Communities of practice can be thought of as self-organizing systems (Wenger 1998b) and are thought to embody many of the benefits and characteristics of associational life such as the generation of what Robert Putnam and others have discussed as social capital (Putnam 2000; Smith 2003, 2009). Importantly, a community of practice is characterized by mutual engagement in a joint enterprise (in this case tree-planting) and a shared repertoire (Lave and Wenger 1991; Wenger 1998a). A *distributed* community of practice refers to a group of geographically distributed individuals who are informally bound together by shared expertise and shared interests or work (Daniel et al. 2003). Although I leave a detailed description of the New Orleans reforestation distributed community of practice to a different conversation (Tidball and Krasny, unpublished manuscript), the point here is that New Orleans, LA (NOLA) residents organized around a particular area of knowledge and activity (trees and tree-planting) and developed or reconstituted rituals and symbols that at once reinforced and reinvented the accumulated knowledge of the community. This suite of practices contributed to enhancing a sense of joint enterprise (tree-planting) and identity around planting trees as a means of recovery, as consistent with Wenger's descriptions of communities of practice.

### ***Ethnographic, Interview and Content Analysis Methods***

I move now into the field study in which I apply the earlier literature review and theory refinement regarding ritual and symbol and trees and tree-planting. Triangulation of multiple methods were employed (Denzin 1970; Hammersley and Atkinson 1983; Burgess 1984) to understand how tree symbols and tree rituals represent a cluster of social mechanisms that deal with disturbance and influence system resilience. Preliminary understanding of the post-Katrina New Orleans situation was developed using traditional ethnographic methods via my involvement in initial response and recovery efforts immediately after Katrina (Tidball and Krasny 2008).

I used photography and videography to document tree symbols and tree rituals I encountered for later interpretation, and collected and interpreted other images, memorials, art installations, and other artifacts related to tree symbols and rituals. At the same time, public documents were reviewed including after action reports and briefings, plans and proposals for rebuilding in NOLA, press releases and news media coverage. Through this initial work, I was introduced to the leaders of four prominent organizational ‘players’ in reforestation efforts in New Orleans after Katrina; the Louisiana State Forester in New Orleans, and the directors of Parkway Partners,<sup>4</sup> Hike for KaTREEna,<sup>5</sup> and RePlant New Orleans (now defunct). These persons were interviewed in depth over a period of months and years, and fulfilled the role of ‘key informants’ in this work.

I conducted participatory rapid assessments of green infrastructure immediately after the storm, and in 2009 enrolled in and completed the citizen forestry training program that was initiated after Katrina by Parkway Partners called ‘Tree Troopers’. Tree Troopers are trained by the Parkway Partners ‘Releaf New Orleans’ program to act as stewards of newly planted trees and existing trees. I participated in multiple tree-planting events from 2006 to 2011. This participation with New Orleans residents in their reforestation activities represented predominantly applied ethnographic research, focusing on rapid assessment, relying heavily on visual anthropological methods and incorporating participant observation.

During the initial period of exploratory interviewing and item generation (Weller 1998), I conducted 30 short (5–10 min) interviews of New Orleans residents affected by the storm, selected through convenience sampling within neighborhoods varying in the tree canopy, tree replanting, and demographic factors. These interviews contributed to helping me gain a better grasp of factors important to New Orleans residents and of terminology they use to describe their experiences. I transcribed and coded these data using ATLAS.ti software. Codes were inductively generated from the transcripts as opposed to fitting data into predetermined categories. Next I constructed matrices from the data to identify patterns and paradoxes, and to be able to readily compare these data with data from other aspects of the study (Maxwell 2006). Through analyzing the data independently of other phases of the research, I was able to arrive at commonalities and themes in post-Katrina trees and recovery discourses; in this way these data ‘complement’ and ‘expand’ on other phases of this study (Greene et al. 1989; Tashakkori and Teddlie 2003).

During the second phase of data collection, informed by Weller’s (1998) narratives and individual accounts, I conducted expanded, in-depth, unstructured and exhaustive interviews of individuals who referenced trees as part of their recovery during the 30 short exploratory interviews. I recorded and transcribed the interviews, and analyzed and coded the data as described above.

In addition to collecting the narratives, I provided some interviewees with a camera and asked them to ‘photo-essay’ their response to the question: ‘How do

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<sup>4</sup> <http://www.parkwaypartnersnola.org/ReLeafNewOrleansInitiative.html>

<sup>5</sup> <http://www.hikeforkatreena.com/>



trees matter to me after Katrina?’ The interviewees and I then discussed and coded the photographs for emergent themes. This qualitative and participatory research method, known variously as participatory photography, photo-elicitation, photo-voice or photo-essay (Collier and Collier 1986 [1967]; Wang and Burris 1994; Wang et al. 1996; Wang 1999; Singhal and Devi 2003), was used to suggest possible interconnections and relationships across themes derived from the interviews, and to seek elaboration, illustration, and clarification of the results of interviews and participant observation. The photo-essay elaboration provided in this chapter is minimal and intended only to augment the qualitative interview data (but see Tidball and Stedman, unpublished manuscript, for a focused study on trees and post-Katrina recovery using exclusively photo-essay methods).

The interviews conducted over a 6 year period after Hurricane Katrina, as well as photo voice and other visual analysis, were conducted with multiple annual classes or cohorts of volunteer community foresters (the above-mentioned Tree Troopers annual training class), as well as community members at large. These individuals reflected a spectrum of social class, ethnic backgrounds, and age groups.

## Findings

In describing some of the findings of this research, I will first ground the research in ethnographic terms, drawing upon other scholars of tree symbolism and my own observations. Next, I will delineate the various tree symbols encountered in post-Katrina New Orleans specifically, and present elaboration of these tree symbols and their meanings as described by residents. This elaboration includes descriptions of tree symbols with both positive and negative connotations, and is amplified by the photo-essays. I will conclude the findings section of this chapter with a description of the act of tree-planting, by individuals and collectively, as symbol and ritual.

### *Discovering Tree Symbols in Post-Katrina New Orleans*

Numerous examples hint at the importance of trees as symbols throughout the Gulf Coast area stricken by Hurricane Katrina. In one case, I was told a story that over a 100 years ago a member of a Bay St. Louis family kept a live oak tree from being cut when a local road was being built. During Hurricane Katrina, three residents found their way to the oak and hung onto it for more than 3 h, until they were rescued. The tree died after the storm and the three survivors asked a sculptor to carve the trunk into a pair of guardian angels that watched over them.<sup>6</sup> This interesting piece of ethnographic data collected while conducting participant observation is but one example of many trees that have been carved by sculptors, their trunks and main branches still protruding into the air from the coastal soil, but taking on new meanings, layered over old. At least 50 such tree sculptures exist along Interstate 90.

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<sup>6</sup><http://thanks-katrina.blogspot.com/2009/03/update-on-highway-90-sculptures.html>

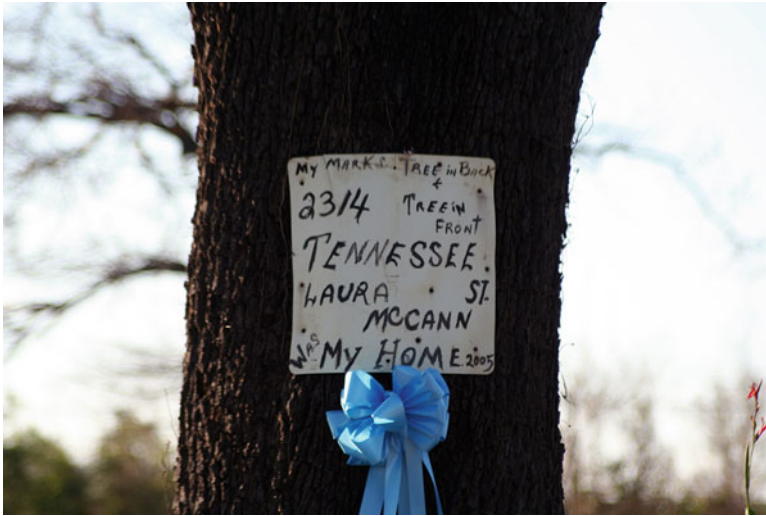
**Fig. 20.1** ‘Scrap House’ installation in downtown New Orleans illustrates central symbolic importance of trees in post-Katrina recovery and remembrance (Photo by Jean Fahr, Parkway Partners)



Ethnographic data collection yielded another example of the idea of the trees being used to communicate about Katrina through their symbolic power in the form of an introduction to the art installation at the Convention Center called ‘Scrap House’.<sup>7</sup> The installation is a tree with a house in its branches, constructed from debris left by Katrina. The tree trunk and branches are made from cut-up 55 gal drums. The artist, speaking about her work, mentions how impressed she was after the hurricane by images of strange assemblages like boats in trees, so she visualized a house blown or washed onto a tree top. The viewer cannot help but contemplate the tree form itself, holding up the house, the home, sheltering a fragile nest. It is also hard not to see in the tree’s form human qualities of arms stretched to heaven, pleading, perhaps from a kneeling position. Of all the many forms and possibilities for a sculpture at perhaps the most visited space in New Orleans aside from Bourbon Street, this particular one leaves the viewer with a strong appreciation for the connection between massive trees and home, of the juxtaposition of the ‘natural’ and built environment, in New Orleans (Fig. 20.1).

The reality of strange assemblages and trees is familiar to many lower 9th Ward residents. I sat on a rocking chair on the porch of a woman I interviewed, who was one of the first Lower 9th Ward residents to return, looking down the miraculously

<sup>7</sup> <http://www.artscouncilofneworleans.org/article.php?story=20081116200403930>



**Fig. 20.2** A surviving tree in the devastated Lower 9th Ward neighborhood of New Orleans, one of many used as symbols and markers of home (Photo by Keith G. Tidball, originally appearing in *Environmental Education Research* Vol. 16, Issue 5-6, 2010, and used with permission)

still tree-lined Tennessee Street. Two years after the storm, I sat in a surreal moment, recalling how impassable this street was directly after the storm, how the houses were scattered amongst the trees, floated away from their steps and moorings, seemingly unaware of the grid and streetscape that was intended to contain and order them. The woman began to speak of the trees, gesturing towards them:

Yeah, they withstood, they withstood the storm... Well those trees are survivors of Katrina because the majority of my things was hooked up in that tree over there, I have pictures to show. When everything broke up, those trees survived Katrina... a lot of them were knocked down, but the farther you go, they were there, you know. Because the way the water went, the force of the water, it went like this (gesturing a flattening motion). Because them [sic] two big houses where the boards was went around it, and well... knocked most things down... Tennessee Street was like a clean slate... Those trees that, say, had about 15' of water, those trees survived, and those down there, some people when the water came, that's what helped them out. They got in the trees where they [rescuers] picked them up, from the trees.

After this interview, I drove down Tennessee Street, where, a few blocks away, I saw a live oak with a sign attached to it, and a pretty blue ribbon. The sign had the address handwritten upon it, and at the same time labeled the tree what it once was, the 'tree in front'. The sign also indicated the property boundaries with the words 'My marks... tree in back and tree in front'. The tree conveyed a message, and served as a marker of occupation, of having been the site of a place called 'home'. There was certainly a tragic overtone in the tree sign, but also one of optimism. The site hadn't been abandoned, and the tree was still alive to convey a message, a claim on the land, as a gift with a pretty bow (Fig. 20.2).

I found many other tree symbols at work in the years after Katrina, evoking roots and rootedness imagery, growth, cycles, and change (Tidball 2009). Supporting evidence for

these interpretations are found in the following pages. All of these images gave rise to the notion that tree symbols and rituals were important to recovery in New Orleans after Hurricane Katrina.

*Memories* of trees were also reported as important symbolically in the wake of Katrina. Similar to the learning through memory experiences of the indigenous communities observed by Berkes et al. (2000), some New Orleans neighborhoods described the importance of their post-Katrina tree-planting in terms of recollections of errors in natural resource management from previous generations and the community's desires to learn from those mistakes (Tidball et al. 2010). This was especially apparent in the neighborhood called Treme, originating in the early nineteenth century.

Claiborne Avenue bisects the Treme neighborhood and historically boasted a wide 'neutral ground' lined with old and stately live oak trees. The public green space is said to have been used as a community gathering place for the area's mostly African-American residents. The construction of an elevated highway through the Treme neighborhood above the oldest section of Claiborne Avenue in the late 1960s is thought to be one of the most controversial developments in the history of New Orleans. After construction, poorly lit asphalt parking lots under the freeway replaced the green neutral grounds, and concrete supports for the highway replaced stately oak trees. Construction of the overpass contributed to the overall decline of the Treme neighborhood in the 1960s and 1970s (Rogers 2009). Remarkably, in 2002, as part of the 'Restore the Oaks' art installation, the outer freeway columns were painted by artists to memorialize the live oak trees that once stood on both sides of Claiborne Avenue.

After Katrina in 2005, some Treme residents began planting trees intensively and with a sense of urgency. During interviews with members of post-Katrina tree-planting groups in Treme, it became clear that memories of the Claiborne Avenue highway development and subsequent loss of trees and neighborhood vitality were playing a large role in present day post-Katrina actions. A community elder recounted:

I am going to go further back (than Katrina)... We lost something... we had these big majestic oaks that city planning and everyone else saw fit to uproot. Along with those oaks we had inherited businesses. So that's the legacy that's lost. So, these trees (we are planting) might be a reminder of what we lost, so that we don't ever forget it and don't let that happen to us again, as well as kind of light a fire under us to ensure that we won't have to worry about a legacy being lost (due to Katrina).

Another community elder related:

We remember, just about five short blocks from here, we have Claiborne Avenue, which was a beautiful corridor of oak trees that, it's unfortunate, but the government came through with the interstate, and they knocked all the trees down...it destroyed the neighborhood; by destroying two hundred or three hundred year old trees, they destroyed the neighborhood. We need to do the opposite of that.

Finally, a tree planter from a neighborhood other than Treme described the situation in this way:

...[Treme is] the oldest African American neighborhood in the country and... it wasn't a tree neighborhood [before Katrina]... people didn't want trees...that's why they didn't have them and then since [before] Katrina...the neighborhood organizations have come to us and



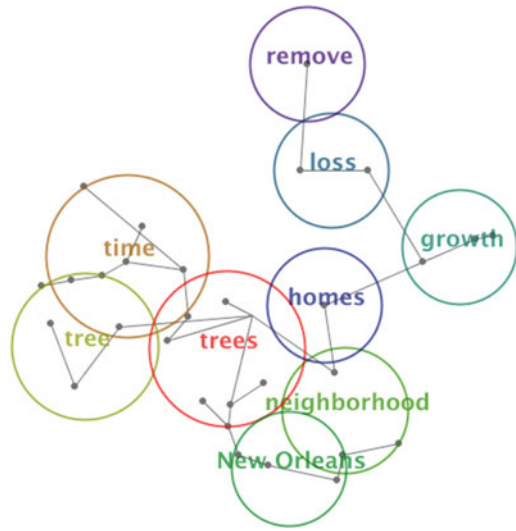
**Fig. 20.3** Paintings of live oak trees created by local artists memorializing the loss of the trees and the tree lined boulevard in the Treme neighborhood of New Orleans (Photo by Jean Fahr, Parkway Partners)

have organized neighborhood plantings of trees and at first the people who were planting were kind of fighting with the people who didn't think trees belonged in Treme... now since the trees are there, everybody's calling, they want trees. We have requests for more than 200 trees in Treme right now and we've already planted 130 there.

In this instance, a social-ecological memory (Barthel et al. 2010) existed among Treme residents about how trees once symbolized vitality, a healthy neighborhood. Simultaneously, community members carried a more foreboding social-ecological memory of how the destruction of their trees decades earlier amounted to the destruction of their neighborhood, creating symbolic import for the idea of not only the absence of trees, but the *taking away* of trees. Only a few years before Hurricane Katrina, tree symbols then reappeared in artistic apparitions meant to communicate the irony of concrete freeway supports standing where once live oaks stood (Fig. 20.3). Finally, the galvanizing effect of Hurricane Katrina's destruction, and seeing how others in New Orleans leveraged the symbol of trees and the ritual of tree-planting to aid in recovery and rebirth, created the conditions for community members in Treme to act upon their own social-ecological memories, symbols, and rituals and plant trees along their streets once again.

Earlier in this chapter I alluded to Victor Turner's classic on symbolism entitled *The Forest of Symbols*. To make some sense of my own growing 'forest of symbols' and meanings, as briefly described above, early in this research I employed a

**Fig. 20.4** Graphic depiction of concepts, themes, connectivity, and relevance from initial interview data and questionnaire of Parkway Partners Tree Trooper class. Note the closeness of concepts of trees and tree with New Orleans, homes, and neighborhood, indicating strong symbolic significance in trees and ideas of place



software content analysis tool called Leximancer<sup>8</sup> to visualize concepts and linkages. I used this tool as a final check on my preliminary understanding of the importance of trees and tree symbols to residents in New Orleans in the context of recovery from Hurricane Katrina. I asked a class of Tree Troopers (the class that I enrolled in) to fill out a questionnaire regarding their personal views on trees and recovery after my interviews with them. Admittedly, the sample is biased by the fact that the participants were already clearly interested and committed to tree-planting; however, the results of this analysis were startling none the less. This initial exploratory analysis of a small group of representatives of the larger New Orleans post-Katrina reforestation community of practice shed light on the way in which concepts like trees and tree-planting permeate social-ecological systems and subsystems (Fig. 20.4). After studying the visualization of concepts, closeness, and connectedness from the data, what was most striking was the closeness of concepts of trees and tree with New Orleans, homes, and neighborhood, indicating strong centrality and symbolic significance in trees and ideas of place.

The founder of Hike for KaTREEena perhaps put it best when she said:

...after the storm people were looking for a way to help and planting trees is an easy way to help and it's a great way to help because you get that instant gratification but you know you get that long-term gratification too and it does mean a lot, trees do mean a lot to people more than just 'hey I'm planting something nice and green and it's going to grow', trees have a lot of symbolism.

<sup>8</sup> <https://www.leximancer.com/>

## *Symbolic Meanings of Trees in Post-Katrina NOLA*

Consistent with the preliminary understanding I gained through participatory observation in New Orleans as briefly described above, content analysis of transcripts of interviews of NOLA residents and photo essays by NOLA residents revealed that NOLA residents have internalized multiple symbolic meanings of trees in different contexts. To make sense of this complex array of meanings of trees, the multiple symbolic meanings have been combined into intuitively formed broad families or types of symbols, and into general categories of meanings derived through multiple coding ‘passes’ through the transcripts. Multiple instances of a particular meaning appearing in a text were counted, even when articulated by the same person more than once. This research indicated that there are three broad families of symbolic meanings of trees: (A) trees themselves as symbols (their presence, their absence, their status); (B) tree-planting as a kind of symbol or symbolic action; and (C) both trees and tree-planting explicitly combined in the discourse. There are 20 general categories of symbolic meanings of trees and tree-planting, representing more than 70 specific and nuanced types of symbolic instances. These categories of symbolic meanings can be further separated into positive meaning and negative meaning groups based on textual analysis of interview data (Fig. 20.5). A neutral group was originally included, but little if any evidence emerged indicating the usefulness of this category.

### **Tree Symbols with Positive Connotations**

Trees as symbols representing positive meanings or connotations included categories such as memorial trees, trees as place icons; trees as refuge; trees as visual cues; trees as short-hand for life, growth, and re-birth; trees representing hope and optimism, trees representing stability and permanence, trees representing therapeutic healing; and trees signifying a return to normalcy. I will touch upon each of these categories briefly.

1. Trees were frequently characterized as representing *survival, stability, strength, and longevity*, acutely legible through resident use of adjectives and phrases for trees such as survivor, survival, perseverance, safety, security, putting down roots, and the correlation drawn by residents regarding the presence of trees and well established neighborhoods.

One resident remarked:

...I know about the live oaks, I know about it being in City Park and Audubon Park and you know along the streets. I know we had a lot of them you know um but the thing is when I went to the Tree Troopers and they say it, how it stood up, how it survived so that’s why it became a symbol.

Another resident invoking ideas of survival stated that:

...the trees represent ‘survival’. The weak ugly tree made it, and is now beautiful, shading, etc. They survive and contribute.

Symbol Family/Type	Gen. Category of Symbolic Meaning	Value	Occurrence
Trees	survival, stability, strength, longevity	Positive (P)	27
	sense of place icons	P	22
	hope, commitment, future	P	16
	life & growth	P	11
	memorials	P	6
	sign of return to normalcy	P	5
	therapy	P	4
	rescuer or refuge	P	2
	visual communication	P	n/a
	removal = punishment/penalty/taking	Negative (N)	16
	damaged = injury/wound/brokenness	N	11
	fallen down = damage/tragedy/loss	N	5
	falling = fear/terror danger/death	N	3
Tree planting	public service	P	18
	commitment to future	P	15
	means of beautifying	P	13
Trees & tree planting	improving environment	P	14
	positive impact on landscape	P	8
	educational	P	6
	liability, risk, hazard, gentrification	N	5

Fig. 20.5 Tree symbol type, categories, meaning value, and occurrence frequency derived from interview data conducted in New Orleans

A resident from a different part of NOLA said:

...a neighborhood with healthy trees just looks more prosperous to me...trees seem to have a notion of, you know, organic life.

A tree trooper said that, for her, trees represented:

...something like stability...it's settled...you know it's a settled neighborhood, that means people have put their roots down.

An elderly resident said that:

...when you pass through streets that have strong trees even the oak trees of course you know have been there a long time then you realize that people have a stake in this neighborhood



and that they're there to stay and the trees show that, the trees show that when they start growing and become full adult trees and, and that they're taken care of and you know the neighborhood and the streets are lined with these beautiful trees and everything. It looks like a neighborhood, it looks like a community. You don't go anywhere in the United States and see well established neighborhoods with no trees. They all have trees so the trees represent and are symbolic of a stable community and when we can get that going in more neighborhoods then people will look at a neighborhood and say 'oh this is a well-established neighborhood, I can see a lot of things happening in this neighborhood'. These people are communicating, they're getting along with each other, they're planting things you know and things are going and they're moving forward in this neighborhood.

2. Trees were often referenced as *sense of place icons*, including trees as attractors, historic trees, trees associated with oral or written traditions, favorite family or yard trees, or trees important for providing a focus for individual, familial, or neighborhood pride. For example, in one NOLA resident's words:

we had people who were going to check on their homes for the first time with the entire family and they would do, they'd encircle a tree and claim it as theirs, as a symbol for their family, for the future, it was their tree... all of a sudden you get a whole family and they encircle the tree, it was very spontaneous on their part... they thought it was their symbol at that moment and they dedicated it to someone else who was lost in the flood you know and it's just really, it was just really a really stunning moment.

3. Trees were frequently invoked as critically important for *representing hope, commitment, and the expectation of a brighter future*, as manifested through the celebrated presence of a newly planted tree, an old tree thought lost to salt water inundation that unexpectedly produces green leaves, flowering trees, trees bearing fruit, reports of numbers of trees planted in NOLA, and affirming reports and comments of passers-by.

Said one NOLA resident, commenting on a particularly dedicated tree planter:

...well I just think that the tree is symbolic to this community effort, and it grows, and from the tree's growth you can say that the community's bonds and the relationship to its own neighborhood grows... so I think that it's a good symbolic, you know, visual image of how we as a community can become closer and safer and we can help each other grow as a community.

Another resident, trying to describe how the trees for him symbolized something inside people, said:

I'm just saying when this looked like a wasteland we were hopeful ...you know, just the condition... you know immediately, you had to have this faith, this love, this belief and it's like ... we're coming here, we're working and I'm just saying that you know I think the trees are a byproduct of that and not necessarily the source or the cause but a byproduct.

4. Similar to how trees express ideas of hope, commitment, and the future, residents who were engaged in recovery and building after Katrina often cited trees as important to them because they represent *life and growth*, including through the production of food and through visual cues, for example green as opposed to brown. One resident interviewed said:

...the tree is really symbolic of progress and growth and as you see the tree growing you know the neighborhood is growing and changing as the tree changes each year and of course we have people who are in the neighborhood now, older citizens and then we expect



**Fig. 20.6** Symbolic use of trees to memorialize unidentified and unclaimed victims of Hurricane Katrina at the New Orleans Katrina Memorial in the Charity Hospital Cemetery at the end of Canal Street at City Park Avenue, in Mid-City New Orleans

the younger people to come in so you see this continuity of growth and development you see and so the trees represent that because we can see the trees as we nurture the trees and we hope people in the neighborhood will come out, take care of the trees, water the trees, do whatever they need to do to keep them growing and beautiful and so as we see this we see the neighborhood getting better and growing so it nurtures the neighborhood too.

Another resident related that:

...to give you an idea of the size of the trailer, it was 154 square feet...but because of the trees surrounding us, because I could get out and walk around the grounds and stand underneath the oak trees which had not been killed, it didn't feel as small at least during the daytime.

5. There are many cases of trees being incorporated as *memorials*, including trees as individual memorials, trees or groves as elements of mass memorials, and informal shrines. A most interesting example of this symbolic use of trees lies in the New Orleans Katrina Memorial in the Charity Hospital Cemetery<sup>9</sup> at the end of Canal Street at City Park Avenue, in Mid-City New Orleans (Fig. 20.6). The memorial includes mausoleums to house the approximately 100 unidentified and

<sup>9</sup><http://www.nolacemeteries.com/charity.html>

identified but unclaimed victims of Hurricane Katrina. The design incorporates shapes of a hurricane and labyrinth, and trees planted and maintained by Hike for KaTREEEna line the outer labyrinthine walkways. A statue of two bronze angels bearing a flaming *fleur de lis* are the focal piece in the center.

Other examples include makeshift memorials and shrines throughout the city, as well as dedicated tree memorials in parks and other open spaces.

6. The presence or appearance of trees in a neighborhood was also mentioned numerous times as sign of a *return to normalcy* by residents affected by Katrina. One NOLA resident described how the presence of trees:

...helps to normalize, it really does you know because now... you know I'm seeing that they have planted a lot of trees on the neutral grounds out here in East New Orleans ... it's great, you know, so like I said the more trees the better.

Another resident expressed optimism and determination in his understanding of how trees helped things seem to be returning to normal:

our city used to be so much more lush with trees than it is now and I want it to come back and I know, well with time, if we just... I'll just keep planting and, and it'll get back to the way it was.

7. Interviews, as well as participatory observation, revealed how trees were seen as *therapeutic* by many NOLA residents, helping with grieving, relieving a sense of hopelessness and despair, and contributing to other forms of coping.

One resident, describing her coping strategies in the weeks after the storm, recalled how she and her husband would:

... take stale bread and go out to City Park and feed the ducks. We would walk around under the trees. That was what we did to keep our sanity.

Another resident, reflecting on the therapeutic qualities trees afforded him said:

...it makes me feel better when there are trees out there ... you can rebuild a house in a year or two but, boy, it takes a long time to get a tree going, it really does... somehow the thought that you know a couple of weeks all of those Japanese Magnolias that we've kind of engineered around the playground are all going to pink at the same time and you're going to have sort of this life coming back to the neighborhood that doesn't look like soon to be gutted houses or yet to be gutted houses or piles of lumber or broken concrete or whatever, I mean I just, I just feel better when the trees are out here, it's not very scientific.

8. As described earlier, trees were mentioned frequently for their role as *rescuer or source of refuge*, as in when trees were used and valorized for finding where one's home was located (Fig. 20.2), when trees were used by people to cling to in periods of high water, or when trees snagged and secured important belongings (see earlier quote by woman on Tennessee Avenue).
9. Trees appeared frequently after Katrina as *visual communication*, in signs, art, and other visual representations such as murals and art installations or collective activist signs, in order to convey messages related to the other described positive meanings of trees (Fig. 20.7a–d).



**Fig. 20.7** A photomontage of trees appearing as symbols on murals and signs to convey ideas about resistance, recovery, and re-birth in Post-Katrina New Orleans

## Negative Connotations of Tree Symbols

Trees and tree-planting as symbols representing more negative meanings or connotations included categories such as falling trees (in the brief period of time when a tree is falling, the ‘falling tree’ invoked intense meanings among respondents), fallen or downed trees, damaged trees still standing, sick or dying trees still standing, loss of trees, tree removal, and absence of trees. As above, I will discuss each of these categories briefly.

10. An important meaning or symbolic interpretation of trees was found in the post-Katrina *removal of trees*. This tree removal symbol was an emotionally charged one, overlapping into feelings of government neglect and ineffectiveness and signifying feelings of unfair punishment, penalty, reprisal, and taking, similar in some cases to grieving the loss of a loved one and in other cases akin to political injustice. Reflecting more political forms of signification were statements like the following:

... you had two separate and real distinct types of damage that happened from Katrina. You had the damage from the storm and the flood that killed and damaged the trees, and then you had the damage that happened from the cleanup effort... now I'm not talking about a church group from Ohio, I'm talking about every guy that's got a chainsaw and a pickup was all of a sudden was a tree company... They didn't have any rules and regulations to go by so there was a lot of confusion... the way that FEMA ran the cleanup operation totally emasculated our existing arborist's companies... and the FEMA people had little or no technical knowledge contributed to the loss of tree canopy in post-Katrina NOLA, a significant loss of tree canopy or trees that need not have been lost.

Another person commented that:

...the problem after the storm was unlicensed arborists were allowed to come into this city and just whack away at the trees... a licensed arborist from Michigan or wherever would come in and cut those trees to the specifics of what they were accustomed to doing in their area. They didn't know anything about live oaks and how it has to spread. They didn't know the live oak doesn't wave in the wind and wouldn't take down that wire. They didn't know the live oak, that the tree has the right-of-way,<sup>10</sup> the wires are secondary that, that's full on in New Orleans.

Reflecting feelings of something being taken, and the associated feelings of loss and grieving were the thoughts of this NOLA resident:

We had a 50-year-old Magnolia in front of our house and after 6 weeks of sitting in brackish water it was a 50-year-old dead Magnolia and that was one of the most heartbreaking things was to have to cut that tree down because we had watched it get bigger. We probably lived in the house for 25 years, watched it get bigger... that tree was planted in about 1950 when this neighborhood was developed um and it had been there and it was so massive that it was taller than the house and we watched generations of squirrels grow up in that thing, in that tree, we watched them build a nest, we watched, we fed the squirrels, we had um mourning doves and

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<sup>10</sup> New Orleans has ordinances regulating treatment of trees rooted in public property or rights-of-way, including green strips between sidewalks and curbs. State-licensed arborists are supposed to be hired in the event that such trees must be pruned. Penalties are to be paid in the event that trees are damaged. See New Orleans Code of Ordinances Chapter 106, Article IV.

cardinals and blue jays, there was an entire ecosystem in that tree and that was our pride and joy right in front of the house and when we came back it was a dead tree (clearing throat).

11. Damaged but still standing trees represented a separate kind of symbol, with overtones of meanings involving concepts such as *injuries*, *wounds*, *brokenness*, *exploited vulnerabilities*, *weaknesses*, as well as feelings of disgust and feelings of being overpowered. One resident expressed his feelings of double disappointment by the loss of trees and the remaining vestige of them: ‘...they were ugly, you know what, what are you going to do with stumps?’

The feelings of shock when trees needed to be trimmed or otherwise manipulated due to damage or prevention of damage also invoked meanings as described above. A Tree Trooper remarked:

Katrina came and the tree didn’t fall even though while I was gone my husband was concerned that any limbs would cause some damage so he did have somebody to come in and trim and it’s like golly, it’s so ugly to me you know?

Another resident conveying succinctly the feelings around the symbolic power of dead trees said: ‘I’d rather have no trees than a dead tree’.

12. Some residents described how fallen or downed trees symbolized for them broader feelings of *damage*, *tragedy*, and *loss* brought about by hurricane Katrina. One elderly gentleman, struggling to control his emotions talked about how he:

... had to remove broken trees that meant something special—[trees planted when we] first moved in, child born, got cancer, loved one died...

Another resident described the scene after the storm had dissipated:

Once we got to the city road, it was like somebody had dropped matchsticks, I mean all the telephone lines were down, wires were everywhere, trees were down, I mean you couldn’t even see the street, all the trees were down and my first thought was this is like a really bad Armageddon movie.

The language of many residents’ ‘storm stories’ has the marks of the sign/signifier relationship described earlier, such as this survivor’s comment that the downed trees were:

... the most immediate visible sign of destruction after the storm. I guess it also had to do with my previous relationship to trees and woods and the peace and grounding I often found in those environments and the realization that the one thing that grounded me and gave me comfort and security had just been totally destroyed in a matter of hours and that I had just had a front row seat to that destruction. I suppose the bottom line was that if I was going to be ok then I had to do something about making the trees ok.

13. Many residents described the terror they felt when they observed a *tree(s) being uprooted, or snapping, and falling down*. This negative meaning of the symbol of tree is an example of how the destruction of a symbol with a positive meaning itself becomes a negative symbol.

I asked one resident what was the worst part of enduring the storm as it was unfolding. The response was:

...the hours riding out the storm were spent watching the trees fall down and break and uproot and for all those hours that the storm lasted all I heard was the constant sound of the trees falling and breaking.

Another resident described the effect the storm's lashing of the trees had on her:

the woods and the trees, it was decimated . . . that was the first, I mean I'd seen trees fall, I'd seen somebody cut a tree and heard it fall and hit the ground and I was like wow, that is, that's powerful, that's strong . . . but to see mother nature do it and to see the trees sway and sway again and sway again and then just to snap . . . that was amazing; or to see it you know just be totally uprooted and fall and crash . . . it's just unbelievably powerful. There's nothing you could do about it.

### Tree-Planting Symbols with Positive Connotations

The act of tree-planting as a symbolic act, or ritual, included categories of meanings that overlapped in some case with those above, such as demonstration of hope and commitment to the future, a means of beautifying the neighborhood, and a form of public service.

14. The act of tree-planting and the presence of tree-planting events also were repeatedly referenced as symbolic of a kind of *duty and public service*. One volunteer, engaged in a massive college service day involving tree-planting, commented:

. . . it's cool because we're going to be out here for a couple hours and I mean altogether we're planting 250 trees, something like that, and just bringing back that whole idea of you know you can, even if we only plant 2 trees today, that makes a difference, you know, going back to just a couple people working together doing, you know, even a small thing. This happens to be a huge [planting] day, but she (Monique Piliè of Hike for KaTREEena) goes out there and plants in much smaller quantities . . . it's just one person making a difference and here in this city in general you really see that a lot and it's exciting you know.

15. The act of tree-planting and the existence of tree-planting events and artifacts were reported to serve as a visual signal for all to view, and a *demonstration of commitment to the future*. One resident described how:

the trees are, well you know you plant a tree and there's such a significant accomplishment, you just feel so good, it makes you feel good and when you see it it's there, it's not like you know you have a flag on your house . . . it might take 6 or 8 months to get the rest of the house and you're still waiting for a check and you can't get the Road Home<sup>11</sup> to give it to you and you have lots of obstacles, but you do have your trees in your neighborhood and you can look down that street and you can see that 'okay we are making progress . . . the trees are back, there's some houses here you, and it's starting to look like my place again, it's starting to be my home again'.

A young person, discussing trees and hope, said:

Well for me it's been a total change from feeling kind of like negative feelings about driving around the city and feeling kind of negative about all the, you know, devastation and everything . . . starting to plant trees has made me totally feel positive and hopeful and like I'm actually making, you know, helping with the solution and not just sitting around grumbling.

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<sup>11</sup> The Road Home program is the largest single housing recovery program in US history and is designed to provide compensation to Louisiana homeowners affected by Hurricanes Katrina and Rita for the damage to their homes. See <https://www.road2la.org/about-us/default.htm>

16. The act of tree-planting and the existence of tree-planting events served as a means of *beautifying a neighborhood*, which appeared in the preliminary content analysis adjacent to ideas of alive. One NOLA resident explained:

...it just seemed like a good idea. Why wouldn't you plant trees if you could, I mean you, you know you look at streets that look good, they've got trees on them right? They've got to get there somehow.

Another resident elaborated on trees and neighborhood beautification:

I begged the volunteers when they came by... I didn't realize they were going to put some new trees on the neutral ground which we really needed in this block. I guess we lost more than I thought. A neighbor across the street planted those 3 cherry trees and I'm just delighted in seeing them bloom.

### Positive Connotations of Trees and Tree-Planting Combined

In some cases, the interview data yielded instances where residents held ideas about tree and tree-planting meanings that could not be easily separated into either solely tree meanings or solely tree-planting meanings, indicating that distinctions between tree symbols and tree rituals may sometimes blur, or be unclear. Some of those cases are elaborated below.

17. *Improving the environment*, especially creating shade and wildlife habitats, appeared frequently as positive connotations of both trees themselves and the act of planting trees. Residents expressed great love for their birds and squirrels, and missed them in the weeks and months after Katrina. They hoped that trees would bring them back (see photo essay 1, below). It is important to note that many residents felt it was important for their feelings not to be interpreted as environmental as such, as illustrated by the following two quotes from interviews:

...people talk about the shade but not because they're coming from an environmental perspective... they're talking about being a New Orleans resident and how hot it gets during the summer and how they remember when they had trees they had a cool place to go and it's, it's the same benefit but it's being seen culturally from a different perspective. It's being called by a different name.

And similarly,

...nobody here ever talks about global warming. I don't hear in conversation people speak about global warming but they talk about patience and wisdom and their grandmothers and they talk about what their homes looked like before Katrina and the amazing trees they had before Katrina. Nobody's ever talked to me about the environmental benefit of it. They talk about the personal benefit of it and wisdom and patience and, and investment for their children. All of these things come up.

18. The combination of trees as symbols and the symbolic rituals of tree-planting were mentioned frequently by residents as symbolizing a *positive impact on the New Orleans landscape* over time. These observations were often linked with ideas about trees and tree-planting as short-hand for investment



and value in a community. One prominent resident comparing well-off neighborhoods with less prosperous ones said:

The Marigny has beautiful sidewalks and functioning gutters and drainage system and trees and St. Roch doesn't have those things at all... it's very easy for children to see that and I think that that affects self-esteem and a sense of self-worth...like how their community values them and looks at them and they get an idea of that from the block that they're growing up on and the area directly around them and where their friends are and if they can walk directly across St. Claude and see something totally different where a different race of people live, that it is very damaging. That makes them go to school feeling like they're not being invested in... so if we could get sidewalks and proper drainage systems and trees in St. Roch...

19. Trees as symbols and the planting of them were also thought of as important for *providing educational opportunities* for members of the New Orleans community after Katrina. One neighborhood leader, recognizing the power of curiosity commented that:

...when people like neighbors in the community see you out with a project like this, this always draws attention and they come out and they want to ask questions and find out what's going on and it's a way to educate the community.

A leader in the community talked about education and the value of education to empower community advocacy, saying:

...we started off in education first... the model that we used was to train a representative from every area so they could be the advocate for the trees in that neighborhood ...they got to be damn good... they are the only group to ever, ever, ever, ever in the history of the city who sat down city representatives and said 'It doesn't make sense what you want to plant' and the city listened. They heard them.

### Negative Connotations of Tree or Tree-Planting Symbols

20. A small number of residents felt that trees meant for them *risk, or stood for liability or hazard*. One resident commented that:

there's some people who are cutting down trees now because they fell, because they were afraid they were going to fall again, you know they lost something, part of their house was lost and so now they're tearing down trees and they, I mean they miss them, they feel bad but they feel like they have to do that and, and we really do need to educate them that if you have a healthy tree so protect your house it's not going to hurt your house.

Another resident shared his assessment of these kinds of feelings and meanings about trees:

there's people that are cutting down all the trees all around their property because they may have had one pecan tree fall on their house and it's going to take a long time to educate them ...but a lot of people speak beyond just technical storm liability and how trees can help.

The primary negative symbolic meaning associated with tree-planting had to do with residents' concerns that tree-planting indicated active or forthcoming gentrification in their neighborhood. A neighborhood elder confided that:

a lot of people see trees as gentrification of their neighborhoods and prices will go up and then the rich people want to move in and it will [cause us to] lose our identify.

## *Corroboration via Photo Essay*

Though the interview data as described above appeared to provide convincing evidence of the many important symbolic and ritual meanings carried by trees and tree-planting in the post-Katrina New Orleans disaster context, and the importance of reforestation rituals emerging and embedded in the dispersed reforestation community of practice, further corroboration was required to better capture these ideas from the perspectives of NOLA residents as seen in their own eyes, and in their own words. To these ends, the following section presents two images and accompanying descriptions as seen and captured from the eyes of NOLA residents themselves. This aspect of the research is used to suggest possible interconnections and relationships across themes derived from the interviews, and to seek elaboration, illustration, and clarification of the results of interviews and participant observation. The photo-essay elaboration provided in this chapter is minimal and intended only to supplement and augment the qualitative interview data (but see Tidball & Stedman, unpublished manuscript, for a focused study on trees and post-Katrina recovery using exclusively photo-essay methods).

### **Photo Essay 1 (Fig. 20.8)**

The thing that hurt the most was (and still is) seeing all those stumps from the dead trees. With diameters wider than my reach, those trees were planted 60 years ago when the area was developed. Shade that covered entire houses is now gone, cardinals no longer sing to me in the morning, and entire families of squirrels that regularly raided my bird feeder have vanished without a trace.

On our first trip home after the storm we got lost while returning to a house we had lived in for 25 years. The trees I had used as landmarks had been chainsawed down, including the two redbuds I had planted in front of our house. Our 50 year old magnolia had survived the winds intact, but had drowned in the brackish floodwaters. You can demolish and rebuild a house in less than a year, but how do you rebuild a tree?

Living in a 154 square foot trailer for 2½ years while we rebuilt left me searching for ways to keep sane and connected. When Parkway Partners showed up at a neighborhood meeting looking for volunteers to plant trees, I leapt at the chance. Upon completion of my tree trooper training, I received a diploma, a baseball cap, and a shovel with my name on it. Since then I have planted trees in Musicians Village and on wide medians along Elysian Fields, Broad Street, and Paris Avenue. I find myself driving along those streets just to check out the progress of the trees, and I am often amazed at how well they have taken root and are growing.

New Orleans is a new city since Katrina. Young people are flocking here and becoming invested in the city's future. New trees are taking the place of the older ones which were lost. My husband jokes that in years to come, someone will point me out as the old lady who planted all those trees.

The trees in the pictures I sent are in Donnelly Park, just across the street from my house. Although I did not plant any of them, they are some of my favorites. Looking out of my kitchen window I can see the beginnings of a small forest which was not there before the storm. We will appreciate the value of all that shade around July, when the summer sun



**Fig. 20.8** Dedication of Donnelly Park in Burbank Gardens, New Orleans, LA, January, 2011. Brass band welcomes guests in front of the largest surviving oak. You can't down the music or the spirit of the neighborhood (Photo and caption by New Orleans resident)

would have turned that old playground into a well baked vacant field. Already we have homes being built on the neighboring streets because of their proximity to the park.

When something like a hurricane knocks you out of your orbit, you must find a new compass to regain your balance. Planting trees has rooted me even more firmly to my neighborhood, has introduced me to neighbors I would never have met otherwise, and has become my investment in the future of this city. Hopefully one day someone will sit under one of those trees and wonder where they all came from, and wherever I am I will be smiling, because I will know the answer.

### Photo Essay 2 (Fig. 20.9)

As I drove up to my home after Katrina, the first thing I saw was that my now leafless live oak was still standing. I stepped out of my car and went to touch the trunk, looking upward to see what damage it had sustained, not realizing until then how much I valued that tree. A large loblolly pine on the front lawn stood tall, broad and graceful and I was proud that its root plate did not look 'rocked' – I trimmed it out for high wind events. But I ultimately cut it down two years after the storm with the rationale that it was too tall, the tallest tree in the neighborhood. I lived in fear during lightning storms that it would draw the strike due to its heavy resin, or that was what I told myself. I felt hollow inside as it was removed and still question did I do it in some irrational post-Katrina fear that it would fall on my house.



**Fig. 20.9** One of many tree symbols referred to by New Orleans residents after Hurricane Katrina... ‘a symbol of the New Orleans I love – flexible, colorful, enduring, and none too upright’ (Photo and caption by New Orleans resident)

And then I went crazy planting native trees that I love on my front lawn: a longleaf pine, parsley hawthorn, red buckeye, eastern redbud, fringe tree, flowering crabapple and even a couple of non-natives. I’m determined to give up grass and restore a mini-forest where that massive pine once was – and they are so lovely – but there is still regret.

The planting of trees confirms that I am staying, putting in roots, reclaiming land that seems a bit more dear. Why the over-kill on planting every type of tree I love? I realize the magnitude of the tree loss in New Orleans and must make up for this. Maybe the trees are a symbol of the New Orleans I love – flexible, colorful, enduring, and none too upright.

## Discussion

The relationship between humans and trees, the symbolic meanings of trees as objects and the meanings associated with their planting and care in the wake of a disaster, and the implication of these symbols and interactions on the resilience of perturbed social-ecological systems is the subject of this chapter. As described earlier, rituals can be understood as storehouses of meaningful symbols by which information is revealed and regarded as authoritative, as dealing with the crucial values of the community (Turner and International African Institute 1968, p. 2; Deflem 1991). In post-Katrina New Orleans, reforestation activities emerged as rituals by

which information that represented a counter-narrative to news media and others who spoke of New Orleans as a ‘failure of resilience’ (Westrum 2006) was revealed and regarded as authoritative. Post-Katrina reforestation rituals acted as storehouses of multiple meaningful tree symbols dealing with crucial community values and concepts such as place attachment and sense of place, resilience and resistance, hope and commitment, and survival and stability. But tree-planting rituals and the symbols contained in them reveal more than crucial social values. They are also transformative for human attitudes and behavior, and therefore the handling of tree symbols in ritual exposes the power of tree symbols to act upon and change the persons involved in ritual performance. Whereas NOLA residents may have been attracted to tree symbols and rituals for reasons such as biological impulses (see Tidball, Chap. 4, this volume) combined with socio-cultural phenomena, for instance, recalling social-ecological memories (Barthel et al. 2010), involvement in memorialization mechanisms (Tidball et al. 2010), or the clear connection of trees to notions of stability and re-birth, the data presented here suggest that subsequent participation in tree-planting rituals appears to change the persons involved such that they experience renewed hope, optimism, and sense of commitment to their neighborhood and to their city, important indicators of community resilience. I have documented how NOLA residents organized around a particular area of knowledge and activity (trees and tree-planting) and developed or reconstituted rituals and symbols that at once reinforced and reinvented the accumulated knowledge of the community via a distributed community of practice centered on trees and tree-planting after Katrina. This, I argue, contributed to enhancing a sense of joint enterprise and identity, and therefore contributed to the resilience of the NOLA social-ecological system. NOLA residents also continue to plant and steward trees, directly adding to the biomass, future urban tree canopy, and the potential capacity of the urban social-ecological system to produce critical ecosystem services (Al-Jiburi et al. 2009). In so doing tree symbols, tree-planting rituals, and those involved in them simultaneously present both a source of and a demonstration of individual, community, and social-ecological system resilience.

The analysis of the data presented here describes trees as symbols with multiple and interrelated meanings, and describes tree-planting rituals as outgrowths from these tree symbols, which gives credence to the hypothesis that the *presence* of tree symbols and tree rituals is of importance to resilience and the process of recovering from a specific disaster or crisis, such as Hurricane Katrina in New Orleans in 2005. Based on the data presented herein, tree symbols and rituals, and how tree symbols and rituals are remembered, reconstituted, and reproduced, represent a cluster of social mechanisms that can be viewed as ‘tangible evidence of *social* mechanisms behind social-ecological practices that deal with disturbance and maintain system resilience’ (Berkes and Folke 1998, pp. 21–22). For New Orleans to continue to build resilience through the experience of the disturbance of Hurricane Katrina, multiple cross-scale activities are required (Ernstson et al. 2010), but for this to occur, sufficient memory from both ecological and social sources for reorganization must be present (Berkes and Folke 2002). In this way I posit, as mentioned earlier, that the constellation of social-ecological memories, social-ecological symbols and

rituals, the resulting relationships between human actors and other system components, feedbacks and cycles catalyzed by these relationships, and so on, all contribute to system memory, processes involved in ‘regeneration and renewal that connect that system’s present to its past’ (Gunderson et al. 2002, p. 264) and aid in conferring resilience.

## Conclusion

Over the last several decades, there has been a debate within the social sciences regarding the relationship of humans and their environments, the extremes of which are characterized by two positions: that people are either agents of landscape degradation or are landscape managers who sustain and increase biological diversity (Lepofsky and Kahn 2011). While I agree with these scholars that realistic models of human-environmental interactions should recognize that individuals and collectives within societies are neither exclusively environmental stewards nor the agents of detrimental ecological changes (Lertzman 2009), I take most from Lepofsky and Kahn’s (2011) assertion that there is limited value in models of human-environmental interaction that ‘vilify the elite and glorify all commoner behaviors’ (p. 331). In Post-Katrina New Orleans, people from all walks of life, various ethnicities, and economic status, from the homeless guerilla gardener to the movie star Brad Pitt, all of whom have inevitably engaged in both landscape degradation and healthy landscape management in the past, came together around a few poignant and multifaceted symbols to form a distributed community of practice and associated symbols and rituals having to do with trees and recovery from a disaster.

This chapter’s intent was to describe trees as symbols, nested within tree-planting rituals, and to describe the importance of the *presence* of tree symbols and tree rituals to the process of recovering from a specific disaster or crisis, Hurricane Katrina in New Orleans in 2005. Further, I endeavored to delineate the role of the *relationship* between individuals or communities and trees and forests, especially in symbolic and ritualistic terms, as an important part of individual or community recovery, and of the resilience of the social-ecological system within which human individuals and communities are embedded. The presence of tree symbols, the social-ecological memories that define them and that inform the rituals that perpetuate them, and the resulting social-ecological relationships between people and trees or forests, as expressed through symbols and rituals, reveals a possible *source* of resilience in this kind of social-ecological system undergoing rapid change.

The broader implication of such a conclusion is that the constellation of social-ecological memories and related factors, as detailed earlier, all contribute to system memory, processes involved in ‘regeneration and renewal that connect that system’s present to its past’ (Gunderson et al. 2002, p. 264). When a system remembers system properties, such as human-nature interactions that produce, restore and enhance mutually beneficial outcomes for biophysical and psychosocial elements of the system,

and those system memories are subsequently reified through social-ecological symbols and social-ecological rituals, a unique possibility for social-ecological system resilience is introduced. Human-nature interactions, particularly those of a class of human-nature interactions called civic ecology practices (Tidball and Krasny 2007; Krasny and Tidball 2012) such as community reforestation, enhance the ability of people in red zones to organize, learn, and act to increase their capacity to withstand, and even grow from, rapid change and uncertainty through nurturing cultural and ecological diversity, through creating opportunities for civic participation or self-organization, and through fostering learning from different types of knowledge.

The research and policy implications and questions of a conclusion such as the above are multiple. Are the findings from this study in post-Katrina New Orleans generalizable? I would answer ‘maybe’, and we need to find out. Clearly there is a need for further study of red zones where this or related phenomena may be observed and better understood. If this phenomenon is recurring, what and how might policy makers plan differently in terms of inevitable disasters and potential conflict? The importance of rapid responses to facilitate ecological discoveries from major disturbances has been well argued (Lindenmayer et al. 2010). However, the corresponding importance of rapid responses to facilitate social-ecological system discoveries from major disturbances, including documenting human-nature interactions such as the importance of trees and tree-planting as symbols, rituals, and the formulation of communities of practice with broad ramifications for social-ecological resilience, is only recently beginning to be discussed. It is my hope that this exploration of the symbols and rituals that emerged around trees in the recovery of New Orleans will add something of value to such discussions.

## Coda

Reflecting on the role of trees as symbols in disaster contexts, it is impossible not to consider what has recently happened in Japan, in the wake of a massive earthquake and resulting tsunami and nuclear crisis that caused the death of over 22,000 people. As I write, the annual Cherry Blossom festival is underway in my former neighborhood in Washington, DC. The trees were a gift from Japan almost 100 years ago. For many, according to a news article in the *Washington Post* (Ruane 2011) ‘the trees actually symbolize renewal, rebirth... and now more than ever, again rebuilding for the Japanese’. The trees’ blossoms are heavy, and they fall to the ground soon after they bloom, observes James Ulak, senior curator of Japanese art at the Freer Gallery and Sackler Gallery in Washington, DC. ‘Japanese poets from early on took this as analogous to the ephemerality of life’, he tells National Public Radio’s Linda Wertheimer, ‘and this blended with a strong Buddhist notion of transience: things are passing, nothing is permanent’ (National Public Radio 2011). The *Washington Post* (Ruane 2011) news article goes on to quote the president of the Japan-America Society of Washington, who specifically relating tree symbolism to the resilience of the people of Japan, said: ‘if ever there is a time when Americans think about Japan,

it's when the trees are blooming. From that point of view, the cherry blossom festival this year has a very special meaning for all Americans, because it's a chance for us to think about Japan and what has happened there and to do something about it... the Japanese people, I've never known anyone more resilient than they are, after what they went through in World War II, and they got back up on their feet'. The importance of trees as symbols, especially in the context of catastrophes, cannot be understated.

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## References

- Al-Jiburi, F., Campbell, L., et al. (2009). *MillionTreesNYC: Green infrastructure and urban ecology: Building a research agenda* (p. 44). New York: NYC Parks & Recreation.
- Anderson, K. (2004). *Nature, culture, and big old trees: Live oaks and ceibas in the landscapes of Louisiana and Guatemala*. Austin: University of Texas Press.
- Appleyard, D. (1979, April). The environment as a social symbol: Within a theory of environmental action and perception. *American Planning Association Journal*, 45(2), 143–153.
- Appleyard, D. (1980). Urban trees, urban forests: What do they mean? In *Proceedings of the national urban forestry conference* (pp. 138–155). Syracuse: State University of New York College of Environmental Science and Forestry.
- Baker, J. K. (2003). *Landscapes: Nature, culture and the production of space*. Pittsburgh: University of Pittsburgh.
- Barthel, S., Folke, C., et al. (2010). Social-ecological memory in urban gardens—Retaining the capacity for management of ecosystem services. *Global Environmental Change*, 20(2), 255–265.
- Berkes, F. (2004). Knowledge, learning and the resilience of social-ecological systems. Knowledge for the development of adaptive co-management. In *Tenth biennial conference of the International Association for the Study of Common Property*, Oaxaca.
- Berkes, F., & Folke, C. (Eds.). (1998). *Linking social and ecological systems*. Cambridge: Cambridge University Press.
- Berkes, F., & Folke, C. (2002). Back to the future: Ecosystem dynamics and local knowledge. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformation in systems of humans and nature* (pp. 121–146). Washington, DC: Island Press.
- Berkes, F., & Turner, N. J. (2006). Knowledge, learning and the evolution of conservation practice for social-ecological system resilience. *Human Ecology*, 34, 479–494.



- Berkes, F., Colding, J., et al. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, 10(5), 1251–1262.
- Boaz, F. (1935). *Kwakiutl culture as reflected in mythology*. New York: American Folklore Society.
- Braverman, I. (2009). *Painted flags: Trees, land, and law in Israel/Palestine*. Cambridge: Cambridge University Press.
- Brown, J. B. (2008). The wave theory of American social movements. *City and Society*, 6(1), 26–45.
- Brunson, D. L., Overfelt, D., et al. (Eds.). (2007). *The sociology of Katrina: Perspectives on a modern catastrophe*. Plymouth: Rowman & Littlefield Publishers, Inc.
- Burgess, R. G. (1984). *In the field: An introduction to field research*. London: Allen & Unwin.
- Chamlee-Wright, E., & Storr, V. H. (2009). There's no place like New Orleans: Sense of place and community recovery in the ninth ward after Hurricane Katrina. *Journal of Urban Affairs*, 31(5), 615–634.
- Coley, R. L., Kuo, F. E., et al. (1997). Where does community grow? The social context created by nature in urban public housing. *Environmental Behavior*, 29(4), 468–492.
- Collier, J., Jr., & Collier, M. (1986 [1967]). *Visual anthropology: Photography as a research method*. Albuquerque: University of New Mexico Press.
- Cronon, W. (2003). *Changes in the land: Indians, colonists, and the ecology of New England*. New York: Hill & Wang.
- Daily, G. C. (Ed.). (1997). *Nature's service: Societal dependence on natural ecosystems*. Washington, DC: Island Press.
- Daniel, B., Schwier, R., et al. (2003). Social capital in virtual learning communities and distributed communities of practice. *Canadian Journal of Learning and Technology*, 29(3), 113–139.
- Daniels, S. (1989). The political iconography of woodland in later Georgian England. In D. Cosgrove & S. Daniels (Eds.), *The iconography of landscape: Essays on the symbolic representation, design and use of past environments* (pp. 43–82). Cambridge: Cambridge University Press.
- Davidson-Hunt, I., & Berkes, F. (2003). Learning as you journey: Anishinaabe perception of social-ecological environments and adaptive learning. *Conservation Ecology*, 8(1), 5.
- Davies, D. (1989). The evocative symbolism of trees. In D. Cosgrove & S. Daniels (Eds.), *The iconography of landscape: Essays on the symbolic representation, design and use of past environments*. Cambridge: Cambridge University Press.
- Deflem, M. (1991). Ritual, anti-structure, and religion: A discussion of Victor Turner's processual symbolic analysis. *Journal for the Scientific Study of Religion*, 30(1), 1–25.
- Denzin, N. K. (1970). *The research act in sociology: A theoretical introduction to sociological methods*. London: Butterworths.
- Donovan, G., Michael, Y., et al. (2011). Urban trees and the risk of poor birth outcomes. *Health & Place*, 17, 390–393.
- Dwyer, J. F., Schroeder, H., et al. (1991). The significance of urban trees and forests: Toward a deeper understanding of values. *Journal of Arboriculture*, 17(10), 276–284.
- Egenter, N. (1981). The sacred trees around Goshonai/Japan. *Asian Folklore Studies*, 40(2), 191–212.
- Ernstson, H., van der Leeuw, S. E., et al. (2010). Urban transitions: On urban resilience and human-dominated ecosystems. *AMBIO: A Journal of the Human Environment*, 39(8), 531–545.
- Faber Taylor, A. F., Wiley, A., et al. (1998). Growing up in the inner city: Green spaces as places to grow. *Environment and Behavior*, 30(1), 3–27.
- Faber Taylor, A., Kuo, F. E., et al. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior*, 33(1), 54–77.
- Fairhead, J., & Leach, M. (1996). *Misreading the African landscape: Society and ecology in a forest-savanna mosaic*. Cambridge: Cambridge University Press.
- Firth, R. (1973). *Symbols: Public and private*. Ithaca: Cornell University Press.

