



# Contrasting visions of science in ecological restoration: Expert-lay dynamics between professional practitioners and volunteers



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## ABSTRACT

Ecological restoration as a popular form of volunteer participation has been praised as an example of democratic natural resource management. However, the involvement of volunteers in projects guided by professionals does not necessarily ensure democratic knowledge exchange and production. Drawing insights from citizen science and political ecology, this paper investigates the role of science in mediating the dynamics between professional practitioners and volunteers. Using case studies of ecological restoration programs at two university arboreta in the American Midwest, this paper argues that the contrasting visions of science between professional practitioners and volunteers led to conflicts and presented challenges for the institutions to genuinely engage the public in contributing local knowledge and framing management priorities. While both groups emphasized the practical aspect of science in guiding restoration work, they differed in how they conceptualized the role of humans in restoration, work priorities, and how to apply scientific theories and methods in restoration. Moreover, at the university arboreta, science defined institutional identity and claims to scientific authority further delineated boundaries between professional practitioners and volunteers. As a result, distrust, tensions, lack of engagement, and different levels of desired public participation existed in these seemingly participatory programs. Theoretically, this paper contributes to the cross-fertilization between citizen science and political ecology by underscoring the politics of participation and the role of science (and its interpretations) in challenging expert-lay dynamics in environmental volunteering programs. Practical recommendations are included for deconstructing the expert-lay hierarchy and moving restoration toward a democratic practice.

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## 1. Introduction

In previous work, I argued that the practice of ecological restoration contains an inherent democratic potential. By this claim, I meant that at its best the activity of ecological restoration preserves the democratic ideal that public participation in a public activity increases the value of that activity. This value in restoration is brought out most effectively by those projects that unite local human and natural communities, and that increase the level of local participation in those restoration projects.

[Andrew Light (2000, p. 163–4)]

Ecological restoration involves human's intentional actions in "assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed" (Society for Ecological Restoration, 2004,

p. 3). In contrast with traditional conservation thinking that regards humans as a negative force in destroying the environment, ecological restoration not only recognizes humans as one integral part of the ecosystem, but also grants humans a positive role in assisting nature's recovery (Higgs, 2003; Jordan, 2003; Jordan and Lubick, 2011). This recognition of the role of humans in influencing nature's trajectory serves as an alternative to the dualistic thinking of human-nature relationship and has gained great momentum in contemporary natural resource management (Gobster and Hull, 2000; Friederici, 2006; Egan et al., 2011; Hobbs et al., 2013).

In the opening quote, Philosopher Andrew Light argues that the practice of ecological restoration is inherently democratic because it provides opportunities for public participation and community involvement. In fact, ecological restoration has been championed by many scholars as an example of participatory environmental management, especially in the first-world, urban context (Higgs, 2003; Light, 2006; Gross, 2006; Gobster, 2010; Newman, 2011). Although, to some extent, ecological restoration projects have

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mobilized many local communities to care for the environment, the diverse interest each group brings presents challenges for democratic participation.

Situated at the nexus between nature and society, ecological restoration has been a topic of interest for geographical inquiries. Studies have addressed conflicts surrounding “which and whose nature to restore” with a focus on exploring the diverse social interpretations of nature among stakeholders. These cases demonstrate that different social groups, for example, governmental agencies, environmental scientists, local resource users, recreationists, and conservationists, all have different opinions on how to restore and manage ecological communities. Specific lines of contestation vary from case to case. In an urban setting, conflicts often center on recreational uses, aesthetics, and property rights (Gobster, 2001; McManus, 2006; Hagerman, 2007; Newman, 2011). In rural communities, tensions emerge from contrasting meanings of cultural landscapes, a sense of community, power struggles between environmentalists, traditional resource users, and governmental policies (Nesbitt and Weiner, 2001; Rikoon, 2006). Ecological restoration projects are especially controversial in European countries given the long history of interworking between nature and people and studies have addressed topics of nature-culture hybridity, nature’s authenticity, and cultural ambivalence toward restoration (Eden et al., 2000; Wastfelt et al., 2012; Emery et al., 2013). In Australia and New Zealand, restoration projects also serve as cases for contesting nativeness and indigeneity among different communities (Coombes, 2007; Trigger et al., 2008). As these studies have demonstrated, there is no one single nature to restore, but rather, negotiations of “which and whose nature to restore” are constantly complicated by power dynamics among social groups, identity politics, and different ways of understanding nature-society relationships.<sup>1</sup>

Whereas these studies contribute to our understanding of the inherent controversy in ecological restoration across different interest groups, I argue that even within groups supporting restoration, there exist similar tensions and contradictions. Especially in participatory restoration programs, land managers, volunteers, and conservation groups may share common restoration objectives on a broad scale. Nevertheless, detailed examination of the interplay among these groups often reveals hidden politics of participation and power struggles, which challenges the notion of ecological restoration as a democratic practice.

