

**National Fish and Wildlife Foundation
Final Programmatic Report**

Project Name and Number: Watts Branch Watershed Restoration Project, Project Number
2007-0082-005

Recipient Organization/Agency: District Department of the Environment (DDOE)

Recipient Organization Web Address: <http://ddoe.dc.gov>

Date Submitted: August 15, 2011

1) Summary of Accomplishments

The Watts Branch Watershed Restoration project has successfully restored of 1.75 miles of an urban stream in the District of Columbia using natural channel design techniques that improve water quality conditions, enhance aquatic and terrestrial habitat, and stabilize eroding stream banks. The District Department of the Environment has also completed pre-monitoring of the stream to document habitat and water quality improvements. Post-monitoring will be completed by DDOE after the grant expires and DDOE will report the results to NFWF and other partners at that time. In order to reduce stormwater pollutants and volumes to Watts Branch DDOE and its partners performed intense community outreach which included planting a total of 601 upland trees on a mixture of small and large properties, installing two low-impact development (LID) facilities at a local school, marking every storm drain in the watershed (a total of 836 storm drains), and providing outreach materials to the majority of watershed residents through door hangers, public meetings, flyers, a web site, and community kiosks. Although several unexpected roadblocks kept the project from being completed in a timely fashion, we believe that the end result is a model for urban stream restoration for the Chesapeake Bay and the nation.

2) Project Activities & Results

Activities	Project Outputs	Post-project Outcomes	Indicator	Baseline Value	Predicted value at completion	Actual value at completion
Restore 1.75 miles of Watts Branch	1.75 miles of Watts Branch restored	Stream's attainment of the District's class B and class C designated use categories Impetus to restore parts of Watts in National Parkland	Number of miles restored	No stream miles have yet been restored	1.75 miles of restored stream	1.75 miles of restored stream
Plant 5 acres and restore 5 acres of riparian buffer	Up to 12,268 trees and shrubs planted in the riparian corridor	A healthy riparian buffer covering up to additional 18 acres	Number of trees planted Acres of new riparian buffer	Currently there are approximately 9 acres of riparian forest	12,268 trees and shrubs planted 5 acres of new riparian buffer planting	Approximately 6,000 trees and shrubs planted 2.5 acres of new riparian buffer planting
Monitor flow and nutrient and sediment loads in the stream for three years	Documentation of a reduction in peak flows and nutrient and sediment loads	Reexamination of Bay model nutrient loads Documentation of continued decline of peak flow and N, P and sediment loads	Annual documentation of flow and nutrient and sediment loads	Currently we have ambient loads but there are no monitored stormwater and annual nutrient and sediment loads for the watershed	Three years of documented decreases in peak flow and in pounds of nitrogen and phosphorous in watershed to an annual estimated reduction of 500 pounds of N, 85.5 pounds of P, and 40,000 pounds of sediment	Pre-implementation monitoring completed. Post monitoring and documented flow and pollutant reductions not complete. To be completed after grant is closed.

Activities	Project Outputs	Post-project Outcomes	Indicator	Baseline Value	Predicted value at completion	Actual value at completion
Plant 460 large-growing upland trees in the watershed	460 large growing upland trees planted	An additional 460 trees planted Trees growing to cover 13 acres	Number of trees planted	There are currently x acres of trees in the watershed (Unknown number of trees currently)	460 trees planted	601 trees planted
Establish one nursery for urban trees and plants in the watershed	One nursery for urban trees and plants created	Trees and shrubs from the nursery planted throughout the watershed	Number of nurseries created	There are no nurseries in the watershed	One nursery for urban trees and plants created	One nursery for urban trees and plants created
Train at least four at-risk young adults from the watershed in nursery management	Four young adults trained in nursery management	An additional 20 young adults trained	Number of young adults trained	There are no youth currently trained	Four young adults trained in nursery management	Thirty five young adults were trained in nursery management, tree planting and maintenance and utilized for tree planting, mulching and watering