- Foley, J. A., DeFries, R., et al. (2005). Global consequences of land use. *Science*, 309(5734), 570–574.
- Fontana, D. (2003). *The secret language of symbols: A visual key to symbols and their meanings*. San Francisco: Chronicle Books.
- Foot, K. E. (1997). *Shadowed ground*. Austin: University of Texas Press.
- Frazer, J. (1915). *The golden bough*. London: Macmillan and Co.
- Gorman, J. (2004). Residents' opinions on the value of street trees depending on tree location. *Journal of Arboriculture*, 30(1), 36–44.
- Goudarzi, S. (2006). New Orleans' trees hit by Katrina face uncertain outlook. *National Geographic News*. [http://news.nationalgeographic.com/news/2006/04/0427\\_060427\\_arborday.html](http://news.nationalgeographic.com/news/2006/04/0427_060427_arborday.html).
- Greene, J. C., Caracelli, V. J., et al. (1989). Toward a conceptual framework for mixed method evaluation designs. *Educational Evaluation and Policy Analysis*, 11(3), 255–274.
- Guha, R. (1989). *The unquiet woods: Ecological change and peasant resistance in the Himalaya*. Berkeley: University of California Press.
- Gunderson, L., Pritchard, L., et al. (2002). A summary and synthesis of resilience in large-scale systems. In L. Gunderson & L. Pritchard (Eds.), *Resilience and the behavior of large scale systems*. Washington, DC: Island Press.
- Hammersley, M., & Atkinson, P. (1983). *Ethnography: Principles and practice*. London: Tavistock.
- Helphand, Kenneth. (2006). *Defiant Gardens: Making Gardens in Wartime*. San Antonio, TX: Trinity University Press.
- Hillman, J. (1975). *Re-visioning psychology*. New York: Harper & Row.
- Hull, R. B. (1992). How the public values urban forests. *Journal of Arboriculture*, 18(2), 98–101.
- Kaplan, R. (1973). Some psychological benefits of gardening. *Environment and Behavior*, 5, 145–152.
- Kaplan, R. (1993). *Urban forestry and the workplace. Managing urban and high-use recreation settings* (General Technical Report NC-163, pp. 41–45). P. H. Gobster. St. Paul: Forest Service, USDA.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge: Cambridge University Press.
- Kearns, E. (2006, Winter). Southern comfort. *American Forests Magazine*. Washington, DC: American Forests.
- Krasny, M. E., & Tidball, K. G. (2012). Civic ecology: A pathway for Earth Stewardship in cities. *Frontiers in Ecology and the Environment*, 10(5), 267–273.
- Kroll-Smith, J. S., & Couch, S. R. (1993). *Symbols, ecology, and contamination: Case studies in the ecological-symbolic approach to disaster*. Emmitsburg: National Emergency Training Center.
- Kuo, F. E., Bacaicoa, M., et al. (1998). Transforming inner-city landscapes: Trees, sense of safety, and preference. *Environment and Behavior*, 30, 28–59.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Lepofsky, D., & Kahn, J. (2011). Cultivating and ecological and social balance: Elite demands and commoner knowledge in ancient Ma'ohi agriculture, society islands. *American Anthropologist*, 113(2), 319–335.
- Lertzman, K. (2009). The paradigm of management, management systems, and resource stewardship. *Journal of Ethnobiology*, 29(2), 339–358.
- Lindenmayer, D. B., Likens, G. E., et al. (2010). Rapid responses to facilitate ecological discoveries from major disturbances. *Frontiers in Ecology and the Environment*, 8(10), 527–532.
- Live oak refers to *Quercus virginiana*. See Haller, John M. 1992. *Quercus virginiana: The southern live oak*. *Arbor Age*. 12(5): 30.
- Lohr, V. I., & Pearson-Mims, C. H. (2006). Responses to scenes with spreading, rounded, and conical tree forms. *Environment and Behavior*, 38(5), 667–688.
- Maxwell, J. (2006). *Qualitative research design: An interactive approach*. Thousand Oaks: Sage Publications.
- McGee, R. J., & Warms, R. L. (2004). *Anthropological theory: An introductory history*. New York: McGraw Hill.

- Miles, I., Sullivan, W., et al. (1998). Ecological restoration volunteers: The benefits of participation. *Urban Ecosystems*, 2, 27–41.
- Miller, D. S., & Rivera, J. D. (2007). Landscapes of disaster and place orientation in the aftermath of Hurricane Katrina. In D. L. Brunsma, D. Overfelt, & J. S. Picou (Eds.), *The sociology of Katrina*. New York: Rowman & Littlefield Publishers, Inc.
- National Public Radio. (2011). Japan's cherry blossoms in brief, beautiful bloom. *Morning Edition*, from <http://www.npr.org/2011/03/25/134824522/japans-cherry-blossoms-in-brief-beautiful-bloom>
- Nell Greenfield Boyce (Writer). (2005). New Orleans' live oaks devastated. *Morning Edition*. <http://www.npr.org/templates/story/story.php?storyId=4837070>: National Public Radio.
- Nute, K. (2004). *Place, time, and being in Japanese architecture*. London: Routledge.
- Perlman, M. (1994). *The power of trees: The reforestation of the soul*. Woodstock: Spring Publications, INC.
- Prudham, S. W. (2004). *Knock on wood: Nature as commodity in Douglas-Fir country*. London: Routledge.
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Shuster.
- Rappaport, R. A. (1984). *Pigs for the ancestors: Ritual in the ecology of a New Guinea people*. New Haven: Yale University Press.
- Reardon, K. M., Green, R., et al. (2009). Overcoming the challenges of post-disaster planning in New Orleans: Lessons from the ACORN housing/university collaborative. *Journal of Planning Education and Research*, 28, 391–400.
- Relf, D. (1998). People-plant relationship, p. 21–42. In: S.P. Simson and M.C. Straus (eds.). *Horticulture as therapy: Principles and practice*. Food Products Press, New York.
- Resilience Alliance. (2010). *Resilience Alliance website*. 2008. <http://www.resalliance.org/1.php>
- Rival, L. (1998a). *The social life of trees: Anthropological perspectives on tree symbolism*. Oxford: Berg.
- Rival, L. (1998b). Trees, from symbols of life and regeneration to political artefacts. In L. Rival (Ed.), *The social life of trees: Anthropological perspectives on tree symbolism*. Oxford: Berg.
- Rogers, D. (2009). *Planners push to tear out elevated I-10 over Claiborne*. New Orleans: Times-Picayune.
- Ruane, M. E. (2011). Festivals muted after quake, Cherry Blossom and Sakura Matsuri events to note Japan's tragedy. *The Washington Post*, Washington, DC.
- Saussure, F. D. (1966). *Course in general linguistics*. Columbus: McGraw-Hill.
- Schroeder, H., & Ruffolo, S. (1996). Householder evaluations of street trees in a Chicago suburb. *Journal of Arboriculture*, 22(1), 35–43.
- Scott, J. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Singhal, A., & Devi, K. (2003). Visual voices in participatory communication. *Communicator*, 38(2), 1–15.
- Smardon, R. C. (1988). Perception and aesthetics of the urban environment: Review of the role of vegetation. *Landscape and Urban Planning*, 15, 85–106.
- Smith, M. K. (2003, 2009). Communities of practice. *The encyclopedia of informal education*. [www.infed.org/biblio/communities\\_of\\_practice.htm](http://www.infed.org/biblio/communities_of_practice.htm).
- Sommer, R., Guenther, H., et al. (1990). Surveying householder response to street trees. *Landscape Journal*, 9(2), 79–85.
- Sullivan, W. C., & Kuo, F. E. (1996). *Do trees strengthen urban communities, reduce domestic violence?* Atlanta: USDA Forest Service Southern Region.
- Summit, J., & McPherson, E. G. (1998). Residential tree planting and care: A study of attitudes and behavior in Sacramento, California. *Journal of Arboriculture*, 24(2), 89–96.
- Tashakkori, A., & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks: Sage Publications.
- Tennessen, C. M., & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology*, 15, 77–85.

- Tidball, K. G. (2009). *Trees and rebirth: Resilience, ritual and symbol in community-based urban reforestation recovery efforts in Post Katrina New Orleans*. American Anthropological Association Annual Meeting, Philadelphia.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K. G., & Krasny, M. E. (2008). *Trees and rebirth: Urban community forestry in Post-Katrina resilience* (CFERF Report). Berkeley: Community Forestry and Environmental Research Fellows Program.
- Tidball, K. G., & Toumey, C. P. (2003). Signifying serpents: Hermeneutic change in Appalachian Pentecostal serpent handling. In C. Ray & L. E. Lassiter (Eds.), *Signifying serpents and Mardi Gras runners: Representing identity in selected Souths*. Athens: University of Georgia Press.
- Tidball, K. G., & Toumey, C. P. (2007). Serpents, sainthood, and celebrity: Symbolic and ritual tensions in Appalachian Pentecostal serpent handling. *Journal of Religion and Popular Culture* 17(Fall), <http://www.usask.ca/relst/jrpc/art17-serpents-print.html>.
- Tidball, K. G., Krasny, M., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research* (Special Issue, Resilience in social-ecological systems: The role of learning and education), 16(5), 341–357.
- Trethewey, N. (2010). *Beyond Katrina: A meditation on the Mississippi Gulf Coast*. Athens: The University of Georgia Press.
- Turner, V. W. (1967). *The forest of symbols; aspects of Ndembu ritual*. Ithaca: Cornell University Press.
- Turner, V. W., & International African Institute. (1968). *The drums of affliction: A study of religious processes among the Ndembu of Zambia*. Oxford: Clarendon Press/International African Institute.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- United States. (2006). *The federal response to Hurricane Katrina: Lessons learned*. Washington, DC: U.S. Executive Office of the President and Assistant to the President for Homeland Security and Counterterrorism.
- Van Gennep, A. (1960). *The rites of passage*. London: Routledge & Kegan Paul Ltd.
- Wachter, S. (2004). *The determinants of neighborhood transformations in Philadelphia: identification and analysis: The New Kensington pilot study*. Pennsylvania: University of Pennsylvania.
- Wang, C. (1999). Photovoice: A participatory action research strategy applied to women's health. *Journal of Women's Health*, 8(2), 185–192.
- Wang, C., & Burris, M. (1994). Empowerment through photo novella: Portraits of participation. *Health Education Quarterly*, 21(2), 171–186.
- Wang, C., Burris, M., et al. (1996). Chinese village women as visual anthropologists: A participatory approach to reaching policy makers. *Social Science and Medicine*, 42(10), 1391–1400.
- Waugh, W. L. (Ed.). (2006). *Shelter from the storm: Repairing the national emergency management system after Hurricane Katrina* (Annals of the American Academy of Political and Social Science). Thousand Oaks: Sage Publications, Inc.
- Weller, S. C. (1998). Structured interviewing and questionnaire construction. In R. Bernard (Ed.), *Handbook of methods in cultural anthropology*. Walnut Creek: AltaMira Press.
- Wells, N. (2000). At home with nature: Effects of “greenness” on children's cognitive functioning. *Environment and Behavior*, 32(6), 775–795.
- Wenger, E. (1998a). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.
- Wenger, E. (1998b, June). Communities of practice: Learning as a social system. *Systems Thinker*. <http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml>.
- Westphal, L. M. (2003). Urban greening and social benefits: A study of empowerment outcomes. *Journal of Arboriculture*, 29(3), 137–147.

- Westrum, R. (2006). All coherence gone: New Orleans as a resilience failure. In *2nd symposium on resilience engineering*, Juan-les-Pins. <http://www.resilience-engineering.org/REpapers/Westrum.pdf>.
- Wimberley, E. T. (2009). *Nested ecology: The place of humans in the ecological hierarchy*. Baltimore: The Johns Hopkins University Press.
- Wittgenstein, L. (2002). Remarks on Frazer's golden bough. In M. Lambek (Ed.), *A reader in the anthropology of religion* (pp. 85–89). Oxford: Blackwell.
- Wolf, K. (2003). Public response to the urban forest inner-city business districts. *Journal of Arboriculture*, 29(3), 117–126.

# Chapter 21

## The Risks of Greening in the Red Zone: Creating Afghanistan's First National Park in the Midst of Conflict

Peter D. Smallwood

**Abstract** After two generations of peace, Afghanistan slid into conflict in 1978, turning much of the country into a dangerous red zone. In the midst of this conflict, Afghanistan established its first National Park, Band-e-Amir, to better preserve one of its natural wonders. While such an endeavor may seem frivolous, the environmental planning required to establish the park provided important opportunities for peacebuilding. It set a clear precedent for the involvement of local people in managing their own resources, and led to the central government recognizing and working with a local, democratic institution established to plan and manage Band-e-Amir. It empowered the local people, an ethnic group severely persecuted under previous regimes.

Afghanistan possesses a surprising array of habitats, from lowland deserts to mountain forests of conifer and mixed hardwoods, to alpine meadows. They support an equally impressive array of wildlife species, including such iconic species as the rare snow leopard and Marco Polo sheep. These habitats provide many other opportunities for greening in this red zone. However, working in active conflict zones is inherently risky, even for environmentalists, one of whom was killed in Afghanistan in 2010. While it is difficult to weigh the risks of such work against the benefits, especially when one has lost a friend and colleague, I argue that the work is worth the risks. In addition to the tangible results, such work also reinforces belief in the value of natural spaces. Tending those ideas may be the most valuable thing we can do.

**Keywords** Wildlife • Conservation • Peacebuilding • Sustainable development • Civil society

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P.D. Smallwood (✉)  
Department of Biology, University of Richmond,  
28 Westhampton Way, Richmond, VA 23173, USA  
e-mail: psmallwo@richmond.edu

It was just a few minutes past 5:00 a.m. on Saturday, 9 October, 2010, when I found myself suddenly wide awake. I got my laptop and returned to bed, planning to read a bit of news to put myself back to sleep. But an e-mail had arrived only a few minutes earlier, informing me that half a world away, a few hours earlier, conservationist Dr. Linda Norgrove died in eastern Afghanistan. The risks of working the red zone are very real; even conservation work. Is it worth the risks?

I got to know Linda in 2008, when I served as director of the Wildlife Conservation Society's (WCS) project in Afghanistan. Shortly after arriving in Kabul, I was introduced to Linda, who had been working with the UN in Afghanistan since 2005. When we met, she was serving as director of the UN's Afghan Conservation Corps. Our work overlapped, and we met a number of times to coordinate our efforts. Linda was also generous with her time and insights, describing the key players and programs for conservation in Afghanistan. I will always be grateful for that. I will return to Linda at the end of this chapter.

Given the continuing violence, Afghanistan may seem like an odd place for conservation work, but it is estimated that 80 % of Afghan people depend directly on Afghanistan's natural resources (UNEP 2006). Its geography and geology have given it a surprisingly diverse fauna and flora. Afghanistan comprises flat deserts below 500 m elevation in the southwest, forested mountains in the east, and alpine valleys above 3,000 m in the northeast, with glaciated mountains reaching beyond 7,000 m. As one small measure of that diversity, Afghanistan has at least nine native species of cat, more than twice the number of native cat species found in all of the USA and Canada combined. Afghans have no doubt depended upon this bountiful diversity through centuries of both peace and strife. In that sense, it should be no surprise that greening in the red zones of Afghanistan includes wildlife conservation.

As you might expect, much of Afghanistan's wildlife appears to be declining, mostly from the pressures of overgrazing the land to support a rapidly growing, very poor population. The atrocities of war over the last 30 years have contributed directly and indirectly to wildlife declines and poverty, as well as other red zone phenomena. Afghanistan's rural people are aware that their wildlife is declining, which disturbs them for both pragmatic and spiritual reasons. The practical concerns are obvious; hunting provides meat and trade goods. But in small villages in the mountains of Afghanistan, I found another concern. They sense that these magnificent animals are part of their landscape; part of God's gifts to them. For example, the Wakhi in the mountains of northeastern Afghanistan build shrines of skulls and horns of the animals they have hunted, to remind them to be grateful for the wildlife (Fig. 21.1). It pains them to think that these gifts may be lost to their children. This pain helped us to connect the mission of WCS—conserving the earth's biodiversity—with their local efforts towards greening their red zone, preserving their natural heritage.

The WCS program in Afghanistan is a large one, with projects ranging from biological surveys of wildlife and grasslands, to environmental education for children in schools and adults, to helping Afghanistan establish the legal instruments necessary to



**Fig. 21.1** Shrine to wildlife, built by Wakhi hunters: Wakhan, Badakhshan Province, Afghanistan (Photo credit, Beth Wald, WCS)

manage their natural resources in a more sustainable way (Bedunah et al. 2010; Harris et al. 2010; Ostrowski et al. 2009; Timmins et al. 2009; see Zahler 2010 for an overview). Here, I will describe only our work in Band-e-Amir, where we helped Afghanistan establish its first National Park. This is where we overlapped with Linda.

Band-e-Amir, in Bamiyan province of central Afghanistan, has a long history of consideration as a national park, starting in the 1970s. Its main attraction is a series of clear blue lakes, held back by natural rock formations known as travertine. Lake Haibat has the most impressive of these dams, a curtain of rock, over 10 m tall at its peak (Fig. 21.2). In more peaceful times, the lake and a religious shrine on its shore drew Afghan and international tourists, providing economic opportunities for the impoverished Hazara who live in this part of Afghanistan. We were fortunate to have Chris Shank working with us; he began working for a national park there in the 1970s (Shank and Larson 1977), before the bloody coup that ended two generations of relative peace.

Very little of the area's larger wildlife has survived the pressures of population and poverty, made more acute by Afghanistan's turmoil. Yet, with proper management, Band-e-Amir and nearby areas could be important wildlife areas again. Enthusiasm for the national park also could be harnessed to motivate Afghan officials in establishing the legal foundations for protected areas and green spaces throughout Afghanistan.





**Fig. 21.2** Lake Haibat, of Band-e-Amir National Park, Bamiyan Province, Afghanistan (Photo credit, Chris Shank, WCS. Inset photo credit, Robert Oberndorf, WCS)

Creating a national park in such an extreme situation may seem frivolous. However, this kind of environmental planning can provide important peacebuilding opportunities in red zones, especially at the subnational level (Conca and Dabelko 2003). It can help reconstitute the rule of law necessary for civil society (Conca and Wallace 2009). This is especially true in Afghanistan, where two generations of civil war have damaged the traditions of civil society along with the environment.

In Afghanistan, the first law passed by the post-Taliban parliament was the Environment Law. It requires that local people have a strong voice in the management of protected areas, without providing specific guidance or rules (it is a framework for future law). As the nation's first protected area, the Band-e-Amir National Park set the precedent for future protected areas in Afghanistan. Therefore, we worked hard to establish as strong a role as possible for local civic organizations and community-based natural resource management.

With the assistance of WCS and Shank, the villages within the proposed boundaries of the park formed the Band-e-Amir Protected Area Committee (BAPAC). BAPAC had local and central government representation, and the Governor of Bamiyan province chaired BAPAC. But the majority of its members are local people, elected by their villages. This is the first time they have been allowed to choose their own representatives to work with the government. Taking the time needed to reach consensus, BAPAC drafted a management plan, thereby setting a precedent for having

local voices play the majority role in managing their resources. This management plan was then forwarded to the central government of Afghanistan. Progress was again delayed, this time by disputes between the Ministry of Agriculture and the National Environmental Protection Agency over their respective roles in the management of protected areas. After months of working closely with the senior officials of both organizations, my colleagues and I were able to help them draft regulations that satisfied both organizations.

On Earth Day, 2009, the Director of Afghanistan's National Environmental Protection Agency designated Band-e-Amir a provisional National Park. This represents a major accomplishment for the villagers of Band-e-Amir: it is the first time they have been empowered to work directly with the central government, through their own elected representatives. Extensive press coverage (the dedication was attended by the US Ambassador to Afghanistan) provided all Afghans with an example of local democracy in action; a local civic organization being recognized by the central government. For the Hazara, who have been severely persecuted by preceding governments and have felt neglected by the current central government, the recognition is particularly significant.

The government of Afghanistan has no experience in managing protected areas, and very little experience in cooperation between agencies of the central government, much less between the central government and local organizations. WCS assisted, providing training and support for park rangers, local entrepreneurs, the Governor of Bamiyan Province, and members of the central government, and even assisting in negotiations between different government agencies. WCS played the role envisioned by Blum (2003), stepping in for countries struggling to re-establish civil society.

The future of this park remains uncertain, as does the future of the country. Afghanistan's legal system is a work in progress, and the legal status of Band-e-Amir as a permanent protected area remains tenuous. Afghanistan faces many challenges, and scholars and policymakers alike disagree on the best approach to development in Afghanistan (Blackwill 2011; Miller 2011). Strengthening Afghanistan's social-ecological systems, and especially *sustaining* them, requires building local Afghan expertise, which takes decades (UNEP 2005). It is not at all clear whether the international community will remain sufficiently engaged for that long.

Which brings me back to Linda, and the central question of this vignette: is it worth it?

Among its many projects, the Afghan Conservation Corp established trails at Band-e-Amir during Linda's tenure. In 2008, Linda left Afghanistan to run the UN environment program in Laos, but missed Afghanistan and its people. She returned early in 2010 to help run a project developing sustainable agriculture and water in eastern Afghanistan. She believed strongly in emancipatory conservation, and in questioning the 'hegemonic claims' made by conservationists and park managers. She was committed to exploring 'counter-hegemonic struggles and the real practice of management' (Norgrove and Hulme 2006). She was kidnapped on her way to an irrigation project in eastern Afghanistan, and was killed during a rescue attempt (Burns 2010; Rubin 2010; Walker 2010). It is the inescapable truth of war: people get

killed, and no one is exempt from the risks. Not even well-meaning environmentalists. We must realistically evaluate the accomplishments and the risks, and ask of each project, is greening in the red zone worth it?

I can only give my own answer, for this particular project. My answer is yes. Our tangible achievements may be modest, and they may be tenuous. If I were to weigh only the tangibles against the risks, I would probably conclude that it is not worth it. But I believe in the intangibles. ‘Greening’ is more than planting trees, it is also planting ideas. We have worked with a large number of Afghans, from senior members of the government, to younger Afghans who may grow into positions of influence. In rural areas, we work with village elders, and help establish environmental education in the primary schools. In all these venues, we plant ideas: that local people should have more say in the care of their lands and resources; that sustainable development is possible and even desirable; that communities need both conservation and development to thrive. In the long run, planting these ideas may be the most important thing we do, in a red zone, or anywhere.

*Linda Norgrove’s parents have established a foundation in her memory to continue her work: <http://www.lindanorgrovefoundation.org/linda.htm>*

## References

- Bedunah, D. J., Shank, C. C., & Alavi, M. A. (2010). Rangelands of Band-e-Amir National Park and Ajar Provisional Wildlife Reserve, Afghanistan. *Rangelands*, 32, 41–52. doi:10.2111/RANGELANDS-D-10-00044.1.
- Blackwill, R. D. (2011). Plan B in Afghanistan. *Foreign Policy*, 90, 42–50.
- Blum, D. W. (2003). Beyond reciprocity: Governance and cooperation around the Caspian Sea (Chapter 5). In K. Conca & G. D. Dabelko (Eds.), *Environmental peacemaking*. Washington, DC: Woodrow Wilson Center Press. 244pp.
- Burns, J.F. (2010, December 3). British tell how rescue by G.I.s broke down. *The New York Times*, p. A8. <http://www.nytimes.com/2010/12/03/world/europe/03britain.html?ref=lindanorgrove>
- Conca, K., & Dabelko, G. D. (2003). The problems and possibilities of environmental peacemaking (Chapter 8). In K. Conca & G. D. Dabelko (Eds.), *Environmental peacemaking*. Washington, DC: Woodrow Wilson Center Press. 244pp.
- Conca, K., & Wallace, J. (2009). Environment and peacebuilding in war-torn societies; Lessons from the UN Environment Programme’s experience with postconflict assessment. *Global Governance*, 15, 485–504.
- Harris, R. B., Winnie, J., Amish, S. J., Beja-Piereira, A., Godinho, R., Costa, V., & Luikart, G. (2010). Argali abundance in the Afghan Pamir using capture–Recapture modeling from fecal DNA. *Journal of Wildlife Management*, 74, 668–677.
- Miller, P. D. (2011). Finish the job: How the war in Afghanistan can be won. *Foreign Affairs*, 90, 51–65.
- Ministry of Agriculture, Irrigation and Livestock (MoAIL). (2009). *Afghanistan’s fourth national report to the convention on biological diversity*. Kabul. Ministry of Agriculture, Irrigation and Livestock. <http://www.cbd.int/doc/world/af/af-nr-04-en.pdf>
- Norgrove, L., & Hulme, D. (2006). Confronting conservation at Mount Elgon, Uganda. *Development and Change*, 37, 1093–1116.
- Ostrowski, S., Zahler, P., Dehgan, A., Stevens, K., Karlstetter, M., & Smallwood, P. D. (2009). Asiatic Black Bear still survives in Nuristan, Afghanistan. *International Bear News*, 18, 14–15.

- Rubin, T. (2010, October 14). An aid worker's courageous success. *The Philadelphia Inquirer*, A23. [http://www.philly.com/inquirer/opinion/20101014\\_Worldview\\_\\_An\\_aid\\_worker\\_s\\_courageous\\_success.html](http://www.philly.com/inquirer/opinion/20101014_Worldview__An_aid_worker_s_courageous_success.html)
- Shank, C. C., & Larsson J.Y. (1977). *A strategy for the establishment and development of Bande Amir National Park* (FO:DP/AFG/AFG/74/016, field document no. 8, December). Kabul: United Nations Development Programme and Food and Agriculture Organization.
- Timmins, R. J., Mostafawi, N., Rajabi, A. M., Noori, H., Ostrowski, S., Olson, U., Svensson, L., & Poole, C. (2009). The discovery of Large-billed Reed Warblers *Acrocephalus orinus* in north-eastern Afghanistan. *BirdingASIA*, 12, 42–45.
- UNEP (2005). *Progress report on the Capacity Building and Institutional Development Programme for Environmental Management in Afghanistan, 2003–2005*. Kabul: UNEP Post-conflict Branch. [http://postconflict.unep.ch/publications/afg\\_PR\\_jan06.pdf](http://postconflict.unep.ch/publications/afg_PR_jan06.pdf)
- UNEP (2006). *Afghanistan's environmental recovery: A post-conflict plan for people and their natural resources*. Kabul: UNEP Post-conflict Branch. [http://postconflict.unep.ch/publications/UNEP\\_afghanistan\\_lr.pdf](http://postconflict.unep.ch/publications/UNEP_afghanistan_lr.pdf)
- Walker, P. (2010, December 27). Aid worker Linda Norgrove nominated for posthumous humanitarian award. *The Guardian*, A8. <http://www.guardian.co.uk/world/2010/dec/27/linda-norgrove-humanitarian-award>
- Zahler, P. Z. (2010). Conservation and governance: Lessons learned from the reconstruction effort in Afghanistan. In E. Fearn (Ed.), *State of the wild 2010–2011* (pp. 72–80). Washington, DC: Island Press. 244p.

# Chapter 22

## Destruction and Replanting of the Urban Forest of Sarajevo, Bosnia and Herzegovina

Igor Laćan and Joe R. McBride

**Abstract** Sarajevo, capital of Bosnia-Herzegovina, experienced severe damage during the 1991–1995 Yugoslav wars. During the 47-month-long Siege of Sarajevo from April 1992 to March 1996, the energy supplies to the city were cut off, and the besieged residents gradually cut down over three-quarters of all urban trees within the siege lines for use as firewood. In addition, some urban green spaces were converted into cemeteries, further reducing the number of urban trees. After the war, the city trees have gradually been replanted using primarily imported tree stock, as most of the local tree nurseries had been destroyed during the siege. This chapter presents the observations and measurements of trees which survived the war, as well as of the trees that have been planted after the war, made in Sarajevo in 2008, 13 years after the siege. We summarize the lessons learned from the Sarajevo experience, regarding both the patterns of damage and the effective strategies for replanting, which include the close relationship between the urban tree damage and the specifics of military operations, the importance of the initial planting stock, and the advantages of collaboration between academic researchers and urban forest managers in a large-scale replanting program.

**Keywords** Former Yugoslavia • Municipal arboriculture • Siege

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I. Laćan (✉)

University Honors Program, Portland State University,  
P.O. Box 751, Portland, OR 97207-0751, USA

Department of Environmental Science, Policy and Management,  
University of California, 230 Wurster Hall #1820, Berkeley, CA, USA  
e-mail: ilacan@cal.berkeley.edu

J.R. McBride

Department of Landscape Architecture and Environmental Planning,  
and Department of Environmental Science, Policy and Management,  
University of California, Berkeley, 230 Wurster Hall #1820,  
Berkeley, CA 94720-1820, USA  
e-mail: Jrm2@berkeley.edu

*Authors Igor Lačan and Joe McBride describe the Bosnian conflict's toll on Sarajevo's urban and nearby forests. After the siege, the city parks department teamed up with university forest scientists to replant what they had lost.*

## Introduction

*Wednesday, November 25, 1992*

Dear Mimmy,

The shooting really has died down. I can hear the whine of the electric saws. The winter and the power saws have condemned the old trees, shaded walks and parks that made Sarajevo so pretty.

I was sad today. I couldn't bear the thought of the trees disappearing from my park. They've been condemned. God, all the things my park has had to go through! The children have left it, Nina forever, and now the linden, birch and plane trees are leaving it forever too. Sad. I couldn't watch, and I can't write any more.

*Zlata's Diary* (Filipović 1994, pp. 104–105)

## *Destructive Events in Cities*

Urban warfare has been a recurring phenomenon during the twentieth century (Machlis and Hanson 2008), often devastating all parts of a city, including urban trees. In Europe, what had been uncommon – the devastation of Louvain and Ypres in World War I (Strachan 2003) – became the norm in World War II, when the destruction of cities and their urban trees, parks and green spaces, reached its apogee. By 1945 many large cities in the Axis countries were nearly completely destroyed, either by aerial bombing (Dresden, Tokyo, Hiroshima and Nagasaki), ground warfare (Aachen), or a combination of the two (Berlin; Dear 1995; Starry 2003). Some large cities in Allied countries were in similar condition, burned down by incendiary bombs (Coventry), or reduced to rubble in a siege (Stalingrad). These cities were rebuilt and their urban forests replanted. Yet only limited systematic studies of the destruction and restoration of urban forests were undertaken (Morris 1997; Cheng and McBride 2006, Chap. 18, this volume), and today 50 years of growth obscures the devastation that had occurred.

Regrettably, there is a region where many cities and their urban forests experienced relatively recent war damage: the south-eastern European countries once comprising the Socialist Federal Republic of Yugoslavia ('former Yugoslavia'). During the early 1990s, former Yugoslavia collapsed in a series of wars, which included urban warfare, genocide, and mass expulsion of people ('ethnic cleansing'). The most infamous instance of urban warfare during the Yugoslav wars was the siege of Sarajevo, the 47 months during which the city was blockaded and bombarded by the Bosnian

Serb forces – effectively turning the city into a large red zone. Energy shortages caused by the siege forced Sarajevo residents to cut their urban trees for firewood, resulting in severe damage to the urban forest. Nevertheless, since the end of the conflict in 1995, the urban forest of Sarajevo has been thoroughly and successfully replanted. This act of replanting – which the Sarajevans started even during the siege, as an act of hope for the future of their city – now provides an excellent recent example of a post-disaster urban forest recovery.

This chapter examines the destruction of the urban and peri-urban forests of Sarajevo, the capital of Bosnia and Herzegovina (BiH), and the factors that shaped the replanting of the city, highlighting the lessons that can be learned from the Sarajevo replanting effort. We also present our observations and measurements (a proxy for tree age) of trees which survived the war and trees planted after the war, and summarize the conversations we had with Sarajevo’s urban foresters during a visit to the city in May 2008.

## Geography and History of Sarajevo

The city of Sarajevo occupies about 141 km<sup>2</sup> of the Sarajevo Basin, extending along the Miljacka River (20–30 m wide, non-navigable) for about 13 km in the E-W direction, and spreading out into the basin to about 3–4 km in the N-S direction. The city includes some level land along the river, but many of the residential areas are built in foothills of the adjacent mountains at an elevation between 511 and 900 m:

...the truly dominant characteristic of the city was the ring of mountains surrounding it, placing the city in a bowl visible and vulnerable to anyone who occupied the rim of high ground on the outside edges. (King 2003, p. 241)

The continental climate of Sarajevo is moderated somewhat by the maritime influence of the Adriatic Sea, but this influence is attenuated by the mountains to the south of the city (Mt. Jahorina, Bjelašnica, and Trebević, all above 1,000 m elevation). Precipitation occurs year-round (yearly avg 825 mm), and snow predominates in winter. The average temperatures range from 1.3°C in January to 19.1°C in July, and the city enjoys an average of 1,830 sunshine-hours per year.

Although settled since prehistory (Munro 1895), Sarajevo first became a notable city during the Ottoman period (1453–1918). A provincial capital, the city was organized around units of *mahala* (neighborhood), each of which contained its own market, mosque, school, etc., connected by a *sokak* (street) or *čaršija* (street with storefronts). Although neither *sokak* nor *čaršija* were typically lined with trees, Sarajevo was already in the seventeenth century famed for its rich urban vegetation (Donia 2006). This consisted of many courtyard trees, either in private yards (often fruit trees) or the school/mosque courtyards. The most notable public trees were the tall poplars (*Populus spp.*), planted in mosque courtyards adjacent to minarets (Fig. 22.1). This minaret-and-poplar pairing endured, to great effect:

the skies of Sarajevo must have appeared as pierced as eyelet lace, for in 1958 Sarajevo had many hundreds of mosques and poplars. (Bertram 1997, p. 2)

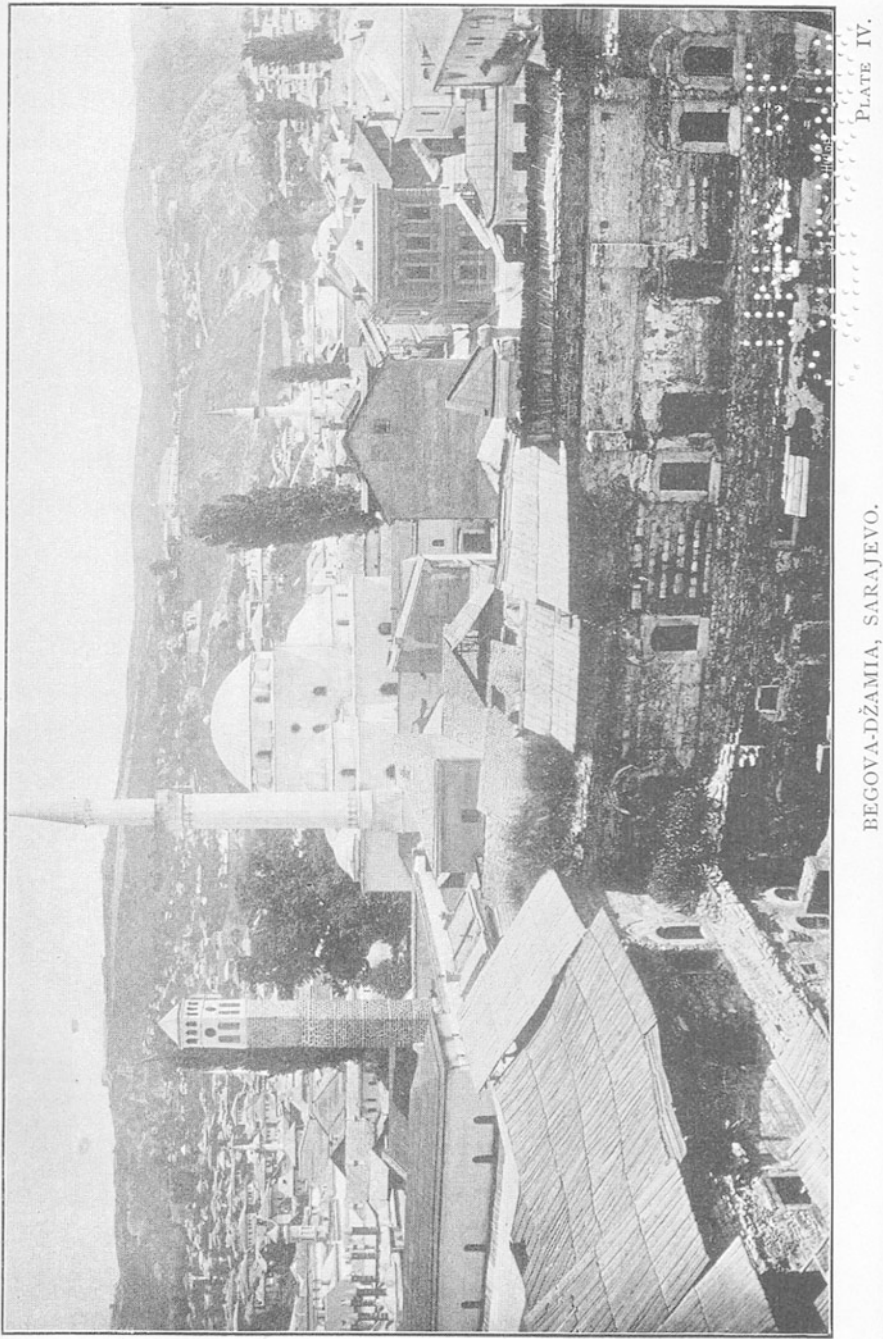
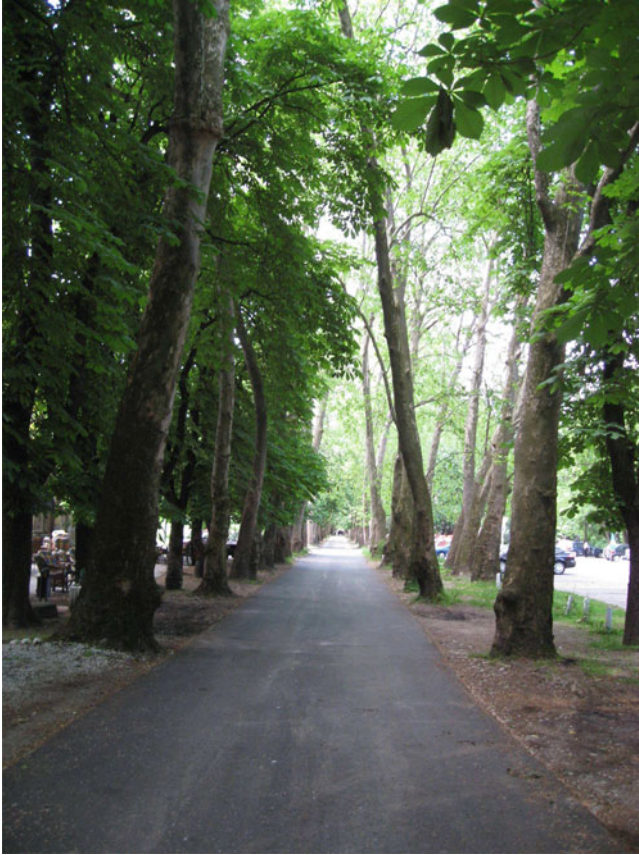


PLATE IV.

BEGOVA-DŽAMIA, SARAJEVO.

**Fig. 22.1** Poplars and minarets in 1895 Sarajevo (From Munro 1895)





**Fig. 22.2** Put za Vrelo Bosne (Bosnia Spring Promenade) in Ilidža park today. London planetrees and horsechestnuts

The second phase of city growth began with the Austro-Hungarian occupation in 1897, which introduced to Sarajevo new architectures and city plans. These included a new street grid, city parks, and tree-lined streets. A prominent example of the latter is ‘Put za Vrelo Bosne’ (the Bosnia Springs Promenade; Fig. 22.2) in the Ilidža suburb, double-lined with two rows of still-extant trees, London planes (*Platanus × acerifolia*) and horsechestnuts (*Aesculus hippocastaneum*).

The third phase in the expansion of Sarajevo occurred in the twentieth century as the population grew from 52,000 residents in 1910 to 430,000 in 1991. Urban trees were planted around newly constructed high-rise residential buildings and along broad boulevards that connected the new parts of town. Bejtić (1973) provides an approximate age distribution for the streets and squares of Sarajevo, and notes that Sarajevo was thus characterized strongly by its Ottoman past (with 50% of all streets and squares predating 1878), but had become in nearly equal measure a modern European city (with 33% of streets and squares built after 1945).

## Sarajevo's Urban and Peri-Urban Forests Before 1991

### *Urban Forest (Before 1991)*

The urban forest of the late twentieth century Sarajevo included plantings from three periods:

1. The pre-twentieth century plantings (Ottoman-period) was characterized by few public trees, but with many private yard trees, and also trees in the many small, partially wooded cemeteries integrated into the city itself which would later be converted into parks (see below).
2. The late nineteenth and early twentieth century plantings (Austro-Hungarian period), which included new tree-lined streets and promenades (e.g., the Miljacka River banks), and saw the construction of the first urban parks, some of which were created by converting the former cemeteries (e.g., Mali and Veliki parks).
3. The Yugoslav period plantings (1918–1991), which greatly expanded the urban forest to include street trees along the many new streets and city parks, and also plantings around the new multi-residential buildings.

The legacy of the latter two periods was visible in the samples we took during our visit to Sarajevo in May of 2008, and suggests the size of the city's pre-war urban trees. For example, the linden trees on Wilson's Promenade (Vilsonovo Šetalište, named after Woodrow Wilson), planted in 1905 (Beus 2009a) about 8 m apart, range from 30 to 69 cm in diameter at breast height (DBH), and average about 19 m in height, forming a closed canopy over the pedestrian walkway on the northern bank of the river Miljacka. Similarly, the large (75–120 cm DBH, 36 m high) London plane trees in the park adjacent to the President's Building are spaced 6–7 m apart, and form a continuous canopy along the park edge.

Individual trees, remnant of the pre-war period, that we observed along streets included a large tree of heaven (*Ailanthus altissima*) which was 100 cm in DBH (but was topped at 13 m); a 9 m tall common linden (*Tilia × europaea*), with trunk of 41 cm DBH but a crown spread of 6 m, very effective in shading the Marijindvor square; and a 28-m tall Lombardy poplar (*Populus nigra*), with a 125 cm DBH. Our sample also included one very large sycamore that possibly dated from the Ottoman period, having a remarkable DBH of 166 cm, and a height 36 m, located next to the old Ottoman-era quarter (Bašćaršija).

### *Peri-Urban Forest (Before 1991)*

Bosnia and Herzegovina is extensively forested, with approximately 43% of the total area covered by forest landscapes, and the forest products industry is an important part of the economy (Pintarić 1998). In this study we consider the forests surrounding Sarajevo that remained inside the siege lines, namely the mountains Hum and Žuč,

and the adjacent hillslopes. These were also largely covered in forests, comprising up to 90% conifers (*Picea abies*, *Pinus sylvestris*, *P. nigra*), but also containing some beech, oaks and hornbeam (*Fagus sylvatica*; *Quercus petraea*, and *Q. pubescens*; and *Carpinus betulus*, respectively). They were typically managed for water-source protection, and slope stabilization, as the local soils are prone to landslides.

## The Siege of Sarajevo

The 47-month Siege of Sarajevo (April 1992 to March 1996) was the longest siege of a European city in the twentieth century (the WW II Siege of Leningrad lasted 29 months). In April 1992, after an unsuccessful attempt to take the city in a ground attack, Bosnian Serb fighters and the remnants of the former Yugoslav army encircled the city and positioned heavy artillery on the surrounding mountains (Silber and Little 1996). The attackers blockaded the roads out of Sarajevo and cut off the water and energy supplies, but would not make any additional attempts to overtake the city. The encircled area encompassed most of urban Sarajevo (except the Serb-held neighborhoods Ilidža, Grbavica, and Kolonija) and a few forested hills to the north, although the siege boundary extended almost into the city center in the Grbavica neighborhood.

Rather than attempt additional ground assaults, the Bosnian Serb forces began to shell the city, resulting in an average of 329 shell-impacts per day, for an estimated total of 2,600,000 shells (Donia 2006). The shelling, along with snipers, killed an estimated 11,000 Sarajevans, and wounded another 50,000. Among the siege victims were three professors of the Faculty of Forestry at the University of Sarajevo, and twelve employees of the Park-Sarajevo public company. Almost every building in the city was damaged (including the Forestry Faculty building and the Park-Sarajevo facilities), and some 35,000 structures were completely destroyed (Association des Architectes DAS-SABIH 1994). Damage to the public utilities and business infrastructure exceeded US \$30 billion, while 100,000 jobs had been lost (Donia 2006). The city's tree nurseries, once the largest in Yugoslavia and operated by the municipal company Park-Sarajevo, were also destroyed. Two characteristics of the siege, which greatly influenced the damage to the urban forest of Sarajevo, were noted by King (2003, p. 273):

...[the artillery shelling was] aimed at political or psychological targets rather than at any target that could help take the city. Sniper fire was random and designed to make life miserable for the citizenry, not to support an overall military assault as at Stalingrad [in WW II].

Despite the arrival of the UN peacekeepers in late 1992, the siege continued through 1993 and 1994. In the fall of 1995, after several well-publicized massacres and with the mounting evidence of genocide, NATO intervened by intensively bombing Bosnian Serb positions in September 1995. After the peace agreement at Dayton was signed in November 1995, Bosnian Serb forces gradually withdrew and the siege was declared lifted on February 29, 1996 (BBC 2008).

**Table 22.1** Damage to the urban trees and green spaces in Sarajevo, 1992–1995

Component	Inventory in 1992	Destroyed in siege, 1992–1995	
		Total	Percent destroyed
Park lawns	1.59 km <sup>2</sup>	1.23 km <sup>2</sup>	77
<b>Trees</b>	<b>26,211</b>	<b>20,094</b>	<b>76</b>
Shrubs	185,748	111,542	60
Roses	11,193 m <sup>2</sup>	5,772 m <sup>2</sup>	51
Flowers	7,574 m <sup>2</sup>	4,905 m <sup>2</sup>	65
Hedges	12.6 km	2.1 km	17
<b>Park benches</b>	<b>1,711</b>	<b>1,706</b>	<b>99</b>
<b>Park fences</b>	<b>1.6 km</b>	<b>1.6 km</b>	<b>100</b>

From Park-Sarajevo (1996)

Combustible materials in bold

### *Effects on the Urban Forest*

The urban trees of Sarajevo sustained heavy damage during the siege, both directly from military operations and indirectly from being harvested for firewood. Direct damage from artillery shells accounts for a minor part of the overall tree loss because artillery and sniper fire was directed at buildings and residents, and few ground operations and little aerial bombing took place. Nevertheless, Sarajevo arborists report commonly encountering shrapnel embedded in the wood, and a 2008 report on the condition of linden trees on Wilson's promenade lists 'damage from ordnance' on every tree evaluated (Dautbašić et al. 2008).

Firewood cutting was the primary form of damage to trees, as desperate Sarajevans resorted to collecting combustible materials for cooking and heating. After using up the wood products remaining in the city (e.g., shipping pallets, but also their own furniture and books; Cohen 1998), the residents first gathered urban wood debris, then 'harvested' wooden park furniture (e.g., benches; Table 22.1), and finally turned to cutting trees. In some areas, especially those sheltered from the direct view of artillery and snipers, the trees were removed very quickly: 'Not even a month had passed from the moment when the first tree was cut down, until the moment when not a single tree could be seen' (Prstojević 1994, p. 313).

After the trees had been cut, residents turned to digging up tree roots, severely damaging the planting pits in the process. In parks, additional damage was caused when former lawns were converted to vegetable gardens, where the besieged residents grew produce to augment their diet ('the average Sarajevan lost 30 pounds during the siege', Donia (2006)). Cohen (1998, p. 383) describes a Sarajevan who kept rabbits (for food), but had to '... cut back on the rabbits because it was hard to feed them. There was no more grass in Sarajevo. The land has all been cultivated or is covered in graves' (see Helphand, Chap. 17, this volume, for discussion of the importance of gardening in red zones).

The expansion of cemeteries – needed to bury the war victims within the siege lines – also contributed to the loss of Sarajevo's urban forest. Not only were the existing cemeteries rapidly enlarged (and thus lost their trees), but some city parks

were hastily converted into cemeteries, also losing their trees. Although these trees likely would have been cut for firewood, it is this land-use conversion of parks to cemeteries that may prove critical in the future, as it could preclude the restoration of urban trees in these formerly wooded areas.

Not all of Sarajevo's urban trees were cut, however. Although there was little systematic effort to protect trees in the face of energy shortages, some trees were protected as 'military assets' (either by the government or citizens) because they shielded streets, government buildings, or residences from direct view of the snipers. Additionally, because the siege line advanced nearly to city center, many trees were directly exposed to sniper fire and so could not be harvested.

In contrast, the trees located in Serb-held areas of Sarajevo (e.g., in Grbavica, or Ilidža) were not cut for firewood as energy was available to the residents there. However, some of those trees were damaged in fires set to buildings by the residents leaving their homes after the siege, when the Serb-held neighborhoods reverted to Bosnian government control.

### ***Effects on Peri-Urban Forest***

The effects on the peri-urban forests within the siege lines were similar to those on the city trees. Direct military damage occurred where front-line battles were fought, and also where trenches were dug and artillery emplacements constructed.

More importantly, firewood cutting was even more extensive (e.g., slopes of Mt. Hum) and tree roots were removed as well, leading to occasional landslides. In the words of urban forestry professor V. Beus: 'everything that could be cut down, was'. Much like in the city, the peri-urban tree cutting was constrained both by the military operations (artillery, snipers, and – importantly – landmines), and by some localized opposition to tree removal. Beus estimated (personal communication) that several hundred hectares of forest were cut during the siege.

### **Tree-Planting in Sarajevo During the War**

Amazingly, despite the hardships experienced in besieged Sarajevo, plans were made (by Park-Sarajevo) during the siege for replanting the city. Although these plans could not be implemented at the time, Sarajevans recognized the importance of (re)planting at least a few trees as symbols of faith in the future of their city. This led to the transporting by the United Nations of a few Colorado blue spruce (*Picea pungens* 'glauca') from one of the Park-Sarajevo nurseries outside city. These were planted (by V. Beus and S. Hećo) adjacent to the President's Building, and are growing well today. Additionally, seeds of horsechestnut and ginkgo in storage within the city were planted at an abandoned army barracks by S. Hećo of Park-Sarajevo. Because of the proximity to the front lines and the potential danger from snipers and landmines, no replanting of the peri-urban forest took place during the siege.

## Planting-After the War, and Urban Forest of Sarajevo Today

### *Urban Tree-Planting*

The replanting plans, made during the war by Park-Sarajevo and the Faculty of Forestry, indicated that replanting would start on the larger boulevards and avenues, and would then extend into smaller streets. Twenty single-species ‘allées’ (*sensu* planted boulevards) were planned (Table 22.2). Some of these 20 species had not previously been common in Sarajevo (e.g., ginkgo, tuliptree), while others would simply be replacements for the lost trees (horsechestnut, linden).

However, despite the fact that the plans were in place, planting stock was unavailable, destroyed along with the city tree nurseries. After public officials informed the international audiences of the need for help (Bures 2001; Kurspahić 2008), several countries (e.g., Spain, Germany, France, Sweden, Croatia, Japan) contributed planting stock. In addition, funds to support tree-planting were raised by American Forests through their Global Releaf program. The first gift of trees came from Spain: 2000 London plane trees, a species well-adapted to the local climate and widely planted before the war. Japan, on the other hand, donated flowering cherries (*Prunus serrulata*), which had not been common in Sarajevo before the war, but appear to be growing well today. The received trees were for the most part ‘bare root stock’, which was ‘healed-in’ at the partially-rebuilt Park-Sarajevo nursery where it was maintained until planting. The majority of the donated trees were 1–3 m tall, although some were much larger (as tall as 4–5 m; Janjić 2002).

Planting took place under the direction of Park-Sarajevo and the Faculty of Forestry at the University of Sarajevo, and was seen as an opportunity to employ some of the thousands of unemployed people in the city. On occasion, community volunteers were organized to plant trees, but most of the planting was done by the Park-Sarajevo staff and the professors and students of the Faculty of Forestry. To enhance their establishment, the trees were watered for the first 2 years after planting using the municipal water trucks.

**Table 22.2** Planned allées of Sarajevo, tree species

1. Linden allée ( <i>Tilia cordata</i> <sup>a</sup> )	2. Horsechestnut allée ( <i>Aesculus</i> spp.)
3. Planetree allée ( <i>Platanus</i> × <i>acerifolia</i> )	4. English oak allée ( <i>Quercus robur</i> <sup>a</sup> )
5. Cherry allée ( <i>Prunus avium</i> <sup>a</sup> )	6. Hornbeam allée ( <i>Carpinus betulus</i> <sup>a</sup> )
7. European ash allée ( <i>Fraxinus excelsior</i> <sup>a</sup> )	8. Narrow-leaved ash allée ( <i>F. angustifolia</i> <sup>a</sup> )
9. Tree-of-heaven allée ( <i>Ailanthus altissima</i> )	10. Silver birch allée ( <i>Betula pendula</i> <sup>a</sup> )
11. Mountainash allée ( <i>Sorbus torminalis</i> <sup>a</sup> )	12. Sophora allée ( <i>Sophora japonica</i> )
13. Tuliptree allée ( <i>Liriodendron tulipifera</i> )	14. Sycamore maple allée ( <i>Acer pseudoplatanus</i> <sup>a</sup> )
15. Ginkgo allée ( <i>Ginkgo biloba</i> )	16. Whitebeam allée ( <i>Sorbus intermedia</i> )
17. Cherry plum allée ( <i>Prunus cerasifera</i> <sup>a</sup> )	18. Crabapple allée ( <i>Malus purpurea</i> )
19. Kwanzan cherry allée ( <i>Prunus serrulata</i> )	20. Sessile oak allée ( <i>Quercus petraea</i> <sup>a</sup> )

<sup>a</sup>Species native to BiH (Šilić 1983)

During our trip to Sarajevo in May 2008, we visited a sample of trees planted in the first few years following the war to record their present size and condition. These trees are typically 6–28 cm in DBH, and 2–14 m tall. All of the trees observed, with the exception of the winter-damaged oriental plane trees (next section), were in very good condition.

Tree-planting is continuing in Sarajevo. Although tree stock is being produced in the Park-Sarajevo nurseries today, much of it still is not large enough for planting, and larger-sized stock continues to be imported, especially from Hungary and Croatia. Unfortunately, some of the smaller planted stock is easily vandalized and saplings have occasionally been pulled from the ground and replanted in private yards.

Urban tree species composition in Sarajevo was comprehensively described by the late professor Nikola Janjić of the Forestry Faculty, University of Sarajevo (2002). In this, his sixth assessment of the cultivated vegetation in the city, Janjić reported a total 219 taxa of woody plants, including 71 trees: 24 conifer taxa (all cultivars) and 47 broadleaf taxa (species and cultivars, not distinguished). Janjić indicated that most of the trees originated from post-war plantings, although a few dated from the 1980s, and only very few remaining trees pre-dated 1980.

Janjić also noted the changing prevalence of tree taxa in Sarajevo, based on his 40 years of observation. Notably, the two species Janjić specifies as becoming ‘most reduced in abundance’ are poplars and the fruit trees (some *Malus*), both species that had been planted in Sarajevo’s earliest urban forest (before the twentieth century). Conversely, the trees that Janjić indicated as ‘very abundant, even overplanted’ include many of the urban trees common in urban forests in the West (Norway maple, horsechestnut, black locust, Chinese elm, and London planetree).

### ***Peri-Urban Replanting***

Replanting of the peri-urban forest was organized by the municipal company Sarajevo-Forests, in cooperation with the Faculty of Forestry. Approximately 40% of the area from which trees were cut has been replanted. Hardwood species are preferred: oaks, maple, beech, hornbeam, and ash (*Quercus* spp., *Acer campestre*, *Fagus sylvatica*, *Carpinus betulus*, and *Fraxinus pennsylvanica*). However, because of continuing limited availability of hardwood seedlings, planting of conifers continues (mostly pines *Pinus nigra* and *P. sylvestris*; and Norway spruce *Picea abies*). The former designation of the peri-urban forests as parks and protected watersheds continues today. Nevertheless, some timber production is planned, and is currently being certified for sustainability by the Forest Stewardship Council (SGS Qualifor 2006).

Other portions of the deforested area are returning to forest cover through natural succession, mostly to non-timber species like birch, aspen and black locust (*Betula pendula*, *Populus tremula*, and *Robinia pseudoacacia*). Yet other deforested areas have been converted to cultivated land by refugees, who have migrated to Sarajevo

from other parts of BiH and taken over land at the margins of the city. These new residents have continued to occasionally clear for gardening some areas that either had been replanted or were returning to forest through natural succession.

One of the most interesting ideas in the peri-urban planting projects is the ‘Ambassadors’ allée’ (Aleja Ambasadora), a section of a local road used as a pedestrian promenade leading to a popular recreation area. Starting in 2002, tree pits have been created along the roadway, and foreign ambassadors in Sarajevo invited to each plant a linden tree, with a plaque marking the ambassador’s country and date of planting. A few dozen lindens have been successfully planted, but one difficulty has been the control of the surrounding (naturally regenerating) trees that are shading out the planted trees (Beus 2009b).

## Lessons Learned

- *Urban tree damage is closely related to the specifics of warfare and military operations.* In red zone Sarajevo, tree cutting for firewood – not the military operations – was the primary cause of damage to the urban forest. The result was a strikingly uneven removal of urban trees from the city, so that some areas lost all their street and park trees, while other areas (some ‘sniper alleys’, Serb-held neighborhoods, etc.) appear today much like they did in 1991. This contrasts with the near complete and spatially uniform destruction of trees in the cities overrun or firebombed in WWII (e.g., Stalingrad, Tokyo, see Cheng and McBride, Chap. 18, this volume). Another specific problem in Sarajevo was the damage to soil surface from people removing tree stumps and from converting parks to gardens (compare to the situation in the ghetto gardens of WW II where sites vacant due to destroyed buildings were planted; Helphand 2006). Soil replacement and extensive re-grading of parks and green strips were often necessary before new trees could be planted.

Some lasting effects of the war on the urban forest are also related to the specific characteristics of the siege. For example, the greatly expanded cemeteries, where tree restoration is unlikely, resulted from the need to bury the siege victims when suburban cemeteries were out of reach. In the peri-urban forest, the land-use conversion to agriculture (by refugees) has also created areas where tree restoration is unlikely. Another lasting effect of the war, and a constraint both to reforestation and to forest management in general, is the presence of landmines. Although most of the peri-urban area has been de-mined (some suburbs only as recently as 2006), some wildland forests are still considered off-limits to foresters.

- *Tree removal was a last resort of people reduced to freezing to death.* As noted in *Zlata’s Diary*, Sarajevans were very proud of their city trees prior to the siege, and damage to trees had been neither common nor tolerated. As an example of this, immediately following the initial attacks in April 1992 – unaware of what extended calamity awaited them – Park-Sarajevo employees and Forestry Faculty professors surveyed the tree damage caused by the first round of shelling, intent





**Fig. 22.3** Tree on Austrijski Trg (Austrian Square) with a basal scar. During the siege, someone started to cut down this tree, but was interrupted by news cameras and, embarrassed, gave up. This situation was, we were told, somewhat common

on ‘sending the bill’ for the damages to the Bosnian Serb fighters. Similarly, Sarajevans even during the siege were quite aware that tree cutting was wrong: we were directed to several large trees with strange basal scars (Fig. 22.3). In what was a repeat occurrence, residents would begin to fell a tree, but then news cameras would appear (to document the wartime hardships) and the tree cutter(s), embarrassed, would abandon their effort.

