Engaging Youth in Watershed Science Through School-based Education Programs

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• The importance of environmental education (EE)
• The role of collaborative partnerships
• Common themes of EE programs in the NYC Watershed
• Overview of five EE programs in the NYC Watershed
  • CWC Public Education Grants Program
  • Watershed Forestry Bus Tour Program
  • Watershed Forestry Institute for Teachers
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  • Catskill Stream & Watershed Education Program
• Challenges & Success Stories
• Summary
Importance of Environmental Education

• The publication of *Last Child in the Woods* (Richard Louv, 2005) sparked a national dialogue about **Nature Deficit Disorder** – the growing trend that “our children are the first generation to be raised without meaningful contact with the natural world.”

  - Children who spend less time outdoors may have a greater risk of developing behavioral problems (anxiety or depression) and attention-deficit disorders.
  - Children who don’t experience nature won’t grow up to cherish, respect, appreciate or protect it.
  - Children need to be environmentally literate in order to become effective future decision-makers.

• EE programs offer supplemental grant funding, curricula, staff resources, and out-of-classroom field trip opportunities that enable students to experience real-world applications of science & technology.

• EE programs expose youth to a variety of environmental careers.
Urban/Rural Watershed Education Working Group:

• **Purpose:**
  • Meets regularly to develop/update program goals & strategies; review & select program participants; annually review/revise program guidelines; work with EE centers to train non-formal educators; provide inter-agency coordination & communication.

• **Members:**
  • Catskill Center for Conservation & Development
  • Catskill Watershed Corporation
  • Common Ground Educational Consulting
  • NYC Department of Environmental Protection
  • Watershed Agricultural Council
  • USDA Forest Service
Common EE Program Themes

• Get students outdoors: “Leave No Child Inside!”
• Establish upstate/downstate connections between urban & rural youth
• Professional development for teachers using science-based curricula
  • Cultivation of environmental literacy
• Hands-on demonstrations & learning activities for students
  • Stream monitoring / water quality testing
  • Interpretive nature hikes / native tree & plant ID
  • Studies of biological cycles & ecological processes
• Focus on instilling a “sense of place” and appreciation of nature
• Promote environmental stewardship ethic by engaging youth in service learning projects: tree planting, stream cleanup, invasive species removal, recycling, community gardens, peer teaching, etc.
CWC Public Education Grants Program

• Annual cycle of grants ($750 - $10,000) awarded to schools, non-profits, and other organizations in NYC or the West of Hudson Watershed to support projects and programs that raise awareness of the NYC Water Supply System and the partnership efforts to protect the watershed.

• Funded by DEP pursuant to the NYC Watershed Agreement (MOA), Filtration Avoidance Determination (FAD), and Water Supply Permit.

• Grants support original projects or “special option” proven programs:
  • Trout in the Classroom
  • Arm of the Sea Theater
  • Catskill Tales & Tunes
  • Streamwatch
  • Field Trips to EE Centers (Ashokan or Frost Valley)
  • Watershed teaching models

• 400+ grants awarded 1998-2012 totaling > $2 million
CWC Public Education Grants Program

• **All CWC Grant Awards:**
  - NYC Audience ~ 34%
  - WOH Audience ~ 53%
  - Mixed Audience ~ 13%

• **“Special Option” Grants: 178 total grant awards (2003-2012)**
  - 51 = Frost Valley YMCA Field Trip
  - 47 = Ashokan Center Field Trip
  - 37 = Trout in the Classroom
  - 25 = Arm of the Sea Theater (“City That Drinks the Mountain Sky”)
  - 13 = Streamwatch (also called CSWEP)
  - 5 = Catskill Tales & Tunes (available since 2007)
  - 1 = Watershed Teaching Models (available since 2011)
CWC Public Education Grants Program
Watershed Forestry Bus Tour Program

- Provides matching grants (up to $3,000) for NYC schools and other audiences to conduct a forestry-related bus tour to the NYC Watershed for the purpose of raising awareness about the NYC Water Supply and promoting the importance of healthy working forests.
- Funded by DEP and USFS through WAC Forestry Program; coordinated and implemented by Common Ground Educational Consulting.
- Two funding cycles per year; timing coincides with CWC Public Education Program so that grant funding can be maximized from both programs.
- **Approximately 20 bus tours conducted each year for ~2,000 participants**
  - Students can visit a watershed EE center where they conduct water testing activities and participate in forestry interpretive hikes.
  - Students get engaged in watershed tree plantings or stream cleanups.
  - Students participating in Trout in the Classroom can travel to the watershed to release baby trout they raised from eggs and studied all school year.
Watershed Forestry Institute for Teachers

• Week-long professional development workshop for NYC and watershed teachers (grades 4-12) who are trained in various EE curricula that focuses on watershed science and forest ecology.

