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# Extension, Communities, and Schools: Results of a Collaborative Forestry Education Project in Philadelphia

**Shorna R. Broussard**
Assistant Professor
Department of Forestry and Natural Resources
Purdue University
West Lafayette, Indiana
Internet Address: srb@fnr.purdue.edu

**Stephen B. Jones**
Vice Chancellor, Extension and Engagement
North Carolina State University
Raleigh, North Carolina

## Introduction

Today 75% of Americans live in either urban or suburban environments, and less than 2% of US citizens live on farms (National Research Council 1996). Thus, Extension's mission of reaching the people with science-based education involves addressing the needs of this increasingly urbanized population. Reaching urban audiences, youth in particular, was the foundation of an environmental education program conducted by Penn State's Forestry Extension Program and other cooperators.

Extension's long history of forestry education (Barden, Jones, & Biles 1996) is what makes it an ideal vehicle to reach inner-city youth with forest stewardship education. While the tradition of Forestry Extension lies with private landowner education, we believe that urban youth forestry education is another area where Extension can have a significant impact. Because private landowners and the public possess similar attitudes about forest management (Bliss 1994), it makes sense that urban residents could benefit from similar education efforts normally targeted at landowners.

Penn State Forestry Extension has taken a first step in addressing the educational needs of inner-city youth through several new programs. We worked with Philadelphia community leaders, school district administrators, and area teachers to develop a comprehensive educational program aimed at helping urban youth

learn about forestry and forest management. We carried out three educational programs: Teaching Forest Stewardship to Urban Youth, the Police Athletic League-Penn State University Summer Natural Resources Program, and the Natural Resources Institute. Data sources include program evaluations and pre- and post-tests of attitudes and knowledge.

## Teaching Forest Stewardship to Urban Youth

Recognizing schools as opportune places for environmental education, Teaching Forest Stewardship to Urban youth was implemented in cooperation with the Philadelphia School District. This educational program aimed to foster a sense of forest stewardship with inner-city youth, helping them learn more about natural resources and their management.

Broussard, Jones, Nielsen, and Flanagan (2001) conducted an evaluation of the program with the goal of comparing educational gains and attitudinal changes after each of the three educational components to determine their effectiveness. The three educational components were:

- Forestry education in a classroom,
- Forestry education in a local urban setting, and
- Forestry education in a more rural setting at a demonstration forest.

Data expressing student attitudes and knowledge about forestry were obtained by administering a questionnaire to the students before and after the activities.

One hundred eighty-two students from three Philadelphia middle schools participated in the educational program. About 46% of the students were male, and 54% were female. The students were in grades 6, 7, and 8, with ages ranging from 9 to 14. About 84% of the students classified themselves as African-American, 4% as American Indian, 1% as Asian-American, 1% as Caucasian, and 0.5% as Latin-Hispanic.

The students were divided into three groups: experimental, control, and placebo. The control group did not participate in any of the educational programs and served as a reference point for the students that did participate in the educational programs. The placebo group received a college preparation presentation unrelated to the content of the study. The students in the experimental groups participated in all three educational components, the forestry activities in the classroom, urban environment, and demonstration forest.

Within those six groups, students were randomly chosen for testing after the first, second, or third educational component. Therefore, all students took one pre-test and one post-test. The three educational activities were cumulative, so all the students in the experimental groups participated in all three components.

### Forestry Education in a Classroom

The first education component was an indoor classroom session consisting of a slide presentation on Pennsylvania's forests, followed by a Project Learning Tree

activity. The slide show adapted for use in this study was created by Allison Harmon (1997) and used when she tested the educational effectiveness of demonstration forest tours with private landowners.

The slide presentation covered topics of forest history, forest ecology, silvicultural treatments, forest growth and development, and threats to forest sustainability. After the slide presentation the students were led through the Project Learning Tree activity titled "We All Need Trees" (American Forest Foundation 1995). The purpose of this activity was to help students discover the diversity and multitude of products that are derived from trees and their importance to society.

**Forestry Education in an Urban Setting**

The second education component was an outdoor urban forestry activity at Cobbs Creek in Philadelphia. Cobbs Creek is part of the 8700-acre Fairmount Park, which is the largest urban landscaped park in the United States. The Cobbs Creek activities included topics of tree measurement and ecology, and a reiteration of tree facts presented in the classroom. The students worked in pairs to measure tree diameter, height, and crown cover. Students also identified the trees that they measured.

Back in the classroom, the students recorded all the data and created a graph of the tree characteristics for the section of Cobbs Creek that was visited. These urban forestry exercises were aimed at helping students make the link to an important natural resource in their community while further illustrating the role that forests play in their everyday lives.

