



Resident and user support for urban natural areas restoration practices



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ABSTRACT

Public support is important to the success of natural areas restoration programs. Support can be especially critical in urban settings where stakeholders recreate in or reside near natural areas but may lack familiarity with practices for managing ecological processes. Surveys of on-site recreationists and nearby residents (N = 888) of 11 Chicago metropolitan natural areas were used to assess support for eight different practices commonly used in oak woodland restoration. Support generally ranged in relation to the level or intensity of management intervention, from more than 90% of the sample supporting the planting of native seeds and plants to just 32% supporting the use of herbicides to control undesired vegetation. On-site users and nearby residents who believed that a restoration practice was being used at the site they visited and/or lived near were much more likely to support the use of that practice than those who did not believe or did not know whether it was being used. These belief variables were the most important predictors in binary logistic regression models of restoration support, though gender (female) also significantly decreased the likelihood of supporting most high-intervention practices. Beyond these findings, results also suggest that support should be viewed as a multidimensional concept that involves perceptual, demographic, and structural components which often differ for different practices. Managers can use the information provided here to increase their understanding of the relative nature of restoration support and devise holistic social-ecological strategies to achieve restoration success.

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1. Introduction

How does one measure the success of an ecological restoration program? Although ecologists often focus on ecological factors such as species diversity, vegetation structure, and ecosystem processes to evaluate the success of their efforts (Ruiz-Jaen and Aide, 2005), it is being increasingly acknowledged that program success also depends upon addressing social factors such as how a restoration looks and how it can be used by the public (Brooks et al., 2013; Wortley et al., 2013). Preferences, use, and other human dimensions of natural resource management are especially important in urban settings, where large numbers of residents may live close to or recreate in natural areas but may not be familiar with the tools and techniques for maintaining natural communities. The failure of managers to implement urban restorations without regard to public stakeholders can result in a loss of support for their programs, compromising ecological goals and diminishing the potential of restored areas to provide unique human

benefits not attainable in conventional urban green spaces (Kaplan et al., 1998; Ingram, 2008).

Such a loss of support happened in Chicago 20 years ago, when in the spring of 1996 an ecologically successful program in the Forest Preserve District of Cook County was halted by policymakers in response to public opposition to restoration activities at some sites (Gobster, 2000). The moratorium lasted a full 10 years on a few of the sites (Anon, 2006), and though restorationists initially downplayed the magnitude of opposition (Shore, 1996; Siewers, 1998), a county-wide resident survey conducted by Barro and Bright (1998) shortly after the start of the moratorium showed that both support for and concerns about management were widely shared. In their analysis, the researchers noted a disconnect in respondents' attitudes toward restoration, with a more than 90% approval for the overall goals of restoration programs but with 75% or more expressing disapproval of specific practices needed to achieve those goals, including removal of mature trees and use of herbicides.

This is not just an isolated local or urban issue, and studies done in rural and wildland areas in the U.S., Europe, Australia, and elsewhere echo this disconnect between the ends and means of restoration goals and practices (e.g., Cary and Williams, 2000; Dandy et al., 2011; Shindler et al., 2012; Woodworth, 2013). Though it should come as no surprise to land managers that different practices are greeted with differing levels of support among public stakeholders, there is little

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systematic evidence for how a set of techniques commonly used in restoration are perceived and supported. Furthermore, little is known about the social factors underlying people's support for restoration and whether and how those factors might vary across different practices. Finally, few studies have attempted to understand how structural factors such as stakeholder group type and management style might influence support.

The aims of the research presented here are to address these knowledge gaps in the context of natural areas management programs in the Chicago metropolitan region. Although much progress has been made on both ecological and social fronts since the days of the 1996 moratorium, conflicts still occasionally arise (Woodworth, 2013). By focusing on the research needs mentioned above within this regional context, it was also hoped that a more systematic analysis might clarify why some practices identified by Barro and Bright (1998) lacked wider support. On a broader level, because most studies of people's response to natural areas management have taken place in rural and wildland settings, a major motivation of our research was to contribute managerially relevant knowledge to the growing international activity in urban ecological restoration with respect to how moderate- to high-level management interventions are perceived and accepted within an urban context (Gobster, 2010).

1.1. Public support for restoration practices

People's preferences for urban nature are long established in the environmental social science literature (e.g., Kaplan and Kaplan, 1989), though early studies often looked more generically at public green space composed of undifferentiated trees and other vegetation. More recent work aimed at understanding the ecological characteristics of urban nature has greater relevance for natural area management and some findings show that higher levels of species diversity and similar measures of ecological quality also correlate with increased preference and use of natural environments (Jorgensen and Gobster, 2010; Hunter and Luck, 2015). But this is not always the case, and for some people urban natural areas that exhibit such characteristics can appear messy and untended, and this perceived lack of care and disorder is often construed as a sign of mismanagement (Nassauer, 1995; Hands and Brown, 2002). Moreover, even if people appreciate the visual and recreational outcomes of a natural area restoration project, they may object to the tools or practices used to achieve that outcome (Shindler et al., 2002). For these reasons, social scientists are increasingly looking at people's support or acceptance of specific management practices to gain a more nuanced understanding of what makes a successful restoration program.