Activities	Project Outputs	Post-project Outcomes	Indicator	Baseline Value	Predicted value at completion	Actual value at completion
Install up to 500 storm drain markers in the watershed	Up to 500 markers installed in the watershed	Watershed residents understand where their stormwater flows to and make appropriate behavioral changes	Number of storm drain markers installed	Currently there are less than 50 markers installed in the watershed	Up to 500 storm drains marked	All 836 storm drains in the watershed were marked.
Create 5,000 stream repair door hangers	5,000 stream door hangers	New stream guides created to continue outreach campaign to residents, businesses and students	Number of stream repair door hangers printed	There are no existing stream repair door hangers	5,000 stream repair door hangers	Approximately 4,800 door hangers and flyers delivered, 1378 letters mailed to residents
Educate approx. 5,000 watershed residents and businesses on the impact their actions have on water quality	An outreach campaign to Watts Branch residents and businesses to increase their understanding of how their actions impact water quality	Businesses and homeowners apply new NPS knowledge in their lives and pass their knowledge to others outside of study area	Number of residents receiving stream repair door hangers Number adopting BMP practices	No residents have received stream repair door hangers Few or no residents or businesses have adopted lot level BMPs	5,000 residents receive stream repair door hangers 50 residents and businesses install lot level BMPs	Over 5,000 residents provided stream repair information Over 50 properties installed trees and RiverSmart homes items.

Activities	Project Outputs	Post-project Outcomes	Indicator	Baseline Value	Predicted value at completion	Actual value at completion
Renovate and complete 1.5 miles of recreational trails in Watts Branch	1.5 miles of trail created or renovated	Watershed residents use the trail for commuting, relaxation, and recreation and become stewards for the stream	Number of miles of trail created and repaired	There is currently around one mile of trail which has gaps and is in disrepair	1.5 miles of trail created or renovated	1.5 miles of trail created or renovated
Remove 7/10 of an acre of impervious surface	7/10 of an acre of impervious surface removed	Additional impervious surfaces removed allowing more stormwater to filter	Acres of impervious surface removed	An unknown amount of impervious surface has been removed from the Watts Branch watershed	A net removal of 7/10 of an acre of impervious surface	A net removal of 7/10 of an acre of impervious surface
Installation of two LID infiltration projects	Two LID infiltration projects installed	Greater adoption of lot-level LID by residents and businesses to control stormwater	Number of LID projects installed Stormwater flow from LID sites Pounds N/P per acre from LID sites	Currently there are few or no LID sites installed in the watershed	Two LID projects installed Reduction in peak flows of stormwater from LID sites Reduction in N/P loads from LID sites	Two LID projects were installed using project funds. Almost a dozen additional LID were installed in the watershed using other funds. A reduction in peak flows and pollutant loads has not yet been documented.

Activities	Project Outputs	Post-project Outcomes	Indicator	Baseline Value	Predicted value at completion	Actual value at completion
<p>Inform and update the Bay Program and Local Governments on the project and its techniques and outcomes</p>	<p>Education of Bay Program officials and urban areas about the program and its results</p>	<p>Program expanded city wide and used as a model by other cities and counties in the Bay area.</p>	<p>Number of presentations about results of projects Amount of information on project methods produced and disseminated</p>	<p>No agencies and local governments have been informed about this project</p>	<p>Four presentations to local governments about program results Four publications produced by DDOE, USFWS and the NRCS on project including web pages, press releases, and external publications.</p>	<p>Three presentations performed: the Washington Metropolitan Council of Governments, the National Conference on Ecological Restoration, and the National Low Impact Development Symposium. Additional presentations and publications will follow the completion of post-construction monitoring.</p>

Activities and Results

Restore 1.75 miles of Watts Branch

NFWF's grant funds allowed the District to complete the restoration of 1.75 miles of Watts Branch, an urban stream in the District of Columbia. Although the project took longer than anticipated we were able to successfully complete this, the primary task of the grant, in its entirety. The stream restoration project was an intensive ten month restoration project which began in October 2010 with extensive invasive plant species control and treatment in order to slow/prevent the spread of invasives during project work. Following the invasive species control work the restoration contractor began the nine month process of stream channel restoration. The major components of in-channel work involved installation of rock vanes, cross vanes, and j-hooks to keep erosive forces off the stream banks while providing grade control and creating pools for habitat at the same time. Additionally the stream work involved grading back the stream banks and created bankfull benches where possible to dissipate the energy of bankfull events in the stream thus reducing bank erosion. All of the stream banks in the corridor have been stabilized by coir matting, native riparian seed mix, and thousands of trees and shrubs planting in the banks, on the bankfull benches, and in upland areas. The thousands of trees and shrubs planted will provide a dense riparian corridor that will help shade and cool stream temperatures, provide food and habitat for terrestrial life, and help stabilize the banks through an extensive root network.