- *Importance of appropriate planting stock (species, size) and of careful transport and handling of material.* Planting stock donations were welcome in Sarajevo after the war, because the local municipal nurseries had been completely destroyed. However, several problems arose with some planting stock that was initially contributed. A portion of saplings labeled as London plane tree were actually oriental plane tree (*Platanus orientalis*). These saplings were not adapted to the early winters of Sarajevo and suffered frost damage, although the trees still

survive along Zmaja od Bosne Avenue, exhibiting branch dieback and stunted growth. Other donated trees were over-mature (as tall as 4–5 m) and, having had their roots trimmed for transport, did not survive planting. In addition, some hornbeam planting stock, donated during the winter of 1996, had been transported in warm, covered trucks, and had broken bud during transport. Unfortunately, low temperatures in Sarajevo at the time the plants arrived resulted in the freezing death of these trees.

- *Importance of good initial plans (once planted, the trees acquire community support).* In a sign that Sarajevans are again proud of their trees, Park-Sarajevo employees trying to remove the struggling oriental plane trees have met public disapproval, as the residents wish that these trees be retained both as a reminder of the support from European Union, and because they (again) are loath to see any tree removed (see Tidball, Chap. 4, this volume, for a discussion of the psychological importance of the stewardship and restoration of nature in red zones).
- *A remarkably productive cooperation of academic experts and municipal arborists in assessment, planning, and planting.* A partnership between the Forestry Faculty of the University of Sarajevo and the city's municipal arborists was an important contributing factor to the success of the replanting effort. This cooperation, begun with the wartime and post-war planting (e.g., by Hećo, and other Park-Sarajevo employees), continued during the post-war damage assessment and inventories (Janjić 2002) and continues today (e.g., the tree condition assessment by Dautbašić et al. 2008), and will result in an urban forest that is in many regards improved relative to the pre-war condition. For example, guided by the Forestry Faculty professors, the city accepted the donations of species that were previously not planted but are climatically appropriate, e.g., Chinese tallow tree *Triadica sebifera*, and several non-native whitebeam species (*Sorbus*), further increasing the overall tree diversity.
- *Rapid recovery of urban forest after the war with good plans and fast extensive replanting, resulting in multiple benefits.* Sarajevo is still being rebuilt 15 years after the war has ended. Although no longer ubiquitous, the damaged buildings remain (Fig. 22.4), and suggest the magnitude of the destruction that had been wrought by the siege. However, even a well-informed visitor to Sarajevo today is unlikely to accurately estimate the devastation the city's green spaces and urban forest had experienced. This is because the post-war replanting has been so thorough and tree growth so effective in re-creating Sarajevo's urban green canopy. It is only the uniformly small size and height of trees along most streets and in most parks – the streets and parks which themselves appear old – that suggest the recent origin of the trees, and hint at some destructive force that had obliterated the earlier tree population. This rapid restoration of the urban forest has multiple benefits, in addition to the economic and the ecological. The growing trees not only screen and diminish the physical damage in the city, but they also provide a sense of revival, growth, and potential – the qualities which reflect today's Sarajevo and its residents.



**Fig. 22.4** Sarajevo today: the rebuilt and repaired (building, *left*), alternating with the still-common reminders of the war (*right*)

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## References

- Association des Architectes DAS-SABIH. (1994). *Urbicide – Sarajevo = Sarajevo, Une Ville Blessée*. Paris: Centre Georges Pompidou (in English and French).
- BBC. (2008). *On this day – 29 February 1996: Siege of Sarajevo is lifted*. Retrieved November 11, 2008, from [http://news.bbc.co.uk/onthisday/hi/dates/stories/february/29/newsid\\_4667000/4667292.stm](http://news.bbc.co.uk/onthisday/hi/dates/stories/february/29/newsid_4667000/4667292.stm)
- Bejtić, A. (1973). *Ulice i trgovi Sarajeva: Topografija, geneza i toponimija (Streets and Squares of Sarajevo: Topography, Genesys, and Toponymy)*. Sarajevo: Muzej Grada (in Bosnian).

- Bertram, C. (1997). *Ottoman Sarajevo: The urban history of Sarajevo in the Ottoman period and into the period of the dual monarchy*. Retrieved July 30, 2008, from <http://www.friends-partners.org/bosnia/cb1.html>
- Beus, V. (2009a). Stare aleje Sarajeva (Old allées of Sarajevo). *Fondeko Svijet*, 28, 32–33 (in Bosnian).
- Beus, V. (2009b). Nove aleje Sarajeva (New allées of Sarajevo). *Fondeko Svijet*, 29, 50–51 (in Bosnian).
- Bures, F. (2001). Turning gold into green. *American Forests*, 107(1), 44–48.
- Cheng, S., & McBride, J. R. (2006). Restoration of the urban forests of Tokyo and Hiroshima following World War II. *Urban Forestry and Urban Greening*, 5, 155–168.
- Cohen, R. (1998). *Hearts grown brutal: Sagas of Sarajevo*. New York: Random House.
- Dautbašić, M., Trešćić, T., & Višnjić, Č. (2008). *Program sanacije oštećenih stabala u 'Wilsonovom Šetalištu' (Restoration of damaged trees along 'Wilson's Promenade')*. Sarajevo: University of Sarajevo (in Bosnian).
- Dear, I. C. B. (1995). *The Oxford guide to World War II*. Oxford: Oxford University Press.
- Donia, R. J. (2006). *Sarajevo: A biography*. London: Hurst and Company.
- Filipović, Z. (1994). *Zlata's diary: A child's life in Sarajevo*. New York: Viking.
- Helphand, K. I. (2006). *Defiant gardens: Making gardens in wintertime*. San Antonio: Trinity University Press.
- Janjić, N. (2002). Šesti prilog poznavanju nesamonikle dendroflore Sarajeva i okoline. *Sixth contribution to the knowledge of the cultivated woody plants of Sarajevo and surroundings*. Works of the Faculty of Forestry University of Sarajevo 32(1), 53–97 (in Bosnian, with English summary).
- King, C. S. (2003). The siege of Sarajevo, 1992–1995. In W. G. Robertson (Ed.), *Block by block: The challenges of urban operations* (pp. 235–290). Fort Leavenworth: U.S. Army Command and General Staff College Press.
- KJKP Park-Sarajevo. (1996). *Štete na urbanom zelenilu Sarajeva (Evaluation of the war damage to urban greenery of Sarajevo)*. Sarajevo: Kanton Sarajevo (in Bosnian).
- Kurspahić, K. (2008). Trees for Sarajevo after the war. *REC News – The Bulletin 8/1*. Retrieved November 11, 2008, from <http://greenhorizon.rec.org/bulletin/Bull81/Sarajevo.html>
- Machlis, G. E., & Hanson, T. (2008). Warfare ecology. *BioScience*, 58(8), 729–736.
- Morris, E. S. (1997). *British town planning and urban design: Principles and policies*. Harlow: Longman.
- Munro, R. (1895). *Rambles and studies in Bosnia-Herzegovina and Dalmatia: With an account of the proceedings of the congress of archaeologists and anthropologists held in Sarajevo, August 1894*. Edinburgh: W. Blackwood.
- Pintarić, K. (1998). Forestry and forest reserves in Bosnia and Herzegovina (Invited report). In J. Diaci (Ed.), *Virgin forests and forest reserves in central and East European Countries: History, present status and future development (Proceedings of the COST E4 meeting)* (pp. 1–15). Ljubljana: University of Ljubljana, Biotechnical Faculty.
- Prstojević, M. (1994). *Sarajevo, the wounded city*. Ljubljana: DAG Grafika.
- SGS Qualifor. (2006). *Forest management certification report 9325-BA*. Retrieved November 11, 2008, from [http://www.forestry.sgs.com/9325-ba\\_-\\_sar-s\\_gbosansko\\_ma2006-10\\_-\\_ad36a\\_gm\\_-\\_psummary.pdf](http://www.forestry.sgs.com/9325-ba_-_sar-s_gbosansko_ma2006-10_-_ad36a_gm_-_psummary.pdf)
- Silber, L., & Little, A. (1996). *Yugoslavia: Death of a nation*. New York: Penguin.
- Šilić, Č. (1983). *Atlas Drveća i Grmlja (Tree and shrub atlas)*. Sarajevo: Svjetlost (in Bosnian).
- Starry, D. A. (2003). Foreword. In W. G. Robertson (Ed.), *Block by block: The challenges of urban operations* (pp. vii–x). Fort Leavenworth: U.S. Army Command and General Staff College Press.
- Strachan, H. (2003). *The First World War: A new illustrated history*. London: Simon & Schuster.

# Chapter 23

## The Re-greening of the Grey: Some Practical Considerations for the Urban Forest

Sandra Dark

**Abstract** When disaster strikes, few communities have a master plan to guide them through the arduous process of urban forest cleanup and re-greening. This shortfall only adds to the confusion and emotional stress of recovery, and can result in substantial immediate and long-term added costs, as well as needlessly prolonging the recovery period. Drawing from the hard-won experiences of those who have experienced disaster such as post-Katrina New Orleans and post-tornado Atlanta, this chapter provides practical insights into the importance of cooperative planning and execution by local government, utilities, civic groups and individuals. Also addressed are novel ways of designing a program that may result in more durable urban forests and public parks that will be less prone to damage in the future and executing a successful re-greening campaign by means of community-wide public education, the recruitment and maintenance of an engaged volunteer force (undeniably the most cost-effective element of almost any program), and the raising of adequate funds and materials for projects regardless of economic times.

**Keywords** Community education • Volunteers • Restoration • Funding • Master plan

*A book like Greening in the Red Zone would not be complete without authentic, practical, hands-on recommendations. This chapter brings to the reader author Sandra Dark's many years of experience in horticulture after disasters, and provides helpful 'lessons learned' she has gleaned over the years from practitioners in the field. Though the examples given stem from her work in the United States, the reader may find parallel organizations in other countries that can be similarly drawn upon to help in post-disaster replanting. Dark is the author of Weather-Proofing*

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S. Dark (✉)

Weatherproofing Your Landscape, A Homeowner's Guide to Protecting and Rescuing Your Plants Norman, 5907 Cardinal Lane, Norman, OK 73026, USA  
e-mail: s-r-dark@sbcglobal.net

*Your Landscape: A Homeowner's Guide to Preserving and Rescuing Your Plants, a how-to book about dealing with damaged green infrastructure in the aftermath of a disaster.*

Human conflicts and natural disasters share a capacity to leave urban forests and green spaces suddenly grey within a matter of weeks or days, even moments. In December 2007, my community was among hundreds from the Great Plains to the Ohio Valley that were left rubble-strewn and reeling by a single catastrophic ice storm. Within a 12-h period, I learned firsthand that limbs and entire trees crashing down on roofs, blocking streets with massive amounts of debris, and causing widespread long-term power outages can be traumatic and leave citizens, businesses, and local governments struggling to cope.

As the world witnessed in post-Hurricane Katrina New Orleans, severe natural disasters can result in extensive disruptions of security, essential services, and market economies that are in many ways similar to those experienced in red zones caused by armed conflicts. New Orleans also has shown that restoring widespread devastation to green spaces can be a monumental undertaking; the challenge for smaller cities and localized neighborhoods is often only a matter of scale (see Tidball, Chap. 20, this volume).

Unfortunately, many communities have no master plan in place to help prevent or recover from disasters in their green spaces, particularly in the urban forests that anchor most parks, streets and other public areas. As a journalist still recovering from experiencing a natural disaster, I set out to learn how savvy governments and community organizers go about 're-greening the grey'.

Since 2007, I have interviewed arborists, state and city urban foresters, cooperative extension agents, community re-greening organizers and volunteers, and individual citizens from across the United States who have had successful, hands-on experience in dealing with devastated green spaces. From those sources, a base of practical information arose upon which a neighborhood or community can build a solid framework for both preventing and recovering from a major disaster in its urban forest. Much of the information is also applicable to a wide variety of green spaces.

Prevention and restoration usually involves:

- Cooperative planning and execution by local government, civic groups, and individuals.
- Designing a program that will result in a more durable urban forest, which requires expertise in arboriculture and a tested model on which to construct a master plan.
- Executing the re-greening campaign by means of public education, an engaged volunteer force, and (needless to say) adequate funding.

Where major disasters are concerned, the actual scope of the re-greening project also needs to be considered. An urban forest is not limited to public property, but also encompasses private and commercial landscapes great and small. In the aggregate, all of these sectors are thought to serve similar functions: they are important for carbon dioxide exchange and storm-water filtration; help cool the urban heat-island;

reduce air pollutants; provide sound barriers, shade, and wildlife habitat; and contribute physical, psychological, and aesthetic qualities that are beneficial to human populations. So improving private elements of a community's canopy can extend the benefits beyond the borders of parks and other public spaces.

## **Finding a Beginning**

The complexities of restoring devastated green spaces, or creating them where they hadn't previously existed, can seem overwhelming for individuals and communities struggling to cope with large swaths of destruction. Often, the learning curve required to understand precisely what needs to be done and how to accomplish that is steep indeed. But if there is a bright spot in any disaster, it is that in all likelihood a similar event has already occurred in some other locale. Communities that have come back from catastrophic acts of nature or human conflict have a wealth of experience with what does and does not work; in general they are ready and willing to share that hard-won knowledge.

Any community can benefit from networking with municipal governments in other cities that have experienced similar forms of disasters, as well as with umbrella organizations such as the Alliance for Community Trees [ACT],<sup>1</sup> which can help an urban re-greening effort find focus and direction, not to mention funding. A state's Urban Forest Coordinator can bring a deep knowledge of arboriculture and government programs to the table that is priceless during any pre- or post-disaster planning. And local cooperative extension offices can provide invaluable horticultural advice that is specific to the soil, climate, and other important considerations of a given location.

By making these important connections, ACT Executive Director Alice Ewen points out, communities new to the process 'can shortcut their way through a lot of questions they might have about how to set up a [re-greening] program'.

## ***Cleanup Issues***

Following a disaster, re-greening cannot begin until hazard control and debris removal is complete. Controlling costs during this phase can leave a community better positioned to deal with financial issues associated with restoration efforts.

A state's Urban Forest Coordinator can provide assistance in qualifying for the maximum amount of Federal Emergency Management Agency (FEMA) aid possible for tree-debris cleanup. This can 'make a huge difference financially to a community', according to ACT's Alice Ewen, noting the case of storm-stricken Tulsa, Oklahoma.

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<sup>1</sup><http://actrees.org>

Because state foresters were at the table from the beginning when real costs associated with local tree removal and hauling fees were being discussed, hundreds of thousands more in FEMA recovery dollars were identified.

Likewise, the enlistment of large numbers of volunteers can slash cleanup costs. Following the December 2007 ice storm, an army of public-spirited students stepped forward to help clean up tons of debris from many hundreds of damaged or destroyed shade trees on the University of Oklahoma campus. Besides the dollar value of their efforts, student involvement was a matter of school spirit in helping to restore the beauty of their campus – much as volunteers recruited by Parkway Partners and known as Tree Troopers are doing in New Orleans (see Tidball, Chap. 20, this volume). As these two cases have shown, when entities as diverse as the University of Oklahoma and Parkway Partners set up events and programs to take advantage of a potential volunteer base, appealing to a sense of social pride can lead to significant cost savings.

## Community Education

In the immediate aftermath of a disaster, the initial distribution of information serves to alert citizens to potentially lethal dangers ranging from unstable trees to fallen power lines. Many of the same emergency distribution channels can be used in the coming weeks and months for the delivery of less urgent directives related to cleanup and long-term restoration stages. For example, issuing basic pruning and tree-care guidelines can begin to lay the educational groundwork necessary for enhancing the physical health and durability of the urban forest.

In addition, a centralized hub for inquiry referrals and information distribution, such as a municipal website or call center, can help avoid the very real prospect that a citizen might track down one piece of useful information (i.e., where to report a tree limb on a power line), but miss all the rest (i.e., the availability of a list of certified arborists, a call for volunteers, and much more).

Many large communities and their associated utilities have disaster policies in place that facilitate the distribution of emergency news releases, including frequently updated websites. For less prepared communities, maintaining an up-to-date roster of area media contacts can speed the flow of must-know information.

In cases where pre-established emergency plans are in place, early public directives might include instructions regarding the preparation and disposal of debris. If debris pickup is not in the plan, directions to a dump site can be provided. As recovery and re-greening programs unfold, citizens can be informed of when and where to expect additional announcements. Online social-network platforms also can be useful in getting out the word, in addition to local clubs, schools, and organizations.

Public education can make recovery and re-greening efforts run more smoothly *as long as the information is accurate and non-contradictory*. The distribution of inaccurate arboriculture information can be avoided if guidelines are prepared by foresters or certified arborists. Extensive guidelines and information are readily



available from the US Forest Service Urban and Community Forestry Program website, including a user-friendly illustrated pruning guide.<sup>2</sup>

Presentations by arborists, foresters, and other experts can carry tree-education out to schools, civic organizations, and neighborhood associations. Soon after the 2007 ice storm in Norman, Oklahoma, city forester Janay Greenlee held a workshop on proper pruning and tree care, including demonstrations and a slide show, attended by more than 100 people. Even before the storm, Greenlee engaged in proactive public education by mailing a flyer to each household cautioning against the topping of trees, a lethal form of pruning.<sup>3</sup> Some trees were nevertheless topped by unskilled tree trimmers who converged on the stricken city following the disaster. Even though lack of funding has prevented a follow-up survey, Greenlee's information blast undoubtedly saved many other salvageable specimens from being further damaged or destroyed.

The demand for such information can be long-running. 'I couldn't tell you how many clubs and organizations I gave my Ice Storm Recovery talk to', said Cleveland County Cooperative Extension agent Tracey Payton two years after the storm. 'And I'm still answering questions pertaining to replanting and pruning'.

Besides recovery, public education also needs to address the other 'r': resilience. In the immediate, often chaotic aftermath of a disaster, the concept of building physical resilience into the urban forest and other green spaces can seem downright esoteric. And yet trees that are unsuited to a location or that have been made structurally unsound by disease, infestation, neglect, or man-made assaults are especially vulnerable to experiencing repeated damage on a significant scale; urban foresters refer to this as 'self-culling' (see Dark and Hill 2010). By contrast, healthy, well-cared-for plants of locally suitable species (i.e., salt or weight tolerant, fire resistant, etc.) are better able to withstand onslaughts, tend to suffer less-severe injuries under circumstances that can devastate less robust specimens, and so have a better chance of rebounding.

Since a mature tree requires far less time to recover from injuries than is required to grow a new one of comparable size, pre-disaster preventive health measures can speed the post-disaster re-greening process. So aside from the funding, logistics, and execution of re-greening, increasing public awareness of the significance and needs of plants can go a long way toward preventing or minimizing disasters in the urban forest, as well as enhancing the damage-resistance of green spaces.

### ***Preventing Post-disaster Damage***

When widespread devastation occurs in an urban forest, untrained tree-trimmers tend to converge on the community, finding ready customers among traumatized property owners who are anxious for quick fixes. These individuals often permanently disfigure damaged trees that could have been restored, or they rush to take

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<sup>2</sup> <http://www.fs.fed.us/ucf/>

<sup>3</sup> <http://bit.ly/FzUnD>

out potentially salvageable trees altogether. This sort of man-made damage to already battered and greyed green spaces can be reduced by encouraging citizens to hire only certified or registered consulting arborists.

Professional organizations such as the International Society of Arboriculture (ISA)<sup>4</sup> can provide lists of members in each state. If professionals are in short supply following a major disaster, it helps to simply take a deep breath: with the exception of unstable limbs and trees, most repairs can wait until an expert arborist becomes available. And where floodwaters have greyed the green, the true extent of damage might not be known until the following spring.

### *Cooperative Efforts*

As the old saying goes, confusion is the enemy of progress. When chaos prevails, as it so often does in the depths of sudden rubble, coordination between government agencies and other public and private entities helps to reduce duplicate efforts and costs, as well as eliminate informational ‘holes’ that one entity might assume another is filling. For example, if two departments hold separate tree-planting clinics within a given period, the likely result is that the two events will split the prospective attendees. By joining forces and sharing facilities, personnel, website referrals, and publicity capacity, precious resources can be utilized more efficiently and economically.

### **Building a Green Army**

A vigorous volunteer force is financially and logistically essential for any major re-greening program in a red zone. In post-Katrina New Orleans, Parkway Partners recruited a solid force of enthusiastic volunteers, many of them from the stricken city’s most devastated neighborhoods. Dubbed Tree Troopers, this force brought a special dedication to replanting the beloved urban forest that their city had lost (see Tidball, Chap. 20, this volume).

Unfortunately, many communities have few if any organized volunteer programs for their green spaces, much less urban forestry programs in their governing structures. And even where rudimentary volunteer programs do exist, proper training can be deficient.

An exception is TreePeople, a non-profit organization based in Los Angeles, California, that has a well-honed model for training and managing volunteers, and boasts 8,000 Citizen Foresters. Chris Imhoff, Director of Education and Program Development, runs a 1-day workshop to train new recruits. ‘And then the Citizen

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<sup>4</sup>[www.isa-arbor.com](http://www.isa-arbor.com)

Forester works directly with an assigned Forestry Manager depending on the type of tree-planting they are doing (school, street, park)'.

The monetary value of such volunteers can be huge. 'It probably saves you 50% on your costs', says Greg Levine, Program Director of Trees Atlanta in Atlanta, Georgia. 'Plus you get extra buy-in from the volunteers' who plant and then take care of the trees.

Building a green army *before* a disaster strikes ensures that trained volunteers and their supervisors will have the experience and management skills needed to bring off a large, sustained re-greening effort. Toward that end, organizations such as TreePeople and Trees Atlanta engage in weekly events to keep volunteers engaged and proficient. TreePeople also sends out a monthly newsletter that includes lists of upcoming events. The organization's website enables volunteers to sign up for specific projects with the click of a button.

And there are 'collateral benefits': scouts, civic clubs, schools, and other groups that adopt specific projects are able to attract important publicity for re-greening programs, which can in turn attract additional volunteers. Also, adopting a specific tree, park or street personalizes the effort, helping to keep enthusiasm and energy piqued for the longer haul of a city-wide re-greening program.

Children in particular make passionate recruits, according to Chris Imhoff: 'They *love* to volunteer'. This sort of education cannot begin too early. TreePeople hosts 10,000 school children annually at its Los Angeles facility. Participants from kindergarten through high school are taught to recognize trees, soil conditions, water-flow issues, and other essentials of forestry. Students who take part in these field trips carry their acquired enthusiasm home with them, and grow up with a fundamental understanding of and appreciation for trees.

But building a green army can present a paradox: veteran organizers such as Greg Levine at Trees Atlanta have learned that one of the best ways to recruit volunteers is to first have them. For one thing, volunteers commonly recruit other volunteers from among friends and co-workers. And there is visibility in numbers: 'We have two or three volunteer projects every Saturday'. With volunteers toggled out in Trees Atlanta t-shirts, 'you're marketing yourself by doing work'.

Obviously, large re-greening projects require an abundance of helping hands. But an added advantage of having large numbers of volunteers is that the more experienced among them can step up to supervise and train new recruits. Chris Imhoff at TreePeople has found that this upward mobility helps to keep volunteers interested in participation. So the process of recruitment, training, and utilization becomes, to a certain extent, self-perpetuating.

But as Norman, Oklahoma city forester Janay Greenlee knows first-hand, creating a vibrant green army from scratch can be a struggle. 'When it comes to establishing a volunteer program, it takes someone full-time' to coordinate the effort; something that many communities and small non-profit re-greening groups cannot afford. As a one-person city forestry department, Greenlee is spread too thinly to tackle recruitment and management of volunteers on her own. So she is focusing her efforts toward establishing a core volunteer group that will in turn establish and manage a full-fledged volunteer program.

Though the reality is that even with early indoctrination only a small segment of a population will volunteer to become citizen arborists, each individual who owns a tree has a stake in the urban forest, for good or bad. Therefore, education of the community at large can play a substantial role in efforts to build durable green spaces.

## **The Renaissance Canopy**

Urban forests and green spaces tend to evolve (or devolve) along with their communities, which can result in patchwork green zones of varying quality as new developments arise and cities sprawl. Following widespread destruction, re-greening presents an opportunity for a community or neighborhood to reinvent its natural environment and improve upon major elements on many levels, in effect bringing about a Renaissance Age in its green spaces. For example, the integration of private landscapes and community green spaces, forming green *connections* rather than green *islands*, can produce more viable wildlife habitat. And the natural culling (by disaster) of diseased and aged trees makes room for the planting of healthy and in many cases more suitable species that will prove to be more durable in the future.

But greyed green spaces don't simply regenerate without firm guidance and well-conceived goals that effectively manage *all* available resources. A community with a strong urban forest and green-space management program has a built-in capacity to meet formidable challenges when disasters occur. But even those with weak or non-existent programs can avail themselves of a wide array of resources to assist them in re-greening efforts.

## ***Restoration Goals***

The restoration of disaster-ravaged green spaces can require years, even decades to complete. In cases where an urban forest has been totally wiped out, such as in some parts of post-Hurricane Katrina New Orleans, a restoration plan presents the tremendous challenge of a clean slate upon which trees will require many generations to achieve anything like their former canopy. But disasters of that magnitude are relatively rare, and in most cases a restoration program can build upon a base of 'survivor trees'.

Nor should funding challenges automatically limit lofty goals: even in difficult economic times, major restoration campaigns can be amazingly successful. When hurricanes destroyed 10,000 trees in Orlando, Florida in 2004, the city launched an ambitious 5-year program to raise funds to replace 10,000 trees by 2010. In the depths of a severe economic recession, the 10,000<sup>th</sup> tree was ceremoniously planted on December 17th, 2009.

To be sure, there is no one-size-fits-all restoration program applicable to every neighborhood, city, or region. But many of the basic tools necessary to carry out a

successful re-greening effort can be universally employed. On a purely logistical level (getting plants in the ground), an extensive urban re-greening plan requires cooperative efforts between the city forester (if one exists); the plant supplier (private or government nursery); the municipal parks planning and public works departments (ensuring that any local tree ordinances are adhered to); and well-organized boots-on-the-ground volunteer groups. ‘We don’t do any public property projects without getting approval from the correct agency or department’, says Jim Summers, director of TreePeople’s Reforestation Initiative. ‘We take care to emphasize working within the system’. This approach can help a group gain important support in wading through bureaucratic red tape when it comes to such things as expediting permits. But regardless of how well organized and efficient a re-greening project might be, it has no legs without financing.

## ***Funding***

When an urban area suffers major devastation, locating funding for plant replacements and associated re-greening expenses becomes a major hurdle. But for communities prepared to crank up fund-raising efforts, assistance is available in the form of grants, matching grants, and donations from public and private sectors. So a volunteer or staff member who is proficient at writing grant proposals can be a great asset to a program. But because no single funding well is likely to produce the total monies required for a bold re-greening program, a healthy mix of government, corporate, and private sources is advisable.

### **Government**

‘There is really very little national money out there for local projects’, says ACT Executive Director Alice Ewen. But a State Urban Forest Coordinator can apprise a community of any government re-greening funds that might be available, including possible matching grants through the US Forest Service’s Urban and Community Forestry Program. And municipal governments might contribute significantly: in some cases, Ewen points out, community urban forest organizations ‘that have been around for awhile have 30–50% [of their funding] in local government contracts, which they may consider as grants, but they are essentially fee-for-service contracts’.

### **Non-profits**

Non-profit umbrella organizations such as ACT can be valuable sources of information and guidance, points out Greg Levine, Program Director for ACT member Trees Atlanta. ‘They help share information and experiences with other like groups, help get us funding, and keep us connected to federal tree advocacy and funding opportunities’.

Besides their extensive networking benefits, such umbrella organizations and foundations serve as clearinghouses, working to match communities with corporations and other entities in search of projects to fund. For example, with grants through its Global ReLeaf Fund, American Forests has helped plant tens of millions of trees throughout the US and around the globe, including in the war-ravaged city of Sarajevo where urban trees had to be felled for firewood (see Laćan and McBride, Chap. 22, this volume). And through its Apache Foundation Tree Grant Program, the Apache Corporation planted its millionth tree in 2009, and is committed to planting millions more. After the 2007 ice storm in Norman, Oklahoma, the Apache Foundation contributed around 4,000 trees to the community's re-greening efforts.

### **Local Businesses and Fundraisers**

Corporate participation can provide large-scale funding, which is often but not always made available in cooperation with non-profit organizations. After a tornado tore through Atlanta, Georgia in 2008, Home Depot promptly donated \$36,000 for tree restoration, including replacing 160 trees that came down in the historic Cabbagetown neighborhood. The local Home Depot store also provided a number of employees to help plant the trees. Businesses have much to gain by sponsoring tree purchases, or contributing materials or workers for re-greening projects: besides fostering a 'green' image, publicity garnered by such contributions translates into high-profile advertising and social goodwill. In addition, some companies use hands-on tree-planting events to build team cooperation among employees.

Fundraisers involving local businesses, schools, and civic organizations can provide significant funds for re-greening programs. Contributors can be encouraged to donate to a central coffer, or to adopt a park, street, or even an individual tree. With adoption programs, citizens often tend to become more dedicated to planting and maintaining restoration projects, especially in their own neighborhoods. As Chris Imhoff of TreePeople puts it, 'They're replanting their homes'.

But re-greening can reach well beyond community projects. In addition to raising funds to meet major restoration goals, ACT Executive Director Alice Ewen recommends that 'you should be thinking of ways to encourage people to take their own voluntary action in their front yards. So you're investing resources in communicating, and then people are using their own money and sweat equity to execute the tree-planting in their front yard'.

### **Neighborhood Associations**

Neighborhood associations have the built-in organization necessary to raise funds for re-greening their own streets following a disaster. For example, at a time when storm-ravaged public and private spaces in Norman, Oklahoma were

being re-greened at an annual rate of eight trees per day, city forester Janay Greenlee provided neighborhood associations with street-side planting stock in batches of from 35 to 150 trees each, which the associations paid for with buy-ins from individual homeowners. ‘The idea is that they plant the trees themselves’, said Greenlee, rather than needing city workers to do the job. In most cases, the associations hired landscapers to do the planting.

### **Private Citizens**

Members of a community’s green army can be adept at finding donors in the private sector, according to Greg Levine at Trees Atlanta. In the process, they don’t overlook themselves. ‘Some of our biggest donors are volunteers’.

### **Non-monetary Donations**

The cost of acquiring desirable replacement stock is only part of the equation. Other expenses include transporting and storing stock; providing planting equipment (either hand tools or heavy equipment, depending on plant size); and ongoing maintenance of the plants to ensure their long-term survival. The exclusive use of municipal equipment and facilities puts a drain on local economies that are already stressed by disaster-recovery expenses. Therefore, successfully soliciting the loan of equipment, storage space, and other logistical support from local businesses can reduce re-greening costs that otherwise must be borne entirely by the municipality and its taxpayers. Public recognition of such donations is an important motivating factor; again, businesses stand to gain desirable positive publicity from their generosity.

### ***Planting and More***

Whether municipal employees or volunteer citizens are used for installation work, major planting projects require a large number of hands. As a point of reference: TreePeople uses a 3–4-member crew for planting 15-gal trees. For a project involving 30 trees of that size, 50–100 volunteers (2 trees per team) are commonly enlisted. Tree-planting is arduous work, so planting sessions are usually limited to 2–2.5 h to keep from burning out the volunteers.

When untrained volunteers are used, special attention needs to be given to assuring that proper planting procedures are followed. Such instructions are a must for giveaway programs when trees are handed out to citizens.

But even at the end of a satisfying day of urban re-greening, the work has only just begun. Following plantings by its Citizen Foresters, the tree-care department at TreePeople continues to work with volunteers to ensure that the trees are properly maintained. According to Chris Imhoff, ‘For 5 years, we are committed to those trees until we ‘graduate’ them’.

The concept of forging greening projects with an army of empowered local volunteers ‘is one of the things that give our tree-planting projects such success’, believes Jim Summers, Director of the TreePeople Reforestation Initiative. ‘More success, actually, than trees planted professionally’.

So when is a re-greened area capable of fully sustaining itself without constant vigilance? Perhaps never. Throughout its ever-evolving existence, an urban forest or other green space is subject to myriad natural and man-made stressors. Part of its durability lies in its engineered-in ability to weather those stressors, and the willingness of municipal and private stewards to remain vigilant and engaged in its defense.

## Closing the Circle

Green spaces provide the living scenery of urban life, and any disaster or event that diminishes the urban canopy detracts from the lives of everyone who resides there. The complicated and costly process of restoring a community’s natural environment to its past glory, or creating entirely new green spaces in an urban setting, can be an exercise of decades and generations. But the incremental transformation of a community from grey to green can begin to reveal itself as the earliest efforts both literally and figuratively take root.

Toward that end, much more work needs to be done on integrating the efforts of governments and re-greening organizations, particularly on a local level. And much more can be done to increase both public education and a sense of personal and community responsibility for the urban natural environment.

Throughout the restoration program, whether re-greened spaces will have the durability to survive the next onslaught will be in great part dependent upon the educated choices made in conceiving and carrying forward the transformation process. The potential rewards can be great. Success will serve to enhance the health of green spaces that can in turn enrich the daily lives of their inseparable human component.

## Reference

Dark, S., & Hill, D. (2010). *Weather-proofing your landscape: A Homeowner’s guide to preserving and rescuing your plants*. Gainesville: University Press of Florida.



## Chapter 24

# Trees and Tree-Planting in Southern Madagascar: Sacredness and Remembrance

Maria Tengö and Jacob von Heland

**Abstract** Maria Tengö and Jacob von Heland describe how the Tandroy people in Madagascar use tree-planting as a symbol of renewal, purification, agreement and boundary-making, and to generate ecosystem services in a fragmented landscape. Both cultural and ecological memory can serve as a source of resilience in the event of future crises.

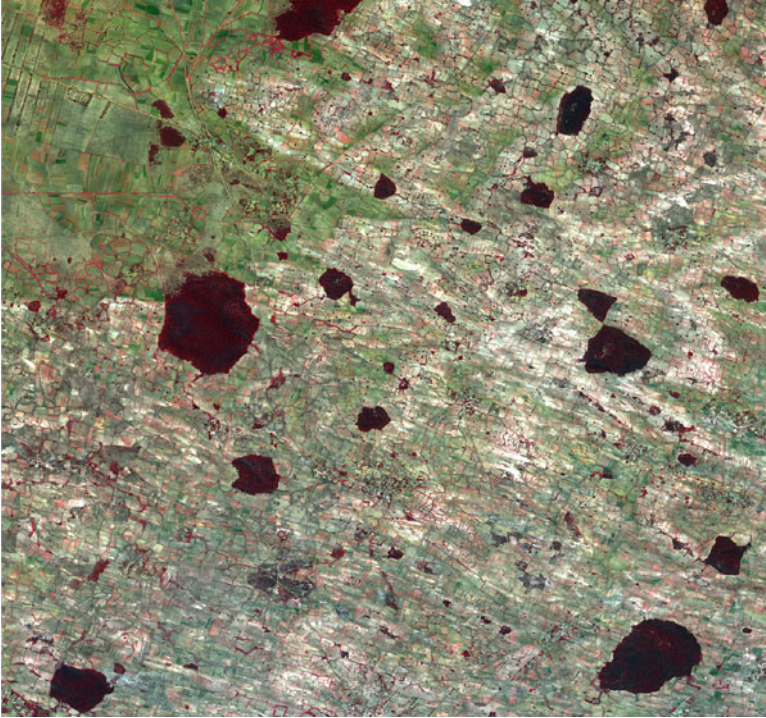
**Keywords** Sacred forests • Tree-planting • Memory • Social-ecological resilience • Madagascar

*Maria Tengö and Jacob von Heland describe how the Tandroy people in Madagascar use tree-planting as a symbol of renewal, purification, agreement and boundary-making, and to generate ecosystem services in a fragmented landscape. Both cultural and ecological memory can serve as a source of resilience in the event of future crises.*

From Madagascar often emerges a discourse of conflict between interests in protecting unique forest biodiversity and rural people's land use practices perceived as destructive (e.g., Kull 2004). In a contrary mood, this story is about local groups that view certain trees as a protective symbol and tree-planting as a social mechanism for remembrance and reconciliation. We argue that the Tandroy in the extreme south of Madagascar are better understood as forest stewards whose histories and daily lives are intertwined with trees and forests. The southern part of the Androy region is scattered with pockets of woodland in an otherwise human-dominated agro-pastoral landscape (Fig. 24.1). These patches are biodiversity hotspots of dry spiny forest vegetation and have the highest endemic flora in all of Madagascar. They also are the home of several lemur species (Elmqvist et al. 2007).

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M. Tengö (✉) • J. von Heland  
Stockholm Resilience Centre, Stockholm University,  
Kräftriket 2A, 106 91 Stockholm, Sweden  
e-mail: maria.tengo@stockholmresilience.su.se; jacobvonheland@gmail.com



**Fig. 24.1** Aerial photo of forest patches from southern Androy, Madagascar. IKONOS resolution

Further, the forest patches perform essential ecosystem services for the surrounding villages including crop pollination by bees (Andriamaparany 2008), regulating the microclimate and capturing moisture from the ocean, and providing habitat for seed dispersers, such as the Ring-tailed lemur, which are important for forest regeneration (Bodin et al. 2006).

The dry spiny forest in Androy is considered to be highly vulnerable for further fragmentation and deforestation. However, archaeological excavations suggest that rather than being remnants of a pristine nature that needs to be shielded from people, several of the old-growth forest patches were once settlements of the Tandroy kingdom that existed between the fifteenth and eighteenth century (Heurtebize 1986; Pearson 1994). The ancestral status of the settlements has been kept alive by the living descendants who consider them as sacred areas that should not be damaged. As a consequence, the forest has grown and expanded in these areas, now referred to as taboo forests or *ala faly* (Tengö et al. 2007; see Fig. 24.2). The role of trees and forest as a channel connecting the living with the ancestors and their spirits remains central in Tandroy culture. Around them, stories from the past proliferate and continue to be integrated into current use of the taboo forests, for funerals, honey harvesting, festivities, and ceremonies. We describe the role of trees and tree-planting in two symbolical domains that underpin the stewardship of the forests: remembrance and purification of fault and reconciliation.



**Fig. 24.2** Transporting water in a dry landscape with taboo forest in the background (including Christian tomb at the edge of the patch)

The Tandroy and their livestock coexist with the highly endemic flora and fauna in an arid and drought prone environment. Their way of life and the associated values are challenged by biophysical stresses as well as by social conflicts and disruptions. Some are well known and expected, such as extended drought periods or the death of the chief elder, while others may be novel, such as the new forms of Christianity that confront customary rules, or chronic drought conditions occurring during the last 15 years (Elmqvist et al. 2007). The Tandroy have to reconcile need, conflict and disturbance in order to maintain the ability of these coupled social-ecological systems to continue to exist over time. Here as well as in most parts of Madagascar, social taboos play a key role in maintaining social order, and also impact the relationship between people and forest (Ruud 1970). The taboos and with them the taboo forests are upheld by social events and rituals. In this context, tree-planting has a double significance. Culturally, planting trees serves as a symbol of renewal, purification, agreement and boundary-making; ecologically, planting trees contributes to the generation of ecosystem services in a fragmented landscape.

Among the Tandroy, trees are planted as sign posts or manifestations of remembrance of significant events involving death. Trees, most commonly *Alluaudia procera*, an endemic and red-listed species, are planted by the tomb of a buried person. The funeral is a central cultural ritual in which people restate

their relationship to the deceased and to one another through gifts (Fee 2000), as well as reinforce their connection with the forest where the body is buried. Cuttings of the same species are also planted along the last journey of the dead body, on the spots where the persons carrying the corps to the burial site are resting. According to the Tandroy, the trees grow with the spirit of the dead, mounting the significance of the groves and the strength of the taboos that protect them. Reverence of the forest further functions to establish and reinforce the legitimacy of land ownership and the place-based identity of the Tandroy. Thus, trees serve as symbols of rootedness and permanence (see Bloch 2005) as well as of the sacredness associated with the ancestral cult. In the past, groves have been planted to memorialize an historical battle field and widespread deaths from an epidemic disease (Tengö et al. 2007).

Violation of a forest taboo, for example cutting or burning at the edge of a forest in the otherwise denuded landscape, implies a pollution that distorts the relationship between the spirits and the living, with potential consequences for the perpetrators' well-being. To purify the transgressor and appease the spirits requires ceremonial sacrifice of at least one *zebu*, or local cattle. The sacrifice serves to restore order and cleanse the site as well as the person who committed the assault.

Trees are also planted as a symbol of sealing agreements or order in society. Many stories of taboo forests involve the planting of *A. procera* or tamarind (*Tamarindus indica*) as a symbol of a friendship or an alliance. For example, a burial forest called *Ankilivineho* derives its name from the two tamarind trees (*kili*) planted by two brothers at a favorite spot where they would be buried. The tamarind, a common village tree, further provides an essential function in providing emergency food during famine. In another story, a baobab tree (*Adamsonia sp.* or *za*) was used as a ritual container of the signing of a pact between two clans, where the spit of the partners was mixed with blood from a *zebu* and poured into the tree (*Anzapenorora*). A current ongoing tension in Androy concerns where to bury Christian confessors, who belong with their ancestors in the *ala faly* but refuse to participate in the sacrifice ceremonies required to access the grove (Tengö and von Heland 2012). In several instances, the burial forest has been divided in two parts, one for Christians and one for the customary ancestral cult. Planted trees demarcate the border that symbolizes the resolution of the conflict within the clan.

These examples illustrate how tree-planting is a central mechanism (Folke 2006) in settling social tensions and disorder in southern Madagascar, while at the same time contributing to afforestation and ecosystem services in an otherwise denuded landscape with drifting sand dunes. Although not providing accessible resources such as food or fuel wood during extended droughts, the forest patches represent essential ecological capital for generation of ecosystem services and sustaining the social-ecological system of Androy. They also represent cultural reference and identity that is essential for the continuation of society. The trees and forests play a key role in maintaining well-being of the Tandroy, as a source of memory in the landscape of heritage, ancestry, and historical crises. This memory may contribute to resilience for dealing with and reorganizing following future crises.

## References

- Andriamaparany, R. (2008). The role of forest patches in generating pollination services in an agricultural landscape in southern Madagascar. Licentiate thesis. Stockholm: Department of Systems Ecology, Stockholm University.
- Bloch, M. (2005). *Essays on cultural transmission*. Oxford, UK/New York: Berg Publishers.
- Bodin, O., Tengö, M., Norman, A., Lundberg, J., & Elmqvist, T. (2006). The value of small size: Loss of forest patches and ecological thresholds in southern Madagascar. *Ecological Applications*, *16*, 440–451.
- Elmqvist, T., Pyykönen, M., Tengö, M., Rakotondrasoa, F., Rabakonandrianina, E., & Radimilahy, C. (2007). Patterns of loss and regeneration of tropical dry forest in Madagascar: The social institutional context. *PLoS ONE*, *2*(5), e402. doi:[10.1371/journal.pone.0000402](https://doi.org/10.1371/journal.pone.0000402).
- Fee, S. (2000). Enga: Further descriptive notes on Tandroy funerary prestations. In C. Allibert & N. Rajanarimanana (Eds.), *L'extraordinaire et le quotidien*. Paris: Karthala.
- Folke, C. (2006). Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change*, *16*, 253–267.
- Heurtebize, G. (1986). *Histoire des Afomarolahy (Extrême-Sud de Madagascar)*. Paris: CNRS.
- Kull, C. A. (2004). *Isle of fire: The political ecology of landscape burning in Madagascar*. Chicago: University of Chicago Press.
- Pearson, M. P. (1994). Kings, cattle and social change in southern Madagascar. *Archaeological review from Cambridge*, *13*, 75–82.
- Ruud, J. (1970). *Taboo*. New York: Humanities Press.
- Tengö, M., & von Heland, J. (2012). Adaptive capacity of local indigenous institutions – The case of the taboo forests in southern Madagascar. In E. Boyd & C. Folke (Eds.), *Adapting institutions: Governance, complexity, and social-ecological resilience*. Cambridge: Cambridge University Press.
- Tengö, M., Johansson, K., Rakotondrasoa, F., Lundberg, J., Andriamaherilala, J. A., Rakotoarisoa, J. A., & Elmqvist, T. (2007). Taboos and forest governance: Informal protection of hot spot dry forest in Southern Madagascar. *Ambio*, *36*, 683–691.

## Chapter 25

# Community-Based Memorials to September 11, 2001: Environmental Stewardship as Memory Work

Erika S. Svendsen and Lindsay K. Campbell

**Abstract** This chapter investigates how people use trees, parks, gardens, and other natural resources as raw materials in and settings for memorials to September 11, 2001. In particular, we focus on ‘found space living memorials’, which we define as sites that are community-managed, re-appropriated from their prior use, often carved out of the public right-of-way, and sometimes for temporary use. These memorials are created as part of traditional mourning rituals and acts of remembrance, but are not limited to formally consecrated sites or the site of the tragedy. They are dispersed throughout the city in everyday and highly public landscapes such as traffic islands, sidewalks, waterfronts, and front yards, demonstrating how ordinary spaces can become sacred. We present several forms of found space community-based living memorials in and around New York City: shrines, viewshed parks, gardens in the public right-of-way, and tree plantings. These cases provide evidence that community-managed memorials are self-organizing, democratic processes which develop independently of state-led memorial initiatives.

**Keywords** Living memorial • Community-managed space • September 11, 2001 • Social meaning • Stewardship • Greening

*Environmental social scientists Erika Svendsen and Lindsay Campbell describe the emergence of found space living memorials after the 9/11 terrorist attacks. They contrast these highly participatory memorialization sites with the more formally designed official World Trade Center memorial, and suggest an important role for environmental stewardship in the form of memorialization in community resilience.*

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E.S. Svendsen (✉) • L.K. Campbell  
NYC Urban Field Station, USDA Forest Service, Northern Research Station,  
431 Walter Reed Road, Fort Totten Cluster #2, Box #12, Bayside, NY 11359, USA  
e-mail: esvendsen@fs.fed.us; lindsaycampbell@fs.fed.us

With actions ranging from planting a single tree, to creating new parks, to rededicating existing forests, hundreds of stewardship groups across the United States created local living memorials in response to the September 11, 2001 terrorist attacks in which four commercial airplanes were hijacked and used as weapons to attack sites of national significance (Svendsen and Campbell 2005, 2010). Despite their abundance, little is known about these dispersed, community-managed sites as they have emerged independently of the national memorials. Public attention as well as scholarly research has focused primarily on the highly visible creation of memorials at the World Trade Center site, the Flight 93 National Memorial, and the Pentagon Memorial. In an effort to better understand how and why people employ their local landscape to memorialize individuals, places, and events we examine ‘found space living memorials’—which we define as memorialization sites that are community-managed, re-appropriated from their prior use, often carved out of the public right-of-way, and sometimes for temporary use. These memorials are created as part of traditional mourning rituals, but are not limited to formally consecrated sites or the site of the tragedy. They are dispersed throughout cities in everyday and highly public landscapes such as traffic islands, sidewalks, waterfronts, and front yards, demonstrating how ordinary spaces can become sacred.

We use September 11 as a case study of a perturbation to which people respond in multiple, varied ways, examining the role of environmental stewardship in human psychological recovery after a traumatic event. We juxtapose community-managed sites with a national memorial in order to understand how different forms of memorials serve different functions, have different social meanings, and engage people in different ways. In order to bound the case study considered here, we examine just local memorials created in the New York City metropolitan region and compare them to the national memorial building process at the World Trade Center site (see Svendsen and Campbell 2005, 2010 for other examples from across the US). Participation in memorial-making can range from contributing to a visioning process, to creating, developing, maintaining, and ongoing programming of sites. We present several forms of found space community-based memorials: shrines, viewshed parks, gardens in the public right-of-way, and tree plantings. These cases provide evidence that community-managed memorials are self-organizing, democratic processes, which develop independently of state-led memorial initiatives.

## **Stewardship, Resilience and Recovery**

In this chapter, we contend that stewardship, or the act of caring for the environment on behalf of a greater public good, is a critical part of our capacity as humans to adjust to an ever-changing world. We consider the emergence of these memorials part of a socio-ecological process of disturbance and resilience. These memorials are the result of spontaneous, self-organizing acts that are motivated by stewards’ sense of community and need for healing rituals, and are expressed through myriad relationships with nature (Svendsen and Campbell 2010). Stewards

use their immediate landscape as a mechanism to demonstrate democratic principles, to express personal values, and to foster a collective resilience in the aftermath of a crisis. Stewards are expressing an ‘adaptive capacity’ that is essential to a healthy society and in some cases to overall ecosystem function (Folke et al. 2003; Gallopin 2006; Tidball and Krasny 2007). The more resilient or adaptive we are, the more likely we are to successfully mediate changes in our environment. How well we manage to adapt depends upon diverse social and biophysical factors. This type of community engagement—which includes human interactions ranging from membership and decision-making to hands-on work—is one way for us to contribute and find meaning within a larger system (Burch and Grove 1993). The act of local memorial-making and stewardship is a non-passive act fundamental to the healing process of those involved (Tidball et al. 2010). Studies of environmental volunteers find that stewardship activities help to lessen feelings of isolation and disempowerment that can lead to depression and anxiety (Sommer et al. 1994; Svendsen and Campbell 2006; Townsend 2006). Furthermore, a study of community garden volunteers found that stewardship can serve a variety of different functions at the individual and collective levels. At the individual level, stewardship can promote relaxation, mitigate stress, create self-confidence, and strengthen sense of control and self-efficacy; at the collective level it can help to establish trust, strengthen social cohesion, share knowledge, and leave a legacy (Svendsen 2009). In the case of September 11, many memorial stewards reported their actions were tied to a personal world view or remembrance of life. These acts of stewardship were expressions of personal longings to spiritually connect with this immense human tragedy and in some small way become a part of the recovery effort.

## Collected Memory and the Pre-memorial Period

Memorials reflect and reinforce the discourses of their creators, the communities in which they are situated, and the broader socio-cultural context. They often represent a highly public and political message (Simpson and Corbridge 2006). Relationships of power, hierarchies, and rule-making affect who has access to, influence over, and control of sacred space (Van der Leeuw 1986). As such, the creation, interpretation, use and stewardship of memorials sites are not without social tensions and controversy (Bosco 2004; Sturken 2004; White 2004). In fact, memorial scholar James Young (1994) suggests that this tension is a necessary part of ‘memory work’, a way to come to terms with a tragedy or a violent event that may foster societal healing. Further, Young challenges the notion of a unitary, collective memory and views memorial-making as a process for voicing ‘collected memory’ (Young 1994). Others have suggested that the ‘pre-memorial period’—before a formal, centralized, state-led memorial is created—serves as time in which historical narratives are publicly debated and memory work begins (Simpson and Corbridge 2006).



Spontaneous memorials are commonly created by individuals in the immediate aftermath of a tragedy. Spontaneous memorials are temporary shrines and remembrances that are often positioned near the site of tragic events (Foote 1997). Consequently, spontaneous memorials are ‘borrowed’ landscapes that serve an alternative use to what was originally intended by the state, private owners, or the public (Mayo 1988). In turn, found space memorials can originate as spontaneous memorials, but can last longer and permanently shift the use of the site. Further, while spontaneous memorials are generally created by the acts of individuals interacting with a public space, the found space memorials explored in this chapter are often created through collective action and the work of formal and informal civic groups.

In this study, we suggest that these community-based memorials represent an important part of ‘memory work’ that is manifested through public acts of stewardship. In many ways, these memorials can be understood within a broader context of democratic processes. These memorials are initiated by civil society and often remain external to traditional, state-led memorial-making. As such, these community-based memorials might be considered as civic innovation, where groups develop place-based strategies in contrast to hierarchical forms of decision-making and planning (Sirianni and Friedland 2001; Taylor 2009). This chapter explores how people use the landscape to remember and reflect as a mourning ritual and in different stages of recovery. It asks what role community-based stewardship of the local environment plays in the memorial-making process. Prior to addressing this question, we present a brief overview of the history of more formal 9/11 memorials in New York City.

## **Ground Zero of the Red Zone**

Although Ground Zero has become a sacred space, a site of vigil and visitation, and will eventually host the preeminent national memorial to September 11, the opportunities for public engagement in memorial creation are clearly restricted and channelized. A design competition for the memorial was held which received 5,201 submissions from 63 different countries (Lower Manhattan Development Corporation 2003c). While the competition was open to the public, the process was overseen by a hand-picked jury of 13 experts from the art and architecture world, September 11 victim family representatives, Lower Manhattan stakeholders, and representatives from the New York State Governor’s and New York City Mayor’s offices (Lower Manhattan Development Corporation 2003b). The winning proposal was ‘Reflecting Absence’ by architect Michael Arad who was later paired with the landscape architect Peter Walker (Lower Manhattan Development Corporation 2004). Sturken (2004) argues that this design competition set off a public debate about ‘populism versus elitism’ in the process of memorial-making.

A variety of government (such as the Lower Manhattan Development Corporation, or LMDC) and nonprofit organizations (such as the Municipal Art Society and Regional Plan Association) worked to engage the public in the visioning and design of the memorial. These groups organized both large-scale, one-time event public input sessions (such as ‘Listening to the City’, which was convened by the Regional Plan Association and funded in part by LMDC, and brought together more than 5,000 participants on July 20, 2002) as well as more diffuse focus groups, exhibitions, and charettes (such as ‘Imagine New York’, which was organized by Municipal Art Society in November 2002) (Municipal Art Society 2003). In both cases, online participation was also encouraged through a variety of digital tools used to capture public comment and dialogue.

These various mechanisms were designed to allow public input into the early stages of the process of memorial creation, but ultimately the authority to make project development decisions was vested in a few key stakeholders, including the Port Authority of New York and New Jersey, Silverstein Properties (the leaseholder of the World Trade Center), and LMDC. Indeed, before any memorial competition was held, LMDC and the Port Authority selected Studio Daniel Liebeskind to create the ‘design concept’ for the World Trade Center site (Lower Manhattan Development Corporation 2003a). Marita Sturken argues that these constraints trump the creative process of memorial-making, ‘In many ways, any memorial design had already been usurped by Liebeskind’s master plan for the site, with its discourse of memorialization and its framing of the footprints as the memorial’s location’. (2004, p. 321). Setha Low (2004) makes an even stronger critique of this process, arguing that public input was ignored:

The designation of a memorial design for Ground Zero has been framed by a disruptive tug-of-war for political power.... In this contentious process, the mourning, anger, and need for resolution of local residents and victims’ families and friends have been largely forgotten. The outpouring of emotion and ideas for a memorial and for rebuilding downtown from citizens who participated in the Municipal Art Society’s ‘Imagine New York’ program has been ignored or, at the very least, set aside to make way for the desires and fantasies of architects and real estate moguls. Many nonprofit organizations and nearby neighborhoods continue to demand a voice in the formal memorial process, but they have not received official recognition, and there is no indication that local meanings and concerns will be included in the design of the memorial...(Low 2004, p. 327).

Despite early engagement in memorial visioning, there are limited opportunities for members of the public and civic groups to participate in ongoing development of the site.

The terms of the site’s redevelopment were to be set not just by democratic deliberation, but by legal mandate, bureaucratic rule, political power, and elite influence. Complicated legal issues related to the terms of Silverstein’s lease and insurance were debated in the courtroom as well as in popular media. The nature of the site is such that the memorial is embedded within large-scale infrastructure development and construction projects; for example, Port Authority reconstructed its PATH train hub within the site. Furthermore, physical access onto the site is limited. Annual remembrances held on-site are restricted to dignitaries and families of September

11 victims. While under construction, the site was still used for pilgrimage, with thousands of visitors walking the perimeter and viewing the progress of rebuilding. Currently, the memorial is accessible to the public, while the construction of the museums and adjacent buildings continues. While the physical site and the overall design process were restricted, it is important to be aware of the public's need to access and interact with the site of the tragedy in a tangible, physical way at all stages of the rebuilding.

## Identification of Stewardship Groups and Data Collection

Memorial stewardship groups were identified using a snowball sampling method where interviewees were asked to identify other memorial groups and sites with which they were familiar (Lofland and Lofland 1984). This information was combined with a newspaper search, starting in the metropolitan areas of the three crash sites (New York, Shanksville, PA, and Arlington, VA/Washington, DC), and extending to the northeast states. Field methods for the research included semi-structured interviews, site observation, and photo documentation. The interviews were guided by a social and site assessment protocol that asked social and biophysical questions about the characteristics of the memorial site and stewardship group. We interviewed a total of 117 stewardship groups via multiple interview methods (Table 25.1). The people we interviewed included civic stewards usually working as part of a volunteer, community-based group; local municipal officials who were either pursuing the projects as part of their official duties or in a 'volunteer' capacity; and family members or friends of September 11 victims who were often deeply and personally motivated to create these sites. In all cases, respondents were asked to speak on behalf of their memorial groups. (For full results from the 117 interviews, see Svendsen and Campbell 2010). This chapter focuses on a subset of individual or civic group-led found space memorials that are within the New York City metropolitan region.

**Table 25.1** Data collection methods

Stewardship groups interviewed in person with sites that were returned to multiple times over 4 years for observation of events, changes in design and use	38
Stewardship groups interviewed in-person with sites that were visited one time only	31
Stewardship groups interviewed by telephone with photos submitted electronically or by mail	25
Stewardship groups that self-registered using the National Registry protocol form electronically or by mail	23
Total stewardship groups interviewed	117

## **Community-Based Memorials Throughout the New York City Region**

The cases presented in this section contrast sharply with the project of national memorialization at the World Trade Center site; they are community-based memorials created on found space within the public realm of New York City. These memorials are located predominantly at sites that are not formally designated as parks. They are small in physical scale, occupying parts of the streetscape, traffic islands, or vacant lots. In terms of temporal scale, these memorials were created shortly after the event and during the 'pre-memorial period', before an official, state-sponsored memorial was dedicated. They range from temporary shrines, to ephemeral performative acts, to sites that were intended to be more permanent even if they lack formal protection. Many of these memorials were created in the viewshed of the World Trade Center site, marking the sites where people witnessed the tragedy and serving as reminders of the Twin Towers where they once stood. Finally, these memorials were initiated by individuals, informal groups, or civic organizations, rather than by government actors. Each of these trends will be more fully explored by examining particular memorial cases.

