Session F4: Tools for Prioritizing Restoration Efforts

Room A107-109
1:30 – 3:00 pm

0206
F4-1

Showing a Restoration Benefit in the Chesapeake Bay Watershed: The Easy, the Not So Easy, and the Very Hard

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The Chesapeake Bay TMDL is a precedent-setting effort to restore a major ecosystem beset by the cumulative effects of decades of degradation. The restoration effort will entail large price tags at the federal, state, and local levels. It is critically important, therefore, that restoration practitioners be able to show a tangible benefit of their actions to water resource managers and the public at large. Only then will the public support restoration on the scale needed. The challenge for practitioners is also one of scale, as showing a restoration benefit is harder on the large spatial scales of interest and in the short time frames desired. We argue for a conceptual framework that acknowledges what kinds of restoration benefits are easier and harder to demonstrate. We present a design for restoration monitoring that includes what is:

- Easy – measuring what you actually did (*e.g.*, changed the stream channel shape)
- Not So Easy – measuring the proximal effect of that change (*e.g.*, reduction in sediment load from bank erosion)
- Very Hard – measuring the ultimate effect on a resource of interest (*e.g.*, improvement in the biota expected from a decrease in sedimentation)

Prior to the Bay TMDL, Maryland began awarding Trust Fund monies for shovel-ready projects to help restore the Bay watershed. The Trust Fund program includes rigorous monitoring for restoration benefits in selected subwatersheds. This includes:

- Detailed geomorphic monitoring, including surveys of permanently monumented cross sections
- Both qualitative and quantitative monitoring (assessing water quality and physical channel conditions) to measure the change in sediment and nutrient loading
- Spring benthic macroinvertebrate and summer fish sampling to address the expected recovery of the biota.

We also discuss the implications of using this three-tiered design to show restoration benefits for the Chesapeake Bay and its tributaries.

0305
F4-2

Using Mapping Technology and Water Sampling to Prioritize Projects to More Effectively Improve Water Quality in Southeastern Oregon

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Northern Malheur County, in southeastern Oregon, is heavily agricultural, with 143,000 acres of row crops, pasture, and livestock. It is served primarily by four irrigation districts that deliver water through a complex system of canals, ditches, drains, and pipelines.

The irrigation districts receive source water from and contribute flows back to the Malheur, Owyhee, and Snake Rivers. Irrigation districts are interrelated in that much of the water that flows off of one district is reused by another district. After irrigation water is diverted into one district’s water delivery system, it is collected in drains and may be reused up to seven times before flowing back into a river.

Agricultural land and irrigation delivery system conditions in one district can significantly affect water quality and water availability in other districts and in rivers. Changes in agricultural and irrigation practices can have significant impacts on Total Maximum Daily Loads (TMDLs) in eastern Oregon and western Idaho by reducing sediment and phosphorus delivery to the Malheur, Owyhee, and Snake Rivers.

To address water quality issues, detailed maps and data were needed to describe irrigation infrastructure, understand the water quality in different drains, prioritize areas for improvement, and inform irrigators about water quality. More than 450 miles of canals and 10,000 irrigation structures in Malheur County were added to a current digital database using GPS and GIS technology.

We then focused on one irrigation district that receives water from rivers and two adjacent irrigation districts, and drains directly into the Malheur River. We:

- Sampled 40 sites for E. coli, nutrients, sediment, and flow to calculate pollutant loads for irrigation water drains
- Are delineating the subwatersheds in GIS for drains flowing from the irrigation district into the Malheur River
- Will combine the GIS and water quality monitoring information to prioritize efforts to address TMDL load allocations.

The project has encouraged irrigation districts to work together to address water quality issues. It has also increased awareness of water quality and conservation issues in Malheur County and helped prioritize areas for assistance. However, one continuing challenge is to overcome local concerns about privacy of spatial data and monitoring results.

0425
F4-3

Recovery Potential Screening: Innovative Assessments in State "Laboratories of Democracy"

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Recovery potential screening is an assessment methodology for comparing large numbers of waters or watersheds based on their relative restorability to help states take better informed and more effective action on their impaired waters. Intentionally designed in USEPA as a highly flexible framework that could be customized, the application of this method in several states and watersheds has demonstrated remarkable variety and innovation as it has been applied in varying state environments, watershed restoration needs and issues. This presentation highlights the differences among several state and watershed-level experiences in carrying out recovery potential screening projects in Minnesota, Michigan, Massachusetts, Pennsylvania, Maryland and Vermont. These projects demonstrated the successful adaptation of a common but flexible assessment approach to individually unique circumstances and program needs.

0477
F4-4

Stormwater and Streams: Understanding the Thermal Impact of Stormwater Best Management Practices

Alison Watts

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As urbanization and build-out occurs, the thermal regime of the surrounding environment is altered. Heated stormwater runoff flows into receiving waters where it mixes, and potentially increases the base temperature of the surface water in lakes, streams, and estuaries. The amount of heat transferred, and the degree of thermal pollution is of great importance for fisheries management and the ecological integrity of receiving waters. Coldwater fisheries in particular are most sensitive to thermal pollution.

This study will present runoff temperature data for a range of stormwater best management practices (BMPs) in relation to established environmental indicators for a study in Durham, NH. Stormwater BMPs examined include conventional, Low Impact Development, and manufactured treatment designs. Thermal inputs to a stormwater system include influent and effluent temperature, solar radiation, longwave radiation, convection and diffusion from both the atmosphere and subsurface, and infiltration. Surface systems that are exposed to direct sunlight have been shown to increase already elevated summer runoff temperatures, while other systems that provide treatment by infiltration and filtration can moderate runoff temperatures by thermal exchange with cool subsurface materials. The thermal impact of stormwater flow to a stream is a function of both the volume of flow, and the temperature differential between the runoff and the stream. A simple thermal model is being developed to calculate the impact of effluent from a stormwater pond to a small stream. Ultimately the goal is to develop design models for standard stormwater devices that can be used to meet specific effluent temperature standards and to maintain the required thermal regime in a receiving stream.