Session O4: Assessment Approaches for Habitat Protection and Restoration

Room B117-119
3:30 – 5:00 pm

0283
O4-1

Assessing the Effectiveness of Restoration Actions at Sites in the Lower Columbia River Estuary

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The Lower Columbia River Estuary Partnership's (Estuary Partnership) Action Effectiveness Monitoring (AEM) Program was created to assess the efficacy of salmon recovery actions in the region. Estuarine habitat restoration for juvenile salmonids is expected to be an important contributor to the effectiveness of recovery efforts for anadromous salmonids throughout the basin. The goals of this AEM program are to provide the Estuary Partnership, primary funding agencies, restoration partners, and others in the region with information useful for evaluating the success of restoration projects, and to use this information to improve restoration project design and inform adaptive management. Thereby, increasing the success of restoration projects in the Lower Columbia River Estuary (LCRE) for the recovery of Endangered Species Act listed salmonids.

Since 2008, four restoration sites in the LCRE have been monitored, both pre- and post-restoration, for habitat, fish and macroinvertebrates. The four AEM sites in this program represent different restoration activities, habitats, and geographic reaches of the LCRE. Monitored parameters follow standardized LCRE protocols and include habitat (vegetation community composition, vegetation planting survival, sediment accretion, hydrology, and continuous water quality parameters), fish (fish communities, salmon growth, condition and genetic information), and macroinvertebrates (macroinvertebrate availability and those selected for by Chinook salmon). Data were collected April through July to capture the period when salmonids are most abundant at these sites.

In 2011, the AEM program sites were analyzed using pre- and post-construction data and against a suite of reference sites. An analysis of data collected through 2010 for each site was conducted, to evaluate the current program, measure short-term successes, and make adjustments to improve data collection. In addition, a parallel program established a suite of reference sites throughout the LCRE to serve as a stable endpoint for desired target conditions at restoration sites. The habitat conditions at AEM sites were compared with these reference sites to further evaluate the effectiveness of restoration actions and inform restoration site design considerations. Preliminary analyses of water quality and a selection of other parameters from the AEM program will be presented.

0449
O4-2

Protecting Manoomin (Wild Rice) Through Modern Science and Traditional Ecological Knowledge

Nancy Schuldt

Fond du Lac Reservation, Cloquet, Minn., USA

The Fond du Lac Band of Lake Superior Chippewa has been actively working to protect and restore culturally significant wild rice waters on their reservation in northeastern Minnesota, twenty miles inland from Lake Superior. This work has involved a special use designation and criteria in the Band's water quality standards, targeted monitoring for the unique hydrologic and water chemistry requirements for *Zizania aquatic*, and rigorous scientific research projects. The Stoney Brook watershed was extensively ditched in the early 1900's, and the result was a loss of over 2000 acres of productive wild rice beds. The remaining rice beds are vulnerable to rapid fluctuations in water levels from large storm events, and the altered hydrology has also enabled native perennial aquatic vegetation to out-compete the annual wild rice plants.

Together with the USGS and the Natural Resource Conservation Service, the Band collaborated on a watershed model that couples surface water and ground water responses to precipitation events, allowing managers to better maintain optimal hydrologic conditions in the wild rice beds. NRCS developed the surface water component of the model, including detailed surveys and cross-sections of the ditch network. The objective of the USGS component of the study was to assess hydraulic gradients, flow directions, and recharge rates to shallow aquifers, and assess the effect of the judicial ditch system on surrounding ground water resources in the Stoney Brook Watershed. In the future, we will also use model output to identify good candidate ditch segments for decommissioning.

The Band has also collaborated with University of Minnesota researchers on two major National Science Foundation-funded projects. Dr. John Pastor of the University of Minnesota Duluth has led a multi-year study of nutrient cycling dynamics to determine factors that contribute to long-observed ‘boom’ and ‘bust’ population cycles of natural wild rice. The second NSF project involves sediment coring and paleoanalysis of historic conditions, including diatoms, pollen, ostracods and phytoliths (species-specific silica structures in plant cell walls) from wild rice. This project is in partnership with the University of Minnesota’s LacCore facility, and includes substantial research opportunities for tribal students.

0515
O4-3

Leading or Lagging Indicator for Water Quality Management

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Leading indicators are measures of performance collected, analyzed, and understood to predict events, avoid calamities, and manage limited resources. To meet important goals such as water quality and aquatic ecosystem conditions, successful prediction first requires correct indicator selection. Water quality parameters can predict risk for certain endpoints (e.g.</i>, human health, fish health, etc.). A lagging indicator may eventually respond, but not soon enough to guide decisions needed to ensure progress. In spite of increasing sophistication and expense, such measurements often cannot determine sources, causes or solutions. Not all water pollution is from an external input. Pollution often comes from the materials long stored in and along riparian areas and wetlands due to their attributes and processes or functions. Wetlands are used for water quality remediation because of their ability to sequester pollutants by slowing flow allowing sediment deposition, and growing productive plant communities. Riparian ecosystems have tremendous capacity for nutrient and pollutant uptake. In a complex food web, rapid uptake following input or digestive release creates a slow nutrient spiral. Fish and wildlife habitats and aquatic food webs often depend on riparian areas that function properly. They absorb or dissipate the energy from high flows, reduce erosion and maintain bank or shore form with strongly rooted stabilizing vegetation, induce sediment deposition to maintain or rebuild floodplains, recharge aquifers through hyporheic exchange and floodplain flooding, and create aquatic and riparian habitat complexity. When a system loses its physical form and its riparian function, habitats are destroyed, sequestered nutrients are released and assimilation processes are unraveled. In most streams, loss of these functions causes most or a significant portion of nonpoint source pollution and it is being predicted or managed by monitoring water quality or inputs from the watershed. Leading indicators needed to manage water quality issues must focus on the drivers of physical functioning. Riparian vegetation begins to decline first and it consistently leads in indicating sequential recovery. Riparian vegetation is often the best leading indicator for adaptive management and sustainability of water quality and aquatic communities.

0109
O4-4

Success at the Streamside – Riparian Buffers that Work

Diane Wilson

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Scientific literature supports the use of the Riparian Forest Buffers (with stormwater entering the buffer as sheet flow or shallow concentrated flow) as the **only** BMP that can do **all** of the following: Capture and hold stormwater runoff from the majority of Pennsylvania storms in a given year; infiltrate most of that water into the ground and/or transport it as shallow flow through the forest buffer soils where pollutant uptake and processing occurs; release excess storm flow evenly further processing pollutants; sequester carbon at significant levels; improve the health of streams and increase their capacity to process organic matter and nutrients generated on the site or upstream of the site.

Because buffers are so important in environmental protection, the Pennsylvania Department of Environmental Protection (DEP) has published ***Riparian Forest Buffer Guidance*** which is meant to assist anyone interested in understanding the functions and values of buffers, and the importance of establishing, maintaining and protecting them. DEP has also recently added buffer requirements to the revised Chapter 102 Erosion and Sediment Control and Stormwater Management regulations. The buffer requirements apply especially to Special Protection waters. In addition, DEP has been involved in long term monitoring of the effects of planting riparian forest buffers on streams that have been impacted by agriculture and urbanization.

This presentation will give an overview of DEPs buffer guidance, the buffer requirements in Chapter 102 regulations and the results of long term monitoring of the efficacy of riparian forest buffers in improving the water quality of degraded streams.