### ***Shrines and Temporary Memorials in the Red Zone***

Perhaps the most visible temporary memorials created after September 11 were the shrines of Union Square Park, which were established in the days immediately following the attacks. Located at 14th Street and Broadway in downtown New York City, Union Square Park serves as a public gathering space. After September 11, access to Lower Manhattan was restricted, and Union Square was one of the publicly accessible parks close to the World Trade Center site. New Yorkers tried to get as close as they could to the site of the tragedy while safely gathering. At first, with telecommunication systems disrupted, the statues, fences, and sidewalks of the park were covered in notices of missing persons and messages to loved ones. As time wore on and some of the missing were realized to be dead, the messages evolved into memorials; the site shifted from one of searching to one of mourning. Flowers were placed at the site, candles were lit, messages of despair and hope were written, and vigils were held. On an everyday basis, Union Square Park is a site for gathering, relaxing, and watching other people and performers. Its use shifted in response to the crisis of September 11, as people re-appropriated the site for their needs. Union Square reminds us that open space in proximity to the site of the event can be transformed to serve as a shrine and a remembrance site—a pattern that has manifested itself in response to other public tragedies, such as the death of Princess Diana or, more recently,

the Virginia Tech University shootings. In each case, a particular segment of the population became stewards of these spaces, keeping watch over the ephemera until it was time for the items to be taken away. On subsequent anniversaries of 9/11, vigils and protests were also held at Union Square Park. Messages of remembrance of the dead were mixed with calls for peace and protest against the various wars in which the US is engaged. The park provides a space for freedom of expression in the public realm.

Other temporary memorials were driven by the impetus of an individual or a group of friends who felt the urgent need to ‘do something’ after the tragedy. Bianca Bob felt that she could not wait for the memorial at the World Trade Center to be created; she had to respond personally and immediately to the loss of life that occurred on September 11. So she organized the Sunflower Project NYC, an effort to plant sunflower seeds throughout Lower Manhattan’s streetscape in whatever available sites she could identify—empty planter boxes, tree pits, and vacant



**Fig. 25.1** Members of the public write message of peace at the one year anniversary of September 11 at Union Square Park

lots. Although motivated by a particular tragic event and perhaps an expression of urgent biophilia (see Tidball, Chap. 4, this volume), Bob's efforts recall a civic environmental tradition similar to the guerilla gardeners who planted seed bombs in vacant lots of Manhattan's Lower East Side in the 1970s, in an effort to reclaim and beautify their neighborhoods. Bob created a website and gathered with groups of friends and strangers to walk the streets and plant seeds. Reflecting on her project, she said:

So many people have been wonderful, really excited, and have helped. It's about personality, communities, and the people that walk by and get involved....A lot of people who have never planted anything ....are involved; it's good for them.

The sunflower plantings were a personal act of remembrance that Bob placed in the public realm. When asked if she considered this effort to be sacred, she said that while it was sacred to her, she recognized that it might not be sacred to many others. These memorials were ephemeral, they might be vandalized, but it was the gesture of caring that mattered to her.



**Fig. 25.2** Bianca Bob and volunteers clearing weeds from a tree pit to plant sunflowers in the spring of 2002

Similar in its physical intervention in the landscape though different in intent, Javier Roux created Suntowers, which was a conceptual art project as much as a memorial. The project involved planting sunflowers on selected Manhattan streets, such that if the World Trade Center were laid on its side from Lower Manhattan to Chelsea, the flowers would trace its outline. Roux was interested in both the act of planting and watering as well as the symbolic form of his piece—which would not be perceptible at street level and was not signed or publicly announced in any way. This individual, artistic impulse—and particularly the impulse to re-create the form of the Twin Towers—was repeated across the country as thousands of people painted, sculpted, quilted, baked, and collaged in remembrance of September 11. Such examples remind us that nature is an important and accessible medium for expression, alongside other artistic media.

### ***Viewsheds of the Red Zone: Places Where People Bore Witness***

While proximity to the site of the tragedy clearly matters in the creation of emergent memorials, there were a number of found space memorials radiating out from Lower Manhattan. In particular, memorial sites are found within the viewshed of the World Trade Center, which was formerly visible throughout the metropolitan region. All of these spaces served as witnessing sites on September 11. The Promenade in Brooklyn Heights is a common gathering site for both residents and tourists alike, and it is visited for its striking views of the New York City skyline and harbor. The former shipping piers that sit vacant and unused below the promenade were slated to become part of the 85-acre Brooklyn Bridge Park, which is under construction as of 2010, and in 2001 was still in the early planning stages. An informal group of Brooklynites created a memorial garden of two flower beds planted with daffodils in the shape of the Twin Towers on the unused piers. Planted initially in the fall of 2001, the flowers first bloomed in the spring of 2002. It was replanted for several years after the event, serving as a reminder each spring of both the tragedy and the subsequent human response. A number of gardeners involved in the project felt that it was both an important visual reminder for visitors to the Promenade, but also a personally fulfilling act to engage in the restorative work of planting for spring. Residents could not wait the many years required for the publicly accessible park to be developed; they needed something to do right away in response to the momentous event. While some felt that perhaps the memorial should inform the permanent design of Brooklyn Bridge Park, as the years passed, the plans evolved and the park was designed with more of an emphasis on multiple uses, including active recreation and interaction with the waterfront, rather than memorialization. This case shows that our needs for our urban open spaces are dynamic and shifting over time.



**Fig. 25.3** Stewards working at the Brooklyn Bridge Park Memorial Garden in the summer of 2005

Another viewshed site across Jamaica Bay in the Rockaways—a seaside peninsula that is a part of Queens, NY—was turned into a Waterfront Tribute Park. The development of this memorial was managed by the Rockaway Chamber of Commerce, which sought both to remember September 11 and to enhance and restore a previously vacant and underutilized portion of the waterfront at Beach 116th Street. While this street is the commercial core of their community, centered around the end of the A train subway and a popular beach destination for New York City residents, the memorial site is located on the generally less-visited Jamaica Bay side of the peninsula. The site was always associated with viewing the New York City skyline and the sunset behind it; on September 11, local residents gathered there to witness the attack on and collapse of the World Trade Center. Liz Sulik of the Chamber reflected on the process of the project’s implementation, which illustrates the high level of public engagement in local memorial-making:

The people were so genuinely interested in the process. People showed up at meetings, they didn’t just blow them off like you might a civic meeting. They really took a lot of pride, and



knowing that this was going to be *the* tribute in the Rockaways; that was important to them. And it really was easy; I don't think we had any dissension. Around the table we had people that ordinarily might not have such a good rapport with one another, and yet when we discussed this, everybody was so focused on this. My job was really to bring us back to task and I don't think I had to do that once.

The Chamber had a vision of turning the site into a waterfront access park, with a canoe/kayak put-in and views of the bay and its wildlife. Although it prominently features a sculptural memorial to September 11, the site also blends other local tragedies into its memorialization. As it was being created, local residents and groups requested to purchase memorial bricks for loved ones who died due to other causes. This site clearly demonstrates the way in which living memorials become embedded in their local communities, and are the product of multiple, often complementary impulses.

### ***The Red Zone Comes Home***

In contrast to viewshed memorials, which are permanently in dialogue with the former World Trade Center site, some found space memorials are intended to serve as local gathering spaces for a particular community near where residents live, embedded within their everyday landscapes. Staten Island is one of the five boroughs of New York City and is the home of many of the city's police officers and fire fighters; it was heavily impacted by September 11, losing 274 residents—both civilian and service personnel. Staten Island can be examined as a case study of the number and diversity of community-based memorials that emerged. One of the Staten Island chapters of the Federated Garden Clubs of New York State created a Healing Garden on a formerly largely barren traffic island on busy access streets to the Staten Island Expressway. While the gardeners did cite the importance of its public visibility, the selection of the site was not simply opportunistic. This traffic island is adjacent to a local firehouse that lost 11 firefighters on September 11 and is the location of an older stone memorial to firefighters killed in the line of duty. The garden was intended both for visual impact as well as to provide an opportunity to engage widows of September 11 and other residents in the planting and maintenance of the site. Overall, the garden was an attempt to help heal the local community by specifically memorializing Staten Island victims through the planting of smoke trees in their memory, and by giving others an opportunity to help in the creation and continuation of the memorial.

Angels' Circle, another local memorial on Staten Island, is within the public right-of-way just a few miles down the road from the Healing Garden. Wendy Pelligrino transformed the traffic island across the street from her house into this tiny, heavily landscaped, fenced, and shrine-like memorial to Staten Island victims of September 11. Each victim is individually memorialized with a stone or grave candle, and the entire site is decorated for Christian and secular holidays as a way of marking time and remembering the dead in connection with important days. Although Pelligrino is personally responsible for the site's constant tending and upkeep, visitors and neighbors have various ways of interacting with the memorial. Under the watchful gaze of a surveillance camera, they are invited to visit and walk through space; some leave

memorials and pictures. A message board and mailbox are available for family members and anonymous visitors to leave messages to each other. A local nursery donates plant materials, with the landscape shifting almost as frequently as the decorations. Pelligrino's intense personal investment, resources, and time given to the maintenance of this site provide a means of coping with tragedy of September 11 while creating a local sacred space specifically for Staten Island victims.

These are just two examples of living memorials that abound on Staten Island. There is also a memorial in a wooded walk at the Staten Island Botanic Garden; a new waterfront Seaside Nature Park created by a group of senior citizens called Turnaround Friends, Inc; a memorial flagpole placed at the Crescent Beach; and patriotic and memorial murals scattered throughout the island. Staten Island is highlighted not for its exceptionalism; indeed, similar clusters of memorials can be found throughout New Jersey, Long Island, Boston, Pennsylvania, Virginia, and Southern California (see Svendsen and Campbell 2006). Rather, this case is an illustrative example of local residents who self-organize to create remembrances in their own communities and on their own terms. Indeed, memorials can be found across the country at both historic sites of local significance (such as town halls and schools) as well as at newly emerging nodes (places where people work, shop, and drive), and even when there is seemingly hardly any space at all.

Even a single tree planted with a particular intention can serve as a public memorial and can evoke a sense of stewardship and care. In Long Island City—a heavily industrial neighborhood in Queens that is crisscrossed with subway tracks, the Long Island Railroad, bridges, and highways—a memorial street tree was planted in memory of Michael E. Brennan, a firefighter who died on September 11. The planting was initiated by students at the Robert F. Wagner School, and was conducted in partnership with the Long Island City Roots community garden and the New York City Department of Parks and Recreation. While hundreds of schools across the country planted memorial trees and tended gardens as living memorials to September 11, this urban school did not have any available grounds on which to create a memorial. So the students partnered with the garden—and through working with the garden members and the Parks Department, they were able to get permission to dedicate and plant a street tree just in front of the garden. At the dedication, hundreds of students, teachers, family members, Parks Department staff, and community members stood in the sidewalks and streets to hear remarks and tie yellow ribbons of remembrance on the young sapling. Michael Brennan's brother spoke at the dedication:

It sort of helps the healing process to know that so many people have come together to make this day possible. After attending so many memorials and funerals over the past seven months, this is more or less a bright day for us here. We look forward to a future of hope. That's what this garden is going to represent too: a new beginning, a fresh start, a look to what's before us.

In this sense, the act of planting a tree as a continued commitment to the future—in remembrance and honor of the past—makes stewards of all those who attended this special service. What this case reinforces is that the significance of the memorial is not embedded solely in the formality of the design. Rather, the ritual act of 'setting aside', the collective decision to create a remembrance, the selection of a site close to home, and the ongoing care for that site are all sources of meaning in local memorials.



**Fig. 25.4** Crowds sitting and standing in the street at the Michael E. Brennan memorial tree dedication in April 2002

## Discussion and Concluding Remarks

As evidenced by these memorials, people use local environments as an expression of social meanings as well as a means to share viewpoints and sympathies with a broader public sphere. The sites presented here are not meant to be an exhaustive typology, but rather an exploration of some of the observed themes in emergent, found space memorials. For some individuals and groups, nature serves as a material or a means of expression that is no different from any other medium for expression and creativity—such as painting a canvas or making a sculpture. Indeed, further research of non-nature based memorials to September 11 (including quilts, songs, road rededications, memorial scholarships, donations, and so on) could provide nuance to the urgent biophilia hypothesis (Tidball, Chap. 4, this volume). However, there are other examples of stewards who very deliberately use nature to symbolize life, death, and renewal. Some leave or plant flowers or create shrines as intimately personal acts, using natural elements and relics as symbols of the life cycle and tokens of beauty. Further, there are aspects of living memorials that are unique—by being in the public realm they are inherently witnessed by many others who may or may not be directly involved in their creation. Thus, whether intentionally or not,

they engage a broad public. They are also often created collaboratively by informal groups or nonprofits working together, because a pooling of resources is required to create or transform these spaces. Thus, the spaces differ from the artist's canvas as they require sustained care over time. A park or garden cannot maintain itself; it must be visited and deliberately stewarded. This ongoing interaction stretches the duration of the memorialization process.

Stewardship can be enacted as both an act of personal recovery and a mechanism for strengthening community ties and social cohesion (see Okvat and Zautra, Chap. 5, and Wals and van der Waal, Chap. 29, this volume). It is suggested here that emergent acts of stewardship may contribute to collective resilience as stewardship engages a broader public (see also, Tidball and Krasny, Chaps. 1 and 2, this volume). While this type of resilience can have a community-wide impact, the benefits are difficult to quantify as they reside in the hearts and minds of individuals. Local memorials are reflections of world views, values, and adaptive capacity. How can we be assured that public, community-based memorials can accommodate a range of expressions and still resonate with an individual's personal journey of recovery? How might these memorials continue to serve the local community and strengthen individual and community resilience long after the memorial has been dedicated?

One of the questions raised by this study is whether policy or planning can build upon this emergent or organic stewardship in the immediate aftermath of a disturbance or even outside of the context of a post-crisis situation. This suggests the need for disaster planning and recovery models to be flexible and fluid as they respond to the recovery needs of a community—observing the ways that people reclaim their public landscape through memorial-making. The power of these spaces resides in their civic-led and decentralized decision-making structure; attempts to support or formalize them as part of memory work must keep this foremost in mind. It is important to note that some of these efforts are fleeting, while others become longer-term building blocks for community recovery. Longitudinal research is required to examine whether sites that emerge due to urgent needs to express and remember become permanently embedded in landscape. Much remains to be learned about how these sites are used, and perhaps reinterpreted and again re-appropriated over time. Public memorials can be controversial as messages may be perceived as too personalized, or as memorials become too frequent in the landscape and compete with other demands for public land use. This leads us to a final set of questions: at what point and why does a community change in terms of its need for local memorials? While these memorials are cultivated and encouraged in the early stages of disaster recovery, how is social meaning mediated over time?

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## References

- Bosco, F. J. (2004). Human rights politics and scaled performances of memory: Conflicts among the Madres de Plaza de Mayo in Argentina. *Social & Cultural Geography*, 5(3), 381–402.
- Burch, W. R., Jr., & Grove, J. M. (1993). People, trees and participation on the urban frontier. *Unasylva*, 44, 19–27.
- Folke, C., Colding, J., et al. (2003). Synthesis: Building resilience and adaptive capacity in social-ecological systems. In F. Berkes, J. Colding, & C. Folke (Eds.), *Navigating social-ecological systems: Building resilience for complexity and change* (pp. 352–387). Cambridge: Cambridge University Press.
- Foote, K. E. (1997). *Shadowed ground: America's landscapes of violence and tragedy*. Austin: University of Texas Press.
- Gallop, G. C. (2006). Linkages between vulnerability, resilience, and adaptive capacity. *Global Environmental Change*, 16, 293–303.
- Lofland, J., & Lofland, L. H. (1984). *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont: Wadsworth Publishing.
- Low, S. M. (2004). The memorialization of September 11: Dominant and local discourse on the rebuilding of the World Trade Center site. *American Ethnologist*, 31(3), 326–339.
- Lower Manhattan Development Corporation. (2003a, February 27). The Lower Manhattan Development Corporation and Port Authority of New York and New Jersey announce selection of Studio Daniel Libeskind: Memory foundations as a design concept for the World Trade Center site. *Press Release*, Retrieved 22 December 2009, from <http://www.renewnyc.com/displaynews.aspx?newsid=41c07ff1-9b1a-41a2-866b-8aa8148b6736>
- Lower Manhattan Development Corporation. (2003b, April 10). Lower Manhattan Development Corporation announces members of jury for International World Trade Center site memorial. *Press Release*, Retrieved 22 December 2009, from <http://www.wtcsitememorial.org/pdf/04.10.03.pdf>.
- Lower Manhattan Development Corporation. (2003c, July 17). Lower Manhattan Development Corporation announces final number of submissions for the World Trade Center site memorial competition. *Press Release*, Retrieved 22 December 2009, from <http://www.wtcsitememorial.org/pdf/07.17.03.pdf>.
- Lower Manhattan Development Corporation. (2004, January 14). Architect Michael Arad and Landscape Architect Peter Walker unveil winning design for World Trade Center site memorial: Reflecting absence. *Press Release*, Retrieved 22 December 2009, from <http://www.wtcsitememorial.org/pdf/01.14.04.pdf>.
- Mayo, J. (1988). War memorials as political memory. *Geographical Review*, 78(1), 62–75.
- Municipal Art Society. (2003). *Imagine New York: Toward the people's memorial*, Summary Report.
- Simpson, E., & Corbridge, S. (2006). The geography of things that may become memories: The 2001 earthquake in Kachchh-Gujarat and the politics of rehabilitation in the prememorial era. *Annals of the Association of American Geographers*, 96(3), 566–585.
- Sirianni, C., & Friedland, L. (2001). *Civic innovation in America*. Berkeley: University of California Press.
- Sommer, R., Learey, F., et al. (1994). Social benefits of residential involvement in tree planting: Comparison with developer planted trees. *Journal of Arboriculture*, 20(6), 323–328.
- Sturken, M. (2004). The aesthetics of absence: Rebuilding ground zero. *American Ethnologist*, 31(3), 311–325.
- Svendsen, E. (2009). Cultivating resilience: Urban stewardship as a means to improving health and well-being. In L. Campbell & A. Wiesen (Eds.), *Restorative commons: Creating health and well-being through urban landscapes*. Newtown Square: US Department of Agriculture, Forest Service, Northern Research Station.

- Svendsen, E., & Campbell, L. (2010). Living memorials: Understanding the social meanings of community-based memorials to September 11, 2001. *Environment and Behavior*, 42(3), 318–334.
- Svendsen, E. S., & Campbell, L.K. (2005). Living memorials project: Year 1 social and site assessment. *General Technical Report*. Newtown Square, PA, U.S. Department of Agriculture, Forest Service, Northeastern Research Station.
- Svendsen, E. S., & Campbell, L. K. (2006). Land-markings: 12 Journeys through 9/11 living memorials. *General Technical Report*. Newtown Square, PA, U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Taylor, B. (2009). “Place” as prepolitical grounds of democracy an Appalachian case study in class conflict, forest politics, and civic networks. *American Behavioral Scientist*, 52(6), 826–845.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), *Social learning: Towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Publishers.
- Tidball, K. G., Krasny, M. E., Svendsen, E., Campbell, L., Helphand, K. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research*, 16(5 & 6), 591–609.
- Townsend, M. (2006). Feel blue? Touch green! Participation in forest/woodland management as a treatment for depression. *Urban Forestry & Urban Greening*, 5, 111–120.
- Van der Leeuw, G. (1986). *Religion in essence and manifestation*. Princeton: Princeton University Press.
- White, G. M. (2004). National subjects: September 11 and Pearl Harbor. *American Ethnologist*, 31(3), 293–310.
- Young, J. E. (1994). *The texture of memory: Holocaust memorials and meaning*. New Haven: Yale University Press.

## Chapter 26

# Six Ares of Land: Resilience of City Dwellers in Russia

Louiza Boukharaeva

**Abstract** Louiza Boukharaeva describes how small garden plots became a source of resilience for residents of the Russian city of Kazan during the social and economic chaos that followed the breakup of the Soviet Union. In addition to being the primary source of basic food items as the large collective farms collapsed, the gardens provided a source of solace for Russians who were confronted with an ugly and fearsome past.

**Keywords** Food security • Subsistence gardening • Urban gardening • Horticultural therapy • Russia

### The Post-Soviet Crisis

Suffering, or profound sorrow, is a marked characteristic of the Russian people. After the Soviet Union was dissolved on December 8, 1991, this sorrow was accentuated by the ensuing social and economic changes. Perhaps most disturbing were the conflicts in Chechnya, and repeated terrorist attacks. In spite of this, the Russian people were able to face social and economic chaos with a relative calm.

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*Original in French, Translated by Marianne Krasny*

The **are** is a unit equal to 100 square meters used for measuring land area. It is identical to the Russian 'сотка' (сотка, 'hundredth'), which is used to describe the size of dacha or allotment garden plots or small city parks where the hectare would be too large. <http://en.wikipedia.org/wiki/Hectare>.

L. Boukharaeva (✉)  
Department of Philosophy, Kazan Technical University,  
10, K. Marx Street, Kazan, Tatarstan 420111, Russia  
e-mail: louiza.boukharaeva@msh-paris.fr

In the 1990s, the Russian individual and collective memory remained marked by the remembrance of the repeated famines of the 1920s, the Second World War, and 1948. The periodic reappearance of food cards during the Soviet era had reared the specter of a return of famines. Then, between 1992 and 1998, the production of large collective farms declined by more than half for all important food staples including grains, sugar beets, meat, and milk. Whereas the Soviet regime had guaranteed stable employment, the fear of not being able to survive and to support one's family resurged with the increase in unemployment resulting from the collapse of industries, and with the considerable decline of revenues. Furthermore, the opening of the archives and the liberalization of information brought to light aspects that until then had been hidden in the history of the Russian people. The social, political, and religious repression, and forced deportations of the past were revealed, whereas previously the memory of these events had been buried and made part of family secrets.

The social repercussions were grave—an outbreak of alcoholism, incapacity of the health system faced with the appearance of AIDS, depression, and emergence of the Russian mafia. Russia experienced a considerable growth in suicide, homicide, and accident rates, resulting in a decrease in life expectancy from 63.8 years during the 1960s to 59.0 years in 2000 for males, and from 72.4 to 72.0 years for females (Federal Statistical Service of the Russian Federation, Moscow 2008).

But if one compares these social consequences with the effects of crises at other time periods and in other regions of the world, one is surprised that they were not more severe. There were rallies and riots, but they did not aim at further destabilizing the society. This relative calm did not result from the supposed passivity of the Russian people. It was in part attributable to the satisfaction of the portion of the population that had access to new liberties. It also can be explained by the existence of a non-commercial exchange sector that served as a shock absorber to buffer the crisis.

## **Urban Gardening at a Large Scale**

This non-commercial sector consists of patches of land tended by small rural farmers and plots used by urban residents. In 2008, the urban parcels numbered 24.4 million (up from 1.3 million in 1990), and covered an area of 2.3 million ha. They included 14 million gardens, 3 million kitchen or vegetable plots, 120,000 dachas, and 7.3 million parcels slated for construction of individual homes (Minister of Economic Development of the Russian Federation, 2008). To this must be added a large number of non-inventoried parcels in urban and peri-urban areas, as well as a growing number of rural land purchases by city residents. A reasonable estimate would be about 25 million urban families having access to space for gardening. Beginning in 1998, federal legislation provided legal status for these efforts.



## A Shock Absorber in the Midst of Crisis

Large scale urban gardening helped urban Russians to surmount the post-Soviet crisis in two ways. First, it had a considerable psychological effect. One of the comments most often reported during interviews with the Russian gardeners was that the time spent in the gardens permitted them to forget for a short time all this chaos and to de-stress. In Russia, the garden plot is perceived as a space at the same time open and protected. Together the tranquility and contact with nature allow people to reconnect with their deeper self, their liberty, and their creativity.

Although there has not been an official evaluation of the services rendered by urban gardening, the Union of Russian Gardeners in St. Petersburg claims that people having access to a garden live longer than others, due to reduced alcoholism among men. More than one third of urban dwellers spend part of their vacation in these spaces, which can be educational for the children and promote family stability.

Urban gardening also allowed families to avoid food shortages. Those with access to a garden in 1990 launched into production of potatoes, fruits, vegetables and medicinal plants in spaces which previously had been only marginally cultivated. New collectives of kitchen gardens and individual gardens were created. Thus, faced with the collapse of the large collective farms, urban gardens furnished the majority of basic food stuffs consumed by urban dwellers during the 1990s.

Today, as a result of the 'amnesty of the datchas' legislation, about half of these parcels belong legally to their users. Russia has one of the highest numbers of small landholders in the world. And urban Russians have demonstrated their resilience to crises that have led to conflict and chaos in other parts of the world.

## References

- Federal Statistical Service of the Russian Federation, Moscow. (2008). *The statistics of Russia: Results of the Russian agricultural census of 2006*. Center of Information and Publication.
- Minister of Economic Development of the Russian Federation. (2008). *National report on the state of the utilization of lands in the Russian Federation in 2007*. Federal Agency of Land Registry Moscow.

# Chapter 27

## Beyond the Bars: Landscapes for Health and Healing in Corrections

Amy L. Lindemuth

**Abstract** Correctional facilities in the United States are stressful social environments within stark institutional settings. They are a unique category of red zone because they do not result from a sudden disturbance to the ecological or social landscape at the scale of a city or nation-state. Rather, they are intentionally constructed spaces that reflect red zone characteristics and as such, they contain the intense, potentially hostile areas and time periods that characterize red zones. Although these settings are experienced by millions of inmates and staff every day, the restorative and therapeutic benefits that the surrounding landscape could provide are rarely given careful consideration by individuals involved in their planning, construction, or administration. Research has shown that gardens and natural settings may be physically and psychologically beneficial for inmates and prison staff in terms of reducing stress, reducing recidivism rates, and improving overall health outcomes. This chapter discusses the potential benefits of prison gardens given available research. Two long-running garden programs, The Children’s Garden at Bedford Hills Correctional Facility and the GreenHouse Program at the Rikers Island Jails, are discussed as well as the elements that help foster the successful design, implementation, and maintenance of gardens within correctional facilities.

**Keywords** Prison Gardens in the United States • Prisons and therapeutic environments • Bedford Hills correctional facility • Rikers Island Jails • Female inmates and children • Horticultural therapy and prisons • Corrections officers and health • Inmates and health

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A.L. Lindemuth (✉)  
Swift Company llc, 3131 Western Avenue, Suite M423, Seattle, WA 98117, USA  
e-mail: amyindemuth@gmail.com

*Landscape architect Amy Lindemuth draws from her experience helping to design and maintain gardens in two different correctional facilities to report on the ways in which such programs help inmates and staff, and to suggest design principles for future prison gardening projects. In so doing, she draws attention to a different kind of red zone—one that does not result from a sudden disturbance or disaster but that similar to other red zones, is characterized by intense, potentially hostile areas and time periods, and that, through family ties, impacts a large network of individuals beyond the prison walls.*

Healing gardens and landscapes have rarely been considered as a relevant feature for inclusion within correctional facility design despite the large population of people living and working in these stressful settings. Landscapes that are intentionally designed to be therapeutic can provide restoration from stress and mental fatigue and opportunities for greater therapeutic transformation (Ulrich 1984, 1991; Hartig 1991). Although they cannot solve all the health and stress-related issues associated with these environments, they can soften some of their effects and improve the ability of individuals to cope with life inside and outside the security fences. They can offer spaces for inmates to reflect on the circumstances that brought them into the corrections system and, for the mentally ill who make up 16 % of the United States prison population (Bureau of Justice Statistics 2001), gardens can help manage behavioral symptoms exacerbated by the sterility, tension, and alienation of their surroundings. For staff, gardens can provide a moment of relief from stress and the constant vigilance they maintain to keep safe from harm (Rhodes 2004).

Since the 1970s, prevailing cultural and political attitudes regarding prisons and jails in the United States have focused on punitive measures rather than methods for rehabilitation. This approach fails to address the needs of inmates who will re-enter the community and helps promote a cycle of recidivism that costs billions of dollars annually (Public Safety Performance Project 2007). Further, this approach contributes to generating a working environment that is noted for its high stress, burnout, and stress related illness (Morgan 2009). Prison environments can offer more in terms of rehabilitation and restoration to inmate and staff populations than they often do. The effect could be significant for staff and inmates and positively impact the community outside the prison complex.

I became interested in corrections after taking a series of undergraduate courses in medical anthropology, taught by Professor Lorna Rhodes at the University of Washington, focused on the culture of institutions and cultural constructions of health and mental illness. Eventually I worked as a research assistant for Professor Rhodes while she completed ethnographic work among inmates living in secure housing units in Washington State prisons. It was at this time that I began to see the effects the corrections system has on those who live and work in prisons and jails and the repercussions this system has on the social fabric of communities across the United States. This work gave me a new perspective on health and the role physical environments play in our physical and psychological well-being.

As a graduate student in landscape architecture, my interest in therapeutic landscapes and corrections led to a thesis project at the Monroe Correctional Complex in Monroe, Washington, designing a large courtyard garden for staff and inmates

within a unit for mentally ill offenders. I also worked as a volunteer on the design and construction of a garden for mothers and their children at the Bedford Hills Correctional Facility in New York State. These experiences gave me insight into the concerns and perceptions of custody staff regarding green spaces in their facilities, and furthered my understanding of the cultural and psychological constraints unique to the field of corrections.

As a practicing landscape architect, this knowledge and my work on several justice projects has led me to continue evaluating approaches for establishing green spaces within prisons and jails. Two case studies presented in this chapter provide examples of typical issues that surround landscape design in corrections. It is my hope that observations from the corrections context will be useful and applicable in broader red zone contexts. A discussion of these challenges, and strategies for successfully addressing them, follows.

## **Corrections: Far-Reaching Influence**

The United States corrections system is a daily reality for millions of Americans. With over two million people incarcerated in the United States today, the US has the highest prison population rate in the world, 756 per 100,000, compared to the world prison population rate of 145 per 100,000 (Walmsley 2009; US Department of Justice 2008). Other statistics reveal a system that includes millions of people beyond the incarcerated who are part of the corrections system, including family members and individuals working in the industry. The United States Department of Labor reports that approximately 500,000 corrections officers were employed during 2006, but this statistic does not account for the tens of thousands of physicians, mental health counselors, administrative support and facilities personnel, and other individuals who spend their week working in prisons and jails (US Department of Labor 2009). Nor do these statistics capture the complex, far reaching influence the corrections industry has on the family, friends, and other community members directly and indirectly affected by the corrections system.

Corrections facilities are a unique category of red zone because they do not result from a sudden disturbance to the ecological or social landscape at the scale of a city or nation-state. Rather, they are intentionally designed and constructed spaces that reflect red zone characteristics and, as such, they contain the intense, potentially hostile or dangerous areas and time periods that characterize red zones (see Tidball and Krasny, Chap. 1, this volume). Similar to combat areas, staff and inmates both feel they are potential targets for assault and each maintains constant vigilance to stay safe from harm. The potential for weapons and violence are daily realities. This exercise is mentally taxing and a persistent source of stress in an environment that is extremely mundane day-to-day and often visually bleak.

Although corrections complexes are perceived as closed, self-contained facilities, most people eventually leave these places and bring their physical and psychological experiences back to their communities. For staff, this is a daily routine.

Staff and former inmates interact with their children, spouses, friends, and associates who may rarely, if ever, enter a corrections facility, but who may experience the effects of living or working in one by association. In this regard, the boundaries of prisons and jails are psychologically permeable, and like other red zones, the psychological effects of their physical environments can represent a disruption to living patterns at the individual, familial, and community level. Thoughtfully designed landscapes in prisons and jails can offer a counterpoint to the intensity and boredom of these facilities and can help mitigate some of the negative psychological impacts of living or working in these environments. Unfortunately, the potential to achieve therapeutic benefits using prison and jail open spaces is not widely considered by individuals involved in the planning, construction, or administration of these complexes.

Contemporary planners and designers of corrections facilities tend to focus on architectural features and management strategies that lower costs while reducing or eliminating negative inmate behavior. Since the 1970s, the direct supervision model and other similar design approaches have used strategies that de-institutionalize and normalize the interior environment. These strategies include open day rooms where inmates move freely and interact directly with officers, replacing bars with security glass, increased natural lighting, moveable furnishings, carpeting, and improved air quality systems (Tarricone 1991; Cramer 2005). These approaches greatly reduce or eliminate violent assaults on staff and fellow inmates and result in a safer, less stressful work and living environment (Cramer 2005). They also result in less long-term wear-and-tear on materials, lowered need for staffing, and reduced maintenance, which translates to lower costs (Wener 1995; Cramer 2005).

These interior architectural strategies are clearly positive and may have long-term impacts on the mental and physical well-being of staff and inmates. Yet, this approach addresses one facet of corrections facilities – individuals' daily experience of their interior environment. The social ecology of corrections is complex and requires multi-pronged approaches that assist individuals with immediate distress, healing from past transgressions, and developing techniques for maintaining their mental health when they encounter new challenges both within the corrections community and communities outside the facility. Within this context, attractive, visually complex exterior landscapes, and associated opportunities for inmate involvement in landscape management, e.g. gardening, provide an additional, relatively low-cost design strategy for mitigating the effects of living and working within corrections facilities.

## **Benefits of Landscapes and Gardens Within Corrections Environments**

Past research demonstrates that naturalistic settings may offer benefits in terms of stress reduction and improved mental states within corrections environments. In several studies conducted within United States correctional facilities, access to

views out of the prison, and the quality of these views, have been shown to have a measurable influence on the behavior and psychological outlook of inmates and staff. Moore (1981) and West (1986) showed that views out from prison cells have a significant impact on the physical well-being of inmates. Moore evaluated the number of sick-calls among nine cell blocks containing over 2,600 men. Among the findings was a correlation between the view quality out of a cell and the number of sick-calls to the infirmary. Inmates with exterior views to farmland and forests were less likely to visit the infirmary than those individuals with interior views to the prison yard (22.9 % with exterior views versus 28.4 % with interior views). Using Moore's methodology, West later correlated the number of sick-calls to the type of exterior views from inmates' cells. This study showed that inmates with a higher percentage of naturalistic elements visible from their cell make fewer sick-calls than inmates with views dominated by the built environment. Another study by Spafford (1991) suggests that view quality within a prison setting affects staff perceptions and overall stress levels. Her research conducted at two Illinois prisons suggests that staff felt calmer when the facility offered more visually complex views. Sixty-one officers were surveyed and results showed a lower probability of nervousness, irritability, and annoyance among staff when the facility's landscape was perceived as spacious and attractive. Thus, these results suggest that having access to attractive, visually complex views can improve the physical and mental health of staff and inmates and ultimately may have an immediate, wide-spread impact on the well-being of the corrections community.

Participation in creating green spaces may provide deeper, long-lasting emotional and psychological benefits in comparison to observing green spaces. Lewis (1990) identifies two modes of experiencing vegetation: observational and participatory. Viewers engage with vegetation in an observational mode of interaction when they feel no personal responsibility for the plants. This mode of interaction occurs frequently within nature settings or in viewing landscapes. In contrast, plants within a garden are experienced in a participatory mode because their care requires individual responsibility. The nurturing that occurs at this intimate scale allows for a more intense experience than that of viewing a landscape. While Lewis maintains both modes benefit well-being, he clearly indicates a different kind of restoration or healing is possible through gardening.

In the observational mode, staff and inmates can experience restorative benefits in terms of stress reduction and restoration from mental fatigue through views of a garden (see Wells, Chap. 7, this volume). Inmates can experience gardens in the participatory mode through propagating, cultivating, and maintaining garden vegetation. This intimate and prolonged interaction with plants in the garden can provide opportunities for reflection and self-regulation of emotions (see also Okvat and Zautra, Chap. 5, this volume). Further, the positive impacts the garden may have on inmates' psychological state may reduce abusive behavior and ultimately benefit staff who are often the targets of these assaults. Fewer assaults can lead to decreased stress for staff and help mitigate stress and stress related illnesses.

Several long-running garden programs have noted positive long-term outcomes for participating inmates. Rice (1993) investigated post-release outcomes for 48

participants in the San Francisco County Jail's horticulture therapy program, aptly named the Garden Project. His analysis showed that inmates benefited from involvement in the program both during incarceration and post-release. Participants reduced negative or self-destructive behaviors in several ways including reduction in illegal activities, fewer friendships with criminal associates, limited reliance on damaging familial relationships, less drug use, and an increased desire for help. Psychological benefits included higher self-esteem and reduced anxiety, depression, and risk-taking behavior. According to Catherine Sneed, the program's founder, Garden Project participants are 25 % less likely to return to jail as non-participants (Jiler 2006). The GreenHouse Program on Rikers Island in New York City has seen a reduction in the recidivism rate from 65 to 25 % for program participants (Jiler 2009). Recidivism reduction is significant given that state spending on corrections reached \$49 billion in 2007 (Public Safety Performance Project 2007). Staff also benefit from enhanced landscapes. Officers posted to GreenHouse have commented that being in the garden was relaxing in addition to having an observable calming and positive effect on inmate behavior (Rikers Island corrections officers, 2005, personal communication with the author).

The above studies, while important, are preliminary, and the results merely *suggest* that there is a positive relationship between having access to visually engaging landscapes and health outcomes for corrections staff and inmates. However, rigorous research and publications focused specifically on this relationship remain sparse. Access to corrections facilities is understandably restricted. Researchers are limited in their choices regarding the use of typical research protocols such as selecting subject populations and establishing control groups. Subject populations are often determined by the custody chain-of-command and the sample size may be limited based on security parameters. Post-release research is compromised by poor response rates from former participants who are preoccupied with pressing issues such as finding housing and remaining sober. While additional studies on this topic are clearly needed to firmly place a priority on including engaging landscape spaces within corrections, this research will likely remain challenging due to the unique constraints of working in corrections settings.

The available research discussed above suggests that gardens within correctional facilities help reduce stress among staff and inmates when the visual quality of the landscape is complex and engaging. They can also help inmates become productive community members post-release if inmates are actively involved in the garden's care. Further, individuals interacting with garden plants for prolonged periods of time, whether through active gardening or quiet contemplation, may have the opportunity to experience significant, long-term emotional and psychological changes. Landscapes must have restorative properties – extent, compatibility, fascination – to offer therapeutic benefits. The degree to which these attributes can be achieved is partially determined by the richness and diversity of the materials and plantings within the garden (Hartig 1991; Ulrich 1991; Kaplan 1995). To achieve this complexity, garden designers working in a corrections setting must understand and address several factors. These include the historical context of the site, the physical context of the garden within the facility, degree of advocacy for the project, security

concerns and requirements, frequent changes in prison personnel and leadership, and the impact of longer time frames on project implementation. Two contemporary gardens examine these issues in greater detail.

## **The Children's Center Garden, Bedford Hills Correctional Facility**

Bedford Hills Correctional Facility (BHCF) is the largest prison for women in New York State and the only maximum-security facility for women, with approximately 63 % of inmates serving time for a violent offense (Women in Prison Project 2007). Located an hour north of New York City, BHCF has a legacy of innovative and experimental programs that is embodied by the Children's Center, a program initiated over 30 years ago by Sister Elaine Roulet of Catholic Charities Diocese of Brooklyn (Ames 1996; Palmer 2005). On average, 70 % of the approximately 800 BHCF inmates are mothers (Women in Prison Project 2007). The main goal of the Children's Center is to help inmates preserve and strengthen relationships with their children during their incarceration. This process is aided by a nursery, parenting center, day care center, prenatal center, and child advocacy office. The programs continue to receive funding through Catholic Charities Diocese of Brooklyn, but also benefit from donations and strong volunteer support from surrounding communities. Support from these and other groups was instrumental in establishing an outdoor garden within the facility for Children's Center programs and continues to play an important role in its continued maintenance and vibrancy.

For years, the Children's Center imagined transforming a courtyard adjacent to the Visitors' Room into an outdoor space for mothers and their children. Strong support from Toni Campoamor, then Director of the Children's Center, Mary Bostwick, Program Coordinator, and Libba Claude, an outside volunteer who raised most of the required funds for the garden, gave the project momentum. In 2003, BHCF contacted University of Washington Landscape Architecture Professor Daniel Winterbottom who worked with the facility and the Children's Center to develop a design. Superintendent Elaine Lord was particularly encouraging and progressive in her thinking about the garden project. Her support and encouragement for the project among state-level administrators were critical factors that helped move the design through custody review. After a final design was approved, Winterbottom and his volunteer team spent the first two weeks of June 2005 building the garden, which opened in July of that year.

The garden includes arbors, glider swings, planter boxes and beds, play equipment, a half-court for basketball, picnic tables, and a diverse selection of shrubs and groundcovers with mature and newly established trees. Most of these elements are often viewed as security risks by custody staff, depending on their location in the garden and the garden's location within the facility. Tall arbors and trees can be used to climb over security fences; lush planting beds can conceal contraband, particularly drugs. Some features are also seen as amenities for inmates. BHCF officers



expressed these concerns during construction, but realized that the garden's location in the middle of the BHCF complex minimized perceived security risks – inmates leaving the garden are still within several layers of security. Staff also felt that the benefits for inmates' children outweighed potential for contraband or perceived privilege for inmates. Generally, officers feel that while inmates deserve punishment, their children do not (BHCF corrections officers, 2005, personal communication with the author).

The garden is accessible to any inmates with visiting children 17 years and under and an officer must be posted in the garden when it is open for use. Other inmates and visitors access the garden visually through the Visitor Center windows. Except during inclement weather, the garden is used throughout the year and includes a range of programmed activities. Most notable is the Center's summer program wherein children stay with a foster family in the community for several days or weeks while visiting their mother each day at BHCF. Most of these hours are spent in the garden which continues to be highly maintained with support from Children's Center staff, volunteers, community garden clubs, and the BHCF horticulture program (Bobbi Blanchard, Children's Center Director, 2009, personal communication with the author).

The original incarnation of BHCF as a women's reformatory left a legacy of reform through education and training – an established history of programming that has continued into the present. Due to this legacy, the project was not considered unusual within the overall framework of the institution by the administration. Strong advocacy for the project from inside leadership and outside volunteers helped the project obtain approval from upper levels of the state corrections department. As the garden has matured, continued support from the administration and outside community help it continue to function as originally envisioned.

## **The GreenHouse Program, Rikers Island Jails Complex**

The GreenHouse Program at the Rikers Island Jails Complex is located in Flushing Bay just north of LaGuardia Airport in New York City. Since 1936 when the city constructed its first jail on the island, facilities have grown to 10 separate detention centers. These jails range from maximum to minimum security and house from 16,000 to 20,000 inmates, both men and women, at any given time (Dominguez 2005; Jiler 2006). Because Rikers Island is a jail and not a prison, the majority of inmates, about 12,000, are detainees – individuals awaiting trial or court dates, or who were denied bail or cannot pay it. In contrast to BHCF, most inmates will spend a limited amount of time within the complex, anywhere from a few months to a year, before being released or sentenced and transferred to a prison upstate.

In 1996 the Horticultural Society of New York (HSNY) began the GreenHouse Program, a jail-to-street program providing inmates at Rikers Island horticulture

training and work experience in the design, installation, and maintenance of gardens. The 2-acre garden is located between two jail facilities in a secured area surrounded by a 10 ft cyclone security fence. Male and female students work and attend classes in separate shifts during different times of the day. The only individuals entering and leaving the site during the day are GreenHouse students, two officers assigned to this post, and HSNY employees, including Hilda Krus, the program's director since 2008.

The garden's restricted access limits the number of individuals who experience the garden, but also allow it to contain features that would be perceived as security risks in other contexts within the jail complex. The space is a series of lush shrub beds, flower borders, and vegetable gardens interspersed by built structures including arbors, post and rail fences, birdhouses, a gazebo with waterfall features, pagoda, greenhouse, and a building used as office and classroom. Walkways are constructed of gravel, brick, and other materials found on the island or donated from outside. Animals, including Peking ducks and Guinea hens, have been introduced over the years, adding an animal husbandry element to the program (Rikers Island corrections officers, 2005, personal communication with the author; Jiler 2006).

The GreenHouse garden, like the BHCF garden, has a strong programming framework. Horticulture classes are primarily taught in winter when conditions become inhospitable for outdoor activities. During this time, inmates also construct birdhouses, bat boxes, planters, and other wood features for the GreenHouse garden, as well as for city schools and parks (Jiler 2006). In addition to maintaining and expanding the garden, students grow plants for schools and other public entities including libraries in low-income neighborhoods. Vegetables grown at GreenHouse are donated to cooking classes offered at the Rikers jails and also to local homeless shelters. Much of this effort is facilitated through partnerships with other HSNY programs including, AppleSeed, GreenBranches, and GreenTeam (Dominguez 2005; Jiler 2006).

GreenHouse students are eligible to participate in HSNY's post-release, after-care program, GreenTeam. GreenTeam is the 'street' portion of the jail-to-street program, which offers paid horticultural internships to inmates upon release. Interns work on public and private gardens and open spaces through contracts HSNY receives via a competitive bidding process, and install 'learning gardens' around the City's branch libraries, which are used for educational programming, literacy classes, and year-round community workshops. Beyond the immediate security of having a paying job, GreenTeam also provides individuals with a work history, professional skills, and the flexibility to attend classes and drug programs, and to address housing or other needs individuals typically face post-release. The success of GreenTeam is apparent by the number of individuals the program has supported over the years, but also by the recidivism rate among participants – less than 10 % return to jail. This is a laudable statistic given that the recidivism rate for Rikers Island Jails averages 65 %, slightly lower than the national average of 67 % (Jiler 2006).

## **Lessons Learned**

### ***Programming and Its Beneficial Role***

Strong programming aids inmates and staff by providing prolonged experiences in a garden or landscape and a framework for meeting individual goals. Clear goals, and spaces to accommodate them, can improve the physical and psychological benefits available from a garden. Both gardens at BHCF and Rikers Island Jails are closely aligned with a program that allows a variety of activities to occur within the site which aids in restoration. The garden at BHCF includes passive spaces for quiet interaction among mothers and children while also providing active space for play. Similarly, the GreenHouse garden includes several distinct garden spaces and styles that facilitate the instruction and learning of horticulture and also quiet reflection. This lack of ambiguity facilitates increased engagement among garden participants who see the space as a calming respite from everyday prison life that is in sync with personal, achievable goals.

Opportunities and experiences offered through careful programming can provide tangible benefits including vocational training, motivation for good behavior, and an occupation tending the garden to alleviate boredom. These attributes give participants employable skills and allow them to enjoy successive, prolonged experiences in the garden. These long periods of time interacting with or observing garden plants allow users opportunities to experience significant long-term emotional and psychological changes. GreenHouse officers and instructors have noted that particularly difficult or combative inmates become less abusive, more engaged, and self-reflective after several weeks in the program (Rikers Island corrections officers, 2005, personal communication with the author).

### ***The Need for Advocacy and Participation***

As the garden projects at Bedford Hills Correctional Facility and the Rikers Island Jails Complex illustrate, having advocates for including more green space inside and outside the facility increases the success of the project. Garden and landscape projects within corrections are affected by current social and political relationships within and outside the facility as well as by the garden's location in time and space. Successful gardens require advocacy to get the design built and keep the site operating with its intended goals after construction. Gardens in corrections settings introduce complexity into an environment that has established rules and limitations, based on legitimate security concerns, which are intended to eliminate visual complexity as well as access to potential weapons and other contraband. Understandably, staff may be resistant to incorporating a garden because the aesthetic does not meet current ideas about acceptable landscapes and about activities within the prison that meet security requirements. It is essential to have

support from staff at multiple levels of the authority structure. Approval from a superintendent who makes daily management decisions for the facility is particularly important. These individuals are one of the primary determinants regarding the facility's programming and budget allocations and their support will make the difference between a project gaining traction or dying on the vine.

Equally important to the project's success is a clear understanding of officers' concerns, so they can be adequately addressed in the design. Officers will feel more comfortable if they believe the project meets security requirements and ultimately keeps them safe from harm or additional challenges in their workday. The best likelihood of obtaining this kind of custody 'buy-in' is to include staff in the design process. Staff participation is critical to understanding security needs for the space. Officer input can assure that the design adequately addresses security requirements and can help establish legitimacy for the project within the ranks of the officer corps. Yet, incorporating staff in the design process often faces challenges due to internal politics and limits placed on staff's time.

Custody staff, including officers, sergeants, lieutenants, and captains, and superintendents, receive intense social pressure from colleagues and superiors to be strict custodians of prison security and protocol. Gardens are often viewed as a privilege and security risk that make the job of custody staff more challenging and dangerous. Superintendents that allow gardens at their facility risk being viewed as lenient on inmates by their superiors and custody staff. One way to address this issue is by showing that a garden or landscape program is beneficial to the facility in ways that are distinct from inmate benefits. Projects that demonstrate cost-effectiveness and produce services for the facility such as food that will supplement other operations budgets can help administrators justify approval of the project, explain its need to staff, and generate enthusiasm and wider legitimacy throughout the custody chain-of-command (Jiler 2006).

Participation by inmates is also desirable and important for the design, but can be challenging to obtain unless the garden is part of an approved program such as GreenHouse. Otherwise, custody staff is usually reluctant to allow civilians to interact with inmates due to concerns that civilians are easily manipulated and will ultimately come to harm. Many corrections facilities provide training sessions to volunteers and other non-custody staff that address these risks and provide strategies for working with inmates. Attending these sessions can help alleviate custody staff concerns.

### ***Maintaining a Short, Efficient Project Schedule***

A tight design and construction schedule can be critical for project success. Political conditions within corrections facilities can change dramatically from one visit to the next. One common occurrence is the sudden change in custody leadership that can occur following elections and new appointments to state corrections departments. Leadership shifts can result in undesirable changes to the project that may compromise

its long-term success. For instance, inmates or staff initially allowed to participate in design development by a previous superintendent may be denied by a new superintendent. This scenario was true for the BHCF garden design and will be a challenge for any project that involves a long design and construction process. Adhering to a tight design and construction schedule will help ensure that the garden is built before leadership changes can take place. It is also advisable for designers to visit the facility often during the design and construction process, and limit time between visits, so they maintain rapport with staff and up-to-date knowledge of the facility's political climate.

### ***Establishing an Appropriate Location***

The level of landscape complexity in terms of plants, layout, and features is partially determined by the location of the garden within the corrections facility. The site location of both the BHCF and GreenHouse garden has a significant impact on what activities and design elements are permissible. Both gardens are located in secured spaces accessible to specific members of the inmate population – inmates with children under 18 at BHCF and horticulture students at Rikers Island. These small groups are screened for contraband upon entering and leaving the garden site and are comprised of inmates who have been classified as non-violent offenders. From a custody viewpoint, these garden locations and the inmates who use them pose fewer security risks. These factors allow both gardens to have a higher level of complex features such as heavily planted areas, mature trees, and built structures that would not be favored in other locations within the facility. The paradox is that these elements strengthen the therapeutic opportunities available in the garden, but also limit the number of inmates who experience them due to their restricted access.

It is possible to have more engaging, complex landscapes in areas of the facility that have wider inmate access if a close partnership is established with the superintendent and custody staff. Custody staff will view various locations within the same institution differently in terms of security. For instance, institutions that house inmates with different custody levels can have significant variations in their security requirements for different courtyards within the same facility. Decisions regarding activities and design elements within a garden will be made according to the level of security risk perceived by staff. It is imperative to work closely with the superintendent to identify potential areas within the facility for gardens and other landscape projects and to have a clear understanding of the security issues associated with each location.

### **Conclusion**

There are many ways that the prison environment can be improved to 'make a difference' for both staff and inmates. Gardens and other outdoor spaces can serve a unique role in greening the corrections red zone, whether programmed or not,

in that they can be available to everyone. Views into aesthetically engaging outdoor spaces appear to be a simple, low-cost method correctional facilities can implement to improve the health and psychological well-being of staff and inmates. In addition, gardens and other thoughtfully programmed outdoor spaces can provide an important counterpoint to institutional life for both staff and inmates. They can offer opportunities for deeper psychological transformation and help alleviate the hostility and intensity of prison and jail red zones. Outside the prison fences, programmed gardens have shown potential to save tax-payer revenues by providing low-cost job training, reduced healthcare costs for inmates and staff, reduced recidivism rates, and reduced operating costs through food production and other sustainable site features. Most notably, gardens in prisons and jails can offer a dose of normalcy in environments that are dominated by hard surfaces, regimentation, and abnormally demanding social interactions. Helping individuals feel less 'institutionalized' when they leave these facilities will not only have positive results for taxpayers, recidivism rates, and staff and inmate health outcomes, it could ultimately make for healthy, safer, more resilient communities.

## References

- Ames, L. (1996, April 28). The view from: Bedford Hills correctional facility; keeping families intact, from prison. *The New York Times*. Retrieved from <http://www.nytimes.com/>
- Bureau of Justice Statistics (2001). Mental health treatment in state prisons, 2000 Special Report, U.S. Department of Justice.
- Cramer, M. L. (2005). Pima county jail: Design reduces violent behavior. *Corrections Forum*, 14 (4), July/August. Pages 18–22.
- Dominguez, M. F. (2005). 2nd chances: A novel prison program in New York city uses nature to teach inmates about life's larger lessons. *Audubon*, 107(3), 58–61.
- Hartig, T., Mang, M., & Evans, G. W. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23(1), 3–26.
- Jiler, J. (2006). *Doing time in the garden: Life lessons through prison horticulture*. Oakland: New Village Press.
- Jiler, J. (2009). *Restoring Lives, Transforming Landscapes: GreenHouse Program at Rikers Island Jail, New York, NY*. Restorative commons: Creating health and well-being through Urban Landscapes, USDA Forest Service.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169–182.
- Lewis, C. A. (1990). Gardening as healing process. In M. Francis & R. T. Hester (Eds.), *The meaning of gardens: Idea, place, and action* (pp. 244–250). Cambridge, MA: MIT Press.
- Moore, E. O. (1981). A prison environment's effect on health care service demands. *Environmental Systems*, 11, 17–34.
- Morgan, W. J. (2009). Correctional officer stress: A review of the literature 1977–2007. *American Jails*, 23(2), 33–43.
- Palmer, R. A. (2005). Sister Elaine unites prison moms with their kids, National Catholic Reporter. <http://www.natcath.com/>
- Public Safety Performance, P. (2007). *Public safety, public spending: Forecasting America's prison population*. Washington, DC: The Pew Center on the States. 52.

- Rhodes, L. A. (2004). *Total confinement: Madness and reason in the maximum security prison*. Berkeley: University of California Press.
- Rice, J. S. (1993). Self-development and horticultural therapy in a jail setting. *Philosophy*. Doctor of Philosophy. The Professional School of Psychology, San Francisco.
- Spafford, A. M. (1991). The prison landscape and the captive audience: Is nature necessity or amenity? *Landscape Architecture*. Urbana-Champaign, University of Illinois. MLA.
- Tarricone, P. (1991). Jailhouse design. *Civil Engineering*, 61(3), 52–55.
- US Department of Justice (2008). Bureau of justice statistics. <http://www.ojp.usdoj.gov/bjs/correct.htm#findings/>
- US Department of Labor (2009). Bureau of labor statistics occupational outlook handbook, 2008–09 edition: Correctional officers. <http://www.bls.gov/oco/ocos156.htm/>
- Ulrich, R. (1984). View through a window may influence recovery from surgery. *Science*, 224(4647), 420–421.
- Ulrich, R., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of Environmental Psychology*, 11, 201–230.
- Walmsley, R. (2009). World prison population list, International Centre for Prison Studies, King's College, London.
- Wener, R. (1995). Evaluating the design of direct-supervision jails. *Progressive Architecture*, 76(2), 79–81.
- West, M. J. (1986). Landscape views and stress response in the prison environment. *Landscape Architecture*. University of Washington, Seattle. **MLA**.
- Women in Prison Project. (2007). *Report on conditions of confinement at Bedford Hills correctional facility*. New York: Correctional Association of New York.

# Chapter 28

## Conservation: The Catalyst for Peace in Northern Kenya

Ian Craig

**Abstract** Ian Craig describes how stakeholder involvement in conservation in some of Africa's most storied landscapes was important in reaching solutions for both wildlife and livelihoods. The importance of reestablishing the trust and credibility between government and communities is discussed.

**Keywords** Northern Rangeland Trust • Kenya • Shaba National Reserve • Conservation • Africa

Drought and famine are a constant threat in Northern Kenya, where people are predominantly dependent on livestock keeping for their living. In 2004, members from politically and socially marginalized pastoralist communities in this region, along with conservationists, established the Northern Rangelands Trust (NRT) to meet the need for an umbrella organization that would assist communities to use conservation as a means of improving and diversifying livelihoods. NRT is governed by a council of elders made up of different ethnic groups working together through the common cause of conservation – conservation which is not just about saving animals, but also about providing alternatives to people's livelihoods, job creation, clean water and healthcare, livestock marketing, and establishing a forum for communication across warring communities. NRT established credibility amongst communities and allowed relationships to develop amid elders whose sons were killing each other in tribal skirmishes. Tourism revenues within the communities' conservancies are currently running at unprecedented levels, allowing the community to educate children, build schools, and provide water in a society that historically has been reliant on livestock and food aid handouts. Revenue from

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I. Craig (✉)

Northern Rangelands Trust, Private bag, Isiolo 60300, Kenya  
e-mail: ian.craig@nrt-kenya.org





**Fig. 28.1** A young Samburu warrior armed with an AK 47 waters his cattle at the 50 Wells, Sera, North Kenya

tourism and the associated job opportunities are the two elements that make this approach to conservation ‘real’ to the community at large. The trust established through different ethnic groups working together to promote conservation was a key factor in reconciling these groups when conflict erupted in 2009.

In the last 10 years the growing instability in the horn of Africa coupled with the proliferation of small arms (see Fig. 28.1) spreading across porous borders has allowed for the creation of well-coordinated armed militias, in some cases politically funded and motivated. Societies that for generations had lived by the spear and sword evolved into much more dangerous and alienated groups. In Northern Kenya, historical ethnically based tensions grew into fierce confrontations with dozens of people being killed at any one time. In addition, the government has been unable to control criminal elements within these societies, aggravating an already tense situation and raising it to new levels. In mid 2009, this level of insecurity, coupled with increasing drought and lack of grazing for livestock in pastoralist communities, led to the invasion of one of Kenya’s most prestigious protected areas – the Shaba National Reserve. In trying to enforce the sanctity of the National Reserve seven policemen were killed in one day by the pastoralist bandits showing total disregard for government authority.

Given the complete breakdown of law and order within the Shaba National Reserve, Kenyan tourism boycotted the park and revenues to the local county council dropped to zero. The Government of Kenya made a special request to NRT to

intervene through dialogue. The Council of Elders selected three elders from each ethnic group. An NRT vehicle, clearly branded to be recognized as belonging to an independent community-owned organization, was deployed under the direction of an NRT regional coordinator from an ethnic background different from those of the warring groups to act as an impartial broker. For two months the group lived amongst the bandits, engaging them as equals. They discussed the implications of their forced invasions of the park: the fact that the cattle were dying irrespective of the fact that they were grazing in the protected area; the fact that revenues from the National Reserve shared with the community were non-existent; the fact that jobs were being lost; and the fact that the government was losing patience. Through a slow process of persuasion by a non-threatening team, the elders could engage where the government could not. After a short six weeks the NRT team returned the Reserve to its original state as a protected area without a shot being fired.

