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Sample references

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Information for subscribers



Human Ecology Review is published by ANU Press
The Australian National University
Canberra ACT 0200, Australia
Email: anupress@anu.edu.au
This title is available online at press.anu.edu.au
ISSN 1074-4827 (print)
ISSN 2204-0919 (online)
Printed by Griffin Press
Cover by Nausica Pinar
Page layout by ANU Press

HUMAN ECOLOGY REVIEW

Volume 21, Number 1, 2015

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Home to Australian Aboriginals, meadows to European graziers, wilderness to bushwalkers: The contested landscapes of the Australian Snowy Mountains. Photo courtesy of Peter Meusburger.

RESEARCH AND THEORY IN HUMAN ECOLOGY

Movement–Countermovement Dynamics in a Land Use Controversy

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Abstract

Recent studies have highlighted the ways in which activism can be suppressed in democratizing nations, yet much of this work tends to be state centered. Our research examines the role that private actors play in the repression of environmental activism in post-socialist Czech Republic. Following the 1989 collapse of the communist regime, the environmental movement experienced a brief period of widespread public support, which quickly gave way to anti-environmental trends and the general vilification of environmental activists. Drawing from in-depth interview data, newspaper coverage, and direct observation, we analyze a contentious highway bypass controversy around the city of Plzeň. Results indicate that environmentalists have been forced to contend not only with political hostility, but also with organized forms of public opposition from an anti-environmentalist countermovement organization.

Keywords: countermovements, democratization, environmentalism, land use, social movements

Introduction

In response to the deplorable environmental problems left in the wake of socialist rule, public environmental concern reached its peak shortly following the 1989 Velvet Revolution (Jehlička, 1999; Moldan & Hak, 2000). During this critical transition period, the burgeoning Czech environmental movement experienced widespread support for its campaigns. However, environmental concern soon waned among the public as attention shifted to the country's economic stability and development as it transitioned from a socialist system. As economic

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anxiety intensified throughout the country, environmental concern gave way to anti-environmental attitudes and the general vilification of environmental activists (Jehlička, 1999; Pavlínek & Pickles, 2000; Shriver & Messer, 2009; Slocock, 1996). Our analysis of an environmental controversy surrounding the placement of a highway bypass in the western Bohemian region of the Czech Republic highlights how the environmental movement strategically designed a campaign in this post-socialist context. Moreover, we examine how a private countermovement organization exploited anti-environmental public sentiments in order to successfully defeat the environmental activists.

Scholars have called for greater attention to the role of private actors as agents of protest control in studies of social movement repression (Earl, 2004, 2006; Ferree, 2005; Meyer & Staggenborg, 1996). It is particularly important to examine how these private agents affect social movement tactics, and ultimately how the activities of private opponents impact social movement success. Studies that focus on private agents of social control have paid particular attention to the importance of countermovements in the context of protest control, noting how they make tactical choices, strategically frame their messages, and enact social and political change (Dixon, 2008; Fetner, 2001; Griffin et al., 1986; Isaac, 2002; Lo, 1982; Meyer & Staggenborg, 1996; Mottl, 1980). We know that the dynamics between countermovements and their target social movements can shape activism and influence policy and the political process (Andrews, 2002; Dixon, 2008). Although much of this research is situated in mature democracies, what is lacking is an understanding of how these dynamics play out in other political contexts.

Building upon previous work on movement–countermovement dynamics as well as elite-driven countermovements, we examine the tactical interplay between an environmental movement and its opposition in the Czech Republic. We use the case of an environmental controversy surrounding the construction of a highway bypass in the industrial city of Plzeň to examine: (1) how movement–countermovement interactions and tactical choices unfold within the post-socialist context; and (2) how the interplay between these two groups influenced public reactions toward this environmental controversy. The ethnographic data used for this project include in-depth interviews with environmentalists, government officials, and private citizens organized to oppose environmental activists. We also utilized direct observation of protest events and analyzed newspaper coverage of the environmental controversy. This unique data set allowed us to analyze the strategies and tactics used by both environmentalists and their opponents. Findings suggest that the tactical interplay between environmental movements and their opposition in post-socialist societies can precipitate success or failure depending on broader trends in public environmental attitudes.

Movement–countermovement dynamics and tactical repertoires

While many social movement scholars have focused on the conflict–repression nexus between social movements and the state (Boykoff, 2007; Cunningham, 2003; Johnston & Mueller, 2001; Koopmans, 2005), comparatively little research has highlighted the role of private actors as agents of social control (Earl, 2004, 2006; Ferree, 2005; Meyer & Staggenborg, 1996). Numerous scholars have adopted Tilly’s (1978, p. 100) conceptualization of repression: “any action by another group which raises the contender’s cost of collective action” (e.g., Earl, 2004; Meyer & Staggenborg, 1996). This broad definition encompasses more traditional forms of repression by the state as well as non-state agents. Earl (2004) explicitly urges social movement analysts to focus on private agents of repression. More specifically, social movement scholars have echoed the need for analyses of how private countermovements influence social movement protest (Earl, 2004, 2006; Linden & Klandermans, 2006; Meyer & Staggenborg, 1996).

Private countermovement organizations can play a significant role in controlling and disrupting social movement activity, yet relatively little attention has been paid to the function of these groups in social movement research (Dixon, 2008; Griffin et al., 1986; Isaac, 2002). Counter.movements are conceptualized in several ways in social movement literature. At their core, counter.movements are defined as organizations that specifically work to oppose established social movements (Fetner, 2001; McCarthy & Zald, 1977; Meyer & Staggenborg, 1998). In this sense, they are characterized as reactive movements (Mottl, 1980; Useem, 1980). While these movements may arise in response to existing social movements, most often they act in tandem with social movements to oppose their tactics and goals (Meyer & Staggenborg, 1996). However, if the movement and countermovement coexist for long enough, they can be empirically uncoupled into two oppositional movements rather than a movement–countermovement pair (Andrews, 2002; Meyer & Staggenborg, 1996).

Research on movement–countermovements relations often focuses on how and why counter.movements emerge. Primarily, the target social movement must be perceived as potentially successful (Andrews, 2002; Meyer & Staggenborg, 1996). If the target social movement is able to reach its goals, the countermovement arises to neutralize those efforts (Meyer & Staggenborg, 1996). In addition, a social movement’s use of “successful” tactics can serve as a model for emergent counter.movements to design similar approaches to protest (Meyer & Staggenborg, 1996; Zald & Useem, 1987). In this way, the very preexistence of a social movement can create the social and political space for a countermovement to emerge.

Scholars have parsed different types of countermovements, but they have paid particular attention to organizations that have elite ties. Compared to more traditional social movements, countermovements are often described as having connections to both local and non-local authorities, placing them in a more advantageous structural location (Gale, 1986; Griffin et al., 1986; Lo, 1982; Mottl, 1980; Pichardo, 1995). Pichardo (1995, p. 42) describes these connections as “institutional linkages.” While most movements try to develop alliances with elite actors in some capacity (Meyer & Staggenborg, 1996; Tarrow, 1994), elite-driven countermovements have elite founders and leaders who drive the movements’ agenda and tactical choices (Austin, 2002; Earl, 2004; Pichardo, 1995). Elite-driven countermovements often arise when either the elites are the direct targets of social movement activity, or when elite interests are threatened by social movement activism.

Elite-driven countermovements often take on the appearance of citizen-based grassroots movements (Earl, 2004; Pichardo, 1995). These organizations often have access to additional resources and support, but they also have greater ability to mobilize the general public to oppose genuine grassroots movements and work toward elite ends. For example, several scholars have highlighted the role of elite-driven movements that take on the appearance of grassroots organizations in “manufacturing uncertainty” in the debate about global climate change (Dunlap, 2013; Oreskes & Conway, 2010; Powell, 2011). This research has shown how elite-driven countermovements not only shape public opinion, but can rally opposition against environmental activist groups. These types of groups are also distinguished by their strategic approaches. Pichardo (1995) distinguishes elite-driven countermovements from other types of private countermovements with the presence of vigilantism. Importantly, elite-driven movements’ influence with local authorities can afford them leeway in the context of violent tactics or vigilantism (Earl, 2004; Pichardo, 1995).

Although previous work has provided guidelines for defining elite-driven countermovements, identifying them in practice can be challenging. It can be problematic to distinguish an elite-driven countermovement from a countermovement that simply has elite alliances. In other words, how does one differentiate between elite support and elite leadership? We define elite-driven countermovements as those that are founded, controlled, and constituted by powerful institutional actors. In contrast, elite-allied countermovements enjoy support and resources from elites, but are founded, controlled, and constituted by non-elite actors. Irons (2006, p. 177) notes, “Current theories of movement repression understate the complexity and variability of the state-countermovement relationship. State and society can overlap in the effort of protest control in multiple ways. However, the assumption that such overlap automatically translates into a fully aligned effort is problematic.” Thus,

the nature of an organization's elite connections can be clandestine, and the composition of the membership base may be unclear. However, distinguishing between elite-driven and elite-allied countermovements has important theoretical and conceptual implications for understanding strategic approaches and tactical choices.

While burgeoning research on movement–countermovement relations has identified some key conceptual and empirical findings (Fetner, 2001; Lo, 1982; Meyer & Staggenborg, 1996, 1998; Mottl, 1980; Zald & Useem, 1987), additional work is needed to unpack the relationships and outcomes associated with these complex interactions. Movement–countermovement dynamics have been described as a conjoint process where both sides influence each other as well as the broader political and social milieu (Fetner, 2001; Gamson & Meyer, 1996; Meyer & Staggenborg, 1996; Miceli, 2005). In this process, it is important to highlight what we term tactical reflexivity, or the willingness and ability of movements to adapt their tactical approaches to changing internal and external circumstances. The ability to alter tactical approaches is especially important in the context of movement–countermovement contention (Meyer & Staggenborg, 1996). Tactical choices range from extra-institutional tactics, such as violent public protest, to institutional approaches, such as lobbying. The scope of a movement's tactics shapes its contention with countermovements, and likewise the interplay between movements informs the development and adaptation of tactical repertoires (Dixon, 2008; Griffin et al., 1986; Rohlinger, 2006).

Much of the research regarding the tactical interplay between movements and countermovements indicates that the antecedent movement sets the tone for the oppositions' tactical choices. Furthermore, the countermovement must often “parallel” the tactics of the target movement in order to retain a tactical advantage. While there may be nuanced differences in the tactical repertoires of either side of the conflict, the countermovement often must engage in the same political or social sphere as its target movement (Dixon, 2008; Meyer & Staggenborg, 1996). The ensuing process of protest and counter-protest involves responding to and opposing frames and claims from each side (Dixon, 2008; Mottl, 1980). For social movements, this work is ancillary to protest efforts aimed at the movement's original goals of social or political change, and thus can potentially redirect crucial organizational resources away from its original targets.

We argue that research on the tactical interplay between movements and countermovements must take three issues into account. First, the end goal of oppositional tactical maneuvering is achieving a favorable position for the movement. If a social movement organization is put on the “defensive,” or put into a position where it must continually retaliate against oppositional framing, it can be at a significant tactical disadvantage. Second, movements must be willing

to adapt their tactical repertoires (Hewitt & McCammon, 2004) and to draw from a diverse arsenal of tactics that can work in multiple protest settings (Dixon, 2008). Tactical flexibility increases a movement's effectiveness in achieving its goals. Third, countermovement efforts can both thwart social movement success and impede a social movement's ability to protest (Meyer & Staggenborg, 1996).

While extant research has provided considerable insights into the complex relationship between movements and countermovements, most of this work has focused on protest activity that occurs in mature democracies. We believe that such dynamics are heavily influenced by the political context as well as the substantive topic under debate. What is unclear in previous work is how dynamics between social movements and countermovements play out in a post-socialist context. In what ways do the tactical choices of each side of the conflict precipitate movement success or failure? Moreover, how can the interplay between an environmental movement and its countermovement affect public environmental attitudes, particularly in a newly developed democracy?

Methods

The data for this project come from ethnographic research and include in-depth interviews, direct observation, and review of archival and secondary sources. As part of a larger research project on environmental activism in the Czech Republic, the second author conducted fieldwork over a 10-year period, between 2000 and 2009. Semi-structured interviews were conducted with 135 respondents. The full data set provides contextual backdrop of the Czech environmental movement. For this project, however, we focus on in-depth interviews with environmentalists associated with Children of the Earth (*Děti Země*) (CoE), government officials involved in the Plzeň bypass controversy, and members of the countermovement organization, Group for the Highway (*občanské sdružení Dálnice*) (GfH).²

Initial contacts were established with representatives of CoE through visits to the regional office in Plzeň and the national headquarters in Prague. We interviewed key leaders from CoE and then used a snowball sampling technique to identify additional activists. Similarly, initial interviews were conducted with the leaders of the countermovement organization GfH. Through snowball sampling we conducted additional interviews with GfH supporters over the next two years. In-depth interviews were also conducted with governmental officials close to the Plzeň controversy who offered their critical assessments of CoE.

2 The countermovement organization was officially registered with the government in September 1997 as *občanské sdružení Dálnice*, or civic group Highway. For clarity in translation, however, we refer to the organization as Group for the Highway (GfH) throughout the analysis.

Archival research and reviews of relevant newspaper coverage provided additional sources of data for this project. We reviewed hundreds of internal environmental movement documents housed at national and regional headquarters of CoE. These data provided invaluable materials not only for constructing the history of the controversy, but also for analyzing the strategies and tactics used by environmentalists and their opponents. We also reviewed nearly 300 newspaper articles on the Plzeň highway bypass controversy between 1999 and 2001, the peak of the public controversy. Nearly two-thirds of these newspaper articles were published in the regional newspaper, *Plzeňský deník*. We also collected and reviewed relevant news articles from *Mladá fronta*, *Právo*, *Lidové noviny*, and *Hospodářské noviny*. Newspaper coverage of the bypass controversy provided significant context for the case and allowed us to better understand the tactical choices used by competing sides.

The origins of the bypass controversy in Plzeň

Our analysis begins by examining the details of the Plzeň bypass conflict. Our findings detail how the environmental organization CoE developed a repertoire of institutional tactics in order to promote a bypass option that would be less damaging to the local environment. We highlight how post-socialist environmental legislation and CoE's reliance on legal and institutional strategies influenced this environmental controversy.

The history of the Plzeň bypass and relevant post-socialist environmental legislation

The city of Plzeň, located in the western Bohemian region of the Czech Republic, has a history of significant issues associated with air pollution. As a hub for four main transport corridors, Plzeň most notably experienced extensive air pollution from heavy traffic congestion. Large trucks made up a significant portion of the traffic, contributing noxious emissions and noise pollution. Both residents and city officials attributed the worst of the air quality problems to the poorly planned highways of the socialist era. The high volume of exhaust from commercial traffic was often trapped by temperature inversion and, as a result, the air pollution was severe enough to choke local residents. In the 1990s, residents began to press officials to move forward with plans to construct a bypass that would redirect traffic away from the city center. A GfH member in the city's center illustrated the urgency of the situation:

The quality of the air in Plzeň is horrible. All of this is because of the bypass. We don't have a highway bypass. There are so many cars and

trucks driving through Plzeň everyday because we don't have a highway that will lead around Plzeň. So the emissions and smog in the center is unbearable. (interview with GfH representative, May 19, 2000)

Recent research has linked the pollution problems in Plzeň to health problems among its residents, specifically noting alarmingly high rates of kidney and colon cancer (Holt, 2010). Aware of these issues, many residents are concerned for their own health as well as the health of the area's children. But despite widespread agreement on the need for a bypass, the debate about where to place the bypass persisted for over a decade.

In 1990, officials considered bypass variants both to the north and south of Plzeň (Konopásek et al., 2008). In response, a coalition of residents in the south protested the proposals for the southern variants. In 1991, a large team of experts analyzed both north and south options and recommended the southern variant (known as the K variant). The recommendation was presented to local and national authorities and negotiations ensued. Although Plzeň's local health official felt that the northern variant was a better choice, the Plzeň municipality, then prime minister Petr Pithart, and the Czechoslovakian Minister of the Environment endorsed the recommended K variant in the south.

In response to the government support for the southern option, residents of the villages Brucna and Cernice (near the proposed K variant) organized a petition in 1991 and 1992 against this variant. An environmental activist described this coalition of residents, known as the Petition Committee, as a group of wealthy citizens with elite connections: "The residents of these areas are very influential, the wealthy upper class of the community. The chief of the Petition Committee is the head of the West Bohemia Energy Works. This is a person in a very influential position. And, they had very strong connections with the local government in Plzeň" (interview with CoE representative, June 8, 2000). The Petition Committee actively promoted an alternative southern route away from Brucna and Cernice, known as the S variant. They called for a new expert analysis of the options in 1992, which resulted in a recommendation for the S variant.

At the same time, significant environmental legislation was passed that facilitated the public's participation in the democratic process. The government passed new environmental laws designed to address the legacy of severe environmental damage left in the wake of the socialist regime. Essentially, these laws provided guidelines and regulations for the environmental assessment of additions to the legislation, planned activities (e.g., construction of new motorways), and public participation in environmental decision-making. The most salient portions of

this new legislation were procedures for environmental impact assessment (EIA) that specifically allowed for public participation in environmental decision-making.

The trend of environment-focused legislation did not last long, however. After the bifurcation of Czechoslovakia into the Czech Republic and Slovak Republic in January 1993, Václav Klaus, a leader in the conservative Civic Democratic Party (*Občanská demokratická strana*), served as prime minister of the Czech Republic. He and his followers began a campaign targeted toward environmental activists and organizations, fostering a widespread anti-environmental sentiment among the Czech public. The new government passed Decree No. 631, The Development of Motorways and Expressways Up to 2005, which charted direction for the progression of highway planning. Significantly, the decree passed without any public discussion despite the EIA process, which required public participation in any new conceptual additions to environmental legislation.

In 1993, a team of experts conducted an EIA to assess potential environmental effects of the proposed bypass variants in Plzeň. Among other data, the assessment relied heavily on the 1992 analysis that recommended the S variant. The team drew considerable criticism for using a biased analysis to inform its recommendation, using faulty data collection procedures, and making a recommendation without sufficient information. Nevertheless, the EIA team recommended the S variant, as proposed by the Petition Committee. This longer variant would be situated further from the wealthier areas of Plzeň and would cut through Valík Hill (an environmentally protected area), near the Plzeň villages of Radobyčice, Štěnovice and Útušice (Konopásek et al., 2008).

Based on the EIA's recommendation for the S variant, the Ministry of the Environment approved a version of this variant in 1994, known as the SUK2. The Water Resource Office challenged the decision, claiming that the SUK2 would pose a significant threat to Plzeň's only source of drinking water, and significant opposition to the SUK2 arose among Plzeň residents. The residents of Štěnovice and Útušice organized a group called the Association for the Protection of Valík Hill. This citizen-based organization needed help in dealing with the complex legal and scientific issues associated with the bypass controversy. They reached out to CoE, an environmental organization with more experience in these types of battles.

Children of the Earth and the campaign for the K variant

CoE formed in September 1989, just three months before the Velvet Revolution. Following the revolution, the activists involved with CoE seized the new opportunities associated with the burgeoning democracy and established

CoE as an official non-governmental organization (NGO) in Prague in 1990. The group focused mainly on the environmental aspects of transport issues, waste, and environmental protection. The organization received funding from international NGOs as well as the European Union. The Plzeň branch of CoE was established in 1990, and in 1994 the Association for the Protection of Valík Hill requested CoE's help with the bypass issue. The Plzeň branch included about 20 core members, but many other environmental activists, NGOs, and concerned citizens became involved.

Like the broader environmental movement, CoE was galvanized by the freedoms and rights available through the post-socialist state. As a result, the group shifted from a tactical repertoire of direct actions to a new set of institutional tactics to lead in the fight for the K variant. Importantly, the environmentalists decided to work within legal and governmental arenas. A veteran environmentalist who had been active in CoE at the national level described how their shift to institutional tactics coincided with the introduction of environmental legislation in the early 90s:

Of course in the beginning of the 1990s, we were doing more direct actions. We didn't have experience [with legal tactics] and there were no opportunities to participate in the hearings, so mostly we were doing petitions, public events, and writing letters to parliament members. This was until 1994 or 1995. Then we started participating in EIAs ... It was then that we started taking advantage of legal strategies. (interview with CoE representative, July 8, 2002)

CoE attempted to take advantage of environmental legislation adopted in the post-socialist period, which opened the door to participation in the decision-making process. An environmentalist with CoE explained their approach to the highway controversy:

There are several mechanisms to involve the public in decision-making ... The law regarding the protection of the environment and the landscape is the most important because it allows civic organizations to participate in all phases of decision-making. Citizens' organizations have the right to appeal and have access to relevant documents. (interview with CoE representative, June 8, 2000)

The environmental group's initial tactics established their participation in the bypass decision-making process; they filed two constitutional complaints in 1994. The first complaint was against the 1993 passage of Klaus's Decree No. 631. The group argued that the decree should not have been passed without being subject to public debate, as per the new EIA. The court upheld the decree because it was seen as an improvement to existing legislature rather than a new

concept, and thus was not subject to public discussion. CoE partnered with the residents of Štěnovice and Útušice to file a second constitutional complaint regarding the revocation of the recommendation for the K variant; however, since the complaint was lodged after the allotted time for challenges to be filed, the courts refused to hear it.

CoE and local residents' strategic efforts were successful in raising concern about environmental issues associated with the bypass. In 1995, an office within the Ministry of the Environment conducted an environmental assessment of the SUK2 on Valík Hill. The office ultimately recommended the K variant as the best environmental option. Nonetheless, the Minister of the Environment conceded to pressures from the other officials and recommended the SUK2 variant on March 15, 1995. Consequently, the local Planning and Control Office in Plzeň issued a territorial decision paving the way for the construction of the SUK2 in December 1995.

The disconnect between the 1995 assessment that recommended the K variant and the ensuing endorsement of the SUK2 heralded problems for the environmental activists. Some CoE activists felt that their faith in the democratic system and their reliance on an institutional tactical repertoire may have been misguided. Importantly, authorities restricted citizens' ability to participate in this decision by limiting the time to file a complaint from 15 to 10 days. CoE immediately asked why the Minister of the Environment had rejected the recommendation for the K variant and threatened to take the issue to court. The environmental activists felt that the minister's recommendation and the ensuing territorial decision from the local Planning and Control Office signaled that the democratic process was failing.

In an attempt to solidify their position as legitimate participants in the bypass decision-making process as well as potentially delay construction of the SUK2, CoE activists decided to communally purchase a strip of land across the proposed route. CoE felt that this intensification of their institutional tactics would allow them to voice their concerns as landowners rather than as an NGO. At the time of the land purchase, Czech legislation was unclear as to how and to what extent NGOs could participate in official decision-making, but landowners were seen as vital participants. However, the strategy backfired as it left CoE vulnerable to oppositional rumors and they severely underestimated how the public would perceive their efforts. Plzeň citizens rejected the land trust strategy, accusing CoE of employing extremist tactics. An environmentalist who took part in the land trust described public perceptions of this tactic:

[The land trust] has been very bad for our image ... In 1995, it looked like a very good idea, but now the people of Plzeň are very angry with us. Journalists write that we are trying to block the bypass by purchasing

the strip of land ... These are just rumors, but you have no chance to tell people, "No, it's not true." (interview with CoE representative, June 8, 2000)

In 1996, CoE persevered with their legal campaign for the K variant. The Minister of Regional Development issued a territorial decision, decreeing the bypass would cut through Valík Hill in the form of a transit tunnel, based on the endorsement of the SUK2 in 1995. CoE immediately protested this decision and acted on their earlier threat to take legal action by jointly filing a lawsuit with several municipalities. In 1997, the Czech High Court ruled in favor of the environmentalists, finding the December 1995 territorial decision for the SUK2 variant illegal for two reasons. First, the director of the local Planning and Control Office limited the time allotted for citizens to object to the decision by five days. Second, whereas the 1993 EIA recommended the original S variant, the Planning and Control Office ultimately supported a modified version of this variant. As a result, the High Court authorized a new EIA, which would assess all possible variant options. At the time of the High Court decision, public support was in favor of the pro-K advocates; a local poll indicated that 46 percent of Plzeň citizens supported CoE.

Stoking anti-environmentalism: Movement-counter-movement dynamics in the bypass controversy

In the mid-1990s, CoE appeared to be spearheading a successful campaign against the SUK2 variant, garnering support from many Plzeň residents. In response to the success of the campaign, however, an elite-driven counter-movement organization emerged to oppose the environmentalists' efforts. We document how this counter-movement fundamentally altered the highway controversy in Plzeň. Our analysis examines the tactical interplay between the environmental movement and counter-movement, and highlights how broader trends in the post-socialist political landscape shaped these dynamics.

The rise of the counter-movement organization, Group for the Highway

In September 1997, a counter-movement organization, GfH, was established to oppose the efforts of CoE and their allies. GfH specifically worked to garner public support for the SUK2, and to erode public and governmental support for CoE. Unlike CoE, GfH devised a tactical repertoire that strategically avoided legal and governmental avenues. Instead, they focused on fighting the environmentalists in the public sphere. In public statements, the counter-movement claimed that

environmentalists were purposefully delaying the construction of the bypass, and therefore endangering the health and well-being of Plzeň residents. During the height of their activities in 2000, an activist in GfH illustrated this sentiment:

I witnessed some old grandmother signing [one of CoE's] petitions and she didn't even know what she was signing ... It is just a bunch of nonsense that the environmentalists are doing. (interview with GfH representative, June 22, 2000)

GfH had institutional ties to Plzeň city authorities. Indeed, the countermovement's leader was a former member of the Plzeň City Council. After GfH was established in 1997, environmentalists noted a significant increase in opposition to their efforts from the city government. In 1998, a new mayor of Plzeň was elected, and he promptly prioritized the construction of the bypass. In numerous public statements and interviews, the mayor blamed CoE for the delays in the bypass construction. The new city authorities publicly accused CoE activists of being ecoterrorists. An environmental activist recalled his reaction to these statements:

In the Plzeň case, the local government and the media took advantage of the situation, and they started blaming the environmentalists for the highway delay. I don't know of any "ecoterrorists" in the Czech Republic. I would like to see one, but there are none ... These people, these "ecoterrorists," would not be in environmental groups like Children of the Earth. (interview with CoE representative, June 8, 2000)

To further stoke the anti-environmentalist sentiment in Plzeň, city officials circulated a public opinion poll that was clearly slanted toward the SUK2. Officials used the results to publicize that support for the K variant in 1997 had shifted to the SUK2 because it would be finished faster. A member of CoE offered an explanation:

Plzeň citizens are very frustrated and that is understandable. It was necessary to find a target to place the blame on. The Plzeň local government continues very intensely to put the blame of the highway bypass controversy on the environmentalists. (interview with CoE representative, June 24, 2000)

GfH began a targeted and strategic public relations campaign to disseminate anti-environmentalist messages. A GfH leader described how they used the media to defeat CoE: "They (CoE) are not able to prove their argument. The key issue is to disprove their arguments in the eyes of the media. So I'm disproving their arguments step by step" (interview with GfH representative, July 12, 2000). Environmentalists argued the countermovement's media campaign illustrated their willingness and desire to mislead the public. An environmentalist from CoE described their frustration with the countermovement's tactics:

"[Countermovement leader's name] reports information about environmentalists to the newspapers, even when he knows it is not true. He just makes unfounded comments to the newspapers, and citizens are willing to believe them" (interview with CoE representative, June 24, 2000).

GfH frequently accused environmentalists of exploiting the democratic process to further their own agenda. A member of the countermovement explained:

When a group of 20 environmentalists put together a petition and get it signed by a thousand of their supporters, our democratic system calls this "public interest." From a legal point of view, this petition is considered worthy of government attention – it has legal power. The state can no longer stop these groups from doing this. Environmentalists are very aware of this fact. (interview with GfH representative, June 22, 2000)

A leader of GfH added that CoE exploited the legal system simply to delay construction of the bypass: "Environmentalists don't do anything except cause delays for the highway ... Every time they appeal, the court has to go through the entire case again. The environmentalists rely on the time it takes for the courts to make a decision just to delay the work that needs to be done" (interview with GfH representative, July 13, 2000). The respondent went on to say that the activists' efforts were wasted: "Ninety percent of these people [environmentalists] are all talk. They are not doing anything for the environment. Standing with a sign or a poster isn't going to do anything for the environment. The people who are really helping the environment are the ones doing research and publishing, not someone who is just arguing with the authorities" (interview with GfH representative, July 13, 2000). Another GfH member simply stated: "In Czech, environmentalists have replaced true ecology with their brand of pseudo protection of the environment" (interview with GfH representative, June 27, 2000).

Environmentalists often explained that local newspapers were biased toward the city government and the elite-supported countermovement organization. CoE leaders pointed to the *Plzeň Daily* (*Plzeňský deník*) as particularly problematic. A member of CoE explained the nature of reporting on the bypass controversy: "I don't know why, but for some reason they [*Plzeň Daily* journalists] are on the side of Plzeň town hall officials on all of these environmental issues. You can see that the *Plzeň Daily* is not objective at all" (interview with CoE representative, June 4, 2001). Another environmental activist reported similar experiences with coverage of the conflict: "There was always something about me or Children of the Earth written in the *Plzeň Daily*, at least once or twice a week. And it was written in a negative way" (interview with CoE representative, June 5,

2001). A member of CoE explained the success of the countermovement's media campaign against environmentalists, and why it was difficult for pro-K activists to fight back:

They [GfH and the Plzeň city government] started circulating lies that were easier to believe. We tried to answer with the truth, but this was not so easy to understand. Their lies were simple, but the truth was complicated. People received the simple lies much better than the complicated truths ... The truth is that the local newspapers were on the side of the town hall. So the local newspapers were publishing these simple lies, and our more complex arguments against it were almost never published. (interview with CoE representative, June 4, 2001)

The escalation of countermovement tactics

Following the second EIA for the bypass in 1998, the tactical interplay between CoE and GfH intensified. The EIA process followed the guidelines laid out by the Czech court. Community meetings allowed public involvement in the EIA process, documents were made widely available to NGOs, and the expert team that evaluated all possible variants used appropriate methods of data collection and analysis. In an effort to counteract claims made by GfH and the Plzeň city government, CoE went to the media and promised that they would support the EIA team's recommendation. The EIA team recommended a variant called the KUO, which was an amalgamation of the K and the SUK2 variants. The KUO was a longer option than the K variant, but would avoid cutting through Valík Hill and would be located closer to Plzeň.

After the recommendation for the KUO was made public, the Ministry of the Environment abrogated the former territorial decision regarding Valík Hill. Importantly, the annulment of this decision technically made the construction of the SUK2 illegal. Despite the recommendation of the new EIA, however, the Ministry of Regional Development failed to endorse the KUO, and instead continued with plans for construction of the SUK2. Following suit, the Plzeň city government also rejected the KUO variant. Consequently, Plzeň officials issued a territorial decision for the SUK2 and authorized permits for the construction of several houses across the proposed KUO corridor.

CoE again relied on their repertoire of institutional tactics and threatened to take the violation of protocol to the courts, accusing the various ministries of backroom dealing and conflicts of interest. After the announcement that the Ministry of Regional Development would not support the KUO, CoE began receiving threatening phone calls. Activists suspected that the callers were either directly affiliated with GfH, or at the very least influenced by the

countermovement's negative campaign against CoE. A leader of CoE played tapes of the phone messages for the second author in June 2000. He described the situation:

We contacted the police and told them that we were threatened ... There were some people that called us and said that we are bastards ... But there were also four threats that were really extreme where they said they will, in very bad words, they will hang us by our balls from the street lamps. (interview with CoE representative, June 24, 2000)

Despite the threats of violence, CoE moved forward with their efforts to challenge the territorial decision in the courts. Along with several other environmental NGOs, the activists wrote a letter to the Minister of Regional Development and requested an explanation for his failure to follow the recommendation of the second EIA. Ultimately, the ministry's rejection of the recommendation left many disenchanted with the process of public involvement in environmental decision-making.

Throughout 2000, both the Plzeň city government and GfH intensified their opposition to CoE. The mayor and his staff continued to make inflammatory statements to the press regarding environmentalists' role in the bypass conflict. Members of CoE noted the disparity in influence and power between the environmentalists and the countermovement group. Environmentalists alleged that GfH was founded by Plzeň elites. GfH's institutional linkages became apparent on May 18, 2000, when the countermovement organized a public demonstration with the support of city authorities and police. The demonstration was held on one of the main streets in Plzeň and was attended by several hundred supporters of GfH. Approximately 20 members of CoE also attended the rally, along with the second author. Several of the environmental activists held signs promoting the K variant. However, the demonstration quickly devolved, leading to threats and violence. A member of CoE who attended the rally described the interaction between GfH and CoE at the demonstration: "[The leader of GfH] attacked us. They also ruined our posters and billboards. They were cussing us in public" (interview with CoE representative, July 8, 2002).

The demonstration was flanked by a significant police presence. Many of the environmentalists expected the police to step in and reprimand GfH supporters. When the police intervened, however, it was the environmentalists who were forced out of the demonstration and across the street. CoE members reported hearing both police and countermovement supporters shouting that the environmentalists had no right to attend the public gathering. Several respondents attributed this to the countermovement's ties to the police and Plzeň city officials.

Activists from CoE specifically chose non-violent tactics at the rally. While the group never used physical violence or threats to accomplish their goals, they realized that even the appearance of these types of tactics would be harmful to their image. The then leader of CoE explained their rationale:

We had a meeting before the demonstration. Normally, I carry pepper spray. I left it here because, really, the worst thing that could happen to us would be if the police say, “There were people from Children of the Earth and they had some kind of arms.” We really could not do this. Also, we discussed whether we would use poles for signs or not. Because, people can say that the poles were not for signs, but for beating someone. So we were very careful. (interview with CoE representative, June 27, 2002)

Despite the unjust treatment of environmentalists, members from GfH circulated a petition for the SUK2 and gathered hundreds of resident signatures. The countermovement organization described the event as a success, and as further evidence that most Plzeň residents did not support CoE.

The defeat of Children of the Earth

In 2000, members of CoE and the pro-K coalition felt that they had to regain public support if they were going to be successful in the courts. The environmentalists filed a new lawsuit against the 1999 territorial decision for the SUK2 on the basis that it both rejected the recommendation made by the EIA and it ignored the Minister of the Environment’s retraction of his support for the SUK2. In a final effort to turn public opinion back to their favor, CoE members posted flyers in buses and bus stations. The flyers explained that CoE was not trying to delay the bypass process with the lawsuit, and that the environmentalists were not against the bypass altogether.

Despite the opposition against them, the environmentalists were initially optimistic about the lawsuit. During interviews conducted in the summer of 2000, several members of CoE explained that they were expecting the High Court to rule in their favor. Moreover, the activists felt that a positive outcome in the courts would prompt Plzeň residents to turn their support back to CoE. For example, one activist explained:

We are right! We have the support of the experts! We are not like the people from Group for the Highway ... And on the other side, the side of Group for the Highway, there are only people from politics ... They have political power. But they have no experts! (interview with CoE representative, June 24, 2000)

At the time, CoE promised that they would withdraw from the bypass controversy if they lost the 2000 lawsuit in the High Court.

