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

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

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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.[1]

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

[1] 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 Pripyat, 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.[2]

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

[2] 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.

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