

# Western Wetland Monitoring and Assessment Workgroup Meeting

April 29, 30 & May 1, 2008, Rushmore Plaza Holiday Inn, Rapid City, South Dakota

## ABSTRACTS

### THEME 1: WETLAND ASSESSMENT

#### **Developing Tools for a Comprehensive Assessment of Wetlands and Riparian Areas in California**

Josh Collins, San Francisco Estuary Institute, San Francisco, CA

**Abstract:** A comprehensive program to assess wetland projects and the ambient condition of wetlands is being developed for California coastal watersheds as part of an effort to track wetland extent and condition statewide. Eco-regional technical teams and a statewide management group assure that the program is relevant to as many state policies, programs, and projects as possible. The program is based on a 3-level approach to wetland assessment plus information management. Level 1 consists of wetland inventories and landscape profiles. These rely on updates of the National and State Wetland Inventories. Wetlands within restoration and mitigation projects and impacted wetlands are mapped as sub-populations of each wetland class. Level 2 features cost-effective probabilistic surveys of ambient condition and project performance relative to a broad spectrum of expected wetland functions and services using the California Rapid Assessment Method (CRAM). A statewide assessment of estuarine wetlands and three watershed demonstration projects using CRAM are underway. Level 3 consists of standardized intensive monitoring to calibrate the Level 2 methods and to evaluate specific wetland functions or services. The Wetland Tracker is a web-based information system for tracking Level 1-3 results and for enabling planners to see each wetland, riparian area, and related project in the context of all others in a watershed context. The 1-2-3 tool set is being piloted through coastal watersheds for later transfer to inland regions. The intent is to create one program of wetland monitoring administered through regional centers for the state as a whole.

#### **Wetland Monitoring and Assessment at the South End of the Prairie Pothole Region – Techniques, Design, and Things Learned**

Vince Evelsiver, Iowa Department of Natural Resources, Iowa City, IA

**Keywords:** Monitoring, Iowa, Contaminants, Wetlands

**Abstract:** Beginning in 2005, the Iowa DNR's Watershed Monitoring and Assessment Section conducted a three year project to monitor permanent and semi-permanent wetlands in north-central Iowa's portion of the Prairie Pothole Region (PPR). This portion of the PPR in Iowa is intensively farmed with less than 10% of the wetlands remaining. Yet the wetlands that do remain still provide a vital role for water quality and critical habitat for several species of wildlife. Intensive level three sampling was carried out at 189 wetlands over the three year period in this region with an emphasis on chemical contaminants, physical properties, and the biological aspects using surveys of fish, plants, and invertebrates. Results indicate that herbicides and excessive nutrients were the most prevalent groups of chemicals detected which in turn reflect negative effects on the biological diversity and richness in these wetlands. However, many other pesticides that were tested for did not show detectable levels. This presentation will provide an overview of how we plan to use this data, what methods worked and didn't work, and how this information will be used to adapt future wetland monitoring projects in Iowa.

#### **Great Salt Lake Wetlands Nutrient Criteria Development: Approach and Progress to Date**

Theron Miller, Utah DEQ, Division of Water, Salt Lake City, UT

**Abstract:** Utah DEQ has received considerable EPA grant and local matching funds to develop and test biological indicators/metrics that reflect the functionality of wetlands surrounding Great Salt Lake. The primary question is whether nutrients from point and nonpoint sources are exceeding the assimilatory capacity of Farmington Bay wetlands and causing impairment to the designated beneficial use which is support for waterfowl and shorebirds and the aquatic life in their food chain. Multiple years of sampling have focused on describing basic ecological functions and important food chain links. Nutrients have been monitored in source waters and sediments and emergent and submerged aquatic vegetation. Associated water quality parameters, including pH and DO were compared to benthic macroinvertebrate and plant community measures. Macroinvertebrate assemblages were typical of those in similar wetland habitats. However, more tolerant taxa dominated sites with elevated nutrient loads. Although several predictable metrics could distinguish these differences, stomach analysis of common shorebirds demonstrated that these tolerant taxa were often the dominant prey items. In turn, nesting success of shorebirds indicate that the beneficial use is being fully supported. These results will be discussed in terms of the goals of Clean Water Act beneficial use assessments and next steps for performing wetland assessments.