On 29 March 2001, the High Court handed down a ruling in favor of the SUK2, upholding the 1999 territorial decision. A few months later, parliament enacted a law specifically stating that the construction of the Plzeň bypass was a matter of public interest. The law allowed the Plzeň city government and the project developer to circumvent many of the official procedures associated with motorway construction. Shortly after the announcement of the court decision, the national office of CoE announced they were officially abandoning the campaign. This decision was perceived as a betrayal by some members of CoE as well as the rest of the pro-K coalition who wanted to continue the campaign.

Discussion and conclusions

While previous research has primarily focused on movement–countermovement dynamics in mature democracies (Fetner, 2001; Lo, 1982; Meyer & Staggenborg, 1996, 1998; Mottl, 1980; Zald & Useem, 1987), our analysis of a highway bypass controversy highlights how these interactions played out in a post-socialist democracy. In response to severe air pollution in the city of Plzeň, both citizens and local authorities agreed there was an immediate need for a highway bypass to redirect commercial and residential traffic away from the city center. However, the placement of the bypass became a highly debated issue for more than a decade. The environmental group CoE relied primarily on institutional tactics to promote their preferred variant of the bypass. In response, the elite-driven countermovement GfH strategically promoted anti-environmentalist sentiment among the public.

Scholars have noted the importance of unpacking the complexities and nuances of elite ties to countermovements (e.g., Irons 2006), which is particularly important in cases of environmental disputes. We argue that these relationships may play out in different ways in terms of tactical repertoires. By examining the membership and connections of GfH, we were able to identify and analyze the group as an elite-driven countermovement. Our findings suggest that the countermovements' elite leadership and connections afforded the group substantial latitude in their use of retaliatory tactics against CoE (see also Earl 2004; Pichardo 1995). However, countermovements that are elite allied and do not have elite leadership may have less leeway for deploying extreme or unlawful tactical approaches. Thus, our research illuminates important questions for future research on elite-driven and elite-allied countermovements.

This research also highlights the importance of examining political context in analyses of movement–countermovement dynamics, especially in cases of

environmental disputes. Our analysis revealed that the newly democratizing political system shaped the interplay between CoE and GfH in several important ways. First, at the time that the highway bypass options were debated in 1992, environmental legislation was passed that facilitated the public's participation in the democratic process. However, public participation in decision-making was new for both policymakers and for Czech citizens. Findings showed that CoE attempted to take advantage of this opportunity, but the rules for participation proved difficult to navigate. For example, the environmental group's land trust strategy was intended to legitimize their participation in the bypass debate; however, it caused both public and official opinion to turn against the group. Thus, whereas established democracies offer well-worn institutional avenues for social movements to participate in environmental discussions, activists must forge new strategic pathways in transitional and post-socialist countries.

In many cases of movement–countermovement interplay set in mature democracies, it is the social movement that develops a repertoire of extra-institutional tactics and the countermovement that utilizes institutional avenues to oppose their target. However, our results highlight how movement–countermovement dynamics developed quite differently in a less mature democracy. Because the Plzeň bypass controversy took place in the decade following the 1989 revolution, the opposing sides of the conflict straddled the socialist and post-socialist eras. Consistent with trends in the broader environmental movement, CoE drew from the tactics afforded them by the new democratic system by adopting an institutional tactical repertoire. The activists became heavily involved in environmental decision-making as well as the legal system throughout their campaign for the K variant. In the months leading up to the 2001 High Court decision against CoE, the environmentalists were confident that proper legal procedure and objective expert opinion would ensure their victory over their opposition.

This case highlights the importance of tactical reflexivity for movement success, specifically in the context of environmental controversies. Previous work on counter-movements highlights how counter-movements often develop tactics that parallel those of their target movement (Dixon, 2008; Meyer & Staggenborg, 1996); however, we argue that counter-movements can identify their opponents' tactical blind spots and use them to their advantage. While CoE developed an institutional strategy, the elite-driven counter-movement GfH drew from an entirely different arsenal of tactics. In addition to relying on their elite ties, the counter-movement forced the conflict out of the courtroom and into the public sphere. In doing so, they gained widespread approval through an intensive media campaign designed to vilify environmentalists. The counter-movement was able to take advantage of the existing bias in the media against environmental protest. In contrast, CoE failed to garner the support of Plzeň residents because

they focused so intently on a purely institutional approach to activism. GfH capitalized on CoE's tactical mistakes and ultimately shifted both public and state support to their preferred version of the bypass.

Our findings reveal how movement-counter movement dynamics influence public opinion in the context of post-socialist environmental controversies. While environmental problems were in the spotlight of public attention at the time of the 1989 Velvet Revolution, environmental concern quickly diminished. From their inception in 1997, GfH tapped into broader trends of anti-environmentalism to engender doubt and distrust of environmentalists among the public. Their deliberate campaign against the environmentalists' agenda, coupled with CoE's failure to engage public support, resulted in a significant upswing in anti-environmental sentiment among the public.

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Bridging Activism and the Academy: Exposing Environmental Injustices Through the Feminist Ethnographic Method of Photovoice¹

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Abstract

The neoliberal rejection of a strong role for governmental regulation of industry has led to increasingly negative consequences for the environment and the people who are forced to bear a disproportionate share of the health and safety hazards created by corporate polluters. The voices of the victims of environmental injustice often go unheard in the policy arena, while an arsenal of paid industry lobbyists exerts undue influence and power over legislative and regulatory agency processes. In this paper, I argue that we as social scientists are frequently positioned in such a way that we could serve as links between the people we study and policymakers, providing an avenue for exposing the ways that neoliberal policies negatively affect the health, safety, and well-being of disenfranchised groups. Through presenting a “Photovoice” project I conducted with 54 women living in five coal-mining communities in southern West Virginia, I demonstrate how feminist activist ethnography, as a distinct type of activist research, can be used for social science inquiry while simultaneously providing an opportunity for research participants’ stories to be heard—and acted upon—by those with political power.

Keywords: activist research, coal, environmental justice, feminist ethnography, neoliberalism, photovoice

Introduction

According to the United States Environmental Protection Agency’s *Toxics Release Inventory*, in 2009 alone, United States industries self-reported releasing 3.37 billion pounds of toxic pollutants into the air, water, and land. Of these

1 An earlier version of this article received the 2013 Robert Boguslaw Award for Technology and Humanism from the Environment & Technology Section of the American Sociological Association.

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toxic substances, approximately 700 million pounds are known or suspected carcinogens (EPA, 2009). Because these are self-reported numbers, it is impossible to know how many more millions of pounds of released toxics are not reported.

The cause of such high rates of illegal releases can be traced to both a lack of enforcement of the laws that are in place and an overall inadequacy of pollution regulation. As a case in point, an investigative study conducted by *The New York Times* in 2009 reveals that since the passage of the Clean Water Act of 1977, the rate of water pollution violations has risen significantly. Between 2004 and 2009, companies and other facilities self-reported violating the Clean Water Act more than 506,000 times (Duhigg, 2009). The vast majority of these polluters have escaped punishment; less than 3 percent of these Clean Water Act violations led to fines or other sanctions for the offending companies (Duhigg, 2009).

Pollution is, quite simply, a cost-saving measure, especially when regulation is lax and punishments are minimal. Over the past three decades, corporations have worked hard to reverse many of the environmental regulations that were won during the 1970s (Faber, 2008). Particularly with the increased international competition that has been the result of globalization, corporations have even more aggressively sought to lower their production costs through pushing for neoliberal policies that would reduce taxes and decrease government regulation. As a result, since the 1970s, the global economy has experienced a shift toward social and economic policies that favor the interests of capital over the well-being of most people. Central to this neoliberal demand for “regulatory reform” is a rolling back of policies aimed at protecting the environment and public health, occupational health and safety rules, consumer protection laws, “and other regulations seen as impinging on corporate earnings” (Faber, 2008, p. 15). Under the guise of increased “market freedom,” this turn toward neoliberalism has served to strengthen the power and control of economic elites (Harvey, 2005).

Because an unrelenting drive to increase profits and decrease costs is intrinsic to corporate capitalism (Sweezy, 1989), it is standard operating procedure for companies to externalize costs (such as pollution) whenever possible (Brulle & Pellow, 2006; Schnaiberg, 1980). It is widely held among environmental sociologists that capitalism has created a “treadmill of production” (Schnaiberg, 1980; Gould et al., 2004) or a “treadmill of accumulation” (Foster, 2005; Foster et al., 2010), wherein economic growth is dependent upon increasing the consumption of natural resources and externalizing the costs of pollution. Companies choose to pollute—both legally and illegally—because it is profitable to do so, far more profitable than implementing pollution-prevention technology (Faber, 2008). For example, rather than “internalize” the \$10 million it would take to install a scrubber to clean chemical pollutants from emissions, when

given the choice, most chemical companies will instead choose to externalize this cost onto the surrounding community through polluting the air and damaging the health of residents (Faber, 2008; p. 24).

Arguably, neoliberal policies have caused the treadmill of accumulation to speed up. Fewer regulations and the primacy of “the market” above all else have meant that corporations have been able to externalize pollution costs more and more readily. Furthermore, as environmental justice scholars contend, not all people share the burden of these cost externalizations equally. Those with the least political and economic power—communities of color, low income communities, women, and people of the global South—bear a disproportionate share of society’s waste and pollution (Bullard, 1990; Bullard et al., 2007; Čapek, 1993; Faber, 2008, 2009; Masterson-Allen & Brown, 1990; Pellow, 2004, 2007). As Faber (2008, p. 25) so poignantly asserts, the most disempowered people in the United States are not only “effectively denied a voice in American society,” but they also “serve as the dumping ground for capital.”

How can we as environmental social scientists help mitigate these injustices? Does our power to counter the harmful effects of the current political–economic order lie simply in our ability to empirically study and theorize the consequences of neoliberalism and capitalism? While such examinations are certainly important to this aim, are the *products* of our research enough? In this paper, I contend that scholars not only have the ability to choose to study the devastating consequences of neoliberal policies on the lives of individual people, but we also hold the power to expose and attract public and policy attention to these consequences through the *methods* of investigation we employ.

Specifically, I contend that feminist activist ethnography—as a distinct type of activist research—is particularly well suited to act as a form of resistance to the injustices of neoliberalism. Discussions of the value of feminist methods rarely take place outside the confines of gender-related research. However, I argue that feminist activist ethnography has utility for other subfields and among scholars who may not necessarily identify as feminists. Drawing on the experience of an eight-month “Photovoice” project I conducted with 54 women living in five coal-mining communities in Central Appalachia, I discuss the ways in which feminist activist ethnography can simultaneously be used for social science inquiry while also serving to promote social justice in the wake of neoliberalism.

Neoliberalism’s lockdown on democratic participation

Ironically, while neoliberal ideologues purport the “freedom” of neoliberal policies, neoliberalism is, as Barbara Ellen Smith (2014) argues, actually a regime

of “*spatial dispossession*,” which both “produces and depends on the lockdown of public space” (Smith, 2011, p. 5). Reid and Taylor (2010, p. 40) similarly argue that neoliberalism has closed off access to the “ecological commons” for many people, “enclos[ing] more and more life forms that were previously taboo or invisible to exchange value (water, air, forests, gift economies or care, genetic codes, professional research, etc.).” Indeed, at its very core, “The power and wealth of capitalism is predicated on the denial and erasure of the commons” (ibid.).

The political assault on the ecological commons is being initiated and led by the biggest corporate polluters in the United States, who have created an intricate web of think tanks, policy institutes, research centers, foundations, non-profit organizations, public relations firms, and political action committees that are organized with the purpose of waging war on environmental regulations (Faber, 2008, p. 15). This network, which Faber terms the “polluter-industrial complex,” is “committed to discrediting the environmental movement and to dismantling state programs and policies that promote environmental justice, protect public health, and safeguard the earth” (ibid.).

The polluting corporate power elite is able to wield inordinate influence through employing a number of strategies, such as contributing enormous sums of money to political campaigns and political action committees (Faber, 2008; Jenkins, 2011); influencing regulatory agency leadership appointments and oversight (Faber, 2008; Harrison, 2011); acting as informal “advisors” to political leaders (Switzer, 1997); hiring researchers and enlisting think tanks to obfuscate and cast doubt on incriminating scientific findings (Markowitz & Rosner, 2002; McCright & Dunlap, 2000; Oreskes & Conway, 2010); reshaping public opinion through astroturf (fake grassroots) organizations and front groups (Beder, 1998; Bell & York, 2010; Boudet & Bell, 2014; Faber, 2008; McNutt & Boland, 2007; Switzer, 1997); and through pouring millions of dollars into lobbying efforts (Faber, 2008; Jenkins, 2011; Switzer, 1997). According to Faber (2008), this final tactic—special interest lobbying—is a particularly powerful mechanism for “colonizing the state.” In 2009 and 2010, special interests spent nearly \$7 billion on lobbying (Beckel, 2011), and there are approximately 90,000 people engaged in or supporting lobbying activities in Washington, DC alone (Faber, 2008, p. 97). As Faber argues:

The infusion of such enormous sums of money into the lobbying process buys corporate polluters disproportionate access to governmental officials and exerts a corrosive effect on American democracy. Industry lobbyists are now integrated so extensively into the environmental agency rule-making and legislative processes that their recommendations

are frequently adopted with little modification. In some cases, corporate lobbyists are the ones actually writing the new rules and regulations word for word. (Faber, 2008, p. 98)

Thus, most often, the voices of ordinary citizens are left out of the legislative process entirely. If neoliberalism is a regime of “spatial dispossession” (Smith, 2014), one of the most insidious sites of spatial dispossession is democratic participation. Accessing and providing input into public policy is a nearly impossible task for the average citizen. As Reid and Taylor (2010) assert, the political system discourages—even blocks—true democratic participation and civic engagement. Individuals must practically “bushwhack their own way out of their homes in order to connect their personal paths with others” and navigate the policy arena (Reid & Taylor, 2010, p. 81). Furthermore, the people who are the most affected by neoliberal policies tend to have the least political power and fewest resources, such as time, money, and education. Thus, a lack of power and resources often translates to a lower propensity toward mobilizing against the machinations of the polluter-industrial complex.

The control that the polluter-industrial complex exerts over the legislative and regulatory bodies that are tasked with protecting the health of the public and environment is clearly a malfeasance of tremendous magnitude. But even more, undoing this lockdown on democratic space may be critical for the future of our planet and its inhabitants. Numerous scholars have argued that in order to slow down the devastation wrought by the treadmill of accumulation, control of the federal government *must* be wrested away from the polluter-industrial complex and put into the hands of local people (Faber, 2008; Foster, 2009; Reid & Taylor, 2010).

Democratizing the state is a monumental task. However, we as social scientists are positioned in such a way that we can contribute to this purpose if we so choose, and I contend that feminist activist ethnography is particularly well suited for this aim.

Feminist activist ethnography: Exposing the effects of neoliberalism on individual lives

Ethnography can be described as a “cocktail” of methods that “share the assumption that personal engagement with the subject is the key to understanding a particular culture or social setting” (Hobbs, 2006, p. 101). This “cocktail” of methods can include such components as participant observation, interviews, discourse analysis, photographs, and other artifacts of the social world (Hobbs, 2006). What makes an ethnography explicitly *feminist* is when it incorporates an intentionality to expose the structures of power that lead to inequality and the

oppression of certain groups, through highlighting the “everyday experiences” of those individuals who are “forced to live on the margins” of society (Davis, 2013, p. 27). As Craven and Davis (2013, p. 1) define it, feminist ethnography is a “project committed to documenting lived experience as it is impacted by gender, race, class, sexuality, and other aspects of participants’ lives.” The mission of feminist inquiry, as articulated by Stanley (1990, p. 15), “is to change the world, not only to study it.”

An ethnography becomes *activist* when it incorporates an “intervention” of some form that works toward social justice goals (Davis, 2013, p. 27). Thus, what makes feminist activist ethnography distinct as a research method is (1) its emphasis on revealing the lived experiences of social inequality and injustice among research participants, and (2) its attempt to do something to bring about positive social change for the people in the study.

Certainly, feminist activist ethnography is not the only type of social science research that is aimed at intervening on behalf of social justice. Practitioners of liberation sociology (Feagin & Vera, 2008); participatory action research (Fals-Borda, 1987; McIntyre, 2008; Tandon, 1981); public sociology (Agger, 2000; Burawoy, 2005); public anthropology (Borofsky, 2011); and activist critical geography (Hay, 2001) also engage research strategies that seek to expose and address social injustices. However, what makes feminist activist ethnography such a powerful tool and counter to neoliberal ideology is its attention to individual people’s stories and experiences of injustice. As Davis and Craven (2011) argue, neoliberalism functions to wipe away the differences among individuals in society by falsely claiming that all groups have the same access to various benefits such as health care, a living wage, a healthy environment, and democratic participation. The particularities of disenfranchised groups’ experiences have been erased by neoliberalism, experiences that feminist ethnography—as a rule—privileges. As Anglin (2013, p. 46) asserts, feminist ethnography can reveal the myriad consequences of neoliberal policies, “and, in so doing, disrupt the logics of necessity and evenhandedness that serve as their justification.” Feminist ethnography has the capacity to serve as a corrective to neoliberal denials of the inequalities inherent to capitalism through its power to “raise the volume of subjugated voices” and expose the ways in which neoliberal policies “lurk in people’s lives” (Davis & Craven, 2011, pp. 197, 195). In other words, researchers engaging this approach are positioned in such a way that they can, if they so choose, bring the voices of marginalized individuals forward to the policy arena.

As Bickham-Mendez (2008) asserts, consciously conducting research with the goal of packaging our findings for legislators and others with political power puts our own position of privilege to good use, as there is a tendency for decision-makers to assume research conducted by social justice organizations is not as

scientific or accurate as academic studies. As such, academic research has the potential to provide social justice movements credibility in the eyes of decision-makers and to draw attention to our research subjects' narratives of injustice. The value of lending legitimacy in this way is underscored by Reid and Taylor (2010, p. 82), who point out that movements for social and environmental justice are often "dismissed as 'too local,' as mere NIMBYism." Likewise, Barbara Ellen Smith argues that there is often a "disparagement of place-based organizing as 'merely' local" because the local is seen as "small, bounded, insular, interior, whereas the global represents a boundless, cosmopolitan exteriority" that is somehow more worthwhile and meaningful (Smith, 2011, p. 12; Smith & Fisher, 2012).

Despite power-holders' frequent dismissal of "the local," I would argue that it is precisely the *localness* of grassroots struggles for environmental justice that offers opportunities for powerful resistance to neoliberalism. The environmental justice platform can be especially influential *because* it is grounded in local struggles for human rights, seeking social justice for people who live in the most polluted environments in the world. This focus on protecting people and communities makes it possible for environmental justice movements to cross political boundaries more readily than mainstream environmental movements, allowing for a wider base of support (Bell, 2010). Finding ways to expose and draw attention to locally produced narratives of injustice is something that feminist researchers are well positioned to do.

The non-neutrality of feminist ethnography

Feminist research does not claim to be neutral, and this lack of neutrality has brought it under critique from researchers who embrace a positivist approach to scientific inquiry. Positivist social science purports "value neutrality" as a litmus test for whether a research study is scientifically sound. The underlying assumption is that researcher-as-human (with a distinct gender identification, class background, age, racial and ethnic identity, sexual identity, and nationality) can, and should, be separated from the knowledge he or she produces. Researchers should be "objective" so as to create value-neutral science. Thus, the idea of undertaking a research study with the intention of exposing the injustices of neoliberalism on individual people's lives would be viewed as "unscientific" through the positivist lens. However, feminist standpoint theorists, such as Dorothy Smith and Sandra Harding, among many others, call into question the very attainability of a value-neutral science, arguing that all researchers occupy a distinct social location that influences every aspect of the knowledge-production process, including who is included as part of the research team, how the data are collected and interpreted, when and why the research project ends, how the research results are reported and shared with

the world, and what types of questions are considered worthy of study in the first place (Harding, 1993). Sandra Harding's (1991, p. 142) concept of "strong objectivity" calls for the "acknowledgement that all human beliefs—including our best scientific beliefs—are socially situated." Thus, rather than feigning true objectivity, we, as scientists, should make clear our positionality and the biases that we inevitably bring to the table. In this way, feminist activist research can be considered a more honest science, because the views of the researcher are exposed for all to see. Taking it even a step further, Leacock (1987, p. 323) argues that attempting to conduct research as a "neutral" observer "means to align oneself, by default, with the institutional structures that discriminate and exploit poor and non-white people." Similarly, Hale (2008, p. 8 cited in Craven and Davis, 2012) contends that such attempts at neutrality create a "smoke screen for alignment with the powerful."

Feminist standpoint theorists also maintain that some of the social locations that certain individuals inhabit are better starting points than others for raising critical questions and initiating particular knowledge-creation endeavors, especially those focused on understanding power relations (Harding, 1991, 1993) or, as Dorothy Smith terms them, "Relations of ruling" (Smith, 1987, p. 3). Specifically, Harding and other standpoint theorists argue that those who occupy marginalized social locations (women, racial and ethnic minorities, working-class individuals, non-heterosexuals, or those who are transgender, for instance) have an "epistemic, scientific, and political advantage" (Harding, 2004, p. 8) because they see the realities of inequality in a way that people occupying positions of political, economic, and social privilege do not. Many feminist activist ethnographers maintain that by seeking out the voices of those who do not typically have a dominant voice in the policy or public arena, a more whole truth can be exposed.

Not all critiques of feminist ethnography have come from the outside. While feminist researchers have long believed that ethnography is particularly well suited for feminist research because of its emphasis on interpersonal relationships and respect for and collaboration with research participants, Judith Stacey, in her heavily cited "Can There Be a Feminist Ethnography?" (1988, p. 24), argues that a "potential treacherousness" lies within this method. As she explains, "Precisely because ethnographic research depends upon human relationship, engagement, and attachment, it places research subjects at grave risk of manipulation and betrayal by the ethnographer" (ibid., p. 23). Researchers are in a very clear position of power—they typically have control over the interpretation of the data, the duration of the research, the product and presentation of the research findings, and the decision of whether they will continue to be involved in the lives of their research participants after the data collection is over. Stacey maintains that the "exploitative aspect of ethnographic

process seem[s] unavoidable,” for “the lives, loves, and tragedies that fieldwork informants share with a researcher are ultimately data, grist for the ethnographic mill, a mill that has a truly grinding power” (ibid., p. 23).

However, Davis (2013, p. 35) counters that in many cases, particularly in this era of neoliberalism, “the question is not what to omit from the feminist ethnographic production as Stacey argued, but rather, what to say when research participants *want us* to share their intimacies with people in positions of power” in the hopes that those individuals may be moved to help in some manner. Davis further reflects that, as a feminist activist researcher, she feels a duty to share the stories she has collected from her research participants “in the manner that they [wish]—in full detail and attributed to them” (Davis, 2013, p. 36). Further corroborating this sentiment, Anglin (2013, p. 49, note 14) maintains that her response to Stacey’s question, “Can There be a Feminist Ethnography?” is decidedly “in the affirmative.” As she sees it, her role as an ethnographer, activist, and feminist is to “aid in making [narratives of injustice] available” to those who might be able to facilitate change (Anglin, 2013, p. 49).

In the remainder of this article, I use the example of a “Photovoice” project that I conducted with women living in the coal-mining region of southern West Virginia to demonstrate how feminist activist ethnography can simultaneously be used for social science inquiry while also providing a venue for research participants’ stories to be heard—and acted upon—by policymakers. In addition, I argue that the Photovoice method addresses some of the dilemmas of feminist ethnography regarding what details are told and whose voice does the telling (the researcher versus the research participants) through creating opportunities for participants to communicate their stories to policymakers for themselves. I examine the potential of this feminist method for empowering research participants to become more politically engaged in their communities as a form of resistance to neoliberalism’s lockdown on democratic participation.

The setting: The coal-mining region of Central Appalachia

The cost externalizations of capitalism are glaringly apparent in the coal-mining region of Central Appalachia, where the true price of cheap energy is externalized onto local people and their environment in the form of pollution, destruction of the land, and limited economic opportunities (Bell, 2013, 2014). In this region, more than 1 million acres of land and over 500 mountains have been destroyed by mountaintop removal coal mining (Geredien, 2009). As a result of mountaintop removal and other coal industry practices, residents must contend with devastating floods, coal slurry impoundment breaches, unsafe

road conditions, air pollution, and ecosystem destruction (Bell, 2010, 2013; EPA, 2005; Erikson, 1976; Flood Advisory Technical Taskforce, 2002; Orem, 2006; Palmer et al., 2010; Scott et al., 2005).

One of the most alarming examples of cost externalization in Central Appalachia is the way in which the coal industry disposes of coal waste from the “cleaning” of coal. Before this fossil fuel is sent to power plants to be burned, it must be processed in order to remove non-combustible materials, such as sulfur. The coal-cleaning process that the industry chooses to use generates large quantities of liquid coal waste, also called “slurry” or “sludge.” This waste product is made up of water, chemicals, and particles of coal, which contain a number of toxic metals, such as aluminum, arsenic, beryllium, cobalt, and mercury, among others. Coal waste is either stored “permanently” in huge dams on the top of surface-mined land (slurry impoundments), or it is pumped underground into abandoned mine shafts (slurry injections). Flying over southern West Virginia and eastern Kentucky, one can see that many of the enormous black impoundments—some containing billions of gallons of coal waste—are situated on mountaintops directly above small communities. The disasters of Buffalo Creek, West Virginia, in 1972 (Erickson, 1976) and Martin County, Kentucky, in 2000 (Eades, 2000; Scott et al., 2005) provide startling evidence of the tremendous damage that can ensue when one of these sludge impoundments fails. In October 2000, the Martin County impoundment spilled 250 million gallons of sludge (20 times greater than the Exxon Valdez oil spill) and polluted more than 70 miles of West Virginia and Kentucky waterways, killing wildlife, decimating habitats, and destroying homes. The community of Buffalo Creek suffered an even more devastating fate on the morning of February 26, 1972, when a torrent of black sludge water ripped through the hollow, killing 125 people and leaving thousands homeless (Erikson, 1976). These two ruinous events are not the only slurry impoundment failures that have occurred; many smaller impoundment breaches take place regularly throughout coal-affected regions and often go unreported in news media outlets. In 2000, 45 slurry impoundments in West Virginia were considered to be at high risk for failure, and 32 were at moderate risk (Eades, 2000).

Underground slurry injections create additional burdens for individuals living in close proximity to these operations. Residents of some communities in Mingo, Boone, and Logan counties in southern West Virginia have found that their well water is contaminated with coal waste leached from underground slurry injection sites (Bell, 2013). Many of the people in these communities at first did not realize that the discolored water was actually coal waste—they were told they either just had iron in their water or that dirt was getting through their

filters. So people bought better water filters and continued drinking, cooking with, and bathing in this contaminated water for many years—until they and their families became ill.

There are well-documented medical disorders that result from organic coal compounds in drinking water, most notably diseases of the kidneys and urinary tract, such as Balken endemic nephropathy, which causes end-stage renal failure and has been linked to cancers of the renal pelvis and upper urinary tract (Orem, 2006). Many of the individuals whose well water is polluted with coal waste have reported suffering a wide range of illnesses, including liver cancer, kidney cancer, brain cancer, skin disorders, gall stones, colitis, painful urination, chronic diarrhea, and organ failure (Duhigg, 2009a; Wells, 2006).

Former top Mine Safety and Health Administration safety trainer Jack Spadaro maintains that the type of coal cleaning that generates a need for coal slurry impoundments and slurry injections is not necessary, as there are “other technologies, such as dry filter press systems.” However, he asserts that the coal industry uses these methods because it “saves a dollar a ton in processing” (Stockman, 2006, pp. 6–7). Thus, while there are other methods of coal cleaning and waste disposal that would be safer for local residents, the coal industry in Central Appalachia chooses *not* to use these more expensive methods, opting instead to externalize the costs onto the surrounding people and environment.

Photovoice as feminist activist ethnography

As part of a larger study (Bell, 2010) examining the barriers to local participation in the Central Appalachian environmental justice movement, in 2008 and 2009 I undertook an eight-month Photovoice project with women living in five coal-mining communities in southern West Virginia.³ The outcomes of this project, many of which were tangential to my own academic research questions and goals, reveal the way that feminist ethnography can be used as a tool to counter the lobbying efforts of the polluter-industrial complex, bringing the voices of unheard citizens to the policy arena.

First conceptualized in the public health literature by Wang and colleagues in the mid-1990s, Photovoice employs participant-produced photography and narratives as a means of giving voice to and facilitating “empowerment education” among marginalized persons or groups (Wang & Burris, 1994; Wang et al., 1998). While others have used modified versions of this method and have still called it Photovoice, the original conceptualization of the process is explicitly feminist (Wang & Redwood-Jones, 2001). Through Photovoice,

³ The project reported here is distinct from the Photovoice project discussed in Bell (2008), which was an earlier, smaller project that I initiated five years earlier in only one coal-mining community.

individuals receive cameras to take pictures that represent important aspects of their lives and communities. Participants attend regular group reflection meetings to share their images, identify common themes, build social bonds with other group members, and discuss and examine the underlying issues represented in their images. After discussing their photographs, participants write short narratives to accompany their pictures, creating “photostories.” Often, Photovoice groups will hold community exhibits, presentations, and participate in other actions as part of their projects. Photovoice has been used in many places throughout the world to provide a mechanism for individuals to become their own documentary photographers, empowering them to make decisions about how their lives and communities should be represented, instead of allowing outside journalists to make those decisions for them. Photovoice has also been used extensively in the field of public health as a health promotion strategy (Catalani & Minkler, 2009).

While Photovoice has primarily been conceptualized as a type of participatory action research, I maintain that it can also be a powerful example of feminist activist ethnography. As noted above, ethnography is a combination of methods that are used to understand the social world—from the perspective of those who are the subjects of our research—through personal engagement with our research participants (Hobbs, 2006). At the very least, Photovoice includes participant observation and the creation of participant-produced photography and narratives, but it often also includes other methods characteristic of ethnography, such as interviews and focus groups. Furthermore, what makes Photovoice a *feminist* method is its focus on marginalized individuals as the participants, and their everyday experiences as the subject matter of the photostories they create. It should be no surprise that Photovoice can be both participatory action research and feminist activist ethnography, as feminisms have long “informed and grounded action research,” despite the fact that many participatory action researchers are unaware of the connection (Maguire, 2001, p. 59).

Photovoice in five coal-affected communities

During the summer of 2008, I began recruiting participants in five coal-mining communities for an eight-month Photovoice project in southern West Virginia. Across these five communities, a total of 54 local women⁴ signed up for the project, 47 of whom had no prior involvement in environmental justice activism and seven of whom were somehow associated with at least one local environmental justice organization working to hold the coal industry responsible for coal-related problems.

4 Some women did drop out over the course of the eight months, however. A total of 40 women created at least one “photostory” during the project, and 35 completed the project.

During the orientation, I gave all the participants digital cameras and asked them to take pictures to “tell the story” of their communities, emphasizing that this story could include positive aspects of their lives and also the problems they and their neighbors face. I facilitated meetings every three weeks in each of the five communities throughout the eight months, providing an opportunity for the women to share their photographs with each other, identify themes or issues that were common among the photos that were shared, create “photostories” (photographs with written narratives), and openly talk about potential solutions to community problems they discussed. In addition to the local meetings, I also organized two regional Photovoice gatherings during the project so that the women from all five communities had the opportunity to meet each other and share their photostories with women from the other communities.

Feminist critiques of fieldwork have pointed to the power imbalances that exist in both the design of research and in the research setting. Feminist ethnographic methods, such as Photovoice, attempt to challenge these power dynamics by viewing research participants not as “subjects” but as partners in the study and co-creators of the design, implementation, and benefits of the research. Thus, while in my project I sought to study the social processes taking place during the course of the project in order to better understand the barriers to environmental justice activism, the *participants* had power over the ultimate outcomes of the project itself. They decided what to photograph, what aspects of life to write about, and which photostories to include in the public exhibits and presentations.

Because they decided what to photograph, some of the women did not focus on coal-related issues at all. Many decided to use their photographs to dispel negative stereotypes about the region, showcasing the beauty of southern West Virginia’s mountains, creeks, and wildlife. Others chose to document important cultural traditions and the rich history of the area through their photostories, such as Figure 1, titled “Ginseng.”



"Ginseng"

Ginseng grows wild in the hills of West Virginia. This piece of ginseng was found in [my community]. It weighed 7 ounces. It might not sound like much, but it isn't something one can find very often....more like once in a lifetime, if you're fortunate. In 2007, one could sell ginseng for around \$800.00 per pound. A piece this size would sell for well over \$1000.00. There is a difference between wild ginseng and cultivated ginseng. It was estimated that this particular piece was over 100 years old!

Figure 1. Example of a photostory about cultural traditions in West Virginia

Source: Southern West Virginia Photovoice Project.

In addition to positive photostories, most of the women also used their photographs and words to reveal problems that they perceived in their communities. It was through these problem photostories that the power of feminist ethnography for reaching policymakers became apparent. Those who chose to use Photovoice in this way focused on a number of different issues, such as dilapidated and dangerous roads or the overwhelming amount of trash littering the roadsides and creek banks. Figure 2 is one example. It is called "Please Pass the Bottle Bill!" and advocates for the West Virginia legislature to pass a bottle deposit law.



“Please Pass the Bottle Bill!”

This picture was taken [in my community] after a rain. As you can see, trash piles up against our bridges almost anytime it rains. Look at all those bottles! The biggest part of the trash we see piled up by our bridges is pop bottles and water bottles. This is really nasty to look at, and all this trash is also very hard on the wildlife in our area. If we had a bottle deposit in our state, a lot of this wouldn't be here. I would really like to see our state pass the Bottle Bill this year.

Figure 2. Example of a problem photostory

Source: Southern West Virginia Photovoice Project.

One of the major problems that became a focal area for many of the women was water contamination. Figure 3 reveals one participant's worries related to coal slurry injection sites behind her home.



“Coal Slurry Injection Site”

This pipe is where the coal companies injected coal slurry (waste) into an old underground coal mine for storage. There are many sites like this throughout the mountains, and no one knows they are there unless they happen upon them while four-wheeling. This site is directly above my home. If it ever breaks loose, the damage will be devastating. No one has ever contacted us to inform us that this slurry injection was taking place so close to our house.

Figure 3. Example of a slurry injection site photostory

Source: Southern West Virginia Photovoice Project.

As the women created photostories documenting the problems in their communities, I encouraged them to write, call, and even meet with their state legislators to discuss the issues. Many of the Photovoice women communicated with their legislators for the very first time through this project, mailing their representatives printed copies of their “problem” photostories or calling them directly. Three even traveled to the state capitol to meet with their legislators in person, taking photostories and video footage of their community’s pothole-stricken roads and water contamination to share. In addition, I helped the Photovoice women organize public exhibits and presentations of their photostories in each of the five communities and put together a regional exhibit in the capital city of Charleston. The women invited local politicians and

legislators to these exhibits and presentations, which was another opportunity to communicate with their elected officials. Four of the five community exhibits had at least one state legislator in attendance. In addition, three local newspapers and one state newspaper covered the content of the Photovoice exhibits, and West Virginia Public Radio ran a four-minute story about the project (including audio from one of the community exhibits). We also created a legislative “issue booklet” of photostories depicting coal-related water contamination, made a website, and self-published a book of photostories that has become part of the collections of a few rural libraries in southern West Virginia. At the end of the project, the women kept all of the photostory boards so that they could continue to organize and hold exhibits of their work throughout their communities.

