University of Delaware
Annual Stormwater NPDES Report
2005

During the third year in operation, January 2005 - December 2005, the University of Delaware Stormwater Management program experienced many successful accomplishments. In an interjurisdictional agreement with the City of Newark, the University continues to strive to develop strategies and programs to ensure compliance with the EPA outlined areas of the NPDES requirements. This report outlines the progress and suitability of the UD stormwater program.

In accordance with MS4 NPDES permit # DE 0051152, the University accomplishments are outlined below. Supporting documents for each item is kept on file.

Public Education and Outreach Activities:

1. On January 7th, 2005 William Woessner presented a seminar on groundwater and flood plain systems at Perkins Student Center. This seminar was co-sponsored by the Delaware Geologic Survey, the College of Marine Studies and the Department of Geology at the University of Delaware.

2. John Talley, the Director of Delaware Geologic Survey at the University presented a lecture at the Lewes campus March 11th, 2005 on what can be done to ensure adequate supplies of quality water are maintained to meet our growing demands. The lecture was called "Water Resources in Southern Delaware-Will We Have Enough?" and was a part of a month long land and sea lecture series presented by UD faculty at our Lewes campus's Virden Center and at the Milford Public Library.

3. The University hosted a conference at Clayton Hall on April 14th called "Water and Our Changing Landscape-Perspectives from the Wild and Scenic White Clay Creek Watershed." This conference was co-sponsored by the University Water Resources Department as well as the City of Newark and highlighted how landscaping choices can impact water quality.

4. The Department of Occupational Health and Safety (DOHS) actively participated in the University's 2005 Ag. Day activities, which is an annual event held at the University celebrating agriculture and natural resources and features educational activities and entertainment. DOHS's stormwater booth included a display table housing literature, children's activities books, games and stickers, and a bean bag toss for the children. The board for the bean bag toss consisted of different options available for individuals to properly manage their waste/trash. The children were given bean bags labeled "trash" and "oil" and asked to make a decision and toss the bag through the hole on the board depicting the correct management practice. The children really loved it and the game won Third place for "hands on" educational activity in the exhibitor competition. The weather was rainy so the event was held indoors, which may have kept the total number of participants lower than in the year previous.

5. The University hosted a State water policy forum "Water Friendly Landscape Design: A Prescription for Healthy Watersheds." at Clayton Hall October 21st, 2005. The forum was open to public participation and was sponsored by the University Water Resource Agency, Delaware Water Resources Center, Longwood Graduate Program in Public Horticulture and Delaware Department of Natural Resources and Environmental Control.

6. Representatives from DOHS participated in two Business Industry Education Alliance (BEI) programs, which were coordinated through the Delaware Center for Teacher Education's Office For School to Work. We conducted a stormwater presentation at two different area schools using the enviroscape (a tabletop model of a watershed) to aid in the children's understanding of

pollution and its migration to our waterways through stormwater. The schools that we attended included Stanton Middle School and Baltz Elementary, both in November 2005.

7. Webpage updating and maintenance: The University Stormwater Management policy was signed by the President of the University and is now listed in our official policies and linked to our stormwater web page. Additional webpage updates include:
    - A link to the United State Geologic Survey (USGS) educational page for outreach information that could be used by teachers and other interested parties.
    - A link to UD Water Resources page for additional information as well as educational opportunities available on campus.
    - Included monthly stormwater quality training opportunities to the DOHS annual safety/educational trainings sessions offered to the University community and linked the schedule to our stormwater page.

8. Participated in the Newark 4H camps held on the UD campus eight consecutive days from 6/20/05 - 6/30/05 and presented stormwater quality program using the envirscape (a tabletop model of a watershed) on loan from the City of Newark. We trained approximately 104 children ranging in age from 5 years to 13 years old. We conducted an additional training session 8/3/05 during a 4H camp using the enviroscape. An additional 27 students were in attendance.

9. On 5/31/05 and 6/7/05 we trained the UD Public Safety Department about the stormwater program at the University and how they could help while out on campus conducting their daily routines. We trained 62 Public Safety Officers in total.

10. On 8/26/05 we trained Public Safety Student Helpers about our stormwater program and what they can do to help with the program while out on campus. The training included information concerning stormwater violations and how to respond if they observe or suspect a violation. We trained approximately 35 student helpers.

11. Trained 28 University Grounds personnel on stormwater management on October 25, 2005. We covered information concerning the University's program and techniques to help increase the quality of stormwater runoff. Also covered information concerning suspect materials or occurrences, procedures, and contact information.