The only discrepancy between the predicted outcome for this activity and the actual outcome was the amount of time that was required to complete the project. Once started, the construction has moved smoothly and on schedule, however there were many severe delays in getting the final project plans approved. The major delay was caused by the slow adoption of new floodplain boundaries, a process mandated by the Federal Emergency Management Agency (FEMA) but implemented by the District Government. The delay was one that could not have been predicted at the start of the project and was beyond the control of the project managers.

Plant 5 acres and restore 5 acres of riparian buffer

The riparian buffer along Watts Branch is approximately fifty percent in place at the time of the writing of this report. Instead of having five acres of riparian buffer and planting approximately 12,000 trees and shrubs, we have completed 2.5 acres and about 6,000 plants. A list of the species and number of plants is included as an attachment to this report.

Although the full amount of planting has not been completed at the writing of this report, it will be fully completed this fall. The reason for the discrepancy between the predicted project outcome and the outcome to date is that the planting is the last work done in a stream restoration project. Because heavy equipment grading the stream banks continued into August, the decision was made to postpone the rest of the planting until the fall when temperatures are lower and rainfall is more plentiful to increase the survival rate.

Monitor flow and nutrient and sediment loads in the stream for three years

An Isco monitoring station was installed at the downstream limit of the restoration project in Watts Branch to monitor flow and nutrient and sediment loads. A similar monitoring station was installed in Oxon Run, a stream with characteristics like those of Watts Branch, located

in a nearby watershed. The monitoring stations recorded data for twelve storm events and two non-storm events between August 2008 and May 2009. Due to difficulties with the monitoring equipment, the first two events at Watts Branch and the first three events at Oxon Run were inaccurately recorded. The data from the successful events will be used for comparison with post-restoration data to be collected at both locations. In total, two years of data will be collected, which are expected to show reductions in peak flow and levels of nitrogen (N), phosphorus (P), and total suspended solids (TSS) in Watts Branch. It is expected that Oxon Run, the control stream, will not display reductions in peak flow or N, P and TSS. Plots of the data collected for both Watts Branch and Oxon Run are included with the enclosed CD in the folder labeled “monitoring.”

USGS stream gage 01651800 is located at the downstream limit of the Watts Branch restoration project, and its data were used to spot check the Isco data for accuracy in measuring stream flow. The pattern of stream flow data collected from the Isco sampler closely resembled that of the USGS gage, however the amount of flow in some cases was much lower. This is most likely due to the location and depth of the Isco probe relative to that of the USGS gage.

Although the Isco sampler recorded rainfall data for each of the storm events, analysis showed that the data was not accurate, most likely due to limited placement locations for the rain gage. Rainfall data were therefore obtained from NOAA’s National Climate Data Center for the Regan National Airport, U.S. National Arboretum, and Oxon Hill weather stations. The Arboretum’s station is in proximity to the Watts Branch monitoring station, and the Oxon Hill station is in proximity to the Oxon Run monitoring station. However, data from these stations are recorded daily, whereas the station at Regan National Airport records data hourly. This data will therefore be used for the detailed analysis of pre- and post-restoration monitoring.

In order to use the data from the Oxon Run monitoring station as a control for comparative analysis, the land use, soil types, and other characteristics of the Oxon Run watershed must be similar to those of Watts Branch. One challenge to this analysis is the inter-jurisdictional nature of the watersheds: both of them span the border between the District and Prince George’s County, Maryland. Most information for the both portions of Watts Branch has been obtained, while additional land use and sewershed data still needs to be gathered for the Maryland portion of Oxon Run. A summary of the Watts Branch watershed and land use data is included with the enclosed CD in the folder labeled “monitoring.”

Plant 460 large-growing upland trees in the watershed

DDOE through a sub-grant to Washington Parks and People (WPP) planted 601 large growing upland trees in the Watts Branch watershed – meeting and exceeding the number projected as our outcome. We were able to do this because we secured additional funding through the city to supplement the WPP sub-grant.

These trees were planted on a mixture of public and private lands and large and small parcels. Areas where trees were planted include churches, schools, parkland, houses, apartment complexes, roadway right of way and a funeral home. The planted trees were all

native species including tulip poplar, red maple, willow oak, sweet gum, hickory, beech, sycamore and river birch.