Three tools were used in reestablishing the trust and credibility between government and communities: (1) communications through a VHF radio system covering hundreds of miles; (2) vehicles provided to each community conservancy to allow easy access to each neighboring community; and (3) the availability of a small aircraft to provide aerial surveillance when livestock are stolen. The Rendille, Samburu and Borana – the three communities fighting and stealing livestock – were all in direct communications through their radio system. The theft of livestock was



**Fig. 28.2** Elephants water peacefully at Sarara Camp, the most successful community owned in camp in North Kenya

reported as soon as it occurred, vehicles were rapidly deployed to the site of the theft, and the aircraft was used as a communication platform to monitor the passage of the stolen livestock. Despite the fact that the bandits attempted to shoot the aircraft, it slowly became apparent that the aircraft could dominate this arena resulting every time in the return of the stolen livestock. The combined approach of the communities, government and NRT forced the criminal elements within the communities into submission. The coordinating body is the NRT which acted with a balanced hand, returning livestock from every ethnic group irrespective of any alliance. This word spread fast amongst communities and government – the bandits soon recognized that they were simply out-performed, and that the combination of communication and availability of aircraft meant that the theft of livestock would not succeed.

Based on this newly developing stability, conservation is once again able to flourish (see Fig. 28.2). If the poaching of an elephant for ivory would result in the loss of the availability of the aircraft and communications, and the loss of healthcare facilities and clean water, the community will not allow such activities to happen. With the increasing numbers of wildlife, a tourism product developed, encouraging new business, providing employment and new revenues. The catalyst for change was insecurity; however, it was impossible to resolve the conflict by analyzing the root cause and applying solutions at that level, it was only possible by providing a common asset to the conflicted communities that if lost would affect all three parties. This is conservation with a broad humanitarian reach. NRT was the trusted body that could catalyze these opportunities.

## Chapter 29

# Sustainability-Oriented Social Learning in Multi-cultural Urban Areas: The Case of the Rotterdam Environmental Centre

Arjen E.J. Wals and Marlon E. van der Waal

**Abstract** This chapter explores the utilization of social cohesion and diversity in creating more sustainable multi-cultural communities. Community greening is seen as a catalyst for sustainability-oriented social learning. Greening here is not the same as literally adding green to a community (trees, parks, gardens) – although that certainly can be a part of it – but rather as a metaphor for improving quality of life and a stepping stone towards sustainability. Social learning is introduced as a process that builds social cohesion and relationships in order to be able to utilize the different perspectives, values and interests people bring to a sustainability challenge. Although there are many perspectives and definitions of social learning it is defined here as: a collaborative, emergent learning process that hinges on the simultaneous cultivation of difference and social cohesion in order to create joint ownership, and to unleash creativity and energy needed to break with existing patterns, routines or systems. The chapter is empirically grounded in the Dutch city of Rotterdam. We use the phrase red zone to refer to parts of Rotterdam, because there are a number of socio-economic, cultural and ecological issues that could come together and escalate in ways that we have seen in similar Western European metropolitan areas such as the Paris *banlieues*. One of the questions we address is: How can, under conditions like these, diversity and social cohesion be used in building more sustainable practices, lifestyles and systems?

**Keywords** Social learning • Diversity • Social cohesion • Boundary crossing • Expeditionary learning • Community development

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A.E.J. Wals (✉) • M.E. van der Waal  
Wageningen University, Hollandseweg 1, 6706 KN Wageningen, The Netherlands  
e-mail: arjen.wals@wur.nl; waalspaans@hetnet.nl

*Parts of the city of Rotterdam are plagued by high levels of crime, unemployment, and pollution. Yet it is in these same neighborhoods that immigrant women are improving green space, young people are reconnecting to their North African homeland through learning about a migratory butterfly, and community members are turning traditional gatherings into an opportunity to learn about the environment. Authors Arjen Wals and Marlon van der Waal use a social learning perspective to help understand how a community organization facilitates this work.*

## **Introduction**

This chapter explores the utilization of social cohesion and diversity in creating more sustainable multi-cultural communities. Community greening is seen as a catalyst for sustainability-oriented social learning. Greening here is not the same as literally adding green to a community (trees, parks, gardens) – although that certainly can be a part of it – but rather as a metaphor for improving quality of life and a stepping stone towards sustainability. Social learning is introduced as a process that builds social cohesion and relationships in order to be able to utilize the different perspectives, values and interests people bring to a sustainability challenge. Although there are many perspectives and definitions of social learning (Glasser 2007) it is defined here as: a collaborative, emergent learning process that hinges on the simultaneous cultivation of difference and social cohesion in order to create joint ownership, and to unleash creativity and energy needed to break with existing patterns, routines or systems.

A key assumption underlying this perspective, one we will explore, is that breaking with current unsustainable practices, routines and systems requires creativity, agency, risk-taking and high levels of motivation. Questions that are addressed, and partially answered, are: how can we create a transformative culture of change that cultivates these qualities in people, organizations and communities? How can diversity and social cohesion be used in building sustainable practices, lifestyles and systems?

## **Rotterdam as Red Zone**

The chapter is empirically grounded in the Dutch city of Rotterdam. The city of Rotterdam is the second largest city of the country and together with the suburbs forms the most urbanized area in the Netherlands. We use the phrase red zone to refer to Rotterdam, or rather parts of Rotterdam, because there are a number of socio-economic, cultural and ecological issues that could come together and escalate in ways that we have seen in similar Western European metropolitan areas such as the Paris *banlieues* (Schneider 2008) and the city of Bradford, UK (Allen 2003). We will first describe some of the elements that are currently affecting different neighborhoods in Rotterdam, and which require the immediate attention of the local government, community organizations, and neighborhood groups.

In January 2009, Rotterdam had just under 600,000 inhabitants and an incredible 2,847 inhabitants per km<sup>2</sup> (the national average is 489 per km<sup>2</sup>) ([www.statline.cbs.nl](http://www.statline.cbs.nl)). Rotterdam is also a very diverse city with nearly half its population not of Dutch origin and representing 173 different nationalities. The largest groups come from Suriname, Morocco, Turkey, the Dutch Antilles and Aruba, and the Cape Verde Islands.<sup>1</sup>

As can be expected from a densely populated area, Rotterdam is facing major social, economic and environmental problems that cause troubled and tense relations between groups of citizens, but also health and security problems that affect all the inhabitants. In this respect, even though Rotterdam may not be struck by extreme dangers as hurricanes and war that create immediate life-threatening situations for tens of thousands of people, Rotterdam as a red zone harbors a series of more subtle threats that make living in this city slowly but increasingly intense and hostile (see also Stedman and Ingalls, Chap. 10, this volume for another type of red zone city).

Starting in 2005, the Rotterdam Centre for Research and Statistics (COS 2008) has conducted a survey among 3,500 inhabitants, asking them to define the main problems of the city. In 2007, the three most cited problems were crime, traffic problems and pollution, and (mis) management of public space (2008).

Crime in Rotterdam is relatively high when compared to other Dutch cities.<sup>2</sup> Rotterdam is the only city in the Netherlands that since 2002 has kept a public record of the ethnic background of people involved in criminal activities. These records show that more than 55 % of Moroccan men between 18 and 85 years old have had at least one encounter with the police, as have 40 % of the Antillean and Suriname men, and 36 % of the Turkish men in this age category, while 18.4 % of the native Dutch male population has had such an encounter (Bovenkerk 2009; Komen and Schooten 2009). High unemployment rates, as a result of loss of jobs associated with Rotterdam harbor, may contribute to this crime problem.

Key environmental issues listed in the survey are: dirty streets (usually referring to streets with litter and dog excrements), air pollution (depending on climatic conditions this usually refers to high ozone levels and/or particulate matter from motorized vehicles), shortage of green areas, noise (mainly from traffic, including air traffic), and risks of disaster by toxic substances (often related to the presence of a major oil refinery and chemical plants in the vicinity of Rotterdam harbor). Indeed inhabitants have reason for concern: a study by the Academic Coalition Healthier Rotterdam in 2008 revealed that lower life spans among Rotterdam residents relative to inhabitants of other parts of the Netherlands could be attributed to: air pollution, noise pollution, smoking, sleeping difficulties, lack of exercise, obesity as well as socio-economic factors such as social marginalization, loneliness, lack of social cohesion, and lower levels of education and income.

Although there are no simple causal explanations or linear relationships, the figures presented here for Rotterdam, particularly the ones related to unemployment,

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<sup>1</sup> [www.cos.rotterdam.nl](http://www.cos.rotterdam.nl)

<sup>2</sup> [www.cbs.nl](http://www.cbs.nl)

contribute to unfavorable perceptions various groups of citizens have of one another. In fact they have led to deep concerns about the integration of ethnic minorities and to fierce and bitter discussions between right- and left- wing parties in the city council of Rotterdam and in the Dutch Parliament. Arguably the buildup of ethnic tensions is not so much fueled by face-to-face interaction between these groups but rather by statistics and, indeed, populist rhetoric. The latter has led to the rise of what some refer to as a right-wing nationalist party: the *Partij voor de Vrijheid* or PVV (Party for Freedom), led by a very outspoken and public figure Geert Wilders, internationally known for his anti-Koran film *Fitna*. Wilders and his party have successfully tapped into the anti-immigration sentiment that grew exponentially as a result of two politically motivated hate murders that took place in the first decade of this century: the murder of Pim Fortuyn, a Rotterdam-based politician who is seen by many as Geert Wilders' predecessor, by a leftist activist, and the murder of the well known movie-maker and columnist Theo van Gogh by a Muslim fundamentalist. In many ways these two incidents, preceded by 9/11, have been landmark events completely changing the political landscape in local and national government and transforming a culture of tolerance and dialogue, which previously characterized the Netherlands, into a polarized culture of distrust and fear.

Veldhuis and Bakker (2009) suggest we may need to soften this harsh conclusion a bit. At the end of their extensive report on Muslims in the Netherlands they write: 'The fact that the release of the anti-Islam movie *Fitna* did not lead to angry responses by Muslim communities may indicate two things. Either the idea of intolerance and polarization has been exaggerated, or Dutch society has gradually rediscovered its traditions and the importance of adhering to common rules and values that include mutual respect. Probably it is a bit of both' (Veldhuis and Bakker 2009). They conclude that globalization in recent years has resulted in increased interaction and interdependency between social groups and a corresponding awareness of social diversity and heterogeneity. According to Veldhuis and Bakker, in order to achieve successful co-existence social groups with different values, norms, historical backgrounds and beliefs need to: 'agree on a basic set of common rules and values and [maintain] a minimum level of mutual respect and understanding' (ibid, p. 28).

## The Rotterdam Environmental Centre

An NGO working against the complicated and often tense backdrop in Rotterdam is the 'Rotterdams Milieu Centrum' (RMC), translated: 'Rotterdam Environmental Center'<sup>3</sup>. The centre became independent in 2003 and is connected to related environmental centers in other large cities including Amsterdam, The Hague and Utrecht. The RMC aims 'to change the city of Rotterdam into a more nature- and environmentally-friendly city where people can live in safety, well-being and social harmony'. The work of the RMC is featured in this chapter because according to a number of indicators (increased participation, continued praise and funding from government agencies,

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<sup>3</sup> [www.rotterdam.milieucentrum.nl](http://www.rotterdam.milieucentrum.nl)

participant feedback, consultation requests by similar organizations elsewhere in the country, and the results of a survey conducted by the independent bureau ORG-ID in 2009), the centre – under challenging conditions and against some trends in Europe in general and certainly in The Netherlands – appears successful in simultaneously developing social cohesion among diverse groups of people and in tackling local manifestations of un-sustainability. In doing so, we claim that the RMC confers resilience within the social-ecological system in this urban European red zone.

The activities of the centre rest on four pillars: ‘environment’, ‘nature’, ‘space’ and ‘diversity’, all of which are addressed in partnership with city government initiatives. Within the pillar *environment*, air quality and climate change are chosen as key themes in response to air pollution and threats of rising sea level. Rotterdam was chosen by the UN World Alliance of Cities Against Poverty as a Centre of Excellence regarding climate change, and the Rotterdam Climate Initiative and the Rotterdam Climate Proof programme tackle climate change issues. In the pillar *nature*, the RMC advises the city council in its management of nature and organizes many nature-oriented projects (e.g., the project ‘Mapping Nature’ in which volunteers are trained to monitor natural areas in the city). In order to make Rotterdam a safer ‘*space*’, inhabitants are involved in the mapping and construction of their city as well as the green elements within. RMC facilitates the process by informing, advising and supporting groups of inhabitants and individuals and by working together with other organizations (e.g., when new building projects are developed or valuable nature areas are threatened). Finally, the RMC addresses the *diversity* pillar by organizing a large number of activities within a special programme called ‘MilieuDivers’ (translated: ‘Environment-Diversity’ programme). It is this programme that forms the focal point of the remainder of the chapter. We will introduce the RMC’s Environment-Diversity programme and analyze it from a social learning perspective. Before doing so, however, we must pay attention to the theoretical basis of the RMC activities as they mimic principles and practices associated with social learning as defined in the opening paragraph of this chapter.

## The Theoretical Basis of the RMC Activities

A key component of the RMC’s strategy to green Rotterdam is the continuous strengthening of local and regional networks in order to establish a broad social basis for its activities<sup>4</sup>. The writings of Paolo Freire, Kurt Hahn and Carl Rogers provide a theoretical underpinning for this work.

### 1. *The critical pedagogy of Paolo Freire*

Freire (1921–1997) is well-known for his battle against suppression and exploitation of impoverished citizens in Brazil. As pedagogue, Freire focused his attention on learning through dialogue, which he saw as the meeting and interaction of human beings who are open to the dynamics of change (Freire 1985, 1987).

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<sup>4</sup>[www.milieucentrum.rotterdam.nl](http://www.milieucentrum.rotterdam.nl)



In having contact with others, humans develop what he calls ‘critical awareness’. A continuous spiral development of action and reflection characterizes the growth of such critical awareness. Freire regarded learning as a productive and creative process in which people are active participants who use and build upon their personal knowledge, competence and experience. Stimulating, arousing and provoking curiosity and engaging learners in collective search for existentially relevant solutions are essential components of Freire’s pedagogy.

2. *Expeditionary learning based on the philosophy of Kurt Hahn*

The German educator Kurt Hahn (1886–1974) developed an educational philosophy based on the idea that society corrupts the innate decency and moral sense of young people (James 2000). By giving learners the opportunity to develop personal leadership qualities and letting them experience the effect of their actions, ‘corruption of the mind’ can be prevented. Outdoor adventure programs, according to Hahn, can provide such opportunities. Expeditionary Learning Outward Bound schools that were founded on the teachings of Hahn (and others) have developed ten principles in order to create a caring, adventurous school culture and an experiential approach to learning, including processes of self-discovery, experimentation, responsibility for learning, mutual trust and cooperation, learning from failure and success, valuing of diversity and inclusion, heterogeneous learning groups, respect for the natural world, and time for solitude and reflection, service and compassion.

3. *The non-directive approach to community development by Carl Rogers*

Drawing on the writings of Carl Rogers, former Rotterdam Mayor Bram Peper puts forth his view that community work is a symptom of crisis in a society; a society in need of community work is characterized by feelings of discontent about welfare conditions. In the non-directive approach, community values are respected and no measures of change are forced. By seeking dialogue, a renewed sense of responsibility and autonomy is fostered. Change is a result of agreed upon cooperation by a large part of the community with government and civil society organizations (Peper 1973).

RMC Director Emile van Rinsum further developed this non-directive approach by creating a method called ‘Opzoomeren’ (‘improving the environment by improving communication between community members from within’). Central to this method are five parameters: determining a central question or need of the community (by doing research); approaching the management of organizations; organizing meetings with members (creating interest); when requested also deepening of the issues by offering workshops, excursions, and debates; and finally fostering the self-efficacy of community organizations and possible cooperation with the RMC.

In practice the method of ‘opzoomeren’ in RMC means reaching out to community leaders who are chairs of associations, committee members or spiritual leaders. They are visited ‘in situ’, in locations where community groups regularly come together (for example, clubhouses, churches and mosques, women’s centers and community centers). Here the RMC offers the community possibilities to organize nature-, environment- and sustainability- focused meetings, excursions and

workshops. The communities show a high interest in the activities of the RMC. Especially interesting to the communities are the documentaries made by the RMC, some of which are filmed in overseas countries as Morocco and Suriname. The documentaries spark discussions and often lead to new activities, such as the forming of special workgroups and excursions around a green theme. The point of departure of the RMC's work is not so much issues of cultural integration but rather existentially relevant issues or common interests that people share. However, by participating in the RMC's activities people do come to see the different ways of looking at, valuing and interpreting multiple issues, thus potentially facilitating cultural integration.

## **The Environment-Diversity Programme**

The Environment-Diversity programme forms an umbrella for a series of projects that together aim to attract the interest and participation of Rotterdam youth and ethnic minorities in nature and environmental organizations and activities. Many environmental education centers in The Netherlands have turned to RMC for advice, as they have been unable to develop a long-lasting relationship with youth groups and especially ethnic minority groups.

Below we briefly introduce three long-term sub-projects or activities that fall under the Environment-Diversity umbrella.

### ***Green Inside, Green Outside (In Dutch: Groen Binnen, Groen Buiten)***

The main objective of the Green Inside, Green Outside project is to enhance the participation and emancipation of women of lower social and economic backgrounds by connecting them to issues in the Netherlands related to nature, culture and sustainability. In this project, groups of 10 women from three 'back street' neighborhoods in Rotterdam with different ethnic composition search for a concealed green area in their own neighborhood. When the women find a potentially attractive green area they do research on the characteristics of the area, including its specific natural elements and its history, and discuss why they have chosen the spot. A professional photographer accompanies the women in their search for the green area. The 30 women then present their findings to each other and a public exhibition of the photographs is held during one of the green conferences of the RMC. In this project the RMC works together with Dona Daria, a local women's organization. In doing so, the RMC tries to counteract red zone risks by reducing marginalization and unemployment and at the same time raising awareness for the benefits of nature and the threats to its existence.

## *Atalanta Project*

The Atalanta is a butterfly that yearly migrates from Africa (Morocco) to Europe (the Netherlands) and is chosen as the name for a project involving young people from 16 to 22 years of age. Participants take a study trip to Morocco in order to explore possibilities for ecotourism in the Rif region, a poor mountainous area in the north of Morocco from where most Moroccans living in the Netherlands have migrated. During their stay in Morocco they have a chance to discover the uniqueness of the area and its nature, and also to gain insight into the difficulties and challenges of development aid and sustainable development. The participants make a short film and booklet about their stay in Morocco and each of them agrees to inform 150 people about their project; their presentations and discussions often are picked up by the local media.

The Atalanta project is part of a programme of the Dutch Institute for Care and Well-Being and is subsidized by the Ministry of Foreign Affairs and Overseas Development, focusing on international exchange and internships. A regional centre for enhancing so-called 'north-south' understanding, COS Rijnmond Midden Holland, guides the group in discussing issues related to, for instance, the UN Millennium Development Goals<sup>5</sup> and development aid. In Morocco the Moroccan nature and environmental association Ilmas acts as content supervisor for the programme. The power of the Atalanta project for Rotterdam lies in the fact that it connects issues of sustainability in Morocco, where many Dutch immigrants originate, with sustainability issues in Rotterdam. It thereby enhances feelings of connectivity and responsibility that are needed to turn Rotterdam into a healthy community (Fig. 29.1).

## *Green Iftars (In Dutch: Milieu Iftars)*

During the holy month of Ramadan, Muslims all over the world fast from sunrise until sunset and by so doing learn such qualities as discipline, endurance, self-control and respect for fellow humans and the Creator. After sunset the fast is broken and people come together to thank the Creator and share a meal. In this month, the RMC and several youth, women's, and local community organizations organize a Green Iftar in different neighborhoods of the city. During a Green Iftar an Iftar meal (evening meal) is provided and participants engage in discussion about issues that are of common concern such as the importance of nature, air quality, climate change and energy. A full programme is provided with lectures, documentaries, theatre

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<sup>5</sup>The UN Millennium Development Goals are to: Eradicate extreme poverty and hunger; Achieve universal primary education; Promote gender equality and empower women; Reduce child mortality; Improve maternal health; Combat HIV/AIDS, malaria and other diseases; Ensure environmental sustainability; and Develop a Global Partnership for Development. Source: [www.un.org/millenniumgoals](http://www.un.org/millenniumgoals)



**Fig. 29.1** Several participants of the Atalanta project on national TV (Karin Oppeland)

and music. Some of the time is devoted to the introduction of other projects of Environment-Diversity. The Green Iftars are popular and attract residents, community workers, members of the city council and youth workers (Fig. 29.2).

## RMC's Work Viewed Through a Social Learning Lens

In almost all projects under the RMC flag one can find elements of a social learning perspective and strategy. This perspective or strategy is not explicitly coined as social learning by the RMC, but is recognized in its long-term goal: 'establishing full and long lasting integration of disadvantaged Rotterdam citizens in environmental organizations'. This goal is not reached by handing out energy friendly light bulbs or organizing an excursion for a school, but rather involves structural investment, long-term commitment, and acknowledging the uncertain development of the process of multi-cultural integration.

A challenge the RMC has identified is how to see the differences that one typically finds among people and groups of people living in the city of Rotterdam as drivers of sustainability. In a recent interview with us, Environment-Diversity programme leader Mohamed Hacene strongly supported the idea that social cohesion



**Fig. 29.2** Youth share a meal and discuss environmental issues during a Green Iftar (Karin Oppelland)

is a prerequisite for diversity to become a fruitful force of change. He identified the creation of loose and informal networks, of strong relationships with a diverse group of organizations by involving them in every stage of a project, of a sense of ‘w-ness’ or belonging to a wider group, along with the recognition of each group’s identities, as key success factors. The RMC chooses not to engage in drawn out bureaucratic consultation rounds which often characterize neighborhood improvement projects.

When mirroring the way of working of the RMC with social learning thought we see important overlap. Consistent with the definition provided in the introduction, social learning is essentially about bringing together people of various backgrounds having different values, perspectives, knowledge and experiences, both from inside and outside a group or organisation, in order to come to a creative quest for answers to questions for which no ready-made solutions are available (Blackmore 2007; Muro and Jeffrey 2008; Wals et al. 2009). Social learning is a process in which people in a safe environment are jointly stimulated to reflect upon implicit assumptions and their own frames of reference, in order to create room for new perspectives, common frames of reference and collaborative actions. The most important characteristics of social learning are:

- it is about learning from each other together;
- it is assumed that we can learn more from one another if we do not all think alike or act alike, in other words: we learn more in heterogeneous groups than we do in homogenous groups;

- it is about creating trust and social cohesion, precisely in order to become more accepting and to make use of the different ways in which people view the world;
- it is about creating ‘ownership’ with respect to both the learning process as well as the solutions that are found, which increases the chance that things will actually take place; and
- it is about collective meaning-making and sense-making (Wals et al. 2009).

Much of the RMC work reflects these characteristics as they reflect the underlying pedagogical and community development principles of Freire, Hahn, and Rogers (see above). Another way in which the center’s work reflects social learning is its ‘iterative’ and ‘emergent’ way of planning and organizing (Holden 2008). The centre does not fix intended outcomes and steps to achieve them but rather sees outcomes as targets and stepping stones that are subject to change as an activity unfolds. This flexibility allows for co-ownership and co-creation of all actors involved but also can be disappointing and stressful to those who are used to or expect clearly defined goals and concrete agreed-upon steps ahead of time. People are not only different in terms of their cultural background or their experiences and knowledge in regards to issues at stake, they also differ in the degree to which they are comfortable with uncertainty. Some deal with uncertainty much more easily and can flexibly adjust themselves to changing circumstances, new insights and new discussion partners than others. Based on insights gained from a study of a Dutch community co-creating its own neighborhood gardens, Wals and Noorduyn (2010) conclude that it is advisable to point out the uncertain nature of a social learning process to those involved early on when one is considering utilizing a social learning-based strategy. It may also be wise to involve people who, by their nature, are already somewhat oriented towards uncertainty and who are unlikely to avoid risks. In the RMC’s experience the people who are drawn to their activities already tend to meet this criterion. The challenge then becomes to also involve or at least keep informed those who are not drawn to the activities.

Whereas other interactive and participatory approaches maintain a focus on hard or measurable results, social learning processes are more about the softer, more difficult to measure results, such as the energy and creativity that can come about when people in a heterogeneous society meet one another and create social cohesion. Such cohesion is considered a precondition of creating a robust system that is capable of dealing with setbacks (Rolfe 2006). Further, whether or not a community can make use of diversity and can deploy conflicts and tension constructively depends in part upon the solidarity or the amount of social cohesion between people. A resilient community also generates a certain degree of trust and safety, so that people will more easily open up to one another and are less frightened about being held accountable for ‘errors’ or alternative views (van Asselt 2000; Bouwen and Taillieu 2004; IFRC 2004; Armitage et al. 2007; Plummer and FitzGibbon 2007; Beers et al. 2010). Opposites and differences, which inevitably arise in processes like those facilitated by the RMC, do not immediately result in the project or activities collapsing, when sufficient social capital is present or has been created among those involved. Environment-Diversity programme leader Mohamed Hacene



**Fig. 29.3** Mohamed Hacene in discussion with representatives of religious groups (Karin Oppelland)

stresses the development of a strong relationship with a wide diversity of organizations at an early stage of every project, as well as the sharing of responsibilities for the organization of activities. The direct contact with these organizations leads to a relationship based on mutual trust (Figs. 29.3 and 29.4).

## Some Critical Success Factors

Below we pull together some considerations that may help in designing similar community-based change processes that hinge on social learning and the utilization of diversity.

### *Contemplation*

Before deploying a social learning-based approach in multi-cultural communities that are under pressure, it is important to carefully determine whether or not social learning is the most obvious path to take (Wals 2007; Reed, 2010). Those who have the possibility to initiate and/or support such a process, e.g., policy-makers, programme staff, project managers and advisors, need to reflect on the *type* of change that is at hand. Contemplating this may lead to favoring either more instrumental or



**Fig. 29.4** ‘Crossing boundaries’ during one of the Environment-Diversity excursions (Karin Oppelland)

a more transformative, social learning-oriented learning process (Wals et al. 2008). Further, it is advisable to determine ahead of time just how certain one can be about the desired change. Social learning-based change seems to be most appropriate in situations where there is no one right solution available beforehand or where there is not one single authority capable of prescribing a pre-determined solution without upsetting the community.

### *Communicating with the Periphery*

As it is tempting to work only with those who are interested from the start, continuous effort needs to be expended in trying to reach those who are not. This is not so much with the aim to turn them into active participants but to make sure that they know what is going on and can step in when they see the project move in a direction that does affect, concern, or interest them. Failing to do so may result in the silent majority or even minority becoming a powerful force that makes itself heard at the end of an interactive process in ways that could undermine everything that has been accomplished. People who are at the periphery of the social learning process need to learn alongside the core even though they are not active participants, to prevent the core group from becoming an exclusive group of capable and motivated citizens who lose touch with their own neighbors, network or organization. We often see a small group of very committed people emerge who can be very creative in generating fantastic solutions that do not resonate at all with other, less involved residents or



other interested parties, such as the municipality, the water board or the architect. Interim steps, choices and results must be shared time and again with people who stand along the sidelines and who have related interests, both officially in the form of a newsletter, public minutes, a website or neighborhood paper, or posted project updates in neighborhood stores and public transport vehicles, as well as informally at home, at the local coffee place, at school or at the sports club.

### ***Fine Tuning Expectations***

When can the outcome of a social learning process be considered successful? The answers to this question often vary considerably. Moreover, this question is usually asked too late or not at all. However, if people have the opportunity to lay their expectations on the table early on in the process, then it is possible to adjust the unrealistic expectations that might be present and therefore to prevent disappointments later on. Whereas one person may have an ecological, sustainable and permaculture based living environment in mind, another may focus mainly on a safe and green playing area built with sustainably-harvested wood. People often also have different perspectives on how much time certain changes should take, as well as on the spatial scale of projects. Whereas one person may only consider the neighborhood itself as becoming sustainable, another may view the neighborhood as an integrated part of the world and may see all kinds of lines running from the neighborhood to elsewhere in the world.

### ***Checking the Institutional Room for Change and Innovation***

Social learning can result in creative solutions for challenges that are collectively experienced. If, upon translating these solutions into strategies and concrete actions, it is found that the proper authorities have not issued a mandate for the realization of the plans, frustration may ensue. Political support and official procedural mandates are therefore a must in social learning processes and the government should be involved from day one. This requires that the governmental commissioning party and/or the management accept the uncertainty that results from a social learning process.

### ***Reporting, Feedback, and Evidence of Success***

The reporting on interactive processes is important for multiple reasons. First, the reporting is a form of legitimization of the process and recognition of the contributions of those involved. In addition, reporting offers one the opportunity to check whether the images, ideas and solutions have been well understood and reproduced correctly. Feedback is essential in order to prevent expectations and images from developing in more than one direction without the group being aware. Reporting also leads to a 'sense of urgency' when agreements are made and deadlines established. At the same time,

reporting is key in terms of recording one's progress (tangible *and* less tangible results). Reporting to the supporters (residents who do not actively participate in the process) and to the 'outside' world (municipality, authorities granting subsidy) is essential. The form of the reporting, the language used, and the distribution of the reports must be in line with the intended audiences.

Providing some kind of 'evidence' of progress in a desired direction is an everyday reality. The Rotterdam city government, which subsidizes the RMC projects, demands to see more tangible results in terms of social and ecological sustainability. Currently, the RMC already collects evaluations and feedback from project members, makes developments visible by organizing exhibitions (as in the Green Inside, Green Outside project), and is registering 'measurables' such as the number of meetings held, the number of people who attend the meetings, the number of community organizations reached, and number of trained and certified environmental educators.

The independent research bureau ORG-ID recently conducted a survey among 26 representatives of various stakeholders working with the RMC. The analysis showed that in general the key stakeholders (e.g., local governments, other nature and environmental organizations and grass-roots supporters) respect and value the RMC as they find that the centre operates professionally, is very much engaged in its work, and is a reliable partner. The RMC is also positively evaluated for its recognition of the interests of other organizations. For RMC Director Hacene however, meeting people and listening to their stories and personal victories is far more valuable and meaningful. In Hacene's words: 'the programme proves itself to be successful when the RMC is invited to attend meetings of the community organizations and when sometimes, even after a few years, an organization calls and asks the RMC to participate in a self-initiated environmental education project'.

One critical success factor is the make-up of the RMC's staff and body of volunteers, which reflects that of the multi-cultural communities with which the centre works. This is in contrast to many other nature and environmental organizations in the Netherlands and in Rotterdam, which are almost all staffed with non-immigrant Dutch employees.

## Final Thoughts

Social learning in the context of sustainability is an open-ended and transformative process that needs to be grounded in the everyday worlds and lives of people and the encounters they have with each other. Especially in potentially red zone multi-cultural neighborhoods such 'encounters' provide possibilities or opportunities for meaningful learning as they can lead both to constructive dissonance and increased social cohesion. The value of difference and diversity in energizing people, creating dissonance and unleashing creativity seems to surface in the projects supported by the RMC, as does the power of 'social cohesion' in creating change, and building resilience, in complex situations characterized by varying degrees of uncertainty (see Carpenter et al. 2001; Rolfe 2006). The success of social learning depends a great deal on the collective



**Fig. 29.5** The Rotterdam mayor Aboutaleb (*left*) together with RMC project leader Mohamed Hacene (Karin Oppeland)

goals and/or visions shared by those engaged in the process, as well as on the quality of the communication with those who are not! Whether such collective goals and visions can actually be achieved depends, at least in part, on the amount of space for possible conflicts, oppositions and contradictions. In social learning the conflicts and their underlying sources need to be explicated rather than concealed. By explicating and deconstructing the oftentimes diverging norms, values, interests and constructions of reality people bring to a sustainability challenge, it not only becomes possible to analyze and understand their roots and their persistence, but also to begin a collaborative change process in which the kind of shared meanings and joint actions emerge that will ultimately help create a more sustainable world.

The RMC's work in greening the Rotterdam red zone and using social learning as catalyst seems to show that such change is possible. The strategy of the RMC to reach change is regarded as successful, but its success also depends on the financial support of local governments and hinges on the personal contacts, competences, trust and flexibility of the project leader and director of the RMC. Despite these dependencies the RMC seems to have succeeded in making the red zone of Rotterdam a little less red and a little more green.

Who would have thought five years ago that in some of the most deteriorated neighborhoods, youth could have co-designed and co-constructed a butterfly garden near the Afrikanerplein (African Square) as a part of a 'nature playground' for inner-city children? Who would have thought that in 2009 there would be neighborhood 'stop climate change street parties' that would inspire a Rotterdam neighborhood like Crooswijk to equip its neighborhood center with solar panels? And, finally, who would have thought five years ago that Rotterdam would have a mayor of Moroccan descent, as is currently the case? (Fig. 29.5).

## References

- Allen, C. (2003). Fair justice. *The Bradford disturbances, the sentencing and the impact*. Guildford and King's Lynn, London.
- Armitage, D., Berkes, F., et al. (Eds.). (2007). *Adaptive co-management: Collaboration, learning, and multi-level governance*. Vancouver: University of British Columbia Press.
- Beers, P. J., Sol, J., et al. (2010, July 4–7). Social learning in a multi-actor innovation context. In *Building sustainable rural futures: The added value of systems approaches in times of change and uncertainty, the 9th IFSA conference*, Vienna.
- Blackmore, C. (2007). What kinds of knowledge, knowing and learning are required for addressing resource dilemmas?: A theoretical overview. *Environmental Science and Policy*, 10, 512–525.
- Bouwen, R., & Taillieu, T. (2004). Multi-party collaboration as social learning for interdependence: Developing relational knowing for sustainable natural resource management. *Journal of Community & Applied Social Psychology*, 14, 137–153.
- Bovenkerk, F. (2009). *Etniciteit, Criminaliteit en Het Strafrecht Utrecht*. Thesis, Utrecht University.
- Carpenter, S., Walker, B., et al. (2001). From metaphor to measurement: Resilience of what to what? *Ecosystems*, 4, 765.
- COS (2008). Feitenkaart. Omnibusenquête (COS) Centrum voor Onderzoek en Statistiek, Rotterdam.
- Freire, P. (1985). *The politics of education – Culture, power, and liberation*. New York: Bergin & Garvey.
- Freire, P. (1987). *Pedagogy of the oppressed*. New York: The Continuum Publishing Corporation.
- Glasser, H. (2007). Minding the gap: The role of social learning in linking our stated desire for a more sustainable desire to our everyday actions and policies. In A. E. J. Wals (Ed.), *Social learning towards a sustainable world* (pp. 35–62). Wageningen: Wageningen Academic Publishers.
- Holden, M. (2008). Social learning in planning: Seattle's sustainable development codebooks. *Progress in Planning*, 69(1), 1–40.
- IFRC (2004). *Focus on community resilience* (World Disasters Report, p. 231). Geneva: International Federation of Red Cross and Red Crescent Societies.
- James, T. (2000). Kurt Hahn and the aims of education. [www.kurthahn.org/writings/james.pdf](http://www.kurthahn.org/writings/james.pdf). Accessed 1 Feb 2013.
- Komen, M., & Van Schooten, E. (2009). Ethnic disparities in Dutch juvenile justice. *Journal of Ethnicity in Criminal Justice*, 7(2), 85–106.
- Muro, M., & Jeffrey, P. (2008). A critical review of the theory and application of social learning in participatory natural resource management processes. *Journal of Environmental Planning and Management*, 51(3), 325–344.
- Peper, A. (1973). *Vorming van welzijnsbeleid. Evolutie en evaluatie van het opbouwwerk*. Meppel: Boom, tweede druk.
- Plummer, R., & FitzGibbon, J. (2007). Connecting adaptive co-management, social learning, and social capital through theory and practice. In D. Armitage, F. Berkes, & N. Doubleday (Eds.), *Adaptive co-management: Collaboration, learning, and multi-level governance*. Vancouver: University of British Columbia Press.
- Reed, M. S., Evely, A. C., et al. (2010). What is social learning? *Ecology and Society*, 15(4), r1.
- Rolfe, R. E. (2006). *Social cohesion and community resilience: A multi-disciplinary review of literature for Rural Health Research*. Halifax: Faculty of Graduate Studies and Research Saint Mary's University.
- Schneider, C. L. (2008). Police power and race riots in Paris. *Politics & Society*, 36(1), 133–145.
- van Asselt, M. B. A. (2000). *Perspectives on uncertainty and risk*. Dordrecht: Kluwer.
- Veldhuis, T., & Bakker, E. (2009). Muslims in the Netherlands: Tensions and violent conflict. *Ethno-religious conflict in Europe: Typologies of radicalisation in Europe's Muslim communities*. Brighton: MICROCON.

- Wals, A. E. J. (2007). Epilogue: Creating networks of conversations. In A. E. J. Wals (Ed.), *Social learning towards a sustainable world* (pp. 497–507). Wageningen: Wageningen Academic Publishers.
- Wals, A. E. J., Geerling-Eijff, F., et al. (2008). All mixed up? Instrumental and emancipatory learning towards a more sustainable world: Considerations for EE policy-makers. *Applied Environmental Education and Communication*, 7(4), 55–65.
- Wals, A. E. J., van der Hoeven, N., et al. (2009). *The acoustics of social learning: Designing learning processes that contribute to a more sustainable world*. Wageningen/Utrecht: Wageningen Academic Publishers/SenterNovem.
- Wals, A. E. J., & Noorduyn, L. (2010). Social learning in action: A reconstruction of an urban community moving towards sustainability. In: Stevenson, R. & Dillon, J. (Eds.), *Engaging environmental education: Learning, culture and agency* (pp. 59–76). Rotterdam: Sense Publishers.

# Chapter 30

## Developing a Safe, Nurturing and Therapeutic Environment for the Families of the Garbage Pickers in Guatemala and for Disabled Children in Bosnia and Herzegovina

Daniel M. Winterbottom

**Abstract** This chapter focuses on the role of natural places in rebuilding children's lives concurrent with a disaster, and on how the rebuilding of a place for safe play, learning and skill building can help children endure and move beyond the immediate effects of the disaster in the red zone. Through the exploration of two case studies, in Guatemala City and in Bosnia and Herzegovina, respectively, we show how garden creation and natural space design play a role in recovery after disaster.

Cast out of their villages, Mayans resettled around the garbage dump in Guatemala City. In 2004, children were banned from the dump and now stay at home without supervision. In 2006, the University of Washington Landscape Architecture Design/Build Program designed a portion of their school facilities and assisted the community in transforming the donated decommissioned dump site into a therapeutic garden. This environment is designed to help the children learn about the natural world, their culture, science, math and writing, gain vocational skills, and ultimately reconstruct their lives in a healthier and constructive direction.

Surviving years of ethnic cleansing, disabled children in Bosnia and Herzegovina face severe discrimination in their villages. Families are left to care for their children suffering from autism and other disabilities with little support. Many have self organized and advocate for and provide care to their children. Many of these providers suffer from their own war related injuries. In 2009, we collaborated with the Community Gardening Association of Bosnia and Herzegovina to create gardens to meet the rehabilitation and therapeutic goals of two associations serving disabled children. The gardens are designed to offer a variety of support activities including horticultural therapy, drama, music and art therapies, active recreation and contemplative escapes.

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D.M. Winterbottom (✉)

Department of Landscape Architecture, College of Built Environments, University of Washington, 349 Gould Hall, Box 355734, Seattle, WA 98195-5734, USA  
e-mail: nina@u.washington.edu

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*Professor and landscape architect Daniel Winterbottom describes gardening projects for children resettled around a garbage dump in Guatemala, and disabled children in Bosnia and Herzegovina. Through a participatory process engaging the children, their parents, teachers, and therapists in design, Winterbottom and his students created gardens that offer horticultural, drama, music, and art therapies, active recreation, and contemplative escapes.*

## **The Design/Build Lab**

Our design/build lab at the University of Washington enables students to work with communities to address issues of social injustice, post-conflict reconstruction and therapeutic interventions. Service learning and cultural exchange are at the core of the design/build program, which engages students in overseas experiences. We collaborate with marginalized populations who have undergone traumatic stress and join their efforts to bring basic necessities, hope and healing to their communities.

We have worked in two red zones. In Guatemala we partner with displaced high-land villagers who fled their homelands during the 30-year genocide seeking safety in the crime ridden barrios of Guatemala City. They now face desperate conditions including extreme poverty, poor sanitation and fragmenting family structures. In Bosnia and Herzegovina (BiH) we partnered with communities who advocate for recognition and support for their underserved children coping with cognitive and physical disabilities. They receive little support as the country suffers from post-war corruption, a breakdown of services, a poor economy and continuing ethnic strife.

With a decade of experience of greening in these red zones, we have learned from our past projects and ongoing research how to effectively design and build gardens for people facing displacement and trauma, whether induced by human or natural disaster. Central to our work is an intensive participatory community design process to engage the participants in informing the designers about their unique cultural, physical and emotional needs and aspirations for the future. Ongoing exchanges with the community are essential resources for project planning from conceptual stages through site design. Our pre-project orientation consists of readings and discussion of cultural traditions and histories, studies about children's experience of war and trauma, and design strategies for therapeutic gardens.

## Impacts of War and Displacement on Children

In the aftermath of war, the loss of a familiar safe home environment with its reliable social structures can result in the loss of identity, social status and culture (Kostelny 2006). The protective factors that support most children – nurturing relationships with care providers, supportive relationships with peers, meaningful interactions with adults, and positive cognitive and emotional stimulation – can be lost in the struggle to secure the basic needs of shelter, food, water and healthcare. Many parents suffer from severe depression, substance abuse, and loss of self-esteem resulting in fragile attachment relationships with their children.

The majority of the Guatemalan families living at the dump fled their Mayan villages in the highlands of Guatemala in the late 1980s to escape unrelenting poverty, inequity of land distribution, and the destructive entanglements of a 30 year civil war. Most settled around the dump because it offered unskilled employment and vacant land. For the children, the legacy of displacement is growing up in the sprawling shanties, exposed to toxins and a poor diet. Education is meager with parents absent or working. Gang predation, sexual abuse and violence are common. Municipal and national government corruption ensures that a network of educational and social services and a reliable system of law and order are inaccessible to these families. The need is enormous and a small percentage receives help from the many NGOs like our partner, Safe Passage.

From 1992 to 1995, Bosnia and to a lesser extent Croatia and Serbia, were devastated by ethnic cleansing. Mixed families were split apart, neighbors attacked neighbors, criminality flourished, and children became scarred by the atrocities they witnessed and the depravities they endured while trapped in the red zone (see also Laćan and McBride, Chap. 22, this volume). Twelve years later, those struggling with the physical and emotional scars of war, amputations and post traumatic stress are left to rebuild their lives and social institutions. The corruption that arises in a broken political and economic system breeds cynicism. Access to nature is restricted by land mines, and much of the urban fabric remains torn apart by bombings. Optimism is fleeting for the country's younger generation who inherit the tragedies of war and distrust.

Programs like Safe Passage and American Friends Service Committee in BiH restore these families by establishing safe places, where children and their parents can develop resilience, empowerment and control over their lives. Community activities that reinforce cultural values and offer participation in recreation, sport and vocational education help develop physical, psychological, and social abilities (Arafat and Musleh 2006). In a study of Palestinian children suffering war trauma, it was found that 90 % of the children identified 'self-improvement efforts as their primary means of coping with life events. Forty percent preferred to keep busy by participating in activities such as sports, arts and family events' (Arafat and Musleh 2006).

Enrollment in school and participation in educational programs has been identified across cultures as having a significant role in reducing trauma and stress,



increasing self-esteem and resilience, and building basic life skills and coping mechanisms for children (Arafat and Musleh 2006; Nicolai and Tripplehorn 2003; Tripplehorn and Chen 2006). Schools' missions in these red zones can widen beyond a focus on traditional curricula to become multi-functional safe zones that support study, play and exploration, cultural celebration and therapy.

Well-child programs can be designed to be integrated into school curricula, whereas facilities offering therapeutic rehabilitation for children with disabilities use applied learning to improve educational outcomes and provide vocational development. This is the intent behind the Children's Garden of Hope and the Healing Gardens of the NGO Leptir and the Institution for Education and Training of Persons with Physical and Psychological Developmental Disabilities (IETPPDD) in BiH. They create therapeutic green zones where learning, working and playing with others instills hope and offers a safe haven from the trauma of red zone atrocities.

## **Role of Nature in Children's Development, Education and Well-Being**

Green spaces offer many benefits for children including play, education, nutrition and vocational skill-building. For children suffering from emotional and social disabilities, helping to care for and cultivate a garden offers a distraction from memories of pain and loss. In a safe, natural environment children can feel free to explore. Stress is reduced as they engage in activities that hone fine and gross motor skill development, improve social interactions, and develop self-esteem (see also Wells, Chap. 7, and Chawla, Chap. 8, this volume).

Adventure therapy offers a therapeutic model in which nature presents subtle challenges for children who are having difficulties coping with boundaries, authority and physical engagement (Berger and Mcleod 2006; Garstet al. 2001; Kaly and Hessacker 2003). Unscripted play itself promotes a healthy self image as children view others in socio-dramatic play or learn about the physical world as they manipulate objects and predict change (Gomez 2005). Equally important are observation and solitary reflection to discover who they are. The outdoors provides many opportunities for children to engage in introspection (Louv 2005).

As a therapeutic tool, play has been used to address the effects of disaster on children. For example, in a controlled study, Shen (2002) found play therapy to be effective for children who had experienced a destructive earthquake in 1999.

Nature therapy offers a counterpoint to more traditional static psychological therapies where the setting is dynamic and nature is conceived as an active partner in shaping the therapeutic process. Immersed in a continually evolving environment, participants face issues related to the uncontrollable and the unexpected and are challenged to develop flexibility and other coping mechanisms.

## Children's Garden of Hope, Guatemala

The traditional villages in the Mayan highlands are close knit with distinct identities and established rules and rituals. Village identity is lost in displacement. The lack of social cohesion offers no safety net for migrants to the city, and with little education, poor nutrition, and bad air quality, and lacking electricity, running water or plumbing, they are locked in a constant struggle to meet their basic needs of food, shelter and health. Many children are left at home alone to care for younger siblings and drop out of school at an early age. Born into this cycle of poverty, children are compelled to follow their parents into the work of garbage picking or to join violent gangs that aggressively recruit children as young 12 years old.

### *Partners*

The Children's Garden of Hope project began with a vision and a partnership between the University of Washington and Safe Passage, which helps the poorest of Guatemala's children break out of poverty in a dignified and permanent way through education. Safe Passage offers a wide range of services to families and supports the enrollment and attendance of children in public schools. Safe Passage acquired decommissioned dump land for their pre-school and vocational schools and asked the University of Washington landscape architecture design/build program to extend its goals for therapy, education and recreation to this landscape. As a safe zone, the gardens would provide a natural environment where children, supervised and nurtured, would feel secure and find their stresses reduced. Here the childhood denied to so many could be rediscovered, and social skills acquired and relationships with family solidified. The garbage dump, transformed into a green zone, would be a refuge in the middle of a neighborhood torn apart by poverty, violence and despair.

In the first phase of the project, a series of meetings with our team of 18 landscape architecture students and community members identified the following needs:

#### *The Parents (all women)*

- Places for parents to socialize, talk and spend time together, knowing their children were safe and engaged in activities of their own
- A walled green zone with supervision at all times
- A place with abundant vegetation, lots of color (flowers) and wildlife. Plants that reminded participants of their homeland
- Areas to raise food and learn gardening so they could share their skills with their children
- A place for celebrations
- Play elements for their children
- Walking paths
- Seating in the shade

*Teachers:*

- An outdoor classroom
- A diverse range of gardens including play, production, mystery and ethno-botanical
- Clear sight lines so the children could be seen anywhere within the park
- Interpretive elements about the plants, insects, physical fitness, ecological systems and Mayan beliefs
- Play areas for children

*The children:*

- Places to explore, climb, play and run
- Range of places, quiet and hidden, active and open
- Mountains, castles, caves, forts, forests and open lawn
- Soccer field
- Flowers, plants and fruit trees
- Animals and insects
- Picnic tables

The goals for the Children's Garden of Hope Park were:

1. Create a park to support all aspects of the children's development, including psychosocial, physical, educational, emotional, vocational, and life skills
2. Create a safe refuge where confrontation and threat would be eliminated and adult supervision provided at all times
3. Create a nature habitat that is stimulating, nurturing, challenging, accommodating and healthy
4. Provide a series of spaces that celebrate the mix of cultures with social gathering areas, and places for adventure, reflection and food cultivation

***Park Description***

The Children's Garden of Hope is walled and gated to secure the site from land invasions and provide protection for the children inside. It is easily accessed by the families who walk their children to the school/park. Located on a decommissioned dump, the land is capped with imported soil. Trees are planted to absorb soil toxins through phyto-remediation and hedgerows are planted to serve as catchments for migrating air-born particulates.

A pre-school serving 150 children and a vocational school are located on the site. In 2006 we designed and built an entry sequence linking the two buildings that serves as the formal gateway. A paved plaza surrounded by sensory and habitat gardens provides a gathering area for mothers picking up and dropping off their children and accommodates school celebrations and recreation such as tricycling, court sports, and jump rope. It also functions as an outdoor classroom, and as a collection point, mediating the transition of activities between the pre-school and the park. An arbor creates a passageway from the entry gate into the park and provides shade for seating in two

suspended porch swings. A small children's exploratory garden is located near the arbor with several interactive elements for fine and gross motor skill development.

In 2007 in a second phase of the project, we designed and installed an adventure playground for the preschool. This play area offers activities that enhance curriculum and address the schools' goals of social, physical and cognitive development for the children. An elevated deck/bridge structure winds through the existing trees, expands to create gathering spaces, and provides links to slides and ladders and other formal play elements. The lower rooms, beneath the deck, are designed for play, performance and gathering. Small gardens, raised turf mounds and trees are integrated into the play area to create a verdant green zone of exploration, cultivation and nurturing.

## **Healing Gardens of Bosnia and Herzegovina**

An estimated 120,000 people with special needs live in BiH, and most receive no public support. Disabled children, shunned by their peers and adults, are kept out of view. Facilities for the children and their families are rare and operate with little funding, resources or skilled care providers. Hope for a productive, integrated future for these children is limited.

In the summer of 2009, underwritten by American Friends Service Committee, I brought five university students to Bosnia to design and build two demonstration restorative gardens for severely disabled children, one in Tuzla supported by the state-run IETPPDD and the other in Bugojno supported by the NGO Leptir.

State-run institutions in Bosnia tend to be bureaucratic systems, rife with patronage. IETPPDD serves 60 disabled children and is staffed by government employees. The passion for the children was noticeably restrained and institutional. The range of disabilities includes autism, Down syndrome and other cognitive disabilities. Physical disabilities include loss of sight, cerebral palsy, physical deformities and loss of limbs. The programs offered are occupational training, physical and speech therapies, music, reading, crafts and drama.

Leptir is a grass roots organization that advocates for the rights of disabled children. They rely on volunteers and sweat equity and are determinedly child centered. Leptir provides educational and rehabilitation programs for 20 patients ages 7–16, three days a week and for 10 younger patients every day. Through occupational, physical and speech therapies, and crafts, drama and martial arts, the patients improve their social, physical and cognitive skills.

### ***Institution for Education and Training of Persons with Physical and Psychological Developmental Disabilities Garden***

IETPPDD's staff envisioned a therapeutic park for horticultural therapy, play, vocational training and performance. Before our arrival, *the Community Gardening Association of Bosnia and Herzegovina (CGABH)* conducted staff and parent focus groups.

*The results include the therapist's desired elements*

- Outdoor classroom
- Outdoor atelier (divided into three smaller plots: modeling, painting & horticultural activities)
- Recreation spaces
- Horticultural therapy garden
- Relaxation, rehabilitation and occupational gardens
- Sensory gardens
- Peace garden
- Zoo/petting, healing garden
- Dwarfs' garden
- Hanging mini-gardens and flowerbeds
- Stage
- Shade house – arbor
- Water element
- Swings, slide and see-saw
- Sand boxes

*The parents' and patients' desired elements*

- Recreation spaces
- Lawn
- Relaxation, rehabilitation and occupational gardens
- Forest garden
- Nursery garden for flowers and plants
- Relaxation music garden
- Pets garden
- Garden with dwarfish plants
- Swimming pool
- Coffee place – bar
- Sandbox
- Eco and video classrooms – outside
- Water element

The design features a 40-ft diameter central mound for crawling, climbing, rolling, and seating to view performances on the stage 12 ft to the north. The grass mound is a gathering area and focal point and mediates between active and quiet zones on either side. The zone closest to the building holds the most active elements and these are linked for a sequence of therapeutic play. At the building entry, stepped raised beds for horticultural therapy and vegetable production are easily accessed by a path designed to meet disability standards, and establish a formal connection into the garden for the most impaired users. A 'stage' for performance and events also serves as an outdoor classroom. Integrated into the stage are monkey bars and a ramp, transitioning into the most active physical play. The adjoining space has balancing elements built from donated tires and left-over timber cut-offs. On the opposite side of the mound a contemplative zone supports quiet activities. There is a calming

shade arbor with a bench swing where children can relax, read with care providers, and quietly socialize. Adjacent to the arbor is a sensory garden with shade trees.

The therapeutic benefits of the garden extend to the staff who work and teach in this rehabilitative environment. They use it as a natural refuge and nurturing place during non-work hours. During the war all of the CGABH staff remained in Bosnia. One, Dragan, served in the BiH army in Sarajevo and offered moving personal testimony of the near incomprehensible difficulties of living and fighting under siege (see also Laćan and McBride, Chap. 22, this volume).

Therapeutic gardens are unfamiliar prototypes in Bosnia, and care providers are intrigued with their potential. They are challenging themselves to integrate new activities into their teaching and design their curriculum around the new spaces. The local neighborhood youth, who participated in the construction process, gained an understanding of the association and the children they serve, which may reduce the stereotyping and marginalization of disabled children. When the participants returned in the fall, the garden was a compelling reason to go out outdoors and IETPPDD has continued to build upon what was initially built.

### *The Healing Garden at Leptir*

For 15 years, the parents who founded Association Leptir have been raising disability awareness. Leptir serves 30 children a year through physical, occupational and speech therapy and art classes. Our site, the front yard, was visible from a well traveled pedestrian street. The garden space functions as a therapeutic environment and because of its visibility, promotes equality for children with disabilities by folding them into the community.

A needs assessment of LEPTIR staff, administrators and parents yielded the following results:

- Garden to walk through
- Vocational garden
- Lots of nature
- Relaxation gardens
- Stage for drama
- Active play area
- Rehabilitation elements
- Climbing mound
- Tree house
- Accessible raised beds
- Seating

The site's assets included three shade trees, an open field to the north, and the relative quiet of a residential neighborhood. The elevated finished floor at the front yard limited access into the building.

The design solution included an accessible path and ramp system to bring all participants into the facility and to link the spaces on either side of the existing entry path, creating a single whole legible space. To the north the path, inlaid with blue tile butterflies, arcs around a 4-ft high lawn mound transitioning into a wooden ramp accessing the raised front porch. Lined with sensory plants, this path provides a pleasant, stimulating passageway for those entering the association building. Flanking the path are two, 4×8 ft raised planters for the horticultural therapy program and between them a lawn area is equipped with balancing tire structures for physical therapy. The porch opens onto a stage for dramatic productions, play activities, structured learning, and rehabilitation activities. Crossing the existing entry path the circulation continues in concrete, then transitions to a raised wooden boardwalk. Wheelchair users can garden side by side at a cantilevered work table and raised planter with participants who stand along the boardwalk. Posts at the boardwalk support a set of monkey bars above and stairs lead to a tree house. Limited space precluded construction of wheelchair access to the tree house, but the majority of the participants are able to climb and the tree house has an open design to allow visual contact with any wheelchair participants below. Beneath the tree house is another set of monkey bars sized for the younger participants. In addition, the boardwalk leads to an arbor bench swing, sandbox and climbing wall.

The gardens at Leptir and IETPPDD facilitate access for the participants, provide places and elements that complement the goals of rehabilitation, and facilitate activities that each association has adopted within their programs. The increased accessibility through the sites, play and recreational opportunities, nature interactions, and gardening beds support the process of rehabilitation in a manner that is engaging and natural to children. The bench swing is a place where both disabled and able bodied children come together and share the experience of motion around which they develop camaraderie. Mothers and siblings help their children climb onto the tires, balance beams and monkey bars, and guide them across the challenge courses, providing a shared experience of accomplishment. On the mound, families come together to enjoy the productions that their children have created, and here the larger community meets to witness the talents and progress of their children and offer support to each other. In Leptir the gardens represent the hopes of the parents – that their children can play and thrive in public, and that those unaware of children with disabilities will develop a different and more compassionate acceptance of them.

## **Lessons Learned**

Our involvement in all three projects coalesced around a shared belief in the therapeutic benefits of nature. Our community design/build process is adaptive and highly effective in these small-scale, need driven projects of place making. Partnering is key and we have learned that our liaison with the non-profit needs to be a strong connection. We need to establish trust in one person who can move the project

forward through impediments and who is available for the duration of our work. Our projects succeed to the extent that they are an exchange, not a handout, of skills and labor, creativity and resourcefulness, understanding and good will.

The participatory process is very informative in assessing community needs and perceptions; however greater input from physical, occupational and child therapists would enhance the design team's ability to address the children's specific disabilities. As an evolving process, the next phases will include this form of participation. Community buy-in could also be expanded. Working with Leptir, a community run organization, we were able to continue our interactions with the community and solicit their opinions throughout the project. In Guatemala and at IETPPDD, there was less continuous interaction with community members. In Guatemala the families worked in the dump and had little time to give to the project. At IETPPDD, a state run institution, community input was not part of the traditional operational process. In both places, methods would need to be developed to increase community engagement.

Many students would like to have more contact with the trauma victims so they can understand the effects of war at a deeper level. However, these exchanges can be disturbing. It is a sensitive issue how to expose students to the realities of a red zone in a way that they can better appreciate the effects, but not be themselves traumatized. Also, these exchanges need to protect and respect the war victims so they don't feel taken advantage of, or treated as oddities.

Disabled children in BiH face the added effects of discrimination and humiliation as well as the lingering effects of the war. There are abundant research and prototypes for design for people with disabilities; less information exists how to help those with disabilities gain acceptance from their communities whose perceptions may be preset and intractable.

Our design goals derive from the strategies of nature play, play therapy, eco-psychology and nature therapy to help participants overcome the persistent effects of trauma, stress and disrupted relationships that undermine healthy growth and development. The gardens feature multiple and flexible uses, adaptable to the needs, moods and abilities of the participants and their care providers. Many of the participants suffer from mood swings, attention deficits, and hyper-activity, and a range of activities are available to accommodate needs that may change day to day, hour by hour, or minute by minute. For these children, the gardens are the one place in their growing years where, with guidance, they can choose safe places to experience reflection, verbal communication, and active group or individual play.

