



Environmental Literacy and Conservation Outcomes



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Improving environmental quality is viewed by many as the ultimate reason to better connect people and nature. Measuring conservation outcomes, however, can be a difficult endeavor due to complex indicators and long timeframes. Researchers approach this challenge from several different angles. One is to assess environmental attitudes and self-reported behaviors of program participants. Another is to consider whether a program includes a component that has participants take some kind of direct conservation action during the course of the program itself. The studies cited below reflect both approaches.

School

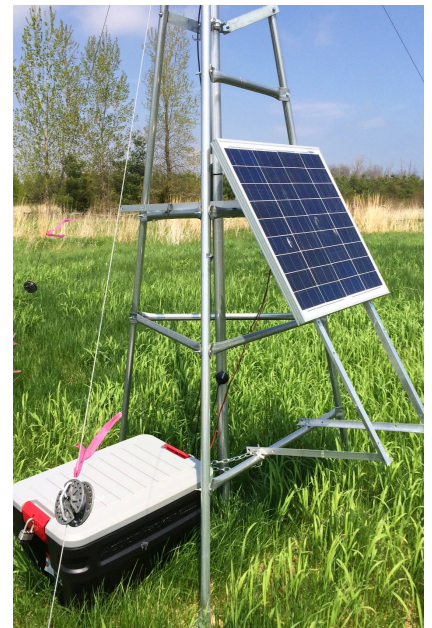
- Fifth and sixth graders in Hawaii participated in a yearlong school program focused on the local environment. Students investigated local issues, collected data, made recommendations based on their findings, and worked to implement their recommendations. Researchers found that participating students became more involved in their communities as they took actions such as **forming partnerships with community agencies, developing solutions to address real-world problems, participating in meetings with elected officials, publishing articles in local newspapers, and sharing information** and solutions with their peers, family, and community. Members of the community viewed the program as a problem-solving tool for the community. (Volk & Cheak, 2003)



participating students became more involved in their communities

- Elementary and secondary students in Thailand took part in a school program focused on local forests and their own communities. Students collected data from forests and from community members and then reported on their findings. Then, in collaboration with other community members, students developed, implemented, and monitored action plans to address specific forest issues. Researchers collected data that suggested that the collaboration created **a cycle of activities that helped local forests, soils, and water supplies**. One group of students, for example, worked to address harmful forest fires that had been instigated by local residents. Students and community members implemented an adult education campaign, monitored forests for fire activity, and put out undesirable forest fires. These efforts resulted in an end to excessive controlled burning in local forests. *(Gallagher, Wheeler, McDonough, & Namfa, 2000)*

- In Queensland, Australia, students participated in different models of multi-day, residential energy education programs. Activities included visiting coal mines and power plants, exploring renewable energy sources, conducting energy audits, and developing energy action plans for each student's school. Results varied for each model of the education program but, in general, researchers reported that **students developed energy efficiency behaviors** and several schools reported decreased energy consumption. *(Purnell, Sinclair, & Gralton, 2004)*



- Rhode Island high school students were enrolled in either an environmental science course or a chemistry course and participated in three activities: water quality testing of local well water; investigation of a stormwater run-off problem and development and implementation of a plan to address the issue; and a survey of invasive plants on a local land trust's property. Project results included using **student-collected data** to seek funding for improved septic systems and to inform a land management plan; installing plunge pools to decrease sedimentation in a local reservoir; and implementing strategies to remove invasive plants in a conservation area. *(Johnson, 2013)*

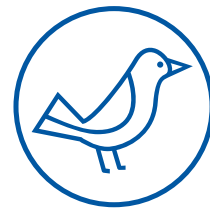
- After investigating local solid waste issues, middle school students in the Midwest instituted a school recycling program that was then adopted as a model for a community recycling program. During a 14-year period, **3,814 tons of trash have been recycled and recycling rates increased 260%**. *(Short, 2007)*

- Illinois high school students investigated a proposed incinerator that was going to be built in their local community and determined that the negative effects outweighed the benefits. They voiced their opposition to the plan and successfully defeated the proposal. Data indicated that their efforts prevented enough toxic emissions from being released into the local environment, which may have led to an estimated 44% increase in cancer rates. *(Short, 2007)*