Originally WPP had anticipated planting the majority of trees on residential parcels in an effort to educate the public about the stream restoration project and connect upland activities to the health of the stream. To that end WPP distributed 2,500 flyers to residents throughout the watershed, however only 36 homeowners elected to take part in the program. The majority of trees were planted at schools, churches, and large housing complexes.

A second unexpected issue was that in some locations vandalism, poor landscape maintenance, and lack of watering necessitated that some trees be replaced and that WPP staff take over the watering efforts. This was especially true on DC Housing Authority lands. A lesson learned was that it is important to have the buy-in of maintenance crews in design and planting – not just building administrators.

Establish one nursery for urban trees and plants in the watershed

Washington Parks and People successfully established an urban nursery in the Watts Branch watershed. The nursery was originally a temporary facility at the WPP Lederer Center but now WPP has secured a more permanent facility to house the nursery. Currently the nursery houses stock grown in other facilities, but eventually the facility will grow and maintain its own plant stock on site.

Train at least four at-risk young adults from the watershed in nursery management

Through the NFWF grant funds 35 youth between 18 and 25 years of age were trained in tree planting and maintenance using US Forest Service standards. Additionally over 3,000 volunteers assisted in maintaining planted trees. The youth were trained in:

- The value of trees to ecosystems and humans;
- Tree identification;
- Tree planting care and maintenance;
- Planting design;
- Safety; and
- Watershed and habitat restoration.

Aid from the District's Urban Forestry Administration (UFA) and DDOE staff helped refine both the training of the youth and their planting techniques. The trees planted in the first planting season were inspected with the UFA and DDOE staff and the trainees. Based on the inspection, planting techniques were refined and improved.

Install up to 500 storm drain markers in the watershed

DDOE greatly exceeded their goal by installing 836 storm drains in the watershed. Through the efforts of this grant we were able to make Watts Branch the first watershed in the District with every storm drain marked letting people know what watershed they are in and that they should not dump trash or other materials down the drains.

We had initially planned on doing the all of this work through volunteer effort, however in the end about sixty percent of the watershed was marked using volunteer effort. The

volunteers included students from the District's Green Summer program, World Bank employees, and Americorps volunteers.

Create 5,000 stream repair door hangers

DDOE and WPP created two different forms of outreach to property owners in the watershed. DDOE created door hangers that were distributed to homeowners as storm drains were marked. These door hangers provided advice to homeowners on what they can do on their property to reduce stormwater pollution. WPP created similar outreach materials for their tree planting effort. Their materials were specifically related to the benefits of tree planting and linking this work to the stream restoration project in Watts Branch.

Through both of these efforts over 5,000 pieces of outreach material were created.

DDOE and WPP could potentially have done a better job in coordinating their production of outreach materials. This could have saved money and lead to better messaging about the project.

DDOE provided additional messaging to residents about the project through mailings to homes throughout the watershed about changes to the floodplain mapping that took place while the project was being designed and permitted. We took the opportunity to include information about the stream restoration project in these materials.

Educate approx. 5,000 watershed residents and businesses on the impact their actions have on water quality

In performing storm drain marking DDOE hung the doorhangers it created on residences around the areas being marked. The storm drain marking occurred throughout the watershed and reached different areas over the full time period of the grant. Washington Parks and People performed similar outreach to property owners throughout the watershed in an effort to recruit property owners to plant trees. Their outreach was focused in the second year of the grant, however it continued through year three to a lesser extent. Through these two efforts over 5,000 residents were reached.

Furthermore DDOE held public meetings and spoke to the public at both Advisory Neighborhood Commission and Civic Association meetings. Through these meetings DDOE reached several hundred residents with messages about the restoration work. DDOE also held a groundbreaking that was attended by approximately 100 people.

Other methods of outreach included a web log (<http://wattsbranchdc.blogspot.com/WPP>), signage installed at several kiosks along the bike trail adjacent to the stream, and mailings sent out to homeowners adjacent to the stream. Furthermore, the restoration project and the revitalization of Marvin Gaye Park have been covered in newspaper articles and on local television.

Although the project used many methods to educate the public, very few seem to have been effective. An example of this is the outreach done by WPP for its tree planting campaign. They went door to door delivering flyers to 2,500 people about an opportunity to have free

trees planted on their property and only 36 residents responded to this outreach. Perhaps the most effective type of outreach effort was speaking at public meetings, however only a few dozen citizens attend these meetings so it is a time intensive method per resident reached.