Photovoice outcomes in Prenter, West Virginia

Less than a year before the Photovoice project started, residents of one of the communities in the project became concerned about possible contamination problems in their well water. One of the local environmental justice organizations held a community meeting to provide a forum for residents to discuss their worries about their discolored and foul-smelling water. Resident Maria Lambert and her family attended this meeting. They, like the others in attendance, began to realize that what they thought was just a problem with their own water was actually a bigger community issue. As Maria told me in an interview for my (2013) book,

Everybody was showing [samples of] their water. Different people stood up and told about their water and told about what they believed was happening, and told about the different illnesses—the brain tumors, the gall bladder problems, stomach problems, children’s teeth falling out, and all of these things.

As she listened to her neighbors, Maria started to realize the similarities between their stories and what had been happening in her own family:

[I]t’s like my whole life [was] flashing before my eyes, because my children had lost their teeth [from decay before breaking through the gums], my parents had had cancer, we’d had our gall bladders removed, and all of these things was, it’s just like, oh no, it’s not just us—it’s the whole community, and we’re not even blood related. There was Jennifer Massey, who had lost her brother to a brain tumor; Kathy Weikle who had a pituitary tumor; Terry Keith who has the triplets and another grandchild who has to bathe in the water, and they were having a rash and everything. They were having to mix their formula with the water and didn’t realize it was bad. Oh gosh, let’s see. Several people had kidney problems in their family. There’s been two kidney transplants—

one was a small child and one was an older gentleman—in the past four or five years. People dying from kidney disease, kidney dialysis patients. My mother had to have a third of her lung removed from lung cancer—it wasn't in the bronchial tubes, it was in the fatty part of the lung, the tissuey part of the lung. And then my father come through thyroid cancer. And my husband and I both have had major stomach problems. (Bell, 2013, p. 72)

The weekend after the community meeting, Maria was hospitalized for intestinal bleeding. Below, she describes the anger she felt when she discovered that the well water was the cause of her health problems.

All summer long I had been on some medication, and my white blood [cell] count had dropped down to 2.5, and that is not good. They wanted me to go off of some of my medication to see if it could be that that was causing it. And I thought, "Well, since I'm going off of medication, I'm just going to go ahead and try to lose some of this weight," because I weighed over two hundred pounds. I lost fifty pounds by drinking water all summer long—our water—the water that we should not have been drinking. They tell you, "Drink lots of water," you know. So when I found out that what I thought was supposed to be a good thing [made me sick], I got so mad. It was just like an inferno inside of me that was just busting to get out. I was just really, really mad. And about the time I would think that I was going to get over it, I'd get mad all over again.

... [P]eople are suffering and it's not right for people in power to take advantage of everyday working, taxpaying, breathing citizens. They're taking away from us and trying to make people believe that they're *giving* to us. They have made people believe that for a hundred years, or more—even from the beginning of time. People in power have *always* abused their power. (Bell, 2013, pp. 78–79)

The residents learned that the well-water contamination was the result of an underground coal slurry injection site. The coal waste had leached out of the storage chambers (which were abandoned underground coal mines) into the water table, polluting all of the wells in the community. Soon after this initial community meeting, Maria became involved with a campaign to bring clean water to Prenter. The group's immediate concern was to raise money for emergency water deliveries to the homes of residents living in the vicinity. Their ultimate goal was to raise enough money and awareness so that the municipal water line would be extended up the entire hollow in order for residents to have permanent access to clean water.

The Photovoice project began a few months after the water efforts in this community were under way. Maria joined a local Photovoice group, and she decided to use her photostories to help draw attention to the water contamination problems that she and other residents were experiencing (see Figure 4).



“The Changing of the Water Filter”

This photo shows what a new water filter should look like (white one) and after only three months (black one), it has become unthinkable black from something lurking in the well. My Dad says it looks like pure coal slurry water -- he should know, as he worked at a coal tippie for many years and saw first-hand what it looked and smelled like.

Figure 4. Example of a water contamination photostory

Source: Southern West Virginia Photovoice Project.

In addition to their inclusion in the community exhibits that we held, the photostories that Maria created, along with other participants’ water contamination photostories, were used to create a full-color, 20-photostory legislative booklet to be used during the 2009 legislative session. The Photovoice women and a community group called the Sludge Safety Project distributed these booklets to West Virginia legislators and used them along with

the enlarged photostory boards in their efforts to educate community leaders, policymakers, and local citizens about the problems with coal slurry injections and impoundments.

Due to the hard work of Maria and the various community groups working for clean water in Prenter, including the Sludge Safety Project, the Prenter Water Fund, Coal River Mountain Watch, and Ohio Valley Environmental Coalition, this community did raise enough money for an emergency water supply, and they eventually received a city block grant to have water service extended into Prenter Hollow. In addition, progress was made toward the goal of banning the practice of underground slurry injections. During the groundbreaking ceremony for the waterline in August 2009, Senator Ron Stollings announced that the West Virginia Department of Environmental Protection would be placing a moratorium on all new permits for coal slurry injection sites.⁵ As reported in the *Coal Valley News*, Stollings specifically cited Maria's photostories as a reason for his commitment to stop new underground coal slurry injections:

"There are some health issues in this community," the Senator and local physician said. "There will be no more new slurry injections from here on out," Stollings said to a round of applause. Stollings praised the work of Prenter resident Maria Lambert, whose photo essays helped give a visual voice to the problems plaguing the area. "I appreciate that grassroots approach and it goes to show that the old adage, the squeaky wheel gets the grease, is correct," he said. (Newman, 2009)

While this Photovoice project was just one small community-based action among the tremendous number of communications legislators receive from industry lobbyists, it does demonstrate how effective this method can be for providing a point of connection between the grassroots community and policy-makers. If making these connections between our research subjects and the policy arena were to become normative within social science research, the outcomes could be significant.

Photovoice as "empowerment education"

While the awareness that the photostories helped bring to the water contamination problems in Prenter was one of the more profound outcomes from the project, there were a number of other less politically contentious, but still positive, results in the other communities. As I describe elsewhere, most of the women who created coal-critical photostories, even those who chose to display them publicly, were not comfortable moving from critique of the

⁵ However, activists are still pushing for a moratorium on permit renewals and modifications for current slurry injection sites.

coal industry to actually taking action against its harmful practices through activism (Bell, 2010). I found numerous social forces at play preventing these women from becoming involved more formally in the environmental justice movement, two of the most significant being the power of the local elite, who were able to exert great pressure within their small communities to stifle residents' willingness to speak out against the coal industry, and, secondly, the changing face of the environmental justice movement, which has made potential local recruits less likely to view the movement as being compatible with their own personal identities (Bell, 2010). Despite the fact that only five of the participants who started the project as "non-activists" became formally involved in the environmental justice movement during the project, 17 of the non-activist participants chose explicitly coal-critical or vaguely coal-critical photostories for inclusion in the public exhibits and the Photovoice website. Thus, it appears that Photovoice provided a number of the participants who were not comfortable with activism per se a more socially "safe" opportunity for expressing public dissent against the practices of the coal industry.

While most of the women were not comfortable becoming involved in formalized activist activities, all of the groups advocated for certain changes and ideas for improvement in their communities. Less politically contentious issues, such as poor road conditions or litter, were common advocacy issues among the Photovoice groups. These were issues that did not challenge the power structure but still gave participants the satisfaction of taking action. One example of such an issue was the pothole-stricken condition of the roads in one of the Photovoice communities. During a meeting at which I led the participants through a process of prioritizing the community problems they had identified through their photostories, the problem of dangerous road conditions, caused by overweight coal trucks, rose to the top of the list of concerns. Inspired by discussions that took place at our regional Photovoice meeting two weeks earlier, Barbara⁶ asked, "Can we get an appointment and just talk to [a legislator]? Let's make a difference—I'm ready!" All of the women in attendance responded enthusiastically to the idea of sharing their concerns with lawmakers, so I provided the women with the phone numbers for all of their state senators and delegates. The women then decided who would photograph different problem areas on the roads in order to create a series of photostories revealing the poor road conditions in their part of the county. At our next meeting, the participants shared five photostories they had created documenting the cracking, potholed roads, as well as one video of the treacherous driving conditions. Barbara volunteered to set up appointments with their two state legislators and was surprised by how easily she was able to schedule these appointments.

6 Barbara is a pseudonym.

Barbara, Brandy,⁷ and Brandy's three-year-old son met me at the state capitol on the day of their appointments, and we went together to their legislators' offices. The photostories, video footage, and Barbara and Brandy's pointed descriptions seemed to reach the two policymakers. Both legislators promised to work on having the roads in their community moved up on the list of repaving projects, as those stretches of road had not been fully repaved in more than 25 years. During our visit, both of the legislators made phone calls to the Department of Highways to request immediate road patching as a temporary fix. Just a few hours later, one of the Photovoice group members who did not go to the capitol saw—and photographed—the Department of Highways patching the problem areas about which Barbara and Brandy had complained! In the months that followed, Barbara regularly checked in with her legislators via phone about the progress being made toward full repaving of their roads.

In addition to the outcomes I have already discussed, the Photovoice project also helped bring about a number of other positive changes in the communities, including the installation of a guard rail on a dangerous curve above a deep ravine; the removal of a dangerous, cracking rock overhang above a narrow stretch of road leading into one of the communities; the repair and reopening of a beloved community pool; the replacement of two dangerous bridges; community-initiated clean-up days; and an increase in civic engagement among many of the Photovoice participants.

While Photovoice was not a pathway to activism among most of the women in the project, it did teach them how to communicate with their legislators and showed them that their opinions matter. One of the profound strengths of Photovoice is the fact that many voices and issues can be articulated, and that participants come to see themselves as holding the power and ability to communicate with policymakers and others with political influence. While participant empowerment is difficult to quantify, it is extremely important. As Wang and colleagues have articulated, the Photovoice process often engenders "empowerment education" among participants (Wang & Burris, 1994; Wang et al., 1998). The outcomes of Photovoice reach beyond simply drawing attention to problems experienced by individual participants. Photovoice also holds the potential to foster a change in the perceptions of participants from non-influential to influential, helping them to see themselves "as actors in the public arena instead of objects of it" (Bell, 2008, p. 41). The fact that many of the Photovoice participants made their first contacts with legislators through this project is not insignificant; a number of the women did not previously know how to access (or even that they *could* access) their elected officials.

⁷ Brandy is a pseudonym.

Many of the participants had positive encounters with their legislators, some even receiving personal phone calls asking for more information about their concerns, and this both surprised and inspired them. Reflecting on her efforts advocating for bottle deposit legislation during the Photovoice project, one participant revealed,

It made me think that it was possible. You know? A lot of times whenever [I] get a big dream or idea in [my] head, I've never really thought real positive about it. It gave me a positive outlook on it anyway, you know, instead of being such a downer.

Another participant expressed similar feelings of increased efficacy after sharing her photostories with community leaders and the general public at her group's community presentation and exhibit:

That was *somethin'*—made me feel like I was on top of the world! Like I could make a difference. 'Cause I didn't think I could do it, because I'm not a talker.

Even after the project ended, a number of the women continued their community work, organizing community clean-ups, calling legislators, and speaking up about problems in their communities. The Photovoice project provided a mechanism for local residents to communicate with policymakers about needs that were going unmet and about the ways in which corporate polluters were affecting their communities. The power of Photovoice as a communication strategy lies in its authenticity. The photographs and narratives are created by people who are directly experiencing these issues, not by paid employees of an advocacy or special interest group.

Discussion and conclusion: Bridging two social worlds

While feminist activist ethnography provides many important opportunities for scholar-activists, it is not without its challenges. As Francesca Cancian (1993, p. 92) notes, within academia, "activist research often conflicts with academic standards" because while activist research "aims at challenging inequality by empowering the powerless, exposing the inequities of the status quo, and promoting social changes that equalize the distribution of resources," more traditional academic research "aims at increasing knowledge about questions that are theoretically or socially significant." Activist research is primarily "'for' relatively powerless groups and often involves close social ties and cooperation with these groups," while academic research is "primarily 'for' colleagues," involving "close ties with faculty and students, and emotional detachment from

the people being studied” (Cancian, 1993, p. 92). Thus, scholars who have a commitment to doing activist research, but who also want to have successful academic careers, must often find a way to “bridge two conflicting social worlds” (Cancian, 1993, p. 92).

Bridging these conflicting social worlds does pose some challenges. As I mentioned previously, the Photovoice project I conducted was part of a larger study (Bell, 2010) aimed at unraveling the various social factors contributing to the relatively low levels of local participation in the environmental justice movement that has been working to hold the coal industry accountable for the many social, environmental, and economic problems it is causing in Central Appalachia. My motivation for initiating a Photovoice project in southern West Virginia was action-oriented—I hoped such a project would draw attention to the hidden injustices taking place in coal-affected communities in southern West Virginia, while also creating a project that was empowering to the participants and their communities. However, it simply would not have been professionally possible at that stage in my career to devote such a great deal of time and so many resources to a project like this had I not also been able to find a way to make it useful to larger theoretical questions I was investigating about the barriers to environmental justice activism. Thus, while my research participants had complete control over what they chose to photograph, what they wrote about those photographs, which of their photostories would be displayed publicly, and what community projects were inspired through the process, I was also collecting data on the decisions they made. Specifically, I was collecting data on who created photostories that were critical of the coal industry, who chose to display their coal-critical photostories in the public exhibits, who took that difficult step into activism to hold the coal industry accountable for the problems it was causing, and—importantly—who did not. My participant observation data and follow-up interviews focused on the social factors within the Photovoice groups and larger communities that led to participants’ willingness or unwillingness to speak critically about the coal industry.

Thus, there were questions within this larger academic research project that were driven by my own research agenda and not that of my research participants. It is important to acknowledge that this is a modification to the “pure” form of participatory action research, wherein the research participants drive all aspects of the study, including the research questions, data collection, and dissemination of the results. My choice to conduct two simultaneous projects (one action-oriented, one academic) with the five Photovoice groups made it possible for me to meet both professional and community interests through the same project, something that may not have been possible otherwise. Indeed, as Cancian (1993) found, this is a strategy to which many other scholar-activists turn. Retaining some control over the research process, and thus modifying

the exclusively collaborative nature of participatory action research, is the approach that all of the scholar-activists Cancian interviewed described using in order to make their activist projects compatible with academic expectations, namely generating peer-reviewed publications. Creating two agendas within the same project (one that the research participants control and one that the researcher controls) is one way to avoid the bind of choosing between the two social worlds of activism and academia. It does, however, also mean that the cautions that Stacey (1988) articulates about feminist ethnography still hold. As scholar-activists using feminist ethnography for dual purposes, we must carefully consider the consequences of our own research agenda and ensure that it does not undermine our research participants' goals for the community-driven portion of the project.⁸

My aim here has been to suggest that, contrary to mainstream beliefs in the academy, social scientists do not need to choose between being an activist and being a scholar—both needs can be met through the same project, and the richness and depth of data that can be collected through feminist ethnography in particular allows for the creation of more than one type of “product.” There is room for both theory building *and* advocacy within the academy. Feminist ethnographic methods, like Photovoice, hold the potential to provide a path through the overgrown landscape between disenfranchised groups and policy-makers. As social scientists, our research often positions us in such a way that we could serve as links between the people we study and policy-makers, providing an avenue for exposing the concerns of unheard individuals through bringing their stories forward, or—as in the case of Photovoice—by facilitating a process by which research participants may bring *their own* stories forward.

Acknowledgments

I am very grateful to the grant agencies and organizations that funded and provided other resources to make the Southern West Virginia Photovoice project possible: The Greater Kanawha Valley Foundation, the Appalachian Regional Commission/West Virginia Development Office Flex-E Grant, the American Sociological Association's Spivack Program in Applied Social Research and Social Policy, the Center for the Study of Women in Society at the University of Oregon (UO), the UO Department of Sociology's Wasby-Johnson Fellowship,

8 This is not to say that we will be able to anticipate all tensions that may emerge, however. In my Photovoice project, for instance, difficulties arose in one of the groups when certain powerful individuals in the wider community felt that the project was too critical of the coal industry. Some participants of the Photovoice group began to silence coal-critical discussions during our meetings due to their worries about the way the project was being perceived by those powerful individuals. The group members wanted to counter those perceptions about the project, and I felt it important to respect their wishes. As a result, I worked with them to amplify the non-coal-related issues, concerns, and ideas for change that they identified through the project in their public presentation and in their community exhibit.

the UO Doctoral Dissertation Fellowship, the Ohio Valley Environmental Coalition, Cabin Creek Health Systems, Photographic Production Services, and the Clay Center for the Arts and Sciences. I am also grateful to Dána-Ain Davis and Christa Craven for organizing a panel on Feminist Activist Ethnography and Neoliberalism at the 2010 American Anthropological Association Annual Meeting. Participating on this panel is where the seeds of this article were planted. I would also like to thank the anonymous reviewers for their invaluable feedback and suggestions. Finally, I thank the Photovoice participants for being part of this project and for sharing their stories, photographic creativity, and love for their communities with me.

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Indigenous Plants: Key Role Players in Community Horticulture Initiatives

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Abstract

Community horticulture is central to the cultivation of plants for a range of human needs. This paper synthesizes available information on the use of indigenous plants in communal nurseries, medicinal and food crop production, agroforestry systems, ecosystem restoration, urban greening and botanical gardens. Despite considerable use of indigenous plant species in a number of community horticulture initiatives worldwide, their utilization in urban greening, food production and ecosystem restoration is infrequent and/or inadequately documented. Hence, this review highlights the potential for using indigenous plants to solve problems relating to food security, livelihood strategies, conservation of useful plants, ecosystem degradation, and biodiversity conservation in urban areas. While community horticulture programs pose potential challenges, it is important to acknowledge their many profound and all-encompassing benefits, especially with their increasingly important societal and environmental roles in light of rapid population growth and urbanization, large-scale environmental degradation, and global climate change.

Keywords: agroforestry, biodiversity conservation, food crops, medicinal plants, restoration, urban greening

Introduction

Modern horticulture is a blend of the science, art, technology, and business involved in intensive plant cultivation for human use (Hynes & Howe, 2002; Relf, 1992). An expert horticulturist transcends the image of a “professional gardener” and requires a unique set of skills derived from several fundamental scientific fields such as soil technology, ecology, principles of plant breeding, and botany, with special emphasis on plant physiology and plant pathology (Stuart Gager, 1919). Furthermore, the realm of the horticulturist also encompasses the all-important social sciences such as education, commerce, and healthcare, which significantly enhance horticulture’s contribution to society. In this sociological context, horticultural activities result in the enrichment of

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communities, income generation, improvement of community health and the integration of “the garden” into the breadth of modern civilization (Botha et al., 2007a; Relf, 1992).

If the complex discipline that is horticulture were to be unraveled further, one of the key components that would emerge is community horticulture (CH). Under this umbrella is an assortment of horticultural activities undertaken in community settings, the scope of which can be remarkably diverse, including community orchards, shared allotments, school gardens, community composting projects, and community nurseries (e.g., Botha et al., 2007a; Chalker-Scott & Collman, 2006; Irvine et al., 1999). CH projects commonly focus on the cultivation of useful, but often non-native, food and medicinal crops, and the role of indigenous plant (IP) species in these initiatives is sometimes under-recognized. As populations grow, and consequent urbanization and the conversion of natural ecosystems to croplands increase, the role of IPs in CH endeavors in curtailing the negative impacts of these activities on biodiversity will become increasingly important. Furthermore, the use of hardy IP species adapted to local conditions may also become central to food security as climate change leads to the increased occurrence of extreme climatic events.

While there is considerable use of IP species in a number of CH initiatives worldwide, especially for agroforestry and the production of food and traditional medicine, the use of IPs in other spheres such as urban greening and ecosystem restoration is less well documented. Furthermore, a synthesis of the research and projects on the practical application of IPs in the field of CH is lacking. Hence, this paper provides an overview of the major sectors within CH where IPs play important roles, and highlights opportunities for further research and subsequent project involvement.

The importance of community horticulture to local communities

Half of the world’s seven billion people reside in cities, and almost two out of three people will be living in urban areas by 2030 (Hynes & Howe, 2002). Thus, most people’s experience, environmental literacy, claims to natural assets, and knowledge and appreciation of nature in the twenty-first century will be shaped and, for most, bounded by the natural, social and built environments of the urban settlements in which they live (ibid.). At first glance, a community garden might appear to be a minor, merely local experience of nature that could be more genuinely sought in wild and remote places. However, gardens represent “the middle ground between the wilderness and the lawn,” and may facilitate the forging of a new urban environmental ethic, and provide help in situations

where “the wilderness ethic is silent or unhelpful” (Pollan, 1992). Furthermore, gardens provide alternatives in cases where the experience of wilderness areas is unaffordable, remote, or inaccessible (Hynes & Howe, 2002).

The relevance of CH programs to local communities is vast and multifaceted, and benefits include income generation, food security, improved urban environmental conditions, ecosystem restoration, social upliftment, crime reduction, and conservation of threatened and commercially valuable species (Botha et al., 2007a; Chalker-Scott & Collman, 2006; Hynes & Howe, 2002; McKinney, 2002; Waliczek et al., 1996). Gardens also have the profound ability to ameliorate peoples’ quality-of-life needs on the higher levels of esteem and self-actualization (Waliczek et al., 1996). Community gardens assist in creating and sustaining relationships between city residents and the soil, and can engender an ethic of urban environmental awareness that neither parks nor wilderness areas—which release and free people from the city—can do (Hynes & Howe, 2002).

Key uses of indigenous plants in community horticulture programs

Many CH initiatives have focused on the production of primarily non-native food crops in urban areas, such as the highly successful Matalahib barrio community garden in Quenzon City, Manila, the Philippines; and several urban community gardens in Kenya, Australia, the United States, United Kingdom, Spain, and elsewhere in Europe (Buckingham, 2003; Domene & Saurí, 2007; Guitart et al., 2014; Irvine et al., 1999; Saldivar-Tanaka & Krasny, 2004). However, others have demonstrated the importance of cultivating IPs for urban greening (McKinney, 2002), conservation (e.g., Böhringer et al., 2003; McKinney, 2002), ecosystem restoration (e.g., Dreesen & Harrington, 1997; Markham et al., 2011; Weiersbye & Witkowski, 2002), and education (e.g., Tunnicliffe, 2001). The cultivation of native medicinal plants to supply traditional healers and curtail the exploitation of wild medicinal species has also been widely advocated for over half a century (e.g., Botha et al., 2007a; Dzerefos & Witkowski, 2001; Gerstner, 1946; Hamilton, 2004; Jäger & Van Staden, 2000; Mander et al., 1996; Ndawonde et al., 2007). There is also great potential for indigenous food crops (e.g., Xaba, 2007) to be grown in community nurseries to supplement mainstream food sources, especially in areas where the cultivation of conventional food crops is difficult due to unsuitable local environmental conditions.

Communal nurseries

IP domestication can aid the conservation of wild resources by enrichment planting in forest areas, smallholder cultivation, and commercial or community

plantations (FAO, 1995; Wickens, 1991). Outreach nurseries (*sensu* Botha et al., 2006, 2007a, 2007b), which are established in conjunction with local stakeholders, are favored conservation and social forestry tools globally, but, as with many integrated conservation and development plans, they do not always produce anticipated results (Botha et al., 2006). Furthermore, domestication and cultivation do not necessarily substitute conservation of genetic diversity, and if no provision is made for the preservation of genetic variation in wild sources, domestication is often followed by decline or disappearance of wild populations (Nair & Merry, 1995). Thus, the advantages and disadvantages of community cultivation projects, including the needs of local communities, and the long-term commitment and economic capital required, must be evaluated to determine the viability of such projects.

Botha et al. (2007a) demonstrated the important social benefits of 65 outreach community nursery projects established among a wide range of ethnic groups in South Africa. The initiatives had the primary objective of growing IPs for income generation in local communities, yet several additional benefits to these communities were also gained. Although the projects had mixed success, with some nurseries breaking even and/or later generating profits, and others declining to a state of collapse, participants acquired skills such as environmental education, and business and health care training, regardless of the success or failure of the respective projects. Furthermore, projects that succeeded resulted in the development of parks; the securing of a resource base of medicinal plants; improved food security; and the promotion of participants' psychological well-being through increased self-confidence, sense of purpose, pride and ownership, and personal satisfaction (*ibid.*). Well-managed communal nurseries could focus on the production of IPs for a range of activities, such as medicinal and food plant cultivation, ecosystem restoration, and urban greening.

Cultivation of medicinal plants

Hundreds of millions of people, mostly in developing countries, derive a significant part of their subsistence needs and income from gathered plant and animal products (Iqbal, 1993). Harvesting of high-value products such as plants for food and medicines also continues in developed countries for cultural and economic reasons, and demand for wild species is increasing with growth in human needs, numbers, and commercial trade (Schippmann et al., 2003). In southern Africa, traditional medicine is an important healthcare component, and most drugs are prepared from plants, almost all of which are wild-collected (Jäger & Van Staden, 2000). In South Africa, the trend toward increased commercialization of medicinal plants has resulted in overharvesting and, in some cases, near extinction of certain valued IP species (Williams et al., 2000). Hence, Jäger and Van Staden (2000) argued that a new strategy for developing medicinal plants as commercial crops is needed, particularly in South Africa,

but also elsewhere. This approach is not new, however, and was identified over 60 years ago by Gerstner (1946). Indeed, a number of agencies are recommending that wild species be introduced to cultivation systems and, given the demand for a continuous and uniform supply of medicinal plants and the accelerating depletion of wild resources, increasing the number of indigenous medicinal plant species in cultivation would be an important strategy for meeting market demands and conservation objectives (Uniyal et al., 2000). In South Africa, extensive research has been undertaken over the last two to three decades on the mass production of useful IPs (Mander et al., 1996). Besides the potential for cultivation of medicinal plants as crops to reduce the need for wild collection, it also facilitates the development of improved strains, for instance, varieties with enhanced plant vigor and efficacy (Ndawonde et al., 2007).

Ex situ conservation is not always sharply separated from in situ conservation, and there are intermediates between the purest forms of both types (Hamilton, 2004). Circa situ conservation refers to a range of practices commonly associated with more traditional and biodiversity-rich agricultural systems (ibid.). This integrated approach includes deliberately encouraging the retention of certain “wild” plant species, which could include indigenous medicinal plants in “natural” habitats and other valued “wild” plants when land is cleared for agriculture, or when croplands are weeded. It also encompasses the growing of valued plants in home gardens, and the selection and storage of seed at the household level for later replanting (ibid.). In a survey of the medicinal plants sold by traders in the traditional medicine markets of Zululand, KwaZulu-Natal, South Africa, Ndawonde et al. (2007) identified 32 species as important candidates for ex situ cultivation initiatives. As part of a broader, holistic conservation approach, including trade monitoring and legislation, the establishment of communal gardens by plant traders was proposed to alleviate pressure on wild populations and increase the availability of rare and threatened species (ibid.). This recommendation is supported by Kowalski and van Staden (2001), who indicated that the propagation of heavily exploited and endangered trees such as stinkwood (*Ocotea bullata*) and pepper bark (*Warburgia salutaris*) has facilitated conservation and reforestation. *Warburgia salutaris* is widely regarded as the most highly prized medicinal plant in southern Africa, and is an excellent example of how the improvement of conservation and livelihoods can be achieved by marrying in situ and ex situ conservation through circa situ means (Botha et al., 2004; Cunningham, 2001). This species has been successfully reintroduced from nurseries in South Africa to Zimbabwe, where it had gone nationally extinct. However, reintroduction was not back into its natural forest habitat, from which it would probably again soon disappear; rather, rooted cuttings were distributed for the home gardens of local farmers, all of whom knew and valued the species, and were prepared to safeguard the young plants for future use (Cunningham, 2001).

Despite the many advantages of medicinal plant cultivation, in certain circumstances it can be impractical. Biological and ecological requirements can be difficult to meet or circumvent, for example, slow growth rates, interactions with pollinators and other species, low germination rates, and susceptibility to pests (Loundou, 2008). Cycads, for example, which are used for traditional medicine in South Africa (Cousins et al., 2011, 2012), have such slow growth rates that cultivation to supply local demand is simply not an option. Medicinal plant production through cultivation can reduce pressure on wild populations, but it may also lead to loss of genetic diversity and loss of incentives to conserve wild populations (Schippmann et al., 2003). Furthermore, cultivated plants are sometimes considered qualitatively inferior when compared with wild-gathered specimens, largely for cultural reasons, but also due to perceived differences in efficacy (ibid.). In Botswana, for example, traditional medicinal practitioners claimed that cultivated plants were unacceptable, as such material lacked the power of wild-collected plants (Cunningham, 1994). Scientific studies partly support this argument, as the medicinal properties in plants are primarily due to the presence of secondary metabolites which the plants need in their natural environments. These compounds are required under particular conditions of stress and competition, and may not be expressed as strongly in the fast-growing cultivated stocks grown under ideal monoculture conditions (Schippmann et al., 2003). Notwithstanding, it is also clear that certain values in plants can be deliberately enhanced under controlled conditions of cultivation (Uniyal et al., 2000), which may include the potency of the active medicinal compounds. Working with local people to determine the microhabitats in which medicinal plants grow in the wild may help in simulating these conditions in a nursery setting.

Owing to the sometimes significant impediments to medicinal plant cultivation, Hamilton (2004) notes that sustainable harvesting of wild stocks is often recommended as the best option for medicinal plant conservation, especially where cultivation is not possible. Wiersum et al. (2006) also advise that if medicinal plant conservation is undertaken, it should be carefully linked with social upliftment by identifying the ties between cultivation practices and livelihood conditions, the role of cultural factors in medicinal plant use and conservation, and that cultivation by local people should not be based primarily on local awareness of the loss of wild species, but on local perceptions of financially lucrative medicinal plants. Furthermore, Botha et al. (2007b) caution that nurseries are risky ventures, even in conducive operating environments, and before embarking on projects, organizations have a moral obligation to consider the potential impacts of projects on local stakeholders. These responsibilities include assessments of project viability as well as the organizations' own willingness and ability to commit to the extensive time frames and resources that are inevitably required (ibid.).

Agroforestry

Many projects involving the cultivation and use of IPs by local communities infiltrate several spheres of influence, and agroforestry initiatives are a case in point. Agroforestry systems represent a major form of small-scale tree planting, where trees are grown in specific combinations with agricultural crops and/or livestock for a range of objectives (Long & Ramachandran Nair, 1999). Agroforestry schemes take advantage of tree–crop interactions, and thereby enhance crop production, diversify farm output, stabilize or improve soils, and ameliorate harsh environmental conditions (ibid.). Community forestry, on the other hand, relates to tree planting undertaken by a community on common land, and is based on peoples’ direct participation—either by propagating trees themselves or by processing tree products locally (ibid.). Compared to the cultivation of exotic tree species, indigenous forest trees play an important role in meeting the needs of local communities in terms of timber, fuelwood, food, and traditional medicine provision, but may also contribute to ecosystem restoration (e.g., Aumeeruddy-Thomas et al., 2004; Cunningham et al., 2002; Saxena et al., 2001), and in situ conservation, albeit in an anthropogenically modified context (Koh & Gardner, 2010). The sheer extent to which humans have dominated the biosphere necessitates the integration of conservation efforts with human activities, such as urban and rural development (ibid.).

While the majority of studies show that despite the invariable loss of some species from the conversion of native habitat for agroforestry use, a large proportion of the original fauna and flora is maintained, as compared to more intensified agricultural land uses (Ranganathan et al., 2008). Notwithstanding, agroforestry systems are dominated by only one or two commercially important, usually exotic species (e.g., *Eucalyptus* and *Pinus*), which are planted mainly in woodlots near farms, along roads, around villages, and as riparian buffers (Long & Ramachandran Nair, 1999). Species diversity is an essential feature of agroforestry systems; in addition to providing fuelwood and timber, a mix of indigenous tree species provide a range of non-timber forest products, and also assist in ecosystem restoration, protection of water quality, and enhancement of local faunal diversity, and therefore should be included in agroforestry initiatives (ibid.).

In the Himalayas, deforestation is a serious threat to biodiversity, and is generally attributed to demographic pressure, which results in demand for land for agriculture and the use of remaining forest to meet growing needs for fodder, fuelwood and timber (Aumeeruddy-Thomas et al., 2004). The Ayubia Ethnobotany Project at the Ayubia National Park in northern Pakistan was therefore instituted to provide recommendations for improvement of fodder and fuelwood management systems, as well as to implement activities to contribute toward the sustainability of plant resource use in the park. One component of the

project involved engaging with local villagers to establish 172 nurseries of fast-growing multipurpose tree species to increase fodder and fuelwood production, and train people in nursery-raising techniques. Tree seedlings were propagated in household and community nurseries for planting on privately owned land and for enrichment of natural forested areas to promote indigenous species conservation (ibid.). Although the project initially achieved poor results, after adapting and improving the approach, approximately 5,300 trees have been planted with community participation, resulting in capacity building, as well as diminished pressure on wild stocks and supplementation thereof (ibid.).

Another case where cultivation of indigenous trees by communities was successful is the *Prunus africana* project in Cameroon. Wild populations of this Afromontane forest tree (known as the African cherry) were the sole source of medicinal bark and bark extract, and bark products from Africa and Madagascar exported to Europe constituted the largest volume of any African medicinal plant in international trade (Cunningham et al., 2002). This exploitation has caused serious damage to wild populations, especially in key conservation areas in Madagascar and Cameroon (ibid.). In an effort to combat the depletion of wild *P. africana* populations, the Kilum Mountain Forestry Project has been helping farmers since 1989 to establish nurseries and plant *P. africana* and other IP species on their farms in the Oku area of the Bui Division, Cameroon. In 1994, there were 35 functional group nurseries, where group members shared seedlings, planting most on their farms and selling some to other farmers and to the project, to be used for forest enrichment planting (ibid.). In total, the groups produced approximately 14,000 *P. africana* seedlings in 1994, and the project purchased 5,348 seedlings for forest enrichment; farmers planted most of the rest on their own farms (ibid.).

These projects, the aforementioned *W. salutaris* cultivation initiative, and many others (see Lapido et al., 1996; Munyanziza, 1996; Ngwira, 1996; Ohlendorf, 1996; Shah & Kalakoti, 1996), clearly illustrate the potential of useful plant domestication. Moreover, the results of Aumeeruddy-Thomas et al. (2004) and Cunningham et al. (2002) show how using IPs in CH can have powerful, positive impacts not only on species conservation and ecosystem restoration, but on the socio-economics of the associated local communities as well. Nonetheless, it is important that local people are properly educated about the benefits of indigenous agroforestry in order for them to recognize its value, and promote their involvement and investment in such projects. It is also vital that the IPs selected for cultivation are suitably adapted to local conditions (ideally indigenous to the specific area in question), and offer goods and services that the community and surrounding ecosystems will derive significant gain from.