**Forestry Education in a Rural Demonstration Forest**

The third education component was a guided tour of Penn State's 12-acre French Creek Forest Stewardship Demonstration Area. Penn State, in partnership with state and federal forestry and natural resource agencies, established seven Forest Stewardship Demonstration Areas across Pennsylvania to encourage responsible forest resource management through education (Harmon, Jones, & Finley, 1997). The 12-acre demonstration area, which is about 1 hour from Philadelphia, comprises six silvicultural treatments: control, thinning from above (high-grade), thinning from below, shelterwood, improvement thinning, and a clear-cut.

Activities at French Creek centered on walking through the woods, examining and comparing the different silvicultural methods, and discussing how harvesting affects forest sustainability and how it is used as a management tool. We also covered forest facts and ecology. The purpose of the demonstration forest activity was to provide a comparison of some harvesting options and encourage dialogue about their positive and negative consequences.

**Knowledge Measures**

In terms of the two knowledge measures, the students who were part of the three-stage cumulative educational activities had more forestry knowledge than the

control and placebo groups (Table 1). Forest Practices knowledge scores ranged from 0 to 1, with one being higher knowledge. Forest Ecology knowledge scores ranged from 1 to 6, with a score of 6 representing higher knowledge. The educational activities together resulted in significant attitude change on all measures as well. After the educational program, students possessed more neutral attitudes about timber harvesting and strict forest preservation while understanding the use of harvesting as a beneficial management tool in forestry.

**Table 1.**
Changes in Forestry Knowledge for the Control and Placebo Groups and Students Who Participated in the Educational Programs

| **Knowledge and Attitude Measures** | **Mean Scores Control/Placebo** | **Mean Scores Treatment Groups** | **F Statistic** | **p-value** |
|---|---|---|---|---|
| Forest Practices and Management Knowledge | 0.43 | 1.12 | 41.23 | .000 |
| Forest Ecology and History Knowledge | 3.39 | 3.78 | 10.66 | .001 |
| Anti-Timber Harvesting | 3.86[1] | 3.48[3] | 11.33 | .001 |
| Utilitarian View of Forests | 2.37[4] | 2.74[1] | 7.30 | .008 |
| Forest Preservation, not Use | 3.39[3] | 3.04[3] | 11.03 | .001 |
| Timber Harvesting Beneficial Mgmt. Tool | 2.67[3]l | 3.33[1] | 17.61 | .000 |
| Timber Harvesting Permanently Destroys Forests | 2.94[1] | 2.39[4] | 13.49 | .000 |
| [1]Strongly Agree, [2]Agree, [3]Neutral, [4]Disagree, [5]Strongly Disagree | | | | |

As a result of participating in the educational activities, the youth learned more about forestry, shed their negative views about forestry, and adopted attitudes in favor of harvesting sustainably. Based on these findings, it can be concluded that classroom exercises, urban forestry activities, and demonstration forests are all valuable components of an educational program and contribute to participant knowledge gain and attitude change.

## Police Athletic League-Penn State University Summer Natural

## Resources Program

Penn State partnered with the Police Athletic League (PAL) of Philadelphia to conduct a 6-week program aimed at teaching inner-city youth about forestry and natural resources. PAL, a non-profit organization that oversees more than 300 PAL chapters across the nation, has nearly 1.5 million young people nationwide who participate every year. In Philadelphia PAL, youth centers provide more than 24,000 boys and girls, ages 6 to 18, with constructive, character-building activities, including athletics, educational programs, and civic/cultural activities to help them resist the temptations of juvenile delinquency and crime.

The PAL-PSU summer program was run through three of the West Philadelphia PAL centers. The goal of the program was to provide inner-city youth with natural resources education experiences. There were 42 students, ages 7 to 18, who participated in the PAL-PSU summer program.

The first week the students went to Cobbs Creek Community Environmental Education Center in Philadelphia. With its riparian areas, wildlife, and trees, the area was an excellent learning resource for the youth. While at Cobbs Creek the students learned about tree identification and looked at different ecological aspects of the park.

The next week students visited the Morris Arboretum in Philadelphia to learn about urban forestry and the many benefits of city trees. The youth examined how trees grow, regulate temperature, and provide oxygen.

The third week the students learned about trees and the wood products that they provide by doing an indoor Project Learning Tree activity called "We All Need Trees." The day ended with the students making their own paper. Because Cobbs Creek was in the process of laying out their trail, the next activity entailed data collection. The students surveyed the area and recorded data on trail width, areas of special interest, damaged areas, and wet areas.

The next week the students left the city to tour the French Creek Demonstration Forest in Reading. There, the students learned about forest management and timber harvesting and how they influence forest sustainability. Complex issues about forest management were explained and discussed in terms of component topics: consumers, forest products, wildlife, water, soil, and enjoyment of forest resources. This was one of the last trips, and it tied together all the concepts and topics that were introduced earlier.