## **Level 1 Wetland Assessment in North Dakota's Prairie Pothole Region**

Rebecca L. Phillips, USDA Agricultural Research Service, Mandan, ND,

Ofer Beeri, University of North Dakota, School of Aerospace Sciences, Grand Forks, ND

**Keywords: Landsat, GIS, Advanced Space Born Thermal Emissions Radiometer, Remote Sensing, Subwatershed Modeling**

**Abstract:** The need for current indicators of wetland condition and cumulative impacts on water resources in the Prairie Pothole Region (PPR) outpaces the capacity of traditional field data collection, calling for collection of assessment data at landscape scales. The dynamic nature of prairie pothole wetlands and the extensive geographic area of the PPR demand that Level 1 assessment includes time-sensitive indicators, but methods are lacking for this region. By examining the relationship between traditional indicators of ecological health and features in the surrounding landscape, we demonstrate remote sensing-based metrics for wetland condition using landscape features as surrogate ecological indicators. Our approach includes a suite of time-sensitive indicators: hydroperiod, land-use, plant communities, and buffered waters. We also modeled subwatersheds to identify groups of wetlands within a common catchment according to surface flows. These data were combined with geologic and soil data layers to identify profiles of wetlands within a subwatershed. Profiles delineate current condition for the population of wetlands within a watershed and target potential restoration sites. Here, we present profiles from (1) a reference site and (2) a comparable, anthropogenically-impacted site. Results indicate these complex wetland ecosystems should be assessed as dynamic populations residing within a catchment using tools that facilitate repeated monitoring to adequately capture temporal sensitive parameters. We underscore how Level 1 assessment for dynamic wetland landscapes in the PPR bridges gaps in traditional field-based knowledge to support comprehensive wetland conservation plans.

## **Wetland Monitoring and Assessment Techniques**

Mike Davis, Dan Ackerman, Nicole Kunkel, Sheri Lares, North Dakota Department of Transportation, Bismarck, ND

**Keywords: Monitoring, Functionality, Wetlands, Wetland Delineation Manual, MnRAM**

**Abstract:** There are numerous wetland monitoring and assessment techniques. In North Dakota, the North Dakota Department of Transportation (NDDOT Engineering and Environmental Section) is developing a reasonable and suitable method for monitoring and assessing mitigated wetland functionality. This method must be quick and straightforward to administer due to the time constraints placed on agencies. As a mitigation goal, the NDDOT hopes to restore impacted wetlands with functioning equivalents within five years of impact. The functionality of wetlands is measured on the basis of vegetation, soils, hydrology, and incorporation into the surrounding landscape. Successful functionality of vegetation is measured by the establishment of wetland vegetation dominance within the mitigated sites. Dominance is completed by meeting or exceeding 67%, as established by the 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual. Soil success is measured on the basis of depth, appearance of redox features, gravel content, and degree of compaction. Hydrology, similar to vegetation, is measured according to the USACE 1987 Wetland Delineation Manual. Landscape integration is measured by following the Minnesota Routine Assessment Method (MnRAM) which is composed of 72 parameters that measure hydrology, habitat, water quality, and groundwater interaction. These techniques allow agencies to rapidly monitor and assess wetlands using a scientific approach.

