Service-learning in Dunn’s Woods

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Abstract
Students have been involved with service-learning and ecology experiments in Dunn’s Woods since the fall of 2009. Our goal has been to manage invasive plant species in the woods to allow recovery of native species and to reintroduce native plant species which are no longer found in the woods. Although we have made significant progress in removing invasive species and re-establishing native plants, there have been challenges with retaining volunteers and questions about the benefits for students of being involved in this service-learning activity. To improve volunteer retention and benefits to volunteers, I tried to start an “adopt-a-plant” program where students could choose a plant species to raise in the greenhouse and later plant the seedlings they raised into areas where they had also helped remove invasive species. The results would be assessed with surveys that would determine why students volunteered and what they learned from the experience. Unfortunately, challenges with the weather, seed germination, and communication between groups and volunteers became a more significant challenge than in previous semesters. As a result, the surveys and adopt-a-plant program could not be implemented effectively. However, the invasive species ecology experiments associated with this project have been successful and have created an opportunity for two undergraduate researchers to do work that resulted in a poster at the Indiana Academy of Sciences meeting.

Intro
Overview
The goal of this project is to assess and improve the service-learning experience for students involved with conservation related volunteer activities in Dunn’s Woods on the Indiana University campus. Experimental studies of invasive plant species in Dunn’s Woods and management of these species has been possible because of the contribution of service-learning courses, other student volunteers, undergraduate researchers and community members. Many students have assisted with invasive species removal and several courses have included this as a
required service learning activity. However, we do not know how much learning actually takes place or why students choose to continue volunteering.

*Dunn’s Woods*

Dunn’s Woods was part of the Dunn family farm before its acquisition by the University (Capshew pers. comm.). Parts of the woods were quarried for limestone and the area may have been used as pasture (Capshew, pers. comm.). After acquisition by Indiana University, archival photos suggest that the area was initially maintained in a park-like state. Various specimen trees were likely planted (Bracalente, pers. comm.), but eventually a hands-off approach was taken, leading to the natural appearance of Dunn’s Woods today. At some point, components of the native flora were re-introduced to Dunn’s Woods or recruited from the seed bank, so that many areas are currently dominated by native spring ephemerals such as Wild Ginger, Spring Beauty and Trout Lilies. Sugar Maple, White Oak, Beech and Tulip Tree dominate the canopy, while Sugar Maple is the dominant understory tree, much like most of Southern Indiana’s forests. Due to the history of human use, summer dominant wildflowers and grasses that are abundant in nearby wooded areas are absent from Dunn’s Woods. Further, like many natural areas, the diversity of Dunn’s Woods is being diminished by dominance of invasive species. Much of the understory is covered by Purple Wintercreeper, with many other invasive plant species also beginning to establish (Appendix A). Consequently, there is a need for the re-establishment of many native plant species and for the control of some of the problematic introduced species.

The location of Dunn’s Woods makes it an ideal location for students to learn forest ecology. The need for restoration work also creates a service learning opportunity where
students can get hands on experience with the problems of invasive species and take an active role in the protection and re-establishment of native biodiversity.

**Restoration and Volunteer Involvement**

Invasive species management began in the fall of 2009 in coordination with Volunteers in Sustainability. Purple Wintercreeper is the most problematic invasive plant in Dunn’s Woods, and initial volunteer efforts focused on hand-pulling small patches of wintercreeper that were spreading into areas not yet dominated by invasive species. At the same time, experimental study plots were established with the assistance of undergraduate researchers to determine the best way to remove wintercreeper and to understand how we could improve the recovery of native plant species. As the project has continued, students from Alpha Phi Omega have volunteered time and invasive species removal has been included as a service learning activity in the Environmental Biology and Living a Sustainable Life courses.

**Intervention**

**Challenges**

Typically, Volunteers in Sustainability and Alpha Phi Omega call-out meetings have resulted in excellent volunteer turnout. However, as work days continue, fewer and fewer students continue to attend workdays. By the end of the fall semester, a small group of dedicated volunteers are continuing to attend workdays, but we have to start over again once the weather improves again in the spring. Further, many of the volunteers from service-learning courses seem to enjoy the work, but few (if any) attend workdays after they have finished their course requirements. I hope to improve volunteer retention by understanding why people volunteer for restoration work and what they enjoy about it. Another challenge is understanding if students are actually learning from their involvement in this service-learning activity. I hope that including
more activities, beyond invasive species removal, will improve both volunteer retention and learning outcomes.

