

US EPA ARCHIVE DOCUMENT

## DC Department of the Environment reduces pollutant loads to the Chesapeake Bay by installing conservation sites in 23 schoolyards

### Waterbody Improved

The program the District is highlighting in 2008 has improved all of the city's watersheds and has furthered environmental education and science learning in the District's public, private, and charter schools. The majority of District schools, like schools across the country, were built without regard to their impact on their surrounding environment. Because of this, school grounds tend to be characterized by compacted soils, stunted trees, large expanses of asphalt and grass and a lack of outdoor classroom areas. As a result, students are rarely exposed to the outdoor environment except for unstructured play time at recess.



Photo 1. Lowell School daylighted a creek that runs through the schoolyard.

From of this program, the District Department of the Environment (DDOE), in part through 319 Nonpoint Source and Chesapeake Bay grant funds, has installed 23 schoolyard conservation sites throughout the city and trained teachers at all grade levels to use these areas to teach to District science standards.

### Problem

By the time that a student reaches sixth grade, s/he has spent about 2,000 hours in schoolyards. This amounts to about 20 percent of the time that the student has spent at school (Edward Cheskey, "How Schoolyard Influence Behavior"). The problem in the District of Columbia is that the typical city schoolyard is highly impacted by man (asphalt & playgrounds) or highly managed by man (sports fields). These environments teach subtle, but powerful lessons to students that nature is to be managed and dominated.

Furthermore, District schoolyards in general lack quiet, sheltered areas used as outdoor classrooms and refection areas. Through this arrangement we are teaching our children that learning takes place only in the classroom and generally through passive lecture-style lessons rather than through interactive, investigative efforts. Finally, because of the highly-urban nature of Washington, D.C., District schoolchildren rarely are exposed to natural environments such as woodlands, successional fields, wetlands, streams, rivers, and estuaries.

While these areas are not used to enhance learning and bring students closer to nature, these areas have a negative impact on the water quality of District waterways. The vast majority of District schools were built before modern stormwater treatment regulations. Instead of detaining and treating their stormwater on site, most District schools send their untreated stormwater quickly offsite through direct drainage into the combined or storm sewer systems or through sheet flow offsite to nearby catch basins.

Finally, the current management of District school grounds is detrimental to native wildlife. Schoolyards tend to be uniform mown grasslands predominantly planted with non-native plants. This habitat favors generalists and further fragments the little remaining space available to natives in the city.

### Project Highlights

In 2002 the District Department of the Environment, Watershed Protection Division started its Schoolyard Conservation Site Program with the motto “Greener Schools, Cleaner Water.” In this first year, three elementary schools, all in the Anacostia Watershed, were involved in the program – River Terrace, P.R. Harris, and Ketchum. Nine teachers received training in environmental education curricula to be used in conjunction with the Schoolyard Conservation Sites and the sites received their first class of students from each school – 104 kids in total.



Photo 2. A constructed wetland at LaSalle Elementary.

The first three sites are indicative of the variety of Schoolyard Conservation Sites that have been funded through the 319 grant. These three schools installed two rain gardens to capture roof runoff, one rain garden to filter stormwater from a parking lot, a butterfly garden, a native plant garden, and several trees.

Since the first three sites were installed the Schoolyard Conservation Site Program has installed 5 sites per year, with the exception of 2005 when no sites were installed. Of the sites installed to date, ten have been in the combined sewer area and thirteen in the separated sewer system. The program has favored sites in the Anacostia watershed, as a part of the District’s focus on restoring the river. Of the sites installed to date, five of the sites are in the Potomac Watershed, five are located in the Rock Creek watershed, and thirteen found in the Anacostia.

To date, the program has involved almost 100 school staff who has not only helped design and install the Schoolyard Conservation sites, but they have learned how to use the sites as outdoor classrooms for their students. At this point thousands of students have been exposed to these sites and received classroom instruction there. These lessons have reinforced concepts being taught in the classroom, including District Public School science and environmental educational standards.

Although the District Government has not studied the impact of these sites on the students that are exposed to them, research has shown that outdoor learning improves behavior, attendance and



Photo 3. A native wildlife habitat in Whittier Elementary.

attitudes of students, compared to traditional curricula. A study conducted by a consortium of 16 State Departments of Education (SEER Roundtable, Environmental Concerns Fact Sheet) found that of schools with hands-on environmental curriculum:

- ❖ 100% had students with improved behavior, attendance, and attitudes relative to traditional schools
- ❖ 77% had improved standardized test scores
- ❖ 93% of the educators noted positive impact on the learning environment

Furthermore, most of the projects to date have focused on planting native plants, either in rain gardens, native plant gardens, wetland areas, or tree planting efforts. Of the twenty-three sites three involved planting vegetable, herb or sensory gardens while the remainder used predominantly native plants.

### Results

We have already discussed the non-stormwater related results of this project. In addition to the benefits we have already discussed, many of these sites had a stormwater treatment component. To date the projects have included:

- ❖ Thirteen rain gardens;
- ❖ An underground stormceptor system;
- ❖ The removal of around 20,000 square feet of impervious surface;
- ❖ Four wetland or pond areas created;
- ❖ One riparian buffer planting; and
- ❖ At least two acres of urban tree canopy where none existed previously.

Using Chesapeake Bay program model figures for estimating nutrient and sediment load reductions, we estimate that to date the schoolyard conservation site program has reduced pollutant loads by 35.6 pounds of nitrogen, 4.1 pounds of phosphorous, and 1.7 tons of sediment per year. These reductions amount to over 85 percent reductions in sediment loads, 60 percent reductions in phosphorous loads, and 70 percent nitrogen load reductions.



Photo 4. Rain garden in the background and an outdoor classroom in the foreground.

More difficult to calculate are the benefits to wildlife. Anecdotal evidence indicates, however that these projects have attracted more wildlife to the individual schoolyards and benefit the local ecosystem. Without a doubt the addition of native plant species, especially focused on the tree canopy and new landscape features like rain gardens and native plant gardens, has increased habitat and biodiversity on the individual schoolyards.

### Partners & Funding

The National Wildlife Federation, Discovery Creek, Project Learning Tree, the Potomac Conservancy, Environmental Concern, the USDA's Natural Resource Conservation Service, the Chesapeake Bay Foundation, and Government of the District of Columbia have all contributed to the success of the Schoolyard Conservation Site Program. Furthermore, this program could never have existed without the interest and aid of hundreds of schoolteachers, principals, community members and students that have spent time constructing and maintaining these sites and teaching and learning in them. Of the Section 319 funding that DDOE has received, \$238,000 was spent on designing and installing the Schoolyard Conservation Sites and \$50,000 was spent on training the educators to use the sites. An additional \$40,000 came from P2 money and \$52,000 from NOAA of which \$54,000 went to on the ground implementation and \$37,500 for training.

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