Food security

Conventional (mostly non-native) food crops have long enjoyed significant popularity in CH (Hynes & Howe, 2002), but there is also increasing emphasis on the cultivation of indigenous food crops. Shifts from the use of traditional foodstuffs (usually a wide variety thereof, and of significant nutritional value) to more conventional (westernized), appealing, but often less nutritious, foods has been witnessed in many cultural groups worldwide, frequently with negative health consequences (Kuhnlein & Receveur, 1996). Decades of official food security policies globally completely ignored the importance of most foodstuffs provided by wild plant species, particularly those harvested from impoverished and agriculturally marginal lands (Dovie et al., 2007). Disregard for, and under-utilization of, indigenous food crops is further exacerbated by the lack of knowledge on the domestication and cultivation of these species, especially in African savannas (ibid.). Moreover, governments and policymakers often ignore the contribution made by (indigenous) trees to local communities, and consequently focus resources on cash crops and livestock (Paumgarten et al., 2005). Okafor (1980), for example, noted that most of the important staple foods in the humid tropics of Nigeria were plants such as cassava, maize, and potato introduced from tropical America or Asia. These crops are only seasonally available, and their utilization is associated with storage problems (ibid.). By contrast, many indigenous woody plants—cultivated, protected, or wild—are good sources of inexpensive plant protein and other essential nutrients, and are obtainable at times of the year when annual staples are unavailable or difficult to store (ibid.). West African compound farms, for example, are dominated by indigenous trees that produce leafy vegetables (*Pterocarpus* species), fruit for cooking (*Dacryodes edulis*), and condiments (*Pentaclethra macrophylla*), thereby adding a significant contribution to the diets of people in local communities (ibid.).

Indigenous species may also serve important complementary purposes, such as soil erosion control, provision of mulch materials, windbreaks, structural materials, timber, fuelwood, medicines, and items for religious purposes (Luoga et al., 2000; Okafor, 1980). Hence, the wide range of uses of indigenous food crops, in addition to human consumption, give them superlative value as potential alternatives to conventional (non-native) food crops for cultivation in CH. In addition, the cultivation of hardy and adaptable indigenous crop species will likely become increasingly important as food security is jeopardized by a changing climate. Trees in particular provide an array of goods and services to households, and when incorporated into peoples' livelihood strategies (e.g., cultivation through home-based and CH initiatives) may help reduce their vulnerability to adversity (Paumgarten et al., 2005).

Since 2007, in an effort to promote the cultivation of indigenous food plants in South Africa, a series of articles have appeared in the popular botanical journal *Veld & Flora*, which provide information on the uses and propagation techniques of several edible and medicinal plant species indigenous to South Africa (e.g., Xaba, 2007). The edible species described are mostly easy to cultivate, adapted to a range of environmental conditions, disease resistant, and produce nutritious fruit, vegetables, leaves, or tubers for human consumption. Increased awareness and encouragement of the use of indigenous species in both rural and urban CH projects is vital if we are to move from conventional crops to more appropriate indigenous ones in order to provide food security in a context of global change.

Rural food security

Numerous resource-poor households in rural areas of most countries are directly dependent on IP resources as an integral part of their livelihoods (Dovie et al., 2007 and citations therein). On a management continuum from truly wild to cultivated, wild food plants are not only an essential source of nutrients, but also provide seasonal dietary diversity to many communities worldwide (Cruz-Garcia & Howard, 2013). While many cultural groups residing in rural areas have a rich indigenous knowledge about wild food sources, their cultivation and preparation, this knowledge is being eroded as the consumption of exotic species and ready-made foodstuffs have become symbols of modernity or wealth (Kuhnlein & Receveur, 1996). Conserving indigenous knowledge is thus important for continued use of wild food resources (Dweba & Mearns, 2011), and negative attitudes toward their use can be reversed through education programs (e.g., Cruz-Garcia & Howard, 2013). While indigenous food plants are mostly wild-harvested, Legwaila et al. (2011) argue that domestication could be used as a strategy to improve food security and cash income for people living in rural areas, and as a means of carbon sequestration for climate change mitigation. Cultivation of indigenous food plants could also reduce pressure on wild populations and, if irrigated, could ensure availability in times of drought in the case of annual herbs.

Farmers in southern Africa are known to retain and protect indigenous fruit trees on their lands, since many rural households rely on these trees as sources of income and subsistence in the Southern Africa Development Community (SADC) (Akinnifesi et al., 2006; Dovie et al., 2007). However, until recently, there has been only a modest effort to cultivate, improve and add value to these fruits. Since 1989, the International Centre for Research in Agroforestry (now the World Agroforestry Centre) initiated research and development work on over 20 priority indigenous fruit tree species in five SADC countries, aimed at improving income generation in rural communities (Akinnifesi et al., 2006). A participatory approach was employed in all stages of domestication, product development, and commercialization. Country-specific priority species were

identified, and have since become the focus of a regional tree domestication program (ibid.). Notably, on the list of priority species is the marula (*Sclerocarya birrea* subsp. *caffra*), which is frequently maintained in homestead plots and arable fields in an agroforestry situation in southern Africa (Shackleton, 2002). It is regarded as a keystone species across its distribution, and is used by rural populations in most countries in which it is found (Helm et al., 2011; Shackleton, 2002). Its indispensability to local communities is ascribed to its multiple uses: the fruits are eaten fresh or fermented to make beer, the kernels are eaten or the oil extracted, and the leaves are browsed by livestock and have medicinal uses, as does the bark (Shackleton, 2002).

Another keystone indigenous tree species that is central to the livelihoods of people in rural African communities is the baobab (*Adansonia digitata*). Like marulas, baobabs have a wide range of uses, especially for food, fiber, and medicine (Venter & Witkowski, 2011, 2013). (Buchmann et al. (2010) reported over 300 uses of all parts of the plant altogether.) Where baobab products are sold in informal markets, they form a key source of income for thousands of rural people. Cash generated from the sale of baobab fruit helps alleviate poverty, improves livelihoods, and allows participation of marginalized people in a growing cash economy (Venter & Witkowski, 2011). Fruit is collected from trees in fields, villages, and surrounding communal land by locals, and processed in situ to supply fruit pulp and oil from the seeds to a large and growing export market (ibid.). Cultivation (possibly in a communal horticultural setting) is another way to increase benefits, and suitable sites could be found in southern Africa, which could follow the lead of West African initiatives in domestication and cultivation (ibid.).

Urban food security

Urban community food gardens are common in certain parts of the world, especially in Europe and the United States (Corrigan, 2011). The community food security movement was initiated in the latter in an attempt to overcome an unequal distribution of food by localizing food production (ibid.). However, despite their prevalence, a broad literature search specifically on indigenous crop cultivation in urban community gardens yields very few studies. Hence, there appears to be a paucity of research in this area, except for the comprehensive work of Shackleton et al. (2009) on African indigenous vegetables in urban agriculture. It is unclear how many community gardens incorporate the cultivation of IPs in their plantings, what kind of IPs they use, and for what reasons.

A study on the vegetable gardens of the Barcelona Metropolitan Region by Domene and Saurí (2007) showed that a large variety of conventional crops are grown (e.g., potatoes, tomatoes, lettuces), but no mention was made of

using IPs. Guitart et al. (2014) indicated that only 12 percent of the 234 plants grown in 23 school gardens in the cities of Brisbane and Gold Coast in Australia were indigenous. Saldivar-Tanaka and Krasny (2004) showed that a mixture of indigenous and exotic fruit and vegetables are cultivated in Latino New York City gardens, but the relative proportions were unclear. It may be that in urban areas the seed and other propagative material of commonly used exotic fruit and vegetables is more easily available than that of less commonly grown indigenous crops, whereas in rural areas people have direct access to the seeds of indigenous species that grow in their surroundings. Rural people are also likely to have more knowledge about the food plants that grow in their surroundings and are therefore more inclined to incorporate them into their gardens, while urban dwellers are more accustomed to non-indigenous conventional fruit and vegetables, which adequately satisfy their dietary requirements.

Shackleton et al. (2009) note that in many sub-Saharan African cities, urban and peri-urban agriculture supplies substantial amounts of the vegetables consumed, and could be potentially transformed into a significant source of indigenous vegetables for urban areas. In order for this to happen, research will need to be undertaken to determine which indigenous vegetables are already being cultivated in this context, the extent to which they are cultivated, and the reasons why these specific vegetables are grown (*ibid.*). Formulating a strategy for increasing their production in urban and peri-urban areas (including CH initiatives) will necessitate a comprehensive understanding of their agronomy, cultural acceptability, and marketing structures (*ibid.*).

Urban community gardens are constrained by access to land (de Neergaard et al., 2009). In the United States, for example, the longevity and permanence of community gardens is delicate and insecure given that they are often located on land that continues to be classified as “open” or “vacant” because it implies an ongoing trajectory toward development of “higher and better use” than gardening (see Drake & Lawson, 2014 and citations therein). In response to these land tenure challenges, community gardening often takes place on school grounds or similar semi-publicly owned land (de Neergaard et al., 2009). In some cases, gardening activities are integrated with the school kitchen and teaching activities (*ibid.*). The use of IPs in such settings could provide substantial enhancement of children’s dietary requirements owing to the high nutrient status of many traditional/indigenous food plants. Furthermore, by integrating the gardening activities into school curriculums, learners would gain knowledge on their indigenous flora and develop an appreciation thereof. Notwithstanding, while the use of school grounds for community gardens provides a feasible alternative to vacant lots, city councils should be persuaded to rezone community gardens currently situated in “vacant lots” as permanent sites for this purpose. City planners must be convinced of the crucial role

community gardens play in food production, building social capital, and income generation, thereby addressing urgent concerns relating to food security, urban sustainability, and neighborhood revitalization (Drake & Lawson, 2014).

Urban greening

Escalating urbanization and conversion of land for agriculture, forestry, and industry is rapidly depleting natural areas worldwide (McKinney, 2002; Pickett & Cadenasso, 2008), and it is therefore vital that a concerted effort is made to safeguard IPs and their associated wildlife across urban areas (Joffe, 2005). Among the many human activities that result in habitat loss, urban development produces some of the greatest local extinction rates, and commonly eliminates the vast majority of native species (McKinney, 2002). Jim and Liu (2001) emphasize that sound ecological planning in cities, such as the designation of interconnected green belts, is extremely important, especially in new, rapidly urbanizing countries such as China. In this context, effective management of the large amount of residential vegetation in urban areas in ways that promote native fauna and flora could make a significant contribution to conservation (McKinney, 2002). Indeed, urban green spaces are becoming an increasingly important refuge for native biodiversity (Goddard et al., 2010), and cultivation of IP species may benefit not only local IP populations, but also native animal populations (McKinney, 2002). For example, indigenous bird and insect species richness in Australia and North America tends to be positively correlated with the prevalence and species diversity of indigenous vegetation. Landscaping golf courses with IPs can also benefit many local native bird species (*ibid.*). In contrast to small disparate niches between buildings, spatially contiguous green spaces, where natural or semi-natural vegetation is preserved, furnish opportunities for spontaneous indigenous vegetation expansion, thereby creating natural bastions of biodiversity within cities (Jim & Liu, 2001).

Urban green spaces provide a range of important ecosystem services that contribute to enhanced quality of life, including aesthetic amenities, diminution of energy use for cooling, increased carbon sequestration, filtration and attenuation of storm water runoff, shade provision and associated energy cost reductions, and promotion of neighborhood social capital (Bolund & Hunhammar, 1999; Parkin et al., 2006; Pickett & Cadenasso, 2008; Troy et al., 2007; Ward et al., 2010). Planting (indigenous) plants in urban settings may also help curtail air and soil pollution and the “heat island” effect, boost average annual rainfall, reduce soil erosion and compaction, reduce the need for routine application of pesticides, and encourage the occupation of green spaces by indigenous fauna (McKinney, 2002). As such, IPs have excellent potential for planting in suburban gardens, parks, on traffic islands along highways, along boulevards, and in industrial areas (Pienaar, 1994), where they can significantly enhance otherwise harsh human-made environments. By increased focus on

urban ecological dynamics, a powerful collaborative effort involving ecologists, urban planners, landscapers, and architects can significantly enhance these environmental goods and services throughout the cities and towns in which they work (Pickett & Cadenasso, 2008). The role of green spaces is especially salient in lower income central city areas, where residents tend to gravitate disproportionately toward vegetated areas for activities occurring in outdoor common spaces (Troy et al., 2007). There is therefore vast potential for these impoverished communities to engage in CH programs to both enhance the local cityscape and encourage social upliftment.

As an example of the dramatic effects urban greening can have, the city of Johannesburg in South Africa, with its estimated 10 million trees, is considered one of the world's largest urban forests, but arose from an otherwise predominantly treeless grassland (Foster, 2009). The forest resulted from early plantations of non-native trees such as *Eucalyptus* species intended to supply pit props for the gold mines, but also to make the city livable for its early white residents (ibid.), and as the suburbs expanded, the tree-planting ethic in private gardens and on street pavements continued. In recent years, the Greater Johannesburg Metropolitan Council has ardently planted even more trees—mostly indigenous species—in the historically sparsely vegetated southern suburbs, with a major focus on Soweto (ibid.). New and existing planted trees provide substantial ecosystem services to the city, which the former natural grassland would be unable to offer. The trees being planted are mostly cultivated by Johannesburg City Parks, and while providing much employment through the greening of disadvantaged areas of the city, CH proponents could potentially be significant stakeholders in this, and other similar IP urban greening initiatives elsewhere. Notwithstanding, the planting of trees in a grassland biome has also presented conservation issues surrounding the protection of grassland species, including many perennial forbs and geophytes in addition to grasses (Grobler et al., 2006). Hence, tree planting should be done only in degraded areas or wastelands, pavements, and parklands where native grassland species have already been eliminated.

The cost reductions of maintaining indigenous urban green areas is a possible drawback for investment in greening initiatives, since IPs are adapted to local conditions, and therefore require less maintenance (e.g., watering, fertilizing and pesticide application) than exotic plants. Hence, CH initiatives, representing a collective effort of people interested in and concerned about conservation in their towns and cities, can use IP species to add significant value to conservation in urban areas, while simultaneously delivering an array of social benefits to city residents. A potential financial spin-off of CH programs focused on IP cultivation is that suburbs of low economic status can create opportunities for income generation through the sale of plant products such as fruits, medicine,

dyes, and fuelwood (Parkin et al., 2006). However, Breuste (2004) cautions that two important subjects require consideration when implementing any IP urban greening scheme: first, the nature of the original biomes in which the urban region is situated, and second, the cultural aspect of acceptance of various natural systems. Furthermore, the feasibility of reducing the human impact on urban open spaces by reintroducing indigenous vegetation must be determined, as well as the circumstances under which this will work (*ibid.*).

Despite the considerable volume of scientific knowledge on IPs in urban and peri-urban areas, its use is fairly limited (Breuste, 2004). On a broader scale, in spite of worldwide rapid urban sprawl, urban ecology has received little attention from conservation biologists, largely due to the traditional focus of conservation research on “natural ecosystems” such as old-growth forests (Koh & Gardner, 2010; Pickett & Cadenasso, 2008). Moreover, utilization of indigenous vegetation in the urban landscape is still problematic in decision-making and planning (Breuste, 2004). On the one hand, there are many activities in cities and towns aimed at providing more green spaces, while on the other, there is escalating destruction of indigenous vegetation, not only for building purposes, but also partly due to maintenance costs of urban open spaces and a growing number of recreational activities requiring cleared land (*ibid.*). Although urban landscapes represent the worst-case scenario in ecosystem management, society is faced with the ever-increasing task of conserving biodiversity in such “unnatural” environments (Koh & Gardner, 2010). It is therefore likely that the use of IPs in CH and other urban greening initiatives will become an increasingly important component of biodiversity conservation in general.

The potentialities of advocating the planting of IPs by, for example, garden clubs in suburban areas, as another form of CH, should not be underestimated. Nonetheless, human acceptance of the sound ecological principles of indigenous urban greening is still an uncertain factor requiring investigation and will, in the long term, be improved by education and evaluated under different cultural and social aspects (Breuste, 2004). Jim and Liu (2001) note that new green spaces in Guangzhou City, China, are often characterized by small, decorative flowering trees, which add considerable aesthetic value, but offer fewer ecosystem goods and services than do indigenous tree species. The rapidly expanding modern metropolis of Shenzhen, known as the “Garden City of China” boasts large swathes of attractive flowering trees and shrubs throughout the city (S. R. Cousins, personal observation). A shift toward planting a mix of decorative ornamentals and more ecologically beneficial IPs may significantly enhance biodiversity conservation and ecosystem goods and services provision in the city. While the use of IPs in urban greening initiatives may present many benefits on paper, perhaps one of the major factors that will underpin the success of such schemes in practice is the cultivation of an ethos of

indigenous greening in children and young people, who generally show greater willingness to participate in such projects than do adults (Parkin et al., 2006). Children's awareness of the importance of IP cultivation and conservation in urban settings, such as through school greening projects, may help shape their future decisions in terms of sustainable living, and promote the implementation of future projects where their participation can help bridge "knowledge-action gaps" in the enhancement of their local communities (ibid.).

Ecosystem restoration

Cultivation of key IP species can be extremely useful for restoration of degraded ecosystems in and around cities (McKinney, 2002), in communal rangelands (e.g., King & Stanton, 2008), and in secondary forests (Koh & Gardner, 2010). Shimozono and Iwatsuki (1986) also emphasize the importance of the propagation of rare and threatened IP species for ex situ conservation in botanical gardens, and the subsequent use of propagated material for reintroductions into the wild to facilitate in situ conservation. Dreesen and Harrington (1997) report that restoration of disturbed lands in the southwestern United States has become a primary objective of many federal and state land management agencies, and a regulatory requirement for extractive industries. Frequently, containerized or bare-root plant materials are used for reclamation activities following severe disturbances or for reintroduction of woody IP species formerly present on poorly managed lands (ibid.).

King (2008) showed that in degraded semi-arid Kenyan rangelands, areas within a two-meter radius of indigenous *Aloe secundiflora* plants were positively associated with higher vegetation cover, species richness, litter cover, soil seed banks, and soil water retention compared with areas devoid of vegetation cover. Planting aloes in degraded rangelands is also known to improve the effectiveness of grass reseeding for rangeland rehabilitation (King & Stanton, 2008). It has also been suggested that the mass propagation of spekboom (*Portulacaria afra*) could be critical to thicket rehabilitation in the Eastern Cape, South Africa, because it grows easily from cuttings and sequesters large quantities of carbon in both soils and biomass at the landscape scale (Powell et al., 2004). Botha et al. (2008) indicated that the transplanting of leaf-succulent species from undisturbed to rehabilitated surface mining areas in Namaqualand, South Africa, was considered a successful restoration method for the reintroduction of indigenous vegetation. Propagating these succulents in nurseries may also be a viable strategy. Cultivation of suitable IPs is also key to the successful stabilization of mine tailings (e.g., Markham et al., 2011). Weiersbye et al. (2006) highlighted the importance of IP species for restoration in a study of the floristic composition of gold and uranium tailings dams and adjoining polluted areas of deep-level mines in South Africa. Of the 376 species identified in the intensive survey, most of the species found on tailings were persisters or natural

colonizers (53–88 percent, depending on substrate), with the majority being indigenous taxa (76 percent) (Weiersbye et al., 2006). Naturally colonizing and persisting species were primarily indigenous perennials comprising resprouting, semi-woody and woody plants, and C4 tussock grasses, which, by virtue of the relatively longer life-span of individuals and apparent tolerance to the tailings conditions, are more likely to assist in the establishment of self-sustaining cover and rehabilitation of gold tailings (*ibid.*). Furthermore, in an effort to ascertain the potential of these species for sustainable rehabilitation of gold mine tailings, Weiersbye and Witkowski (2002) characterized seed production, seed fate, and patterns of seed dormancy and germination for 46 of the most highly suitable species. These results have been used to develop propagation techniques and protocols for mine tailing rehabilitation initiatives. Such endeavors provide opportunities for communities to engage in CH projects; communities would benefit not only from employment, but also experience enhanced living conditions in the vicinity of stabilized mine tailings.

Botanical gardens

If the concept of CH is expanded beyond the collective effort of people in local communities cultivating plants for various environmental and socio-economic purposes, it could also encompass botanical gardens, and the vital roles they play in over 150 countries across the globe. Botanical gardens are unique public green spaces as they are so-called “shop windows of biodiversity” (Ward et al., 2010). The roles played by botanical gardens are multifaceted, and include holding of documented collections of living plants for the purposes of scientific research, conservation, display, and education (*ibid.*). Based on its available resources and public demand, each botanical garden identifies the strategy and directions of development of scientific and educational projects, and also identifies its particular socioecological role and positioning in the region in which it is located (Kuzevanov & Sizykh, 2006). A key function of botanical gardens is to develop public understanding of biodiversity and conservation biology, whose foundations lie in the identification of IP specimens (Kuzevanov & Sizykh, 2006; Tunnicliffe, 2001), an activity that is central to botanical garden visits. Through displays of broad collections of decorative and useful food and medicinal IPs, botanical gardens can play a pivotal role in stimulating visitors’ ideas with regard to using IPs in home gardening, and thereby contribute to indigenous urban greening.

In addition to their vital functions as environmental education facilities, botanical gardens are also crucial for biodiversity conservation (Donaldson, 2009). In response to the increased exploitation and degradation of wild plant resources worldwide, conservationists have removed specimens of rare and threatened plant species from the wild and attempted to propagate them in the artificial, but protected environment of botanical gardens (Shimozono & Iwatsuki,

1986). Cycads epitomize this vital role of botanical gardens, as they are highly prized collector's items in the horticultural trade and several species have gone extinct in the wild due to over-collection (Donaldson, 2003), now surviving only in private collections and botanical gardens. Other conservation initiatives include the establishment of gene banks for IPs, including living collections, seed banks, and plant tissue cultures; the development of herbaria and research on plant systematics; and research on the restoration of degraded habitats and subsequent reintroduction of plant species to these areas (Kuzevanov & Sizykh, 2006). Botanical gardens also involve local communities in environmental conservation and decision-making with regard to plant protection (*ibid.*). The invaluable contribution of botanical gardens to biodiversity conservation and society can be further enhanced by collaborating with local CH groups by sharing resources and providing valuable training on the cultivation of IPs. Establishing extensive networks with local communities can induce ripple effects of the positive influence of botanical gardens in cultivating IPs across surrounding areas, and hence enhance their relevance to society at large.

Conclusion

Indigenous plants play important roles in certain CH initiatives, especially those that contribute to *in situ*, *ex situ*, and *circa situ* IP conservation, such as agroforestry, medicinal plant cultivation, ecosystem restoration, and urban greening/urban biodiversity conservation. Communal nurseries are key places for the cultivation of indigenous medicinal plants, as they may alleviate pressure on wild populations and increase the availability of rare and threatened species in order to meet market demands. Agroforestry systems are dependent on the diversity of tree species used, and indigenous trees offer a range of ecosystem goods and services to the local community while enriching wild populations and improving biodiversity conservation in agricultural landscapes. Key agroforestry projects involving medicinal tree cultivation in Africa demonstrate the powerful positive impacts on biodiversity conservation and local community socioeconomics. Indigenous plants will likely play an increasingly important role in providing food security, since they frequently offer superior alternatives to conventional non-native crops due to their high nutritional value and ability to grow in climatically harsh regions. It appears that IPs are more commonly planted in community gardens in rural areas than in cities, possibly because rural communities have more knowledge of and contact with the IPs in their surroundings and are therefore more likely to use them. The use of IPs for food security requires further research to unravel current trends and highlight opportunities for increased use. Native plant species can play pivotal roles in biodiversity conservation in urban landscapes, which have traditionally been ignored by conservationists focusing primarily on the preservation of

“natural ecosystems.” More research is needed on the benefits IPs offer in terms of reducing the routine maintenance of public gardens in cities, which often involves the use of irrigation and chemical pesticides, taking into account council needs and regulations. Biodiversity conservation in urban areas also goes hand in hand with ecosystem restoration, which is becoming increasingly important due to widespread habitat destruction across the globe, and offers yet another opportunity for the engagement of local communities in communal nurseries to supply IPs for restoration projects. Thus, the use of IPs in CH, which is vital, but often under-recognized, deserves the attention of conservationists, researchers, local governments, non-governmental organizations, and citizens to devise and implement innovative solutions to socio-economic problems and biodiversity conservation worldwide. It is therefore recommended that community activists, policymakers, researchers, and non-governmental organizations engage in extensive networking and knowledge sharing so that the use of IPs can be integrated into more CH projects in the range of contexts in which they are found.

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The Degradation of Nature and the Growth of Environmental Concern: Toward a Theory of the Capture and Limits of Ecological Value

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Abstract

In this paper we overcome limitations of extant models of long-term social evolution by developing a formal theory that explains the emergence of environmental injustices and movements for environmental protection by incorporating the concept of ecological value, a value derived from the supply and quality of ecological services demanded by a society or group(s) within a society. The theory explains how intra- and inter-societal imbalances of political and/or economic power are harnessed to capture distant ecological value in response to selection pressures resulting from reductions in the local level and/or quality of ecological services and in response to the growth of environmental concern. Opposing the continued capture are the same forces that generate it—ecological degradation and ecological concern—the dynamics of which shift along with the scale; as the forces move from the local to the global they lead to a bifurcation point at which either solutions for ecological sustainability are implemented or failure occurs in the form of ecological collapse. We close by considering the ramifications of this model in which the relative levels of these forces shape the future.

Keywords: environmental justice, environmentalism, political economy, theory, unequal ecological exchange

Introduction

The struggle for ecological justice reveals inequality in the benefits and costs of the human-environment relationship. While all societies degrade the quality of the environment to some degree as they extract, transform, and generate waste from resource use (cf. Chase-Dunn & Hall, 2009; Chew, 2001), those

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societies/groups/individuals with power can leverage it to experience more of the benefits of environmental use, creating “environmental privilege” (Park & Pellow, 2013); conversely, less power often leads to fewer benefits and greater costs. For example, numerous studies over two decades in the United States have revealed that the locations of polluting sites are likely to be near concentrations of racial minorities and those in the lower class (Mohai et al., 2009; cf. Bullard, 2000; Downey, 2006; Elliott & Pais, 2006; Grant et al., 2010; Pellow, 2002, 2004). On a global scale, the global North has used the global South as “trash dumps” (Faber, 2008) and ecologically unequal exchange has occurred as more-developed countries externalize the impacts of their consumption (such as deforestation due to beef and coffee) to less-developed countries (Jorgenson et al., 2009; cf. Bunker & Ciccantell, 2005; Frey, 2009; Hornborg, 2001; Martínez-Alier, 1997, 2002; Moore, 2000a, 2000b, 2010; Rice, 2007, 2009; Roberts & Parks, 2007, 2009). Generally speaking, ecological value is captured by groups with power advantages: upper classes, dominant racial or ethnic groups, and core states in the world-system.

In this paper, we examine the social evolution of ecological injustice and unequal ecological exchange through the development of a formal, general theory that explains their emergence and impact. The theory illustrates how power differences within and between societies have historically shaped, and been shaped by, three critical factors that are part of the exchange between our species and the environment: (1) the search for *ecological value*, undertaken to meet members’ demands; (2) *ecological injustice*, stemming from inequalities in the realization of ecological value; and (3) the *ideology of ecological concern*, or the desire for ecological quality. These systemic processes, we argue, result in a *capture of ecological value* by the more powerful group. The capture of ecological value is an intergroup process that occurs as a solution to the pressures resulting from a reduction in the level and/or quality of ecological services—that is, ecological degradation—and because of the absence or inefficacy of sustainable solutions. The theory posits (1) ecological value as a function of the locally experienced supply and quality of ecological services; (2) the motivation to capture it as a function of selection pressures from both ecological degradation and demand for ecological services, and in response to the growth of the ideology of ecological concern; and (3) the ability to capture ecological value as a function of intra- and inter-societal imbalances of political and/or economic power. At the macro and global scales, the capture of ecological value is an emergent phenomenon; it appears as the polity and economy emerge and then strengthen as autonomous institutional spheres (Abrutyn, 2009, 2014b), reductions in ecological quality reach a threshold, and ecological concern becomes a widespread value. Opposing the continued capture are the same forces that generate it, the dynamics of which shift along with the social and geographic scale at which they operate. Hence, ecological value-seeking can act

as motivation for ecological protection of and justice for the local individual, group, and/or society while simultaneously acting as motivation for distant degradation and injustice; with motivation turning to achievement if a favorable power imbalance exists. The way that these factors work in the future, we argue, will shape the possibilities for ecological sustainability at the global level.

Despite their importance, many extant theories of long-term social evolution suffer from omitting or underspecifying the role these factors play in the human–environment relationship and both human and non-human systems. For example, Chase-Dunn and Hall’s (2009) “iteration model” includes “geographical/botanical/zoological capital” and environmental degradation as factors but does not include cultural factors such as conservation ideologies nor the manifestation of power as a variable in ecological exchange. Other models, like Chew’s (2001, 2007, 2008), include power as a means to capital accumulation that—along with urbanization and population growth—leads to ecological degradation and periodic political/economic/demographic “Dark Ages”; however, Chew understates the impact the emergence of what he calls “ecological consciousness” has on reinterpreting the past as well as affecting the choices actors make in the present or future.

Alternatively, Moore (2011a, 2011b) argues that successive ecological crises have existed over the *longue durée* of human evolution, resulting from the unnatural separation of social relations from the biophysical environment. Crises, then, grow parallel to the size and scale of separation. While we share Moore’s (2011a, 2011b) perspective that a theory of human evolution must locate socio-ecological relations within evolutionary processes, he does not afford ecological concern much significance as a possible mediating or limiting factor in the evolution of those relations. Finally, ecological modernization theory suggests that technological innovations, efficiencies, and ecological concern, each reducing negative ecological impact, will occur together with development (cf. Mol et al., 2009). But there is limited evidence to support modernization theory’s predictions (e.g., Dietz et al., 2012; Gonzalez, 2005); moreover, while modernization theory does offer an explanation of ecological concern it fails to include the effects of unequal development/environmental injustices and the emergence of ecological concern among less-developed societies.

This paper looks to supplement and build off these theories, by taking seriously the role of environmental ideologies, adding the capture of ecological value to the study of intra- and inter-societal processes, and delineating the dynamics of ecological value capture and the growth of ecological concern. In doing so, we posit a formal, general theory, built at an abstract level; that is, the model explains processes that are common within and between many societies but does not attempt to address instances of divergence and variation. Ultimately, this theory exposes the need for social change that addresses two key forces

that can inhibit the possibilities for an ecologically sustainable and just future: inequalities in power and the localization of ecological concern. It is the unequal distribution of power within and between societies that allows for an ecological value capture to occur and the desire to protect the quality of the local over the global ecology that generates motivation to achieve this imbalance.

A theory of the capture of ecological value

Undergirding the emergence of the capture of ecological value are three very important forces creating the engine of change: population pressures, resource intensification, and environmental degradation. Building on the work of Chase-Dunn and Hall (2009), population pressures are strains on a group resulting from the unmet resource demands of members of that group. A critical problem that emerges as populations grow in size is the increasing demand for resource production to meet consumption needs: more food, space, shelter, clothing, and other resources must be produced to meet the growing needs and demands of larger populations. Though several solutions are available to groups, research has shown that eventually circumscription (geographic, political, and/or social) limits mobility, and resource intensification—the increasing throughput of resources from an environment to meet the demands of the population—becomes the likely remedy. As resource intensification occurs, environmental degradation occurs: extraction of resources, exhaustion of soil, reduction of biodiversity, and the production of waste all reduce the quality of the environment (cf. Abrutyn & Lawrence, 2010; Johnson & Earle, 2000; Turner & Maryanski, 2009).

To be sure, the “valences” at which population pressure, resource intensification, and environmental degradation become salient vary across time and place and are often dependent on many other factors, including the mode of production—but these forces as the main drivers of change do not change. The classic “ $I=PAT$ ” equation specifies environmental impact as a function of population size, affluence levels, and technology (Commoner, 1972; Ehrlich & Holdren, 1971), but this can be expanded and nuanced. For example, Secombe (1992) argues that population dynamics were linked to changing land availability and rights and associated norms of peasants regarding marriage that resulted in later marriages and fewer births during the transition from feudalism to capitalism. From Marx, we find the acceleration of resource demands associated with change from the production of goods for use to the production of goods for exchange reconceptualized as the treadmill(s) of production/accumulation/consumption (cf. Foster, 2005). In his work on commodity frontiers, Moore (2000b, p. 416) reveals how the transition from smallholding, “subsistence-surplus” grain production to commodified sugar production by the Portuguese

during the fifteenth century on the North Atlantic island of Madeira generated “ecological exhaustion” from an “environmentally destructive multiplier effect” (Moore, 2000b, pp. 412–413).

In this same work, Moore identifies an additional, and key, component of our theoretical model. Sugar production required a great deal of wood: fuel for the boilers, housing for labor, and ships for transport to markets. Local wood was utilized where available until supplies were exhausted. The continued demand for wood eventually led to the search for alternative sources, first destroying forests “adjacent to the cane fields [and later from] distant forests” (ibid., p. 420). Hence, resource extraction does not need to be limited to the local resource base, if and when resources can be extracted from other locations. To be sure, it becomes a matter of whether the means to foreign extraction are extant or not. If they are not, groups must innovate to extract resources, such as in the example of the triangular trade system premised on the New World colonies as resource suppliers (cf. Clark & Foster, 2009; Moore, 2000a, 2010; Pointing, 2007, Chapter 9). Groups are motivated to innovation where environmental degradation has generated sufficient selection pressures, or pressures that challenge existing structural and cultural solutions to exigencies (Turner & Maryanski, 2009; see also Cohen, 1977; Diamond, 2005; Pointing, 2007).

While specific adaptive responses vary in content and efficacy because of ecological, environmental, and sociocultural constraints, two general responses can be delineated: organizational and technological innovation. Organizational responses involve the emergence and coordination of horizontal and functional divisions of labor as well as vertical, hierarchical patterns of domination (Abrutyn, 2014b; Abrutyn & Turner, 2011). Technological innovations are often harnessed as part of organizational responses. For example, in the pre-modern world, the emergence of temple- and then palace-economies facilitated the coordination of massive divisions of labor, the construction of complex public works—such as canals or irrigation systems—and the centralization of risk in trade and resource management (Earle, 2002; Yoffee, 2005). In the fifteenth-century transatlantic sugar trade, in addition to benefiting from the earlier advances in ship design and navigation (cf. Hugill, 1995), it took 20 years to create a production and export infrastructure. The organizational and technological innovations included “technical expertise and financing ... supplied by the Genoese, Portugal covered protection costs, and African slaves (imported by the Genoese and Portuguese)” (Moore, 2000b, p. 417).

Successful innovation not only contributes to the emergence of new selection pressures or the amplification of old ones, but also to increased political, military, and/or economic power—as was the case with the Genoese and Portuguese. The level of natural resources available to political actors also has important ramifications for power. A shortage of resources generates selection pressures

for the emergence of an increasingly autonomous polity as an organizational innovation that can manage what little resources a group has while also finding ways to expand resource availability (Abrutyn, 2013, 2014a). More resources, however, make political goals and self-aggrandizement possible as surplus is centralized and power is monopolized. In short, population pressures and its consequences can get locked into a feedback loop that accelerates the evolutionary process, as power, technology, and the pressure for greater political organization intensify. Likewise, as political complexity grows, new logistical problems related to power inequities and legitimacy contribute to growing economic and legal complexity and, thereby, new selection pressures (Adams, 1966; Yoffee, 2005). Consequently, the expansion of power implies the use of more resources, the need for intensified production, and purposeful political policies aimed at population growth (Abrutyn & Lawrence, 2010). For instance, Jorgenson and Clark (2009) find that a country's military spending increases its ecological footprint as it contributes to both the "treadmill of destruction" and the "treadmill of production."