## **Functional Assessment of Colorado's Wetlands: The Benefits and Application of Stressor-based Techniques in Wetland Evaluation**

Brad Johnson, Colorado State University, Department of Biology, Fort Collins, CO

**Abstract:** In 2006, Colorado Department of Transportation commissioned a study to develop a rapid functional assessment method suitable to meet their Clean Water Act (CWA) permitting needs. If acceptable, U.S. Army Corps of Engineers desired to adopt the method for general use in their CWA permitting program. The author, in collaboration with EcoMetrics, LLC, surveyed past and current assessment approaches seeking to develop the most efficient approach in light of programmatic needs and agency resource limitations. Plying recent advances in wetland science and assessment technology, the study team developed a methodology based on evaluation of stressors and their effects on wetland functioning and condition. The study team suggests that stressor evaluation is a rapid and intuitive, yet powerful approach to wetland assessment. Some key advantages of a stressor-based approach such as the one developed in Colorado, is that it takes full advantage of hydrogeomorphic assessment theory without being cumbersome, it indexes current wetland functioning relative to natural (reference) functioning, and it catalogs and highlights specific causes of wetland degradation. This latter characteristic is particularly valuable for developing mitigation plans, since alleviation of wetland stressors is the basis for wetland restoration and enhancement.

### **Three Tiered Wetland Assessment using a Probabilistic Design**

Edward Shawn DeKeyser, Christina Hargiss, Donald R. Kirby, North Dakota State University, Department of Animal and Range Sciences, Fargo, ND, Michael J. Ell, North Dakota Department of Health, Bismarck, ND

**Abstract:** We assessed wetland plant community integrity (health) in a designated area of the Missouri Coteau in central North Dakota. A probabilistic design was used in the selection of sample points and a three tiered sampling approach was utilized to estimate the vegetative condition of wetlands within the defined area. The three tiered approach included a remote sensing, rapid assessment, and an intensive assessment component. Four different sampling models were applied to wetlands in the study area: 1) the Landscape Wetland Condition Analysis Model (LWCAM); 2) the North Dakota Rapid Assessment Method (NDRAM); 3) the Index of Plant Community Integrity (IPCI); and 4) the Hydrogeomorphic (HGM) model. The LWCAM is a geographic information system-based model that quantitatively assesses landscape structure surrounding a wetland and predicts the potential wetland plant community integrity. The NDRAM quickly estimates the overall wetland integrity of a site with results similar to the IPCI. The vegetative-based IPCI evaluates the condition of plant communities based on a site intensive plant community survey. The HGM model quantifies the amount of disturbance within a wetland basin based on physical, chemical, and biological characteristics at the site and landscape levels. There were 255 seasonal wetlands sampled using the four procedures. There were approximately another 700 temporary, seasonal, and semi-permanent wetlands sampled using the NDRAM. Information from this study can be used as a model for determining need specific, financial, and time appropriate wetland sampling methods for other areas of the Prairie Pothole Region.

### **Assessment of Wetland Condition in the Missouri Coteau of North Dakota**

Christina Hargiss, Edward Shawn DeKeyser, Donald R. Kirby, North Dakota State University, Department of Animal and Range Sciences, Fargo, ND, Michael J. Ell, North Dakota Department of Health, Bismarck, ND

**Abstract:** We assessed wetland condition based on plant community integrity in a designated area of the Missouri Coteau in central North Dakota. Four different sampling models were applied to wetlands in the study area: 1) a geographic information system-based Landscape Wetland Condition Analysis Model (LWCAM); 2) the North Dakota Rapid Assessment Method (NDRAM) for estimating wetland condition; 3) the vegetative-based Index of Plant Community Integrity (IPCI); and 4) the Hydrogeomorphic (HGM) model. Results from testing approximately 955 wetlands using the four sampling procedures found a variety of land uses and vegetation characteristics were present in the study area. Results from the IPCI were compared to results found using the NDRAM and LWCAM Models. The NDRAM and LWCAM differed in precision in determining wetland condition when compared to the IPCI. To find the overall condition of the area results of the Models' were considered individually and correlated. Results showed that wetland condition was based on land use while topography was the main factor affecting land use and consequent wetland condition. Repeat assessment of this study area has the ability to indicate the trend of wetland plant community integrity in relation to the present and future predominant land practices. Information from this study can also be used to estimate wetland condition across other areas of the Missouri Coteau and can be used as a model for determining appropriate wetland sampling methods for other areas of the Prairie Pothole Region.

