



Ecological restoration volunteers: the benefits of participation

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There is an international volunteer movement to protect and restore sensitive natural landscapes. In Illinois alone, almost 40,000 acres of rare prairie, oak savanna, wetlands and woodland ecosystems in urban and suburban communities are monitored and managed by volunteers. As natural habitats disappear or become degraded worldwide, it is increasingly important to understand how a personal involvement with nature, in the form of restoration, benefits the individual as well as aiding in species and ecosystem survival. This study examined the satisfactions that volunteers derive from prairie restoration in the Chicago metropolitan area. Questionnaire responses from 263 volunteers indicate that volunteers experience high levels of many different satisfactions. Tenure, frequency and extent of involvement in restoration were used to predict restoration satisfactions, life satisfaction and life functioning. Implications for recruiting and sustaining volunteer involvement in restoration efforts are discussed.

Keywords: restoration; volunteers; benefits; satisfactions; life satisfaction; life functioning; participation; prairies

Introduction

Every Sunday morning for the past 20 years, a number of North Branch Prairie Project volunteers have met at a designated site in the Cook County Forest Preserves and worked for three hours to restore Illinois prairie. This group is not unique. It is part of the Volunteer Stewardship Network (VSN). Created in 1983, the VSN has become a force of over 5000 people from numerous walks of life who take care of nearly 40 000 acres of rare prairie, oak savanna, wetlands and woodland ecosystems in Illinois (Becker, 1995). Similar groups of volunteers take on similar responsibilities in ecologically threatened areas in many nations.

What prompts volunteers to devote their time and energy to the challenge of ecological restoration? This study is about one set of possible reasons – the psychological benefits of participation in restoration. To understand the potential value in studying these benefits, it is useful to know why restoration, and restoration volunteers, are so important.

Sensitive natural habitats are disappearing around the world. At this time, virtually all the prairies in the central U.S. have been swallowed up by agricultural and urban development. In the process, prairies, wetlands, savannas and forested lands are disturbed or destroyed by urban growth as it spreads farther and farther from metropolitan areas (Stokes, 1989; Garreau, 1991; Nelson, 1992). In the absence of intervention, the price for all this progress will be the loss of native habitats that connect us to our past and protect our ecological future. Intervention is necessary.

Unfortunately, simply setting land aside in government preserves and letting nature take its course has not been sufficient to ensure the existence of these native habitats. Because government preserves are generally fragmented, controlled for fire, and surrounded by development, they are vulnerable and often become disturbed. For instance, virtually all the savannas and a number of prairies in Illinois' Cook County

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Forest Preserves were overcome by European buckthorn (*Rhamnus cathartica*), a commonly planted bush in residential areas that chokes out native species (Packard, 1988).

Restoration is “a commitment to the re-creation of an entire community of plants and animals modeled strictly on one that occurs naturally” (Jordan, 1986, p. 19). It involves many types of activities, from researching the physical and cultural history of an area to pulling weeds or collecting seeds (Burton, *et al.*, 1988; Packard, 1988; Schramm, 1990). Because of disturbances such as the invasion of European buckthorn, Illinois’ Cook County Forest Preserve District hopes to restore 80% of its 67 000 acres of land in the coming years (Nevius, 1994).

Carl Becker, Chief of the Division of Natural Heritage for Illinois’ Department of Natural Resources, states that restoration work would not be carried out if it were not for volunteers. He estimates that the value of time and skill donated by VSN volunteers in Illinois is well over \$2.5 million for the years 1990–1994 (Becker, 1995).

Because volunteers are crucial for most restoration projects, it is important to explore why individuals contribute the time and effort necessary to carry out these enormous tasks. One way to explore this issue is to examine the benefits volunteers derive from their participation in restoration activities. Examining benefits may provide useful information for recruiting and nurturing restoration volunteers. It may also provide state organizations and volunteer group leaders with a clearer picture of what makes volunteers come back again and again.

Unfortunately, previous research on ecological restoration offers few clues. Although the body of research on restoration is growing, the existing literature has largely been concerned with the biological (e.g., Higgs, 1997; Packard and Mutel, 1997), ethical (e.g., Cowell, 1993; McQuillan, 1998), and political (e.g., Naiman *et al.*, 1995; Light and Higgs, 1997) issues involved in restoration. With the exception of one unpublished dissertation based on a sample of 12 volunteers (Fisk, 1995), we found no studies specifically examining the psychological aspects of participation in restoration.

Although no published research to date has documented the benefits of restoration participation, a review of the related literature provides insight into the possible benefits. These possible benefits, drawn from the literature in leisure studies, environmental psychology and the study of volunteers, include an overall sense of satisfaction from participating, a variety of specific kinds of satisfaction, and increases in life satisfaction and life functioning. Each of these possible benefits and the related literature are described below.

One possible benefit of participating in restoration activities may be an overall sense of satisfaction. Indeed, overall satisfaction has been examined as one of the benefits associated with nature-related activities and experiences (Kaplan, 1973, 1993).