Renovate and complete 1.5 miles of recreational trails in Watts Branch

Because of the delays in performing the stream restoration work, even before stream restoration began the Department of Transportation and the Department of Parks and Recreation had completed the design, renovation, and installation of a recreational trail along Watts Branch. The trail is a hiker-biker trail and includes several crossings of Watts Branch, a fitness trail, playground areas, and landscaped sitting areas.

The recreational trail has dramatically increased the number of people using the park and the amount of time spent in the park. This has had a positive impact on increasing citizen interest in restoring the stream and in the stream restoration project. It is not yet clear the impact additional traffic will have on the health of the stream in terms of water quality since the project has not yet been completed. Our hope is that the greater number of visitors will increase stewardship which will help keep the stream clean by removing trash and reporting any unusual water quality events.

Remove 7/10 of an acre of impervious surface

The 7/10 of an acre of impervious surface was removed as a part of the trail revitalization project. The reduction of impervious surface comes primarily from removing an unused large concrete pad that was originally installed as a gathering area/band pavilion. Additional imperviousness was removed by reducing the sinuosity of the bike path in locations.

There is currently a tradeoff between the size of trails and the amount of imperviousness they create. In this case the trail is wider to accommodate bicycles and pedestrians leading to larger amounts of impervious surface. Narrow paths are generally considered poor sites for permeable pavement because they can more easily become clogged than a wider surface. As permeable pavement technology improves, paths such as this may become porous surfaces removing some of the downside of wider paths.

Installation of two LID infiltration projects

Through the restoration work in and around Watts Branch, six LID facilities have been installed to date. These projects include two LID installed at the Integrated Design Electronics Academy Public Charter School (IDEA School). The IDEA school LID were not DDOE's first choice for LID projects, but in the end they turned out to be a very good fit.

The IDEA School's mission includes preparing students for careers in engineering and technical backgrounds and the school was undergoing a large-scale renovation where they wanted to include environmentally sensitive practices for educational and demonstration purposes and to reduce their environmental impact. The IDEA school has installed Rain Tanks and will complete the installation of a bioretention cell in September. Rain Tanks are a proprietary storm water system that provides underground storage and infiltration of storm water. The rain tank installed at IDEA School will capture stormwater from a 1.2" rain event (90 percent of rain events in the District are less than 1.2") that can be recycled for irrigation

or, if it is not needed at the time, the collected water can infiltrate into the ground. The bioretention cell is awaiting cooler, wetter months for installation to ensure the success of planting. The total stormwater retained by these two LID in a 1.2” storm event is 6,375 cubic feet of water or 47,688 gallons.

Other LID installed by grant partners, but not funded through this grant include three bioretention cells in Marvin Gaye Park between Minnesota and Nannie Helen Burroughs Avenues, NE. These LID were installed by the Deputy Mayor for Planning and Economic Development as a part of upgrades to the park. They take stormwater from adjacent roadways and filter and infiltrate it – facilitating groundwater recharge and ensuring that the water reaching Watts Branch from these roadways is clean. Another benefit of these bioretention cells is that they are highly visible. They are a focal point - located along two major roadways and are at a major entryway in to Marvin Gaye Park.

Perhaps the most interesting LID is a bioretention cell installed as a part of “Planters Grove,” a peanut-shaped grove within Marvin Gaye Park along the bike trail. This grove came to fruition through a partnership between Planters, the peanut company, and the District. The site is one of four park areas being installed around the country by Planters.

Other LID projects in the watershed outside of this grant include the complete reconstruction of Nannie Helen Burroughs Avenue by the District Department of Transportation (DDOT) and the completion of the projected LEED Gold H.D. Woodson high school. The Nannie Helen Burroughs Avenue project is a Green Highways project that will include demonstrations of roadway LID including porous concrete, six bioretention cells, and additional street tree canopy. H.D. Woodson includes stimulus funded greening such as a vegetated roof and cisterns which capture rainwater to be reused in toilet flushing.

Despite the number of LID now installed in the Watts Branch Watershed, getting LID installed for the grant was a difficult process. Initially we had intended to develop an MOU with the Department of Transportation to install LID on roads adjacent to the park. This fell through when it became evident that DDOT would not be able to complete the projects in the timeframe necessitated by the grant.