The primary goal of the gardens in Guatemala and BiH was to foster education, social, physical and cognitive development, and to nurture each participant through a range of nature interactions. The sensorial gardens stimulate smell, touch and visual attention and the climbing trees, jumping stones, and rolling hills encourage a physical relationship and interaction with nature. While the park and gardens represent refuge they are also an escape. Within the park and gardens the human threats of violence and abuse are removed, prejudices from outsiders negated, and the associated stress levels reduced. These are places where children can express themselves openly, stumble in their attempts to progress without fear of humiliation, and seek support among the care providers when problems or issues of self confidence,



image and reliance surface. In the gardens the stigma of being disabled or traumatized is non-existent, and children can strive, fail and succeed without a sense of judgment or disapproval, while physical and cognitive well-being and positive self-image are fostered.

## Conclusion

In the three projects we found children to be quite resilient. Given their circumstances, it is extraordinary that they are willing to reenroll in school and participate in rehabilitation programs. For the older children in Guatemala, the stigmatization of being an older student in a second grade class is ever present and their willingness to attend school takes courage and strength of character. The children's resilience can mask other deeper disturbances and the use of nature play, play therapy, eco-psychology and nature therapy to elicit and help develop coping mechanisms provides a unique opportunity for landscape architects to positively affect the children and diminish the effects of this disaster.

The children of the dumps are plagued by multiple traumatic experiences, war, violence and environmental and social threats, sexual and physical abuse, lack of education, poor diets and early childhood and fetal toxic exposure. Many strategies, play therapy, counseling, journaling, role play and adventure play, have been traditionally used to address the traumatic effects and disabilities caused by disasters. As holistic environments that empower their users by offering a range of choices, the Children's Garden of Hope and the healing gardens at Leptir and IETPPDD attempt to respond to the changing and varied conditions by providing multiple opportunities. The core of the design is found in the linkages between active and passive play activities through the network of garden elements. The gardens differ in style, character and therapeutic objectives and offer a diverse range of experiences from formal to wild, tactile, aromatic, colorful and humorous. Together, through differing exposures to nature these provide a nurturing framework. Mood swings, hyper-activity, depression and attention deficit disorders are common in the children. The range of spaces and activities enables the children through their own initiative or encouraged by a care provider to seek the most appropriate place to meet their immediate needs. Many children use the bench swings under the arbors as a source of comfort. The gentle rocking motion, the quiet shaded space, the sense of enclosure and refuge within the arbor are appealing to children feeling overly stressed, socially challenged, or seeking a calming counterpoint to intensive activities. The swing accommodates several children with a care provider and many children use this activity to passively observe children engaged in other activities within the gardens, to listen to a storyteller read or narrate a story, or to socialize. A counterpoint to the passive experience unfolds on the active elements, bridges, climbing structures, climbing mounds, tree houses and slides in the other areas of the garden. The rigorous educational support system offered by Safe Passage, overlaid upon the therapeutic benefits provided in the park, provide a two pronged strategy to support

and provide skills so the children of the dumps can break the cycle of poverty, violence and despair that defines their life at the dump. Parents are, in most cases willing to pool their already marginal resources and further sacrifice as they attempt to ensure the success of their children. A therapeutic environment will help to enable even the most traumatized children to recapture their childhood, learn coping mechanisms, and move beyond the 'dump' physically, intellectually and economically.

Elements within the gardens are designed to be multifunctional to maximize their educational and therapeutic benefits. For example, a wall with alphabet cut-outs can be used for climbing or hide-and-seek. To this end teachers and care providers participated not just in the design, but they also reviewed the ease of use, proportions, and aesthetics during the building process. We encouraged care providers to integrate the needs of their classroom curricula within the park, so that the forms, activities, plant selection, and interpretive elements will become outdoor curriculum components complementary to those in the classrooms. Tiles illustrating the fauna found in the garden are embedded in columns supporting an arbor that flanks the habitat garden in Guatemala. Teachers open the science curriculum to their students as they walk under the arbor, the tiles revealing the web of life in the garden from worms to snails, spiders, butterflies and birds. Names of the species are written in Spanish and English, so their instructional value extends to language classes as well.

In Guatemala, many of the parents came from rural environments and the play garden concept connected them to memories of nature in their childhood that they wanted to recapture and share with their children. Many of the mothers had tended gardens in their villages and longed to pass their knowledge of cultivation on to their children. The hope is that the parents' personal investment in the park will contribute to its good stewardship.

During the participatory process in Guatemala and through the input from parents in BiH, it became clear that mothers desired many activities they could share with their children. In an effort to support meaningful interactions between parents and their children, to reduce the depression affecting many of the parents, and to strengthen the insecure attachment relationships, shared activities became a priority in the programming of the park and gardens. It was also important to achieve a balance between shared activities such as gardening, education and recreation, and places for private activities, meditation, and reflection. Sensory gardens, meditative spaces, and secret paths have been included in phases two and three.

Our projects are implemented with volunteer equity and modest budgets. They are intended to be replicable where resources are scarce using indigenous construction types. In Guatemala, we used concrete mixed on site for seat walls, assisted by local craftsmen and ornamented in the local vernacular crafts.

The gardens described in this chapter may provide models for replication by the many organizations serving veterans rehabilitating from post-traumatic stress disorder, women recovering from war atrocities, refugees and returnees deprived of useful work, and disabled children. An important part of the process, one that the flexibility of the phased design/build process can easily accommodate, is to observe how the built components function and to adjust future phases as needed. In serving a unique

population and trying to understand their needs, future designers will build upon those interventions that prove to be most effective. In assessing the benefits of these three projects, early observations indicate the goals of the gardens are being met, producing significant benefits for all of the users.

## References

- Arafat, C., & Musleh, T. (2006). Education and hope: A psychosocial assessment of Palestinian children. In N. Boothby, A. Strang, & M. Wessells (Eds.), *A world turned upside down: Social ecological approaches to children in war zones*. Bloomfield: Kumarian Press Inc.
- Berger, R., & Mcleod, J. (2006). Incorporating nature into therapy: A framework for practice. *Journal of Systemic Therapies*, 25(2), 80–94.
- Garst, B., Scheider, I., et al. (2001). Outdoor adventure program participation impacts on adolescent self-perception. *Journal of Experiential Education*, 24(1), 45–50.
- Gomez, R. (2005). Playscapes: Rural, urban and suburban. In K. Glascott Burriss & B. Foulks Boyd (Eds.), *Outdoor learning and play ages 8-12*. Olney: Association for Childhood Education International.
- Kaly, P., & Hessacker, M. (2003). Effects of a ship-based adventure programme on adolescent self-esteem and ego-identity development. *Journal of Experiential Education*, 26(2), 97–105.
- Kostelny, K. (2006). A cultural-based, integrative approach; Helping war-affected children. In N. Boothby, A. Strang, & M. Wessells (Eds.), *A world turned upsidedown: Social ecological approaches to children in war zones*. Bloomfield: Kumarian Press Inc.
- Louv, R. (2005). *Last child in the woods*. Chapel Hill: Algonquin Books of Chapel Hill.
- Nicolai, S., & Tripplehorn, C. (2003). *The role of education in protecting children in conflict*. London: Humanitarian Practice Network.
- Shen, Y. (2002). Short-term group play therapy in Chinese earthquake victims. Effects on anxiety, depression, and adjustment. *International Journal of Play Therapy*, 11(1), 54.
- Tripplehorn, C., & Chen, C. (2006). Religion as resource and risk: The double-edged sword for children in situations of armed conflict. In N. Boothby, A. Strang, & M. G. Wessells (Eds.), *A world turned upside down: Social ecological approaches to children in war zones*. Bloomfield: Kumarian Press, Inc.

# Chapter 31

## Reforestation Activities at a Chadian Refugee Camp in Northern Cameroon

Elizabeth A. Moore

**Abstract** This mini-chapter provides a case study illustration of agroforestry practices carried out in Langui Refugee Camp, Northern Cameroon. Agroforestry programs provide multiple benefits for refugees, including nutrition improvement income generation, and field improvement. In addition, they give social benefits, such as the opportunity to learn and gain training, the opportunity to participate in community projects, and the improvement of relations with local inhabitants outside the refugee camp. In the case of the Langui agroforestry program, these benefits were seen through the implementation of a local nursery, agroforestry training classes, and tree-planting projects carried out around the camp. It offers an example of the positive potential for agroforestry programs in the context of refugee camps.

**Keywords** Agroforestry • Refugee camp • Peace • Tree-planting • Training

After an attack by rebel forces on Chad's capital N'Djamena in 2008, thousands of refugees fled over the river into neighboring Cameroon. Most returned after violence subsided, but about 5,000 have remained at the Langui Refugee Camp near the provincial capital of Garoua in northern Cameroon. The United Nations High Commissioner for Refugees (UNHCR) and the Red Cross provide support for the camp.

Influxes of refugees sometimes lead to conflicts with the local population over competition for scarce food and other resources, and related to environmental destruction perpetrated by the newcomers. For example, refugees cut down trees for cooking, may be forced to farm less-than-fertile land, and add to waste problems. Northern Cameroon already is facing the reality of the approaching desert, which

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E.A. Moore (✉)  
Department of Forest Resources and Environmental Conservation (0324),  
College of Natural Resources and Environment, Virginia Tech,  
Cheatham 314, Blacksburg, VA 24061, USA  
e-mail: elmoore@vt.edu



**Fig. 31.1** Newly planted moringa trees at refugee homes

along with desertification in Chad, leading to lack of resources, could be a factor in the ongoing strife.

Reforestation and agroforestry programs are often cited as methods to combat the desertification, improve field fertility, and augment water availability. Thus, implementing such programs in refugee camps is an important step towards healing the local environment and equipping refugees with new knowledge to help them advance in the future. Additionally, forestry programs can be implemented to reduce animosity between refugees and local populations.

With support from the UNHCR, Red Cross, World Wildlife Fund (WWF), and local Cameroonians, a US Peace Corps volunteer has worked with the Langui camp refugees to initiate environmental projects. For example, several refugees worked with a local Cameroonian to start a tree nursery (see Fig. 31.5). They learned how to propagate a variety of forest and fruit trees, and are sharing their newly acquired knowledge with other refugees. The nursery will be selling the trees to both refugees and local Cameroonians, and may serve as a source of trees for nearby WWF projects. There are also several initiatives aimed at reforestation of the refugee camp, including an effort to plant a fruit tree and four Moringa (*Moringa oleifera*) trees, (see Fig. 31.1) known for their medicinal and nutritional values, around each household, and to create living fences around the elementary school. Nearly 70 refugees are participating in an agroforestry course sponsored by Trees for the Future (see Fig. 31.2) and, using knowledge from the course, have begun constructing a living fence windbreak around the camp to mitigate the impact of destructive wind and rain storms.



**Fig. 31.2** Refugees taking part in the agroforestry training course sponsored by Trees for the Future

When asked why he had helped the refugees by sharing his expertise and starting a tree nursery, local Cameroonian Youalé Jean-Paul described a group of refugees in another town, who, upon leaving to return home, chopped down mango trees. The returning refugees claimed ‘We will no longer be here to benefit from the trees’. Youalé Jean-Paul said this negative image—of refugees not caring about their impact on local Cameroonians or the environment—is what he and the refugees are fighting against. He hopes that helping refugees plant trees will promote peace and good relations among refugees and local Cameroonians (see Fig. 31.3).

The tree nursery has the potential to provide the refugees with an alternate source of income. Most refugees have difficulty finding employment and many remain idle for months at a time, thus adding to stress in the refugee camp. Being able to learn, use their knowledge, and earn money from a skill such as tree-planting creates pride in the work of one’s own hands and purpose in one’s existence. Further, the Chadian refugees will carry their new knowledge of planting and caring for trees wherever they travel—whether back to their native Chad, on to yet another country, or to a more permanent community in Cameroon (see Fig. 31.4). In this way, learning that occurs at refugee camps becomes a powerful tool for disseminating knowledge more broadly across regions and populations.

Several of the refugees want to plant some trees outside the camp. They hope to benefit the environment and replace trees they have cut down for firewood. One refugee stated, ‘If we just plant trees here in our camp, the local Cameroonians will say that it’s just for us. But if we plant them in their villages, they will understand,



**Fig. 31.3** Cameroonian Youale Jean Paul and other refugees at their tree nursery

it is not just to benefit ourselves, but for the environment and everyone'. As such, the refugees are planning to arrive at local villages with a gift of ten trees, to be planted in the local markets or near the school. Through extending a symbolic olive branch and expression of appreciation, such actions could aid relations between refugees and local populations not only at Langui, but if expanded, at sites throughout the world. Because of these and other beneficial outcomes of tree-planting among refugees, reforestation has emerged as a strategy for UNHCR and other aid agencies as they address issues of environmental destruction and peace in refugee camps worldwide.



**Fig. 31.4** Chaddian refugee Damon Ouankreo in front of moringa plants in their tree nursery



**Fig. 31.5** Yaouale Jean Paul, Damon Ouankreo and Honee Kissandou, project initiators, at their tree nursery



## Chapter 32

# Growing Hope: How Urban Gardens Are Empowering War-Affected Liberians and Harvesting a New Generation of City Farmers

Christina Holder

**Abstract** This chapter details the stories of women who survived Liberia’s brutal civil war and turned to gardening as a means of rebuilding hope and ensuring food security. Despite limited space and resources, gardens arising in war-torn Liberia offer an example of greening in the red zone.

**Keywords** Gardens • Greening • Urban farming • Liberia • War

*Freelance journalist Christina Holder relates the stories of women who survived Liberia’s brutal civil war and are now turning to gardening as a means of rebuilding hope and ensuring food security. Although plagued by limited space and resources, gardens arising amidst the rubble of post-war Monrovia offer an example of how wounded and marginalized individuals can self-organize to produce something of value to their families and community.*

In the West African nation of Liberia, nearly 3.5 million people endured a brutal and terrifying civil war from 1989 until 2003. Years of economic instability, socio-economic divisions, and fierce power struggles among rival groups culminated in a coup d’état in 1980 and a full-blown civil war in 1989. Liberia was in ruins—and more than 200,000 people were dead—by the time the war ended 14 years later.

That is the quick, news version of Liberia’s war history. But war history is always much more complicated than a few opening sentences can relate. Many Liberians do not seem to spend a great deal of time thinking about how or why war happened. They want to know how to move forward in the midst of the devastation. I can write that because I have spent a lot of time listening to my Liberian friends. I arrived in Liberia in 2008—a year that also happened to mark the country’s 5-year peace,

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C. Holder (✉)  
1500 Duke University Road, Apartment D3A, Durham, NC 27701, USA  
e-mail: christinaleeholder@gmail.com

albeit upheld by the second largest United Nations' peacekeeping force in the world. I went there to tell the under-reported stories of war-affected Liberians and to report on the country's post-war development for newspapers in the United States. It is not often that American readers get an opportunity to read news about Liberia, and I hoped to change that.

I felt curiously drawn to people I had never met but whose stories I longed to tell. I knew that giving Liberians a voice would not heal them of the pains and injustices they had endured. But I believed it could propel them on a journey of healing. I believed their stories could motivate people to care about Liberia's post-war development. I believed that sharing my Liberian friends' stories was the first step in ensuring that the pain, the brutality, the injustices, and even the hope would not be covered up like the innocent buried in unmarked mass graves. In the spirit of Walt Whitman ('I sit and look out upon all the sorrows of the world, and upon all oppression and shame... All these—all ... the meanness and agony without end, I sitting, look out upon, See, hear, and am silent...'), I did not want to live in the silence.

On that first night, the plane taking me to Liberia's capital, Monrovia, glided through the darkness. The night covered up the wide green vistas of palm trees that in the day time would bake beneath a searing sun. It also cloaked the city scenes I would work in for the next year—the broken-down neighborhoods, the rampant poverty, the darkness and sickness resulting from a lack of stable infrastructure such as electricity and running water.

But even in the midst of a city recovering from war, I soon saw signs of hope. As I walked the neighborhood streets of Monrovia, I noticed paltry garden patches growing on sides of roads. I noticed vegetables sprouting in abandoned private lots, covering the fronts of houses where one would expect a lawn, popping from the dirty earth of junkyards. They seemed to burst like confetti that rises and falls in random places. I walked through a lot of abandoned cars and found a few vegetable sprouts mingling with the debris. In one neighborhood in Sinkor, a community on the outskirts of Monrovia, a Liberian woman planted leafy green vegetables called potato greens in front of her house along a dirt street. To a visitor, the foliage might have looked like landscaping instead of food. For those who lived in the house, the foliage meant there always was food no further than the front door. Each of these gardens is an example of greening in the red zone.

In a capital city where space is limited and being a farmer is stereotyped as being old-fashioned, I found that city dwellers were breaking apart stereotypes like a hoe turning soil and transforming once embattled roadsides into small green spaces. Interestingly, the gardens seemed to grow freely. It turns out that the Liberian government wasn't enforcing any codes for growing on government-owned right-of-ways. This could be, in part, attributed to the government's focus on rebuilding infrastructure. Who has time or money to regulate codes for vegetable gardens, when there is electricity and running water and sewer systems to be restored? But even the former Monrovia city police director, Emmanuel Crusoe, who served in the capital during the country's post-war years, sees growing city gardens as a way to foster independent living skills following so many years of war. For now, city gardens seem to be safe and even encouraged.

Roadside gardens are producing bounties beyond the harvests. While no one has published a scientific study on the psychological effects of growing a city garden in war-torn Liberia, the hope, empowerment and healing taking place in these green spaces is palpable. The gardens are feeding large, extended families living in tight, decrepit dwellings. They are producing income in a country where most people live on less than \$1 a day, according to World Bank statistics (Wolfowitz 2007). They are ushering in a new way of life for many people who feel as ruined as the city in which they live. They are allowing Liberians to go to sleep at night knowing the peace of their homeland and the confidence that comes with small steps toward self-sufficiency in a fertile nation that has relied on food aid from humanitarian organizations for 20 years.

## Liberia's Tangled Roots of War

Liberia's roots reach far into the United States' soil. Free-born black Americans officially founded the country in 1822 when they sailed to West Africa to escape the persecution they had endured under the oppressive rule of slavery in the United States. But instead the cycle of oppression continued. Some black American settlers, who would come to be known as Americo-Liberians, began oppressing the native Liberians. This led to years of tension between the two groups. Those explosive elements mixed with the other weighty troubles in the country such as widespread poverty, tribal rivalries, economic instability and ongoing power struggles.

Divisions grew among Americo-Liberians and native Africans throughout Liberia's early years, but organized violence did not erupt until the 1970s during an uprising known as the 'rice riots'. William Tolbert, an Americo-Liberian who served as president for 27 years, died while in office. Vice president William Tubman assumed the presidency. Tubman, like Tolbert, was an Americo-Liberian. But Tubman tried a new approach to governing. He was the 'first president to speak an indigenous language', writes Peter Dennis of The International Center for Transitional Justice, 'and he promoted a program to bring more indigenous persons into the government'. The following passage, excerpted from Dennis' *A Brief History of Liberia*, describes what happened next:

Unfortunately, this initiative lacked support within Tolbert's own administration, and while the majority felt the change was occurring too slowly, many Americo-Liberians felt it was too rapid. In April 1979, a proposal to raise the price of rice (which the Tolbert administration subsidized) met with violent opposition. The government claimed that the price increase was meant to promote more local farming, slow the rate of urban migration, and reduce dependence on imported rice. However, opposition leaders also pointed out that the Tolbert family controlled the rice monopoly in Liberia and therefore stood to prosper. The ensuing 'rice riots' severely damaged Tolbert's credibility and increased the administration's vulnerability (Dennis 2006).

Liberia's rice riots led to increasing dissatisfaction among the country's indigenous people. By 1980, that dissatisfaction turned into brutal organized violence. A 27-year-old indigenous Liberian named Samuel K. Doe led a coup d'état against Tolbert's government. Doe and his followers executed Tolbert in the presidential

mansion and then took captive more than a dozen dignitaries, whom they tied to posts on a beach overlooking the Atlantic Ocean and fatally shot. By 1989, war had come to Liberia. Warlord and Americo-Liberian Charles Taylor launched a civil war to topple Doe and to take control of the country. A rival faction leader named Prince Johnson, who still serves in Liberia's Senate, captured Doe first. He drank a beer while watching his men brutally torture Doe, who wore underwear only. The execution once was available online, but now YouTube shows snippets of the capture only—of a pleading, tearful Doe—and leaves the rest to the viewer's imagination.

The Liberian civil war spread throughout the country, and rival factions formed and split as they fought against one another. Some of the most bizarre fighting in war history took place in Liberia, with soldiers wearing women's wigs and even wedding dresses as if they were playing a game of 'dress up'. Soldiers from many rival groups fought until shortly after Taylor—who gained the presidency in 1997—fled the country in 2003. By then, the country had turned into a wasteland. There wasn't any electricity or running water. An estimated 200,000 people died while tens of thousands became refugees.

In 2005, Ellen Johnson-Sirleaf became Africa's first democratically-elected female president. (About 8 years earlier, she had garnered only 9.6 % of the vote while Taylor took 75.3 % according to PBS Online NewsHour, Schecter (2009)), Under her leadership, street lights and running water have returned slowly to parts of Monrovia and to other cities. For the country's Independence Day celebration in 2009, she lit up the third largest city in Liberia, Gbargna, which is located about 3 hours northeast of the capital.

But Liberians continue living in the shadows of a complex history. At the time of writing this chapter, it has been more than 6 years since the country's protracted civil war ended. The world's second largest United Nations peacekeeping force—nearly 10,000 strong—keeps watch while the national police force patrols dark neighborhoods without guns due to the country's 2003 disarmament. Johnson-Sirleaf has asked the United Nations to stay longer than their 2010 mandate for fear of unrest in the country leading up to the 2011 presidential election. There are many uncertainties and fears rooted in the minds of Liberians. They continue to be haunted by the trauma of war—living with undiagnosed post-traumatic stress disorder—and fearing the return of chaos and bloodshed. Today, Taylor is being held in The Hague, where he has been since June 20, 2006. He is being tried on 11 counts of war crimes against humanity related to the civil war in neighboring Sierra Leone, which roughly coincided with Liberia's war. Prosecutors say that Taylor was the mastermind behind arming Sierra Leone's Revolutionary United Front in exchange for diamonds. His trial makes for hot debate on the streets of Liberia's cities—with those vying for both his acquittal and imprisonment. Meanwhile, Taylor still has not been tried for any crimes related to war in his country.

## Roadside Gardens: A Look at Liberia's New City Farmers

When Wata King thinks about her country's 14-year civil war, she sees the flies. They swarm over dead bodies on a dusty road, sown like seeds in the dirt from where they came and where they will return. Wata walks that dusty road in her mind. She scavenges for food with only one good eye—her left—for her three small children and her husband. Her right eye was battered by shrapnel twisting in the mad acrobatics of war. Today, she can only see shadows in an eye that would have been sharp had it not been for the war.

In Wata's memory, however, shadows do not exist. Everything is in focus. Wata begins her daily hunt for food in the darkness—a time Liberians call 'soon in the morning'—and walks all day from village to village. The moments turn into miles along the dusty road. She sees dead bodies 'all over'—on the road and in the water. This is her war experience.

Some people just give up, she tells me one day as I sit with her outside the concrete house she shares with several families. 'They take one or two steps ... They would rather die than to go', she says. Going back home empty-handed to her children was especially 'sorrowful', she says. 'Sometime you go and come back, you can't see nothing', she tells me.

Wata's immediate family was blessed: no one died of hunger. But she has not forgotten the long days of scavenging and the pangs of hunger. 'I just thank God. Because through God, [he] made me to survive. Because other people died innocently'. With the memory of hunger still in her mind, today Wata is taking control of her family's food security. As Liberia slowly recovers from the war, she is putting her hands into the soil. In 2009, Wata began growing a garden of leafy greens on the roadside across from the house where she lives on the bustling perimeter of Monrovia. City gardens in Monrovia are filled with corn, cassava (similar to a potato), and potato greens (a leafy plant similar to spinach or collards). Potato greens can be grown from the plant's stem, which makes them an easy and inexpensive vegetable to cultivate. Wata planted the greens as an experiment to see if she could generate extra income and provide more food for her family of six.

Since the first roadside garden she planted across the street from her house about a year ago, she's replanted several times and earned a little extra income from selling part of her harvest. Having a small space and gardening without extra resources such as fertilizer sometimes leaves her with depleted soil and meager harvests. For now, Wata's roadside garden is an experiment in self-sufficiency. Gardening brings a sense of empowerment and hope. Wata's experience in scavenging for food during the war—and now her management of a roadside city garden—reinforce her duty to her family and to her own existence in post-war Liberia.

Down the road from Wata King's garden patch, an elderly Norah Quiqui tends a garden filled with a wide variety of Liberian staples. Norah is one of Liberia's many market women who sell vegetables in a nearby outdoor market. Her son, Lawrence, 29,



**Fig. 32.1** Norah Quiqui's roadside garden in Sinkor, a community on the outskirts of Liberia's capital city of Monrovia (Courtesy of Christina Holder, freelance journalist)

runs a photo booth near Norah's bushy street-corner patch. In 2009 and later in 2010, the large garden, filled with corn and leafy greens called cassava leaf, was flanked by random clots of trash and an abandoned yellow taxi. This is typical of many gardens here that are planted in the dilapidated pockets of Monrovia (Fig. 32.1).

Lawrence, Norah's son, says he is thankful for his mother's gardening. He says he remembers going to bed hungry often during the war. Growing vegetables has helped not only feed the Quiqui's extended family, but it has helped to put Lawrence and his six siblings through school. During the war, Norah experienced hunger and hardship. Her husband passed away due to a suspected heart attack. But she thanks God for the two most often quoted praises in post-war Liberia: survival and sustenance. 'They buying. We eating. That way alright', she says. 'We don't want war. I scared for the war. No war, I happy'.

In 2010, Mamie Rogert's garden patch looked like a yard full of grass stretching wide from the concrete house she lives in with friends in a neighborhood on the outskirts of Monrovia. She has been growing a garden full of leafy green vegetables and corn there for about 3 years and has turned the patch into a business that helps to feed her and her four children. She can make about 1,500 liberty dollars (LD), the equivalent of about 22 USD and about 16 Euros, per harvest. If a Liberian city farmer is able to plant at least once a month, he or she can make almost enough to buy at least one, 110-lb or 50-kg bag of rice, which was selling for about \$28 in April 2010. Most Liberians, however, buy rice by the cup—which often is measured

in an empty soup can. A ‘cup’ costs about 12 cents. It takes a few weeks only for vegetables like potato greens to grow during Liberia’s rainy season, which begins in April and lasts until November. Therefore, if a city farmer can find a wide space in the city, such as a plot of earth behind a house or in an abandoned lot, then his or her possibilities for making income increase.

Greening in Liberia’s red zone also is leading to community building. In the same neighborhood where Rogert lives is a collective of five women who garden together. Mapu Blackie, Mama Kollie, Ma-tuma Koromah, Massay Sabah and Bendu Washington do not know their ages, but they are likely nearing or in their 60s. They plant cassava leaf, onions and another leafy vegetable called water greens. When they have harvested, the women share the produce for eating and selling. ‘That’s my garden helping me’, Mapu says. They have risen as both entrepreneurs and symbols of self-sufficiency in their neighborhood. When neighbors do not have food, they come to the women for help.

Wata, Norah, Mamie and the women’s gardening collective represent just a handful of Monrovia city farmers who are trying to forge a new life for themselves through green spaces in the midst of Liberia’s red zone. They are not always making a significant amount of money from their garden harvests. However, anecdotally, these women’s stories make a significant contribution to our understanding of the current challenges in post-war Liberia—and the desire of these women to move into post-war lifestyles that are stable and self-sufficient. Furthermore, it is significant that these city farmers are women. While both men and women garden and farm in Liberia, the World Bank’s 2007 study *Comprehensive Assessment of the Agriculture Sector in Liberia* reports that women play a dominant role in the country’s agricultural sector. Women constitute 53 % of the country’s agricultural labor force and are responsible for producing 60 % of all the country’s agricultural products, according to the World Bank report. Furthermore, the income earned by Liberian women ‘has an important role in ensuring family welfare and fighting poverty’ because it often is ‘spent in household’s basic needs and education in higher proportions than male earned income’, according to the report.

Rachel J. Slater also noted the positive social and psychological effects of gardening on women’s lives through her recording of life histories of 14 women living in post-apartheid South African townships. In her 2001 article, Slater concluded that South African women who maintained gardens gained a sense of identity, empowerment and peace in their green spaces:

Many women find solace from both trauma and the daily stresses of township life through their gardens—a kind of empowerment process not found in the literature. Furthermore, through gardening they become conscious of different domains of society over which they can wield power or control. In the context of powerlessness, women turn to the one thing over which they can exact control—their gardens. The garden becomes a site of resistance to societal constraints. Through gardening, women find something tangible, meaningful and productive that they can do. With each cabbage, onion or potato that they grow successfully, they are chipping away at the problems and the desolation or hopelessness they feel in their situation. It is empowering to be able to take yourself away somewhere, to a place that is your own, and be alone with your thoughts, hopes and fears. It is empowering to find space where you have control and can make your own decisions (Slater 2001).

Perhaps female farmers in Liberia are also creating opportunities to experience both empowerment and healing within their city’s small, green spaces.

## Meager Harvests: The Challenges to Food Security

Many refugees fled fighting in remote areas of the country and set up their new homes in Monrovia. A third of Liberia's estimated 3.5 million people live in Monrovia, according to the country's latest census, which was completed in March 2008 (Liberia Institute of Statistics and Geo-Information Services 2009). Transplanted Liberians brought their farming lifestyle with them—but found they did not have enough space to cultivate a real farm. The compromise is a roadside garden wherever the soil is deep and wide enough to plant.

City gardening is likely to continue sprouting as a way to generate food in the midst of Liberia's rising rice prices. Johnson-Sirleaf has been trying to encourage Liberians to get their hands into the soil. She launched a 'sensitization program' aimed at getting 'all Liberians to go back to the soil', according to press release from Johnson-Sirleaf's Executive Mansion (2008). Essentially, the government encouraged Liberians to try gardening and to consider moving out of the city to farm. The government also has funded seed banks in more remote areas of the country and gives Liberians who are experimenting with gardening and farming starter plants of the country's staple foods for free. The Ministry of Agriculture has developed an extension program that allows Liberian gardeners and farmers access to Ministry experts. Those experts will visit the plots and give gardeners and farmers tips on how to get better returns from the soil. Noting the importance of farming to Liberia's post-war future, the Ministry of Agriculture in partnership with the United Nations Food and Agriculture Organization (FAO) launched a School Garden Program that trains high school and university instructors in vegetable production, according to a news article in the *Liberian Observer* (2010). The hope is that the instructors will grow school gardens that will ignite an interest for agriculture among students.

As Liberians look to the future and consider gardening as part of their post-war lives, there are many challenges to sustaining agriculture in the city. The challenges sometimes clash with benefits and make it harder for Liberians to pursue gardening and farming. Emmanuel Crusoe, the former Monrovia city police director, says that many Monrovia do not participate in gardening as a way to generate a main source of income because they have lived in the fast-paced city for most of their lives. City dwellers are not farmers, he says. There also is evidence that there is a negative stereotype associated with becoming a farmer. 'Farming does not seem to hold the same status as professions in the city do', says Jennifer Gerson, an American dietician who lived in Liberia for 5 years and worked with city-dwelling Liberians on gardening techniques. 'It seems like a lower class especially to the younger generations'. These attitudes could be factors as to why more Liberians are not embracing city gardening.

Land constraints, theft and wait times are other big obstacles to city gardening. It is difficult to convince some Liberians to try gardening or farming because one must convince them to wait for a harvest when they could be making money as petty traders, says World Food Program's Liberia Program Officer Amos Ballayan. Gerson, the dietician, told me in a 2010 interview that she found it challenging to convince Liberians that gardening could be a sustainable enterprise. It was expensive to obtain tools, seeds, and other necessary equipment for managing a garden. Then, theft was



a big concern for many potential gardeners—not only theft of supplies but also of the crops ready to be harvested. ‘There were many people who were frustrated in their efforts... They didn’t have adequate security for their gardens and suffered losses. Some gave up’, she says. The women’s gardening collective also has experienced theft of their crops.

Yet another challenge was finding adequate space and soil to plant a sustainable garden. Because there isn’t a neighborhood trash collection system in place in post-war Liberia, most people bury their trash in the soil. When Gerson began preparing her garden at her home in Liberia—a model plot where she experimented with gardening techniques that she later shared with Liberians—she had a difficult time getting started. ‘You find tons of glass, plastic and tin cans in the ground’, she says. ‘At one site we actually found an old car buried by the rebels’.

Many Liberians do not want to move to more rural parts of the country, even if it means more growing space. ‘Everybody now knows that Monrovia is Liberia’, Crusoe says. ‘Everybody wants to be in Monrovia to make a living’. Wata King does not want to move away, but she does want to grow a larger garden. She would like to have a patch big and fertile enough that it starts yielding a regular income. For now, however, she’s willing to experiment and to carefully tend the garden with her one good eye. After so many years of war and hunger, she knows what it feels like to have things taken by force, and so she is embracing the freedom she has right now. ‘People walking, they taking people from among you. Walking. ‘Hey you, come here’. *Pow! Pow!* Hey you, come here. They kill you’, Wata remembers. In post-war Liberia, she feels proud to have this small, dignified garden of her own.

## **Extra Hands: Toiling Alongside World Humanitarian Organizations**

Several world humanitarian organizations in Liberia are targeting farming projects in the country. But to my knowledge, they all are focused on the physical survival of the farmer and her or his family—and not on psychological healing. Liberians face widespread undiagnosed post-traumatic stress disorder. In a country with meager agricultural returns, it is perhaps the potential for healing—rather than income—that is more ripe for those who slip their hands into the soil.

Most farming projects sponsored by humanitarian organizations are located in remote parts of the country, where Liberians are familiar with the traditions of farming and perhaps ease into the arduous work because of that familiarity. Several organizations, however, are targeting city farming. The United Nation’s Food and Agriculture Organization (FAO) is hoping to expand the reach of more urbanized gardens. A new project, funded by the Swedish International Development Corporation Agency (SIDA), currently is targeting 5,000 urban residents of five major counties in Liberia (Integrated Regional Information Networks 2010). The goal of the project is to motivate Liberians to not only grow gardens but to surpass subsistence gardening and to start ‘market gardens’, according to a news article by the Integrated Regional

Information Networks, a project of the UN Office for the Coordination of Humanitarian Affairs. FAO provides seeds and farming training but not tools, fertilizer or insecticides. Most of the farming done in Liberia is called ‘slash and burn’. Liberian farmers burn a field to clear it for farming. After a few harvests, they move on, says Gerson, the dietician, who spent time teaching Liberians how to build compost piles and to diversify crops to replenish soil with essential nutrients. ‘They had no idea that adding organic matter back into the soil can provide nutrients for future crops and ultimately increase the sustainability of farming that plot of land’, she told me in a 2010 interview.

Reverend Priscilla Jaiah, a native Liberian who went to the United States during the war and since has returned, has had some success in encouraging her fellow Liberians to grow vegetable gardens. In 2009, she began growing a large vegetable garden in the backyard of her house in Ganta, the country’s second largest city, and introduced Liberians to vegetables they have not typically eaten such as lettuce and green beans. In 2010, Jaiah has continued to grow the garden and has employed Liberians to help her with the small harvests. The Liberians who participated have experienced pride and confidence as they have benefited from the fruits of their labors. Some have even started their own gardens.

## **Conclusion: The Seeds of the Future**

It is too early to determine whether Liberia’s urban gardens will lead to the significant social and psychological changes—such as lowering crime rates—that have sprouted in green spaces in other red zones (Kuo and Sullivan 2001). However, it certainly is possible. As Liberia’s government grows stronger and is able to institute more social programs that organize youth and put men and women to work, urban gardening and city farmers may become part of a larger, organized movement that leads to healing from war trauma, community empowerment and entrepreneurship, and food and income security. As Okvat and Zautra (Chap. 5, this volume) and Tidball (Chap. 4, this volume) have pointed out, engaging in activities that lead to positive emotions is critical to mental health in a crisis or stressful situation. Okvat and Zautra’s review of community gardening and other greening literature provides yet another perspective on the psychological changes that can take place in green spaces. Individuals who work together to turn soil and harvest crops in disaster areas may experience benefits such as positive moods and the ability to feel relaxed, improved self-esteem, and actual healing within a community where reflecting on trauma becomes a shared experience.

Organizations that have set up ‘healing gardens’ in countries that have a similar past to Liberia’s may have a role in Liberia’s greening in the red zone. The Garden of Forgiveness is a New-York based educational non-profit that teaches the public about forgiveness as a catalyst for healing. The organization does this by creating peaceful gardens where people can reflect and where community leaders can hold remembrance services. The organization is headed by Reverend Lyndon F. Harris,

who was the priest overseeing relief ministries at Ground Zero during the Sept. 11 terrorist attacks, and Frederic Luskin, the co-founder and director of the Stanford University Forgiveness Project. The Gardens of Forgiveness project began in Beirut, Lebanon, and currently is working on plans for another garden in Rwanda, where genocide devastated the country. The Garden of Forgiveness is working with award-winning landscape architect, Julie Moir Messervy, author of *Contemplative Gardens* and *The Inward Garden*, on unique contemplative features for the garden that they hope will be a meeting place in the capital, Kigali. Harris said he would like to see such a garden in Liberia. As Winterbottom (Chap. 30 this volume) has described, landscape architects are sometimes ready to step into post-conflict settings, using design principles to help communities create gardens that facilitate learning, access to natural spaces that allow contemplation and safe play for children, and other elements that are known to help in healing and recovery in conflict settings.

In the meantime, small roadside gardens are important to Liberia's healing and reconstruction. They harvest empowerment, peace and healing. They appeal to an underserved demographic—women who are the main gatherers and producers of agricultural products but who remain the lowest paid. They are a unique part of the nation's post-war psychology. Roadside gardens foster independence and self-sufficiency because Liberians have taken it upon themselves to grow their own food rather than to rely on the government to institute an urban gardening plan. Gardens are forging new lives, and we can see those new lives reflected in every harvest among the ruins.

## References

- Dennis, P. (2006). A brief history of Liberia. The International Center for Transitional Justice, May 2006. <http://www.ictj.org/static/Africa/Liberia/BriefHistory.pdf>
- Executive Mansion. (2008). President Sirleaf encourages Liberians to return to the soil, 16 June 2008. [http://www.emansion.gov.lr/press.php?news\\_id=745](http://www.emansion.gov.lr/press.php?news_id=745)
- Integrated Regional Information Networks. (2010). LIBERIA: Urban gardens to boost food security, 19 Jan 2010. <http://www.irinnews.org/report.aspx?ReportId=87798>
- Kuo, F. E., & Sullivan, W. C. (2001). 'Environment and crime in the inner city: Does vegetation reduce crime?' *Environment and Behavior*, 33(3), 343–367.
- Liberia Institute of Statistics and Geo-Information Services. (2009). Republic of Liberia 2008 national population and housing census final results, May 2009. [http://www.emansion.gov.lr/doc/Population\\_by\\_County.pdf](http://www.emansion.gov.lr/doc/Population_by_County.pdf)
- Liberian Observer. (2010). MOA goes nationwide with strategy to increase food production, 23 Jan 2010. <http://www.liberianobserver.com/node/4166>
- PBS Online NewsHour. Liberia's uneasy peace. <http://www.pbs.org/newshour/bb/africa/liberia/taylor-bio.html>
- Schecter, A. (2009). Charles Taylor has become a Jew, his wife says. ABCNews.com, 9 July 2009. <http://abcnews.go.com/Blotter/story?id=7795476&page=1>
- Slater, R. J. (2001). Urban agriculture, gender and empowerment: An alternative view. *Development Southern Africa*, 18(5), 635–650.

- Wolfowitz, P. (2007). Remarks at the Liberia Partner's Forum. Washington, DC, 13 Feb 13. <http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/ORGANIZATION/EXTPRESIDENT2007/EXTPASTPRESIDENTS/EXTOFFICEPRESIDENT/0,,contentMDK:21219580~menuPK:64343277~pagePK:51174171~piPK:64258873~theSitePK:1014541,00.html>
- World Bank. (2007). Development Southern Africa Publication details, including instructions for authors and subscription information. <http://www.informaworld.com/smpp/title~content=t713413745>

# Chapter 33

## Cyprus: Greening in the Dead Zone

Anna Grichting

**Abstract** The Green Line Buffer Zone that has divided the island of Cyprus since 1974 is often referred to as the Dead Zone. It is not a line, but a swathe of land that acts as a buffer between the Greek Cypriot and Turkish Cypriot communities. Patrolled by the United Nations, it is a ‘thick border’ according to the categories of borders described by Michel Butor, ‘a corridor of death, desolation and barbed wire’ (which) holds the possibility of softening to ‘become the very image of the crossing of frontiers’ (Butor et al. 1989). Similar to other military enclaves, the Buffer Zone is trapped in a status quo that has frozen the development and exploitation of the land, allowing unexpected natures to flourish. This has resulted in the *softening* of the deadly rift through a rich landscape of biodiversity that hosts a number of endangered species in Cyprus. The preservation of this precious flora and fauna, as well as associated ecological and cultural initiatives, offer a building block for collaboration between the communities on both sides of the dividing line and an opportunity for new narratives and strategies of reconciliation based on a common, sustainable future. This chapter describes a project being developed by the author to make the ‘Green Line greener’, envisioning the transformation of the military fault line into an ecological seam through the web of environmental and cultural initiatives that are taking place across the Green Line.

**Keywords** Buffer zones • No-Man’s land • Peacebuilding • Environmental cooperation • Third landscapes

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A. Grichting (✉)  
Department of Architecture and Urban Planning, School of Engineering, Qatar University,  
P.O. Box 2713, Doha, Qatar  
e-mail: [anna.grichting@qu.edu.qa](mailto:anna.grichting@qu.edu.qa)

*As part of a research project with the Harvard Program on Conflict Research based on her PhD dissertation, Anna Grichting developed a plan for greening of the dividing line between Greek and Turkish Cyprus. The site of intense fighting during the 1970s, this former red zone has become a dead zone for humans but a green zone for biodiversity. Grichting proposes a vision for the future whereby cooperation in conserving biodiversity and other natural and cultural resources becomes a means for reconnecting the Greek and Turkish communities.*

## Introduction

At its maximum of defiance, the frontier doubles itself inevitably into two lines, each turned toward the exterior, but which must also protect the interior against the threat not only of the other but also of this intermediary interstitial region, the no-man's land, this geographical expression of misunderstanding, of rift, at first a corridor of death, desolation, and barbed wire, but which can sometimes soften and become the very image of the crossing of frontiers when that finally begins to occur (Butor et al. 1989).

The Green Line that divides the island of Cyprus is often referred to as the Dead Zone. Crossing the island from east to west for a length of 180 km, it is not a line, but a swathe of land that acts as a buffer between the Greek Cypriot and Turkish Cypriot communities. Patrolled by the United Nations, this 'thick border' can be described as a 'corridor of death, desolation and barbed wire' – yet it can also be viewed as a space that holds the possibility of softening to 'become the very image of the crossing of frontiers' (Butor et al. 1989). The linear military enclave is imprisoned between the de-facto ceasefire lines that define the two territories according to the agreement that came into effect on 16 August 1974, putting an end to the fighting that opposed the two communities. While the area is highly militarized, it is not considered a *hot* conflict zone or an insecure, hostile red zone (see Tidball and Krasny, Chap. 1, this volume). It is more often described as a Dead Zone, where villages, agricultural fields and infrastructures like the Nicosia Airport, have been damaged, destroyed or abandoned, and where the United Nations Forces in Cyprus (UNFICYP), who control and patrol the Buffer Zone, are mainly engaged in preserving the status quo – that is, in ensuring that the cease fire lines are respected and that nothing is moved or removed. Albeit, Nature does not recognize nor respect the status quo and while man-made structures have been frozen in time, wildlife and spontaneous vegetation have flourished in this No-Man's land, taking advantage of the lack of human interference and activities. The result is a *softening* of the deadly rift through a rich landscape of biodiversity that offers a haven for a number of endangered species in Cyprus. The frozen status quo and the inertia of the Cyprus Problem are also resisted by Cypriots on both sides. They have been collaborating across the border on cultural, social and environmental issues, with the aim of building a sustainable and reunified future for Cyprus. Initiatives to preserve the precious flora and fauna of the Green Line, associated with similar cross-border ecological and cultural projects, are foundations



**Fig. 33.1** The Dead Zone of Cyprus. Frozen architecture and flourishing nature. A Greek checkpoint along the United Nations Buffer Zone near Nicosia (Photo: Anna Grichting)

for constructive collaboration between the communities on both sides of the dividing line. These initiatives open the way for new narratives and strategies of reconciliation based on a common and shared sustainable future (Fig. 33.1).

This chapter describes a project being developed by the author to make the ‘Green Line Greener’, which envisions the transformation of the military fault line into an ecological seam through the web of environmental and cultural initiatives that are taking place across the Green Line. Situated *between the lines*, this project is intended as a means to cross the chasm between the torn Cypriot societies. The conceptualization of a sustainable spatial plan for the future development of the Green Line was developed through an applied research project by the author that resulted in a doctoral dissertation at Harvard University (Grichting 2008). The project was first presented to governmental and non-governmental organizations and various stakeholders in Cyprus in July 2006 (Grichting 2006) under the Harvard Program on Conflict Research and has been communicated at a number of conferences in Cyprus and worldwide. The project is now being developed in collaboration with Friends of Nature Cyprus (FoN), a bi-communal NGO working on the environment, as well as with the German-Cypriot Forum (DZF), a platform for dialogue that supports the rapprochement process between Turkish Cypriots and Greek Cypriots.

## **PeaceBuilding and Environmental Cooperation**

Environmental threats that ignore political boundaries, such as water scarcity and loss of biodiversity, are often the cause of tension between nations and the source of territorial dispute. Recent developments in research and policy are beginning to view these environmental challenges as opportunities for cooperation and peace building. Likewise, the unexpected natural developments that emerge in the confined areas of boundaries and military buffer zones are being recognized as unique reserves of biodiversity, as backbones for sustainable development and as potential catalysts for peace. Environmental planning that unites the natural and social sciences therefore has an important contribution to make to peacebuilding – where resource scarcity and environmental protection can in fact be catalysts for resolving otherwise intractable disputes (Ali 2003). A shared vital resource can become the keystone for building bridges between parties who would otherwise not sit at the same table (Halle et al. 2002). Environmental cooperation can enhance trust, establish habits of cooperation, forge cooperative trans-societal linkages, and create shared regional norms and identities (Conca et al. 2005). Civil society is an essential, yet underutilized component in environmental peacemaking and if peace is to be achieved, it must be between societies as well as governments. A successful and sustainable peace strategy should therefore be achieved through both intergovernmental as well as inter-societal pathways, engaging a broad community of stakeholders by combining environment, development and peace-related concerns (Conca et al. 2005). Nevertheless, we must be aware of the possible collision of the rights of local communities with the interests of nature preservation, and the risk of the weakening of local resource claimants against the strengthening of state control over the resources (Peluso 2004). Any project that aspires to build sustainable peace and preserve nature, such as the project for the Green Line of Cyprus presented here, needs to identify and anticipate possible sources of conflict that may arise in the planning and peace process.

## **Green Lines and Unexpected Natures: The Boundary in Movement**

In areas of conflict, a Green Line is used to designate a military dividing line or provisional demarcation line that separates the warring territories. The first reference to a Green Line can be traced to a defense line of the German Army in Italy during World War II, which ran along the summits of the Apennine Mountains. Several years later, in 1949, the armistice line between Israel and the Arab nations was designated as the Green Line, as was the disputed border between India and Pakistan in the Rann of Kutch marshlands, which open up into the Arabian Sea. During the period of the civil war in Lebanon (1975–1990), Beirut was separated by a strip of derelict land that formed between the front lines of the Christian East and Moslem



West, which became known as the Green Line. In Cyprus, the Green Line was first established in Nicosia in 1963, extending across the island in 1974, as a result of the military coup by the Greek Junta and a responding intervention by the Turkish Army.

The military origins of the designation *Green Line* remain vague. While the Israeli and Cypriot Green Lines have been attributed to the green pencil markings drafted on a map, Beirut's Green Line is said to be the result of the spontaneous vegetation that developed during the years of the conflict between the militias' front lines. It is precisely this wild growth within the boundary that is of interest to us, the resilient Nature that *softens* the *thick frontier*, the boundary in movement which can engender a *crossing of the frontier* (Butor et al. 1989) becoming a catalyst to deconstruct the mental and physical walls that entrench the communities on both sides. The *Boundary in Movement* (a neologism of the author) is inspired by the *Garden in Movement* – a landscaping strategy developed by the French horticultural engineer and landscape architect, Gilles Clément – which accommodates and orchestrates these spontaneous natures, extracting or enhancing certain species to create an evolving landscape shaped by the historical, cultural and ecological conditions surrounding the site. In contemporary questions of landscape, these dynamic or unexpected natures have become increasingly recognized for their ecological value and for their contribution to the preservation of biodiversity. Clément describes these marginal sites and neglected areas abandoned to nature as *Third Landscapes* – as the undecided pieces of the Global garden where biodiversity thrives and as the earth's genetic reservoir. These refuges for ecological diversity are lying fallow waiting for new programs, political decisions or – in the case of the Cyprus Green Line – a peace plan. In the interstices of time, of indecision, of status quos, they develop their own programs with nature, gaining new ecological value.

## The Dead Zone: From Military Fault Line to Ecological Seam

The Green Line of Cyprus is commonly called the Buffer Zone, no-man's land, or the Attila Line. It is referred to by locals as the Dead Zone – a name which evokes the many lives that were lost and the continuing perils of venturing into the Green Line unauthorized. The term also refers to the state of decay of the buildings and infrastructures lying within it. The United Nations Buffer Zone (UNBZ) – as it is officially referred to – varies in width from 3.5 m in the historic center of Nicosia to 5 km in the area surrounding the former airport, one of its widest sections. It delineates a border between the de jure Republic of Cyprus (which still defines the whole island as its territory) and the de facto Turkish Republic of Northern Cyprus, recognized only by Turkey. Since 2004, the Green Line also marks the border of the European Union.

With its irregular form, the Green Line divides the capital city Nicosia, disrupting the perfect geometry of the Venetian fortifications, meandering along what was formerly the bed of the Pedios River before it was diverted around the city walls to



**Fig. 33.2** Map of the Green Line Buffer Zone (*light green*) with the state forests (*dark green*) and the location of the different landscapes and programs of the Green Line Vision Plan (Anna Grichting)

create a moat. Linking a unique succession of sceneries, the Buffer Zone constitutes a cross-section of the different landscapes and ecologies of the island. From the deltas and sandy beaches of the East coast (Famagusta-Varosha), it connects with the rocky shores of the West coast (Kokkina enclave), passing through wetlands, fertile plains and hills, and abandoned copper mines, following the crests of mountain tops. It is traversed by many rivers that flow from the Troodos Mountains into the plains and connects with a patchwork of national forests and future Natura 2000 sites (Fig. 33.2).

The Dead Zone is riddled with landmines and other negative forms of pollution. It holds deep in its soil the traumatic memories of the identified victims and the unidentified missing persons, encapsulating almost 50 years of communal strife. On a more positive note, this marginal landscape has been extracted from rampant developments and intensive agricultural exploitation, allowing Nature to flourish. Similarly, the Demilitarized Zone in Korea has been described by scientists and nature lovers as a Garden of Eden or a ready-made paradise park (Grichting 2009; Grichting and Kim, Chap. 15, this volume). This highly militarized, 4 km wide corridor that divides the Korean peninsula has become a lush landscape hosting a rich collection of endangered species of flora and fauna. The Iron Curtain, which once divided Europe and the World, was similarly a dehumanized strip of land, covered by sand and weed killer and it was only after the fall of the Wall that the process of recolonization by nature began (see Cramer, Chap. 34, this volume). The recognition of the *death strip* as a potential *life line* or ecological corridor running through Europe prompted environmental organizations and NGOs to initiate a project to conserve the Iron Curtain as a Green Belt running from the North to the South of Europe (IUCN).

In Cyprus, a polarized political and physical landscape still divides the Greek and Turkish communities and the (de-facto) Turkish Republic of Northern Cyprus continues to suffer from an economic and political embargo, despite incentives by the European Union to dis-enclave the Turkish Cypriots in anticipation of a solution to the Cyprus problem. Since 2003, movement between the two communities has been permitted through five checkpoints along the Green Line. This opening of the boundary, accompanied by the continued efforts of the United Nations as well as several NGOs in Cyprus, has encouraged and facilitated environmental cooperation

and peacebuilding initiatives on both sides, regardless of the political stalemate that followed the public refusal (in 2004) of the UN Annan Plan for a settlement of the Cyprus Problem.

Many NGOs and associations are building bridges across the Green Line. These include cultural organizations, such as the Bi-Communal Choir and the recently formed Bi-Communal Jazz Band; NGOs centered on questions of environmental preservation and sustainable development – focusing on water, biodiversity, renewable energies, and organic farming – which include Friends of Nature Cyprus, the Bi-Communal Cyprus Organic Advisory Group, Birdlife Cyprus, and the Cyprus Wind Association, to name but a few; as well as NGOs working on social issues of missing persons and historical dialogue. The positive developments that are occurring within, and across, this enclaved territory – this web of cooperative actions and initiatives – lay the foundations for the Vision Plan which proposes the Green Line as a backbone to reclaim a biologically and culturally diverse Cyprus.

Envisioning the Green Line as a catalyst for reconciliation articulated around environmental preservation and sustainable planning is posited as an alternative to the fractured landscapes and ruptured communities of Cyprus. It can serve as a catalyst that could help in shifting the focus from polarized territorial claims to the potentially unifying aims of protecting the environment, and to the building of a socially, economically and ecologically sustainable future. In order to implement this vision for the Green Line, it should be communicated to the Cypriot populations that, in the face of increasing environmental threats and diminishing resources, collaboration and planning across both communities, as well as with regional and global actors and organizations, is necessary. This vision will also need to be translated into a set of policies and planning instruments in a process that brings together all the stakeholders. It will be constructed through the interweaving of the matrix of collaborative approaches and the overlaying of the multiple landscapes emerging within the Green Line.

## **Landscapes of the Green Line**

### ***A Landscape of Biodiversity***

The first scientific attempt to assess the flora and fauna of the Buffer Zone was undertaken in 2007 by a team of 14 scientists from the Greek and Turkish Cypriot communities funded by the US Agency for International Development. This study unearthed the existence of rare, endemic and vulnerable flora and fauna species, and confirmed the hypothesis (put forward by the author) that the Buffer Zone was a haven of biodiversity. It also provides information concerning locations of wildlife habitats and corridors that will be valuable in prioritizing conservation planning for key endemic or endangered species, and is a first step towards a more detailed mapping of the habitats in the Green Line, such as the habitat mapping that was undertaken in the German segment of the Iron Curtain Green Belt (Schlumprecht 2007).

Eight study sites were selected across the width of the buffer zone, covering different habitat types, including river, coastal, farmland, wetland, and forest. The findings include rare plants, hedgehogs, hares, foxes, an endemic mouse (*Mus cypriaca*), vulnerable bird species, and reptiles and amphibians such as the Mediterranean chameleon, the blunt nose viper and the green frog. Around 200–300 Cyprus mouflon were observed around the abandoned hillside village of Variseia. The mouflon is a wild sheep and a national symbol, which has been on the island for several thousand years. It was on the verge of extinction a decade ago and it is now believed that there are around 3,000 mouflons in the Buffer Zone (Gucel et al. 2007). More recently, another endangered species on the Red List, the Mediterranean monk seal, was spotted by Turkish soldiers in the areas where the Buffer Zone extends into the sea off Kokkina on the West Coast of the island. Kokkina was a place of intense confrontation between the Greek Cypriot and Turkish Cypriot communities during the inter-communal struggle of 1963–1964 and is therefore a key site for nature preservation, reconciliation and commemoration within the Green Line.

## *A Landscape of Memory and Forgiving*

Our common pain is our common future (Uludag 2007).

There are numerous sites of memory along the Green Line, many of them painful memories of the ethnic clashes of the 1960s and 1970s. Abandoned cemeteries, ruined churches, centennial olive trees, individual memorials, collective monuments, traces and relics all articulate landscapes and sites of remembrance. Yet there are still people grieving on both sides for the hundreds of men, women and children who disappeared without a trace during the height of the conflict. According to UN data, more than 1,400 Greek Cypriots and 500 Turkish Cypriots are listed as missing and some 270 remains have been unearthed on both sides of the cease-fire line. While it may not be possible to locate all the missing persons and their graves, it is important that they be honored and remembered as this remembrance and grieving will help to heal the wounds between the two communities. Sevgul Uludag is a journalist and peace activist who founded the NGO Hands Across the Divide in 2001 to promote peace in Cyprus. Uludag has investigated the issue of missing people and mass graves in Cyprus, uncovering the fates of thousands of people who disappeared during Greek-Turkish clashes in the 1960s and 1970s from mass executions, abductions and targeted assassinations. Her work has allowed families to mourn and commemorate their dead, and it also reveals that both Greek and Turkish Cypriots saw themselves as the victims of the conflict, showing them that all Cypriots are both perpetrators and victims.

The families of the Missing on both sides are the walking wounded whose aching hearts and souls need to be comforted. This can only happen when we realize that there is still even more to lose by not embracing each other's needs now, by not trying to forgive even if there are things that are so hard to forgive (Uludag 2007).