Specifically, this study investigates the interactions between professional practitioners and experienced volunteers at two university arboreta in the American Midwest.<sup>2</sup> Although both professional practitioners and volunteers were supportive of restoration, their opinions diverged on issues of the role of humans in restoration and how to implement restoration projects on the ground. Through my research, the role of “science” (and its interpretations) emerged as a critical concept in mediating the dynamics between the two groups. Whereas both groups referred to “science” in their discussion about restoration, they meant different interpretations of

science. Generally volunteers referred to science broadly defined, as ecological knowledge. Although volunteers rarely used the term “science” directly, they frequently made references to ecological concepts behind restoration. Moreover, their enthusiasm about the learning aspect of restoration work was considered as a form of scientific inquiry. By contrast, professional practitioners conceptualized “science” narrowly as academic research and scientifically-informed practices. Claims to scientific authority were often made by professional practitioners to delineate their boundaries against “lay” volunteers.<sup>3</sup> As a result, although both groups seemingly worked collaboratively for restoration projects, there were tensions and contradictions therein.

In this paper, I first review debates over the role of science in ecological restoration. To address gaps in current studies of environmental volunteering, I draw insights from citizen science and political ecology and argue how the two fields can not only inform each other, but also shed light on the dynamics between conservation professionals and volunteers. I then analyze the contrasting visions of science between professional practitioners and volunteers through case studies. The paper concludes with theoretical contributions and practical applications for environmental volunteering programs.

## 2. Debates over the role of science in ecological restoration

Since the emergence of ecological restoration in the 1970s, science has been a strong component. The early practitioners of restoration argued that ecological restoration is the ultimate test of ecological theories—if people can put damaged ecosystems back to work again that means they have really understood how ecosystems work (Bradshaw, 1987; Jordan et al., 1987). Ecological restoration exemplifies the mutually enhancing relationship between science and practice. On the one hand, restoration ecology as science lays out the scientific foundation for the practice. On the other hand, ecological restoration as practice examines scientific theories and poses new research questions.

As the field expands in scope, the central role of science has become more prominent. Many ecologists and environmental scientists emphasize the importance of basing restoration work on ecological theories and methods and warn against conventional trial-and-error approaches to restoration (Pickett and Parker, 1994; Lake, 2001; Falk et al., 2006). This emphasis on the role of science has generated debates over the relative importance of other social and cultural factors in ecological restoration.

Cultural anthropologist Eric Higgs (1994, 2005) argues that science is one, but not the only, component of ecological restoration. Cultural practices, aesthetic preferences, social needs, and other political and economic considerations should also be taken into account. Higgs worries that the hierarchy of knowledge constructed by singling out science over other knowledges would limit the scope of restoration and risk losing restoration’s social relevance.

Both Higgs and Light further expand their idea of restoration as restoring humans’ relationships with nature to conceptualizing restoration as a democratic practice (Light and Higgs, 1996; Higgs, 1997, 2003; Light, 2000, 2006). When ecological restoration is framed as community-based projects, people from all walks of life are welcomed to participate. Based on this democratic thesis, they argue against the domination of scientific knowledge over other knowledges of nature. Instead of conducting restoration as scientific endeavors, they regard restoration as providing opportu-

<sup>1</sup> In addition to the most relevant studies reviewed here, other lines of geographical inquiry focus on ecological restoration as a case for analyzing changing narratives of environmental policies (see Clark, 2009; Norgaard et al., 2009) and neoliberal governance of the environment (see Robertson, 2010; Dempsey and Robertson, 2012). Others also examine stream restoration as an example of a new form of expertise, which is produced in the private sector as opposed to in the academia (see Doyle et al., 2013; Lave, 2012, 2014).

<sup>2</sup> For the purpose of highlighting the expert-lay dynamics in ecological restoration, the categories of “professional practitioners” and “volunteers” are used in this paper. However, both groups encompass a wide variety of people. Generally, professional practitioners have formal training in ecology and are in charge of making decisions on land management. They have titles of land care managers, horticulturists, and research scientists. Volunteers are the general public who participate in restoration programs at the arboreta. This study focuses on “experienced volunteers,” who participate regularly and have longer-term commitment to restoration projects.

<sup>3</sup> Such an emphasis on scientific authority is characteristic of professional practitioners at the university arboreta. It is important to note that professional practitioners at other organizations, such as environmental NGOs, city parks, and community groups, may not emphasize scientific authority as much.

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