At this time we found the IDEA School project and were able to award a sub-grant to them to install the two LID, however these LID too were almost derailed by concerns within DDOE about a geo-thermal heat pump being installed at the school as a part of their reconstruction. The review of the heat pump designs delayed the school construction which also impacted the installation of the LID (generally among the last work done on a construction project).

Inform and update the Bay Program and Local Governments on the project and its techniques and outcomes

Our projected output for this grant was four presentations to local governments about program results and four publications produced by DDOE, USFWS and the NRCS on project including web pages, press releases, and external publications. We will have performed three presentations by the end of the grant period: one to the Washington Metropolitan Council of Governments, one at the National Society for Ecological Restoration meeting in

Baltimore, MD, and one at the National Low Impact Development Symposium in Philadelphia, PA (accepted and to be held in September 2011). To date we have created press releases and assembled web pages on the project, but we have not yet created any full length publications on the stream restoration project.

The presentations we have done to date have been well received. This project is one of the largest ultra-urban stream restoration projects that we are aware of and urban jurisdictions both locally and throughout the Chesapeake Bay and nation have been interested in learning about the techniques used, the challenges faced and overcome, and the outcomes to date.

The reason that we have not achieved our projected outcomes for this is because we have not completed post-monitoring of the restoration project. As such we cannot compare our pre-restoration monitoring data with the load reductions we see now that the stream restoration work is complete.

As a part of a grant amendment with NFWF, DDOE promised to complete the post-construction monitoring and report on our findings. We anticipate achieving and surpassing our committed goals for presentations and publications once the monitoring and analysis work is complete. We expect this to be complete in towards the end of calendar year 2012.

3) Lessons Learned

In putting together the grant proposal for this project, we believed one of the items that would make this project unique and a great example of urban stream restoration was the multi-agency coordination involved in the effort. Although inter-agency cooperation and coordination was a hallmark of the project, it was not to the extent we originally predicted. Initially we believed that “the partnership aspect of this grant will create an economy of scale, reducing the cost of any individual component of the grant alone by performing them concurrently.” However, we found that coordinating project timelines was extremely difficult. Although high cost savings did not emerge from coordination, there were some savings. In some cases DDOE contractors performed work that would normally be performed by DC Water contractors. In other cases, project work such as the removal of sewer crossings were delayed until the stream restoration work was done in the project area. These types of coordination undoubtedly reduced mobilization costs.

However, even if great cost savings were not achieved by coordination, the partnership aspect of this effort did greatly improve the project outcomes. The groundwork laid by the partnership before the grant and the coordination during the design and construction led to additional projects being identified and more restoration work occurring. In the discussion of LID projects installed through the grant funds above, we identify the great number of additional LID installed primarily because of the coordination and momentum of this effort. Other restoration work along Watts Branch outside of the project area include the installation of a trash trap at the mouth of Watts Branch and a series of bioretention cells along Jay Street NE – just adjacent to the stream.

One of the unanticipated outcomes is that large projects such as this one build momentum for restoration beyond the scope of the project. Other examples (beyond those details above) of

projects and out of the box thinking that have taken place due to the momentum from this grant include:

- DC Water purchasing a property along Watts Branch so that it can abandon a sewer pipe that was exposed;
- The development of concept designs for a “green” street along Dix Street NE – a roadway that runs adjacent and parallel to the stream; and
- The construction of two zero stormwater and carbon footprint homes for low income homeowners built by Habitat for Humanity for the solar decathlon.

Another unexpected lesson was the advantage of constructing the project during an economic downturn. Although the effects of the recession are still deeply felt in the District and even more in the neighborhoods around Watts Branch, the downturn did mean that our costs estimates, developed during a more robust economic period, were higher than the winning bid put forward. These cost savings are going to be reinvested in adding additional plantings to the stream corridor and helping to fund on-site changes in grading to add more bankfull benching as well as funding several LID projects in the watershed to further protect the stream restoration investment. Although in this case the timing was coincidental, having plans prepared and ready to go during an economic downturn can save a jurisdiction money and put people to work.