The last week of the program the students visited Penn State's University Park campus for a day. The day began with a trip to Beaver Stadium, home of the Nittany Lions. Afterwards the focus shifted to college preparation talks covering areas like coursework preparation, SATs, financial aid, and careers. Many of the students were college-bound, so this information was very timely.

The afternoon was filled with trips to Penn State's agricultural and forest lands, where the students gained even more firsthand information on how we obtain food, wood products, and other benefits from the land. Before returning to

Philadelphia the students toured the Deer Research Facility to learn about some of Pennsylvania's wildlife.

PAL youth centers represent an excellent partner that can give Extension another window into the urban inner-city community. As a result of the PAL-PSU summer program, the students were able to voluntarily participate in a unique program that broadened their knowledge in a new subject area. In addition to the natural resources activities, they gained some insight into the college application and admission process.

## Natural Resources Institute

The Natural Resources Institute (NRI), a weeklong teacher training program, equips Philadelphia teachers with the skills necessary to incorporate natural resources into their curricula. The program was held approximately 4 driving hours from Philadelphia, at Penn State's Shavers Creek Environmental Center and at other forested areas near the University Park campus in Central Pennsylvania. Ten science teachers from Philadelphia elementary, middle, and high schools participated in the program.

The week of the Natural Resources Institute began with an orientation discussing the week's activities. In the spirit of working together, a team-building program was included early on. This day included individual and group challenges that emphasized communication, cooperation, leadership styles, diversity, improving one's self-concept, and understanding the role of the individual within the team. The day also included "Discovery Walks," during which the teachers explored how to utilize the outdoor environment for student learning experiences. The following day included more team building, a birds of prey presentation, and more classroom activities that the teachers could use.

Mid-week, the teachers went through a Project Learning Tree workshop in which presenters introduced them to the curriculum and went through several activities, as they would do with students. They also heard a presentation on wildlife from Penn State's wildlife biologist.

The last day included topics on urban forestry and tours of the Stone Valley Demonstration Forest and Rock Springs Forest Stewardship Demonstration Woodlot. This day the teachers learned about forest products, human consumption of natural resources, wildlife, and different ways that forests are managed. The teachers also explored issues of forest sustainability.

The program evaluations indicated that the teachers thought the program objectives were clearly stated; the content was relevant, timely, and appropriate; the instructional aids were supportive; and the overall program was excellent. The teachers referred to the NRI instructors as a "committed group of naturalists," and rated the instructors very high.

After attending the workshop, 80% of the teachers said they planned to incorporate natural resource activities and lessons into their classrooms within the next 6 months. The teachers ranked the team-building and hands-on

instruction among the most useful aspects of the program. Teachers also found interacting with other teachers in the District very useful. One teacher described how they would greatly benefit from "the connections we made with other teachers at other schools."

## Key Lessons

Through these three education programs, Penn State Forestry Extension was able to provide a number of Philadelphia youth with a quality natural resources educational experience. We identified several key lessons of program design from our experience with the Philadelphia educational programs.

First, educational program effectiveness is dependent upon incorporating both indoor and outdoor sessions. Outdoor experiential learning activities can be effective tools to work with urban youth environmental education (Bixler, Carlisle, Hammitt, & Floyd, 1994; Bennett & Padalino 1989; Bowman & Shepard 1985; Carlson & Baumgartner 1974). The indoor activities making paper and doing other Project Learning Tree exercises were effective in getting all the students acclimated to forestry and learning in a natural environment. These exercises also allowed time to address any fears or discomforts associated with learning in a forested environment.

Second, the teachers are an important link in youth education. Given the proper tools, teachers can incorporate natural resources into their classrooms providing additional benefits beyond the initial training. Some teachers indicated that lack of background knowledge was a barrier to incorporating environmental education into their curricula (Chamberlain, Forest, Gasdaska, & Weigmann, 1990). This is an area where Extension can lend expertise, becoming involved with local school districts and arranging classroom visits or field trips.

Last, tying into the urban community and environment are important aspects of inner-city youth education. By collaborating with PAL workers in established youth programs, we established a comfortable and familiar setting in which students could learn. Researchers have found that some students express fearful responses to learning in natural environments (Bixler et al., 1994; Metro, Dwyer, & Dreschler, 1981). Through this study's use of the urban environment, the children were able to make a connection with natural resources in their own communities. Translating the educational experience into something the children could relate to in their own neighborhood was key.

## Conclusion

Designing an educational program using indoor, urban, and forested environments is an effective way to help students gain more knowledge and shape their attitudes about forestry. Schools and community centers represent additional avenues to reach inner-city youth. When educators (both formal and non-formal) are empowered with information, skills, networks, and confidence, they can pass the benefits of a natural resources education on to their students.

This project shows how beneficial results can be gained through collaborative

programming and partnering. Our experience not only serves as an example for Extension educators interested in engaging urban youth but also provides insight into natural resources education.

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