## **SPECIAL SESSION: INTERMITTENT STREAMS**

### **Selection and Validation of Intermittent Stream Reference Sites for Eastern South Dakota: Evaluation of GIS-Generated Watershed Condition Scores against Field Validation Data**

Nels H. Troelstrup, Jr., Eric Rasmussen, Ross Vander Vorste, Sol Brich, South Dakota State University, Department of Biology & Microbiology, Brookings, SD

**Keywords:** Intermittent Streams, Ecoregion, ATtILA, Reference Site

**Abstract:** Water quality monitoring and assessment efforts are conducted with the context of regional benchmarks called reference sites. Reference sites are operationally defined as those which are minimally impacted within a particular physiographic or ecological region. South Dakota currently has no stream reference site selection process. The objectives of this effort were to (1) utilize GIS-based, landscape assessment tools to identify high quality watersheds within eastern South Dakota and (2) evaluate watershed condition scores against on-site field data. Intermittent, headwater streams (watershed area 1-6 km<sup>2</sup>) were delineated using the NHDPlus database to yield a total population of 2,849 streams. Watershed condition scores were generated using ATtILA based upon GIS data layers of human population density, elevation, slope, stream flowlines, land-cover, precipitation and roads. ATtILA scores ranged from 5 (Excellent) to 100 (Severely Degraded) with an ecoregion average of 52.5. Forty candidate reference sites with watershed condition scores falling in the upper 25<sup>th</sup> percentile were randomly selected by Level IV ecoregion and validated against digital orthophotoquads using ARCVIEW. Those passing remote validation criteria were also field validated using the Peterson Riparian Channel Evaluation (RCE) protocol. As expected, RCE scores demonstrated a negative, linear relationship with ATtILA scores ( $R^2=0.59$ ). While local site conditions

did vary significantly around the predicted regression line, it is clear that ATtILA was an effective screening tool for selection of regional reference sites. It is proposed that this methodology be employed to select ecoregion-specific reference sites for future stream habitat and biological monitoring efforts.

## **THEME 2: WETLAND PROTECTION AND DELINEATION**

### **Are Field-Implementation Processes Pursuant to the Corps of Engineers' Wetlands Delineation Manual Meeting the Manual's Intent?**

Michael McKernan, David Huebert, TetrES Consultants Inc., Winnipeg, CAN

#### **Keywords: Wetlands, Delineation, Hydric Soils**

**Abstract:** Within the United States, the wetland protection is an objective pursuant to s.404 of the *Clean Water Act* (CWA). The U.S. Army Corps of Engineers (USCoE) 1987 'Wetland Delineation Manual (WDM)', provides guidance for delineation of wetlands by wetland-designation specialists. In principle, wetland delineation is based on vegetation, hydrology, and soil characteristics. In practice, pedological criteria are often of key importance. One consequence of emphasis on pedologic attributes is that, notwithstanding that many low-lying areas have not impounded surface waters for centuries, the presence of hydric soil attributes in such low-lying depressions usually results in the strict requirement to designate such areas as "wetlands", even when occurring exclusive mono-topic dryland agricultural crop cover. Where such "wetlands" drain to a navigable waterbody, they must be protected as being "jurisdictional wetlands."

Another consequence is that wetland values and attributes can be threatened when large (and, often, politically-sensitive) projects are rushed to completion. In Benson County, ND, in 2004, field investigations of the thoroughness of prior wetland delineations found that selective excavation of the 'A' and 'B' horizons in certain soil profiles during project construction removed key evidence of what was indicated to have been "wetland" by aerial photographs, satellite data, drainage maps, and other applications of the USCoE manual. The absence of the key pedological matrices, and of the evidence of redoximorphic and other hydric attributes, meant that the mis-designation of one wetland, or the incomplete designation of other wetlands, could not be proved. The absence of proof also meant that violations of s.404 of the CWA could not be proved. Similarly, one specific violation (of several) of the prescriptions of Nation-Wide Permit NWP-12 could not be proved. These examples illustrate how procedural emphasis on soil hydric features can subvert the intent of the WDM.