In addition to experiencing an overall sense of satisfaction, ecological restoration participants may also derive a variety of specific kinds of satisfaction from their involvement, such as the satisfaction associated with a sense of accomplishment or the satisfaction of making new friends. There have been numerous studies on the satisfactions and psychological benefits associated with nature, conservation, volunteer, and leisure activities. Although these studies may not provide an exhaustive list of possible satisfactions, they offer insight into a wide variety of possible satisfactions that individuals may experience from involvement in restoration.

Participation in nature activities offers a range of satisfactions. Kaplan and Kaplan (1989) theorize that being in nature provides an opportunity to get away from one’s regular routine, to be in a world that one connects with, to feel that one’s environment is supportive, and to be fascinated – all of which can leave one in a state of mind that allows for quiet reflection. And at least one nature activity, gardening, is challenging in a way that both requires knowledge and provides it (Kaplan, 1973). Restoration involves goals and actions similar to those of gardening. Thus it seems possible that participating in restoration activities offers some or all of the benefits associated with gardening and other nature activities.

Participation in conservation activities has been associated with a number of specific satisfactions. Individuals who recycle report a sense of satisfaction from participating in an activity that can make a difference, as well as the satisfaction associated with being a part of a community activity (DeYoung, 1986). Restoration is a group effort to repair natural communities. Thus it seems possible that in the act of restoring, volunteers may experience a sense of community with each other, as well as a sense of connection with nature.

Participation in volunteer activities has been associated with the satisfaction of making a difference, accomplishing something, and doing something meaningful. A young man working for voting rights in the South in the 1960s described the source of his satisfaction as, "What I get accomplished, the people I reach and who get to me: that's why I'm here" (Coles, 1993, p. 73). Treekeepers – volunteers who help with maintenance of trees in public areas – provide another example of this sense of accomplishment. These volunteers gain a sense of satisfaction from doing something tangible to help the environment (Westphal, 1993). It seems possible that restoration volunteers experience both an immediate sense of accomplishment, from tasks such as clearing brush, and a longer term sense of accomplishment, from watching a site over time as it responds to human assistance.

In addition to the satisfaction of making a difference, another important satisfaction that volunteer activities provide is the sense of personal growth. In the organizational psychology literature, Katz and Kahn (1978) attribute the satisfaction of being part of an organization, in part, to the opportunity to confirm one's notion of the sort of person one sees oneself to be. For example, a study of human service volunteers revealed that their second most important motive for volunteering was to feel better about themselves (Cnaan and Goldberg-Glen, 1991). It seems possible that ecological restoration volunteers experience the satisfaction of personal growth from their restoration activities.

Participation in volunteer activities provides the satisfaction of meeting people of similar interests and making new friends. Active members in the Sierra Club described socializing as part of the satisfaction related to membership; socializing was not part of the nonactive members' satisfactions (Weinstein and Manzo, 1987). Because ecological restoration activities are generally done in groups, they may also provide related satisfactions.

Finally, participation in leisure activities offers a range of satisfactions (Beard and Ragheb, 1980). Some of these satisfactions echo those discussed above; for example, leisure activities can provide opportunities to get away from one's regular routine, to learn about one's surroundings, or to socialize. One satisfaction that looms larger in the leisure literature than in the literatures on nature, conservation and volunteer activities is the satisfaction associated with physical activity. People enjoy participating in activities that challenge them physically (Butler, 1967; Kraus, 1971) and develop their physical fitness (Singer, 1976). Restoration work covers a wide range of activities, including physically demanding tasks. Thus one possible benefit of participating in restoration may be physical satisfaction.

In sum, a review of related areas of research reveals a range of specific satisfactions that may be part of the ecological restoration experience. Restoration may offer many of the satisfactions offered by nature activities, from getting away from one's normal routine to providing a source of fascination. In addition, like other environmental or conservation activities, restoration may offer the opportunity to be part of something meaningful, and the satisfactions of social or community involvement. And like many volunteer activities, participation in restoration may offer an opportunity to achieve personal growth. Finally, like other leisure activities, ecological restoration may provide opportunities for physical satisfaction.

It seems possible that any of these satisfactions may be associated with restoration volunteering. What is unclear at this point is whether restoration work provides none, some, or all of these specific kinds of satisfaction. Moreover, it is unclear which specific satisfactions are most important in the restoration experience.

If restoration activities do provide a number of specific satisfactions to volunteers, it seems possible that these satisfactions are reflected in volunteers' satisfaction with their lives as a whole. Research on the importance of leisure activities suggests that participation in leisure activities leads to increased perceptions of wellness (Ragheb, 1993) and satisfaction with community life (Allen and Beattie, 1984). In addition, in one study, 'healthy' leisure activities such as nature activities and volunteer work contributed to the robust functioning of AIDS caregivers (Canin, 1991). These findings suggest that in addition to providing a range of specific satisfactions, participation in prairie restoration may actually enhance the individual volunteer's life satisfaction and life functioning.

The benefits an individual gains from participating in restoration activities may depend on any number of factors. The volunteers' amount or type of participation may play a role in their satisfaction. Different individuals have different levels of involvement in restoration, as reflected in their frequency of participation, tenure of participation and the amount and type of responsibilities they assume above and beyond volunteering for workdays. Previous research suggests that the benefits gained from an activity may well depend on the individual's level of involvement in that activity.

