

High School Students use GIS & GPS to study how water flows in and around the Delaware Technical and Community College (DTCC) Campus

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DTCC TRIO Program

- **Classic Upward Bound**
- **Educational Talent Search**
- **Upward Bound Math & Science Center**
 - **Funded by the U.S. Department of Education**
 - **Must have completed the eighth grade, but have not entered 11th grade**
 - **2/3 of the participants are to be both low-income and first-generation college bound students**
 - **Desire to attend college**



Text above has been modified from the DTCC. TRIO Program website at http://www.dtcc.edu/owens/ccp/SSS_Trio/Pages/TRIO1.htm

Upward Bound Math & Science Center

- 50 participating high school students from Sussex County, DE
- Goals
 - Strengthen students math and science skills
 - Help students recognize their potential to excel in math and science
 - Encourage them to pursue post-secondary degrees

Research Question

- How and where does the water flow in and around the DelTech Georgetown Campus?
- What types of careers would be involved in the event that the DelTech campus would flood or have a hazardous waste spill and have to be evacuated?



Outline of the six week program

1. Presentations / GPS scavenger hunt
2. Data creation
3. Guest speaker / Data collection
4. Data finalization / Education and outreach
5. Field reconnaissance
6. Students final presentations

Presentations – Day 1

- Using GIS to study Human Impact
- Understanding Watersheds
- Using GIS as a tool for the research question
- GPS/Geocache Instruction



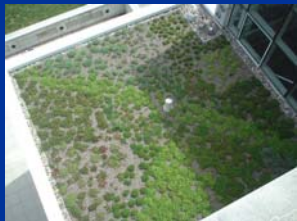
Geocache Adventure – Day 1

- Way points from around the campus were prerecorded into the gps units
- Students navigated to the landmarks around the DelTech Georgetown Campus
- Students learned about careers
 - Nursing, Paramedic
 - DNREC, Division of Soil & Water
 - Communication
 - Biotechnology
 - Educational technology
 - Architectural Engineering



Data creation - Day 2

- Discussed different types of surfaces
 - What makes water move fast vs. slow
 - Villanova campus examples of BMPs



Green Roof



Bioinfiltration Traffic Island



Porous Asphalt

- Students “heads up” digitized pervious and impervious surfaces on the campus
 - 2007 Delaware Digital Orthophotography
Sidewalks, Parking Lots, Stormwater Pond,
Building Footprints, and grass areas

Stormwater - Day 3

- Discussion on the watershed connection
- Where the water flows



Stormwater - Day 3

- **Guest Speaker**
 - Purpose of storm drains and storm water ponds
 - 2006 Storm
 - Bridge destruction
- **Students used the gps to collect coordinates of the storm drains**
 - Teams of three
 - Added the data to their maps



Data Finalization / Education and Outreach - Day 4

- Split the group into two teams
 - Indoor
 - Outdoor
- Indoor team continued to work on “heads-up digitizing and finalizing maps
- Outdoor team placed storm drain medallions around the campus
 - “No Dumping, Drains to Creek”