### **Identification and Analysis of Geographically Isolated Wetlands in Montana**

Linda Vance, Montana Natural Heritage Program, Helena, MT

**Abstract:** Over the past several years, the federal courts have issued several rulings that restrict Clean Water Act jurisdiction over wetlands that are not connected to navigable rivers. In the Glaciated Plains, many wetlands have no apparent surface water connection to any river, navigable or not, and in the absence of state legislation, may lack any substantial legal protection. At the same time, these wetlands are under pressure from resource extraction and crop agriculture. In this presentation, we will discuss our recent Montana study which used GIS to analyze the extent of isolated wetlands across mapped areas of the state, and to identify those which might be particularly threatened by energy and agricultural development. We will explain the assumptions and techniques that we used, detail the important findings, and outline the data that would be required to implement a similar analysis in other states.

### **Clean Water Act Section 404 Jurisdictional Determinations**

Chris Hunter, US EPA Headquarters, Wetlands Division, Washington, DC and Toney Ott, US EPA Region 8, Wetlands Program, Denver, CO

**Abstract:** In June of 2006, the United States Supreme Court rendered a split decision in the case of *Rapanos v. United States/Carabell v. United States*. In response to this decision, EPA and the Corps of Engineers issued guidance to the field implementing the decision in June 2007. This guidance created new categories of waters and new rationales for asserting jurisdiction, such as "relatively permanent waters" and "waters with a significant nexus to traditionally navigable waters".

In order to implement this guidance, Army Corps and Engineers and EPA field offices have been trying to utilize existing hydrologic and watershed data for particular aquatic resources, and define the needs for new tools to consistently and appropriately assert jurisdiction. Staff in both agencies is looking to watershed assessment tools to provide the information needed to make determinations that are quick, consistent, and defensible, as well as reduce the new workload demands imposed by the new guidance. Additionally, there is a growing recognition that these tools, and the data they provide, can be used in areas outside jurisdictional determinations, such as broader regulatory project review, and compensatory mitigation.

This presentation will briefly cover the guidance stemming from the *Rapanos* decision, an overview of the guidance itself, and current practices in Region 8. The majority of the time will then be spent discussing opportunities for

watershed assessment tools to provide needed data for jurisdictional determinations, and presenting one jurisdictional case study.

### **Developing a State Wetland Conservation Strategy**

Lynda Saul, Montana Department of Environmental Quality, Helena, MT

**Abstract:** The State of Montana through the Montana Wetland Council recently completed a year-long planning process to develop a conservation strategy for wetlands titled; “Priceless Resources: A Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2008-2012.” Montana will share their experience working with the broad-based Wetland Council, a strategic planner, a Strategic Planning Team, and requesting and receiving input from over 500 Montanans. Buy-in from diverse constituencies was critical to the development and acceptance of the Strategic Framework. Lessons learned and recommendation for other states, tribes, and others will be described. The Governor has endorsed Montana’s Strategic Framework.

### **Formation of the Flathead Reservation Aquatic Weed Working Group - a Cooperative Approach to Addressing Aquatic Invasive Species Issues**

Sue Ball, Wetland Conservation Program, Pablo, MT

**Abstract:** Preventing and combating introduction of aquatic invasive species across multi-jurisdictional and ownership boundaries requires an integrated, cooperative approach that was lacking on the Flathead Indian Reservation of western Montana. Recognition of the increasing cost and threat to our aquatic resources from locally established populations of purple loosestrife, yellow flag iris, flowering rush, and reed canarygrass, and the proliferation and expansion of many other aquatic invasive species throughout our region, prompted the formation of a local Flathead Reservation Aquatic Weed Working Group (AWWG). In order to help protect function and value of the diverse wetland and riparian habitats of the Reservation the CSKT Wetlands Conservation Program started organizing the AWWG and hosting 3 meetings per year starting in 2006. All interested local, Tribal, State, and Federal agencies, local Tribal College and State Universities, Extension Programs, conservation groups and public are invited to participate in information transfer, workshop development, coordination of mapping and treatment activities, and partnership development for pursuing funding for projects identified by the AWWG. To date we have had 20-60 active participants at our meetings; shared information about and ranked potential impact from approximately 30 aquatic and riparian invasive species that exist on or near the Reservation; hosted a free summer workshop on identification of submergent aquatic species of the Reservation attended by 30 participants; are developing a guide to aquatic invasive species and their native look-a-likes; and have formed several partnerships for successful pursuit of grant funding for AWWG supported research, management, or education projects.