While we are aware of no systematic research examining the relationship between volunteer satisfaction and involvement, there is some research on the relationship between (paid) job satisfaction and involvement. Volunteer work has some differences with paid employment, but it also has some similarities. Like paid work, volunteer work involves a task to be completed, the use of an individual's skills and creativity, and the opportunity for achievement, success and recognition (Gidron, 1983). Thus the literature on the relationship between level of involvement and job satisfaction may offer insight into the relationship between involvement and restoration satisfactions.

In general, measures of involvement and satisfaction are correlated in the literature on job satisfaction. First, the longer employees work for the same organization, the higher their job satisfaction (Bedeian *et al.*, 1992). Second, not only is tenure of involvement a consistent predictor of job satisfaction, but so too is frequency of involvement. Studies comparing the satisfaction levels of part-time employees to those of full-time employees indicate that part-time employees experience less job satisfaction (Hall and Gordon, 1973; Miller and Terborg, 1979). And third, while it is difficult to discern the direction of the relationship between commitment and job satisfaction (Begley and Czajka, 1993), there is some indication that higher commitment can lead to higher job satisfaction (Mathieu, 1991).

Ecological restoration volunteers vary in their tenure of involvement, their frequency of involvement, and their commitment to restoration. Although restoration work is part-time for all volunteers, the amount of hours contributed varies. Some consistently contribute their time every week, others do so less frequently. Some restoration volunteers simply come out and help on workdays. Others volunteer for additional responsibilities, such as monitoring a site for specific plants, monitoring for insects, or being a site steward. Stewards demonstrate the highest levels of commitment, taking responsibility for a variety of managerial activities and making decisions regarding how a specific site is managed.

Because the literature on job satisfaction suggests that higher levels of involvement are associated with higher levels of satisfaction, in this study we examined restoration volunteers' satisfactions in light of their levels of involvement. We examined whether beginning volunteers experience the same satisfactions as veteran volunteers or whether, as in the case of paid work, satisfaction increases with tenure. We also examined the extent to which frequency of participation plays a role in volunteer satisfaction. And finally, we examined the relationship between the additional responsibilities an individual assumes and the restoration benefits they experience. This study examined a number of possible benefits associated with participating in restoration activities, including (1) overall satisfaction with the activity, (2) a number of specific kinds of satisfaction, (3) increases in life satisfaction, and (4) increases in effective life functioning. In addition, it examined possible factors that might mediate the benefits gained from restoration, including (1) frequency of participation, (2) tenure of participation, and (3) type and amount of additional responsibilities assumed.

Method

In order to address these issues, a questionnaire was developed and distributed to individuals identified on restoration organization mailing lists (e.g., The North Branch Prairie Project, The Friends of the Indian Boundary Prairies) throughout the Chicago region.

Participants

Participants in this study were drawn from the Volunteer Stewardship Network in the six counties that make up the Chicago metropolitan region, where over 3000 people belong to numerous restoration organizations. From this group a large and varied random sample of volunteers could be chosen. Many VSN members are volunteers who actively take part in restoration activities. Others, however, merely receive the newsletters and other mailings but do not participate in restoration activities.

A list of leaders in local prairie restoration organizations was obtained from the Chicago office of The Nature Conservancy. Through a number of phone calls and letters to these leaders, approximately 2000 names and addresses were acquired from nine different restoration groups. The numbers of names on these lists ranged from as few as 17 for the Indian Boundary Prairie Group to over 600 for the North Branch Prairie Project. Organization and company names were eliminated from the mailing lists.

From the remaining names, a list of stewards was identified. To ensure an adequate response rate from individuals who were very involved in restoration projects, these 167 stewards were included in the sample. The remaining names were randomly selected from the various lists. In total, 504 surveys were mailed.

Ten questionnaires were returned as undeliverable. One participant received two questionnaires, which lowered the total number of people filling out questionnaires to 493. The response rate was 63% ($n = 310$). Four participants completed fewer than half of the items. Their responses were eliminated, leaving 306 questionnaires to be analyzed.

Measures

For each participant, measures were made of (1) satisfactions related to restoration activities, (2) level of involvement in restoration, (3) life satisfaction, and (4) life functioning.

Satisfactions. The questionnaire asked about the participant's overall satisfaction with restoration activities, and it included 50 possible satisfactions that our review of the literature indicated might be associated with restoration. Participants were asked to respond to the overall and specific satisfaction items using a five-point Likert scale (0 *not at all* to 4 *very much*) to indicate the degree of satisfaction they experienced.

Involvement. The questionnaire included items designed to measure the frequency of workday participation and the tenure of involvement in restoration. Involvement was also measured by the volunteer's participation in the additional responsibilities associated with restoration, such as stewardship, monitoring, education and publicity.

Life satisfaction. The question Generally, how satisfied are you with your life? was answered on a 5-point Likert scale (0 *not at all* to 4 *very much*).