**using student-
collected data
to impact
conservation**

- **A state legislator in Hawaii credits local fifth and sixth graders with the passage of a “bottle bill” law** that mandates a refundable deposit on beverage containers that can be recycled or reused. The students became involved when they began investigating solid waste issues in their community and worked to educate the public and local officials about the need for and adherence to a container deposit law. Over a two-year period, 42,277 tons of deposit containers were recycled and beverage container recycling rates increased 48%. *(Short, 2007)*
- In Maryland, high school students investigated their local watershed as part of an environmental science course. To address the decline of the area’s wood duck (*Aix sponsa*) population, students worked to build, place, and monitor artificial wood duck nests. Data suggested that these efforts helped **increase occupancy rates of the constructed wood duck nests by 23% over a 10-year time period** contributing to an additional 42 adult ducks in the area each year.
- For more than a decade, students at a Midwestern high school worked to restore a wetlands area adjacent to their school. Students collected baseline data, monitored environmental conditions, planned a riparian buffer, and conducted numerous plantings of native plants and trees. Their actions resulted in the **enhancement of existing wildlife habitat**, creation of an additional 5.4 acres of habitat, improved water quality, and significant increases in the number of species of trees, plants, and birds. *(Short, 2007)*



increased sense of
stewardship for their
local environment

- Researchers in Boston developed, implemented, and evaluated an urban ecology field-based study program to **engage traditionally underrepresented students in real-world science through professional development, curriculum, fieldwork, and an annual research conference** for students. The program featured yearlong research projects that assessed local ecological health. Survey and interview results indicated that participants significantly increased their sense of stewardship for their local environment and experienced a heightened sense of ownership for their local community. *(Barnett, Lord, & Strauss, 2006)*

Adult

- Two university campuses in Minnesota implemented hands-on sustainability projects involving collaborative efforts between students, staff, and facilities crews. The **projects linked academics with operations and resulted in concrete projects**: installation of a wind turbine; a university course focused on the design of an on-campus eco-house; the design and implementation of a green roof; and restoration of a wetlands area. University staff provided specific data for the wind turbine project, reporting that the use of the wind turbine in its first year resulted in preventing 9,531 tons of carbon dioxide, 23 tons of sulfur dioxide, and 21 tons of nitrous oxide being released into the air. (*Savanick, Strong, & Manning, 2008*)



- In Panama, researchers developed a program to help restore the harpy eagle (*Harpia harpyja*), which is threatened by human actions including habitat loss and direct killing. **Educational program components included teacher trainings, a media campaign, community meetings, and a scientific and traditional knowledge-exchange program**. Evaluation results demonstrated that that misinformation about harpy eagles significantly decreased after the educational intervention. Additionally, 40 harpy eagles have been released since the start of the program, and six of those have settled near human populations. There has only been one human-caused harpy death, and researchers reported that local residents now show obvious excitement when they see a harpy eagle. (*Curti & Valdez, 2009*)
- A university-sponsored education program for suburban homeowners was launched in Connecticut to improve stormwater quality. The program included **workshops, one-on-one consulting, site assessments, and structural modifications** such as the installation of rain barrels and redirection of downspouts. Data indicated improved quality of stormwater runoff (less nitrates and bacteria) and significant increase in the use of stormwater **best management practices**. (*Dietz, Clausen, & Filchak, 2004*)
- A review of 18 **marine wildlife experiences that included an interpretive, educational component revealed a range of conservation benefits**. On-site behavior changes included no longer touching wildlife and maintaining an appropriate distance from wildlife and digging sites. Visitors also reported new behaviors they had undertaken or planned to take once they returned home. Example behaviors included using energy-saving devices, talking to friends and family about environmental issues, donating money to environmental causes, and picking up litter. (*Zeppel, 2008*)
- Adults in New Mexico and Oregon who participated in a ten-week course on climate change and committed to 30 hours of **volunteer work to help reduce greenhouse gases**. Program staff reported that participants, on average, reduced greenhouse gas emissions by two tons; organized the purchase and installation of a solar energy system in a state capitol building; and developed a grocery store composting program that resulted in a five-ton decrease of waste going to landfills. (*Johnson, 2013*)