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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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.[1]

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 Mentoor. 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

[1] 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,[2] 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[3] 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

[2] 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).

[3] For an overview of green political thought, see http://www.greenparty.org/ and 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,[4] as part of the title of his

[4] 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

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.[5]

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.

[5] 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, macrosystems 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 datcha 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 datcha 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 (Schmelzkopf 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.

13. Nature Engagement to Foster Resilience in Military Communities Marianne E. Krasny, Katherine Hess Pace, Keith G. Tidball, and Kenneth Helphand	Sense of community (Bowen et al. 2001, 2003) Community capacity (Huebner et al. 2009) Descriptions of multiple nature-based programs for veterans	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 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.
14. Garden for Victory! The American Victory Garden Campaign of World War II Laura Lawson	Government reports and historical documents	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.
16. Green Zones from Above and Below: A Retrospective and Cautionary Tale Charles Geisler	Theories of social and economic organization and historical accounts	Granting access to land historically has been used for empire building and as a response to negative aspects of industrialization.
17. Reflections on Defiant Gardens: Making Gardens in Wartime Kenneth Helphand	Testimony from soldiers, veterans, and war-time survivors	Soldiers turn to gardening as a source of individual resilience during war.

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.

22. Destruction and Replanting of the Urban Forest of Sarajevo, Bosnia and Herzegovina Igor Laćan and Joe R. McBride	Urban forest as part of Sarajevo social-ecological system.	War, including shelling and harvesting of trees for fuel	Reestablishment of urban forest through university and city led tree-planting.
23. The Re-greening of the Grey: Some Practical Considerations for the Urban Forest Sandra Gray	Urban forests and green infrastructure in cities. Chapter addresses urban trees more generally without reference to a particular place or system.	Tornadoes and other violent weather events	Collaborative efforts to restore damaged tree canopy, involving city government, local and national non-profit organizations, and community members.
25. Community-Based Memorials to September 11, 2001: Environmental Stewardship as Memory Work Erika S. Svendsen and Lindsay K. Campbell	Individuals who lost friends and family members. Social-ecological system of Manhattan. More broadly a sense of identity as a nation and world power.	Terrorist attacks to sites symbolic of global economic dominance and national pride	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.
27. Beyond the Bars: Landscapes for Health and Healing in Corrections Amy L. Lindemuth	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.	Negative psychological and societal effects of prison environments	Prisoners engage in gardening, which leads to positive feedbacks related to the value of green spaces in emotional well-being and healing.
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	Immigrants and immigrant communities in city of Rotterdam seeking acceptance, emotional well-being, and sense of community.	Discrimination and psychological and social impacts of displacement, including potential for ethnic discrimination and violence	Immigrants engaged in greening of open space.

(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 Tengö 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 Ares of Land: Resilience of City Dwellers in Russia Louiza Boukharaeva	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.

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