Life functioning. Life functioning was measured with 12 items (Canin, 1991). Each item was answered using a 5-point Likert scale (0 *not at all* to 4 *very much*).

In addition to these measures, the questionnaire also included a number of standard demographic questions. Finally, the questionnaire included several open-ended questions that allowed participants to comment further on their restoration experiences or enrich answers to other items.

Results and discussion

Analyses focused on two major issues. First, the benefits of participation in prairie restoration were analyzed, specifically examining the volunteers' overall satisfaction, sources of satisfaction, life satisfaction and life functioning. Second, factors that may affect these benefits, such as levels of participation, were examined.

Benefits of participation in restoration

Overall satisfaction. Of the 306 respondents, 263 indicated that they had taken part in at least one restoration workday, and 43 indicated they had not. Of those who had taken part in workdays, the mean rating in response to the question Generally, how satisfied are you with your restoration activities? was 3.2 on a scale of 0 to 4, in which 0 represents *not at all* and 4 represents *very much*. While it is not surprising that those who take part in these activities feel some satisfaction from their involvement, 3.2 is still rather high. Moreover, this mean rating reflects responses from volunteers with a wide range of participation, from those who have tried it once to those who make restoration a regular part of their lives.

Specific sources of satisfaction. To examine the specific types of satisfaction that volunteers derive from restoration activity, responses to the 50 individual satisfaction items were first subjected to Principal Components Analysis with Varimax rotation of orthogonal factors. A six-factor solution revealed the most coherent and distinct categories of satisfaction. Items for the factors were summed to create six scales, as shown in Table 1.

The first scale, *A chance to be away*, includes six items. The sense of being away, which has been identified as one benefit of being in a natural environment (Kaplan and Kaplan, 1989), is similar to this category of satisfaction. The second scale, *Meaningful action*, includes ten items related to taking part in something important. The third scale, *Participation*, includes seven items related to broadening one's experiences. The fourth scale, *Personal growth*, includes nine items related to the volunteer's well-being and spiritual development. The fifth scale, *Physical*, includes three items related to health and physical fitness. And finally, the sixth scale, *Fascination with nature*, includes three items related to the wonders or fascination of nature. This fits the notion of natural environments being intrinsically fascinating (Kaplan and Kaplan, 1989).

To the extent that restoration activity provides all these different kinds of satisfactions, mean ratings for the six categories should all be high. Indeed, all category means were above the midpoint (2.0) – some well above – indicating that volunteers experience many rich and meaningful satisfactions from this single activity. *Meaningful action* and *Fascination with nature* were the two highest rated sources of satisfaction, with means of 3.3 and 3.2, respectively. The next highest rated source of satisfaction was *Participation*, with a mean of 2.8, followed by *A Chance to be away* and *Physical*, with means of 2.6 and 2.5, respectively. *Personal growth* was the lowest rated source of satisfaction, with a mean of 2.3. As the paired *t*-test results in Table 2 show, each of the rank order differences between the various sources of satisfaction was statistically significant, with one exception – there was no significant difference between ratings for *A chance to be away* and *Physical*.

These findings echo those from previous, related studies. For instance, recycling has been associated with satisfactions similar to *Meaningful action* and *Participation* (DeYoung, 1986). According to DeYoung's study, involvement in recycling allowed people to feel they had a chance to do something that makes a difference, to be a part of the community and participate in bringing sense or order to the world. If one perceives that the world environment is being degraded, feeling that one has a meaningful role, or in other words, feeling a sense of participation, can prevent a sense of helplessness and increase one's feeling of being able to cope (Kaplan and Kaplan, 1982). The mean ratings for *Meaningful action* and *Participation* reveal

Table 1. Restoration satisfaction categories, alphas, and items

Category	Alpha	Items
A Chance to be away	.89	Being in a quiet peaceful spot Being alone with my thoughts Just letting my mind wander Getting away from it all Feeling peace of mind Breaking out of the routine
Meaningful action	.92	Making life better for the coming generations Causing good things to happen Acting in a responsible manner towards the Earth Feeling I am doing the right thing Being of benefit to society or the community Feeling I am doing something useful Creating something beautiful A sense of accomplishment A sense that things are getting done Feeling I can play a role in nature
Participation	.86	Working with different age groups A broader experience Accomplishing something in a group Meeting with friendly and interesting people Having shared goals Opportunity to try new things Getting me fully involved
Personal growth	.91	Being a part of something profound Changing my life Help me with my self-confidence Restoring or contributing to my spirituality Help me to deal better with my day to day problems Feeling humble Help me with my personal growth Fitting into my place in the natural scheme Help me to be optimistic
Physical	.87	Developing my physical fitness Physically challenging Helping me to stay healthy
Fascination with nature	.70	Seeking out and enjoying the wonders of nature Learning how nature works Absorbing and fascinating

that prairie restoration activities provide a great deal of these specific satisfactions – perhaps facilitating the sense of being able to cope.