• Funded by DEP and USFS through WAC Forestry Program; coordinated and implemented by Catskill Center for Conservation & Development.

• Usually conducted every summer in the Catskills or EOH Watershed.
  • 13 Institutes held during 1999-2011 for 230 total participants

• Includes field trips to a NYC reservoir, model forest, timber harvest site, wood products business, stream restoration site, and other locations.

• Examples of EE curricula/activities provided to teachers:
  • The Catskills: A Sense of Place
  • Project Learning Tree (PLT)
  • Project WET, Leafpack
Green Connections Program

• A school-based extension of the Watershed Forestry Institute for Teachers whereby alumni engage their students in **facilitated upstate/downstate partnerships**; exchange student communications; conduct common lessons (using EE curriculum provided by the Institute); and participate in urban/rural field trips to experience their counterpart’s “sense of place”.

• Funded by DEP and USFS through WAC Forestry Program; coordinated and implemented by Catskill Center for Conservation & Development.

• Each year, up to 6 classroom partnerships are formed between NYC and watershed schools, reaching 300-500 students annually.

• **More than 3,327 students have participated since 2001.**

  • Students use science-based learning activities to compare their urban and rural environments (water testing, tree ID, nature journals, etc.)
Green Connections Program
The **Catskill Stream & Watershed Education Program** (CSWEP) provides classroom and field instruction for West of Hudson watershed schools (grades 4-12) through a five-day lesson plan that covers the water cycle, watersheds, groundwater, stream management and stewardship.

- Funded by DEP and USFS through WAC Forestry Program; coordinated and implemented by Catskill Center for Conservation & Development in collaboration with DEP’s Stream Management Program.

- 30 classrooms participate annually (300-500 students per year).
  - **More than 3,000 students have participated since 2003.**

- Students are engaged in stream monitoring/management techniques during the field lessons; they also conduct data analyses.

- Funding for Streamwatch (a version of CSWEP) is also available to schools through the CWC Public Education Grants Program.
• Increasing demands placed on teachers to achieve student testing results and meet various federal, State and City educational standards.

• Securing support from school administrations whose decisions are affected by public health (disease outbreaks), public safety (field trip accidents), testing results, budget constraints, competing priorities.
  • Need to ensure that school administrators understand the value of multi-disciplinary yet non-traditional EE programs.

• Declining interest from watershed school teachers...WHY?
  • Need to recruit a new generation of teachers into watershed EE programs to continue the good work of their aging/retiring predecessors.

• Evaluating student knowledge and behavior changes; developing performance metrics for measuring longer-term success.
Success Stories: Trout in the Classroom (TIC)

- Science-based program supported by Trout Unlimited and NYCDEP.
- 14 CWC grants (totaling $128,600) awarded since 1998 to support annual teacher conferences, new curricula, and to expand overall program.
- Another 37 CWC grants awarded to schools since 2003 to support their enrollment in the TIC Program (equipment, supplies, technology, etc.).
- ~25 schools participating in TIC have received WAC bus tour grants to visit the watershed and release their trout during a full-day of EE activities.
- Many TIC teachers also participate in other watershed EE programs.
- ~200 teachers and ~1,800 students participate in TIC every year.
More Success Stories

• An AP Science Teacher at LaGuardia High School reports that after visiting Frost Valley in 2011 using a WAC bus tour grant, his student's test score increased 120%.

• A 6th grade science teacher from The Young Women’s Leadership School of Astoria wrote: “I participated in the forestry tour for teachers last summer. I would say that the program changed my past perspective. It has given me more insight [and] helped me change the way I teach. My students used to think they are not part of the watershed. One of my goals is for my students to realize they are an essential part of the watershed, and everything they do will have an impact on the environment.”

• In 2012, Patricia Lockhart, a science teacher at PS 57 in Staten Island who participates in every watershed EE program available to her, was one of 18 teachers nationwide to receive the Presidential Innovation Award for Environmental Education. In 2008, Pat also received the “New York Post” Liberty Medal for Education.

• At least 80% of WOH watershed school districts have participated in watershed EE programs and approximately 50% have integrated EE into their regular school-year lesson plans, with support from their administrations.
Summary

• **Total audience reached by watershed EE programs > 200,000 since 1997.**

• The long-term success of the NYC Watershed Protection Program will ultimately rely on the next generation of scientifically literate and well-informed decision-makers (watershed residents & water consumers).

• Currently conducting a comprehensive evaluation of all programs
  
  • Multiple program options offered by multiple entities require high level of coordination to maximize grant funding & minimize project overlap

• Continued importance of partnerships & collaboration...
Questions?

Thank You!

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