*Adopt-a-plant?*

During the Spring of 2011 I tried to start an “Adopt-a-plant” program in association with the Dunn’s Woods restoration project so that students would have the opportunity to be involved in more of the restoration activities. Removal of invasive species is still needed, but students could also volunteer to raise seedlings of a native plant species in the greenhouse and transplant them into areas where invasive species were removed. This will improve restoration efforts because many native species are slow to re-establish following invasive species removal and many native species are no longer present in the woods and require re-introduction. Adopting a plant will also allow a constructive complement to the invasive species removal efforts. Further, I hope that adopting a species will help students feel more ownership over the process of restoration and a deeper connection to the woods.

*Assessment*

The success of this program will be partially evaluated by volunteer retention rates. Student attitudes and knowledge about ecology and the environment and their motivation to volunteer and participate in other activities was also meant to be assessed with a survey (Appendix B). I had hoped to survey students when they began their involvement with the Dunn’s Woods project and again at the end of the semester to see how their knowledge and attitudes had changed and to see what motivated them to either continue or quit volunteering.

*Results*

Unfortunately, the program could not be implemented effectively. Poor weather conditions delayed field work and slow germination and growth of native plant species in the greenhouse also delayed greenhouse work. There were further challenges with scheduling and communication. Consequently, only volunteers from Alpha Phi Omega were able to attend greenhouse workdays. These students seemed to be mostly motivated by the need to fill their fraternity’s service requirement and did not follow up with planting or invasive species removal workdays in the woods. Frequent rain cancelations meant that not even a regular group of
volunteers to pull invasives could be established this spring. Further, response rates to surveys were very low, but I was not very persistent with these surveys since the many other challenges would have limited how informative the responses would have been.

Despite the challenges, we made significant progress in the woods. A few new areas were cleared of invasive species. We revisited several previously pulled areas to clean up resprouts of invasive species. Greenhouse volunteers prepared approximately 1,000 native plant seedlings. 600 of these have been planted into removal areas by volunteers, and the rest will grow in the greenhouses until they are big enough for transplant. I am still hopeful that even intermittent volunteering has benefits for the students involved in this project, but I was unable to assess this with the methods I had developed for this project.

**Future Directions**

Since communications were a major challenge this semester, better coordination and announcement of workdays will be emphasized in the fall semester. Hopefully, the weather will also allow more consistent workdays. In any case, future research on the outcomes of working in Dunn’s Woods may be more productive if conducted in coordination with a service learning course. This would allow pre and post tests of a more controlled group. Pairing this with surveys of long term volunteers may provide interesting insight into the motivations for volunteering and the benefits gained from involvement in restoration work.

**Other Activities**

In association with volunteer work days, long-term experimental study plots were established to determine the most effective way to control invasive plants and restore native species. Part of the motivation for the establishment of these plots was to create a resource for students interested in ecology research. This has been very successful so far. These plots were established with the assistance of two undergraduate researchers who helped prepare seedlings for transplant, remove invasive species and helped monitor the study plots. Following their involvement in the establishment of these plots, both students developed independent research projects using this study site. Both students helped monitor herbivory on the native plant seedlings planted into the study plots to determine how native herbivores interact with invasive plants and the consequences of these interactions for native plants. One student followed up on
this with a study of seed predation within invaded, not invaded, and invasive species removal areas. This work resulted in a poster at the 2011 Indiana Academy of Sciences meeting. Follow-up work will determine how differences in herbivory associated with invasive species effect native communities. Another student has also helped establish study plots and is studying the interaction of invasion and drought stress on the establishment of native plant seedlings. Work this summer will investigate this in both the Dunn’s Woods study plots and greenhouse experiments.
Appendix A: Map of Dunn’s Woods Invasive Species
Appendix B: Student Volunteer Survey

Major:

Why are you interested in volunteering in Dunn’s Woods?

Have you participated in Dunn’s Woods workdays before? 
If so, how many?

Which activity do you most look forward to this semester?
  o Raising seedlings in the greenhouse
  o Removing invasive plants from Dunn’s Woods
  o Transplanting native species
  o Other:

Agree --- Disagree

I feel comfortable in Dunn’s Woods
I believe that natural forested areas contribute to the beauty of IU’s campus.
IU’s campus provides good habitat for plants and wildlife
Non-native species are causing the declines of native plants and wildlife.

In what ways do you currently act responsibly about the environment?
  • Use alternative transportation when I can (bike, bus, walk)
  • Recycle
  • Make efforts to conserve energy
  • Political activism
  • Visit natural areas on campus or around Bloomington
  • Volunteer for conservation-related activities
  • Other:

Open ended questions

What are some common plants and wildlife that live in the natural areas on IU’s campus?

What is an invasive species?

Why do you think it is important to protect Dunn’s Woods or other campus woods?