The high ratings for *Fascination with nature* represent a relationship with nature that involves enjoying and learning about nature’s wonders, but there is no implied sense of being connected to nature. The Kaplans theorize that contact with nature offers individuals satisfaction not only from fascination and the chance to be away but also from a sense of connectedness and compatibility as well. Two survey items that were not part of the *Fascination with nature* category address these other aspects of a relationship with

Table 2. Sources of restoration satisfaction, in descending order

Source of satisfaction	Mean	Std. dev.	Paired- <i>t</i>	<i>p</i> -value
Meaningful action	3.3	0.7	2.2	.03
Fascination with nature	3.2	0.7	9.3	<.0001
Participation	2.8	0.8	3.4	.0008
A Chance to be away	2.6	0.9	1.9	.06
Physical	2.5	1.0	2.8	.005
Personal growth	2.4	1.0		

Paired *t*-statistics refer to the difference between ratings for each source of satisfaction and the next highest rated source of satisfaction.

nature. The high mean ratings for these two items, Feeling I can play a role in nature and Feeling I belong in nature (*M*s 3.1 and 3.2 on a 0 to 4 scale), represent the satisfaction gained from feeling a part of the natural world.

The high means for these two items may also speak specifically about the restoration experience. Restoration offers the opportunity for participants to have a meaningful, active hand in the natural process – helping natural habitats to thrive. Restoration may provide an opportunity to experience benefits from nature on a deeper level than from other interactions with nature.

Levels of involvement and benefits

Involvement factors that may be associated with the volunteers' levels of satisfaction include tenure of participation, frequency of participation, and amount and type of additional responsibilities assumed. For each of these factors, the relationship to volunteers' overall satisfaction with restoration activities, specific satisfactions experienced, life satisfaction and life functioning were examined.

Because life functioning was assessed through twelve individual items, these items were subjected to factor analysis. Principal Components Analysis with Varimax rotation of orthogonal factors yielded two coherent and distinct factors, and items for these factors were summed to create two scales. The first scale, *Positive life functioning*, included six items (e.g., Felt clear and focused about my thinking, Felt energetic and excited about what I am doing, Felt on top of the world), with an alpha of .83. The second scale, *Negative life functioning*, included five items (e.g., Had a hard time making up my mind about things, Felt things just don't make much sense), with an alpha of .75.

Tenure of participation and benefits experienced. Volunteer involvement in restoration activities ranged from 2 months to 27 years. The average tenure was 5.6 years. Regression analysis revealed that the volunteer's overall rating for restoration satisfaction was marginally significantly higher, $F(244) = 3.3$, $p = .07$, as tenure increased. However, tenure had little correlation with the specific satisfactions associated with restoration. *Fascination with nature* was the only satisfaction category that increased as tenure increased, $F(249) = 4.6$, $p = .03$. Tenure was also unrelated to *Life satisfaction*, *positive life functioning* and *Negative life functioning*.

One possible explanation of these findings is that the benefits of involvement in restoration work are, for the most part, immediate. For example, a volunteer may experience a strong sense of satisfaction from being engaged in *Meaningful action*, or enjoy the *Physical* aspect of the work, from the very beginning. In this way, tenure may not be an important factor in the satisfactions derived from restoration.

Another possibility is that, over time, a fuller picture of the restoration experience emerges. For instance, it is possible that in some ways volunteers may experience a deeper sense of *Meaningful action* or *Personal growth* after years of participation, but that this is tempered by the frustrations that may naturally come about as one becomes more and more involved in a project. Several respondents commented that

they would have appreciated an opportunity to describe their frustrations with restoration work as well as their satisfactions.

One satisfaction, *Fascination with nature*, did increase with tenure. That it did may speak to the knowledge a volunteer can acquire about the natural world after years of experience. Many long-time restoration volunteers wrote about the rewards of educating others and giving tours. From another perspective, a woman who reported a 12-year involvement with restoration, commented, "The more you know, the more you realize there is to learn."

Overall, longer tenure was not associated with measurable benefits. Perhaps a volunteer's frequency of involvement relates more clearly to benefits.

Frequency of participation and benefits experienced. Volunteers estimated their participation in work-days over the previous six months, selecting from these response options: Once or twice; Every few months; About once a month; A few times a month; Every week, or nearly so; or More than once a week. The participants were divided into two groups, those who participated less often (once a month or less; $n = 144$) and those who participated more often (a few times a month or more; $n = 106$). Possible differences in benefits for those who participate more or less often were examined with a series of one-tailed Student's t -tests.

As shown in Table 3, overall restoration satisfaction and a number of specific satisfactions with restoration activities were higher for those who participated more often. Those who participated more often experienced higher satisfaction in four of the six satisfaction categories: *Fascination with nature*, *Participation*, *Physical*, and *Personal growth*. Each of these effects of participation frequency on overall and specific sources of satisfaction remained significant when tested in a MANOVA. Further, a two-way MANOVA, in which both tenure and frequency of participation were used to predict satisfaction ratings, revealed no interaction between the effects of tenure and those of frequency.