12. The University offered several water related courses for students as well as continuing education participants including:
    School of Urban Affairs and Public Policy
    - UAPP 611 - 010 Regional Watershed Management
    - UAPP 667 - 014 GIS Applications in Public and Non-profit Sectors
    - UAPP 652 - 010 GIS in Public Policy

    Department of Civil and Environmental Engineering
    - CIEG 440 - 010 Water Resources Engineering
    - CIEG 467 - 016 Watershed Engineering, Planning, and Design

    College of Agriculture and Natural Resources
    - EGTE 103 Land and Water Management
    - EGTE 321 Storm Water Management

13. The University Cooperative Extension, which is used by the public to connect with and take advantage of the university knowledge, research and resources in an effort to address regional and/or agricultural needs, offers information, publications and educational programs that incorporate stormwater management information. They offer one-on-one assistance and guidance to anyone who calls concerning a stormwater related question. Additionally, when a member of the extension office is called out to urban subdivisions for landscaping assistance they also incorporate a discussion on stormwater management practices. Finally, they have a web page defining renewable resources, which includes water, and offer publications and programs throughout the year.

14. Cooperatively participated in Newark's Community Day activities with the City of Newark Stormwater Program Coordinator by operating an informational booth and providing stormwater related literature as well as give aways (i.e. ball caps, t-shirts, rain drop stress balls, and coloring books and crayons). The give away items were handed to each participant after a very brief question and answer session relating to stormwater. We had approximately 435 total participants at our booth for the day event.

Participation and Involvement:

1. The UD Water Resources Agency works as local watershed coordinators for:
    - Christina Basin Clean Water Partnership with the goal to restore the Brandywine, Red Clay, White Clay, and Christina Creeks to fishable/swimmable status by 2015.
    - White Clay Creek (WWC) Wild and Scenic River Watershed Committee with the goal to implement a watershed plan for the wild and scenic WCC as it flows through PA and Delaware including the UD campus.

2. Occupational Health and Safety dedicated a part-time Environmental Health Specialist position exclusively to the Stormwater program beginning in November 2005.

3. The Environmental Health Specialist attended the Christina Basin Action Team meeting in December 2005.

4. The Environmental Health Specialist attended Certified Stormwater Inspector training in November 2005 that was presented by the National Stormwater Center.

5. The Environmental Health Specialist attended the Certified Construction Reviewer Course in October 2005 and received certification.

6. Quarterly meetings were held with the City of Newark Stormwater Program Coordinator, the Assistant Director of Grounds, and representatives from the Department of Occupational Health and Safety quarterly in 2005 to discuss campus stormwater related accomplishments and information/plans for continued program advancement. The dates met were 3/3/05, 6/24/05, 9/1/05, and 12/1/05.

7. University of Delaware's Water Resource Center funded a number of undergraduate internships during the '04-'05 school year, ten of which were stormwater related. The funded projects included:
    - *"Rain Gardens"*
    - *"Delaware River Basin State of the Basin report Card"*
    - *"Nutrient release From Mineralization of Poultry Litter under Simulated Field Conditions"*
    - *"Winter Needle Conductance Rates of Pinus Strobus L (eastern white pine): Meteorological Conditions and Intraspecific Variability.*
    - *"Landowner Perceptions of the Stringency of Water Quality Regulations in Delaware"*
    - *"The impact of the Solid Waste Decision on Isolated Wetlands in Delaware"*
    - *"The Effects of Dietary Level and Source of Cu on Broiler Cu Excretion and Movement of Copper (Cu) Through the Broiler Excreta Amended Soils"*
    - *"Sustainable, Low-Impact Methods for managing Mosquito Populations in Storm Water Ponds"*
    - *"Detection of Salmonella in Biosolids using a Combination of Cultural, Molecular and Immunological Methods"*

- *"Diversity, Function, and Benefits of Plants Adapted to Flood Prone and Poorly Drained Environments"*

8. Joe Farrell, a university employee in the College of Marine Studies manages and coordinates a variety of watershed programs including:

- Delaware NEMO (non-point Education for municipal officials) a statewide collaborative education program targeted to local officials. Offered a stormwater pond maintenance workshop to the officials in Kent and Sussex counties in 2005.
- Submitted recommendations to Secretary Hughs and the Governor's Surface Water Advisory Committee on stormwater facility maintenance issues in Sussex County.
- Manages the Citizen Monitoring Programs:
  - Inland Bays Watershed
  - HAB Monitoring (inland bays and tributaries and some ocean)
  - Bacteria monitoring (inland bays, ocean, Delaware Bay, Broadkill River)
  - Broadkill River monitoring
- Involved in the development of the Tributary Action Team for Broadkill River Watershed to develop a pollution Control Strategy.