As the levels of political, military, and economic power increase, the *means* to utilize that power—within and between societies—and the *motivation* to use this power grow concomitantly. As ambitions of and demands on a group/polity grow faster than a given populous and/or ecosystem can sustainably support, those with the means turn their attention outwards to potential sources of resources and solutions to selection pressures and the power and prestige that comes with them. We add the variable "motivation" to utilize power because it is not obvious that people in power simply create the means to conquer or ensnare outsiders. Rather, the means are created as reasons to exploit neighbors grow. Hence, as local ecological degradation causes available resources to decline, the motivation to seek replacement resources externally increases.

The motivation to seek distant resources may be better thought of as a capture of ecological value. The value is derived from ecological services (also called ecosystem services) that are "the many benefits—large and small, direct and indirect—that ecosystems provide to people. These consist of all the natural products and processes that contribute to human well-being, as well as the personal and social enjoyment derived from nature" (Landsberg et al., 2011, p. 1; see also Daily & Matson, 2008; Emerson et al., 2012; Millennium Ecosystem Assessment, 2005; Trevors et al., 2006). While value is a complex concept that is historically contingent,² part of the value of environmental use can occur

2 *Value*, as it relates to the environment, has a rich history as a contested concept that is beyond the scope of this paper; however, it should be noted that there are clear distinctions between instrumental and intrinsic value (Cobb, 1993) and between value as "*homogenous* social labor time" and exchange and use values (Burkett, 1999, pp. 81–82). These values are historically contingent, in the sense that they vary over time, space, and by mode of production, with the emergence of capitalism as the historical moment when value was an "abstraction from use value and nature" in order to facilitate accumulation (Burkett, 1999, p. 82; cf.

through negative ecological impacts, such as the resort-style downhill ski industry (Park & Pellow, 2013) or the exchange value generated in a situation in which forests are removed to create lumber for markets at the expense of a high-quality biosphere that provides ecosystem services that are sustainable, such as clean air and water; services can be aesthetic and/or ideological and, in that sense, value may occur from non-use—an “extra-human nature” (Burkett, 1999). Indeed, the sentiment that “nature” has intrinsic and/or spiritual value is found across time and place (Bell, 2012; Daniel et al., 2012; Hawken, 2007; de Steiguer, 2006). One attempt to place a monetary value on a variety of ecosystem services estimated their total biospheric value in a range of US\$16–54 trillion (Costanza et al., 1997). While there is a danger that monetization can lead to privatization, accumulation, or further injustices, mechanisms for the protection of ecological quality from a more holistic perspective are common, such as payments to landowners to maintain biodiversity (Pagiola et al., 2004).

Ecological degradation alters supply and demand curves for ecological services, reducing supply and increasing demand (Costanza et al., 1997). We posit that the increase in demand is both a reflection and an outcome of the growth of ecological concern, which can act as a powerful motivation for ecological value-seeking by interested individuals, organizations, and nation-states. Early examples of environmentalism appeared in the eighteenth and nineteenth centuries in the protection of colonies (Grove, 1995). Protests following Three Mile Island and Love Canal in the United States, Kenya’s Green Belt Movement, Chico Mendes and the rubber tappers in Brazil, and the appearance and expansion of environmental and environmental justice movements as the scale of degradation increased in the post-World War II period are clear examples of the growth of ecological concern (Foster, 1999; McNeill, 2000; Pellow et al., 2001; Rudel et al., 2011).

With displaced degradation, ecological value—in addition to economic profit—is captured by more powerful groups as they increase the level and quality of the ecosystem services they enjoy. But the use of power can also be in response to pressures from below for increases in ecological quality; specifically in the form of the ideology of ecological concern and in demands for ecological services that exceed current supply. We argue that ecological degradation triggers or amplifies these two factors, which tend to converge and become forces of social change.

Harvey, 1996; Moore, 2014). The value of ecosystem services *could* encompass all of these possible forms of value; e.g., a forest can represent instrumental value for the shelter it provides inhabitants, intrinsic value for people who feel love for the trees, value as homogenous social labor time for capitalists who are assessing the possibility of deforestation for the exchange value that will emerge as the lumber reaches the market, and use value from the oxygen generated. Of course, the different values can lead to either positive or negative outcomes for ecological sustainability. While monetizing ecological services has the potential to facilitate private accumulation, we believe that, if the services include the benefits to all species, it may offer the best solution in this historical moment; moreover, the growth of ecological concern, concern for both human and non-human rights to ecological equality, may demand that conceptualization of value.

Given that humans prefer higher quality environments and the ecological services they provide for their mental and physical benefits, the environment is clearly a component in what is commonly called a standard of living. A decline in the real or perceived standard of living is an important motivating force for social action (Harris, 1977). And, similar to other forms of collective behavior, a certain level—or threshold—of concern typically needs to be met before that concern grows into pressure for change (Granovetter, 1978). Thus, the threshold would be reached when a significant proportion of the population—in size and/or influence—experiences a real or perceived decline. We include the perception of a decline because the images of nature, the environment, and its effects are “refracted” through cultural lenses (Foster & Holleman, 2012). When an actual or threatened reduction in local ecological quality from pollution or other forms of degradation creates a real or perceived decline in the standard of living, social movements often emerge to address the problems, including applying pressure on elites in the political economy to respond (cf. Polanyi, 1944 [2001]). The response can be for the improvement of local ecological quality through the institutionalization of sustainable use and a “steady-state economy” (Daly & Townsend, 1993), but that solution is often subordinated to unsustainable economic growth (Foster et al., 2010; Pierce, 1992).

Another response to the demand for ecological services is to harness power for the capture of ecological value from distant sources; this can lead to conflict and imbalanced trade. In the modern world-system, scholars have studied the effects of imbalanced coercive power in systemic processes including colonization and trade. Core nations, or those in the most dominant trade positions (Frank, 2007), are able to extract natural resources and obtain cheap labor, either through the use of force or imbalanced exchanges, from semi-peripheral and peripheral nations (Chase-Dunn, 1998; Wallerstein, 1974). For example, typical unequal exchanges involve the transfer of economic and ecological value as low-value (but ecologically costly) raw materials flow from less-developed “extractive economies” in the periphery to developed countries in the core who profit from the transformation and consumption of the raw materials into higher-value products; some of which are exported back to the periphery (Bunker, 1985; Eisenmenger & Giljum, 2007). Moreover, core nation-states and their multinational corporations use economic and political power to negotiate the terms of trade and foreign environmental, labor, and other regulations in their favor (Woods, 2006; see also Konisky, 2008; Stiglitz, 2007). Research has also uncovered “recursive exploitation”: reforestation in the powerful core countries of the world-system, such as the United States and Japan, is linked to deforestation in the less powerful semi-periphery, such as Costa Rica and Indonesia, which in turn is tied to greater deforestation in the least powerful countries, such as Madagascar and Cote d’Ivoire (Burns et al., 2009; cf. Roberts et al., 2009).

When the growth of ecological concern is limited to the local environment, a characteristic that can be traced back to our hunting and gathering origins (Moran, 2006, pp. 9–11), the capture of ecological value from others may meet with resistance primarily from ecological limits and opposition from groups who suffer the negative consequences. As previously mentioned, the demand of payments for ecological debt by groups in the global South is one example of contestation (e.g., Martínez-Alier, 1997). Other examples include movements in India against water use by Coca-Cola (Ciafone, 2012), in Brazil against ethanol production by Cargill (Via Campesina, 2010), and movements across Latin America against ecological injustices committed by powerful groups within the countries (Carruthers, 2008).

In recent years, the ideology of ecological concern has become globalized, and may constitute a worldwide value-orientation (Dunlap, 2006; Dunlap & York, 2008) as it has been institutionalized as part of global governance (Biermann & Pattberg, 2012; Chase-Dunn & Hall, 2009; Frank et al., 2000; Lawrence, 2009; Schofer & Hironaka, 2005). The expansion of concern acts as an emergent counter-force to attempts at ecological value capture. Sometimes the pressure emerges from local groups and “boomerangs” through international organizations to return back to the local political economy (Keck & Sikkink, 1998). International certification programs, such as “dolphin safe” and organic labeling, are additional means by which ecological concern is globalized (Pattberg, 2012). Ecological concerns are also part of larger movements for global change, such as the anti-capitalist movement (Buttel & Gould, 2004) and as “a movement of movements” as revealed at World Social Forums (Kaneshiro et al., 2012). Additionally, the proliferation of global environmental, nature-based, and environmental justice organizations, such as Greenpeace, World Wildlife Fund, and possibly thousands of others is evidence of other emerging global movements (Hawken, 2007).

It would be a mistake to ignore the pressure these groups and movements put on those in positions of power to effect change; if only as a means to reducing political and economic costs found in grievances and protests that threaten political elite’s legitimacy or potential constituency (Martínez-Alier, 1997). As movements and organizations emerge and polities react to the pressures by creating environmental departments and regulations, a global ideology of ecological concern becomes a real force shaping the relationships between nation-states and patterns of legitimacy, albeit with inconsistent results thus far (Schofer & Hironaka, 2005).

An additional limit emerges as systemic degradation, or the total amount of degradation across Earth’s entire biosphere. It is accelerated both by the feedback loop discussed above and by the pursuit of ecological value as a solution. Climate change, for instance, is a form of degradation that has global effects regardless of the source of pollution. When system degradation threatens the system, as

experienced locally in terms of declining quality of ecological services and opportunities, another source of pressure to act is placed on those in power. Systemic degradation can also contribute to spread the ideology of ecological concern, although with a lag effect because transportation/communication technologies, scientific knowledge, and the perception of a declining standard of living have not kept pace with the ability to degrade ecosystems and the entire biosphere; in addition, any ideology is always filtered through cultural lenses and must compete with other ideologies for prominence (Foster & Holleman, 2012). Ultimately, a struggle ensues between forces of ecological degradation and protection.

The formal theoretical model

Our visual depiction of the full theoretical model containing the concepts and processes discussed is presented in Figure 1.

As we move from left to right across the model, the engine of change contains the population pressures and resource intensification that initially can generate an increase in resources. This leads to local ecological degradation, creating selection pressures for technological and organizational innovation as solutions. But unsustainable solutions lead to further degradation through the feedback loop in the engine of change. When effective solutions are not implemented, the likelihood of collapse, disintegration, and/or conquest increases.

The level and availability of natural resources will partially determine the level of political, military, and economic power that can be consolidated and, thereby, utilized against weaker groups or societies through the threat or use of force and/or the establishment of imbalanced trade relationships. But ecological quality declines as resource demands grow, leading to a decline in the real or perceived standard of living. As a threshold in the decline is reached, the affected relationships grow in number. First, there is a lag effect that eventually erodes the legitimacy and therefore the power of the ruling elite. The second effect is an increase in the motivation to use power to capture ecological value. Again, this refers to the elite's motivation to seek imbalanced relations externally, in this case to improve the real or perceived standard of living and reduce dissent in the populace. The third effect, the ideology of ecological concern, is represented by a dotted line because it is a relationship that has emerged in an organized form rather recently. As ecological concern gains traction and becomes a salient ideology in civil society, the potential for greater perception of declining standards of living due to ecological quality should also increase. Not only does this ideology offer people a framework for defining and understanding their local ecology, the presence and spread of such an ideology would likely produce

associations or movements putting pressure on the polity and/or economy to take measures that improve ecological quality while also creating motivation for capturing ecological value from displaced degradation.

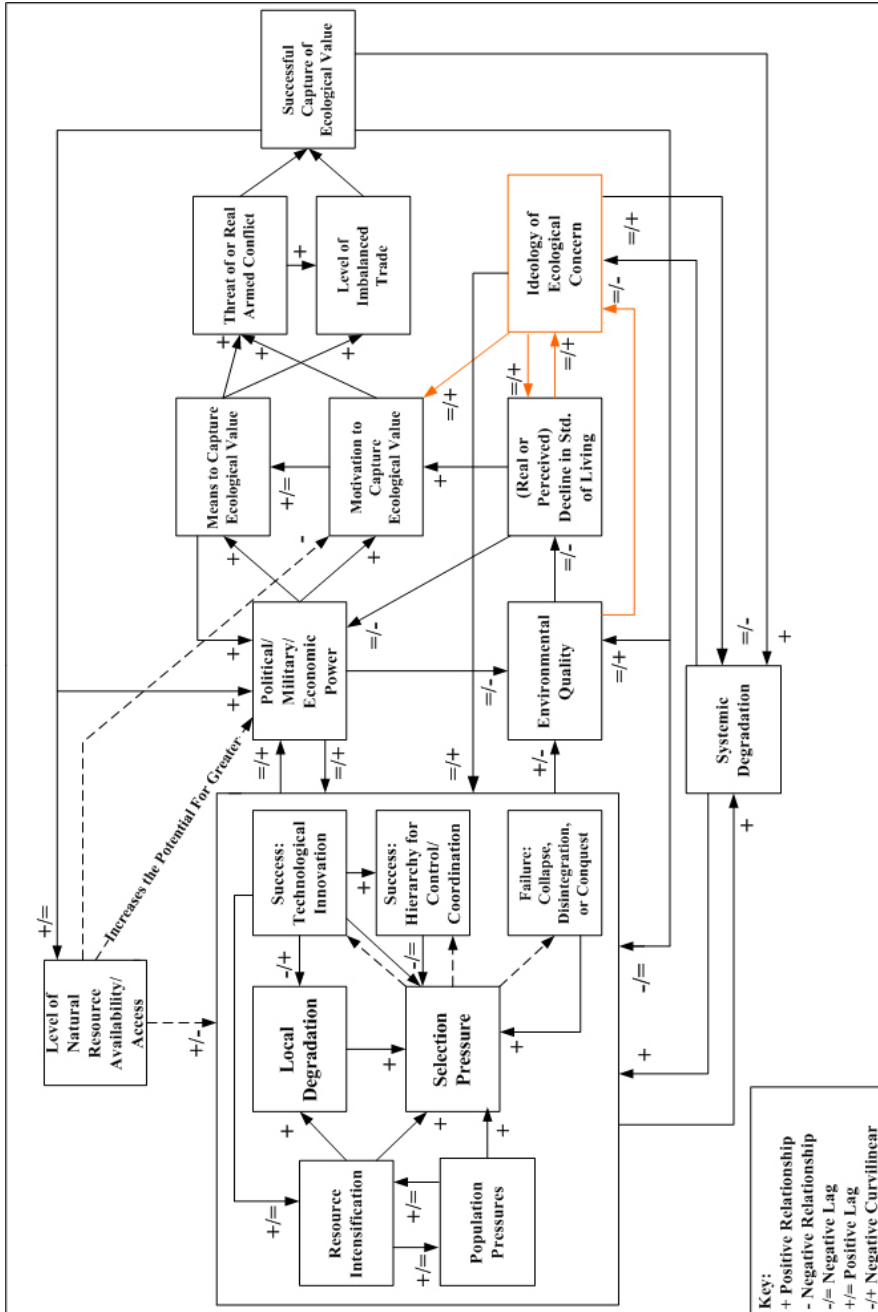


Figure 1: Theoretical model of the capture and limits of ecological value

The successful capture of ecological value will both increase the local ecological quality and provide more resources for the more powerful group/society's production, consumption, and waste assimilation. But this leads to an increase in systemic degradation, which puts additional strain on all ecosystems but also generates an increase and global spreading of the ideology of ecological concern. The continued cycling of the processes leading to the capture of ecological value reaches an ultimate bifurcation point: (a) success—sustainable solutions are found; or (b) failure—the biosphere is degraded to the point that it can no longer support human societies.

Discussion

The theory presented here explains the macro-level dynamics applicable to the capture of ecological value. Any discussion of domestic and geopolitics, world-systems, or globalization must also contend with the fact that it is not just the traditional resource flows characterizing the unequal relationships between core–periphery or dominant–subordinate groups and societies; the displacement of environmental degradation is equally important and has a long history. While we have focused on macro-level dynamics, similar processes take place within societies as less powerful groups experience environmental injustice through exposure to a disproportionate share of the negative effects of intra-societal ecological degradation.

The displacement of degradation creates a paradox: the level of local and/or domestic resource consumption can seem sustainable, masking the impact on the environment in the system as a whole, and thus providing little incentive for truly sustainable living. This is not a new phenomenon in human social evolution as environmental degradation has been occurring for millennia. What is different, however, is the amount of resource use and waste production, currently requiring one-and-a-half Earths to assimilate (Global Footprint Network, 2010). There are more people using more resources in a finite biosphere. The types and degree of degradation have also increased due to technological innovation such as chemical production, nuclear fission, and fossil fuel-based manufacturing and transportation, while the effects of degradation are more difficult to contain in a particular area.

In response, environmental and environmental justice movements have led efforts to protect the biosphere in local and distant locations. Their work must be part of global movements toward innovation of sustainable means to live within the limits, however historically defined, necessary for ecosystems and the biosphere to provide ecological value for all inhabitants. As described by the theoretical model, and as demonstrated by societies in the past, failure results

in ecological failure and the collapse of an environment's ability to support life. Due to the expansion of these processes to the global level, the Earth system is now in peril.

Important political, economic, and cultural ramifications emerge from this model. Local, NIMBYist protection of ecological value is unjust in the short term and unsustainable in the long term. The sense of what is "local" may change as knowledge of the complexity and interconnectedness of ecosystems spreads. The displacement of ecological degradation could reach an end when there are no longer any distant resources to exploit, which could occur as resources are exhausted and/or as ecological concern becomes universal, leaving no "others." An explicit recognition of the value of ecological services to the continuation of our species and of the connections between ours and other species that provide them is essential. But they cannot be privatized and sold to the highest bidder and/or for the benefit of some at the expense of others; that is, a continuation of capitalism's "cheap nature" strategy (Moore, 2014, p. 308). It must be a recognition and protection of ecological quality that all should share in. And the speed of the treadmills of production and consumption that have been reducing ecological quality cannot continue to expand.

This requires a much larger cultural change, away from ecologically destructive values and practices and toward a holistic ecological view. Beck's (2000) cosmopolitanism, in which a plurality of actors at multiple intra- and inter-societal levels strives for universal goals, is one guide. While imperfect, there is evidence that this has begun: The United Nations' conferences on sustainable development, Bolivia's "Law of the Rights of Mother Earth" (*Ley de Derechos de la Madre Tierra*) and the push for its global adoption (Global Alliance for the Rights of Nature, 2014), and, as previously mentioned, at World Social Forums. Contra modernization theory, ecological concern is not limited to developed countries. As Foster (2009) passionately argues, it may take a socialist revolution to generate the sweeping political, economic, and other cultural changes necessary to prevent local and global ecological destruction.

We do see the potential in a global ecosocialism for avoiding continued ecological decline and collapse. But, as Harvey (1996) asserts, a successful ecosocialist project must negotiate the multiple and changing temporal and social scales at which power and meaning reside; for example, there are "two senses of universality" in which universal inclusion must coexist with particularities in identity and practice (Harvey, 1996, p. 203). The particularities must, however, recognize the equality of all, both humans and the non-human world, in the sharing of ecological quality. It may be best, then, to return to Marx via Moore (2014, pp. 287, 304), who argued that human and extra-human natures, "historical natures," exist in a dialectal relationship—they can thrive or decline together. We believe that the emergence of ecological concern for human and

extra-human natures as a universal ideology offers that promise. We hope that by explicating the social drivers of the capture of ecological value, the discussion and theory presented here can be part of that process.

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A Human Ecology Approach to Environmental Inequality: A County-Level Analysis of Natural Disasters and the Distribution of Landfills in the Southeastern United States

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Abstract

One underexplored area of great concern is the relationship between disasters and disposition of the waste they generate, which often amounts to the equivalent of 5 to 15 years of garbage that the same community would create under normal conditions. This paper develops a theoretical framework to analyze the factors that influence the distribution of landfills by integrating insights gained from the environmental inequality and human ecology traditions. The synthesis informs the quantitative analysis of the distribution of landfills across counties in the southeastern region of the United States by examining crucial associated variables, disasters, and other relevant factors gleaned from prior research. Findings suggest that natural disasters have indirect relationships with other communities that process waste. Results also point to the disproportionate concentration of landfills in counties with greater minority populations. The conclusions and implications of the findings are discussed in addition to a range of potential applications for future research.

Keywords: environmental inequality, human ecology, landfills, natural disasters, POET model

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Introduction

The horrific effects of natural disasters make it a topic of immediate and significant concern, yet there is a near total lack of examination of the effects of natural disasters on important problems, such as landfill waste. Global warming² trends affect society in numerous ways, with international scientific consortiums identifying the increased frequency and magnitude of extreme weather events as one such outcome (IPCC, 2007). In their recent review of the field, Rudel et al. (2011:233) conclude that, "Under these circumstances, disasters, community resilience after disasters, and the political economy of relief and mitigation efforts should become important foci for more theoretical work." Following their call, this paper theoretically develops and empirically analyzes the relationship of natural disasters and the distribution of landfills in the southeastern United States. Examining this connection reflects an especially important facet of community resilience and recovery post-disaster, as clearing waste and debris is one of the fundamental challenges to a successful recovery (Brown et al., 2011; EPA, 2008; Luther, 2008).

The linkages that connect natural disasters and waste are much deeper than a one-way relationship whereby natural disasters create vast amounts of waste: The accumulation of waste in landfills accelerates the generation of greenhouse gases (e.g., methane, carbon dioxide) that contribute to climate change, which in turn leads to more frequent and intense disasters producing even larger volumes of landfill waste (EPA, 2006, 2013a). Particularly important is the influence of methane, which is the second-largest contributor to the greenhouse effect with a warming potential estimated to be 20 times greater than carbon dioxide (Lelieveld, 2006:405). Methane is a by-product of a number of natural processes, but its prevalence in the atmosphere has witnessed a recent upsurge mostly due to anthropogenic sources (Forster et al., 2007). Methane-reduction strategies cite the accumulation of organic waste in landfills, primarily in developed countries, as central targets given their substantial contributions of such emissions (Hogan et al., 1991; EPA, 2006, 2013a).

Further, disasters can decimate existing forestlands in the course of their destruction and subsequently precipitate the harvesting of wood to rebuild, which are additional links to global climate change as the removal of trees reduces the amount of carbon dioxide sequestered from the atmosphere via

2 The authors immediately note differences in the terminology used to refer to "global warming." Some believe "global warming" is subject to misinterpretation because it does not reflect the entirety of outcomes related to the greenhouse effect, which include changes in precipitation, wind patterns, and even humidity, and prefer "climate change" as a better descriptor. Leading climate scientist in America James Hansen advocates for "global climate disruption" to characterize the process of and outcomes related to anthropogenic stress on the climate. Global warming and climate change rank top in the popular vernacular and are used interchangeably in this paper.

photosynthesis. Yet another tie is the emission of greenhouse gases incurred in the collection, transport, and burying or burning of trash in the wake of a disaster (EPA, 2013a). The degree to which global climate change is posited to result from the release and trapping of greenhouse gases in the atmosphere underscores the importance of critically evaluating disaster events and the myriad environmental losses they bring. As such, it is important for theoretical and empirical progress in the field that we begin to consider the cycles that connect these key environmental dynamics.

Notably, theory and empirics on the topics of climate change (e.g., Roberts & Parks, 2007), disasters (e.g., Fothergill & Peek, 2004), and landfills (e.g., Mohai & Saha, 2007) jointly emphasize that marginalized populations suffer disproportionate exposure to such adversities and their effects (for review see Brulle & Pellow, 2006; Mohai et al., 2009). Thus, not only are these topics linked in ways that perpetuate and exacerbate one another, but they are also connected in their relative contributions to widening gaps of inequality. Despite their importance, it is extremely rare for analyses to examine the relationship between disasters and landfills, which is one gap this paper seeks to fill.³

Disasters and waste

To contextualize the amount of waste produced by disaster events, the EPA (2013b) reports that in 2011 the United States generated 250 million tons of municipal solid waste while Hurricane Katrina in 2005 created approximately 113.5 cubic yards (227 million tons)⁴ of waste (Luther, 2008). Generally, disasters generate the equivalent of 5 to 15 years' worth of waste in a matter of days (Brown et al., 2011), with clear implications for overwhelming waste disposal facilities. Disaster debris is a wide-ranging category with potential impacts on all types of landfills, as there are vegetative (fallen trees, yard waste), municipal (household trash), construction and demolition (C&D) (concrete, lumber, metals, drywall, roofing, and other demolition materials), hazardous (oil, pesticides), industrial (commercial buildings and materials), and structural (downed power lines, unearthened septic tanks, collapsed roadways and bridges) types of waste to be removed. Depending on the severity of the event, removing debris often presents the single most challenging hurdle to recovery (Brown et al., 2011; Luther, 2008).

There are short- and long-term considerations for clearing disaster debris. Human health concerns most immediately dictate the swift removal and

³ In fact, the authors are unaware of any analysis in sociology or its related disciplines that empirically tests the relationship between natural disasters and landfills.

⁴ Although the conversion from yards to tons depends on the type of materials, doubling the number of tons to estimate cubic yards is used by EPA disaster waste management authorities (Luther, 2008:3).

subsequent disposal of waste that poses the greatest threat to individuals. For example, following Hurricane Katrina and the levee breach that flooded New Orleans, the Army Corps of Engineers removed some 36 million pounds of rotten food from local storage facilities to curb rodent infestation and associated illnesses (Luther, 2008:4). In the overwhelming surge of disposal demands, communities would benefit from using alternative techniques to process waste (e.g., recycling, burning)⁵ in an effort to divert as much as possible from landfills. Unfortunately, a lack of disaster preparedness is a major hurdle to implementing these alternative waste management practices on a widespread basis (Brown et al., 2011; Luther, 2008). Disasters often occur without much notice⁶ (if any at all) and communities are left to deal with the aftermath in the absence of pre-disaster planning, including techniques to process waste that are less impactful on landfill capacities.⁷ In the long-run, it is acutely important that communities dispose of disaster waste in ways that prevent contamination and toxicity of the air, land, and water sources.

Disaster waste is especially prone to improper disposal, as the desire for a speedy recovery takes precedence over future troubles instigated by contamination. The sheer volume of waste post-disaster amplifies the likelihood that hazardous waste will be improperly disposed of in landfills that are not equipped to minimize threats to human health and the environment. Thus, virtually all landfills are vulnerable to post-disaster use and contamination by commingled hazardous and non-hazardous waste (Luther, 2008). Despite mighty efforts by the Army Corps of Engineers to implement optimal methods of segregating and disposing of waste after Hurricane Katrina, most of the debris “was mixed to the point that separation [was] either difficult or essentially impossible” (Luther, 2008:10).

While federal mandates regulate the standards of operation for municipal solid waste and hazardous waste landfills,⁸ individual states are charged with establishing operating criteria for other landfill types (e.g., C&D; industrial). This is especially consequential for disaster debris, the bulk of which is C&D

5 We acknowledge there are additional environmental concerns posed by incineration techniques, most notably the air pollution that results.

6 Some disasters (e.g., earthquakes) occur with little or no warning, others (e.g., hurricanes) might elicit some advanced notice, most of which is dedicated to evacuation and protection. Furthermore, predicting the severity of disasters is wrought with uncertainty.

7 Although some communities have excelled in pre-disaster planning, in general, local governments are especially overburdened in the current era of neoliberalism and federal government rollback, which shifts responsibilities from the federal to local governmental bodies, the latter of which have inferior monetary and human capital assets (see e.g., Tierney, 2012).

8 The United States Environmental Protection Agency (EPA) regulates the location, operation, design, control, monitoring, closure, post-closure maintenance, and financial solvency criteria for municipal solid waste landfills under subtitle D of the Resource Conservation and Recovery Act; subtitle C of the Act regulates the same for hazardous waste landfills.

waste that lacks federal regulation.⁹ To illustrate, C&D landfills are not subject to federal mandates that require their municipal solid waste counterparts to have protective liners, control leachate, and collect runoff. States also define what constitutes C&D waste, and often in the aftermath of a disaster, choose to relax their definitions to expedite removal and disposal.¹⁰ This was precisely the case after Hurricane Katrina when the Louisiana Department of Environmental Quality expanded acceptable C&D waste to include “construction and demolition debris with asbestos contaminated waste” (Luther, 2008:11). These complex circumstances apply to four landfills in the New Orleans area and therefore warrant consideration.

Amid the horrific tragedy brought about by the levee failure in the aftermath of Hurricane Katrina, officials were faced with multiple controversial decisions. Among those was the designation of four landfills in the greater New Orleans area—Gentilly, River Birch, Highway 90, and Chef Menteur—to dispose of disaster waste. The ensuing saga was reported in *The Times-Picayune* (Russell, 2012) and *The New York Times* (Eaton, 2006). Prior to Katrina, Highway 90 operated as a C&D landfill while River Birch was permitted to accept municipal solid waste. The storm’s wreckage spiked dumping in Highway 90 by 2,400 percent in the year following the flood (Louisiana Department of Environmental Quality, as reported in Russell, 2012); meanwhile, the Old Gentilly Dump and Chef Menteur landfills were given emergency permits to accept C&D waste. Local environmentalists, who remembered the Superfund site that resulted from the reopening of Agriculture Street dump after Hurricane Betsy, initiated a firestorm of protests and campaigns to suspend the emergency-issued permits. Their concern was compounded by the fact that the Chef Menteur landfill secured a zoning waiver to permit its operation, which is located next to the Bayou Sauvage National Wildlife Refuge with close proximity to a largely Vietnamese community. The following statement of concern was issued by the Louisiana Field Office of the U.S. Fish & Wildlife Service:

Given the scope and nature of the flooding events and the age of many of the buildings to be demolished and deposited in the proposed landfill, we believe that the delivery of materials containing numerous environmental contaminants, such as lead-based paint, asbestos, creosote, arsenic-based wood treatment chemicals, various petroleum products, and a variety of pesticides and household cleaning chemicals would be unavoidable. Placement of such materials in an unlined landfill,

9 In fact, the Sierra Club sued the EPA for failing to regulate C&D landfills that receive hazardous waste from conditionally exempt small quantity generators (CESQGs—those that generate less than 100 kilograms of hazardous waste per month).

10 Importantly, “demolition” waste is far more likely to be contaminated than “construction” waste, and the former constitutes the bulk of post-disaster debris.

particularly within coastal wetlands, could potentially result in leaching and resultant persistent contamination of ground water, surface water and adjacent wetland habitats. (quoted in Luther, 2008:13)

After operating for four months and handling tons of debris, the Chef Menteur landfill was closed due to failure to obtain a conventional permit—a decided victory in the eyes of surrounding neighborhoods and local environmental advocates. We likely do not yet know the full extent of damage exacted on communities receiving post-Katrina waste, especially in light of modified definitions of acceptable waste and emergency permits. In this case and most instances of disaster waste, the desire for timely removal takes precedence over enforcing the segregation and proper disposal of contaminated waste.

Environmental inequality

Most agree that the fight against environmental inequality began in 1982 in Warren County, North Carolina, when word spread that the state authorized the dumping of over 100 million pounds of PCB-contaminated soil in the predominantly African-American county (Bullard, 2000; Mohai et al., 2009; Roberts & Toffolon-Weiss, 2001). This prompted swift movement from activists who organized to stop the dumping and bring to the forefront the disproportionate exposure of minorities to harmful pollution as a crucial social problem. Two influential reports were subsequently commissioned (GAO, 1983; UCC, 1987) and jointly concluded that African-American communities evidenced a disproportionate concentration of hazardous waste facilities, a trend that was particularly prominent in the southern United States.

The apparent discriminatory nature of the siting of these facilities coupled with the harmful toxicity of exposure spurred scholarly interest in the location of hazardous waste facilities. Beginning with the pioneering work of Bullard (1983, 1990, 2000), a number of assessments have investigated the correlates of communities that host locally unwanted land uses (LULUs), hazardous waste facilities (Bullard et al., 2007; Mohai & Saha, 2007), and other types of environmental hazards (Downey, 2006, 2007). Differences in methodologies, units of analysis, and types of environmental outcomes utilized have produced a rather mixed bag in terms of results that strongly support, somewhat support, or find no support for the uneven distribution of environmental hazards among racial and poverty lines (Downey, 2006). Regarding landfills, however, the more consistent finding points to the disproportionate exposure of minority communities to hazardous waste facilities (Bullard et al., 2007; Mohai & Saha, 2007) and LULUs (Bullard, 2000), which remains significant when controlling for associated cofactors of poverty, education, income, and property value, among others. Their conclusion is that historically marginalized populations

continue to experience injustice by exposure to environmental hazards and property devaluation; some interpret these associations as deliberate siting decisions indicative of political and institutional racial segregation.

While the focus on hazardous waste facilities (Bullard et al., 2007; Mohai & Saha, 2007) and other noxious land uses (e.g., municipal landfills, lead smelters, chemical plants; Bullard, 2000) is indicative of the severe toxicity effects of the materials associated with them, this paper considers all land devoted to processing waste as a potential factor contributing to inequality. Quite simply, land area devoted to landfilling is unavailable for other productive uses. The transformation of natural capital (Flora & Flora, 2013) to landfill undermines the proliferation of other (political, financial, social, human, and cultural) forms of community capital. Flora and Flora (2013) convincingly argue that natural capital—in essence, land and the life or embedded wealth it contains—is the most important of them all, based on its potential to boost all other types of capital. Landfills, then, contribute to the greatest losses of productivity and productivity potential in communities, which undermines the socioeconomic progress of the individuals in them.

Expanding the environmental inequality framework to all landfills is consequential given that for the 613 counties included in the present analysis, hazardous waste facilities comprise less than 1 percent of all landfills, whereas C&D landfills make up roughly 70 percent, and industrial and municipal landfills about 15 percent each. To reiterate, in the wake of disasters it is precisely those latter three types of landfills that are especially prone to contamination. It is of particular importance to understand the nature of the association across those communities that experience natural disasters and those that host landfills, a linkage that has not yet been explored in the sociological literature. It follows, then, that the analyses presented below examine the influence of natural disasters on the distribution of C&D, industrial, and municipal landfills across southeastern United States counties.

We focus on the southeastern United States precisely because punctuated socioeconomic inequality (Wimberley & Morris, 1997) and environmental injustice (Bullard, 2000; Roberts & Toffolon-Weiss, 2001) characterize the region. The work of Wimberley and Morris (1997) demonstrates that the bulk of the nation's individuals who are poor, uneducated, impoverished, rural, and African-American reside in southeastern counties (or what they refer to as the "Black Belt South"); these trends are confirmed to hold across space and time for various measures of inequality. The South, in general, has a distinct legacy of corporate exploitation of natural resources, cheap labor, and lax regulations, especially regarding labor and the environment (Bullard, 2000; Roberts & Toffolon-Weiss, 2001). These trends are not unlike observed patterns of the global hierarchy of nations and the division of labor therein that relegates dirty industries and

waste produced in the wealthy core to disadvantaged zones in the world-system for precisely the same reasons—cheap labor, abundant natural resources, and a virtual *carte blanche* to operate in the absence of regulation (Bunker, 1985; Frank, 1969; Wallerstein, 1974). The southeastern region in the United States, then, constitutes a “Third World” (Bullard, 2000:xv) or “peripheral” area of sorts within the United States (see e.g., Driscoll & Kick, 2013; Smith, 1987), although we hasten to add other areas in comparable circumstances, such as Native American reservations in the west. For these reasons, the southeastern United States presents a particularly important area to examine the themes treated above; the analysis that follows empirically examines the correlates of landfill distribution across 613 counties in seven southeastern states (Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee).

