An Overview of the Washington Stormwater Center

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Director, Washington Stormwater Center
Professor of Ecotoxicology
The Washington Stormwater Center was created through a state legislative mandate (R.C.W. 90.48.545) for a stormwater technical and educational resource center for all stormwater permit holders in the state.

A joint center between UW-Tacoma and WSU-P developed in 2010.
Our Mission

To protect Washington’s waters through improvements in stormwater management, serving as the central resource in Washington for integrated NPDES education, permit technical assistance, stormwater management and new technology research, development, and evaluation.

Our vision

The Washington Stormwater Center will be the preferred one-stop source of stormwater management support systems, knowledge, and resource referrals for all businesses and governmental agencies in Washington State.
The Washington Stormwater Center works on evaluation of new stormwater management technologies, education for National Pollutant Discharge Elimination System (NPDES) permittees (business and municipal), and stormwater research.

We are particularly interested in the toxicity of stormwater pollutants to aquatic organisms and how to reduce or eliminate toxicity.

Our research partners include NOAA, USFW, UW Tacoma, The Puyallup and Suquamish tribes of Indians and many others.
Overview of Departments and Services

Business Resource Program
- Educational workshops, videos, webinars, publications
- Stormwater management tools
- One-on-one assistance

TAPE - Emerging Technologies
- Technology Assessment Protocol – Ecology (TAPE)
- Information dissemination (technical briefs)
- Functionally Equivalent BMP evaluations

Municipal Resource Program
- Educational workshops, videos, webinars, publications
- Stormwater management tools
- Information Clearinghouse

Stormwater Research/Outreach
- LID research development
- Educational workshops, videos, webinars, publications
- Development of new tools and methods

ASSISTANCE • RESEARCH • TRAINING
2008 – WSU-P receives $1 million to build large-scale LID research and education program
Washington State University: Puyallup GSI Facility

Permeable Pavement

Rain Gardens

Mesocosms
2012 WSU-P receives $800,000 to build the Aquatic Toxicology Laboratory

An expansion of the original salmon toxicology lab
Support for Stormwater Research and Education at WSU

Stormwater is a major initiative for WSU through our Grand Challenges Program

Recent Faculty hires

- Dr. Ani Jayakaran, Stormwater Engineer, LID Educator, WSU-P
- Dr. Jenifer McIntyre, Aquatic Toxicologist, WSU-P
- Executive Director for the WSC- Stark
- Courtney Gardner, Biogeochemist/Soil Microbiologist, WSU Pullman
- Joe Cook, Water Economist, WSU Pullman
Partners

- NOAA
- USFW
- WWU
- Harvard
- Northwest Indian Fisheries Commission and individual tribes
- Boeing
- Various municipalities
Permeable pavements
Permeable paving is a range of sustainable materials and techniques with a base and subbase that allows the movement of stormwater through the surface. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water.
Permeable pavements - a great idea but there are problems

- They do not have the tensile and compressive strength of regular pavements
- Can clog over time if not maintained properly
The WSC received a grant from Boeing to evaluate a carbon fiber product that they developed for aircraft wings as a potential means to increase the durability of permeable pavements.
Partners/Personnel

WSU Civil and Environmental Engineering
Karl Englund, Li Hui, Sommayeh Nassiri,

WSC and WSU Puyallup
The WSU engineering team developed the process to incorporate carbon fiber into permeable asphalt and concrete.
Permeable asphalt columns
Results

- Addition of Boeing’s carbon fiber to permeable concrete and asphalt resulted in increased tensile and compressive strength improved infiltration.
- Addition of carbon fiber to permeable asphalt reduced toxicity to *C. dubia*.
- Carbon fiber modified permeable pavements show promise for future stormwater management.
Idea School, Tacoma, Washington
Next steps

- Evaluate toxicity of stormwater that passes through these pavements to salmon and other fish species
- Evaluate stormwater from a series of rain events
- Evaluate leachate toxicity over time – run multiple water samples through the columns
- Further testing of these modified permeable pavements in the real world