The role of botanic gardens in academic and community-based restoration

Kern Ewing

University of Washington Botanic Gardens

Abstract

Ecological restoration that is performed, sponsored, or overseen by a botanic garden can have a number of positive effects for the garden, but the community that the garden serves is also benefited. And of course the ecosystem that has been damaged by human activity is improved. Two examples of restoration work sponsored by the University of Washington Botanic Gardens show how reaching out to the community can be effective and can show positive results.

Keywords

Capstone, community participation, curriculum, ecological restoration, public programmes, students, swamp, watersheds

Introduction

Ecological restoration is an activity that repairs damage, mostly human-inflicted, that decreases the viability of the earth as a living space. Botanic gardens are places where collection and research are done to enrich the human population and to educate them about how the biological world works. Restoration works well in the botanic garden setting because the involvement of gardens results in positive benefits for the garden, the community that uses the garden, and the environment.

Benefits to the garden

Engaging in restoration is a major benefit for botanic gardens for a number of reasons.

1) Participating in restoration requires the staff and administration of a garden to actually learn the skills required. Currently, gardens have abundant capability in the fields of horticulture, seed collection/processing, and propagation, but successful restoration requires a working knowledge of an ecological component that may not have been required by gardens in the past.

2) The next generation of restoration ecologists is trained, especially if the garden has an association with a university that has a restoration curriculum. As a consequence, better restoration is done, but another benefit to the garden is the increase in influence, as time goes by and careers blossom, of people trained by the garden (it is always good to have well-placed friends).

3) There are opportunities for public education. Restoration is a hands-on activity that provides opportunities for educating the public about food webs, plant-soil interactions, pollination, water relations, succession, ecological services and other important elements of the biology of natural systems.

4) Community support develops. People begin to see the importance of natural systems when they understand the relationship between the human environment and the natural environment. And, when they are involved in a restoration project, they feel a sense of ownership.

Benefits to people in the community

Members of the community often benefit from being involved in restoration. The degree to which they become invested in projects or in the ethos of restoration often surprises them.

1) There is often a feeling of reconnection to the land. Urban and suburban life often causes us to forget that we are an integral component of a living system (Jordan, 2003). Much of our cultural history is based upon this connection.

2) People in the community learn how to do restoration. Restoration is a skill and requires some knowledge of a real discipline. With this skill, the community can continue to do other restoration projects.

3) People engage in helpful and invigorating work with plants and nature. We go hiking, we go to the lake, and we play sports…why not engage in restoration? Restoration is active, strenuous, and engages all of the senses. It is a great way to keep mentally and physically healthy.

4) Community members improve their community. Not only do they improve the environment of their community, but they improve the structure of community interactions by doing useful, helpful work in a communal fashion.

Benefits to restored ecosystems

Natural systems, particularly in urban environments, have been destroyed, degraded, fragmented and isolated. These negative changes have occurred incrementally, and the restoration of ecological functions is likewise occurring in an incremental fashion.

1) Fragmented ecosystems are being reconnected. Urban creeks and riparian zones are especially appropriate for restoration supported by botanic gardens because they can be restored piecemeal, they constitute functioning corridors, and they are close by in urban neighbourhoods.

2) Invasive species are controlled. Invasive species removal is a good activity for community restoration because it requires little training, and stewards or community members find it easy to determine when additional work is needed.

3) Continued stewardship is much more likely in a community environment. Lack of follow-up is a major cause of restoration failure (National Research Council, 2001). When restoration is done in a neighbourhood, there are many eyes on a project. People comment and react when it appears that more work needs to be done or attention needs to be paid.

4) We are learning how to restore efficiently and effectively. The easier it is to restore, and the more effective that restoration efforts are, the more likely it is that restoration will be incorporated as public policy and damaged ecosystems will be repaired as a matter of course.

Case Studies

A good way to examine how botanic gardens, the actions of community volunteers, and environmental improvement are interrelated is by looking at the functioning of successful

programs. We offer two examples that demonstrate the integration of academics, botanic garden resources and community involvement in the successful implementation of restoration projects

I. Restoration in an academic setting

The University of Washington has a curriculum in restoration ecology, and has involved students in hands-on restoration courses since 1995. The curriculum features plant-based courses such as Plant Propagation, Nursery Management, and Landscape Plant Management. There are also ecosystem-based courses that include Restoration of North American Ecosystems, Wetland Ecology and Management, and Biology of Plant Invasions. Recently a Restoration Design course has been introduced; it requires the preparation of designs in a team environment. A Project Management course is in the planning stages to complement the design course and provide more tools for project implementation. Finally, there is a three-part Restoration Capstone; it is human-community based and emphasizes working with a client, engaging volunteers, interacting with local governments, contacting the business community, and generally encourages students to become comfortable with working with the community around them (Gold *et al*. 2006).