Additional one-tailed t -tests were conducted to examine whether more frequent participation in restoration might also yield greater life satisfaction and life functioning. These analyses revealed that individuals who participated more often had higher ratings for life satisfaction than did those who participated less often, $t(236) = 1.6$, $p = .05$. Furthermore, the relationship is the same for life functioning ratings. Those who participated more had significantly higher *Positive life functioning* ratings, $t(234) = 2.4$, $p = .008$, and significantly lower ratings for *Negative life functioning* than did less frequent restoration participants, $t(234) = 2.1$, $p = .02$ (see Table 3).

In this sample of 263 volunteers, frequency of participation had a clear association with measures of restoration satisfaction, life satisfaction and life functioning. Of course, we cannot know the direction of

Table 3. The Relationship between frequency of participation and benefit means

Benefits	Participate more often	Participate less often	Unpaired t -statistic	p -value
Overall satisfaction	3.4	3.0	4.3	.0001
Meaningful action	3.4	3.3	0.9	ns
Fascination with nature	3.4	3.2	2.7	.003
Participation	2.9	2.7	1.9	.03
A Chance to be away	2.6	2.7	0.3	ns
Physical	2.7	2.4	1.9	.03
Personal growth	2.6	2.3	3.0	.001
Life satisfaction	3.1	3.0	1.6	.05
Positive life functioning	2.9	2.7	2.4	.009
Negative life functioning	1.1	1.3	2.1	.02

ns = not significant at $p = .05$.

the effect from these findings alone. It may be that frequent participation enhances life satisfaction and life functioning, but perhaps the reverse is true – happy, well functioning people may tend to get more involved and experience higher satisfactions.¹ Previous findings on the positive impacts of gardening and other nature activities lend some support to the idea that ecological restoration enhances life functioning (Cimprich, 1990; Canin, 1991). The findings here raise the important possibility that future research could establish a causal link between restoration activities and enhanced life functioning; as Hartig and colleagues have pointed out, such research might then assist in the recruitment and retention of restoration volunteers (Hartig *et al.*, 1994).

One possible explanation for higher life satisfaction and life functioning ratings on the part of regular volunteers is that these volunteers also have other factors in common – for example, their choice of leisure activities. Restoration volunteers who participate more often may also be more involved in nature activities of other sorts. These other nature activities might contribute to higher life satisfaction and better life functioning.

Thus regular participation in restoration workdays was associated with greater benefits – more overall satisfaction from the activity, more specific satisfactions, greater life satisfaction, and higher levels of life functioning. To explore further the effects of volunteers' involvement on the benefits they derived from restoration, we examined whether volunteers' involvement in additional responsibilities was associated with any differences in the benefits they experienced.

Participation in additional responsibilities and benefits experienced. Volunteers responded to the question Have you volunteered for specific responsibilities? by checking a number of choices, including stewardship, education, publicity and monitoring. Two hundred forty participants had volunteered for at least one additional responsibility. Sixty-three individuals checked *none*, indicating they had not volunteered for any additional responsibilities.

Student's *t*-tests were used to compare levels of satisfaction for participants vs. nonparticipants in the various additional activities (e.g., stewards vs. nonstewards). Table 4 shows how restoration satisfactions differed for individuals involved in stewardship, education and publicity vs. those individuals who were not; in addition, it shows how restoration satisfactions differed for individuals who volunteered for no additional responsibilities vs. those who volunteered for at least one additional responsibility.

Table 4 illustrates the pattern that emerged – participating in additional activities was frequently associated with higher satisfactions, while not participating in additional activities was associated with lower satisfactions. The relationship between each of the various additional activities and restoration satisfactions is discussed in turn below.

Table 4. Levels of satisfaction associated with restoration responsibilities

Satisfactions	Specific responsibilities			
	Steward	Education	Publicity	None
Overall Satisfaction	Higher	Higher		Lower
Meaningful action	higher		higher	
Fascination of nature	higher	higher	higher	lower
Participation				
Being away				
Physical	higher			lower
Personal growth	higher	higher		lower

One-tailed *t*-test (higher and lower significant at $p \leq .05$; blank = not significant).

Fifty-six percent, or 145, of the participants in this study were stewards or costewards. Stewards manage restoration activities on particular sites. Being a steward involves making decisions concerning the ecological management of a site and directing volunteer activities during workdays; for sites on private property, stewardship sometimes involves working with the landowner to develop a management plan. Stewardship was the responsibility most associated with higher levels of satisfaction. Stewards gave systematically higher overall satisfaction ratings ($M = 3.3$) than did nonstewards ($M = 3.0$), $t(255) = 2.8$, $p = .003$. Moreover, stewards gave higher ratings for four of the six specific satisfaction categories. Stewards had higher levels of satisfaction from *Meaningful action* ($M = 3.4$) than nonstewards ($M = 3.2$), $t(261) = 3.7$, $p = .0001$. They also reported more satisfaction from *Fascination with nature* ($M = 3.4$) than nonstewards ($M = 3.1$), $t(262) = 1.989$, $p = .02$. Stewards rated their *Physical* satisfaction ($M = 2.7$) higher than nonstewards ($M = 2.3$), $t(261) = 3.2$, $p = .0007$. And finally, stewards reported more satisfaction with *Personal growth* ($M = 2.4$) than nonstewards ($M = 2.2$), $t(262) = 2.2$, $p = .01$.