Complementary theoretical approaches: Human ecology, POET and the ecological complex

Human ecology (Park & Burgess, 1921) is a foundational theoretical perspective that offers complementary ways of understanding the dynamics treated so far. Simply put, human ecology emphasizes the ecological embeddedness of social organization, technology, population and the environment. Particularly instructive for our purposes is the POET model as formalized by Duncan (1959, 1961), which identifies interdependencies among population (P), social organization/structure (O) and technology (T), while maintaining that all three are key causes of environmental problems (E), as well as bring consequences of one another and of the environment itself. The analysis of ecological factors as both predictors and outcomes, and the modeling of feedback loops among all terms, are key innovations.

Duncan’s work (1959, 1961) articulates a framework in the human ecology tradition that is conceptually rich, logically compelling, derivative of hypotheses, and amenable to empirical specification and analysis. Subsequent empirical applications illustrate the viability of the POET model across a wide range of topics including, but not limited to, demography (Sly, 1972; White, 2008), disasters (Donner 2007), and agriculture (Albrecht & Murdock, 1984). Those cases where POET is concretely applied promote testing and further theoretical refinements (e.g., Albrecht & Murdock, 1984; Clement, 2010; Donner, 2007; Sly, 1972; York & Mancus, 2009). The POET model’s holistic approach provides a useful framework for examining the ties that integrate societal–environmental interactions, such as those elaborated below.

From a human ecology perspective, landfills may be viewed as components of both the T and E terms, as landfills represent a technology devised to manage the environmental pressure of waste. Indeed, increases in the size and density

of a population are the mechanisms driving the need to process waste in an organized and technical manner ($P \rightarrow E, O, T$). The growing environmental burden of waste influenced social organization and technology via the creation of waste collection routes and landfills ($E \rightarrow O, T$), and the organization of the social and technical responses to deal with waste have, in turn, impacted environmental quality in the areas where landfills are located ($O, T \rightarrow E$). Social organization surrounding landfills reflects reductions in environmental quality via companion losses of land and housing values, in mutually reinforcing ways ($O \rightarrow E; E \rightarrow O$). To elaborate, there is mixed evidence that the organization of political and economic institutions is such that vulnerable populations share a disproportionate burden of environmental externalities ($O \rightarrow E$). Concomitantly, the proximity of communities to polluting and toxic land uses reduces the value of the land and housing therein, potentially impacting the organization of the population in ways that exacerbate inequality ($E \rightarrow O$). There are likely additional feedback effects whereby populations reorganize themselves to escape noxious land uses, such as landfills ($E \rightarrow P$).

Further, environmental crises, such as natural disasters, greatly accelerate the generation of waste ($E \rightarrow E$) that communities must process ($E \rightarrow T$) in order to recover the organization of their population in the aftermath of disasters ($T \rightarrow O, P$). Collective concerns surrounding disasters stimulated the organization of federal and state systems (e.g., Federal Emergency Management Agency) to standardize the response to and management of these events ($E \rightarrow O$). Finally, we situate within the POET framework the organizational ($O \rightarrow E$) and technological ($T \rightarrow E$) contributions to engineering disasters (Freudenburg et al., 2008) and note how these configurations exaggerate the magnitude of their calamitous effects (Perrow, 2007).

The POET model provides an extremely useful framework for conceptualizing nature–society interactions, broadly conceived, and is particularly instructive for our specific focus on the association of population (size, change), its organization (demographic characteristics and power), environmental crises (disasters), and the distribution of technical responses to manage environmental pressure (landfills). Given the burgeoning scholarship that demonstrates the political and economic dimensions that condition all factors that comprise our analytic focus such as the patterns of environmental injustice treated above, it is important to weave the POET model with a political economy lens that accounts for such dynamics. To do just that we turn to a human ecology approach to environmental inequality.

A human ecology approach to environmental inequality

In this section we offer a preliminary interweaving of themes from the theories treated above to inform the subsequent analysis. In particular, we integrate environmental inequality emphases on the political and economic arrangements that contribute to subnational stratification with human ecology tenets that recognize the ecological embeddedness of nature–society interactions. Rather than situate these perspectives as competing explanations, our goal is to focus on their compatibilities and how they collectively improve understanding of the dynamics we test. In our view, a synthesis such as this has the potential to contribute to cumulative science in ways that improve the empirical and theoretical foundations from which they are derived. Of course, this is a modest, preliminary attempt to identify a handful of relational pathways that might be a beginning point for future refinements.

The compelling logic of the POET model and its constituent constellation of applications to diverse circumstances make it an especially powerful framework for interpreting the web of nature–society interactions. What is lacking, perhaps, is the explicit premise that each term requires concrete specification. The environmental inequality framework helps concretize the more generic POET model by articulating the political and economic arrangements that perpetuate inequality across space (Agyeman et al., 2003). Indeed, environmental inequality scholarship emerging from academic (e.g., Agyeman et al., 2003; Bullard, 2000; Mohai & Saha, 2007) and public arenas (e.g., GAO, 1983; UCC, 1987) problematizes the unequal distribution of environmental protection and risks across subsets of the population, with specific focus on the vulnerability of marginalized communities and those that lack the political power to oppose LULUs.

Using insights from theories of environmental inequality, the POET model can be used to elaborate the ways in which biophysical conditions interact with social forces in a mutually determinative fashion. We first note that various subfields of research conclusively demonstrate differences in population (birth rates and death rates—see e.g., Thompson, 1929), organization (productive and economic—see e.g., Wallerstein, 1974), the environment (degradation and conservation—see e.g., Roberts & Parks, 2007), and technology (its spread and its benefactors—see e.g., Volti, 2010) across nations, regions, communities, and the people in them. These themes have been interrogated to such an extent that we immediately acknowledge the abridged nature of the citations we offer. Thus, there is ample justification in observing that the POET model's general tenets are grounded by incorporating political–economic postulations on concrete differences in the distributions of interest, particularly the pronounced

vulnerability experienced by certain segments of the population relative to others. That is, while human ecology explains the relationships among these four key dimensions, theories of environmental inequality add that there is an uneven nature to these components that impact the relationships therein (see York & Mancus, 2009). We include in our model select factors to capture these contours in order to understand their relationships to the distribution of landfills.

Data and methods

This paper utilizes a unique data set to analyze county-level correlates to the distribution of landfills in the southeastern United States. Because many landfills are located outside of urban centers, it is requisite that the unit of analysis includes metropolitan and non-metropolitan areas. Following the tradition of highly lauded studies of regional processes (Hooks & Smith, 2004; Tolbert et al., 1998), this paper uses county-level data that are often easier to obtain as counties are relatively stable boundaries. The inclusion of the history of disasters makes this an important consideration, so it is possible to examine cumulative associations with the outcome of interest.

We conduct OLS (ordinary least squares) regression to examine the association of relevant factors to the distribution of landfills across counties; variables are drawn from comparable prior efforts and the interweaving of the interpretations they use, as treated above. Also included in the models is the number of natural disasters in each county for the time period 1964–2011, to shed light on the relationship between a key facet of waste generation (i.e., disasters) and disposal (i.e., landfills). Our results do not allow us to identify how or why certain segments of the population suffer disproportionate exposure to landfills, but our goal instead is to analyze the county-level associations to landfill distribution. If environmental inequality does not exist, you would expect landfills to be evenly distributed across counties, irrespective of demographic and social differences.

Dependent variable

The dependent variable represents the municipal, industrial, and C&D landfills in a county as a percentage of the cumulative total of the 1,334 landfills in the region. We employ this outcome as opposed to the count of landfills for two reasons. First, environmental justice perspectives emphasize the *relative* differences in the distribution of stratification. Thus, it is not the absolute number of landfills that is of substantive import, but rather it is the comparison of the relative concentration of landfills that is meaningful. Second, there is a technical complication: count outcomes such as this one that cluster around zero and have a rapidly descending upper tail are inappropriate for conventional

analytic techniques such as OLS regression. While binary transformations could be undertaken and logistic regressions performed, doing so would dilute the precision of the data.¹¹

The data are drawn from a variety of publicly available sources (Alabama Department of Environmental Management, 2011a, 2011b; Georgia Department of Natural Resources, 2012; Louisiana Department of Environmental Quality, 2013; Mississippi Department of Environmental Quality, 2013; North Carolina Department of Environment and Natural Resources, 2013; South Carolina Department of Health and Environmental Control, 2012; Tennessee Department of Environment and Conservation, 2013). For each state, an initial search for a directory of existing landfills was conducted at the relevant state department website (e.g., in Alabama—the Department of Environmental Management; in Louisiana—the Department of Environmental Quality). With two exceptions (Alabama and South Carolina), the list of active landfills was immediately accessible through a searchable database on the state website. The most recent data available for Alabama and South Carolina were for the year 2011; personal communication with the respective state agencies confirmed there had been no changes in the two years following the publication of those lists. For all states, contact was established with the respective environmental department to confirm the directory on the website is the most up-to-date, valid, and reliable source of information.

A comparison of the data received from individual state offices to national databases (such as the EPA's Toxic Release Inventory) revealed the greater efficiency of the former. Speaking with staff from each state's environmental office yielded more in-depth and up-to-date information than that gleaned from national databases.¹² Discrepancies in state regulations further complicate data searches on the national level (i.e., EPA website) regarding C&D and industrial landfills, as states are responsible for defining and regulating those facilities. Ostensibly, the collection of these data is best approached by directly obtaining the information from the appropriate state office. It is fortunate that the Freedom of Information Act and other right-to-know initiatives impel state offices to respond quickly to citizen inquiries such as these. As such, the data used in the analyses that follow are for the year 2013 and are taken from state branches that oversee environmental management.

11 To maintain consistency with prior efforts and in the spirit of experimentation, the analyses were re-run using the binary outcome (1 = landfill; 0 = no landfill) in a logistic regression model. Conclusions remain the same; the authors will share the results with any reader who requests them.

12 As one illustration, a search for hazardous waste facilities in Alabama using the EPA's Envirofacts database returned a list of five addresses, whereas contact with the program officer in Alabama's Department of Environmental Management revealed only one of those remained in operation. After delving further to explain the contradictory information, we discovered the EPA's list had not been updated since 1994.

Independent variables

We include the total number of federally declared disasters for each county over the period 1964–2011.¹³ This count includes floods, tornadoes, storms, and hurricanes.¹⁴ The data are from the Federal Emergency Management Agency (2013). To facilitate comparison with prior efforts, we include variables used in analyses of hazardous waste facilities and other LULUs in the environmental inequality literature—percent non-white in each county, percent below poverty, percent with a bachelor's degree, median household income, and median housing values—taken from the United States Census Bureau (2010). Two other variables taken from the Census Bureau are included: total county population in 2010 and the percentage change in population from 2000 to 2010. While population is expected to have a positive, “stock effect” on landfills that has accumulated by decades, will there be a “time lag” for population change and landfills? Very large populations typically evidence comparatively small percentage-based changes in the course of a decade. Smaller bases, however, can evidence very large departures (of growth or decline) in a decade.¹⁵ We suspect an immediate growth is unlikely to be addressed in such a short period; however, decreases in population size might accompany the distribution of landfills as individuals relocate away from such land uses (e.g., “not in my backyard” (NIMBY)). It might be, then, that landfills “crowd out” human capital (read: people). Also plausible is that population declines reduce the potential for successfully organizing political opposition to LULUs. Our data do not allow us to assess the time ordering of such mechanisms, but do allow us to assess the extent to which there is an association between population change and landfills.

Discussion of results

Table 1 provides descriptive statistics and the bivariate correlation matrix of variables included in the analysis. Population and population change are shown to have positive bivariate associations with landfills, and the socioeconomic predictors are correlated in expected ways. The high correlations among the latter are a preliminary indication of multicollinearity,¹⁶ which can bias standard errors in multivariate analyses. The consequence is a greater likelihood of committing Type II errors (i.e., rejecting true hypotheses), a point returned to below.

13 This time period is chosen because the average life of a landfill is around 50 years (Allied Waste Industries, 2007), thus the years covered in the indicator is comparable to the expected life of the outcome.

14 In principle, earthquakes are also included as “disasters,” but for the counties sampled there were no such events.

15 For example, a 1 percent population change in Fulton County, Georgia, (whose population is roughly one million) would require the transition of some 10,000 individuals, whereas Lanier County, Georgia, (population of around 10,000) would attain 1 percent population change with the transition of just 100 individuals.

16 To quote Bollen (1989:58), “The simple bivariate correlation between explanatory variables is not sufficient for determining the extent of collinearity. The multiple correlation of each explanatory variable regressed on the other explanatory variables comes closer to measuring this dependence.”

Table 1. Descriptive statistics and bivariate correlation matrix of variables included in the analysis of landfills for 613 counties in southeastern United States, 2013

Independent variables	Mean	Std Dev	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1 Landfills (% of total)	0.14	0.13	1.000									
X2 Landfills (count)	2.18	2.32	0.992**	1.000								
X3 Population	10.48	1.08	0.569**	0.555**	1.000							
X4 Population change	8.41	14.51	0.106**	0.101*	0.420**	1.000						
X5 Disasters	8.22	4.21	0.034	0.044	0.148**	-0.204**	1.000					
X6 Non-white (%)	33.36	19.29	0.105**	0.097*	-0.059	-0.327**	-0.088*	1.000				
X7 Poverty (%)	20.35	6.32	-0.176**	-0.173**	-0.461**	-0.574**	-0.018	0.555**	1.000			
X8 Bachelor degree or higher (%)	16.37	7.70	0.358**	0.349**	0.671**	0.437**	-0.048	0.000	-0.411**	1.000		
X9 Median household income (ln)	10.55	0.23	0.272**	0.266**	0.593**	0.661**	0.010	-0.353**	-0.869**	0.622**	1.000	
X10 Median housing value (ln)	11.55	0.35	0.241**	0.240**	0.619**	0.635**	-0.080*	-0.376**	-0.699**	0.742**	0.815**	1.000

* $p < 0.05$, ** $p < 0.01$.

Table 2 presents the OLS coefficients, model fit indicators, and multicollinearity diagnostics for each estimation. Model 1 is taken as the best-fitted model on the basis of the F-statistic, statistical significance of the associations, and the absence of untoward collinearity. Before turning to those results, we first discuss the findings from the alternative models. Models 2, 3, 4, 5, and 6 add socio-economic factors shown to be important in prior environmental justice studies. While these predictors are found to be non-significant (with median housing value as a partial exception in Model 3; $p < 0.10$), the condition numbers for these models indicate unacceptable levels of multicollinearity (i.e., in excess of 30). This is suggestive of biased standard errors, which may, in part, explain the failure to find significant associations with the distribution of landfills. Thus we interpret these findings with extreme caution.

All models demonstrate consistent associations of population, population change, disasters, and percent non-white with landfill distribution. As expected, population is found to be positively associated with the distribution of landfills, which reflects the logic of human ecology and the POET model treated above. Population change is found, in all cases, to be negatively associated with the distribution of landfills. The multivariate coefficient of population change is likely indicative of areas with large population growth or declines, since large populations typically change at slower rates. We interpret this relationship as complementary to environmental inequality and human ecology perspectives, and one we anticipated from their synthesis. First, there is a general tendency to locate landfills in areas that have fewer inhabitants, including communities that experience exodus for entirely unrelated reasons. Second, environmental inequality offers that fewer people, save those with exceptional wealth or political power, will hold less sway in organizing opposition to LULUs compared to areas with rapidly growing populations. Third, advance warning of impending changes such as a new landfill may spur resident departures.¹⁷ Fourth, as stated by Hawley (1944:404), human ecology “concerns the adjustment of population to the resources and other physical conditions of the habitat.” We conjecture this association is picking up on the proclivity of individuals to organize their lives in ways that avoid noxious land uses, although our analyses do not allow us to assess the temporality of such events. Importantly, this finding might be particularly consequential for rural areas that are experiencing comparatively large rates of population decline.

17 We note the potential for landfills to be repurposed post-closure to deliver a recreational amenity, such as a park or playground, which might attract new residents and improve land values. However, laws differentially regulate the timeframe for post-closure care, which is federally mandated as 30 years for municipal landfills, but varies on a state-by-state basis for industrial and C&D landfills. Thus, we note that, in principle, there is the potential for repurposed landfills to provide a social amenity that reverses the dynamics uncovered here, although that transformation is often a decades-long process for municipal landfills and our toxicity concerns remain for those landfills in which post-closure care is determined by the state.

Table 2. OLS coefficients predicting percent of landfills for 613 counties in southeastern United States, 2013

Independent variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B	b	B	b	B	b	B	b	B	b	B	b
Constant	-0.677 (0.045)	***	-0.904 (0.292)	***	-0.306 (0.203)	***	-0.653 (0.058)	***	-0.692 (0.051)	***	-0.667 (0.061)	***
Population (ln)	0.080 (0.005)	***	0.078 (0.005)	***	0.085 (0.005)	***	0.078 (0.005)	***	0.082 (0.006)	***	0.081 (0.006)	***
Population change, 2000–2010	-0.001 (0.000)	***	-0.002 (0.000)	***	-0.001 (0.000)	***	-0.002 (0.000)	***	-0.001 (0.000)	***	-0.001 (0.000)	***
Disasters, 1964–2011	-0.003 (0.001)	**	-0.003 (0.001)	**	-0.003 (0.001)	**	-0.003 (0.001)	**	-0.003 (0.001)	**	-0.003 (0.001)	**
Non-white (%)	0.001 (0.000)	**	0.001 (0.000)	*	0.000 (0.000)	*	0.001 (0.000)	*	0.001 (0.000)	*	0.001 (0.000)	*
Median household income			0.023 (0.003)									
Median housing value					-0.037 (0.020)	†						
Poverty, 2007–2011 (%)							-0.001 (0.001)	-0.032			-0.001 (0.001)	-0.038
Bachelor degree or higher (%)									-0.001 (0.000)	-0.03	-0.001 (0.001)	-0.035
F-statistic	85.597***		68.557***		69.468***		68.499***		68.449***		57.140***	
R ²	0.360		0.361		0.364		0.361		0.361		0.361	
Highest VIF	1.550		2.468		2.563		2.262		2.071		2.316	
Condition number	29.93		220.72		156.42		39.36		39.709		47.05	

Note: Standard errors are in parentheses.
† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Disasters are shown in all models to be negatively associated with the outcome. That is, those counties with greater occurrences of disasters tend to have fewer landfills relative to others. Importantly, this suggests there are indirect impacts of disasters that affect other communities that process the large volumes of waste generated by these events. Percent non-white is positively associated with the distribution of landfills, indicating that counties with greater numbers of minorities are associated with a disproportionately greater concentration of landfills in the region. Our findings suggest that environmental inequality does exist because we fail to support the hypothesis that landfills are randomly distributed.

Conclusions and implications

Clearly communities directly impacted by disasters suffer an indescribable onslaught of trauma, tragedy, and socio-economic losses. This paper offers a modest step in developing the theoretical and empirical linkages between natural disasters and the disposal of waste. Given the extraordinary amounts of waste generated by such tragic events, it is important to approach these topics in a holistic manner to specify and advance the connections among these interrelated social problems. This paper weaves perspectives of environmental justice and human ecology within sociology to inform an empirical analysis of the distribution of landfills in the southeastern region of the United States. Our findings indicate that disasters bear additional, indirect impacts on communities that process waste. This is an important finding and one that runs counter to conventional expectations. As climate change intensifies with predicted exacerbating effects on the occurrence and severity of extreme weather events, it is especially important to consider the indirect impacts on other areas. Further, as waste gathers in landfills more globally, greenhouse gases are emitted on a worldwide basis that, in turn, contribute to global warming trends, which then lead to intense disasters that generate large amounts of waste. Even when waste is incinerated, methane and carbon dioxide are released, further exacerbating climate change. We conclude these dynamics are best assessed in a holistic fashion that examines the relative contribution of each axis to widening gaps of inequality across communities.

Theoretically, the implication is that researchers should consider the web of linkages among the myriad causes and effects of global climate change that adversely impacts communities. The synthesis of the theoretical frameworks presented above is an especially promising undertaking for realizing this objective. In particular, we advocate the interweaving of themes from political economy perspectives (in this case, environmental inequality) with human ecology traditions (the POET model). Rather than assuming a conventional approach to constructing competing hypotheses and interpreting results as confirming or disconfirming one to the exclusion of others, we point to the

potential for an alternative model that identifies intersections among theories and interprets results in ways that foster cumulative improvements. Indeed, critics often bemoan the failure of human ecology to incorporate and account for economic injustices and political struggles. However, it is clear the POET model leaves ample space for processes of inequality, power, and dependency. Further, we develop the case for combining the strengths of human ecology and its emphasis on biophysical processes that influence human societies with more recent articulations of political-economic dynamics that contribute to inequality. In short, we believe a POET model inspired by political-economic considerations is particularly efficacious for future work in the area.

The purpose of the analysis is not to make claims on the historical motivations for siting landfills, but rather to determine the county-level characteristics that correspond to one form of natural capital loss—the distribution of landfills. In this respect, the findings point to the heightened vulnerability of counties with larger minority presence relative to others. One possibility for future research is to investigate the historical unfolding of uneven development across subnational units to gain clarity on the precise mechanisms that collectively worsen conditions for certain segments of the population, especially land-use decisions related to disaster waste management. Historical case studies and ethnographies of communities are especially promising avenues for uncovering such dynamics. Additionally, analyses might be replicated in different contexts to inform a comparison of regions in the United States; they might also be undertaken at other levels of aggregation to discern if those refinements lead to the same conclusions as those reached here.

While we do not test the mechanisms that produce inequalities over time, our results point to the non-random distribution of landfills across the southeastern region that, in future analyses, could be linked to socio-economic indicators of progress and human health outcomes of fundamental importance to environmental justice (Brulle & Pellow, 2006). Put differently, the distribution of landfills as both a predictor and outcome of various axes of inequality across communities is a fruitful direction for future research to explore. Moreover, further investigation into the nuances of the association between population change and landfills seems warranted to clarify the chronology of events and the influence of socioeconomic factors. For instance, if landfills spur county-level declines in population, what segments of the population are able to move away from LULUs, and how do socio-economic factors affect this decision?

Environmental inequality treatments acknowledge the importance of using empirical research to initiate public policy debates and future directions. In this vein, one implication of our findings might be that federal and local disaster management bodies should consider directing relief efforts to communities receiving disaster waste, and craft policies that protect the land, socio-economic progress, productivity potential, and the health and well-being of those

communities. Doing so also requires a holistic approach to mitigating the effects of disasters, including the waste that results from these tragedies. A singular focus on the direct, immediate effects on the areas where the events occur does not achieve the desired result. Rather, it is the understanding of the interlinkages among disasters, waste, and landfill disposal that is most auspicious for boosting the sustainability of all communities affected by myriad outcomes associated with disasters. It is important to note that the “ecological complex” and the POET model as presented by Duncan (1959, 1961) is a particularly persuasive and useful framework for conceiving such connections. Future analyses might benefit from the integration of theories as presented here, to test a wide range of outcomes related to the social, economic, and environmental sustainability of individuals and the communities in which they are embedded.

Methodologically, the analyses presented demonstrate the technical complications that arise when models include indicators that evidence untoward levels of collinearity. While the quantitative analyses presented show a notable amount of consistency with prior, related efforts, the multicollinearity diagnostics (variance inflation factors, condition numbers) throw caution on the interpretation of models 2–6. Although imperfect indicators of collinearity, these are serious considerations that can affect results, conclusions, and public policy implications. Future research might incorporate alternative estimation techniques that reduce multicollinearity in models through, for instance, the inclusion of latent or composite indicators. It might be that percent non-white, poverty, household income, and housing values are cognate indicators of inequality that when modeled as a composite variable ranks as a chief predictor of environmental inequality. Structural equation modeling is one estimation technique that allows the researcher to specify latent variables (measurement model) within a structural (path) model.

The analysis presented links disasters and socio-economic factors to the distribution of landfills in the southeastern United States, yet the conclusions drawn from the results should be taken as only a preliminary starting point for further empirical research. We advocate further work in the area and provide a range of possibilities above. More generally, we see great utility in playing less part in the nearly universally employed “gladiator” approach to hypothesis testing, coupled with support, instead, for the adoption of integrative approaches to theory and empirics that highlight the compatibilities, reciprocities, and potential for synthesis among relevant explanations. Although we could envision contention between much more holistic packages of carefully integrated hypotheses that form overarching approaches, we believe this has potential for advancing the accumulation of knowledge. As theoretical and empirical developments accrue, sociology has the potential to advance understanding of nature–societal interactions that might improve disaster and waste management

in ways that enhance the sustainability of communities and individuals who face the challenges presented by significant social problems discussed in this paper.

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Trust and Skepticism in Dynamic Tension: Concepts and Empirical Refinements From Research on the Mountain Pine Beetle Outbreak in Alberta, Canada

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Abstract

Drawing on published research involving public trust and environmental risk regulation, this study explores a differentiated view of trust that includes aspects of uncritical trust, critical trust, distrust and cynicism. Using survey research of residents ($n = 1,303$) in three mountain pine beetle affected regions of Alberta, Canada, we examine the attributes of research participants who are grouped into these four types of trust and argue that critical trust relates to a category of citizenship that is ideally important for the effective functioning of democratic society. In contrast to research that draws a strong connection between public trust and public satisfaction with resource management decisions, this study identifies several subtle but significant differences in these terms, calling for more careful attention to trust-related concepts as they are utilized in research and practice.

Keywords: civic engagement, democratic decision-making, public participation, resource management, risk analysis

Introduction

Efforts to cultivate public trust in natural resource management are often identified as a key goal in achieving public acceptance of natural resource policy and management options (Mackenzie & Larson, 2010; Shindler et al.,

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2009; Toman et al., 2011; Vaske et al., 2007; Winter et al., 2004). As an example, Olsen and Shindler state that “trustworthy relations, developed well before the fire occurs, are significant to bringing agency personnel and citizens together to agree on a course of action after a fire” (2010, p. 137). Within the private sector, public trust is also linked to the social contract or social license to manage public resources (Shindler et al., 2002; Wang, 2005). Current work in this field of study is exemplified by Sharp et al. (2013), who articulate important analytical distinctions between trust and trustworthiness and demonstrate the conditions under which resource management agencies can foster trust-building activities with various publics as a long-term goal. Similarly, Lijebblad et al. (2009) identify several attributes of trust that are instrumental in achieving public trust in land management decision-making. Toward this end, scholarship on trust and resource management is often concerned with identifying the conditions that allow for the effective implementation of policies and practices within a context of social responsibility and social acceptability. Natural resource practitioners are focused on improving communications, building relations and institutional reputations in order to increase the public’s trust in the activities of management agencies, and these efforts at achieving public trust and social acceptability are often conflated.

In contrast with this positive view of trust, however, another area of literature addresses the limitations of public trust as a policy and management objective. Democratic theorists such as Mark Warren make a broad claim that distrust is an important element of the democratic process in that distrust offers a basis for “the healthy suspicion of power upon which the vitality of democracy depends” (Warren, 1999, p. 310). Within the environmental management literature, research is also focused on the need for a more nuanced and differentiated view of trust, examining the crucial components of trust and distrust that are relevant to questions of public participation, public scrutiny, critical inquiry, and informed decision-making. Trettin and Musham (2000, p. 412), for example, claim that “trust may no longer be possible or desirable and quite possibly is not a realistic goal” within the context of environmental risk communication. Equally, this critical perspective on trust is taken up within a resource management context (Parkins, 2010) where high levels of interpersonal trust are found to be entirely unhelpful in fostering small group citizen engagement. Similarly, Smith et al. (2013a, p. 16) discovered that “individuals who easily trust others were less likely to be involved in resource-related management actions.” In recognizing this recurring and negative relationship between a high degree of trust and robust citizen engagement, Poortinga and Pidgeon (2003) call for a more nuanced typology of trust in the context of risk regulation that exists along a continuum of trust and distrust. At the middle range of this continuum these authors define a preferred type of “critical trust” that has advantages in terms of maintaining a degree of public interest or scrutiny about matters of public concern. This

critical trust element offers value within a resource management context because it indicates a critically engaged type of citizen in contrast to a citizen who is simply and blindly trusting. When critical trust is present, citizens are more trusting of the processes and institutions of resource management while at the same time calling attention to alternative points of view, critically engaging in discussion and debate about resource management options, and generally pushing for better or more optimal management solutions. Achieving this level of critical trust is therefore recommended as a preferred solution for involved citizens within a functioning democracy (Warren, 1999). Moreover, with this more nuanced understanding of trust, it becomes difficult to draw a direct connection between a citizen who is trusting and a citizen who is accepting of certain management practices or policy decisions; public trust and social acceptability are not necessarily the same thing.

Drawing on this differentiated view of trust, this paper offers a typology of trust that is developed from the published literature and an empirical analysis of trust within a natural resource management setting. The data set is derived from a survey of citizens who are facing issues of trust and risk regulation in relation to a mountain pine beetle (MPB) (*Dendroctonus ponderosae* Hopkins) outbreak that has spread east into Alberta across the Rocky Mountains from the neighboring province of British Columbia, Canada. In deductive fashion we delineate a trust typology that is based on published literature and discuss how this typology is operationalized within our study. Then in more inductive fashion we explore the dimensions of trust that emerge from our empirical findings.

Consistent with other published research (e.g., Poortinga & Pidgeon, 2003), we find two dimensions of trust (general trust and skepticism) that are useful in understanding citizen perspectives on trust. We also find that words such as “trust” and “satisfaction” on a questionnaire have subtle but significant differences in meaning for survey participants. Implications from this analysis call for the development of more robust trust typologies in research and careful attention to the attributes of citizens that are associated with critical trust.

Contextualizing trust

Before we explore conceptual elements of trust, it is important to discuss briefly a conceptual basis for trust, and answer a basic question that undergirds this study. Why such an intensive focus on trust in resource management settings? We see three reasons for this focus. First, for a long time, resource management agencies have recognized that engaged citizenship often leads to better decision-making, where scientists, citizens, and policymakers can work together on complex issues and arrive at optimal solutions (Daniels & Walker, 1996; Tanz & Howard, 1991). Second, in contrast with a “knowledge deficit model” of citizen

engagement, where lay citizens need to be educated before they can effectively participate in decision-making, scholars recognize that public participation is more about bringing diverse modes of thinking, attitudes, and values into a decision-making process (Árvai, 2014; Sturgis & Allum, 2004). These arguments are clearly exhibited in popular notions of post-normal science (Funtowicz & Ravetz, (1993) and public rationality (Slovic, 2000) where lay involvement and perspectives are valued. In other words, when issues are marked by high levels of uncertainty, expert knowledge of a subject is less important than the processes by which diverse forms of knowledge and understanding are brought to bear on the issues. Third, in recognition of the first two points, researchers are concerned about how to achieve the required conditions for meaningful and effective citizen engagement, and a common criterion of effectiveness is trust (Halvorsen, 2003; Shindler & Neburka, 1997). Moreover, theories of deliberative democracy are concerned with issues of inclusion and non-coercion, implying a need for diversity and openness to new ideas (Chambers, 2003); a topic to which we return later in this paper. For these reasons, the idea of trust is gaining greater attention within resource management settings, and is a focus of this paper.

Conceptualizing trust

Trust refers to a situation where something of value is held by one person for the benefit of another. In this sense trust “involves a judgement, however tacit or habitual, to accept vulnerability to the potential ill will of others by granting them discretionary power over some good” (Warren, 1999, p. 311). As a way to differentiate several dimensions of trust, Zucker (1986) identifies three specific ways in which trust is produced. Trust is process-based where an association with others generates trust through personal experience and a sense of shared history. Trust is characteristic-based where individual ethnicity or sociodemographic background provides a basis for trust. Finally, trust is also institution-based where trust is produced through institutional structures and attributes of association between individuals and groups that otherwise have no personal connection. It is this third way of producing trust that scholars claim to be the most important within contemporary society. We are faced with a world of complex management challenges that requires social coordination and levels of institutional trust to manage such things as water treatment facilities, airline travel, and forest health. In the words of Luhmann, “the very complexity of the social order creates a greater need for coordination and hence a need to determine the future—i.e., a need for trust, a need which is now decreasingly met by familiarity” (1979, p. 20).

This lack of familiarity speaks to the growing institutional basis for producing trust and what some scholars identify as “social trust” (Siegrist, 2000; Siegrist &

Cvetkovich, 2000). Within an institutional context, “social trust is employed to select experts who are trustworthy and whose opinions can be believed as being accurate” (Siegrist & Cvetkovich, 2000, p. 714). Social trust is the willingness to rely on those who have responsibility for making decisions and taking actions related to the management of technology, the environment, medicine, or other realms of public health and safety. The people being trusted are those within organizations who may not be personally known to the individual making the trust attribution (Siegrist et al., 2000). One of the most important factors affecting social trust is the perception that the agency and people representing the agency share similar values as the public (Smith et al., 2013a). When individuals perceive that their opinions and values are reflected in an agency’s planning and management efforts they are more likely to trust the agency and support management actions (Needham & Vaske, 2008; Siegrist et al., 2000; Smith et al., 2013a).

Social trust may be particularly important in situations where the public lacks knowledge. When the public lacks sufficient knowledge for making risk assessments and acceptability judgments, they trust the judgments of experts and management agencies to do the right thing. Public reactions and acceptance of new technologies, for example, are guided by social trust and the confidence people have in companies and government agencies (Siegrist et al., 2000, p. 355). Similarly, satisfaction with management responses to new threats to forest ecosystems may be based on a degree of trust in government. This concept of trust in government has a distinctive institutional basis and a future orientation, as compared to other ways in which trust is produced and situated at the interpersonal level. Therefore, the concept of institutional trust is taken up in this study as a starting point for understanding a multifaceted notion of trust in contemporary society.

Drawing on a multifaceted understanding of institutional trust, authors such as Poortinga and Pidgeon (2003) as well as Renn and Levine (1991) identify several core components of trust that include perceived competence (the degree of technical expertise), objectivity (absence of bias), fairness (degree that all relevant points of view are taken into account), consistency (predictability of ideas and behavior based on past experience), and faith (the goodwill that is expressed within the trusting relationship). Added to these components, the work of Kasperson et al. (1992) also offers four components of trust: commitment, competence, caring, and predictability, which map onto the five components from Renn and Levine (1991). This differentiated view of trust, where multiple factors are thought to have a distinctive role in the way that trust manifests within society is understood by these authors to have merit in terms of providing a conceptually rich framework for research.

Researchers also note, however, that the empirical evidence is quite limited in terms of uncovering and confirming these multiple components of trust. In spite of efforts to develop a more complex empirical model, previous work has often arrived at two-factor solutions. Frewer et al. (1996) found one factor related to general trust and another factor related to care. Metlay (1999) found one factor related to general trust and another factor related to competence. Earle and Cvetkovich (1995) identify factors related to agreement and sympathy, and more recently Poortinga and Pidgeon (2003) found one factor related to general trust and another factor related to skepticism. Although the work of Smith et al. (2013b) and Lijebblad et al. (2009) represents more recent findings of trust components relative to land management, in this study we are particularly interested in the two-factor model and trust typology put forward by Poortinga and Pidgeon (2003) because of the way it draws on notions of distrust that are central to the analytic framework for this research. This typology results in four distinct types of trust that are identified in Figure 1.