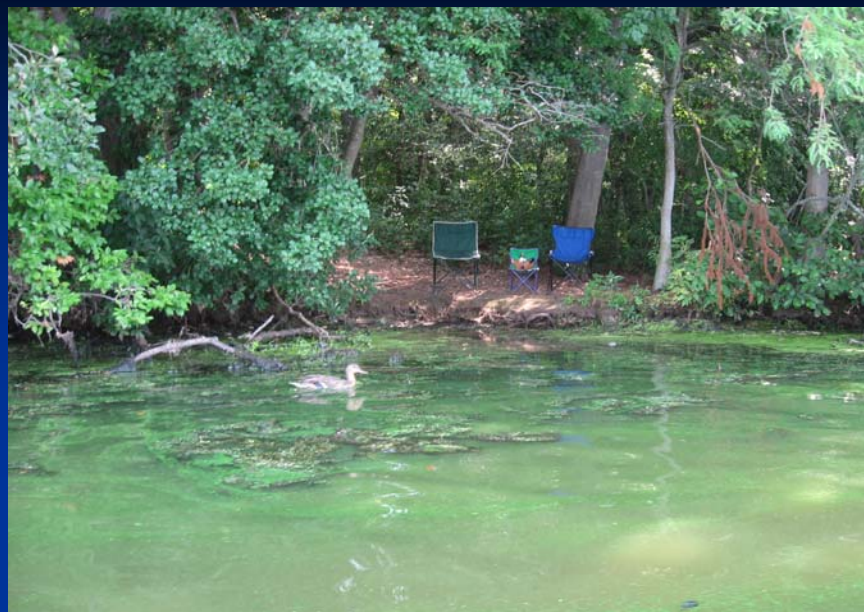


Field Trip – Day 5

- **Trap Pond State Park**
 - Kayaking field reconnaissance
 - Nature trail walk
- **Purdue AgriRecycle Center in Seaford, DE**
 - Poultry litter

Natural source of nutrients and organic matter
Process dries and pasteurizes poultry litter to
create both pellets and granular fertilizer





Final Presentation - Day 6

- Students prepared brochures for attendees
- Finalized presentation in the morning
- Presented in the afternoon to DTCC staff



Students Final Presentation - Day 6

- **Mission Statement**

- Each student here has put a large effort into the Del-Tech campus and its drainage systems. By using GPS systems we were able to find the importance of drainage systems, identify problems on campus, and also find solutions for these problems. During this experience, we learned a lot about the drainage systems on campus while in hopes of creating awareness in the community for a long-lasting affect of our efforts.

Students Final Presentation - Day 6

- **Effects on the Environment**
 - **Poor drainage leads to pollution and land runoff. Which in turn, affects the land or body of water that it is drained to. With storm water, sediments as well as other pollutants, damage the fish, wildlife and plants.**



Students Final Presentation - Day 6

- Heavy Rains affected many areas
 - Seaford
 - Georgetown
- Bridge destruction
 - DTCC Campus
 - Galestown Bridge
 - Reliance Bridge



Students Final Presentation - Day 6

What we learned

- If we help maintain and respect our environment the better quality it is for us to live.
- Helping our environment helps us in the near future because we survive on our environment. The environment provides us with shelter and food.



Students Final Presentation - Day 6

What we learned continued

- If we didn't cooperate and work with each other then it would've been hard to get things done.
- Cooperating helped us form our final conclusions and come up with the brilliant power point you are watching now.



Students Final Presentation - Day 6

- Future Direction for DTCC
 - Bioinfiltration traffic island
 - Native plantings buffer around southern end of storm water pond
 - More trash receptacles
 - Pervious pavers in staff parking areas
 - Possible green roof