Perhaps the easiest lesson to articulate, but the hardest to learn, is to expect the unexpected and budget additional time for them. This project experienced several long delays due to unanticipated issues. At the start of this project, no one was even thinking about the redrawing of floodplain maps, much less that their issuance would impact the project and put it on hold for an extended period. Furthermore we could not have seen that our LID projects would be held up by questions about geo-thermal wells on the school grounds. Although everything worked out in the end, budgeting additional time would have saved everyone a great deal of consternation.

We have also found, not surprisingly, that stream restoration monitoring is difficult, expensive, and time consuming. Due to the high costs of contracting the work, the monitoring work was done in-house at DDOE. DDOE approached USGS as well as universities to see if they could assist with this element. Unfortunately the costs proposed by these entities would have taken up nearly half of the grant funds. Doing the work in-house stretched already overworked staff and caused staff to work many evenings and weekends (storms seem to generally occur outside of business hours). Because of the difficulty in controlling all the monitoring variables, we do not yet have a good understanding of how useful our data will be. For example our control watershed is a few miles from the restored watershed. Will differences in storm intensities between the two sites make them difficult to compare?

We do not yet have a complete understanding of the effectiveness or cost effectiveness of the restoration project. The reason for this being incomplete is the lack of post-monitoring data to compare with our pre-construction monitoring. That being said, anecdotally we believe that, from our visual inspections, the restoration work has greatly improved aquatic habitat, removed blockages to fish passage, reduced sewer line leaks, lead to reductions in nutrient and sediment loads, and increase the number of visitors to the park. Through our post-monitoring and future monitoring efforts we hope to delist Watts Branch for several of its TMDLs due to its project and

associated spin-off projects. As we collect and analyze this data we will present the results to NFWF, to local governments, to practitioners, and to the Bay Program.

4) Dissemination

As noted in our final project activity above, we have not yet completed the monitoring and analysis work so we cannot fully address our dissemination efforts and what we have learned from them.

We have, however, reached a few early conclusions regarding both the necessity and effectiveness of dissemination methods through this project. Unfortunately our conclusions are somewhat contradictory and do not lead to a clear course of action regarding outreach on projects.

One conclusion we have drawn is that direct outreach such as going door to door with flyers is ineffective. Our conclusion is consistent with marketing research that shows that very few people read this type of material. On the other hand we have found that disseminating flyers is important and necessary. Even if property owners do not read them, as a government agency it is important to show that you have made an attempt to reach homeowners about projects like this. Additionally, passing out flyers with project specific contact information allows those residents who are interested in the project or have concerns to speak with someone directly about the restoration work.

A similar statement can be made about project web pages. We have found that these pages get very little traffic. Additionally those going to the site tend to already be familiar with the project to some extent so they are not reaching very many new people. On the other hand, web pages are an important tool to show that the project leaders are doing their due diligence to attempt to inform the public.

Almost the opposite can be said of public meetings and conference presentations. We have found that this type of outreach can be very effective. Having even five minutes to provide information to a civic association or a group of scientists definitely gets the message out to an audience and one that generally wants to be “in the know.” However these groups tend to be small and not a representative cross section of people we would like to reach. So although this type of work is time consuming for the number of people reached, it is an important type of outreach.

The bottom line seems to be that various messaging techniques need to be used, regardless of their effectiveness. Showing that the project has put forth the effort to reach all affected parties is as important as actually reaching the sometimes small audience that is truly interested.

5) Project Documents

Attached Project Documents:

- a) Representative photos – see folder labeled “photos” on enclosed CD
- b) Documentation of match – see folder labeled “match” on enclosed CD

- c) Links to websites, media coverage and videos of the project – see folder labeled media coverage on enclosed CD and <http://www.youtube.com/watch?v=NmgImAaMJ0M>
- d) Project press releases and presentations – see folder labeled “press releases and presentations” on enclosed CD
- e) Activity documentation – see enclosed CD with documentation for the following projects
 - a. Additional Projects
 - b. DC Water
 - c. DPR
 - d. LID projects
 - e. Monitoring
 - f. Storm drain marking
 - g. Stream Restoration
 - h. Tree planting

POSTING OF FINAL REPORT: *This report and attached project documents may be shared by the Foundation and any Funding Source for the Project via their respective websites. In the event that the Recipient intends to claim that its final report or project documents contains material that does not have to be posted on such websites because it is protected from disclosure by statutory or regulatory provisions, the Recipient shall clearly mark all such potentially protected materials as “PROTECTED” and provide an explanation and complete citation to the statutory or regulatory source for such protection.*