Eighty-three of the participants in this study reported having volunteered for educational duties. Education volunteers give tours and talks to children and adults, describing the prairie and the restoration projects. Educators reported higher levels of restoration satisfactions than did noneducators, but the difference is smaller than that between stewards and nonstewards. Educators had a higher overall rating for restoration satisfaction ($M = 3.4$) than noneducators ($M = 3.1$), $t(255) = 3.2$, $p = .0009$. In addition, volunteering for education duties was associated with greater satisfaction from two of the specific satisfaction categories. Education volunteers had higher levels of satisfaction from *Fascination with nature* ($M = 3.4$) than those who did not volunteer for educational activities ($M = 3.2$), $t(261) = 2.7$, $p = .004$. They also reported more satisfaction from *Personal growth* ($M = 2.5$) than noneducators ($M = 2.2$), $t(262) = 2.1$, $p = .02$.

Fifty-six volunteers reported taking part in publicity duties. Publicity duties include writing press releases and organizing other promotional activities. Publicists reported higher levels of restoration satisfactions than did nonpublicists, but only in two of the specific satisfaction categories and not in overall restoration satisfaction. Publicity volunteers had higher levels of satisfaction from *Meaningful action* ($M = 3.5$) than their nonvolunteering counterparts ($M = 3.3$), $t(262) = 1.7$, $p = .05$. They also reported more satisfaction from *Fascination with nature* ($M = 3.4$) than their nonvolunteering counterparts ($M = 3.3$), $t(261) = 1.7$, $p = .05$.

Forty-nine volunteers reported being involved in some monitoring responsibility. Monitoring involves the task of observing and estimating the abundance of specific plants, insects, birds or other wildlife. Unlike the other added restoration activities, monitoring was associated with no increase in overall restoration satisfaction or any specific satisfactions.

Sixty-three study respondents reported volunteering for no additional responsibilities beyond their participation in regular workdays. In comparison to individuals who do volunteer for one or more additional responsibilities, these volunteers experienced lower levels of restoration satisfaction. They reported lower levels of overall restoration satisfaction ($M = 2.8$) than those who volunteered for additional responsibilities ($M = 3.3$), $t(255) = 4.2$, $p < .0001$. Moreover, individuals who volunteered for no additional responsibilities rated three of the specific satisfactions lower than did individuals who volunteered for at least one additional responsibility. Compared to volunteers who took on additional tasks, those who did not reported lower levels of satisfaction from *Fascination with nature* ($M = 3.0$ vs. 3.3), $t(261) = 2.2$, $p = .02$. They also reported less *Physical* satisfaction ($M = 2.3$ vs. 2.6), $t(261) = 1.7$, $p = .04$. And finally, they reported less satisfaction from *Personal growth* ($M = 2.2$ vs. 2.4), $t(262) = 2.0$, $p = .03$.

Possible relationships between each of the specific responsibilities (i.e., stewardship, education, publicity, and monitoring) and *Life satisfaction*, *Positive life functioning* and *Negative life functioning* were examined. Not one of these specific responsibilities was associated with life satisfaction or life functioning. Rather, what is important is whether one volunteered for additional tasks at all. Compared to those

who took on additional responsibilities, restoration volunteers who did not take on additional duties experienced systematically lower levels of life satisfaction, $t(249) = 1.6$, $p = .05$, and gave systematically higher ratings to the *Negative life functioning* scale, $t(246) = 2.7$, $p = .003$.

In sum, monitoring duties were not related to differences in reported benefits of restoration, but stewardship, education and publicity duties were all related to higher levels of satisfaction. Conversely, volunteering without additional responsibilities was associated with lower levels of satisfaction.²

Why are some responsibilities associated with satisfactions while others are not? The answer may involve, in part, the volunteer's sense of commitment. Stewardship is the most involving and encompassing responsibility that a volunteer can assume. It is not surprising, given the level of involvement required, that stewardship had a number of associations with the satisfactions. The connection between commitment and satisfaction becomes more clear in reviewing the relationship between not volunteering for additional responsibilities, life satisfaction and life functioning. Respondents who did not volunteer for additional responsibilities – and thus may be viewed as having made less of a commitment to restoration than their counterparts who did – experienced lower life satisfaction and functioning.

Taken together, the findings regarding tenure of participation, frequency of participation and participation in additional responsibilities show a connection between involvement and restoration satisfactions. Those volunteers who participated less, or those who did not volunteer for additional responsibilities, had lower satisfaction levels in a number of categories. While the connection is less clear for life satisfaction and life functioning, the pattern is similar. Those who participated less, and those who did not volunteer for additional duties, had lower life satisfaction, lower positive functioning and higher negative functioning ratings.

Implications

Jordan (1989) and others (Hartig *et al.*, 1994) have theorized that the restoration of natural areas is beneficial not only to the plant and animal species whose habitat is revived and healed but also to the individual volunteers who take part in the restoration process. This study is the first to document systematically the benefits of restoration for restoration volunteers. While the list of satisfactions examined here is not exhaustive, it is clear that volunteers experience a number of important satisfactions from restoration. Furthermore, volunteers experience high levels of many of these satisfactions.