Ecological restoration usually involves some combination of practices to enhance native species diversity, vegetation structure, and ecosystem processes, though specific actions can vary widely by ecosystem type and geographic region. In the Midwestern U.S. where our study takes place, practices used in prairie, oak savanna, and oak woodland restoration often include: planting and seeding of native plants; hand weeding, mechanical removal, prescribed burning, and herbicide application to control undesired flora and maintain desired flora; and fencing and sharpshooting to control overabundant fauna, mainly white-tailed deer (*Odocoileus virginianus*) (Packard and Mutel, 2005). We contend that the degree of public support for these practices will vary inversely by the intensity or perceived level of intervention into nature, with high support for relatively benign activities such as seeding and planting of natives and lower support for high intervention activities such as burning, herbicide use, and lethal deer removal.

Evidence to support this hypothesis is scattered within the research literature, with much of the work focusing on individual practices. Studies that comprehensively address a set of ecological restoration practices are particularly sparse as they relate to urban areas. Besides the work by Barro and Bright (1998) already mentioned, a study by Miller et al. (2002), also conducted in metropolitan Chicago, examined

residents' attitudes toward prescribed burning as a tool in ecological restoration and found support for that practice by nearly 3/4 of respondents across their nine-county study area. Levels of support for other practices (acceptable in some cases/all cases) included thinning invasive trees in woodlands (71%), deer control (68%), removing shrubs (64%), clearing trees from prairies (51%), and spraying herbicides (40%). In another study of urban natural areas in Michigan, Ryan (2005) found park users held slightly positive attitudes toward controlled burning, were neutral on cutting down non-native trees and shrubs, and were slightly negative on spraying herbicides to eliminate non-native shrubs. In a regional study of sagebrush ecosystem restoration in the Great Basin of the U.S., Shindler et al. (2012) found high public acceptance among urban and rural residents for practices such as prescribed fire, grazing, and tree and shrub removal but low support for herbicide use and chaining (i.e., removing shrubs by dragging a heavy chain between two vehicles).

Beyond these comprehensive studies, there is a larger body of international research on public support for individual practices in restoration and other management contexts that help inform our study. A number of studies have examined people's perceptions of native plants in urban parks and natural areas (Daumants, 2003; Schulof, 1989; Schwartz et al., 2014). Findings from this work generally show a high appreciation and support for the use of natives, though some people prefer more formal and ornamental plant selections (Khew et al., 2015) and may oppose the removal of non-natives to solely favor native plantings (Kendle and Rose, 2000; Foster and Sandberg, 2004). Much has been written on preferences and social acceptability of tree cutting in the context of wildland timber harvesting (e.g., Ribe, 1989), with people generally tolerant of light thinnings but more often opposed to removal of large trees and extensive areas of trees (i.e., clearcutting). These same concerns can apply to ecological management, particularly when the goals entail restoring closed semi-natural and plantation forests to more open woodland, savanna, and grassland ecosystems (e.g., Cary and Williams, 2000; De Valck et al., 2014). A number of studies have examined public support for prescribed fire to reduce accumulated ground fuel loads and associated wildfire risk in fire-dependent ecosystems, particularly in urban-wildland interface areas (e.g., Bell and Oliveras, 2006; Ryan, 2012). Findings from this work generally show high support, though levels of support can vary significantly from study to study (Toman et al., 2014). People's perceptions of herbicide and other chemical applications for weed and pest control have been studied with respect to forestry (e.g., Norgaard, 2007; Howle et al., 2010), farm and rangeland (e.g., Doohan et al., 2010; Evans and Rollins, 2012) and residential lawn (Larson et al., 2010; Blaine et al., 2012) management. While the landowner-based studies we reviewed (mostly North American focused) showed that a majority of respondents used chemicals to control weeds, those studies that looked at broader public groups and public land applications found respondents generally had negative perceptions of their use. Finally, many studies have been conducted to examine public perceptions of deer control in metropolitan (e.g., Kilpatrick et al., 2007; Urbanek et al., 2012; Johnson, 2014) and rural/peri-urban (Dandy et al., 2011) settings, to reduce vegetation damage as well as vehicle collisions. Much of this work examines public support for different control options and most studies find at least moderate support for some type of control, though results vary widely from study to study.

1.2. Factors affecting support

Information about relative levels of support for restoration practices is helpful in designing a socially acceptable program, but it is also important to understand the social factors underlying that support. We contend that support can be predicted from beliefs and perceptions of nature and its management, knowledge and experience with environmental and restoration issues, and different social-demographic and structural characteristics of the population. This hypothesis builds

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