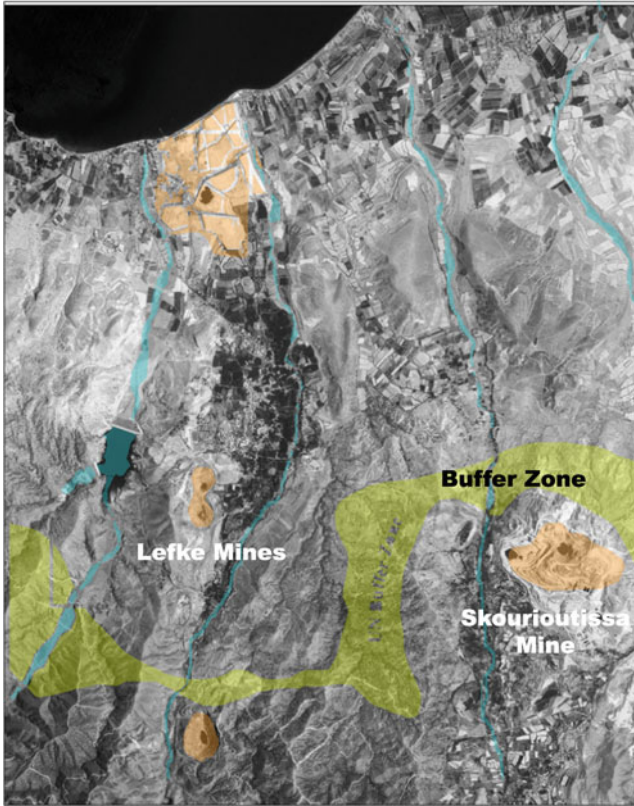
## *A Social and Cultural Landscape*

A number of obsolete copper mines are located on either side of the Green Line near the West coast of the island – the Greek mines of Skouriotissa and the American owned Cyprus Mining Company and Lefka-Mavrovouni-Xeros area. These copper mines belong to the cultural history of Cyprus and it is said that the very name of the island derives from the Latin name for copper, *Cyprium*. The Skiouritissa Mine produced copper ore for more than 4,000 years. In Roman times, the mines were leased to King Herod. These mines also served as sites for acts of solidarity between Turkish and Greek Cypriot miners, who joined forces in their struggle for better wages and working conditions. A 4-month long strike occurred in 1948, in which the ‘unity, heroism, discipline and self-sacrifice of the miners (Greeks and Turks alike) and their families, wrote one of the greatest chapters in the history of the labor movement’ (Varnavas 1998). Today, the proposed remediation of these mines is a bi-communal project that will unite Turkish and Greek experts in a newly established ‘think-tank’, an initiative of the Laona Foundation for the Conservation and Regeneration of the Cypriot countryside (Laona 2009). The objective is to elaborate measures for sustainable site rehabilitation, as it affects past and future licensees of mines and quarries, as well as the legal/policy framework (Cilliers 2008; Fig. 33.3).

## *A Landscape of Cooperation*

The Association for Historical Dialogue and Research (ADHR) is recognized as an exemplar of how productive cooperation, creative ideas and respect can contribute to overcoming the divide. Since its foundation, the association has enlisted members from various ethnic, linguistic and professional backgrounds working in education in Cyprus. Its aim is to engage them in a productive dialogue on the pedagogies, uses, and abuses of history in relation to the conflict. The Association has not only created a network across the divide to transform the polarized histories and divided narratives of the conflict, but has also initiated a project to create a physical space – ‘A Home for Cooperation’ – to facilitate peacebuilding projects by civil society. The project is based on the conviction that the major obstacles faced by civil society in Cyprus are the limited infrastructure for multi-communal activities and the lack of skills in identifying and securing institutional support. The effort is supported by a number of international donors.

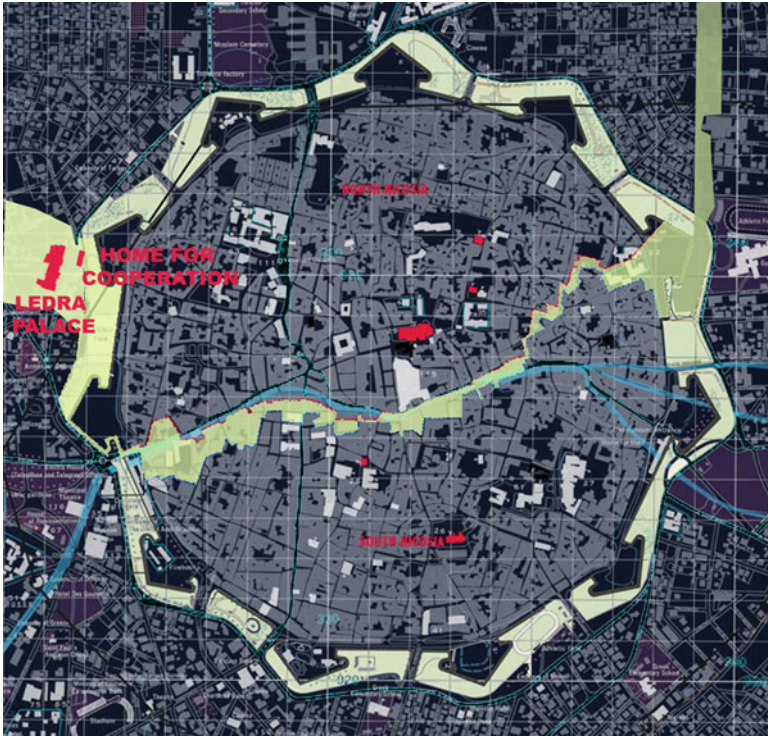
The building that will house the Association was constructed in the 1940s and will be renovated to host exhibitions, archives, research, training, and public events. Located in a symbolic space close to the Venetian Walls and opposite Ledra Palace – a former hotel built during colonial times, which is now used by the UN – it will act as a catalyst to reactivating an abandoned area of Nicosia’s Dead Zone. Over the years, Ledra Palace has become a space for many of the bi-communal meetings, including the numerous international talks aimed at finding a solution to the political situation. Before the opening of multiple checkpoints in 2003 and of the Ledra Street



**Fig. 33.3** Aerial view of the Skouriotissa and Lefke Copper Mines on either side of the *Green Line* (Photomontage: Anna Grichting)

crossing in the heart of Nicosia in 2008, Ledra Palace checkpoint was the only crossing point in Nicosia reserved for pedestrians, UN personnel and diplomats.

Friends of Nature Cyprus (the Cypriot partners of the Green Line Vision project mentioned above) will be one of the tenants of the Home for Cooperation. Within the general concept to transform the Buffer Zone into a backbone for ecological planning in Cyprus – which includes preserving biodiversity, developing ecotourism and organic farming, addressing water issues and storm water management, and creating landscapes of memory for the victims and missing persons – it is also envisaged to create a Green Building Code for landscape, urban planning and constructions within the Buffer Zone. By applying these codes, the project for the rehabilitation of the building and surrounding landscape for the Home for Cooperation can become a catalyst for the implementation of the Green Line project. For example, a green roof could be combined with water-collecting devices and the building could further be adapted with water and energy saving devices as well as for showcasing and promoting different aspects of recycling. The surrounding landscape will be designed with plantings that become part of a healthy environment, requiring



**Fig. 33.4** Map of the Walled City of Nicosia with the Venetian Walls and Green Line Buffer Zone, indicating the location of the Home for Cooperation and the Ledra Palace (Map: Anna Grichting)

little water, fostering biodiversity, as well as providing shade for the public spaces. In this way, the area surrounding Ledra Palace could remain a site of unique historical importance for peacebuilding activities in the future, as well as becoming an incubator for the Green Line Vision project (Fig. 33.4).

### ***The Nicosia Master Plan: A Precedent for Collaborative Planning and a Model for the Green Line Vision Plan***

Verdant nature and endangered species offer one form of resilience to the negative effects of the division. Another form of resistance is provoked by the topography, that is, the natural slope of the terrain, which affects the flow of water and waste both over and underground. The free and fluid movement of water and sewerage, like nature itself, disregards the dividing line, coercing both sides to collaborate on the development and maintenance of these vital infrastructures, thereby creating a co-dependent system.

The Bi-Communal Nicosia Master Plan is a unique and award-winning example of collaborative planning in a divided city. It originated from a project to resolve the sewerage problem and evolved to become a plan for the rehabilitation of the walled city. The plan emerged from the realization that it was impossible to plan and intervene on the sewage network of the entire city without the technical cooperation of both sides. The Master Plan was initiated in 1979 by the two mayors of North and South Nicosia, Lellos Demetriades and Mustafa Akinci respectively, and was born from an ambition to overcome the politics of division despite the continuing difficulty of establishing formal relations between the administrations of both communities. With funding from the United Nations and the European Union, the plan evolved to include the renovation of public and religious buildings (mosques, churches, markets, caravanserais) and the rehabilitation of two neighborhoods situated along the Green Line – an Ottoman neighborhood in the Turkish sector and a traditional Greek neighborhood in the Greek sector – as well as the complete restoration of the Venetian Walls surrounding the city.

Peter Hocknell, in his analysis of the Nicosia Master Plan, concludes that in order to move forward with cooperative projects, it is important that they can be elaborated in spaces that are extracted from the dominant ideologies and dogmas of either side, in areas of common issues (Hocknell et al. 1991). Hocknell posits the concept of superordinate goals (put forward by Mazerfer Sherif in 1958) that are compelling and highly appealing to members of two or more groups in conflict, but cannot be attained by the resources and energies of the groups separately (Sherif 1958). Superordinate goals differ from common goals, in that common goals can be achieved unilaterally. Hocknell suggests that technical, environmental, or economic cooperation may further develop in Nicosia and envisions the potential for this cooperation to spill over into political peace.

### ***Greening the Dead Zone: A Pathway to Reconciliation***

The proposed Vision Plan for the Green Line addresses the current environmental challenges that face the island of Cyprus, which include water pollution, water scarcity, coastal degradation and loss of wildlife habitats, amongst other – all of which could be articulated as superordinate goals (as described above) and which, it is hoped, will also build bridges and pathways to sustainable peace. Our proposal – to make the Green Line Greener – engages multiple stakeholders and civil society, harnessing existing environmental and cultural initiatives that are emerging from the ground up, that is, from the natural resilience of the landscape as well as from a bottom-up collaborative process involving the communities on both sides. The project will also seek to remediate the negative developments in the boundary zone, which include landmines, abandoned structures and copper mines, and aspires to preserve the positive developments in the Buffer Zone, in particular in the preservation of endangered species. In doing so, it seeks to provoke a shift from the narratives of



disputed land rights to common issues of preserving the environment, thereby acting as a catalyst for the reintegration of the divided communities. As a backbone for the reconstruction and reconciliation process, it could become an opportunity for innovative environmental landscape and urban design and offer sites for the establishment of new organizations and institutions that will participate in overcoming the psychological rift. Building on environmental regulations that are being enforced by the European Union, it could benefit from international funding aimed at encouraging sustainable practices and policies.

## Conclusion

In view of the many competing and diverging territorial claims that continue to divide the Cypriot population, the feasibility of a proposal for an ecological corridor and landscape of memory along the Green Line may be questioned. The question of land ownership will be one of the major obstacles. It is necessary to develop policies and instruments to implement the plan and that anticipate a future solution. In the event of a reunification, the forces of real estate will rapidly engulf the parcels of the Green Line. Such policy instruments include an Ecological Survey and Habitat Mapping as well as a plan for future Land Use in the Green Line that will project the future ecological and commemorative activities. One of the strategies put forward for the Korean Demilitarized Zone in the event of a reunification is to freeze development over a period of time in order to conduct the necessary research and develop an appropriate plan. Amongst the tools of urban and environmental planning, eminent domain is an instrument of expropriation that can be applied to acquire land for public works and this would require that the environmental qualities of the Green Line be valued as a public good. Friends of the Earth Germany have recognized that land purchase is one of the best ways to protect habitats from destruction in the long run and they have started to buy unique habitats that can be bought from private owners through a system of Green Share Certificates. For example, to this day, around 280 ha of the German Green Belt have been purchased through Green Share Certificates by more than 10,000 people, who have become symbolic shareholders of the German Green Belt (IUCN).

Continued comparative research as well as international and local collaborations can bring the necessary knowledge and tools for the implementation of this project for the Greening of the Dead Zone. This red zone is envisioned as a *boundary in movement*, as a future *landscape of memory in becoming*. Today, the Green Line stills exists – as a rift of division and past traumas – and we are proposing a vision of its transformation into a corridor of biodiversity and a space of reconciliation. This process of visioning a new landscape of peace is seen as a contribution to the building of capacity, trust, and forgiveness, and as a green light for the future of this red zone of conflict, bringing new life to the Dead Zone of Cyprus (Fig. 33.5).



**Fig. 33.5** Visions for the future of the Green Line. Nicosia Airport Solar City (Concept and Photomontage: Anna Grichting)

## References

- Ali, S. H. (2003). Environmental planning and cooperative behavior: Catalyzing sustainable consensus. *Journal of Planning Education and Research*, 23(2), 165–176.
- Butor, M., Jacomino, C., et al. (1989). *Frontiers*. Birmingham: Summa Publications.
- Cilliers, J. (2008). *Rehabilitation of abandoned mines and quarries*. Cyprus: UNDP ACT Action for Cooperation and Trust.
- Conca, K., Carius, A., & Dabelko, G. D. (2005). *Building peace through environmental cooperation*. New York/London: W.W. Norton & Company.
- Grichting, A. (2006). *The green line of Cyprus: Human development and reconciliation through environmental cooperation*. Cambridge: Harvard Program on Conflict Research HPCR.
- Grichting, A. K. (2008). *Boundariescapes: Recasting the green line of Cyprus*. Thesis, Graduate School of Design. Doctor of Design Program, Harvard University.
- Grichting, A. (2009). The Korea DMZ. A ready-made Paradise Park or a laboratory of ecological planning? *SPACE Magazine*, 494, 16–21.
- Gucel, S., Charalambidou, I., Bayram, G., Karatas, A., Ozden, O., Soyumert, A., & Fuller, W. (2007). *Monitoring biodiversity of the buffer zone in Cyprus*. Cyprus: Near East University.
- Halle, M., Mathew, R., & Switzer, J. (2002). *Conserving the peace: Resources livelihoods and security*. Winnipeg: IISD Publications Centre.
- Hocknell, P., Calotychos, V., & Papadakis, Y. (1991). Introduction. Divisive cities, divided cities: Nicosia. *Journal of Mediterranean Studies. History, Culture, Society in the Mediterranean World*, 8(2), 147–168.
- IUCN. *European Green Belt*. Retrieved February 14, 2010, from [http://europeangreenbelt.org/001.route\\_ce.html](http://europeangreenbelt.org/001.route_ce.html).
- Laona. (2009). *The Laona foundation for the conservation and regeneration of the Cypriot countryside*. . from <http://www.conservation.org.cy/laona/laona.htm>.

- Peluso, N. L. (1993). Coercing conservation: The politics of state resource control. In R. Lipschutz & K. Conca (Eds.), *The state and social power in global environmental politics*. New York: Columbia University Press.
- Schlumprecht, H. (2007). *Habitat inventory of the German Green Belt*. Retrieved 3 May, 2010, from <http://www.europeangreenbelt.org/003.local.004.html>.
- Sherif, M. (1958). Superordinate goals in the reduction of intergroup conflict. *The American Journal of Sociology*, 63, 349–356.
- Uludag, S. (2007). *Oysters with the missing pearls*. Cyprus: İkme Bilban publishing House.
- Varnavas, P. (1998). *The common labour struggles of Greek and Turkish Cypriots*. Nicosia: Pancyprian Federation of Labour.

## Chapter 34

# The Berlin Wall Trail: A Cycling and Hiking Route on the Traces of Berlin's East–West Division During the Cold War

Michael Cramer

**Abstract** In this final short chapter, European Parliament Member Michael Cramer describes the greening of the Berlin Wall. Working together, citizen volunteers, NGOs, and governments have transformed the former ‘death strip’, a dramatic and enduring symbol of the divisions brought about by the Cold War, into a site of natural beauty and reconciliation. The Berlin Wall may well be one of the most emotion-charged structures built in the twentieth century. Not only did it cleave one of Europe’s great capitals in two – the Wall stood as a concrete symbol of the world’s division into two opposing blocs. Today its remnants remain a memorial against violence, tyranny and the abuse of power, and as a warning to future generations never to forget the price Europe paid for its Cold War division. The Berlin Wall Trail, a cycle trail running along the former division line, presents an excellent combination of history workshop and bicycle tourism, green urbanism, recreation and culture. The trail serves as a reminder of the city’s division, and its reunification, stressing the importance of sustainable (urban) mobility and community involvement in greening.

**Keywords** Sustainable mobility • Active memorial • Berlin wall • Green urbanism • Recreation and culture

The Berlin Wall may well be one of the most emotion-charged structures of the twentieth century. Not only did it cleave one of Europe’s great capitals in two, it also stood as a concrete symbol of the world’s division into two opposing blocs. Today its remnants stand as a memorial against violence, tyranny and the abuse of

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M. Cramer (✉)  
European Parliament, Greens/European Free Alliance,  
ASP 08 G 104, 60, Rue Wiertz, B-1047 Brussels, Belgium  
e-mail: michael.cramer@europarl.europa.eu

power, and as a warning to future generations never to forget the price Europe paid for its Cold War divisions. A bicycle and hiking trail running along its length, the Berlin Wall today is a genuine ride or walk through history, culture, nature and politics.

## From a Death Strip to Urban Greening

After the fall of Communism, citizens groups, teachers, environmentalists, and young people joined in transforming the Cold War symbol of death into an urban green corridor. One such group, the Teltower Slab Environmental Initiative, planted hedges and fruit trees and cleaned-up Hertha Pond. Germans were supported in their efforts by the Japanese, who presented 800 cherry trees to the German people for planting along the Wall 'out of joy over the German reunification' (Fig. 34.1).

Whereas after the end of the Cold War, many people simply wanted to forget the division of Berlin and erase all of its traces, some Germans understood the importance of remembering rather than repressing their history. Teachers Marian Przybilla and Helga Garduhn, together with their students and local residents, campaigned successfully to stop the Wall's border tower from being torn down and to ensure that natural habitats were restored around the tower. This campaign also resulted in over 80,000 trees being planted in the border strip (Figs. 34.2 and 34.3).



**Fig. 34.1** Cherry trees in the former border strip in Lichterfelde-Süd. Thanks to the greening efforts of citizens groups, today's young Berliners can cycle through history and nature



**Fig. 34.2** Deutsche Waldjugend guard tower in 1989. In order for the guards to have a clear line of sight in which to fire their weapons, the border strip was leveled



**Fig. 34.3** Deutsche Waldjugend guard tower in 2002. Two teachers from East and West Berlin were recognized for their work to preserve the Tower by the German Federal Cross of Merit. A sign on the tower reads: 'A tower you can touch. After ten years the one-time death-zone has turned into an oasis'

## **Experiencing the Berlin Wall Today**

When people talk about the Berlin Wall, they usually mean the 40-km border that ran through the middle of the city, dividing it into East and West Berlin. In fact, the Berlin Wall was much longer and includes the 120-km long border between West Berlin and -what is today- the surrounding state of Brandenburg .

Today, the rural stretch of the Trail winds through pleasant countryside and woods, and can readily be explored by bicycle. It takes one to the longest remnants of the original Wall, the 1,300-m 'East-Side-Gallery', and to Bernauer Straße, where the 1.5-km long central memorial stretches out over a wide area. There you can see the old path of the soldiers in the death strip, a watch tower, an information center, and a wonderful new park occupying the site of the old train station.

Along the Trail one also discovers past oddities like the ice cellar in Spandau; the border crossing at Staaken; or Wall Park, an enclave surrounded on three sides by the Wall where people congregate for music, parties, and flea markets on weekends. You can feel a breath of Cold War intrigue at Glienicker Bridge, where the occupying powers traded captured spies on fog-shrouded nights, or examine the remains of the largest border crossing complex, the Dreilinden Autobahn entrance to Berlin, which is now preserved as an historic site.

To commemorate the 40<sup>th</sup> anniversary of the Wall's construction in 2001, I began to lead guided bicycle rides along the Wall. The public reaction to these tours was very positive, and prompted the city government to put all remaining traces of the Wall under historic preservation status, as well as to build a bicycle-friendly marked trail the length of the one-time border. A published guide to the Trail helps bicyclists as well as hikers experience their conflicted history.

Today, the 160-km route consists of 19 sections, each of which begins and ends at a public transport station. Bicycles may be transported on all regional public transport. Thus, in addition to serving as a reminder of Berlin's division and its peaceful reunification, the Trail also is a demonstration of sustainable urban transportation.

## **Connecting East and West: A Sustainable Vision for the Future**

The current state of the former border strip sharply contrasts with its appearance during the Cold War. Where once the grey Wall with its barbwire and sentinels stood, today there is a corridor of paths and green parks. The gradual greening of the former division line plays an essential role through its integration of history, green urbanism, recreation, and culture. It is not only a symbol of Berlin's transformation, but also helps Berliners reintegrate what could have become a waste area into the city, as a living space and connecting element between East and West. The trail contributes to overcoming the painful past of Berlin, without merely forgetting history. Moreover, by fostering sustainable transport such as

cycling and walking, it also enhances the health of the inhabitants. Finally, the Berlin Wall Trail has become one of the most appealing assets for tourism in Berlin, combining leisure with a city tour.

The Berlin Wall Trail proves that past and future can meet in a way that helps overcome former divisions and sustains the ecological transformation of our cities. The transformation of the land occupied by the former death strip helps to heal the scars of the past and to remember the overcoming of division through the peaceful revolutions in Central and Eastern Europe. The Trail represents not only a source of healing through greening of a formerly highly fortified site, but also an attractive and sustainable vision for the future.



# Chapter 35

## Synthesis and Conclusion: Applying Greening in Red Zones

Keith G. Tidball, Elon D. Weinstein, and Marianne E. Krasny

**Abstract** The authors posit that the critical question for the post-disaster and post-conflict policy-making community may be whether their actions foster or inhibit individual and societal expressions of urgent biophilia and restorative sense of place. The authors argue that inhibiting such expression may aggravate a disaster or conflict scenario, whereas the evidence presented in the case studies in the book *Greening in the Red Zone* suggests that fostering such expression releases a series of cascading effects whereby humans rebuild a sense of personal equilibrium, restore and reconcile their place in the ecosystem, create anew a sense of community and of place, and put into motion the first steps toward restoring a healthier social-ecological system. The authors call upon policy makers to consider the role of participatory natural resource management—or of greening—in responses to disaster and conflict.

**Keywords** Social-ecological system resilience • Post-conflict and post-disaster policy • Path dependencies • Greening

*Co-editors Keith Tidball and Marianne Krasny join development expert Elon Weinstein to present an overview of the lessons learned through this collection of greening in the red zone real-life examples and research-based explanations. Focusing on policy makers, they recommend broadening planning perspectives to*

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K.G. Tidball • M.E. Krasny  
Civic Ecology Lab, Department of Natural Resources, Cornell University,  
118 Fernow Hall, Ithaca, NY 14853, USA  
e-mail: kgtidball@cornell.edu; mek2@cornell.edu

E.D. Weinstein (✉)  
International Sustainable Systems (IS2),  
615 Princeton Place NW, Washington, DC 20010, USA  
e-mail: elon@is-two.com

*encompass human-nature relations, sense of place, and systems thinking, and engaging in new forms of governance that leverage existing local assets to foster resilience and recovery in post-catastrophe and slow-decline settings.*

## Introduction

Former US president Theodore Roosevelt, who understood trees and wild spaces as vital to the well-being of people and of a nation, once said: ‘A people without children would face a hopeless future; a country without trees is almost as hopeless’. Political leaders in Japan following the Second World War similarly recognized the importance of nature to a nation’s identity and resilience—in particular as part of the rebuilding process following the devastation of war. They initiated a national program to remove the ghost-like skeletons of trees that were a reminder of the horrors of armed conflict (Lifton 1991 [1969]), as well as to preserve surviving trees and to plant new ones (Cheng and McBride, Chap. 18, this volume). Despite these examples and related arguments by scholars writing about conflict and the environment (see Dabelko and Conca 2002; Machlis and Hanson 2008), in most cases policy makers dealing with conflict have expressed little interest in trees or other green infrastructure, except perhaps as a commodity (Jonnes 2011). Thus, in this final chapter we address two questions: What challenges do members of the policy-making community face in considering green infrastructure, and perhaps more importantly the *act of greening*, as components of recovery efforts following war, disaster, or other sudden and large-scale perturbances? How might the policy-making community concerned with post-disaster and post-conflict apply the lessons of *Greening in the Red Zone*?

We begin by applying earlier discussions of social-ecological system resilience and feedbacks (Tidball and Krasny, Chap. 2, this volume) to build a visual conceptualization of greening in red zones that may prove useful for the policy-making community in understanding barriers to adopting greening policies. By policy-making community, we refer broadly to the elected officials, institutional policy makers and planners, policy implementers or bureaucrats, and members of the host community coming from the government, NGO, and private sectors. Next we describe how the nature of policy-making communities and their associated path-dependencies and institutional patterns of behavior make approaching greening in red zones challenging, while offering insights from the chapters in this volume into how these barriers also provide opportunities for the policy-making community to facilitate such greening. In the subsequent sections, we summarize key findings from the synthesis of the chapters in this volume, and then turn to recommendations for the policy-making community related to using greening as a tool—or as an especially useful ‘arrow in the quiver’ of strategies employed—for recovery and rebuilding in red zones. We conclude with several suggestions for future research on the importance of human-nature relations in red zones, and more broadly in the evolving human security discourse.

## Visualizing Greening in Red Zones: Systems Implications

Given that social-ecological systems experiencing disaster and conflict can be resistant to further change, one cannot expect that single actions such as greening will enable a system to rebuild following a major disturbance. The social-ecological systems resilience framework (Chap. 2, this volume), and in particular notions about vicious and virtuous cycles or feedback loops (Gallopín 2002; Powell et al. 2002; Matthews and Selman 2006; Selman 2006; Tidball and Krasny 2011), are helpful in identifying barriers to change but also opportunities that can be leveraged for transformation (Fig. 35.1). Such cycles represent interactions that are typically self-sustaining and reinforce one another. If their direction of influence is negative, they are considered vicious cycles, and if their direction is positive, they are known as virtuous cycles (Varis 1999).

Poverty traps (also referred to as lock-in traps, see Allison and Hobbs 2004) can be considered a type of red zone system characterized by vicious cycles of poverty leading to crime and environmental degradation, which in turn foreclose economic development and other opportunities. However, it is within these same impoverished red zones that communities sometimes ‘self-organize’ to restore crime-ridden and degraded vacant lands, transforming them into community gardens and parks, which become sites that foster social capital and provide ecosystem services (Bolund and Hunhammar 1999; Shava and Mentoor, Chap. 6, this volume; Barthel et al. 2005). Such self-organized community greening, or ‘civic ecology’ practices (Tidball and Krasny 2007; Krasny and Tidball 2010), may be one among a number of factors that help to ‘flip’ these systems from a vicious cycle of red zone induced decay into a more virtuous cycle of recovery and rebirth (Tidball and Krasny 2008).

In the parlance of resilience scholars, vicious cycles (Gallopín 2002) represent one stable state within a landscape at a given moment in time (see Beisner et al. 2003). Any one landscape contains other possible stable states, such as virtuous cycles of people creating or restoring green space, leading to greater access to nature and community and ecosystem well-being, and setting the stage for further greening activity (Tidball and Stedman 2013; Tidball and Krasny 2008, 2011). Depicted in another way, a vicious cycle can be imagined as a ball that is constantly swirling around one basin within a larger landscape (for a detailed discussion of ‘ball and cup’ depictions of stability landscapes, see Pawlowski 2006); the goal of a policy maker is to move that ball to a different basin that represents a virtuous cycle (Fig. 35.2). To allow the ball to enter a different basin requires either making changes within the basin, or allowing the ball to move to a new basin by changing features of the landscape so that barriers between the two basins are lower (see Scheffer et al. (2001) and Walker et al. (2004) for a more thorough description of stability landscapes and basins of attraction). Most of the chapters in this volume speak to changing the conditions within a basin, for example by increasing the magnitude of the stewardship activities in a conflict-ridden neighborhood. In this chapter we address how planners and policy makers might develop policies that could shape the barriers between the vicious and virtuous basins of attraction to ensure that the system is able to adapt, and then adopt conditions of a desirable state.

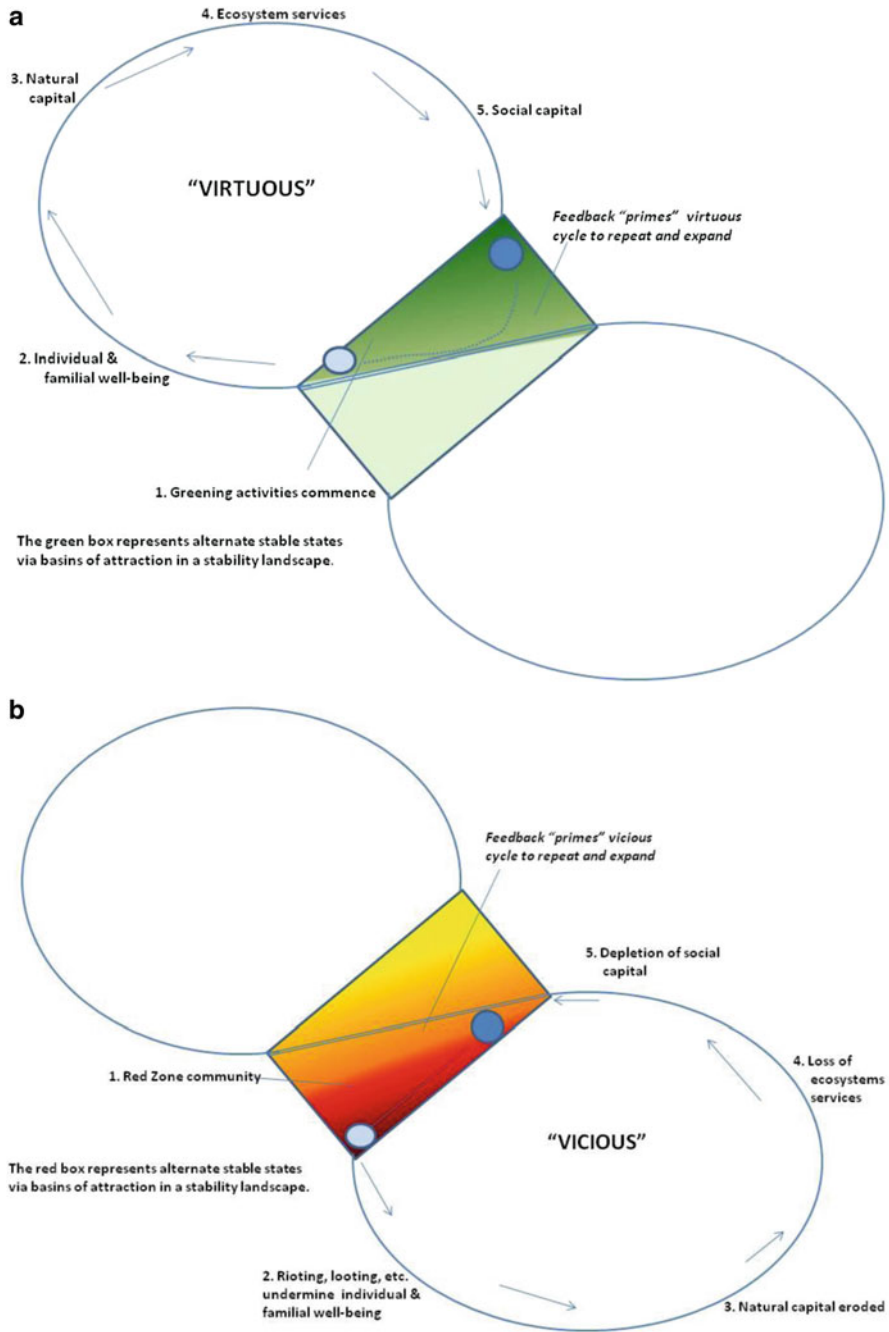
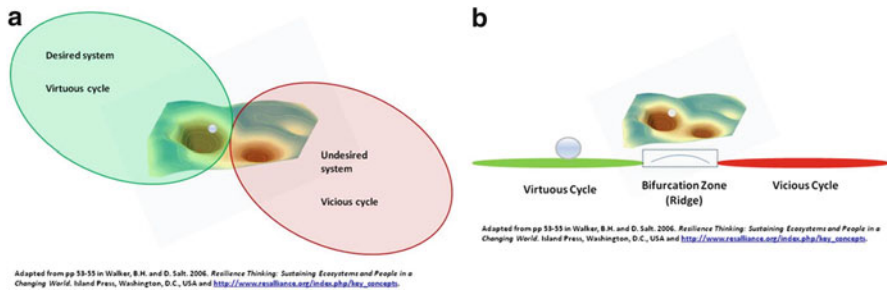


Fig. 35.1 Virtuous and vicious cycles, adapted from Tidball and Krasny, 2011



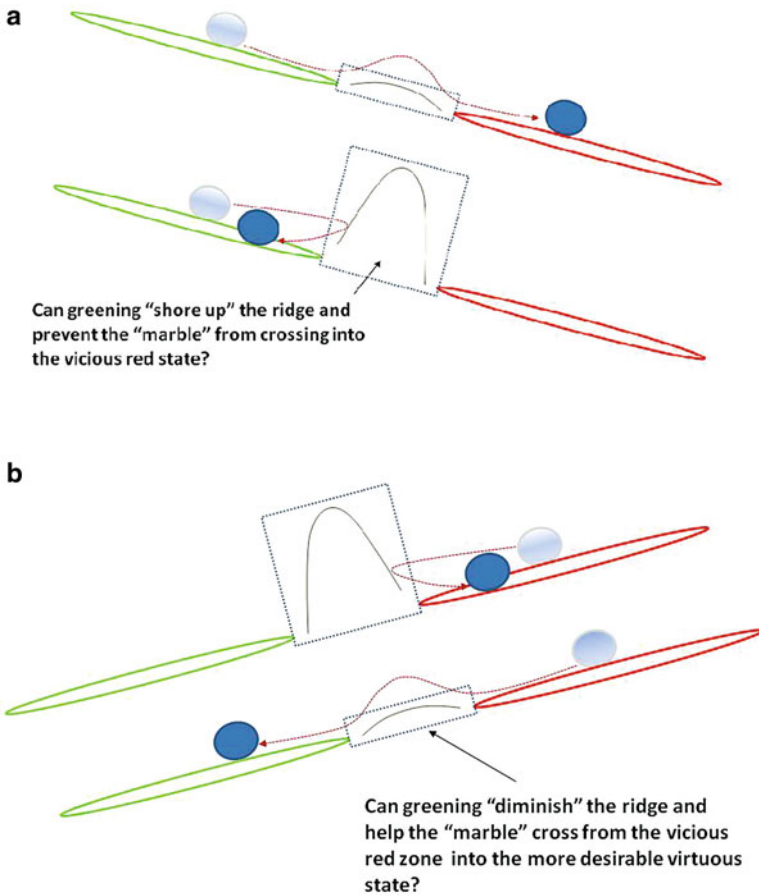
**Fig. 35.2** Virtuous and vicious cycles viewed as ball and cup diagrams

How might one change the landscape to lower barriers between the red vicious and the green virtuous cycles? One can envision a ‘ridge’ or bifurcation zone (Scheffer 2009) separating the two cycles or basins. Then one can envision that by reducing the height of the ridge, it becomes easier to move the ball from the vicious cycle to the virtuous cycle basin. Conversely, shoring up the ridge might prevent the ball from moving from a virtuous greening cycle to a vicious cycle of degraded green space and crime. In this metaphorical model, the ridge could represent legal barriers, unfavorable public opinion, competition for scarce resources, or as is central to this chapter, absence of a policy framework that fosters greening practices. Altering the ridge might require a change in government or NGO policy or an influx of money or other resources from outside the vicious cycle (Fig. 35.3). Changes in government policy or resources may be dependent upon the discovery of evidence in support of the value of greening practices in these contexts.

When viewed from this perspective, it becomes increasingly more difficult to envision greening in a red zone acting alone to overcome the ridge that separates the vicious from the virtuous cycle basin. Hence the importance for policy makers to become aware of the value of greening strategies and their application in red zones, and to adopt a social-ecological systems view that attempts to ascertain how such strategies can work in consort with other initiatives attempting to tip the balance—that is, to reduce the barriers to crossing from resistant vicious to more virtuous feedback cycles within perturbed systems.

## Changing the Policy Landscape: Challenges and Opportunities

Similar to how social-ecological systems can be resistant to change, the policy-making ‘system’ itself may be subject to its own resistant feedbacks. Thus, one might envision a particular policy-making community as either a sub-system or ‘basin’ characterized by certain features within a larger landscape of multiple policy



**Fig. 35.3** Maintaining barriers to vicious states, and reducing barriers to transition to virtuous states, adapted from Tidball and Krasny, 2011

options or basins, or as a meta-system itself containing multiple options or basins. As is the case in social-ecological systems, barriers to moving from one policy option to another—to crossing the ridge separating policy basins—are not easy to overcome (Fig. 35.4).

Keeping this metaphor in mind, and following Pelling (2007) who has described feedback cycles as both ‘opportunities and barriers to building adaptive potential’ in red zone contexts, we outline five barriers that limit rethinking of post-disaster policy options to incorporate greening, as well as how the insights garnered through the chapters in this volume might help address those barriers. These barriers—and related opportunities for rethinking policy options—fall into the following general categories: understanding human-nature relationships and the importance of place, understanding systems thinking, finding the right vocabulary, developing a culture of open-mindedness and attention to locally derived solutions, and embracing new forms of governance.

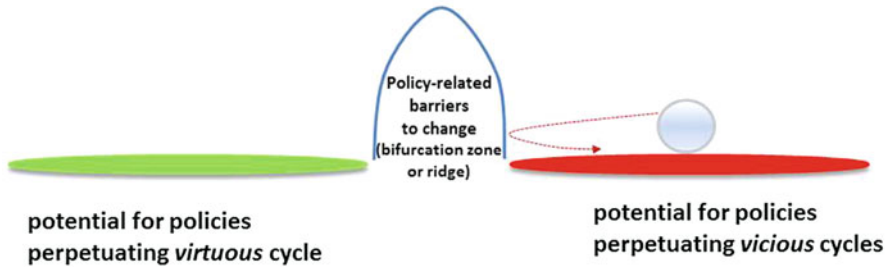


Fig. 35.4 Policy barriers as ridges in a ball and cup diagram

### *Understanding Human-Nature Relationships and the Importance of Place*

This volume makes a clear case that humans are of, and part of, nature. This view is in contrast to notions of humans as being exempt from universal rules governing ecosystems—i.e., as a distinct group of beings who are outside of and have complete control over nature. Further, the chapters by Wells (Chap. 7), Okvat and Zautra (Chap. 5), and Tidball (Chap. 4) present research-based evidence for the healing power of nature, and Tidball goes one step further by explicitly linking psychological, sociological, and cultural understandings with biological, physiological, and genetic explanations for why humans might turn to nature in red zone times and places. Whereas humans engage with nature in a variety of ways during taxing times (see Krasny et al., Chap. 13), the *act of greening* in whatever form, whether planting trees or producing food, recreating wildlife habitat or restoring wetlands, is a further means of experiencing the healing potential of interacting with the rest of nature.

Moving from individuals to local communities, Stedman and Ingalls (Chap. 10) argue for the importance of attachment to places—or tophophilia—in the well-being of red zone and other communities, and importantly, in the willingness of people to participate in greening and other civic renewal activities (see also Tidball and Stedman 2013). Whereas civic renewal efforts centered on rebuilding the physical infrastructure play an important role in red zone communities (Kelling and Coles 1996; Vale and Campanella 2005), greening efforts go one step further by integrating the psychosocial aspects of humans' relationship with nature with other components of civic engagement. Greening also may reinforce or restore a positive sense of place through such mechanisms as providing continuity with past customs and values related to growing vegetables, herbs, and trees (e.g., of rural people who have moved to cities, see Shava et al. 2010; or of people in small, recently industrialized villages seeking to recreate village groves, see Lee, Chap. 12, this volume).

Yet, people's relationship to nature and to place is largely absent from the policy conversation despite the paramount role it plays in the psychology of residents and the success or failure of virtually all efforts in troubled regions. The policy-making

community has a tendency to focus on things and people, deemphasizing relationships, and often ignoring the value of place. The implications of these tendencies for policy and program design are profound.

The notion of ‘broken windows’ (Wilson and Kelling 1982) is critical in this regard, and offers potential for bringing greening into the policy conversation. Broken windows describes a situation where government and communities disinvest in places lacking orderliness, starting with smaller blights or incivilities such as broken windows or litter that no one bothers to repair or pick up, and leading to loss of pride in one’s community, crime, degraded green space, and eventually red zone vicious cycles even in the absence of a sudden large perturbation. This notion may have informed Mayor Guiliani’s thinking in launching his successful efforts to restore safe neighborhoods in New York City, which started with simple yet symbolic acts such as arresting people who skipped over subway ticket booths (Gladwell 2000). Although one person not paying the subway fee, carelessly littering, or breaking a window may seem inconsequential compared to serious crime such as assault or robbery (all of which plagued NYC’s subway system in the 1990s), each small act is symbolic of how people treat their place, and small acts can lead to disinvestment, uncaring, and even despair. Thus the importance of *Fixing Broken Windows* (Kelling and Coles 1996).

Yet Guiliani’s and other ‘fixing broken windows’ policies have focused nearly exclusively on reinstating public order and on repairing man-made structures and symbols of urbanism, while overlooking community capacity, green infrastructure, and acts of greening. The famous ‘drive-by’ videos of Felton Earls and colleagues in Chicago (Earls et al. 1995) originally identified concentrated poverty and collective efficacy as two factors necessary for successful neighborhood efficacy (Sampson et al. 1997). Later, in an interview with the *New York Times*, Earls commented specifically on how the presence of community gardens and the collective efficacy cultivated in them might be associated with fewer broken windows and other incivilities and with lower incidence of crime, and went on to say that the greatest influence in ameliorating red-zone like conditions may be neighbors’ willingness to act, when needed, for one another’s benefit, and particularly for the benefit of one another’s children (Hurley 2004). Earls further suggested that rather than focusing on arresting perpetrators of petty crimes, local governments should support the development of cooperative efforts in low-income neighborhoods by encouraging neighbors to meet and work together, and that cities that sow community gardens ‘may reap a harvest of not only kale and tomatoes, but safer neighborhoods and healthier children’ (ibid). Earls’ insights challenge the dominant urban renewal policy paradigm focusing exclusively on order and the built infrastructure. The chapters in this book provide an explanation for how the community gardens that Earls references, along with the crucial greening acts behind those green spaces, could play a role in reducing crime and other red zone conditions. In particular, how the psychosocial components of greening contribute to its meaning and to its effectiveness in mitigating red zone conditions are captured in the notions of biophilia, urgent biophilia, and topophilia, and in the myriad empirical studies of the cognitive, emotional, and social impacts of green space and greening reviewed in this book.



Paramount to greening as a means to ‘fix broken windows’ by investing in collective efficacy is the role that place plays in the identity of community members and of entire communities. Although creating an identity through association with place, as captured in the notion of topophilia, need not explicitly include greenness, the added existential quality of greening brings with it an unusual power to positively affect the psychology of those involved, precisely because it reaches something fundamentally present in the human psyche. Further, greening *reinforces* and *restores* a sound sense of place. This occurs not only through reinforcing a fundamental human connection to nature but also through ‘remembering and reifying’ past traditions related to use and stewardship of green space (Tidball et al. 2010). Thus, for individuals and for communities, including those that have been incrementally decaying over decades and sinking into the complete chaos of the red zone, continuity with the past is rebuilt, and a sensation of the unbroken created, through greening. The ‘brokenness’ is undone and a sense of balance returns to a community.

Time and time again, whether with civilians in war zones, criminals in prisons, children in playgrounds, or soldiers with post-traumatic stress syndrome trying to reintegrate into civilian life, greening reaches a deeply buried chord that can promote personal healing, as well as provide vast opportunities to bring people together by making explicit the shared relationship to nature and the act of greening. Further, greening heals the *place* as well as the people in it. Such greening can be for food security in West Africa or aesthetic qualities in Japan, or to ‘fix broken windows’ and rediscover collective efficacy in Detroit. Regardless, the rebuilding of place and self are part and parcel of the same enterprise, and the re-greening of a stricken environment by a stricken people is a path with special potential for helping to shift the landscape—or shaping the barrier between vicious and virtuous basins on a landscape.

### ***Understanding Systems Thinking***

The natural resources and international development policy-making communities have recognized past failures of single-objective policies that reflect so-called policy silos (Peirce 2009; Staley 2009) or stovepipe thinking (Johnson-Freese and Nichols 2011). Social-ecological systems perspectives, which emphasize the connections among people, their actions, and other components of the environment, offer a promising alternative (Berkes and Folke 2002; Folke et al. 2002). In particular, this literature highlights two fundamental aspects of a social-ecological systems approach to healing troubled or disaster-wrought people and places. First, the nature of post-disaster environments demands recognition that individual elements and processes within that environment have some relationship to each other, whether through feedbacks, networks, or some other mechanism. These systems are ecological not because they are green or natural—though they may be—but because they are characterized by layers upon layers of relationships that ultimately link the fate

of all parts of the system, importantly, including the people within them (see Kotov 1997; Luskasik 1998; Pei 2000; Carlock and Fenton 2001; Sage and Cuppan 2001; Tidball et al. 2008; Jamshidi 2009). Second, social-ecological systems are dynamic. As we have seen above and in the chapter on resilience (Chap. 2, this volume), the social-ecological systems resilience framework presents several heuristics, including the adaptive cycle, feedbacks, vicious and virtuous cycles, and basins of attraction, that help us to understand the nature of change and resistance to change in systems over time. An understanding that systems are dynamic, and that policies can be designed around expectations of change rather than of stability, is fundamental to social-ecological systems resilience thinking but has not yet been well integrated into planning nor applied by the policy community in post-conflict and post-disaster response contexts.

Thus, we hope this book will provoke the policy-making community to further explore, adapt, and apply systems thinking to red zone contexts. Vicious and virtuous cycles and basins of attraction provide an important heuristic for the policy-making community in developing an understanding of how dynamic processes reinforce each other—for the good and for the bad.

### *Finding the Right Vocabulary*

In contrast to the focus on dynamic systems among social-ecological systems researchers, the lexicon often used by government agencies and NGOs to describe development, disaster response, and conflicted theatres reflects a dominant view of these kinds of places as static. That lexicon, which is stamped into plans and evaluations, also overwhelmingly emphasizes conditions over characteristics. A condition, such as stability, describes how a place is doing at a given point in time, whereas a characteristic, such as resilience, expresses the nature of a person, place or social-ecological system over varying time and spatial scales (Werner 1995; Cutter et al. 2008). The problem with setting stability as a policy objective is that systems are highly dynamic, and their conditions are impermanent. Relative to dynamic characteristics such as resilience, stability is easier to understand, simpler to design for, and therefore more likely to find its way into operational plans. The 2007 surge of 20,000 US troops in Iraq is one of the most prominent recent examples of expending vast resources simply to alter conditions—to create stability—with limited consideration given to longer-term characteristics such as social-ecological system resilience. Such interventions run the danger of creating stable conditions for the short term, but causing a population to feel dependent, vulnerable, exploited and even oppressed, and thus setting the conditions for future violence.

This emphasis on stability rather than resilience, and the unrealistic treatment of stability as a permanent state, is symptomatic of a command and control mentality that imagines policy and programs directly steering a place and its people towards a final objective (Holling and Meffe 1996). In contrast, the greening examples in this volume suggest the presence of nascent processes of transformation—of initial attempts to break out of vicious cycles and move into more positive basins of attraction. Such

processes beg us to consider a different role for the policy-making community—one of catalytic enablers for locally-derived transformations that are already underway. Although examples from government agencies may be harder to come by given the prevalence of top-down approaches, they do exist. For example, in the chapter by Svendsen and Campbell (Chap. 25), the US Forest Service developed a national registry and other means to support self-organized greening efforts that emerged in communities across the US as part of the 9/11 healing process (Svendsen and Campbell 2005a, b). This example is notable in two respects. First, it was directed by the US Congress, the members of which may have more freedom than government bureaucrats to engage in ‘out of the box’ thinking. Second, the Living Memorials project was facilitated by a small, non-traditional and perhaps more flexible team of urban social scientists working within the larger bureaucracy of the US Forest Service. This and several other *Greening in the Red Zone* cases suggest how, at times and places where nascent efforts exist that have the potential to cultivate virtuous cycles on a landscape characterized by vicious cycles of violence and degraded spaces, the policy-making community can step back from top-down approaches and instead develop means of enabling self-discovered modes of healing and rebuilding. Such a shift in approach will require an expansion of the policy lexicon to incorporate notions of changing characteristics, self-organization, and resilience.

In this volume, we have started to propose a lexicon that may prove useful to the policy-making community interested in the role of human connections to nature in post-disaster and post-conflict rebuilding. This lexicon starts with the title of this book, greening in the red zone, and includes other concepts emerging in resource management and development contexts, including biophilia, urgent biophilia, topophilia, social-ecological systems, resilience, vicious and virtuous circles, basins of attraction, and asset-based approaches. Another attempt to create a new vocabulary is our previous work on ‘environment-shaping’. This work explores post-conflict and post-disaster planning that rests on five fundamental elements: (1) an asset-based rather than a deficit, gap, or needs approach; (2) a systems view of sustainability in the form of societal and physical feedback loops; (3) participatory methods throughout all aspects of planning; (4) an emphasis on locals’ perceptions as a key driver of policy and programming decisions; and (5) critical path-styled planning that focuses first on objectives, and only on sectors or other categorical sub-divisions of planning in the translation to implementation plans (Weinstein and Tidball 2007; Tidball and Weinstein 2011).

Further work is needed however. For example, what language can we use to describe how approaches consistent with greening in red zones could be used by a military that has been trained to depersonalize the enemy? And how might the media describe such efforts as important elements of security policy, rather than ‘touchy-feely’ human-interest story after-thoughts? Or how might development agencies depict systems thinking and learning from locally-derived solutions in their policy documents and hiring criteria? Developing such a vocabulary will help to transform sometimes implicit understandings of the importance of human-nature relationships felt nearly universally among humans, and from the evidence presented in this volume, into more explicit understandings and policies for multiple development scenarios.

## *Developing a Culture of Open-Mindedness and Attention to Locally Derived Solutions*

Despite the universality of human-nature connections, the role of nature in how people absorb shock and exhibit resilience in the face of dire conditions varies widely. All the cases presented in this book reflect the unique attributes of place—whether they be small-scale, local efforts such as the Martissant Park in Port-au-Prince (Chap. 3), coming together around greening amidst the fraying social structure of neighborhoods within Rotterdam (Chap. 29), or community forestry in the aftermath of a hurricane in New Orleans (Chap. 20); regional efforts such as collaborative wild-life management in Kenya (Chap. 28); nationally-significant initiatives such as tree-planting following war in Serbia/Herzegovina (Chap. 22) or Japan (Chap. 18); or cases transcending two nation-states such as the greening of the red line in Cyprus (Chap. 33) or of the Demilitarized Zone in Korea (Chap. 15). As such, they present opportunities for further learning about how greening efforts vary depending on place. Perhaps they also will stimulate seeking out other such cases, as well as attempts to understand their implications and potential for developing policies at the local, regional, and nation-state levels. In contrast, a culture that focuses exclusively on comparing cold statistics across different conflict or disasters settings without regard to context—such as numbers of deaths, number of injured, and number of rapes—may inhibit development professionals from considering greening in crafting approaches to healing a traumatized community. Such thinking also may lead the policy-making community to deemphasize relationships among people, between people and nature, and importantly between people and local place.

Further, members of the policy-making community sequestered in office buildings may not have opportunities to observe or take part in community greening activities and thus may not see greening as a local asset. One means to ground policy decisions in attention to place and to a role for greening is to draw on existing, and facilitate new connections to local place and nature, as well as with community, among members of the policy-making community. In one such effort, the US Secretary of Agriculture launched the People's Garden initiative, challenging all US Department of Agriculture (USDA) facilities across the US to implement a garden on-site or to become engaged with a local community garden. The response was overwhelming, perhaps reflecting a longing for engagement with nature and community. For example, within 45 min of sending an email calling for volunteers to help at the USDA headquarters garden in Washington DC, over 75 employees had responded, and within a year of launching the nationwide program, over 400 gardens had been established at USDA facilities (L Marquez, USDA, personal communication). Regardless of the agency for which they work, many government bureaucrats likely garden at home and are aware of the role gardening and other nature-based activities play in their everyday mental health and in recovery following personal hardship. Proponents of greening in red zones working in agencies and NGOs might leverage these social-ecological memories and draw on such activities and awareness to create a culture of understanding of the importance of the role of local greening in recovery and resilience.

In pursuing policies that leverage existing self-organized, place-based practices and local assets, development professionals will be forced to devolve substantial design control to recipients of aid, even as they fund such efforts. The ability of members of the policy-making community to trust those who they intend to help requires a willingness to accept risk, patience, and a substantial diminishment of ego as they take a step back and wait and see what green emerges from red, and how they can best reinforce the positives of what emerges. This entails asking what sorts of nascent transformations in social-ecological systems are already underway, and whether it is desirable to see that change continue. Further, it requires asking if, and what sorts of, interventions are in fact needed to move the marble in the direction of a different basin. This thinking is challenging, given the political pressure on development professionals for rapid progress coupled with limited resources, and thus we recognize the challenges they face vis-a-vis our calls for recognition and facilitation of self-organized practices and assets.

In cases where the policy-making community embraces locally-derived approaches to dealing with disaster, they also face issues related to balancing local and practical knowledge with specialized and technical expertise (Schipper and Pelling 2006). The chapter by Lačan and McBride (Chap. 22) provides an example of how the expertise of university scientists was incorporated into local efforts to replant a tree canopy following its devastation during the war in Sarajevo. Similarly, the chapters by Grichting (Chap. 33) and Winterbottom (Chap. 30) describe cases of university landscape architects working with community members to plan and implement greening projects.

The approaches we call for also place greater burden on potential recipients of aid, who are being called upon to act and to form more equal partnerships, rather than remain passive recipients of outside assistance. Such approaches require that local people recognize how much of their identity, health and resilience is dependent on nurturing their active relationship with nature. These approaches may also call on local people to engage in monitoring the results of their efforts, thus contributing knowledge as a kind of feedback that can be used in adapting resource management practices (Tidball and Krasny 2012). An important sign of resilience in a community and among individuals is the emergence or reemergence of healthy behaviors and relationships without prompting from outsiders, including actively engaging with nature. To green is a verb not a noun, and it is the *act* of greening, not just the bearing of witness, that reinforces self-sufficiency, sense of community, and attachment to place.

### ***Embracing New Forms of Governance***

For most of the greening in red zone cases in this volume, leadership comes from the non-government sector. NGOs provided leadership for Martissant Park in Haiti (the Foundation for Knowledge and Liberty or FOKAL), wildlife management in Kenya (Northern Rangelands Trust), and the village grove restoration efforts in Korea (Forest for Life). In other cases, university scientists played a lead role, as in

the reforestation efforts in Sarajevo (Laćan and McBride, Chap. 22, this volume), planning for the greening of the red line separating the two nations on the island of Cyprus (Grichting, Chap. 33), and planning and installing gardens in Guatemala and Bosnia (Winterbottom, Chap. 30). In some examples, such as the Korean village groves, NGOs leveraged community-driven efforts into a national movement (Lee, Chap. 12). Similarly, in Germany, grass-roots and NGO-initiated efforts received support from government and were transformed into a project—the greening of the Berlin Wall—of national and trans-national post-cold war significance (Cramer, Chap. 34). And in Russia, grassroots gardening efforts were recognized and further enabled by government, which granted the gardeners long-term leases to plots of land (Boukharaeva, Chap. 26). In cases that are early in their development, such as the self-organized greening efforts by veterans returning from Iraq and Afghanistan (Krasny et al., Chap. 13), the opportunity exists for NGOs and government to play a similar role in supporting and facilitating small local efforts, and in helping to create a national network of such efforts that provides opportunities for participants to share resources and learn from each other.

Nobel laureate Elinor Ostrom has referred to ‘polycentric systems’ of governance characterized by ‘multiple governing authorities at differing scales’ (Ostrom 2010), and a similar concept, ‘overlap in governance’, is one of 11 attributes of resilient systems outlined by Walker and Salt (2006). These notions reflect governance arrangements in many of the red zone greening cases in this book, where local residents, grassroots community groups, NGOs, government agencies, and sometimes university researchers form partnerships that span from neighborhood-scale greening practices to national and trans-national nascent networks and policies. For the policy-making community, this implies embracing new, more agile forms of *governance* in place of more rigid notions of *government*. An example of where this is already happening comes from the US Environmental Protection Agency, which has adopted a multi-institution partnership model, including partners that engage communities in hands-on stewardship, in addressing control of non-point source pollution and other intransigent resource problems where more adversarial and command-control regulatory policies have proven ineffective (Sirianni 2009). Such polycentric governance approaches that incorporate human-nature interactions could be expanded to encompass planning for and responding to red zone situations, and are consistent with the notion that multiple efforts acting in partnership are needed to reduce the barriers between vicious and virtuous basins on a landscape.

### ***Challenges and Opportunities Recap***

Resilience thinkers look to red zones and policy traps as opportunities for reorganization, rebuilding, and recreating—for shifting from approaches aimed at accommodation or adaptation to those aimed at transformations (Pelling and Dill 2010). One way to rebuild—and to potentially shift the landscape toward more virtuous cycles of environmental and community stewardship and well-being—is to seek

out, learn from, and leverage nascent examples of people connecting to place, and of local citizens engaging in greening as a means of personal, community, and ecosystem recovery. Healing traumatized communities is no easy or quick task, and the challenges posed to the policy-making community hardly make their position an enviable one; but what better place to address dystopian problems than in the places most in need of a hint of utopia? Policy makers at a higher level also can learn from cases where formal government, NGO, university and other partners in a polycentric system of governance have already joined together to facilitate greening in red zones. Recent scholarship on social-ecological systems resilience and human-nature relations, along with the cases and lexicon presented in this volume, present a starting point for rethinking approaches and helping to tip the policy landscape to a new way of acting.

## **Lessons Learned**

We now turn to a synthesis of more specific lessons learned through compiling this volume. We organize the lessons around the five barriers and related opportunities to changing the policy landscape presented in the previous section.

### ***Understanding Human-Nature Relationships and the Importance of Place***

#### **Greening Can Contribute to a Shared Sense of Identity and to Rebuilding Identity Post-crisis**

The notion of topophilia introduced in the chapter by Stedman and Ingalls, i.e., an attachment to or love of place largely garnered through experience, has important implications for post-disaster/ post-conflict rebuilding. Topophilia is something that virtually all of us experience, whether it is love for a forest grove, park, or the local bookstore or bar. Where topophilia incorporates nature as part of place, a more universal biophilia with potential evolutionary origins may play a role (Wilson 1984; Tidball, Chap. 4, this volume; Kellert and Wilson 1993; Kellert 1997a, b).

Place is often the basis for individuals' and a community's sense of identity, whether tied to a specific geographic location (e.g., Nigeria or New York) or the characteristic activities of a place (e.g., fishing, farming, or city dwelling). Several chapters help us to understand the degree to which topophilia and the act of greening play a role in defining, discovering, and rediscovering identity. These chapters also help us understand more about the *loss* of 'placeness' (Relph 1976), and the strong urge to regain a sense of place. In instances where a physical place

has been destroyed or reconfigured, self-identity can be severely challenged. This appears to be especially true for children (Blizzard and Schuster 2004). The act of rebuilding place therefore is not just about returning utility to the built infrastructure (Vale and Campanella 2005), but also about reconstructing self and community identity. Barthel and colleagues (Chap. 11) explore the implications of deep self-identification with place within the context of urban allotment gardens, whereas Hull (Chap. 19) and Tidball (Chap. 20) widen the scope of greening as part of rebuilding identity to include tree-planting in southeastern US cities, where live oaks are symbols of not only local place, but also of recovery and determination, and of re-birth.