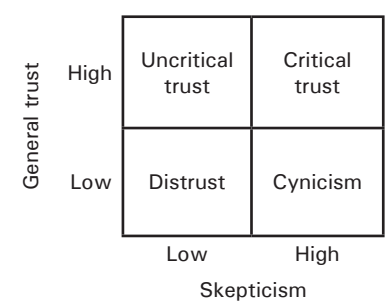


Figure 1. A conceptual typology of trust

Source: Adapted from Poortinga and Pidgeon (2003); used with permission.

From this typology we point out that notions of distrust, critical trust, and cynicism are not the same thing. From a public policy point of view, achieving uncritical trust (high general trust and low skepticism) is a common objective in terms of getting policies implemented with the least amount of friction. Democratic theorists and practitioners, however, point to the value of critical trust (high general trust and high skepticism), as a counterpoint to apathy, disinterest, and uncritical acceptance that can be associated with public policy choices.

These conceptual advances are an important part of the literature on trust and environmental risk regulation in western countries. There is less empirical analysis, however, on the attributes of individuals who are aligned with these four types of trust. We know little about the characteristics associated with people who, for instance, have high levels of general trust and skepticism versus people who have low levels of general trust and skepticism. We also

do not know much about how these types are distributed within the general population and the linkages to other factors such as awareness of resource management options, level of dependence on the local resource in question, general educational background, and so on. This study offers some insight into these relationships. It also offers insight into the dimensions of trust that are reflected in survey statements like “I trust the government” and “I am satisfied with management actions.” As a starting point for this analysis, the next section provides an overview of the MPB outbreak in Alberta.

Mountain pine beetle in Alberta

Alberta is a resource-rich province with a high-profile energy industry most notably linked to the oil sands region, the third-largest proven oil reserves in the world. The province is dominated by the energy industry, but it has several strong primary industries including agriculture, forestry, and mining. Not without controversy in many circles of influence (e.g., Timoney & Lee, 2001), the provincial government enjoys relatively favorable standing with Alberta citizens, who have one of the highest standards of living in Canada, and who have elected the same politically conservative government into office since 1971. Given the prominent culture of resource management, dependence on these industries for wealth creation, and familiarity with resource management decisions, this broader sociopolitical context offers an important backdrop to issues of public perception regarding the MPB in Alberta.

The MPB is endemic to the lodgepole pine (*Pinus contorta* Dougl. ex Loud. var. *latifolia* Englem.) forests of western North America. Since the 1990s, however, the beetle has increased in population and spread beyond its historical range, affecting most of the western United States, southern British Columbia, and eastern Alberta. In British Columbia alone, the beetle has infested 18.1 million hectares and killed a cumulative total of 710 million cubic meters of timber (MFLNRO, 2012) and is predicted to have significant long-term economic impacts in the province (Patriquin et al., 2007). In addition, the beetle is impacting watersheds, wildlife habitat, carbon storage, forest fire risk, and recreation (ASRD, 2007b; Nealis & Peter, 2008). In the neighboring province of Alberta, the expansion of local endemic populations and overflights from British Columbia in 2006 and 2009 have extended the MPB to areas of the province with no prior history of the beetle. In addition to spreading to new areas, the beetle appears to be able to adapt to other species such as jack pine (*Pinus banksiana* Lamb.), a predominant species in much of Canada’s boreal forest (Safranyik et al., 2010).

As the beetle spreads, scientists and land managers are faced with the challenge of formulating management actions and strategies with uncertainty of the beetle’s biology and ecology in these new habitats. Although significant progress

is being made in the scientific understanding of this unprecedented epidemic, much uncertainty remains regarding the effectiveness of treatment options and the persistence of the beetle, especially in the boreal forest. In response to the MPB infestation in Alberta, the provincial government department responsible for forest management on provincial crown lands has developed a management strategy and action plan aimed at containing and minimizing the infestation along the eastern slopes of the Rocky Mountains and preventing spread of the beetle into the boreal forest (ASRD, 2007a, 2007b). Because this land is largely publicly owned, public acceptance of management strategies is critical to effective MPB management (Shindler et al., 2002).

The rapid pace of the MPB outbreak has resulted in management agencies having little time to solicit public input and incorporate local concerns into the management response, or to educate the public about management intentions and interventions (Mackenzie & Larson, 2010). Thus, during periods of rapid infestation, the public may have little choice but to rely on the judgments of experts, trust management agencies, and accept their response. Given these details, the MPB outbreak in Alberta offers an interesting opportunity to explore dimensions of trust and public land management in the context of environmental risk.

Survey research methods

Survey data were gathered from a sample of residents of the western forested area of Alberta. Using a stratified sampling approach the area was divided into three study regions representing different MPB histories. The southwest region has a history of MPB outbreaks dating back to the 1940s and was experiencing an outbreak at the time of the study. The west-central region had no history of MPB and no outbreak during the study period but had high potential for beetle population growth. The northwest region also had no history of the beetle but was experiencing a large outbreak as a result of a dispersal of beetles from British Columbia in 2006. More details on the study regions can be found in McFarlane et al. (forthcoming). Several management options were being used by the provincial government to control the beetle on provincial crown lands in the regions: single-tree treatments such as cut and burn, harvesting areas of infested trees and processing the trees to kill the beetles, forest industry adjusting harvest plans to log healthy but susceptible areas before they were attacked, and prescribed burning.

Residents were recruited by telephone to participate in a mail survey. Of the 5,647 residents who were contacted, 1,994 agreed to participate in the mail survey: 643 from the southwest, 649 from the west-central, and 702 from the northwest. The initial survey package was mailed in September 2009, followed

by a reminder postcard two weeks later and another survey package about six weeks after the initial mailing. A total of 1,303 questionnaires were returned, representing an overall mail survey response of 66 percent (%) (74% for the southwest, 66% for the west-central, and 59% for the northwest); and an overall response of 23% based on the initial telephone contacts.

The questionnaire assessed perceptions of MPB impacts, attitude toward the MPB, acceptability of management options, satisfaction with response to the beetle, trust in government and the forest industry, awareness of MPB and its management, sources of MPB information, and several demographic attributes of survey participants. A subset of these variables was used in the analysis. We assessed general trust using statements related to commitment, openness, fairness, competence, and faith regarding the provincial government. Skepticism was assessed using statements related to vested interest of the forest industry and credibility of the provincial government (Table 1).

In addition to these survey items, we included statements in the questionnaire that are more direct in the use of “trust” wording as well as a measure of the level of public “satisfaction” with MPB interventions. In contrast to the indirect ways in which the concept of trust is taken up within survey items reported in Table 1, these additional survey statements are more direct in their language. For example:

- I trust the provincial government to implement a responsible and effective MPB management program
- I am satisfied with the provincial government’s response to the MPB.

When survey participants read these statements, we assume they reflect a degree of happiness or acceptance with a management strategy or a decision to the extent that the public is not concerned and will understand the situation to be uncontroversial. If this is the case, these survey statements offer an opportunity to explore the multifaceted nature of trust within the context of MPB management in Alberta. Trust statements were rated on a scale of 1 to 5, 1 being strongly disagree and 5 being strongly agree, with a no opinion option. Other survey items are also included in the analysis to follow.

Respondents rated their awareness of MPB management in their region on a 4-point scale: 1 = not aware of it, 2 = little knowledge, 3 = moderate knowledge, and 4 = well informed. To examine perceived values similarity, respondents rated the statement “I feel the response to the mountain pine beetle reflects my values and opinions” on a scale of 1 = strongly disagree to 5 = strongly agree, with a no opinion option. Satisfaction with the provincial government response to the beetle was assessed on a scale of 1 = very dissatisfied to 5 = very satisfied, with a no opinion option. Being female, having a household member

dependent on the forest industry for their economic livelihood, and having a post-secondary education were treated as dummy variables whereby 0 = no and 1 = yes. Confirmatory factor analysis of trust statements was conducted with Lisrel® 8.8. Other data analysis was conducted using SAS® 9.3.

Results

Descriptive statistics and confirmatory factor analysis

Examining the trust statements in Table 1, mean scores and standard deviations provide insights on the general trends within survey responses. Respondents tend to agree ($M > 3.0$) that the government is committed to reducing the impact of MPB, is open to new ideas and alternative points of view, has the necessary expertise to manage the beetle effectively, and is too influenced by the forest industry regarding MPB. There is slightly less agreement ($M \sim 3.0$) for the idea that the government considers all relevant points of view in managing MPB, and significantly more agreement that MPB control is in the best interest of Albertans ($M > 4.0$). There was disagreement that government information about the MPB tends to be biased and one-sided ($M < 3.0$).

Table 1. Confirmatory factor analysis of trust statements relating to mountain pine beetle in Alberta, Canada

Factors and statements	Loading (t value)		Mean (SD)	
General trust				
The provincial government is committed to reducing the impacts of mountain pine beetle on Alberta	0.69	(18.58)	3.80	(1.00)
The provincial government is open to new ideas and alternative points of view on beetle management	0.80	(22.37)	3.32	(1.02)
In managing the mountain pine beetle, the provincial government considers all relevant points of view	0.78	(21.60)	3.08	(1.03)
The provincial government has the necessary expertise to manage the beetle effectively	0.65	(15.08)	3.22	(1.15)
Mountain pine beetle control is in the best interest of Albertans	0.45	(11.29)	4.32	(0.98)
Skepticism				
The provincial government is too influenced by the forest industry regarding mountain pine beetle management	0.57	(10.97)	3.19	(1.15)
Provincial government information about the mountain pine beetle tends to be biased and one-sided	0.74	(14.08)	2.97	(1.02)

SD = standard deviation; RMSEA = 0.05; AGFI = 0.967; $\chi^2 = 35.86$; $df = 13$; $\chi^2/df = 2.76$.

Turning to the factor analysis, we tested Poortinga and Pidgeon's (2003) two-factor model of general trust and skepticism. Fit criteria for the two-factor model

indicate a good fit (RMSEA = 0.05; AGFI = 0.97; $\chi^2 = 35.86$; $df = 13$; $p = 0.0006$; $\chi^2/df = 2.76$). These two factors are used in subsequent analysis described below as an empirical and analytical basis for developing the trust typology conceptualized in Figure 1.

Trust types

To create a typology of trust we calculated scores for the general trust and skepticism factors for each respondent by summing the ratings of the statements that loaded on the factor. Next, we used the SAS FASTCLUS procedure to produce four discrete, non-overlapping clusters based on the summed factor scores. Finally, we calculated mean factor scores for each cluster and used Poortinga and Pidgeon's (2003) conceptual typology as a guide in naming the clusters. About 16% ($n = 204$) of respondents could not be classified because of missing values on at least one of the general trust or skepticism statements and were removed from further analysis. Of respondents who were classified, the Critical and Uncritical trust clusters each represent about 36% of respondents and the Cynicism and Distrust clusters represent about 8% and 20% of respondents, respectively (Table 2). Respondents in the Uncritical cluster have high general trust and low skepticism in regard to the government's management of MPB and therefore are likely to accept the government's information and decisions. Critical trust respondents have moderate general trust combined with moderate skepticism suggesting that although respondents in this category may trust the government they are also likely to question the government's MPB information and management decisions. The Cynicism cluster has the lowest trust of government in managing the MPB and highest skepticism about the government's intentions. Poortinga and Pidgeon (2003) refer to this as deep distrust and suggest the Cynicism category represents a rejection of everything that comes from government. Although the Distrust cluster also has low general trust and high skepticism this cluster is not as distrusting and skeptical as the Cynicism cluster. Descriptive statistics show that about 70% of respondents in the four clusters had a post-secondary education, 42% were female, 62% had moderate knowledge or were well informed about MPB management in their region, and 20% had a household member dependent on the forest industry for their economic livelihood. About 49% trust the provincial government to implement a responsible and effective MPB management program, about 53% were somewhat or very satisfied with the provincial government response, and about 44% felt the response reflected their values and opinions.

Table 2. Characteristics of the trust clusters

	Cluster			
	Uncritical	Critical	Cynicism	Distrust
Respondents number (%)	368 (35.79)	373 (36.28)	82 (7.97)	205 (19.94)
General trust score ¹ <i>M</i> (SD)	4.27 (0.29) ^a	3.52 (0.23) ^b	1.73 (0.36) ^c	2.77 (0.23) ^d
Skepticism score ¹ <i>M</i> (SD)	2.48 (0.79) ^a	3.18 (0.62) ^b	4.19 (0.83) ^c	3.48 (0.80) ^d

¹ Rated on a scale from 1 = strongly disagree to 5 = strongly agree. Any two means in a row that do not share a letter are significantly different at $p < 0.05$ according to the Tukey-Kramer test. *M* (SD) = mean (standard deviation).

Table 3 indicates there are differences among the clusters based on trust in the provincial government, satisfaction with management response to MPB, values similarity, awareness of MPB management, and demographics. The Uncritical cluster shows greater trust in the provincial government to implement a responsible and effective MPB management program, are more satisfied with the provincial government response to the beetle, are better informed about MPB management in their region, and show higher agreement that the response reflects their values and opinions than the other trust types. Although the Critical cluster also trusts the provincial government to implement a responsible and effective MPB management program, are satisfied with the provincial government response to the beetle, and view the response as reflecting their values and opinions, they rate these variables near neutral ($M = 3.0$) and significantly lower than the Uncritical cluster and higher than the Distrust and Cynicism clusters. These results and the moderate scores on general trust and skepticism suggest that the Critical cluster represents a moderate group between those who are very satisfied and trusting and those who are distrusting and cynical. As theory on trust and democracy would suggest, this group might be more likely to engage as citizens in natural resource management participatory processes.

Both the Distrust and Cynicism clusters do not trust the government to implement a responsible and effective MPB management program, are dissatisfied with the provincial government response to the beetle, and do not view the response as reflecting their values and opinions. The Distrust cluster scored lower than the other groups on these variables. The four clusters do not differ on age and sex but there are significant differences for education with the Distrust and Cynicism clusters having a higher percentage with a post-secondary education.

Table 3. Means (standard deviations)¹ of attributes of a trust typology for management of mountain pine beetle

Attributes	Uncritical trust	Critical trust	Cynicism	Distrust
Trust: I trust the provincial government to implement a responsible and effective MPB management program ²	3.99 (0.86) ^a	3.11 (1.00) ^b	1.59 (0.88) ^c	2.26 (1.07) ^d
Satisfaction: Satisfaction with the provincial government response ³	3.89 (0.85) ^a	3.25 (1.02) ^b	2.17 (1.10) ^c	2.77 (1.02) ^d
Values similarity: I feel the response to the mountain pine beetle reflects my values and opinions ²	3.84 (0.85) ^a	3.21 (0.85) ^b	1.96 (1.06) ^c	2.68 (1.03) ^d
Awareness: Moderate or high awareness of MPB management ⁴ (%)	71.31	55.71	59.76	58.33
Demographics				
Age in years	52.54 (13.44)	50.14 (12.52)	50.18 (12.14)	50.33 (13.87)
Female (%)	43.21	43.97	40.24	39.02
Post-secondary education ⁴ (%)	66.47	68.97	84.00	75.92
Forest industry – dependent household member (%)	21.39	17.71	22.78	20.10

¹ Any two means in a row that do not share a letter are significantly different at $p < 0.05$ according to the Tukey-Kramer test; ² rated on a scale from 1 = strongly disagree to 5 = strongly agree; ³ rated on a scale from 1 = very dissatisfied to 5 = very satisfied; ⁴ significantly different at $p < 0.05$ based on χ^2 test of independence.

Exploring differences between trust and satisfaction

In examining the link between the deeper meanings of terms like trust and satisfaction in this study, we used ordinary least squares regression to uncover these insights. Descriptive statistics for key variables are provided in Table 4, and they include the two trust factors (generalized trust and skepticism), values similarity, awareness of MPB, and satisfaction with MPB management. First, we regressed the trust statement (I trust the provincial government ...) on the two trust factors, values similarity, awareness, and demographics (age, sex, education, and forest dependence) (Table 5; Model 1). General trust, skepticism, and values similarity have significant beta coefficients. As expected,

general trust and values similarity have a positive influence and skepticism has a negative association with the trust statement. None of the demographic variables have a significant influence on the dependent variable. The regression explained about 52% of the variance in the trust statement with an *F* value of 100. Next, we regressed the satisfaction statement (satisfaction with provincial government response) on the same independent variables (Table 5; Model 2). Similar to the first regression, general trust and values similarity have significant beta coefficients and the direction of these relationships is consistent. The main difference between these two regression models is that skepticism is not significant and forest dependence is significant in the satisfaction model, and general trust has a larger beta coefficient in Model 1. These differences are reflected in the explained variance which is much lower for Model 2 (27.4%; *F* value = 32.28).

Table 4. Distribution of variables used in regression analyses to explore factors associated with trust and satisfaction with management of mountain pine beetle

Variable	Mean (SD)
General trust	3.53 (0.77)
Skepticism	3.07 (0.90)
Trust in provincial government	3.14 (1.23)
Satisfaction with provincial government response	3.28 (1.00)
Values similarity	3.31 (1.09)
Moderate or high awareness of MPB management (%)	62.06
Age in years	51.04 (13.13)
Female (%)	42.41
Post-secondary education (%)	70.64
Forest dependent (%)	19.90

SD = standard deviation.

Table 5. Standardized ordinary least squares regression estimates of variables associated with trust and satisfaction of management of mountain pine beetle

Independent variables	Dependent variables	
	Model 1 Trust statement	Model 2 Satisfaction statement
General trust	0.57 ^a	0.39 ^a
Skepticism	-0.13 ^a	-0.04
Value similarity	0.13 ^a	0.16 ^a
Awareness of management	-0.03	0.01
Age	0.02	< -0.01
Female	< -0.01	0.02
Post-secondary education	< -0.02	0.03
Forest dependent	-0.05	-0.07 ^b
<i>n</i>	720	663
Adjusted <i>R</i> ²	0.524	0.274
<i>F</i> value	100.11 ^a	32.28 ^a

^a $p \leq 0.001$; ^b $p \leq 0.05$.

Discussion

Consistent with other research that attempts to provide a richly differentiated typology of trust, our two-factor solution is consistent with Poortinga and Pidgeon (2003), who identify general trust and skepticism as important dimensions of trust within the general population. This analysis does not necessarily discount the broader sense in which trust is inclusive of components such as trustworthiness, objectivity, consistency, and goodwill where these components may still be important conceptually in terms of public judgments about trust at institutional levels. Although other studies have used a multifactorial approach to trust (e.g., Smith et al., 2013b), we learn through this empirical work that several of the components of trust may be subsumed within one factor of “general trust” and this factor has statistical resonance with key dependent variables in this study.

Following the outcome of the two-factor solution (general trust and skepticism), our typology of trust takes this analysis further than other published research by showing how different dimensions of trust map onto questions of MPB management and several demographic variables. Analysis shows there are distinct populations of survey participants who can be classified according to four types of trust, with a large number of these participants falling into the Uncritical trust and Critical trust categories. A key distinction between Uncritical trust and Critical trust has to do with the relative levels of trust,

satisfaction, and values similarity among those who are in the Critical trust category. Individuals in the Critical trust category are less trusting than the Uncritical trust group (with average scores a little over 3.0 (neutral) on a 5-point scale), but they remain significantly more trusting than those who are in the Distrust and Cynicism categories. In other words, individuals with critical but trusting views appear to hold a unique middle position between those who are characterized by uncritical trust on one hand and those who are distrusting and cynical on the other. Individuals in the Critical trust category respond to statements of trust, satisfaction, and values similarity in ways that are distinct from other individuals.

Referring back to the discussion of democratic theory and the expected value that critical trust holds in terms of fostering alternative points of view, critical engagement, discussion, debate, and improved decisions, one might argue that instead of seeking ever higher levels of trust between the general public and resource managers (e.g., Vaske et al., 2007), it is preferable to seek a moderate level of trust that is tempered with a degree of skepticism. Propositions made by political theorists such as Warren (1999) about the value of distrust as a democratic resource are borne out by recent research by Smith et al. (2013a) who observe that individuals who trust in resource managers are also less likely to be involved in resource management actions. In taking this position, there is recognition that citizens can also become too distrustful and too cynical, and are not likely to make valuable contributions to management and policy debates. Moreover, these categories of deep distrust are unproductive and debilitating within a resource management context, often leading to harsh conflict, legal action, and the breakdown of democratic procedures.

A middle ground, therefore, represented by critical trust holds a dynamic tension between trust and skepticism. In our survey, a sizable number of survey participants held this position (36% of classified respondents), and one policy challenge might include finding ways to maintain trust and skepticism in balance as an objective of civic engagement processes. In more practical terms, how might one nurture individuals to hold the desirable characteristics of critical trust? This is an important question that deserves further attention within a resource management context, but insights from deliberative democracy may offer some hints. If broad representation and inclusion is a hallmark of democratic process (Chambers, 2003), then one way to maintain skepticism is to maintain and support wide-ranging and often dissenting views within a decision-making process. Instead of driving toward a final decision as efficiently as possible, more engaged citizens may need time to explore alternative points of view, wrestle with issues, and come to reasoned judgment based on insights from a range of sources and forms of expertise. Ideas along these lines are clearly

difficult to implement against conventional wisdom, but resources are available to facilitate the practical aspects of this paper in terms of critically engaged citizenship (e.g., Gastil & Levine, 2005).

Another source of insight from this study comes from the regression analysis and the distinctions between statements about trust and statements about satisfaction in relation to MPB management. Although the published literature on natural resource management often draws a strong connection between levels of trust and levels of satisfaction or social acceptability of management prescriptions, this analysis indicates that responses to these statements draw on different degrees of general trust and skepticism. General trust is a significant predictor of individual responses to statements about trust and satisfaction, but the magnitude of the relationship is quite different and the explained variance is much lower for the satisfaction statement. Satisfaction has a lot less to do with general trust and skepticism in this model and therefore when a person indicates that they are satisfied with a management response we have less confidence in linking this response to related factors such as trust or skepticism. In other words, this analysis indicates that we have less insight into the predictors of public satisfaction with management action and we are cautious about overdrawing a connection between social trust and satisfaction when it comes to judging public perceptions of resource management activities.

Conclusion

Within the resource management literature, public trust and public satisfaction are often conflated in ways that are not helpful. To remedy this situation, and to add to a growing body of literature on this topic, this study identifies a category of critically trusting members of the general public who are distinct from those who are uncritically trusting on one hand and entirely distrusting and cynical on the other hand. This middle ground of trusting and skeptical citizens who hold these two positions in dynamic tension can be identified empirically within a general population survey and, as argued in this paper, can make important contributions to the democratic process in resource management.

Given the relatively small sample sizes for each trust type, and the limited range of variables to identify and describe this Critical trust group, additional research on this topic can provide more insight into the characteristics of this group and the conditions under which this group can be promoted and enhanced within the general population. In the end, this study cautions against high levels of uncritical public trust as a goal of resource management and cautions against conflating notions of trust with notions of social acceptability in relation to resource management decisions.

Acknowledgments

We thank the Foothills Research Institute, Hinton, Alberta, for their financial support of this study, and we thank David Watson for his technical assistance with the survey research.

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Shared Principles of Restoration Practice in the Chicago Wilderness Region

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Abstract

We describe the rules, norms, and strategies (institutional statements) that characterize ecological restoration across 10 organizations in the Chicago Wilderness region. Our use of Ostrom's IAD ADICO grammar tool is novel in both context (non-extractive resource management) and data type (qualitative interviews). Results suggest that, in contrast to a focus on rules in the literature, restoration is overwhelmingly guided by strategies (institutional statements void of tangible or emotional sanctions). Moreover, a small, but critical set of norms exist. From over 1,700 institutional statements extracted, we found a suite of rich principles that guide behavior in all of the organizations: (1) qualify, don't quantify; (2) listen to the land; (3) practice follow-up; (4) do no harm; (5) respond to sanctions from the land; (6) balance diverse internal stakeholders; and (7) balance diverse external factors. These principles suggest that Chicago Wilderness restorationists have a strong shared understanding upon which collective action and adaptive management occurs.

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Keywords: ADICO, Chicago Wilderness, ecological restoration, institutional statements

Introduction

Ecological restoration is “[t]he process of assisting the recovery of damaged, degraded, or destroyed ecosystems” (SER, 2004, p. 1). Restoration, as an approach to ecosystem management, involves setting goals that are guided by scientific knowledge and societal values; it is a human-implemented procedure, and people perceive and interpret ecosystems—what they are and what they should be—in different ways (Glaser, 2006; Manuel-Navarrete et al., 2004). In comparison to many other land management activities (e.g., fishing, timber harvesting) ecological restoration is relatively new and has a different purpose. Restoration emerged in the United States within the last century, but has evolved into academic and professional pursuits only within the last several decades (Ehrenfeld, 2000; Jordan & Lubick, 2011). Ecological restoration adds value to an ecosystem, and is often, although not exclusively, practiced where resource extraction is not a goal. Restoration goals may include the protection and enhancement of ecosystem services, provision of social and spiritual benefits, and protection of specific species.

Ecological restoration constitutes a social–ecological systems “problem” (Ostrom, 2007). That is, ecological restoration is typically a collective action situation in which multiple individuals all benefit from a particular action (e.g., restoring ecosystem services), but in order to reap these benefits some individuals must work together and share the costs.² Costs can include budget issues, information needs, coordination limitations, competing priorities, and political conflicts—all of which could lead to uncooperative behavior (Imperial, 1999). Furthermore, even when there are accepted goals and techniques (e.g., prescribed fire, invasive species control), the ways or extent to which these techniques are used, or even expectations of what exactly the outcomes might look like, can differ (Gobster & Hull, 2000).

Ecological restoration is most likely to be successful when there is (1) cooperation between individuals, (2) a willingness to learn, and change both perceptions and actions, and (3) the integration of both environmental and social considerations (Imperial, 1999; Long et al., 2003; Pahl-Wostl, 2006; Smith, 2013). As a cooperative endeavor that supports a mutually beneficial relationship between humans and the landscape, ecological restoration can be enhanced by institutions that guide individual and collective behavior. Institutions are

2 While restoration activities can and do take place on privately owned land by the single landowner, in this paper we focus on ecological restoration taking place on public lands, or on lands held by land trusts. These situations constitute collective action situations.

rules, norms, and strategies, or collectively shared prescriptions, that guide behavior (Ostrom, 2005). The analysis of institutions, as the social tools that influence behavior trade-offs, is a distinct and important type of inquiry that can help link social and ecological phenomena and, in particular, advance our understanding of sustainable ecosystem management (Mincey et al., 2013). Even where maximizing extractive potential is not a goal, properly designed institutions can increase stability and reduce uncertainty (Ostrom, 2007).

We describe here the institutions that guide urban ecological restoration in the Chicago Wilderness region. We use the ADICO grammar tool (Crawford & Ostrom, 2005) to extract the institutional statements from a set of in-depth interviews of restorationists. ADICO (Attribute, Deontic, aIm, Condition, and Or else) allows for the systematic formatting of rules, norms, and strategies that frequently are only tacitly understood. In contrast to much of the institutional literature, we give equal attention to all three types of institutional statements. We then extend our focus to the suite of institutional statements that broadly characterize a shared suite of philosophical principles followed by Chicago Wilderness restorationists. These principles highlight ecological restoration as a non-extractive natural resource management practice guided by a sense of responsibility to and a connection with the land. First we provide a brief history of the practice of ecological restoration, and particularly its evolution in the Chicago metropolitan region, as well as previous applications of institutional analyses and ADICO.

Background

Ecological restoration in Chicago Wilderness

Chicago Wilderness is “a regional biodiversity conservation alliance committed to protecting nature and enriching the lives of the region’s residents” (Heneghan et al., 2012, p. 74). The alliance serves as a source and coordinator of information (and often financial and other support) for more than 360 member organizations, which include government agencies, large and small conservation organizations, cultural and education institutions, volunteer groups, corporations, and faith-based groups. Many of Chicago Wilderness’ members conduct ecological restoration within the region’s 360,000 acres of protected natural areas. As outlined in the 1999 *Biodiversity Recovery Plan*, Chicago Wilderness members share broad, common goals that are based in restoration ecology science (CRBC, 1999). However, activities and plans developed to implement these goals vary among Chicago Wilderness land managing organizations.

The RESTORE (rethinking ecological and social theories of restoration ecology) project explores whether and how decision-making styles affect biodiversity

outcomes in a range of Chicago Wilderness organizations. Funded by the National Science Foundation's Dynamics of Coupled Natural and Human Systems program, the RESTORE project focuses on groups in Chicago Wilderness who collectively make decisions regarding oak woodland restoration projects. RESTORE has this focus because (1) oak ecosystems are in decline and are of global conservation significance (Knoot et al., 2010), and (2) restoration techniques can be especially contentious because differences in positions on land use and management practices exist at the human/nature interface (e.g., Crane et al., 2014; Gobster & Hull, 2000).

The project explores distinct management categories: manager-led, co-management, and research-led. Manager-led describes projects in which the landowner is dominant in decision-making and on-the-ground management; co-management describes projects in which there is a high degree of volunteer participation and autonomy in both decision-making and on-the-ground activities, and the landowner may or may not be active in decision-making and management; and finally, research-led describes projects in which scientific exploration is central to restoration activities. The RESTORE project investigators sought to describe, compare, and contrast these decision-making styles using a variety of analytic tools, including agent-based modeling (Watkins et al., 2013; Zellner et al., 2014), thematic content analysis (themes such as conflict, communication, emotions), and the extraction of rules, norms, and strategies, as framed in the institutional analysis and development literature (Ostrom, 2005).

Chicago Wilderness has been lauded for its role in "the development of a new code of ethics for biodiversity conservation" (Mackey et al., 2008, p. 1). In particular, an IUCN case study of the Chicago Wilderness alliance, which documented the alliance's "practical solutions, ethical values and principles that underpin [its] work" (Mackey et al., 2008, p. 4), informed a global biodiversity conservation plan that stresses human responsibility, a moral obligation to change, and the importance of economic and social justice.

Chicago Wilderness's approach complements the philosophical arguments of several restoration ecology scholars who argue that the practice of restoration is personal, perceptual, and experiential, and that there are limits to how much one can, and should, define restoration goals (Ehrenfeld, 2000; Hobbs, 2007; Simpson, 2009). Higgs (2005) maintains that while scientific information is critical to restoration, the practice must respect and integrate other kinds of knowledge and even "a moral center that is beyond the scope of science" (p. 159). Indeed, ecological restoration is a form of adaptive management through which knowledge is gained incrementally through on-the-ground practices and, often, the sharing of information between restorationists. A recent review of restoration projects found that the goals were much broader than those acknowledged in the Society for Ecological Restoration's "attributes

of restoration,” which primarily consider form, function, and stability of an ecosystem; over half of the projects had broader goals related to social needs, such as cultural values and community engagement (Hallett et al., 2013). All this is to say, ecological restoration is fundamentally a social–ecological practice guided by both scientific knowledge as well as broader social understandings of human–environment interaction.

Institutional analysis and the ADICO tool

Institutions (rules, norms, and strategies) are the human-created prescriptions designed to affect incentives and guide behavior (McGinnis, 2011; Ostrom, 2005, 2011). Rules, norms, and strategies are differentiated in part by the sanction associated with following or not following the prescription. A rule has a tangible sanction (e.g., a reward or a fine and a system for monitoring infraction), a norm has an emotional sanction (e.g., pride or guilt) and a strategy lacks tangible or emotional sanctions (Ostrom, 2005; Schlüter & Theesfeld, 2010).³ However, Schlüter and Theesfeld (2010) suggest that strategies often have automatic sanctions, that is, sanctions not imposed by another person (e.g., getting in an accident from driving on the wrong side of the road).

Institutional analyses have been used to understand the conditions under which successful resource management institutions are most likely to emerge, primarily in developing country contexts where livelihoods are based on resource extraction (e.g., Chhatre & Agrawal, 2008; Gibson et al., 2000). The existence of rules, and in particular the prevalence and effectiveness of monitoring and tangible sanctioning in successfully managing extractive common-pool natural resource situations, is the focus of most institutional analyses to date (Coleman & Steed, 2009; Gibson et al., 2005; Madrigal-Ballesteros et al., 2013; Ostrom, 1990). Institutional analyses of non-extractive resource management in self-organized rural communities in Indiana have also been conducted (Fleischman et al., 2010; Gibson & Koontz, 1998; Mincey et al., 2013). These studies suggest that the most effective and robust institutions are those that support collective values through social learning and interaction, implying that norms may also be important (although norms were not explicitly studied).

Institutional analyses to date have made clear the types and importance of rules, but little to no attention has been paid to the type, distribution, and impact of norms and strategies. Nonetheless, the theoretical basis has been laid by Ostrom and colleagues (Crawford & Ostrom, 1995, 2005; Ostrom 2005). To reveal, differentiate between, and systematically analyze rules, norms, and strategies,

³ Rules, norms, and strategies can function at multiple, but linked, levels of analysis (operational, collective choice, and constitutional). There is also a set of institutional statement classifications, including position statements, boundary statements, and more. Because this paper focuses on the type of statements (rules, norms, and strategies) used by Chicago Wilderness restorationists, we forego detail on the other components.

Crawford and Ostrom (2005) developed the ADICO grammar tool (Table 1). Understanding whether a component is present is critical to determining whether it is a rule, norm, or strategy. A rule contains all five components (ADICO). A norm contains all but an “or else” (ADIC). A strategy contains all but a deontic and an “or else” (AIC). We use work by Schlüter and Theesfeld (2010) to further distinguish and track the sanctions associated with norms and strategies, since neither is captured by the “or else” component of the ADICO syntax, although they are acknowledged in institutional analyses (Ostrom, 2005).

Table 1. The components of the ADICO syntax and how they define rules, norms, and strategies

Component	Definition
A	Attribute (the “who”: who does this statement refer to?)
D	Deontic (may, must, must not, should, should not)
I	aim (the “what”: what is the statement about?)
C	Condition (under what conditions must the aim occur?) * Default can be “in all times and in all places” (Ostrom, 2005, p. 149) or “everywhere and always”
O	Or else (the tangible sanction for not following a rule) * The term “or else” is used only for rules * Can be gradual: Initial or accidental violations may not incur tangible sanctions, but repeated violations lead to them
ADICO = rule, ADIC = norm, AIC = strategy	

Source: Ostrom (2005).

To date, ADICO has been applied only to state-level written policy (Basurto et al., 2010; Siddiki et al., 2011). To our knowledge, our study was the first application to a non-extractive resource management situation and in which the primary data are qualitative interviews and participant observation. Our goal in using ADICO was to identify the individual rules, norms, and strategies that guide the organizations’ decision-making processes, actions, and outcomes. To understand whether it was appropriate to focus mainly on rules (that is, institutional statements with tangible sanctions), we tracked the prevalence and strength of all three types of institutional statement. We acknowledge that the ADICO grammar tool is just one way to understand the decision-making process, and as such can complement other forms of analysis (e.g., content analysis). Thus, in this paper we also rely heavily on our qualitative data to evaluate and inform the meaning, strength, and relevance of each institutional statement, or sets of statements.