The findings here also suggest that several involvement factors may play an important role in the extent to which benefits are experienced. Volunteers who participate more frequently experience significantly higher satisfaction levels than those who participate less frequently. In addition, these volunteers report higher levels of life satisfaction and life functioning. Being a steward is a particularly important factor in the experience of satisfaction. Stewardship, a highly involving responsibility, is associated with higher levels of a number of restoration satisfactions. From the opposite perspective, volunteers who do not take on any additional responsibilities experience less satisfaction from their participation in a number of categories, as well as lower life satisfaction ratings.

The results of this study provide some insight for volunteer managers in their efforts to recruit and retain volunteers. Although it is important to remember that each volunteer is an individual with unique goals and needs, and that volunteers vary in what provides or increases satisfaction, understanding more about the volunteers in general is helpful. For instance, since frequent participation may be an important factor in the experience of higher levels of satisfaction, some effort might be made to encourage volunteers to participate in workdays regularly. And, while not everyone can or should take on the duties of being a steward, encouraging volunteers to get involved further through additional responsibilities may enrich their restoration experience.

Along the same lines, it is clear that volunteers benefit from the sense that they are participating in something meaningful. Developing this sense in volunteers might be accomplished in a number of ways, directly or indirectly. It is possible this might be accomplished in ways as simple as helping volunteers see the progress in a day's work. It might also be accomplished by relating the work to the bigger picture.

The findings here may not only contribute to the recruitment and nurturing of restoration volunteers but also serve to expand and reinforce our understanding of the benefits associated with nature, volunteering, conservation, and leisure activities. Conversely, while all these areas of research contribute to the understanding of the benefits of restoration, none really tells the whole story. With this study, we can begin to see restoration as a form of involvement with nature that combines the benefits usually associated with nature activities with the benefits associated with volunteer, conservation and leisure activities. Indeed, one of the primary proponents of ecological restoration, William Jordan (1994), describes restoration involvement as an extremely attractive relationship with nature, one in which the active and passive qualities in human nature are well balanced.

This study raises a number of questions for future research. How might the benefits from involvement in restoration compare with the benefits from involvement in other nature activities? Does feeling that one is part of the environmental healing process increase the experience of benefits? Does being part of a large, cooperative volunteer effort diminish opportunities for reflection? In this study, restoration was examined in light of benefits usually associated with contact with nature. A study directly comparing the benefits of participation in restoration with those of participation in other nature activities would enrich our understanding of ourselves and our relationship with the natural world.

Similarly, future research might compare and contrast ecological restoration with other volunteer activities, other conservation activities, and other leisure activities. How do the benefits of restoration work compare for volunteers versus paid employees? How do the benefits of restoration fieldwork differ from other environmentally motivated activities, such as recycling or door-to-door solicitation for the Sierra Club?

And finally, future research might work to develop a richer understanding of the restoration experience. For example, the effect of participation in restoration activities might be examined from the perspective of costs as well as benefits. What are the costs and frustrations of taking on these tasks? If any hardships – weather, mosquitoes or local bureaucracy, for example – prove sufficient to discourage some volunteers, this would be valuable information for stewards and restoration managers.

Conclusion

In the quest for balance between nature and urbanization, ecological restoration is critical to ensure the existence of prairies and other natural areas. In addition, restoration provides the opportunity for volunteers to develop a hands-on, healing relationship with the natural world. This relationship yields a number of psychological benefits including an overall sense of satisfaction from restoration and a variety of specific satisfactions. Further, findings on life satisfaction and life functioning suggest that restoration may work as a positive factor in the lives of volunteers.

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Notes

1. We compared ecological restoration with other leisure activities in terms of the relationship between frequency of participation and level of life functioning. Results echoed those of Canin (1991). For some leisure activities (e.g., Quiet time with friends, family; Spending time in a natural area; Gardening/watching wildlife), more frequent participation was associated with significantly better life functioning. For other leisure activities, there was no relationship between frequency of participation and life functioning. And for still others (Go to parties, nightclubs; Watch TV), more frequent participation was associated with significantly poorer life functioning. These findings raise three possibilities: (1) that some leisure activities promote life functioning while others detract from it; (2) that different levels of life functioning dispose individuals to participate in different leisure activities; or (3) that an individual's leisure activities both affect, and are affected by, levels of life functioning.
2. We compared the effects of additional responsibility on satisfactions for men vs. women, examining the seven satisfaction outcomes associated with each of five additional responsibilities (stewardship, publicity, education, monitoring, and none) separately for men vs. women. We found only a slight effect for men and little or no effect for women. In thirty-five possible comparisons for men, there were seven marginally significant or significant effects; in each of these cases, more responsibility was associated with greater satisfaction. In thirty-five possible comparisons for women, there were only three marginally significant results; two in one direction, one in the other. That is, additional responsibilities were not consistently related to higher or lower satisfactions for women volunteers.

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