9. Dr. Ullman, a professor in the College of Marine Studies, conducted several collaborative studies involving water and the transport of contaminants from uplands to the Delaware Bays and the Chesapeake including:

- February 2003 -January 2005 he studied the "*ecohydrological processes of freshwater seeps across the estuarine beach faces*."
- October 2004-March 2006 he conducted the "*Millsboro Pond Project: The Determination of Total Nutrient Loads from Millsboro Pond to Indian River Estuary from Data Provided by an Automated Nutrient Analyzer."*

10. Dr. Luther, a professor in the College of Marine Studies, also conducted studies in 2005 involving the water quality in the inland bays. He studied the nutrient (specifically the hydrogen sulfide, phosphorous) and complex metals levels in the bays, which are elevated/aggravated by stormwater migration. He is currently working to publish the data collected from these efforts.

11. DOHS sponsored the City of Newark's Annual Community Clean Up by donating $500.00 for the event. We solicited volunteers through an email forwarded to the Chairs of the University Safety Committee's who disseminated the information within each of their prospective departments. Additionally, OHS announced the sponsorship and solicited volunteers in the March 2005 edition of our Safety Newsletter.

12. John Gingrich (Post Doctoral Fellow) and Robert Anderson (Graduate student), both of the University's Entomology and Wildlife Ecology Department conducted research in 2005 delineating a campus stormwater retention pond, located on Syncock Lane, as an outdoor laboratory. They worked on a research project entitled: "*Potential of Retention Ponds to Produce Nuisance Mosquitoes and West Nile Virus Vectors. Part II: Field Trials for the Non-Pesticidal, Self-Sustaining Control of Mosquitoes".* The researchers used the retention pond on Syncock Lane to test the effectiveness of Alum in controlling/diminishing the mosquito larvae populations.

13. Graduate and undergraduate students in the Department of Civil and Environmental Engineering as well as the School of Urban Affairs and Public Policy have delineated the UD watershed as an on-campus laboratory. They reviewed and researched stormwater best management practices (BMP's) for the following areas:

- Blue Hen Creek and Fairfield Run
- Center for the Arts underground Stormwater Management System

- Stormwater pond behind Harrington Dormitory complex
- Bio-retention facility at Rodney Dormitory complex
- Small stream behind Trabant Student Center parking garage on Delaware Ave.
- Rain Garden in front of the UD Water Resource Agency
- Stormwater wetland along Cool Run on the Ag. farm

13. The UD Water Resources Agency secured a grant form the National Fish and Wildlife Federation and the Delaware Estuary Program for students to conduct a stream restoration project along the Blue Hen Creek in front of the new Hotel near Clayton Hall.

Illicit Discharge Detection and Elimination:

Construction Site Runoff Control:

1. All construction activities on campus greater than one acre in size were required to have a Certified Construction Reviewer (CCR) conduct weekly site visits. The two main sites on campus included the Center for the Arts project and the Laird Campus Residence Halls project. Duffield and Associates were contracted by the University Facilities Department to provide third party CCR reviews weekly. The reports were forwarded to the prospective University Project Manager, the University Environmental Health Specialist, the contractor Site Supervisor and other contracted individuals that are responsible for the stormwater quality on each construction site.
2. Conducted weekly site reviews in August and September in an effort to resolve issues on the CCR reports on a timelier basis.

Post-Construction Runoff Control:

1. The University Grounds department maintains the stormwater management areas on a regular basis to ensure proper functioning of the areas. Additionally, they respond and correct any reported problems.

Pollution prevention/Good Housekeeping:

1. University Facilities Department reported that parking lot and campus street sweeping efforts documented 69.36 tons of debris removed in 2005.

2. University Facilities Department reports that 900 linear feet of curb replacement efforts were accomplished in 2005 avoiding the creation of concrete debris from campus parking lots and streets.

3. University students participated in two separate Community Clean up days in the 2005 calendar year. The first was on April 27th and removed debris from several Newark City parks as well as a State Park along the Delaware River. It was reported that more than 200 bags of trash were collected. A second event was held on November 13th and included approximately 400 university students.

4. University students also conducted a student sponsored clean up project along Main Street in Newark on November 22, 2005. Student volunteers form the Dickinson Community Council, the Dickinson Community Service Club and the Tau Epsilon Phi fraternity participated and reportedly collected a total of 20 trash bags during the event.

5. The University Facilities Department installed oil sensors in elevator wells located in Smith Hall and the Center for the Arts parking garage. These oil sensors are engineered to automatically shut off the sump pumps in the wells to prevent the potential for oil contaminated water from being pumped into the storm drain system.

6. The University started the process of amending its Spill Prevention, Control and Countermeasure (SPCC) Plan through the assistance of Environmental Resource Management (ERM). This plan formalizes the oil spill prevention and response program for the University.