Methods

Case study

Ten Chicago Wilderness member organizations of various types, sizes, and geographic locale participated in this study and each represented one of our three a priori management categories. Four organizations were manager-led (M1, M2, M3 and M4), four were co-management (C1, C2, C3, and their co-managing landowner, and C4, whose associated landowner was not active in management), and two were research-led (R1 and R2). We conducted over 80 semi-structured, confidential interviews with restoration decision makers and over 50 observations of organization meetings and ecological restoration workdays between March 2010 and December 2012 (details of these methods can be found in Westphal et al., 2014). The interviews were extensive and covered topics such as background and job responsibilities, respondent's assessment of the natural area in question, restoration decision-making processes in their organization, and the importance and inclusion of the public and resources such as money and labor in decision-making. Interviews were recorded and transcribed for analysis. Field notes from participant observation sessions were written within 24 hours of the fieldwork (Westphal et al., 2014).

Content analysis and institutional statement extraction

As our analytical process using the ADICO syntax is detailed in great length in (Westphal et al., 2014), we only briefly describe it here. After interviews were transcribed verbatim, they were analyzed for broad themes, including but not limited to management actions, decision information, perceptions of landscape, and emotion. This analysis gave us a deep understanding of the data and the thematic patterns therein before we identified each rule, strategy, and norm. We then analyzed the statements in the context of the full data set, and relied on all that we had learned about the organizations through the thematic content analysis. For all institutional statements and ethnographic data, we provide the case ID code (e.g., M2 or R1) and a pseudonym for the respondent.

Results

We extracted 1,747 institutional statements from our interview data. About two-thirds of the institutional statements are strategies. Given the focus on rules in most institutional analysis and development studies, and given that they are not the most dominant type of institutional statement in our study, it is worth noting the kinds of rules we did extract. Rules were primarily about acquiring

approval (from bosses or boards, or from agencies for permits), abiding by restrictions of grants and referenda, spending money, and public use of sites. For example, two rules found in every organization were:

- restorationists must be trained and certified to operate a chainsaw;
- restorationists must apply for a permit to apply herbicide.

Few rules described on-the-ground application of a particular restoration technique. One exception is the following rule, also found in every organization: restorationists must not “smoke out” neighbors (during a prescribed burn). Failure to abide by any of these rules could result in tangible sanctions such as fines and revoked privileges.

Restoration principles

We found several sets of recurring statements that thematically describe and guide ecological restoration as a practice in the Chicago Wilderness region. We aggregated institutional statements that exhibited a common theme as a “principle.” Norms and strategies, as well as rules, played an important role in these principles. While not every interviewee expressed the principles, all principles were found in every study organization. Next we describe these seven ecological restoration principles in detail, giving several examples of the kinds of institutional statements from which the principles were composed. We also provide qualitative data excerpts from which the institutional statements were extracted.

1. Qualify, don’t quantify

In comparison to other natural resource management contexts in which institutional analysis has been conducted, we found very few statements that quantify the inputs or outputs of behavior (e.g., number of trees harvested, number of pounds of fish caught).

Institutional statements in which actions were quantified allowed us to see where there was variation in implementation of particular restoration practices. For example, the multiple institutional statements concerning the quantification of seeding practices (examples C, D, and E in Table 2), led us to confirm that seeding practices are more varied across organizations than other basic restoration actions, such as prescribed burns, removal of invasive species, or deer management.

Table 2. Examples of institutional statements that specified a quantified input or output, that is, a numerical upper or lower bounds for particular restoration actions

Restoration action	Example of institutional statement
(A) Size of stem that volunteers are able to cut	Volunteers must not cut stems that are larger than 6 inches in diameter, always and everywhere, or else risk losing volunteer privileges [Rule]
(B) Frequency and extent of conducting prescribed burns	Restorationists burn biennially, such that 50 percent of parcel is done annually, when and where possible [Strategy]
(C) The distance within which seeds can be purchased and/or collected	Restorationists must only purchase seed that has been harvested from within 100 miles of purchase location, always and everywhere, or else risk losing job [Rule]
(D) The amount of seeds that can be collected from a given population	Restorationists collect two-thirds of seed population, always and everywhere [Strategy]
(E) When to sow in seeds	Restorationists avoid seeding after the first year of buckthorn seedlings and re-sprouts always and everywhere [Strategy]

We found an abundance of strategies (institutional statements with no tangible or emotional sanction) that describe specific inputs of restoration practices qualitatively and in relative terms. Often, these statements read like a restoration field handbook or suggested guidelines, rather than explicit, quantified actions. For example, consider the following interview excerpts and the strategies we extracted from them:

(1) Kent [will] see if there's a patch of loosestrife this year in the wet area, then he's gotta make that his priority to get that before it goes to seed and drops ... So there's a certain schedule with seasonal, how seasons go, and it's up to us to prioritize. (Susan, M3)

Restorationists get to invasive plants before "it goes to seed and drops," when and where possible.

(2) And, for instance, somebody came in and they really didn't want us cutting down cherry trees ... They are not very fire resistant and they just didn't live in the habitats that we were restoring. Historically. We're trying to restore things from the plant community up. (Roger, C3)

Restorationists remove cherry trees, when and where appropriate.

(3) [I'd focus more on] just cutting buckthorn out there—doing anything out there! Any clearing that we do in the woods, generally we don't clear more land than we have seed to sow. (Jen, R1)

Restorationists clear buckthorn, only if they have sufficient seed to sow after removal.

Restorationists often stated or implied that if they were successful in their work they would feel pride and other positive emotions, indicating that with lack of success they would likely experience emotions like guilt and shame. For example, consider the following interview excerpts and the norms we extracted from them:

(1) Interviewer: What [is] the overall goal for the management of the woodlands?

Bob: To sustain and conserve natural resources; to promote diverse, healthy, natural, thriving, functional ecosystems ... I'm saying that with smirk—because it sounds generic—but I really do believe it. (Bob, R2)

[Organization] must sustain and conserve natural resources, promote diverse, healthy, natural, thriving, functional ecosystems, always and everywhere (norm).

(2) Some people like to clear all the crap out and start throwing seed everywhere. Well, our attitude has always been, you know, the [native] seed bank is there. It's got a lot of stuff in it that hasn't been able to express itself because it's been covered over with buckthorn or whatever else. Let's see what's already there before we start changing things ... Because I think an attitude that they [volunteers] have and a lot of people have is that they want to see something change within their lifetime ... as much as we like to see, you know, all the crap gone, all the trillium pops up, everything's great ... That may not be realistic. (Jerry, C1–3)

Restorationists should wait to see what is in the seedbank before seeding, always and everywhere (norm).

The first data excerpt and norm illustrate Bob's expressed deep belief in a broad, organizational goal that, when attempted, brings pride. In the second excerpt, Jerry concedes that there may be a desire to see immediate changes, but stresses that there is a responsibility to be realistic and patient. Jerry illustrates a concern that some restorationists might act too fast and therefore potentially waste resources and, even worse, miss what was waiting to express itself from the seed bank. Interestingly, in the same way that quantification of whether and when in a restoration project to sow seed was diverse across organizations, this kind of norm was not unanimous across, or even within, all organizations. Other groups had norms that strongly suggested the need for seeding because there is no dormant seedbank, and in several organizations there were disagreements about whether or how long to wait. Both versions of the wait/don't wait seeding norm are indicative of the qualitative principle because both lack a specific quantification of how soon to seed or how long to wait.

2. Listen to the land

One principle that was ubiquitous across all cases was the importance and power of connecting with, observation of, and listening to the landscape, along with the ability to adapt. This principle consisted of a mix of norms and strategies. For example, consider the following interview excerpts:

(1) We meet this great guy ... who is just a restoration and ecology genius of a person ... he goes “have you ever slept out on the prairie? It will tell you what it needs.” I thought it was such a kooky answer—that’s why I think I like him so much—he’s a little wacky like that but I think what he is just trying to tell me is, don’t worry about all the technology and just do what you really think is going to work well and work from your heart. (Becky, M4)

Restorationists should do what they really think is going to work well and work from their heart, always and everywhere (norm).

(2) ... he’s spent literally thousands of hours, 25 years, learning all this stuff. He couldn’t possibly write it so that someone else would know. I imagine like what tribal people used to be. He knows when certain plants are ... when their seeds are ripe. Now if you did a written plan and said “well, bud root seed is going to be ripe on May 1st.” but if it’s been a cold spring it won’t be ripe on May 1st. It might be ripe on May 12th. Al knows that. He’ll keep track. He’s like one of those old shamans that they had in the tribal society that knows. He’ll see the signs. (Doug, C4)

Restorationists make decisions based on day-to-day observations and advice from others, and not the calendar date (strategy).

In the first excerpt, a land manager describes a successful seeding dispersal project and seeding advice given to her by a fellow restorationist. The references to “working from your heart” and “just think how nature does it” indicate the presence, and application, of emotion as derived from a connection to the land, to guide restoration decisions. The references to “tribal knowledge” and experience in excerpt two indicate the importance of paying attention to the land and using direct observations and intuition to inform decisions. The ability to be able to listen to the land was present in every organization, although not every individual mentioned it. Indeed, as the excerpts above suggest, some individuals are particularly lauded and sought out for their ability to listen to the land.

3. Practice “follow-up”

Another guiding restoration principle is ensuring that “follow-up” is possible. Follow-up means returning to an area to ensure that restoration actions are having a positive impact and conducting the same action again or applying a secondary one (e.g., applying herbicide to recently cut stems of invasive plants) as needed. This was an important principle in every organization. Here we provide two excerpts and their extracted strategies:

(1) Related to invasive species control ... It's being persistent and repeating and going back multiple years to actually make headway. Being very diligent. I would say that that's a rule of thumb ... We know that as much as we try to implement an ... effective prescribed burn regime at a particular site or within a particular community, that that will not always take care of the woody invasive species. And that we have to go back and pay attention to those small stems. (Lori, M2)

[The organization] conducts follow-up management actions, always and everywhere.

(2) They [the operations field staff] have a lot of areas that they've been working on year after year, and they still are going into those areas ... I could come up with a lot more sites for them, [but] we gotta realistically think: What sites can they get to? Don't want to have them clear all brand new areas that we haven't even touched yet ... So, they're going to continue working on some of these areas 'til they feel that they're restored and that they could let them go naturally. (Mitch, M1)

Ecologists do not suggest new sites to work on if crews can't keep up and older sites aren't functioning “naturally.”

4. Do no harm

Yet another pervasive principle for conducting restoration is a “do no harm” philosophy. Like listening to the land and follow-up, this principle is exemplified by a mix of institutional statement types. Consider the following interview excerpts and their associated institutional statements:

(1) If we're doing winter work, we need to get off into a sensitive area, get equipment off the road ... we would need to have frozen grounds so that we can get equipment off without causing damage to soil, for example. So we don't wanna just drive off the roads and cause these paths and ruts and this kind of thing. (Bob, R2)

Restorationists use equipment on sensitive areas only in the winter when ground is frozen (strategy).

(2) It's just that the [organization] wants to promote volunteerism from the corporate groups, but it's sort of like getting people to use the woods by creating a trail system. A lot of people here don't appreciate if you have 30 people come into the woods in the spring when it's soft and muddy and wet and the ephemerals are blooming. You don't want 30 people marching around, pulling garlic mustard or doing whatever. Or cutting buckthorn in the middle of the summertime, which I tend not to want to do because of the soil compaction. (Jen, R1)

Land managers should deploy volunteers wherever they will do the least harm, always and everywhere (norm).

(3) Paul talks to the ecologists [to make] sure that what he's doing, what we're doing, is not going to cause more harm ... Barb mentioned how she wanted this whole area mowed out at [natural area]. Okay, now typically we don't start mowing until after August 1st, 'cause that's when the birds are gone. Well this area was so degraded, we didn't think it would be a problem to get in there a little bit before and get a jump start on some of the mowing ... Well, we went in there and mowed it: Oh my God, the shit hit the fan, you know. It was like: "What are you doing?! We had a bird study going on in there!" We were like: I can't believe there was any bird in there because it was just overrun with clover, sweet clover and burdock and all kinds of junk in there. And Paul just figured it was okay to go in there and get a head start. Well, we found out it wasn't ... This was one thing we felt like we were golden. (George, C1-3)

Restorationists must not conduct activities that do ecological harm, always and everywhere, or else risk serious reprimand, or more (rule).

The second institutional statement is a norm because there is an implied pressure felt by Jen to maximize the use of volunteers as well as an obligation to minimize impacts from those volunteers. The third institutional statement was coded as a rule given the obvious trouble that restorationists were in after mowing. In the organization from which this rule was extracted (a co-management case), our qualitative analysis suggests deep-rooted and long-standing distrust, even animosity, among participants. This social atmosphere, in which interpersonal sanctions are not enough, may have contributed to the need for tangible sanctioning through rules. Regardless of the associated sanction, the principle of "do no harm" was present in all of our study organizations.

5. Respond to sanctions from the land

We also found, in every organization, people who talked as if the land itself was providing sanctions—in terms of automatic sanctions like increases or decreases

in biodiversity and health, as well as positive and negative emotional responses felt by people. We coded these statements as norms, because they define the on-the-ground costs or benefits, made evident through emotion, that result from conducting ecological restoration. For example, consider the following interview excerpts and their extracted norms:

(1) When you finally see the fruits of your efforts and you really see an area get turned around. You know, saving it from the brink of extinction and death and all ... rescuing a beautiful sedge meadow valley from buckthorn. When you have your success stories that's always a good thing. [Will, C1–3]

Restorationists may feel a sense of pride when they see the fruits of their labors.

(2) We manage one of the world's largest populations of prairie fringed orchids ... If we don't do it right, the world loses it. There's a purpose and a sense of responsibility to make sure my children and their children see those things. [Erika, M2]

Restorationists may feel guilt if endangered species are lost.

It is clear that these sanctions (positive in excerpt 1, negative in excerpt 2) are strong motivators for restorationists to do the work they do, but the motivation is not described in terms of monetary payoffs, nor is it measured by emotional outcomes induced by coworkers, the public, or any other person. Rather, these sanctions are associated with the overall moral, obligatory, and value-laden undertone expressed in the culture of ecological restoration (Glaser, 2006; Jordan & Lubick, 2011).

6. Balance diverse internal stakeholders

Land managers often describe the need to balance and prioritize different factors (sites, stakeholders, resources, etc.), without defining exactly how much effort should go to one factor or another. For example, consider the following interview excerpt, in which a department manager describes one of the most challenging parts of her job, and the norm we extracted:

(1) On a staff level, it's managing staff expectations. The natural resource people tend to have a very focused, driven, passionate attitude and way they look at things. Versus the planning staff, [who] are much more of a generalist ... So a lot of times, you have the passion of saying, "This has to be like this." And then you have to say, "Wait a minute, no. What are the alternatives?" ... it's hard to manage sometimes, but it probably creates better projects when you have this type of a process. (Ellen, M2)

Department manager should balance the needs of multiple internal groups, always and everywhere (norm).

Here, the manager is aware of and sympathetic to the multiple perceptions and understandings that those involved with restoration may have. But even more broadly, an organization may need to balance multiple organizational goals. For example, consider the following excerpts and their extracted norms:

(2) ... this being our main education site, we went up against a lot of education programs going on here [so] we can't be aggressively doing land management techniques... So that has, at times, stifled us in what we wanted to do because we have to find balance. (Sam, M4)

Organization may allow education to trump land management at [this particular natural area] (norm).

(3) ... all the time that I've been working here, I've tried to use native, local genotype to restore. Well, this project came on board, so all the seed that I'm collecting this year, most of it is going to this project ... if I use seed there and I don't have it for here [the natural area], then they buy seed. And it usually comes from 150 miles away or further.

Interviewer: So that's defeating your purpose.

Jen: Right. ... it creates a lot of stress for me. Because I'm trying to collect as much native, local genotype as I can here. And I can't collect it all. So they're buying in part of it. Which—that's just the way it has to be. (Jen, R1)

Manager must balance local seed needs in natural areas with local seed needs in special project areas (and so occasionally purchases seed) (norm).

From the second excerpt, we glean how the organization faces the sometime frustrating challenge of negotiating multiple organizational goals—land management, ecological restoration, and education. From the third excerpt we understand that while balancing goals may result in Jen feeling guilt for not sticking to her own restoration philosophy of using only local seed in all areas, she may feel less guilt for having attempted to put at least some local seed in the project area. Further, there may be a larger organizational emotional sanction if Jen does not cooperate in the management of multiple sections for multiple reasons. That is, others in the organization want to see the special project come to fruition, and they rely on Jen for management assistance.

7. Balance diverse external factors

Beyond the perceptions of restorationists themselves and the goals of an organization, there is awareness that the public has diverse interests in natural areas as well. Consider the following interview excerpts in which managers discuss the need to consider non-ecological factors, and their extracted institutional statements:

(1) So what about public perception? That's worth something. It's not just about ecology; it's about beautification, public perception, getting volunteers committed to sites all over [the region]. (Larry, C1–3)

Organization considers science, ecology, neighborhoods, people's interests, and aesthetics in decisions, always and everywhere (strategy).

(2) Even when we do the resource management work, we have to talk about the other public uses ... When there's skiable snow [at a site], you can't drive your machinery or your trucks down the limestone trail because that would conflict with people utilizing the trail. So, we always kind of had to work around things like that. (Ron, M1)

Organization must consider and balance restoration work with public desire for recreation (norm).

Like the rule we describe for the “do no harm” principle above, for the second excerpt we have evidence from additional qualitative analysis to suggest a long-standing issue with public access, which may contribute to the obligatory (although not mandatory) nature of this institutional statement. Both institutional statements describe a recognition of multiple public uses of natural areas (passive aesthetics, active recreation). Although the types and extent of public use vary across sites, we found this recognition in every organization.

Discussion

One finding of this research is that rules, norms, and strategies can aggregate together to suggest a common principle. The principles we presented above are overwhelmingly composed of strategies and norms. We think this makes sense, for several reasons. Ecological restoration is a fairly new practice; as such, there is still a lot of trial and error and a need for creativity and flexibility. Science has yet to develop a baseline of information needed to construct, and enforce, many restoration rules. In fact, recent legislative action (i.e., the creation of formal rules) concerning restoration in Brazil has drawn criticism, in part because of the potential for rules to force a “one-size-fits-all” approach and to deny the possibility for on-the-ground experimentation (Aronson, 2010; Durigan et al., 2010). Our work indicates the significance of strategies, and especially norms,

in shaping behavior and decisions in ecological restoration. Thus, our work and results open the door to additional institutional analyses in other contexts. We expect that these other institutional statements would dominate in other land management situations, too, when the application of IAD and ADICO turns from its current focus on formal policy documents and an emphasis on formal rules to the full set of potential institutional statements.

One advantage of strategies is that they are most readily changed (e.g., there is no formal rule-changing mechanism that must take place) and therefore they are more readily adaptable to new scientific information. As the science and practice of ecological restoration advances (setting the stage for creating more rules to guide restoration activities), it is likely that strategies will remain an important institutional type, because of the need to be adaptive and flexible in a dynamic, and at times uncertain, social–ecological system (Armitage et al., 2009; Aronson et al., 2010; Murray & Marmorek, 2003; Pahl-Wostl et al., 2007). In fact, Gobster (2010) argues that the viability of ecological restoration as a practice, especially in urban areas, depends not only on ecological outcomes but also on how socially successful restoration projects are. The organizations conducting ecological restoration in Chicago Wilderness strive to recognize multiple and diverse stakeholders within, as well as external to, the restoration community. Therefore, while recognizing the importance of the Society for Ecological Restoration’s restoration goals of viable structure, function, and stability, they also recognize the importance of including social values in their restoration goals (Aronson et al., 2010; Hallett et al., 2013).

The principles we found are broad, philosophical guidelines, often rooted in a deep understanding of the ecological landscape within which the restorationist is working. For example, knowing how many cherry trees is “too many,” how much seed is “sufficient,” or when oak “dominance” has been achieved are understandings that are learned over time and with experience deepening a restorationist’s understanding of the landscape in which they are working. This supports Simpson’s (2009, p. 116) suggestion that “[o]ur generalized management model of how to restore *an* oak savanna cannot tell us how to restore *this* oak savanna.” Institutional statements that aggregate to principles such as “listen to the land,” “do no harm,” and “follow-up” reflect a direct and individual relationship with the land, through which management decisions are made. These institutional statements suggest that observation and interpretation are fundamental management tools and the freedom to change perceptions and subsequent decisions is permissible; that is, restorationists engage in what Berkes et al. (2000) call a qualitative approach to adaptive management.

Nonetheless, principles like “listen to the land” beg the question of what to do if multiple people “listen” and hear different things. This is handled in different ways across the organizations we investigated, but respected individuals can

play a key role in such situations. In some organizations, these individuals are strong leaders, even referred to as benign dictators. In others, individuals have been brought in to the organization specifically to coordinate decision-making in the face of divergent opinions (Zellner et al., 2014). We found these individuals to play a critical role in restoration decision-making since often when there is disagreement, there is no established basis in the scientific literature on which to base decisions (e.g., regarding seeding practices).

That Chicago Wilderness restorationists feel sanctions from the land may indicate a collective cultural ethos and place-based ecological knowledge, that is, a traditional ecological knowledge frequently ascribed to indigenous societies (Long et al., 2003; Plaganyi et al., 2013). Arguably, the institutional statements and the principles they collectively describe highlight the critical connection with and responsibility toward the land, and constitute a nascent form of traditional ecological knowledge. Berkes et al. (2000, p. 1252) argue that it matters less whether practices are traditional or contemporary, but rather that local knowledge exists that “helps monitor, interpret, and respond to dynamic changes in ecosystems and the resources and services that they generate.” That these principles are shared across the Chicago Wilderness restoration community suggests a shared collective understanding exists, one capable of igniting cooperation toward a common regional restoration goal.

Finally, one might ask if we needed to conduct the painstaking analysis of extracting each and every rule, norm, and strategy. Might we have found the same information using a more traditional thematic analysis? Yes, and no. The principles identified above could have been identified through our qualitative analysis of the interview data. But understanding the principles in the context of the growing literature on common-pool resources through the lens of the IAD framework and its focus on sanctions could not have been done without extracting the institutional statements. For example, the principle that restorationists use qualitative rather than quantitative measures is distinctly different from extractive common-pool resource situations reported in the literature to date—although we suspect that some of these principles will be found to be at play in extractive situations as well. Also, the prevalence and usefulness (given their ability to change more easily than norms or rules) of strategies would not have been determined without ADICO. Lastly, the concept that sanctions may come from a source other than other people is another significant departure from the existing literature—and one rooted in norms rather than rules. Again, we expect to find these meaningful but non-human sanctions in extractive common-pool resource situations as well, but that is for future research and study.

Conclusion

From our analysis of the rules, norms, and strategies found in diverse organizations engaging in ecological restoration in the Chicago Wilderness region, we conclude that a set of philosophical, yet practical, principles guide the practice of ecological restoration. Avoiding harm, listening to the land, practicing follow-up actions, and taking a qualitative approach to actions and outcomes characterize these organizations' restoration approaches. Importantly, all organizations are also guided by basic principles of social collaboration—both internally and externally. Since all organizations, regardless of management style, expressed these principles, we can view them together as a regional system of collective action that is beneficial for the larger good. In the metropolitan region of Chicago Wilderness, this shared understanding represents a strength of the alliance and, just as IUCN suggests, Chicago Wilderness is a model for other conservation efforts (Mackey et al., 2008).

In contrast to previous studies of institutional statements, our work suggests that norms and strategies are just as important, if not more so, than rules in the non-extractive, value-adding context of urban ecological restoration. Norms and strategies form the collective ethos of Chicago Wilderness restorationists, and are whence collaborative and adaptive management can thrive. Continued recognition of the importance of individual experience on and with the land is vital, as such experiences can subsequently create shared understandings of responsibility for and deep knowledge about the land, which in turn may create more resilient and sustainable landscapes that support both people and biodiversity.

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BOOK REVIEWS

Ecology and Experience: Reflections From a Human Ecological Perspective

By Richard J. Borden

**Berkeley, CA: North Atlantic Books, 454 pp.,
2014**

ISBN: 978-1-58394-772-2

Reviewed by Thomas J. Burns¹

This book is unique. It reads as several books in one, woven together by the author's personal and professional experience. It is a history of the discipline of human ecology, and at the same time it is Richard Borden's personal memoir and musings over the course of a long and rich career as an academic and human ecologist.

As Borden has spent the majority of his career at the College of the Atlantic in Bar Harbor, Maine (which has one, and only one, major—Human Ecology), much of what he brings together in the discipline of human ecology and his personal memoirs take place against the backdrop of the college and his life there.

Drawing on the work of Joseph Campbell and Rollo May, Borden sets the tone for what is to come in the book, with a thoughtful discussion of the importance of myth and metaphor. Drawing on Campbell's (1990, p. 101) ideas that "Myths do not have to do with analyzing and scientifically discovering causes ... [but rather] ... Myth has to do with relating the human being to his [or her] environment," Borden makes the case that, while looking for causes can in some circumstances be a bona fide pursuit, it is in the end a limited enterprise. Rather, in a Zen-like way, the point is to appreciate and to engage with the environment.

In this sense, human ecology becomes part science, part art, and ultimately a spiritual (sans formal religion) venture. As Borden (p. xxi) puts it, "... the power of myth has always been told in the language of poets and artists, whose special gifts go further than what they consciously know."

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So it is in the prophetic spirit, or perhaps that of the *Rishi* of Vedic times, that Borden embarks on his reflexive journey to make sense of human ecology's (and his own) attempts to make sense of the world in which we live, and particularly humankind's long and complex relationship to it, and place in it.

After laying this foundation, Borden embarks on the main part of his book, which is divided into four sections: Transects and Plots, Facets of Life, Wider Points of View, and a final Coda.

The first section, Transects and Plots, is the most personal and unabashedly "least academic" part of the book. In it, he traces his own life journey from his earliest years, and how he first found the discipline of human ecology. Here, he looks at significant parts of human ecology's charisma as a discipline that drew him in the first place, and how he found himself in the discipline. He gives the existentialist Søren Kierkegaard's dictum (p. 70), for what is an emerging through-line of the book: "Life is not a problem to be solved, but a reality to be experienced." Herein we see the importance of cognitive and humanist psychologists such as Ulric Neisser, Jean Piaget, Abraham Maslow, and Joseph Rychlak. As the young Richard Borden was making sense of the world, these were some of the thinkers he was reading and trying to make sense of.

Borden concludes his first section with a lengthy discussion of formal education, and how it has unfolded institutionally. He warns particularly of succumbing to what Whitehead (1929/1978) characterized as the "inert ideas" of received wisdom. The central problem of education thus becomes precisely that of keeping ideas alive and nurturing them in (academic and other) communities, without falling prey to this inertia.

In the section Facets of Life, Borden grapples with a number of issues of the life or death variety. He explores issues about life and death, time (local, but mostly geologic), and asks the deceptively simple question: "Where is the environment?"

He then ventures into the importance of context in the discipline of human ecology, and in living systems in general. Here, the limits of the sequestered laboratory become all too apparent. He concludes this section with thoughts on metaphor and meaning. He makes his vision clear throughout that the discipline is not just an objective one, with measurable and rationalized ways of seeing. It is a deeply personal one.

Borden launches the section Wider Points of View with a quote from Marcuse that "Wholeness demands its own rigor." That rigor is not born of yet more precise instruments and elaborate mathematical equations. Rather, it is a rigor of thought, of insight, of perception. This book in general, and this section in particular, is at least partly a manifesto for the Human Ecological Imagination,

and its obsession (my words here, not Borden's, but I do think they speak to what he is about) with relating the parts back to the whole, and never falling into the seductive trap of thinking that analysis, however rigorous, is ever sufficient without the synthesis that follows.

Borden is an advocate of multidisciplinary approaches, because of their ability to encourage students and citizens of the world to see that world through a variety of lenses. This leads to a final chapter on the unfinished course, and some possible scenarios for education and human ecology in the years ahead.

Not unlike the coda of a well-orchestrated symphony, the Coda here recounts and crystallizes the central ideas from earlier in the book. He is alone at the end of Eagle Lake in Acadia National Park, musing on the meaning of life and death. He concludes (p. 398) with a touching quote from his dear Patricia. He is prepared to go "back into the soup." "I am prepared to meet it as a homecoming. Everything else is mystery."

This book flows from the life work of someone with maturity and wisdom. It could not have been written by a young person, nor by someone who had not done a great deal of study, introspection, and meditating on the world and his and humankind's place in it. The opening of this review bears repeating here—this is a unique book. The reader cannot escape being touched by it, moved deeply.

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Total Liberation: The Power and Promise of Animal Rights and the Radical Earth Movement

By David Naguib Pellow

Minneapolis, MN: University of Minnesota Press, 336 pp., 2014

ISBN: 0816687773

Reviewed by Kimberly Murray¹

One problem facing sociologists is the study of intersectionality and the ways that group memberships intersect to create different realities for groups and individuals (Crenshaw, 1994). Although many attempts are made to understand prevalent variables of interest (i.e., race, class, gender, and sexual orientation), studies often become focused on one variable of interest, while giving other variables less attention. Research on intersectionality also lacks a complex understanding of the relationships between humans, the environment, and other nonhumans. These relationships have yet to gain prominence in mainstream sociological discourse, and a need remains for a theoretical framework that incorporates an understanding of natural resources, animals, and ecosystems as central and necessary to the study of society. Similarly, sociologists must endeavor to prevent the compartmentalization of sociological thought into different areas of interest, with some areas of interest gaining more attention than others.

David Naguib Pellow's *Total Liberation: The Power and Promise of Animal Rights and the Radical Earth Movement* is one attempt to demonstrate the intersectionality of human and nonhuman life. He outlines the "total liberation framework," which builds upon many theoretical perspectives to develop a new understanding of inequality across all life forms. This framework acknowledges not only oppression across key variables, such as race, class, and gender, but also across nonhuman entities. He argues that we cannot fully understand oppression within the confines of human societies, nor within the environments in which we live. He invites readers into the lives of members of the total liberation

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movement, including animal and earth liberationists, through an intense and meticulous analysis of more than 100 interviews, observations of events and rallies, and material culture produced by liberation groups.

The total liberation framework has four key components around which the book is organized: “an ethic of justice and anti-oppression for people, nonhuman animals, and ecosystems; anarchism; anticapitalism; and an embrace of direct action tactics” (p. 61). The book first investigates the origins of radical thought found within animal and environmental movements (Chapter 1). The following chapters (2–4) address the cultural value of justice within these movements, anarchism and anticapitalism, and direct action taken by members of the movement. The last two chapters (4–5) address the Green Scare and the ways in which members of these radical movements have resisted governmental repression by modeling tactics found within other collective movements, such as women’s suffrage and abolitionist movements. The chapters form a powerful argument that one cannot study society without considering the natural environment, and that the exploitation of nonhuman life is just as destructive, and perhaps even more damaging, as inequality found within human societies. What makes each chapter so interesting and valuable to both the public and academia are the candid excerpts from interviews with liberationists.

Total Liberation also adds to the body of work on collective movements, violence and conflict, and framing. Even though environmental harm has increased over time, the American cultural consciousness largely prioritizes and rewards economic, rather than environmental, endeavors. Environmental concerns may fade from the American consciousness because of the ways in which environmental movements develop (Burns & LeMoyné, 2001). Environmental concerns are often included within a political regime. However, political regimes have not prioritized environmental protection, which has led to less effective environmental policy.

Similarly, Homer-Dixon (1999) describes the relationship between environmental scarcity and social unrest, violence, and conflict. Violence often occurs when some other variable (such as class inequality or racial oppression) exists along with environmental scarcity. This creates a complex mix of stresses that increases likelihood of violence, which is predicted to increase as the world’s resources continue to be consumed in unsustainable ways.

Pellow does an excellent job contextualizing the total liberation movement as a product of the political and economic inequality surrounding environmental concerns and the individuals fighting to change the American consciousness to understand ecosystems and other nonhuman life forms as entities that need rights and protections comparable to the rights people aspire to attain. Finally, Benford and Snow (2000) argue that before the 1980s, social movements’

scholars failed to fully address in their studies “meaning work—the struggle over the production of mobilizing and countermobilizing ideas and meanings” (p. 613). Social movement scholars seeking to understand meaning work must first acknowledge that actors in social movements are actively involved in producing new meanings or challenging, changing, and maintaining existing meanings within a culture. Pellow captures the negotiation of meanings about different world views pertaining to the relationship between nature and society, and outlines, especially in Chapter 1, “injustice frames” (Gamson et al., 1982) developed by members of liberationist groups.

Although the book has many contributions to the literature, including a summary of various socioecological theories on the relationship between animals, nature, and society and an examination of the meaning of terrorism when the terrorist label is placed upon members of liberationist groups such as the Earth Liberation Front and the Animal Liberation Front, one of the most important takeaways from the book relates to the political nature of race. Pellow argues that most radical earth and animal rights liberationists are privileged in that they are white and middle-class, yet they reject the idea of white privilege. In a way, they become “less white” in their defiance, and they are placed within a hierarchy of oppression typically reserved for racial minorities. Also, despite arguing that white liberationists are able to ideologically reject white privilege, he points out the advantages white liberationists have, such as shorter prison sentences and larger public support. Therefore, even though race is socially constructed, varies across time and place, and is a political tool used to create a system of superiority and inferiority within society, it seems as if within the American cultural context, one cannot fully separate the idea of race and skin color. This presents readers with a conundrum: white liberationists are not fully “white” in that they reject their superiority within the racial hierarchy, yet they still have advantages within the criminal justice system compared to racial minorities because of their whiteness. Theoretically, the study of race and how racial labels apply to whites who reject their privilege or do not fully achieve “whiteness” (i.e., poor whites) is understudied, making Pellow’s insights highly valuable.

Perhaps one of the most important contributions of this book that all academics can benefit from is Pellow’s description of his research process and the ethical concerns he faced. While researching animal and earth liberationists, he faced pressures from nonacademic authorities to divulge confidential names of interviewees suspected of illegal or ecoterrorist activities. He highlights a huge problem facing academics: the need to conduct research in a way that ensures the confidentiality of participants, even when pressured by powerful government agencies to share confidential information. He was approached by the FBI, sought advice from lawyers about how to protect the participants in

his study, and even used email addresses not associated with his university in order to protect his participants. He describes how another professor was jailed because he refused to give access to confidential information to authorities. Pellow openly acknowledges that he received “mixed messages” from the American Sociological Association on the matter, but for personal and professional reasons he refused to cooperate with the authorities. Academics must discuss these issues and determine better ways to protect researchers and research participants from negative consequences.

Finally, this book advances what Bergesen and Bartley (2000) describe as an “eco-sociology,” a discipline that recognizes the need for sociologists to think beyond purely social boundaries in order to incorporate all living things into theory. “The key is the ecoequality assumption, for once it is recognized that all living things have the same moral status, then it is impossible to leave nonhumans out of the conception of a moral community and some kind of social order” (p. 318). Pellow depicts liberationists in a much more positive light than government agencies and the media often portray them. It is important also to understand that liberationists view their actions as just, despite the risk of being labeled a terrorist. Amster (2006) argues that previous attempts to extinguish the cause of environmental and animals rights activists by government or political lobbies often encouraged more deviant and violent behavior. Therefore, by eliminating proper and democratic modes of expressing frustration and disagreement with the capitalist world view, members of these movements are left with few options and resort to extreme acts in order to be heard.

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