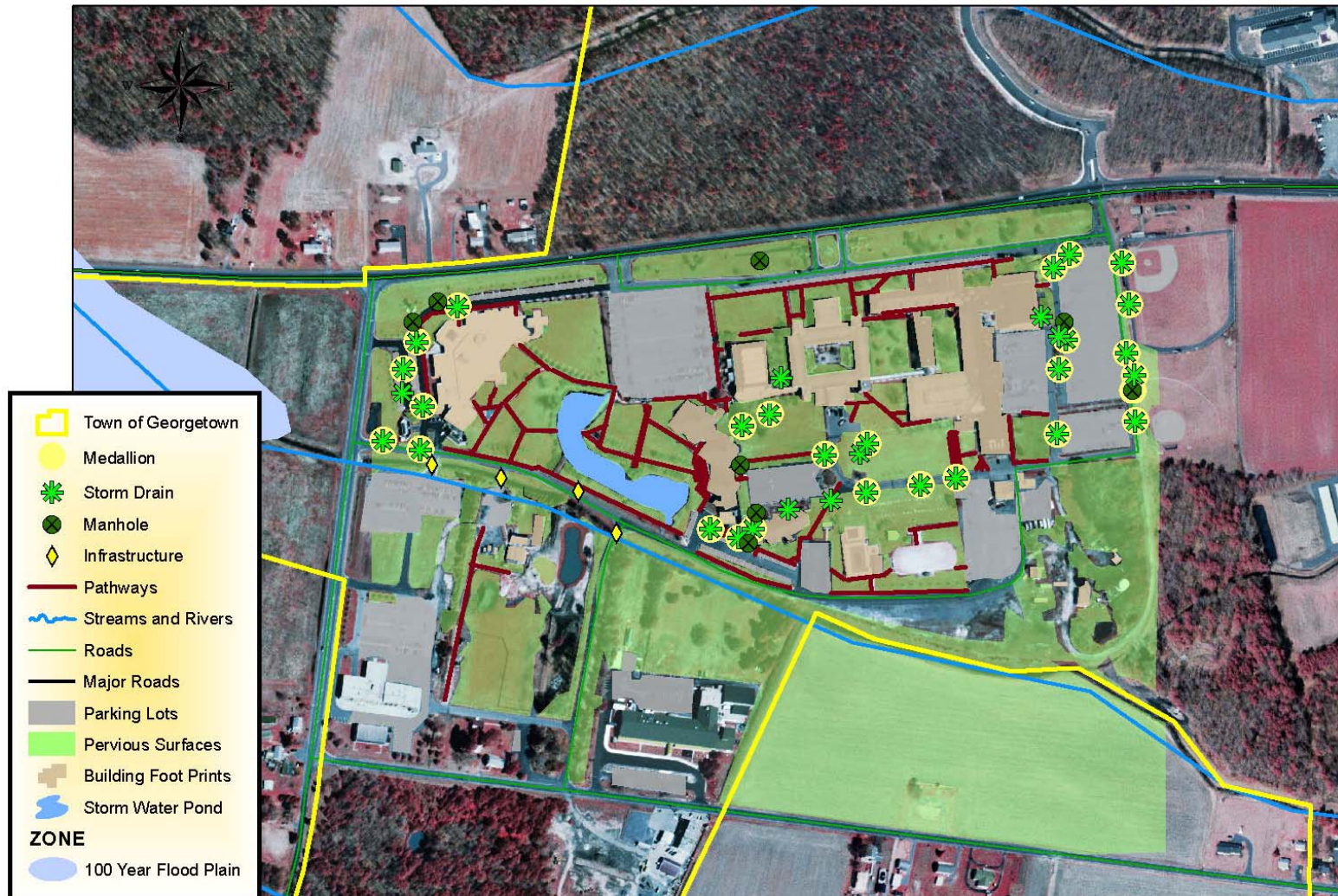


Map Presentation – Day 6

DTCC, Owens Campus in Georgetown

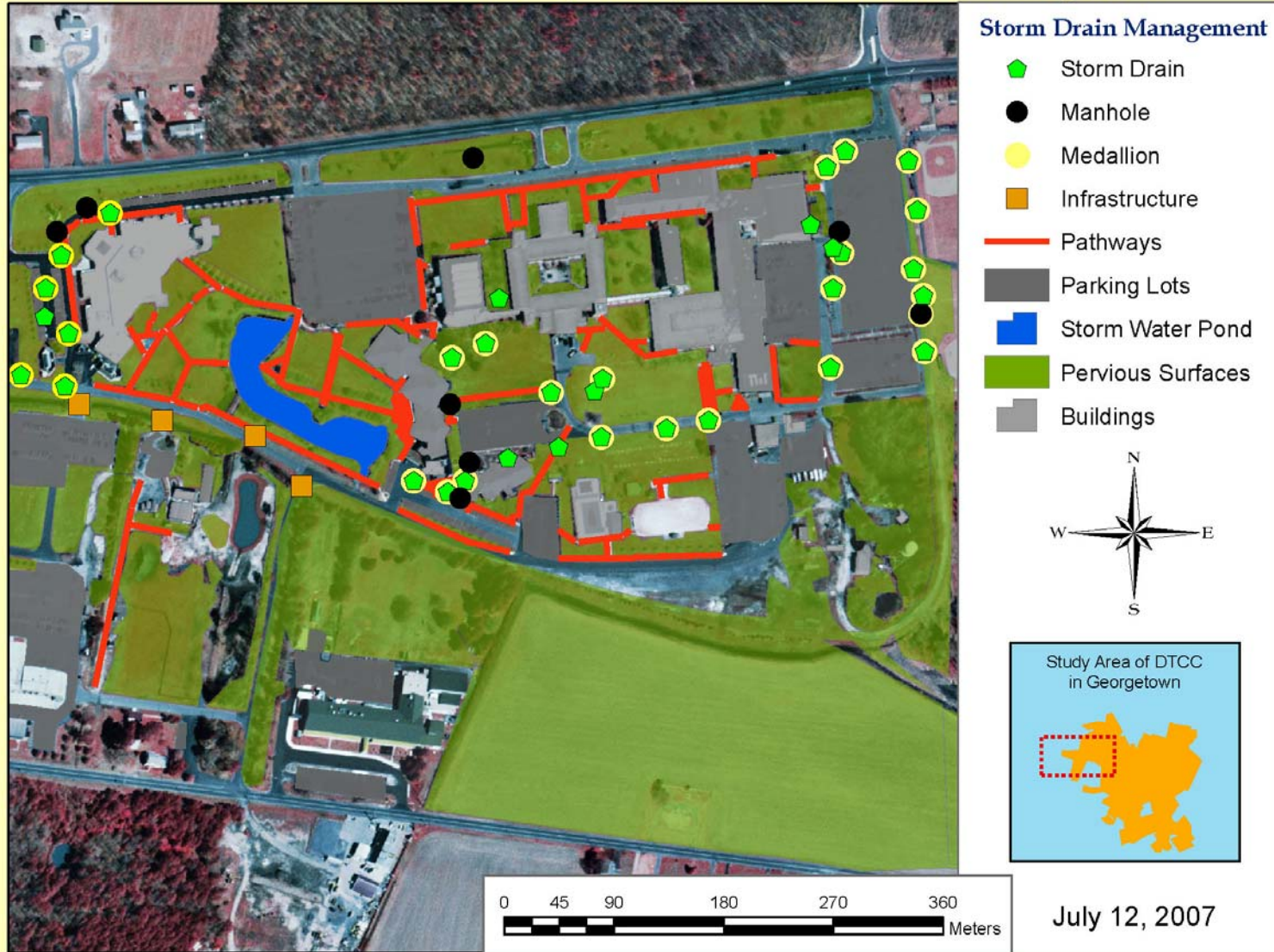
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Can parking lots become more permeable?



Map Presentation – Day 6

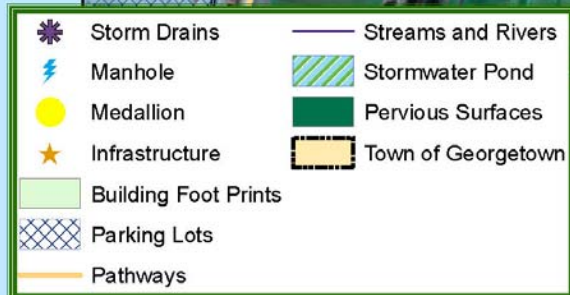
Delaware Technical & Community College, Owens Campus in Georgetown



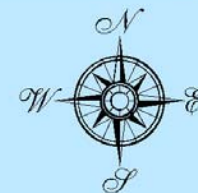
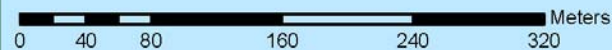
Map Presentation – Day 6

Delaware Technical & Community College, Owens Campus in Georgetown

Water in Motion



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**Children can make a huge impact on the future,
so never underestimate what they can do and learn!**

Thank you

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