In addition to rebuilding an internal sense of identity based in social memories of past environments and traditions, greening plays a role in reconstructing the actual physical and living environment following destruction due to war or natural disaster. In these cases, physical manifestations in the form of green spaces reappear as a symbol of identity not just for those actively engaged in greening, but also for those who passively witness such reemergence. Of particular relevance to the policy-making community, the reification of identity through acts of greening as rebuilding provides an important opportunity for members of a broader community to collectively discover ways in which a past identity is shared, and to reshape a new identity that is shared more broadly in the present (Tidball, Chap. 20; Hull, Chap. 19; Dark, Chap. 23, this volume). In the discovery of shared identity, and the shared process of building together and negotiating that identity, are the seeds of prevention of future internal conflicts, and a deepening resilience in the face of future traumatic events.

But just as shared place meanings and identity bind community members to each other, so differences in attributed meaning to the same place can lead to conflict. The city of Jerusalem, claimed by innumerable groups as exclusively central to their identity, is perhaps the most prominent example. Symbols such as trees and forests are sometimes used for less than benevolent purposes and can contribute to red zones rather than ameliorating them (Guha 1989; Fairhead and Leach 1996; Scott 1998; Cronon 2003; Prudham 2004). Again related to the Israel-Palestine territorial conflict are two dominant and highly symbolic treed landscapes—pine forests and olive groves (Braverman 2009). The pine tree is associated with Zionist afforestation of the Promised Land, while the olive tree symbolizes agricultural connections to the land long held by Palestinians (ibid). In his book *Painted Flags: Trees, Land, and Law in Israel/Palestine*, Braverman describes in great depth the story of trees through the narratives of military and government officials, architects, lawyers, Palestinian and Israeli farmers, and Jewish settlers, including cases of trees actually being targeted by military forces, removed, and destroyed, sometimes repeatedly. He sums up the situation:

(I)n this pitting of the pine tree and its people against the olive tree and its people, a discursive and material split is constructed with dogged determination by the two national ideologies that compete in and over the landscape of Israel/Palestine, so that these two tree types assume the totemic quality of their people, reflecting and reifying the standing conflict (p. 165).



## The Act of Greening Differs from Green Spaces

Similar to connecting to green spaces, the collective act of community greening leads to improved psychological, cognitive, and social health. The *act* of greening has the further benefit of fostering a deeper sense of self-worth as an individual contributes to the community's overall well-being. Greening also serves as a basis for framing place meaning and identity, and for empowerment through demonstrable opportunities for community organizing. Through these outcomes, as well as through producing food and other ecosystem services, one form of greening—community gardening—serves as an enabler of community (Okvat and Zautra, Chap. 5; Stedman and Ingalls, Chap. 10, this volume) and even national (Lawson, Chap. 14) resilience. Further, although community greening is often initiated by local residents for local residents, such projects generally form partnerships with NGOs, government, and universities; thus greening is consistent with current polycentric governance (Ostrom 2010) and civic renewal (Sirrianni 2009) strategies aimed at environmental enhancement. Critical to the thesis of this book, the act of greening has broader implications than green spaces per se, albeit the vast majority of research in this area has focused on exposure to green spaces or even less, simply views of green features (Ulrich 1983, 1984, 1993; Sullivan and Kuo 1996; Wells 2000; Faber Taylor et al. 2002).

The Soweto Mountain of Hope (Chap. 6) provides a powerful case of how the *thing* community gardens—the actual green spaces—while important in themselves may not be as relevant as the *action* community gardening, which for many is a transformative process. The primary beneficiaries of greening are those who participate, even if secondary benefits can be had by those who simply witness or use the resultant green spaces. The policy-making community may want to take particular heed of the Soweto case and of the myriad of similar examples that demonstrate the power of harnessing dynamic practices—rather than focusing more narrowly on formal memorials or static spaces—as a form of transformation and a means to greater resilience. By highlighting the act of greening, this volume continues an important emphasis shifting from the lexicon of condition—managing for a stable endpoint—to the characteristics that form the basis of, or processes that build resilient communities.

## *Understanding Systems Thinking*

### Crises Open Up Opportunities for Renewal

As described in the chapter on resilience, disasters, conflict and other situations that tip a system toward chaos also create opportunities for renewal (Pelling and Dill 2010). In best case scenarios, such renewal has implications that spiral up levels of organization, described as panarachies (Gunderson and Holling 2002). So for example, the 9/11 terrorist attacks opened up opportunities for expressions of greening

that led to recognition of the importance of greening by the US government (Chap. 25), and the collapse of the communist Soviet Eastern Bloc created an opportunity for transforming the Berlin Wall—a space with global significance related to conflict and oppression—to a space of beauty, freedom of expression, and freedom to enjoy nature—the Berlin Wall Trail (Chap. 34).

### **Within the Context of Resilience, Greening Operates Back and Forth Across Scales of Time and Space**

The introductory chapter by Tidball and Krasny explores the seeming tension between problem-framing at a national versus at a local and even individual level by asking the question: ‘where, or at what scale, is resilience?’ While it is impossible to avoid discussing development and post-disaster or conflict without at least acknowledging a national context, nations are hardly monolithic. Instead they are aggregations of overlapping communities within communities (Scheffer 2009; see also literatures on cybernetics, systems of systems, and complex systems; Wimberley 2009), each composed of both shared and unique attributes. Further, various aspects of communities transform over time and at different rates, depending on internal and external factors. Thus, greening at a neighborhood scale post-disaster as in the 9/11 Living Memorial examples in the chapter by Svendsen and Campbell (Chap. 25) may be repeated in multiple communities and have implications for resilience at the local as well as national scale. Greening also may be one of the first practices emerging almost immediately after a disaster or even during a ‘slow burn’ decline such as in current-day Detroit. Greening in turn may lay the groundwork for—or tip the balance in favor of—other resilience processes, such as rebuilding the built infrastructure. Notably, formerly crime ridden, trash-strewn neighborhoods in lower Manhattan spawned a slew of community gardens, which some people credit with subsequent renewal of the area.

Interestingly, resilience as it relates to greening may move over multiple levels of organization from the local to the national and back to the local, almost as if the greening processes were at once ‘fractal’ and ‘scale free’ (see Mandelbrot 1982; Andriani and McKelvey 2009). Resilience *resides* in human-nature interactions and in the ability to express them through greening. At the same time, human-nature interactions as expressed through greening may be *sources* of resilience for individuals, communities, and nations when faced with red zone conditions. Thus, on a day to day basis as we engage in greening, we are expressing our resilience as well as creating a source of resilience in the face of future crises at multiple scales.

Further, although transformation may be framed as incremental versus whole system, greening may obfuscate such distinctions. Related to both scale and pace, greening may be unusual in its ability to treat individuals, communities and nations simultaneously, as it can bring immediate salve to individuals and communities while slowly establishing the foundation for a deeper resilience that may be drawn on in future crises.

## Red Zone Boundaries Are Fluid

Systems thinking often emphasizes defining system boundaries, which can be fluid during times of crisis. For example, Stedman and Ingalls (Chap. 10) ask the question of when does a 'slow burn' system, such as a declining rust-belt city, tip over into a red zone. Similarly the boundaries between direct victims of, leaders in green responses to, and others present and working within red zones are not readily defined. Whereas civilians severely affected by disaster and conflict are quickly recognized as victims, the trauma experienced by soldiers and other participants in conflict, including rescue workers, is often less readily apparent either to themselves or to others. As the United States military has increasingly recognized post-traumatic stress disorder as a real phenomenon worthy of naming and treatment, and as significant government resources are now being allocated toward addressing this problem, little has been written about the veterans who themselves are organizing responses to their own crisis through greening (Chap. 13). Though current wars on terrorism have largely spared civilians in developed countries, many poorer societies are almost entirely militarized. In areas of Somalia and Afghanistan, for example, where whole communities may be actively involved in conflict, either directly as part-time armed combatants, as human shields or suicide bombers, or as indirect support personnel to combat action by cooking, providing intelligence, or logistical and transport provision, whole communities are victims, yet some victims also emerge as leading efforts to restore a sense of hope and a return to normal functioning. The chapter by Holder (Chap. 32) shows how war has impacted women in Liberia, the chapter by Winterbottom (Chap. 30) provides testimony to how families and children have been displaced by war and poverty in Guatemala, and the chapter by Lawson (Chap. 14) recounts how an overseas war impacted food production and other aspects of life across an entire nation despite the fact that its citizens were thousands of miles from military action. Similarly, Lindemuth's (Chap. 27) example of greening in prisons clouds the distinction between criminal and civilian players in dystopia. Yet each of these chapters presents the unsung heroes who lead efforts to act no longer as victims but as transformers of the social and ecological chaos they are enduring.

Lawson's chapter further highlights how, just as traumatic events spare no one in an impacted community, the web of food production impacts virtually all aspects of community life, the economy, and the environment. Of particular salience to policy makers struggling with resource-starved systems that have experienced substantial physical damage to roads, ports, airfields, and manufacturing facilities, Lawson ties the entire supply chain of food production to issues of resource management and to war effort economies. Her Victory Gardens case demonstrates how food grown at home requires less transport and has fewer logistical costs and resource requirements, and thus can contribute not just to patriotic fervor and civilian commitment in the face of war, but also to freeing up resources to respond to the war effort. Thus, not just are boundaries between red zone and slowly decaying social-ecological

systems, and boundaries between victims, responders and others impacted, fluid, so too are the boundaries between greening and other more widely recognized responses to disaster and conflict.

### ***Developing a Culture of Open-Mindedness and Attention to Locally Derived Solutions***

#### **Assets Can Be Identified Even in Dystopic Environments**

Okvat and Zautra (Chap. 5) and Tidball (Chap. 20) present an overview of research demonstrating how the ability to express positive emotions through interaction with nature during times of hardship facilitates recovery, a finding which is consistent with a shift among health professionals from a focus on negative to positive influences on health (Chap. 7). A similar shift from emphasizing deficits, i.e., the ways in which a place and people are weak or sick, to assets, i.e., the ways in which a community exhibits strength and health, characterize policy initiatives that leverage local greening efforts to meaningfully contribute to the long-term well-being of their partner communities (see environment shaping, Weinstein and Tidball 2007; Tidball and Weinstein 2011).

#### **Small Cases May Point to Larger Implications**

Moore's case study of greening in a refugee camp in Northern Cameroon (Chap. 31) may have substantially broader implications than presented. At the beginning of 2010 over 2.5 million people resided in refugee camps.<sup>1</sup> One camp alone in Dagahaley, Kenya housed 93,000 people, a fraction of the 256,000 who live in the network of Kenyan Dadaab camps. Furthermore many refugee camps are essentially permanent; hundreds of thousands of Burundians representing multiple generations of refugees have occupied Tanzanian refugee camps since 1972. For younger residents these camps are the only home they know. In addition to the red zone tensions that led to the flight of refugees, the persistence of these camps has created tensions between Tanzania and Burundi, between Tanzanians and the Burundian refugees, and within the camps themselves. Moore's view of the Cameroonian refugee camps as possible centers of food and forest production is intriguing, because it holds the potential both for introducing self-sufficiency to camps and for relieving tensions within the camps and between the camp residents and their hosts, particularly in those instances in which repatriation is not forthcoming. In the refugee camp and other cases, the policy-making community is confronted with questions about how one might scale-up and adapt grass-roots and NGO-initiated greening efforts to similar situations across multiple contexts.

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<sup>1</sup>United Nations Refugee Agency, Statistical Yearbook 2009, p.9.

## *Engaging in New Forms of Governance*

### **Policy Makers and Development Professionals Have an Important Role to Play**

While most chapters in this volume have pointed towards reinforcing indigenously-derived, emergent practices leading to community resilience, the re-greening of Tokyo and Hiroshima after allied bombing in the contribution by Cheng and McBride (Chap. 18) is an important example of how policy makers have the power to contribute directly and substantively. The policy-making community holds a unique position in their ability to couple a macro view of the problem and its solutions with financial and other resources. The result is an opportunity to have broad impact when compared to strictly bottom-up approaches whose potential scope is limited due to their inherently localized nature and resource scarcity. Boukharavaeva (Chap. 26) depicts how self-organized urban gardening efforts served as a shock absorber of trauma, and how they were recognized and reinforced by the actions of policy makers who, in a radical gesture given the history of land ownership in Soviet Russia, granted property rights to the gardeners. Mid-level policy makers, through their influence on day-to-day responses to disaster and conflict, also occupy a pivotal linking function between community groups and NGOs on the one hand, and politicians and even other nation-states trying to influence the policy of weaker states on the other (Pelling and Dill 2010). Much more work remains to be done in identifying roles for government and other components of a governance system in facilitating different types of greening occurring in diverse red zone settings.

## **Recommendations**

In this section, we synthesize our observations and lessons learned into recommendations for the policy-making community. The recommendations that follow are difficult, may take a long time to bring about, and demand courage from those involved. We recognize the challenges. At the same time we firmly believe that avoiding some of the mistakes of the past will entail taking responsibility for fully confronting the existential quality of our personal and of humankind's relationship with nature. To do so is to say, simply, 'nature matters'.

### ***Treat Environmental Issues and Environmentally-Based Solutions to Policy Problems with a Priority That Reflects Their Actual Level of Impact***

The case has been made for the impact that green and greening has on lives both individually and collectively. Whether we are rich or poor, live an urban or rural existence, or are at war or peace, there is no disassociating ourselves from our

relationship to nature or our dependence upon the services nature provides to us (Tidball and Stedman 2013). We do not have the liberty to walk away from nature for the simple reason that we are an integral part of it. Innately we understand that our place in nature, our relationship to it, is existential. Our physical and psychological survival is ultimately dependent on the degree to which we recognize and embrace how we relate to the natural world that feeds us, slakes our thirst, cleanses our air, and calms our spirit. Things ‘green’ and by extension the act of greening are an absolute national security imperative for every nation on earth, but particularly for those whose population density and behavior demand the most attention. Numerous other authors have made this point through discussions of food and energy security (Gleick 1990; Kobtzeff 2000), and of conflicts over natural resources (Machlis and Hanson 2008; Machlis et al. 2011). Still others have talked about a role for trans-boundary parks and conservation in peace-making (Dabelko and Conca 2002). In this volume, we add to these literatures a consideration of the importance of engagement in hands-on greening with the intent to build resilience in individuals, communities, and ecosystems impacted by conflict and disaster.

### ***Emphasize Characteristics Rather Than Conditions, and Systems Thinking***

Identify and address system characteristics, such as resilience and transformability, rather than focus more narrowly on achieving static conditions. Such an emphasis on dynamic processes is consistent with systems thinking. Previous work by Tidball and Weinstein (Weinstein and Tidball 2007; Tidball and Weinstein 2011) suggests how an environment shaping strategy provides a path for applying such thinking in post-conflict and post-disaster development contexts.

### ***Allow Human Experience to Guide Policy Making***

In rare instances torture victims, disaster survivors, or former combatants confront policy makers directly. Such events are momentarily galvanizing if only because they are so dramatic and the audience so unprepared to manage and effectively internalize what they are witnessing, that they may be instrumental in sparking discussions about changes in policy. But what is the role of human experience in more rational policy making? And what is it that is meant to be secured if not people’s abilities to enable positive experiences and to limit bad ones? We ignore the psychological and social impacts of our decisions at our peril. Only now, for example, is the US military fully confronting the magnitude of psychological impacts of repeated deployments to combat zones, which reach far beyond military institutions and deeply into our communities. Greening should be an important part of the multi-faceted human experience that is considered in policy making.

### ***Relinquish Control When Needed***

One of the defining characteristics of a dynamic system is that by definition, it is constantly changing, usually in unpredictable ways and at unpredicted magnitudes, and for unforeseen reasons. We live in complex systems, and thus imagining that we are in control may not reflect reality. And yet, policy and program design – not just in military domains but also environmental, economic, social, and virtually all other domains as well—is dominated by a command and control mentality. The analogies of holding a shallow pan of water or riding a bucking horse are apropos. The harder one holds on the more certain the water will spill or the rider will crash to the ground. Attempts at absolute control virtually ensures failure, whereas adaptation to an enabling and constraining role substantially improves our odds at making a meaningful difference, relies heavily on existing resilient qualities of the system, and by extension reduces the likelihood that we will contribute to comprehensive system failure.

Similarly, policy solutions based on the inherent assets of a place and its people are more likely to take hold and influence substantial change than those that are mismatched. Grassroots or bottom-up derived solutions sometimes get short shrift because they challenge the reputation of the policy maker as an expert, deny the viability of command and control, and don't always dovetail perfectly with our own world view. The participatory approaches that are required of an asset-based strategy to policy and program design take time and a real willingness to accept that the role of the professional is not only to educate, but also to listen, absorb, understand, and then translate that understanding into the actionable.

### ***At Times Resist Pressure for Immediate Results***

Allowing systems to transform takes time. Trust renews over generations, and collectively recognizing shared interests takes years. While people and political systems are highly impatient, long-standing strategies culled from the world of participatory project management make it possible to demonstrate continual progress by designing incremental but meaningful gains over the course of an otherwise slow process.

The policy-making community is therefore challenged not to make decisions between little and quickly on the one hand, and big and slow on the other, but instead to seek a better understanding of the relationships between local communities' identities and institutions, and those of nations, and the contributions immediate short-term efforts can have in lowering or heightening barriers to the whole system shifting from one basin of attraction to another. In this respect, we suggest a perspective that emphasizes multiple vertical and horizontal interactions over hierarchies—that a particular level of action be treated not as a point lower or higher up in a hierarchy, but rather as a node in a network of relationships.

## ***Work Across Sectors to Incrementally Incorporate Environmental Stewardship and Management into Existing Programs***

Addressing seemingly categorical issues, such as environment, security, education, or economic well-being, requires policy makers to work across multiple functional areas. This is made difficult through highly bifurcated implementing bureaucracies, i.e., agencies and departments charged with implementing programs that choose not to collaborate. However, innumerable opportunities exist to introduce greening into existing efforts, even if they are not yet fully connected to other programs or policies. Community-based land and resource management, for example, may be incorporated into school curricula and out-of-school environmental education programs (Krasny and Tidball 2009; Krasny and Roth 2010), and micro-lending and micro-economic development programs can favor or even explicitly encourage effective bottom-up resource management or community farming/greening efforts. Judicial and legal oriented reform projects can highlight environmental and land issues such as property rights and land-use. Community development and organizing efforts can use community greening as building blocks. Eventually enough greening-related programs will reside in multiple components of the development puzzle so that tying them together into a self-reinforcing web will not be such an impossible task after all. Greening, or the environment more broadly, may serve as a theme that roots each of the disparate sectors in holistic approaches to development post-disaster or conflict. A critical factor in incorporating greening into development strategies will be adding an individual with environmental and greening expertise onto inter-disciplinary teams in post-disaster and post-conflict settings.

## ***Pursuing a Greening in the Red Zone Research Agenda***

The evidence accumulated in this volume comes from synthesizing on-the-ground examples of greening in red zones with research about human-nature relations and social-ecological systems resilience. Because research that focuses specifically on greening responses in red zones is hard to come by, this volume is meant to stimulate thinking about possibilities—about the potential for greening to help people reorganize and rebuild in red zones—rather than to suggest that we have all the answers. Such thinking will inevitably raise questions that could be answered by inter-disciplinary research drawing from the social and ecological sciences.

For example, in the area of human-nature relations, much work has been done on the emotional, psychological and cognitive impacts of exposure to green spaces among hospital patients, young children, and residents of low income housing, and a few studies have been conducted on the outcomes of active engagement in greening among urban greening participants (see Okvat and Zautra, Chap. 5; Tidball, Chap. 4; and Wells, Chap. 7 for reviews). Further, a number of authors in this volume have collected testimony on the power of gardening and other forms of greening and green spaces from soldiers and civilians in war zones (Helphand, Chap. 17 and



Krasny et al., Chap. 13), children under conditions of extreme poverty (Chawla, Chap. 8), hurricane survivors (Tidball, Chap. 20), women in post-war Liberia (Holder, Chap. 32), among others experiencing red zone conditions. However, we lack empirical research, such as long-term, comparative, or other studies, that more rigorously tests the impacts of greening specifically on individuals and communities in red zones.

Relative to social-ecological systems resilience, many studies have described social and ecological processes within particular systems, for example fishing dependent villages in Southeast Asia (Daw et al. 2009), First Nations communities in the boreal region of Canada (Berkes et al. 2000), and forest dependent communities in the Pacific Northwest (Fernandez-Gimenez et al. 2008). Other authors have described rebuilding processes post-disaster (Vale and Campanella 2005) or have distilled characteristics of disasters, including frequency, magnitude, and extent, that can be used as a basis for planning interventions (Pelling 2007). However, we are not aware of empirical studies that use a social-ecological systems framework to study processes occurring in disaster and conflict zones, and that treat red zones as a type of emergent and relatively short-lived social-ecological system with a unique set of characteristics different from those of other systems. Do red zone systems share commonalities relative to social and ecological processes that cut across specific contexts?

A fundamental issue for greening in red zone researchers is how they might partner with on-the-ground implementers and policy makers in defining research questions, collecting data, and other aspects of the research process. When policy makers, project implementers, and community leaders working in red zones are involved in research, questions may be better informed by real-life experience and needs, and the results may be more readily reinserted into policies and on-the-ground practices. Policy makers with the foresight and courage to invite multiple stakeholders into research they fund may develop more robust plans informed by data on specific outcomes of interest. For example, the defense and development agencies might be interested in ways to leverage incipient greening efforts to improve group behavioral dynamics and morale.

A number of difficulties face a researcher investigating the role of greening in red zones. Given the dangerous and challenging conditions that characterize all red zones and the oft-times spontaneous responses, controlled experiments will likely not be possible. Instead 'natural' experiments looking at variations in conditions that occur in the field, or qualitative research that follows greening practices in-depth and over time, may be employed. In addition, commonly held notions about linear relationships may not hold. For example, the ability of a community to mount a greening or other response to disaster depends in part on existing human capital, yet at the same time when a community is able to take charge and respond effectively to a disaster, human capital may be created. The same may be true for social, cultural, and natural capital, as well as for sense of place. Further complicating any research endeavor, these different capitals interact with each other through greening, as when a group of individuals with trusting relationships and a history of volunteerism (aspects of social capital) is able to come together to recreate natural capital lost

in a disaster (e.g., by planting trees). These relationships may be envisioned as the different forms of capital nested within each other in a progressively larger series of concentric rings (from human to social to ecological, see Wimberley 2009). Alternatively, processes at the individual, social-cultural, and ecological scale may be viewed as nested adaptive cycles forming panarchies of small-scale, relatively fast processes both impacting and being impacted by larger and slower processes (see Gunderson and Holling 2002). To add to the research challenges, multiple forms of capital that are integrated in a greening response serve as both sources and expressions of resilience during disaster as well as during the rebuilding period.

Despite this complexity, in thinking about a future research agenda, we have found it possible to break down the types of questions into those about the nature of the greening response and about the nature of the red zone, both of which are addressed below. We then address questions related to sense of place, which may be used to help connect various greening responses to the particulars of the red zone. Finally, we briefly address questions related to the role of the policy-making community in leveraging greening efforts as part of post-conflict and post-disaster response.

## *Greening Response*

The chapters in this book point to the myriad of possible greening responses in red zones, and thus set the foundation for research about what determines the particular greening actions observed under various conditions. So for example, are there forms of greening that are universal and immediate (e.g., planting flowers or community gardening), as well as expressions of greening related to the symbols of particular cultures and places (e.g., planting live oak trees in New Orleans)? Under what conditions do people engage in greening with immediate visible results (e.g., planting flowers) versus forms of greening that are more long-term yet involve greater investment and risk of failure (e.g., tree-planting, larger-scale greening of contested spaces such as the Berlin Wall)? What is the role of human capital (e.g., local leadership) and social capital (e.g., social connectivity, volunteerism) in fostering various greening responses? And what role do social and ecological memories play in eliciting a particular greening response?

The type of greening response may be determined not only by factors such as local leadership, culture, and social-ecological memories, but also by the nature of the red zone. Thus, another set of questions relates to how people respond to the particulars of the red zone, such as whether it is the result of slow, low-level, but sustained disturbances or a sudden, dramatic and rare event. The chapter on rust-belt cities (Chap. 10) raises a slew of potential inquiries concerning the relationship between the speed and magnitude of the catastrophe and the rate of rebuilding efforts. How do the slow-burn decays of rust-belt cities mute or distort residents' memories of more favorable conditions, leading in a vicious cycle like process to less motivation to green and subsequent further decline? Could a seemingly more

rapid renewal of the city of New Orleans relative to the city of Detroit, both of which have been suffering decline over a period of many years, be attributed in part to a reaction to the subsequent massive disturbance in the form of hurricanes in New Orleans? Are there similarities in the types of response to repeated disturbances, such as long-term economic decline in Detroit, or the serial extinction of tree species over time due to repeated insect invasions in the northeastern US, even though the social-ecological systems in which they take place differ radically? How might one characterize greening responses generally among slow versus fast disturbances? And what are the differences in greening responses to both fast and slow disturbances impacting a particular system, such as a forest that experiences slow erosion of species composition versus a sudden forest fire? Predicting a greening response to a particular type of disturbance is further complicated by the fact that we generally cannot predict when a disturbance or series of disturbances, such as earthquakes, influxes of refugees, or slow economic decline, may transform social-ecological systems into less desirable basins of attraction or red zones. For example, we are unable to identify or quantify the factors that suddenly transform a landscape characterized by a trickling of refugees into one where massive migrations occur.

In addition to rate and magnitude of the disturbance, other factors related to red zone characteristics undoubtedly play a role in determining any sort of greening response. Whereas hurricanes, floods, and other ‘acts of god’ all can result in significant environmental contamination, some disasters—including oil spills, nuclear bombs, nuclear plant melt downs, and chemical plant explosions—by their very nature are associated with pollution over wide areas and impacting significant numbers of people. Although we see greening actions in response to such disturbances, for example, planting trees in post-atomic bomb Japan and rehabilitating oiled birds along the Gulf Coast of the US, questions arise as to the deeper impacts of such responses for the individuals and communities as well as the ecosystems involved. For example, does cleaning oiled birds result in the same cognitive and emotional outcomes as reestablishing native plants in more ‘natural’ salt marshes? One might hypothesize that cleaning up after a human caused disaster will lead to different types of satisfactions and other psychological outcomes than greening after a disaster that is perceived as ‘an act of god’. Finally, questions may arise about how real dangers, such as from exposure to contaminants or being attacked in a war zone, impact greening responses.

### ***Greening Outcomes***

In addition to looking at factors determining the type of greening response, researchers may pose questions related to the role various greening actions play in disaster recovery at multiple scales. What determines whether greening in a red zone is simply an individual spontaneous act of defiance to regain a sense of personal equilibrium in the face of unbearable conditions, an action taken with neighbors to re-create a

sense of community or sense of place, and/or an act of political protest? An example of the latter is the scrap metal sculpture at the Soweto Mountain of Hope in South Africa; a larger-than-life human figure holds a world globe and a Chevron sign, thus expressing an anti-globalization message. Another example might be Latino guerrilla gardens planted on contested spaces in the US or in Latin America. Because symbolism and ritual may be closely linked to the greening response, in particular when greening is seen as a political action, questions arise as to how green spaces and greening are viewed as symbols of culture and protest, and the meaning of the rituals that arise around such acts.

A research agenda would also include a set of questions focusing on greening outcomes for ecosystems. The recounting of the replanting of Sarjevo by Laćan and McBride (Chap. 22) is one of the few chapters in this volume that addresses ecosystem resilience rather than social outcomes. Given what we know about the relatively small scale of greening efforts, what sorts of outcomes do they have for ecosystems? One particular challenge is developing measures for ecosystem responses that are appropriate for the scale of greening efforts and for red zone settings, and that are sensitive to any scaling-up of greening from the work of a few individuals to a network of many active programs.

### *Sense of Place, Greening, and Conflict*

The symbolic nature of place generally includes a green or biophysical component. This may be related to trees, such as the live oak trees symbolic of New Orleans or Charleston SC (see Tidball, Chap. 20 and Hull, Chap. 19, this volume), cedars in Israel or olive trees defining Palestine as a place (Braverman 2009), or other iconic species such as the oysters that once defined the character of New York City (Kurlansky 2006). Landscape features, such as the lakes of Wisconsin, may also play an important role in residents' sense of place, including place attachment and place meaning (Stedman 2003). The relationship between place, greening, and conflict or disaster is multi-faceted. For example, place attachment may erode over time due to repeated assaults on a particular place's green and built elements, as seen in the economic, social, and environmental decline of the rust-belt cities described by Stedman and Ingalls (Chap. 10). Yet we know little about how various levels of place attachment or types of place meaning might impact motivations to rebuild following disaster, or how re-greening post-disaster might affect place attachment and place meaning. Other potential areas for research include the psychological impacts on war victims of purposeful destruction of symbols of place—such as the cutting of olive trees by Israeli youth in Palestine (Braverman 2009).

Further, there may be connections between active engagement in greening, sense of place, and notions of social and ecological justice. For example, how does protest through greening and green spaces—such as planting gardens on 'claimed' land or camping out in trees in defiance of efforts to cut them down—connect building or expressing sense of place to notions of justice? Conversely, how does destruction of green space relate to notions of justice? How might one define and explore notions of social-ecological or 'sense of place justice'?

## ***Government and NGO Responses to Greening***

Whereas grassroots greening efforts pose particular challenges for policy-makers used to defining and implementing their own solutions, this volume presents several examples of governments recognizing the value of self-organized greening by granting property rights to gardeners in Russia (Boukharaeva, Chap. 26) or official status as Living Memorials to planting efforts in the US (Svendsen and Campbell, Chap. 25). Research could investigate outcomes of government and NGO strategies for supporting existing and incubating new greening efforts. The outcomes of any interventions would be expected to vary according to many of the factors mentioned above, including symbolic meanings of and rituals attached to different kinds of trees, green spaces and greening responses; the frequency and type of disturbance; as well as the political, social and ecological context in which the interventions take place.

Understanding processes leading to decline and rebuilding is critical for policy makers engaged in development and aid programs (Pelling and Dill 2010). To be effective, the policy-making community needs to have answers to questions such as: What are the thresholds that divide a red zone from a non-red zone state? When, and under what conditions, might a place shift from a red basin to a green one, or back? Under what set of conditions and how long might this transition be expected to last? When should development agencies intervene so as to most effectively enable virtuous cycles or mitigate vicious ones? For how long should they continue their efforts before barriers between basins have been sufficiently built up or broken down?

## **Conclusion**

We began this final chapter with a quote from Theodore Roosevelt, whose interest in the outdoors and conservation may have stemmed from how he used nature study and embracing a strenuous life to overcome childhood asthma, and who, as President of the US, set aside over 200 million acres as national parks, forests, wildlife preserves, and other conservation areas (Beale 1956; Morris 1979; Donald 2007). Thus, the life and accomplishments of Theodore Roosevelt connect a central theme addressed in the chapters of this book—humans as *of* and *part of* nature, and as turning to nature as a source of resilience—with this closing chapter about policy making.

Although Roosevelt was no stranger to war and conflict, which he both participated in as a soldier, deliberated about as a policy maker,<sup>2</sup> and suffered from deeply when his youngest and favorite son was killed at age 20 in aerial combat during World War I, we are not aware of evidence that he connected his interest in nature directly with any post-conflict policies *per se*. Nor would he have been privy to discussions about more recent notions of social-ecological systems, feedbacks, and landscapes dotted with basins of attraction including vicious and virtuous cycles, or

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<sup>2</sup>Theodore Roosevelt was the first US president to receive the Nobel Peace Prize, in 1906.

about the potential of participatory, bottom-up approaches to address local and even national-level post-conflict and post-disaster rebuilding. Yet, Roosevelt understood the power of human-nature interactions and healing on multiple levels, as is demonstrated by his actions during a formative period of his life.

As Linda Heyd, park ranger and interpreter at Theodore Roosevelt National Park Ranger tells it, an old rustic cabin sits behind the park visitor center in Medora, North Dakota. Structurally humble, one might wonder why it still exists and why people work so hard to preserve it. The reason is that it once housed a future US president at a pivotal moment in his development as a man. Heavily burdened by grief and anguish, Roosevelt retreated to North Dakota after his young wife and his mother died at their home in New York within hours of each other. Trying to remove the painful memory of these tragic deaths from his mind, Theodore escaped the bustling east coast with its cities and streets full of ghosts, to head west and find healing in the great expanse of grass and sky.<sup>3</sup> He did heal there, and as he did, he reconnected with the natural world in all its detail, diversity, and restorative bounty. And as a policy maker, he later went on to think big regarding human-nature interactions, and establish or enlarge 150 national forests, 51 federal bird reservations, 4 national game preserves, 5 national parks, and 18 national monuments.<sup>4</sup> Although Roosevelt's moments of turning to nature as a means of personal resilience were separated in time and space from his actions as a policy maker, there is much to learn from Roosevelt's use of nature in time of crisis, and the possible link between his personal actions and his later grand impact on national and even global policy. The rustic cabin and numerous other monuments and parks also embody lessons about the memorialization that has since occurred, reifying the importance of our relationships to nature and of places for healing.

As policy makers, researchers, practitioners, and simply humans, we have the potential to connect our relationship with nature as expressed through greening, with policies aimed at 'tipping' the balance in favor of more virtuous, greener and community-minded basins across post-disaster and post-conflict landscapes. How might we not only create and reinforce virtuous cycles of greening and rebuilding in social-ecological systems, but also virtuous cycles of being attentive to and leveraging existing assets in the very policy-making communities that impact these systems? We have seen from the myriad examples presented in this volume the diverse forms that greening can take, in part related to local, regional, and nation-state histories, cultures, and ecologies. Whereas some forms of greening post-disaster seem to cut across multiple contexts—such as gardening in post-war Liberia and Serbia, in post-apartheid South African townships, and after 9/11 in the US—others are more regionally-specific, such as wildlife management in Kenya or village groves in South Korea. In some instances local efforts gain regional or global importance as symbols of recovery, such as the greening of the Berlin Wall or of the red line separating Cyprus. Because so much variability exists both within greening activities and

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<sup>3</sup> <http://medorand.com/attractions/?401>

<sup>4</sup> <http://www.theodoreroosevelt.org/life/conNatPark.htm>

the contexts where they are applied, policy makers will need to fine-tune any ideas or recommendations they have gleaned from this book to take into account specific contexts. Part of a local context is the nature of small-scale, self-organized greening initiatives that reflect local culture and social-ecological memories.

In short, we are calling for policy makers to join with researchers to take a systems view—to model and understand the multiple networks of relationships among communities, regions, and nation-states, as well as the networks of governing institutions that work at various levels. At the same time, we are asking the policy-making community to join with the community greeners—to recognize not only the role of human-nature relations in the abstract, but also how such relationships are manifested in specific acts, at specific places, and at specific times. Reflecting the notion that multiple efforts addressing a suite of problems simultaneously are required to transform vicious into virtuous cycles in social-ecological systems, multiple, cross-sector, and integrative efforts among the greening, research, and policy communities will be needed to tip the balance in favor of policies that support greening and transformation in red zones. To this end we are also encouraging the policy making community to *think big*, like Roosevelt did, but armed with new and exciting ideas.

At a fundamental level, the critical question for the post-disaster and post-conflict policy-making community may be whether their actions foster or inhibit individual and societal expressions of urgent biophilia and restorative sense of place. We believe that inhibiting such expression may aggravate a disaster or conflict scenario, whereas the evidence presented in this book suggests that fostering such expression releases a series of cascading effects whereby humans rebuild a sense of personal equilibrium, restore and reconcile their place in the ecosystem, create anew a sense of community and of place, and put into motion the first steps toward restoring a healthier social-ecological system.

Thus, we call upon policy makers to consider the role of participatory natural resource management—or of greening—in responses to red zones. Again we may look to the insights of the resilient Japanese, who have transformed their society in the twentieth century to become a model of democracy and efficiency, and who are now facing perhaps an even greater challenge in the twenty-first century to rebuild and transform in the aftermath of disaster of almost unimaginable scale. Yet policy makers in Japan from the very highest levels are listening to scholars and experts as well as farmers and fishermen who are encouraging a visionary approach to rebuilding after the Great East Japan Earthquake, tsunami, and nuclear catastrophe (Global Environmental Action 2011). Policy makers are seeking counsel from scholars of Satoyama and Satoumi (Takeuchi et al. 2003; Shidei 2006; Morimoto et al. 2009), who are encouraging a remembering and a reconnection of the Japanese culture's deep historical connection to nature. They are seeking new ways of thinking about themselves in relation to nature in the twenty-first century, they are reflecting societal concerns regarding safe and sustainable renewable energy alternatives, and they have invited conversation specifically about greening in the red zone. They have, simply, decided to embrace transformation, to *think big* about greening and sustainability.

Greening in the red zone, as a way of describing human-nature interaction after disaster and war, and as a policy approach, requires a kind of suspension of disbelief, and also a pragmatic understanding of the limitations of such an approach. The many authors of this volume do not wish to convey that greening and its attendant multiple benefits are a magic wand to be waved over tragic circumstances to green-wash away the grim realities of disaster and war. Yet, we feel that the preponderance of empirical evidence and anecdotal corroboration as presented here and elsewhere regarding the value of greening in the red zone merits attention by the post-disaster and post-conflict planning and response communities. If planting trees, or caring for habitat, or gardening can restore both human morale and ecosystem service provision, and these things can happen in emergent and participatory ways with relatively minimal investment and transaction costs, and can catalyze and reinforce positive feedbacks and virtuous cycles in such tenuous and fragile periods, why wouldn't one add this arrow to the quiver of disaster planners and response practitioners? This is what we hope to accomplish with this volume—to shed light upon the virtues of greening in the red zone, and to encourage adaptation and adoption of this approach as soon as is practicable. In light of inevitable climate change and future shocks, adding new approaches to the menu of options is the order of the day. But as important as quivers of new arrows are, the most important element is the knowledge and willingness to use them. We are boldly suggesting that the post-disaster and post-conflict response communities be bold, to think big like Roosevelt in his day, to accept the challenge of transformation following the lead of Japan today, to affirm fundamental inclinations like urgent biophilia and restorative topophilia, and to reap the multiple benefits of virtuous cycles and social-ecological services provided, via greening in the red zone.

## References

- Allison, H., & Hobbs, R. J. (2004). Resilience, adaptive capacity, and the “Lock-in Trap” of the Western Australian agricultural region. *Ecology and Society*, 9(1), article 3.
- Andriani, P., & McKelvey, B. (2009). From Gaussian to Paretian thinking: Causes and implications of power laws in organizations. *Organization Science*, 20(6).
- Barthel, S., Colding, J., et al. (2005). History and local management of a biodiversity-rich, urban cultural landscape. *Ecology and Society*, 10(2), 10.
- Beale, H. K. (1956). *Theodore Roosevelt and the rise of America to world power*. Baltimore: The Johns Hopkins Press.
- Beisner, B. E., Haydon, D. T., et al. (2003). Alternative stable states in ecology. *Frontiers in Ecology and the Environment*, 1(7), 376–382.
- Berkes, F., & Folke, C. (2002). Back to the future: Ecosystem dynamics and local knowledge. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformation in systems of humans and nature* (pp. 121–146). Washington, DC: Island Press.
- Berkes, F., Colding, J., et al. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications*, 10, 1251–1262.
- Blizzard, C., & Schuster Jr., R. (2004). “They all cared about the forest”: Elementary school children’s experiences of the loss of a wooded play space at a private school in Upstate New York. In: Proceedings of the northeastern recreation research symposium, Bolton Landing, NY, USDA Forest Service, Northeastern Research Station.



- Bolund, P., & Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, 29(2), 293–301.
- Brauerman, I. (2009). *Painted flags: Trees, land, and Law in Israel/Palestine*. Cambridge: Cambridge University Press.
- Carlock, P. G., & Fenton, R. E. (2001). System of systems (SoS) enterprise systems for information-intensive organizations. *Systems Engineering*, 4(4), 242–261.
- Cronon, W. (2003). *Changes in the land: Indians, colonists, and the ecology of New England*. New York: Hill and Wang.
- Cutter, S. L., Barnes, L., et al. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 18(4), 598–606.
- Dabelko, G., & Conca, K. (2002). *Environmental peacemaking*. Baltimore: Johns Hopkins University Press.
- Daw, T., Adger, W. N., et al. (2009). Climate change and capture fisheries: Potential impacts, adaptation, and mitigation. In K. Cochrane, C. De Young, D. Soto, & T. Bahri (Eds.), *Climate change implications for fisheries and aquaculture: overview of current scientific knowledge*. FAO Fisheries and Aquaculture Technical Paper Number 530. Rome: FAO.
- Donald, A. D. (2007). *Lion in the White House: The life of Theodore Roosevelt*. New York: Basic Books.
- Earls, F. J., Raudenbush, S. W., et al. (1995). Project on Human Development in Chicago Neighborhoods (PHDCN): Systematic Social Observation. *National Archive of Criminal Justice Data*. <http://www.icpsr.umich.edu/icpsrweb/NACJD/studies/13578>.
- Faber Taylor, A., Kuo, F. E., et al. (2002). Views of nature and self-discipline: Evidence from inner-city children. *Journal of Environmental Psychology*, 22, 49–63.
- Fairhead, J., & Leach, M. (1996). *Misreading the African landscape: Society and ecology in a forest–Savanna Mosaic*. Cambridge: Cambridge University Press.
- Fernandez-Gimenez, M. E., Ballard, H. L., et al. (2008). Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. *Ecology and Society*, 13(2), 4.
- Folke, C., Carpenter, S., et al. (2002). *Resilience for sustainable development: Building adaptive capacity in a world of transformations*. Paris: International Council for Scientific Unions (ICSU).
- Gallopín, G. (2002). Planning for resilience: Scenarios, surprises, and branch points. In L. Gunderson & C. S. Holling (Eds.), *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Gladwell, M. (2000). *The tipping point: How little things can make a big difference*. Boston: Little, Brown and Company.
- Gleick, P. H. (1990). Environment, resources, and international security and politics. In E. Arnett (Ed.), *Science and international security: Responding to a changing world* (pp. 501–523). Washington, DC: American Association for the Advancement of Science Press.
- Global Environmental Action (2011). GEA international conference 2011 building sustainable societies through reconstruction. Building Sustainable Societies through Reconstruction, Tokyo, Japan, Global Environmental Action.
- Guha, R. (1989). *The unquiet woods: Ecological change and peasant resistance in the Himalaya*. Berkeley: University of California Press.
- Gunderson, L. H., & Holling, C. S. (Eds.). (2002). *Panarchy: Understanding transformations in human and natural systems*. Washington, DC: Island Press.
- Holling, C. S., & Meffe, G. K. (1996). Command and control and the pathology of natural resource management. *Conservation Biology*, 10, 328–337.
- Hurley, D. (2004). Scientist at work—Felton Earls; On crime as science (A neighbor at a time). *New York Times*. NYC, NY: the New York Times Company.
- Jamshidi, M. (Ed.). (2009). *System of systems engineering: Innovations for the 21st century*. Hoboken: Wiley.
- Johnson-Freese, J., & Nichols, T. M. (2011). Academic stovepipes undermine US security. *World Politics Review* 14 April.

- Jonnes, J. (2011). What is a tree worth? *Wilson Quarterly*, 35(1), 34–41.
- Kellert, S. (1997a). *Kinship to mastery: Biophilia in human evolution and development*. Washington, DC: Island Press.
- Kellert, S. (1997b). *The value of life: Biological diversity and human society*. Washington, DC: Island Press.
- Kellert, S., & Wilson, E. (Eds.). (1993). *The biophilia hypothesis*. Washington, DC: Island Press.
- Kelling, G. L., & Coles, C. M. (1996). *Fixing broken windows: Restoring order and reducing crime in our communities*. New York City: Touchstone.
- Kobtzeff, O. (2000). Environmental security and civil society. In H. Gardner (Ed.), *Central and southeastern Europe in transition: Perspectives on success and failure since 1989* (pp. 219–296). Westport: Praeger.
- Kotov, V. (1997). Systems of systems as communicating structures. *Hewlett Packard Computer Systems Laboratory Paper, HPL-97-124*, 1–15.
- Krasny, M., & Roth, W.-M. (2010). Environmental education for social-ecological system resilience: a perspective from activity theory. *Environmental Education Research*, 16(5–6), 545–558.
- Krasny, M. E., & Tidball, K. G. (2009). Community gardens as contexts for science, stewardship, and civic action learning. *Cities and the Environment*, 2(1), 8.
- Krasny, M. E., & Tidball, K.G. (2010). Civic ecology: Linking social and ecological approaches in extension. *Journal of Extension* Feb 2010.
- Kurlansky, M. (2006). *The big oyster: History on the half shell*. New York City: Ballantine Books.
- Lifton, R. J. (1991 [1969]). *Death in life: Survivors of Hiroshima*. Chapel Hill: University of North Carolina Press.
- Luskasik, S. J. (1998). Systems, systems of systems, and the education of engineers. *Artificial Intelligence for Engineering Design, Analysis, and Manufacturing*, 12(1), 11–60.
- Machlis, G. E., & Hanson, T. (2008). Warfare ecology. *Bioscience*, 58(8), 729–736.
- Machlis, G. E., Hanson, T., et al. (2011). *Warfare ecology: A new synthesis for peace and security*. Dordrecht: Springer.
- Mandelbrot, B. B. (1982). *The fractal geometry of nature*. New York: WH Freeman.
- Matthews, R., & Selman, P. (2006). Landscape as a focus for integrating human and environmental processes. *Journal of Agricultural Economics*, 57(2), 199–212.
- Morimoto, J., Kondo, T., et al. (2009). Satoyama–satoumi sub-global assessment in Japan and involvement of the Hokkaido Cluster. *Landscape and Ecological Engineering*, 5(1), 91–96.
- Morris, E. (1979). *The rise of Theodore Roosevelt*. New York: Coward, McCann & Geoghegan, Inc.
- Ostrom, E. (2010). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change*, 20, 550–557.
- Pawlowski, C. (2006). Dynamic landscapes, stability and ecological modeling. *Acta Biotheoretica*, 54(1), 43–53.
- Pei, R. S. (2000). Systems of systems integration (SoSI): A smart way of acquiring army C4I2WS systems. In: Proceedings of the 2000 summer computer simulation conference, Vancouver, BC, Canada.
- Peirce, N. (2009). An overdue breakout from ‘silos,’ borders. *Nation’s Cities Weekly*. Irvine: Entrepreneur Media.
- Pelling, M. (2007). *The vulnerability of cities: Natural disaster and social resilience*. London: Earthscan.
- Pelling, M., & Dill, K. (2010). Disaster politics: Tipping points for change in the adaptation of sociopolitical regimes. *Progress in Human Geography*, 34, 21–37.
- Powell, J., Selman, P., et al. (2002). Protected areas: Reinforcing the virtuous circle. *Planning Practice and Research*, 17(3), 279–295.
- Prudham, S. W. (2004). *Knock on wood: Nature as commodity in Douglas-Fir country*. London: Routledge.
- Relph, E. (1976). *Place and placelessness*. London: Pion.

- Sage, A. P., & Cuppan, C. D. (2001). On the systems engineering and management of systems of systems and federations of systems. *Information, Knowledge, Systems Management*, 2(4), 325–334.
- Sampson, R. J., Raudenbush, S. W., et al. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 277(5328), 918–924.
- Scheffer, M. (2009). *Critical transitions in nature and society*. Princeton: Princeton University Press.
- Scheffer, M., Carpenter, S., et al. (2001). Catastrophic shifts in ecosystems. *Nature*, 413(6856), 591–596.
- Schipper, L., & Pelling, M. (2006). Disaster risk, climate change and international development: Scope for, and challenges to, integration. *Disasters*, 30(1), 19–38.
- Scott, J. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven: Yale University Press.
- Selman, P. (2006). *Planning at the landscape scale*. London: Routledge.
- Shava, S., Krasny, M. E., et al. (2010). Agricultural knowledge in urban and resettled communities: Applications to social–ecological resilience and environmental education. *Environmental Education Research (Special Issue, Resilience in social-ecological systems: The role of learning and education)*, 16(5), 325–329.
- Shidei, T. (2006). *Forest should not be “mori” and “hayashi”—my forest theory*. Kyoto: Nakanishiya Shuppan co.
- Sirianni, C. (2009). *Investing in democracy: Engaging citizens in collaborative governance*. Washington, DC: Brookings Institution Press.
- Staley, S. (2009). Does breaking down policy silos mean the end of federalism? *Reason.org* <http://reason.org/news/printer/does-breaking-down-policy-silo2011>
- Stedman, R. C. (2003). Is it really just a social construction?: The contribution of the physical environment to sense of place. *Society and Natural Resources*, 6(8), 671–685.
- Sullivan, W. C., & Kuo, F. E. (1996). *Do trees strengthen urban communities, reduce domestic violence?* Atlanta: USDA Forest Service Southern Region.
- Svendsen, E., & Campbell, L. (2005a). Living memorials project: Year 1 social and site assessment. *General Technical Report NE-333*, USDA Forest Service.
- Svendsen, E. S., & Campbell, L. K. (2005b). *Land-markings: 12 Journeys through 9/11 living memorials, NRS-INF-1-06*. Newtown Square, PA, USDA Forest Service, Northern Research Station, GTR-NE-3333.
- Takeuchi, K., Brown, R., et al. (2003). *Satoyama—the traditional rural landscape of Japan*. Tokyo: Springer.
- Tidball, K. G., & Krasny, M. E. (2007). From risk to resilience: What role for community greening and civic ecology in cities? In A. Wals (Ed.), *Social learning towards a more sustainable world* (pp. 149–164). Wageningen: Wageningen Academic Press.
- Tidball, K. G., & Krasny, M. E. (2008). “Raising” resilience: Urban community forestry in post-conflict and post-disaster contexts. *Resilience 2008*. Stockholm, Sweden.
- Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere*, 2(2), article 21.
- Tidball, K. G., & Krasny, M. E. (2012). A role for citizen science in disaster and conflict recovery and resilience. In J. Dickinson & R. Bonney (Eds.), *Citizen science: Public participation in environmental research*. Ithaca: Cornell University Press.
- Tidball, K., & Stedman, R. (2013). Positive dependency and virtuous cycles: From resource dependence to resilience in urban social-ecological systems. *Ecological Economics*, 86(0), 292–299. doi: [10.1016/j.ecolecon.2012.10.004](https://doi.org/10.1016/j.ecolecon.2012.10.004)
- Tidball, K. G., & Weinstein, E. D. (2011). Applying the environment shaping methodology: Conceptual and practical challenges. *Journal of Intervention and Statebuilding*, 5(4).
- Tidball, K., Weinstein, E., et al. (2008). Stake-holder asset-based planning environment. *Department of Defense and DOD/OSD 2007 STTR Topic 003 Final Technical Report*. Washington, DC, jointly published by Logos Technologies, Inc., Cornell University, and International Sustainable Systems, 114.

- Tidball, K. G., Krasny, M., et al. (2010). Stewardship, learning, and memory in disaster resilience. *Environmental Education Research (Special Issue, Resilience in social-ecological systems: The role of learning and education)*, 16(5), 341–357.
- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment* (pp. 85–125). New York: Plenum.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224, 420–421.
- Ulrich, R. (1993). Effects of exposure to nature and abstract pictures on patients recovering from open heart surgery. *Journal of Social Psychophysiological Research*, 30, 204–221.
- Vale, L. J., & Campanella, T. J. (Eds.). (2005). *The resilient city: How modern cities recover from disaster*. New York: Oxford University Press.
- Varis, O. (1999). Water resources development: Vicious and virtuous circles. *Ambio*, 28(7), 599–603.
- Walker, B. H., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Washington, DC: Island Press.
- Walker, B., Holling, C. S., et al. (2004). Resilience, adaptability and transformability in social-ecological systems. *Ecology and Society*, 9(2), 5.
- Weinstein, E., & Tidball, K. G. (2007). Environment shaping: An alternative approach to development and aid. *Journal of Intervention and Statebuilding*, 1, 67–85.
- Wells, N. (2000). At home with nature: Effects of “Greenness” on children’s cognitive functioning. *Environment and Behavior*, 32(6), 775–795.
- Werner, E. E. (1995). Resilience in development. *Current Directions in Psychological Science*, 4(3), 81–85.
- Wilson, E. O. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.
- Wilson, J. Q., & Kelling, G. L. (1982). *Broken windows*. The Atlantic Washington, DC: Atlantic Media Company.
- Wimberley, E. T. (2009). *Nested ecology: The place of humans in the ecological hierarchy*. Baltimore: The Johns Hopkins University Press.

# Afterword

## A Closing Thought on Urban Resilience

Dan Lewis\*

‘Greening in the Red Zone’ is a critical, yet under-emphasized and under-utilized strategy for recovery following crisis. The content of this compilation describes a wide array of expertise that explores the concepts of ‘nature’ and ‘nurture’ together in an environment where both are typically damaged or destroyed... the ‘Red Zone’. It further opens new opportunities for the aid community, which is perpetually struggling to find the means to leave the survivors of red zone crises with the social and psychological tools to recover... ‘Greening’. The case studies, analysis and narratives suggest dozens of practical, inexpensive, and catalytic examples of how to apply a new dimension to comprehensive social-ecological recovery programming that not only addresses immediate needs, but also embeds the fundamental values of resilience.

Nowhere are these values more acutely in demand than in human settlements located in red zones, and nowhere else is the complexity of recovery more intricate. In spite of serious efforts to address this within the humanitarian community of practice, the capacity to function strategically, effectively, and within an integrated and collaborative system remains a challenge (see Weinstein and Tidball 2007; Tidball and Weinstein 2011 and Chap. 35, this volume). The consequences of this reverberate across the perceived divide between humanitarian and development defined mandates, which lie at the center of the confusion and dis-function that leaves in its wake situations like Haiti’s and South Sudan’s – in a perpetual red zone state. This ‘perception’ could be simply eliminated if the structural impediments created by donor states in their mandates to blend ‘humanitarian’ and ‘development’ funds were removed. And why not? Certainly enough has been written on the topic. We’ve all seen too many adverse media rants castigating the inefficiency of aid programs, and too many families have had their personal and collective resilience eroded by decades-long handout programs.

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\*The opinions expressed in this Afterword are those of the author and do not necessarily reflect the position of the United Nations or UN Habitat.

D. Lewis  
Chief, Urban Risk Reduction and City Resilience Profiling Programme,  
United Nations – Habitat, P.O. Box 30030, Nairobi, Kenya

‘Resilience’ – in particular urban resilience – demands a forward looking, target driven approach to urban development that uses a wide range of measures addressing all elements of urban systems, and anticipating all plausible hazards. Ensuring these targets are met demands an integration of effort throughout the hierarchy of: community – the population; organization – the government; and structure – or the physical assets, of all cities and other peopled landscapes. Interwoven through this structure are economic, social, environmental and cultural attributes that define the unique character of each social-ecological system referred to as a city. Understanding and protecting this, while ensuring the safety of all urban assets, especially its populations are critical in seeking urban resilience, especially as red zone conditions appear more imminent.

Within the urban red zone, the same principles apply – integration, coordination, and common purpose. After all, it is only practice – not policy – that limits humanitarian inputs to temporary investments, and development programming to explore ‘bespoke’ options rather than absorb output from emergency or life preserving humanitarian operations. More importantly, it is in the immediate aftermath of any crisis that acute vulnerabilities are starkly obvious, and the potential for taking early measures to address such vulnerabilities that can have long term or even permanent impact is extremely high. Often this is opportunity lost, though with a relatively simple remedy.

These concepts and this opportunity are inferred throughout *Greening in the Red Zone*, and understanding that all options, suggestions, and experience are contextual; the concept of social-ecological resilience is in any event, defined by the sum of *all* of its parts, and from all urban sub-systems. Stedman and Ingalls (see [Chap. 10](#)) contextualize their argument in ‘Topophilia, Biophilia and Greening in the Red Zone’ by reminding us that red zones exist in cities suffering longer term economic torpor and loss of social systems. Equally, the potential for slower onset erosion of capacity to maintain and deliver services in rapidly urbanizing areas is an uneasy truth that faces residents, business, urban managers and politicians, unless radical change in development and governance systems are made, now.

However, a final note on the concept of achievable resilience as alluded to in this compilation: Whilst most of the chapters in this volume illustrate how stewardship of the ‘ecology’ can (and does) provide a means of overcoming the misery of crisis – often in multiple and unacknowledged ways – while (re-) building individual, community and even urban resilience, new thinking needs to be applied to countries such as Kiribati, Tuvalu, and Maldives for instance, whose very existence is threatened by increasing sea temperatures and sea volume, and other countries where sea-level rise and coastal erosion are threatening the existence of whole towns such as St. Louis in Senegal, Dhaka in Bangladesh, or several towns along the southern coast of Cuba, to name just a few. In these cases, the options for sustainable ‘resilience’ are limited primarily by time, and the future is clearly written.

Notwithstanding the last point, *Greening in the Red Zone* explores the linkages – physical, social, and psychological, between ‘cultivation’ (in all its defined permutations- see Tidball [Chap. 4](#)), recovery, and transformation (Pickett et al. 2004), introducing

and promoting the process of greening the red zones of the world. UN-Habitat<sup>1</sup>, while essentially an ‘urban’ driven organization, recognizes the impact of ‘built’ systems on ‘eco-’systems, including built urban green-space, the intersections between the carrying and regenerative capacities of ecosystems and the metabolism of ‘hard’ infrastructure, the value (and reliance) of cities on internal, peri-urban and hinterland ecosystems, and the need for responsible stewardship of these within a sustainable urban development trajectory. A recent in-depth study by UN-Habitat of 57 cities (unpublished as of 20 Jan, 2013) reveals the degree to which these ecosystems and urban systems are inter-dependent, yet also reveals a wide variance in recognition – much less understanding – within regions, states, and cities of how critical that inter-dependence is. Most striking was a near-complete ignorance of supporting ecosystem services such as carbon storage, nutrient recycling, and pollination, all of which will be critical for cities facing red zone contexts brought about by climate change and food crisis. Again, the conclusions reached and guidance provided in this volume illustrate a series of practical and implementable measures that can bridge this ‘recognition gap’, through engagement of the organizational continuum from individual, up through community/neighborhood, borough, local authority, to the nation state including roles for external organizations such as those of ours working in and through red zones around the world.

## References

- Pickett, S. T. A., Cadenasso, M. L., & Grove, J. M. (2004). Resilient cities: Meaning, models, and metaphor for integrating the ecological, socio-economic, and planning realms. *Landscape and Urban Planning*, 69, 369–384.
- Tidball, K. G., & Weinstein, E. D. (2011). Applying the environment shaping methodology: Conceptual and practical challenges. *Journal of Intervention and Statebuilding*, 5(4), 369–394.
- Weinstein, E., & Tidball, K. G. (2007). Environment shaping: An alternative approach to development and aid. *Journal of Intervention and Statebuilding*, 1(Spring) 67–85.

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<sup>1</sup> [www.unhabitat.org](http://www.unhabitat.org)

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