The capstone course is a critical part of community-based restoration education in our curriculum, and it has run successfully for eleven years, so its structure and timing will be described here. The course lasts an entire academic year (nine months), though much of the groundwork is laid during the summer months by instructors who interact with potential clients and evaluate potential sites. This means that planning for each project happens in the fall, plant installation happens in the winter, and the project is finished in the spring. This timing works well in the mild and wet climate of the Pacific Northwest part of the U.S.

Students join teams that usually have a total of five or six members. They are allowed to review potential projects and vote for those they would prefer and those that they would not want to participate in. Eventually teams are formed; they get a project and a client. Clients are expected to provide a site and a project. They also sign an agreement that commits them to review and comment on the work products of the class (proposal, work plan, as-built, stewardship plan). Clients must also provide a work-ready site, which means that any engineered modifications or earth moving must be done by the client. Clients are also encouraged to provide assistance in the form of plants, mulch, transportation, tools and other forms of assistance, if they can. Some course fees are available to buy plant materials if client resources need to be augmented; plant propagation and nursery courses may also be able to contribute plants.

Student teams are encouraged to engage the community and find community resources. They are expected to seek out and work with volunteer groups; for instance, local middle and high schools may have community service requirements so that their students are looking for projects. Teams are encouraged to apply for small local grants, and ask for donations of plants, food or equipment from local businesses. Team members are expected to speak to community meetings and to local government groups such as planning commissions or city councils. Teams may also create interpretive signs, environmental art, or wildlife structures on site.

At the end of each academic year, there is a poster session at which projects are presented to the public. Web documents that students have been producing all year are used to create good

graphics for posters. Present, former and prospective students and clients are invited, as are members of the media, faculty, school administrators, local politicians, neighbours and interested members of the public. The end-of-year poster sessions have turned into good networking events, and food and beverages are provided by students and faculty to encourage a good time.

The gains from the capstone class are many.
1) We restore community sites that need to be restored.
2) We produce confident graduates.
3) We have happy neighbours in the neighbourhoods where the work is done.
4) We have developed a good reputation for our program and the University.
5) We have developed many good contacts in local government and the environmental community.
6) We have actually encouraged many of our clients and some neighbourhood groups to become more environmentally active.

II. Community Partnerships: non-academic restoration (working with community groups)

Another way in which botanic gardens can work with the community to achieve restoration and to accomplish other goals is by working with engaged community groups. The University of Washington Botanic Garden (UWBG) manages a 76 acre natural area that showcases restoration (it is a retired landfill). Several times a year we conduct guided tours of the site, and talk about plants, animals, restoration and the history of the site. On one such walk, several neighbours became enthusiastic about a potential restoration project on the edge of the natural area, adjoining the residential neighbourhood where they live.
The project was an urban wetland that had developed on the site of a historic sawmill, any remnants of which had disappeared half a century ago. It was at the mouth of an urbanized creek (Yesler Creek), which had long ago been covered, filled and put into pipes. On the edge of Lake Washington, the site had developed on its own to become a true swamp, with standing water under a canopy of black cottonwood and willow trees. It was infested with the non-native *Rubus armeniacus* (Himalayan blackberry.)

The group and UWBG staff decided that building a trail was an important first step. The trail would allow access for restoration, would support the education mission of the University, and would attract neighbours to the site. Because of the fluctuation of the adjacent Lake Washington, a section of boardwalk would be necessary to complete a loop trail. A spur trail to a bird viewing platform was also proposed.

Although this project is less than a year old, several positive results have been produced. Three public events have been hosted (a winter walk, a children's "Swamp Mystery Tour", and a walk from the headwaters of the creek to the mouth). Neighbourhood councils have formally stated their support. Some money has been raised and grant proposals have been submitted. A trail has been cleared and surfaced with wood chips. Work parties are held on a monthly basis and the restoration of the site continues.

Conclusion

Ecological restoration is a new academic discipline and public pursuit arising from mankind's historic relationship with the land. This relationship has in the past been one of husbandry, of

taking care of the land you use. Botanic gardens can use the energy that restoration generates to increase their visibility and augment the role they have in solving natural world problems.

References

Gold, W., Ewing, K., Banks, J., Groom, M., Hinckley, T., Secord, D., and Shebitz, D. 2006. Collaborative ecological restoration. Science 312:1880-1881.

Jordan, William R. 2003. The Sunflower Forest: Ecological Restoration and the New Communion with Nature. University of California Press, Berkeley.

National Research Council 2001. Compensating for Wetland Losses under the Clean Water Act. National Academy Press, Washington, D.C.