## **THEME 3: WETLAND FUNCTIONS AND RESTORATION**

### **A Quantitative System for Linking Wetland Functions to New National Wetlands Inventory Mapping with Hydrogeomorphic Attributes in Montana**

Greg Kudray, Linda Vance, Montana Natural Heritage Program, Helena, MT

**Keywords:** National Wetland Inventory, Hydrogeomorphic, Wetland Functions, Landscape Analysis, Wetland Mapping

**Abstract:** Hydrogeomorphic (HGM) attributes are assigned for all new National Wetland Inventory (NWI) mapping completed by the Montana Wetland/Riparian Mapping Center. Each combination of NWI – HGM codes used in mapping has been assigned one of three performance levels based on a literature review for each of ten wetland functions. While the HGM system was developed to estimate wetland functions, HGM codes lack information about significant site factors coded in the NWI classification like water regime and vegetation, which influence functions like habitat value, sediment retention, and nutrient cycling. Incorporating the information inherent in both systems results in a more accurate assessment of wetland functions.

Performance levels are multiplied by wetland polygon acreage then each function is summarized in 0.5 km landscape grid cells for map display. Levels for some functions are modified to reflect differences in performance with elevation. Functions include: 1) water storage and flood peak modification, 2) stream flow maintenance, 3) ground water recharge, 4) nutrient cycling, 5) sediment retention, 6) shoreline stabilization, 7) native plant community maintenance, 8) terrestrial habitat, 9) aquatic habitat, and 10) conservation of wetland biodiversity.

Maps of functions will be presented from a wetland change study in the Bitterroot Valley of Montana. The maps show where various ecological functions are concentrated in the landscape. This system has been incorporated into all new NWI mapping for Montana; over 25% of Montana is currently funded for new mapping. This functional attribution will be useful for public education, wetland policy development, conservation activities, mitigation, and research.

## **Evaluation of the Ability of a Linear Fen/Bog Wetland Complex at Colomac Mine, Northwest Territories, Canada to Accommodate Treated Mine Effluent**

Dave B. Huebert, Michael McKernan, TetrES Consultants Inc., Winnipeg, CAN

**Keywords:** Wetland, Attenuation, Nitrogen, Phosphorus

**Abstract:** The Colomac gold mine north of Yellowknife, NWT, Canada, ceased operations in 1997. Part of the legacy of mine operations was a tailings pond contaminated with cyanide. The tailings pond was remediated through addition of phosphorus, which accelerated the breakdown of the toxic cyanide, but which resulted in production of nutrient-rich water. The purpose of our study was to characterize the vegetation and flow patterns within a wetland complex adjacent to the tailings pond, and to determine if the wetland could accommodate the anticipated flow from the tailings pond and attenuate N and P in discharge waters. The 8 ha wetland complex was primarily a black spruce-dominated linear fen, with a natural seepage channel connected by two small open pools containing aquatic sedge (*Carex*). The seepage channel was large enough to accommodate the spring-freshet peak flow of 7,200 m<sup>3</sup>/d, though it was possible that an increase in flow would alter vegetation within the wetland complex, and depth to permafrost. Based on residence time, the wetland could attenuate P at yearly mean flow rates, but at peak flow rates, the projected 4-day residence time was insufficient for complete removal of P from discharge waters. Assuming optimal rates of denitrification, the wetland was capable of attenuating N under most, but not all, flow scenarios. Based on the requirements for N and P removal, it was recommended by TetrES that peak flow rates be reduced through a variety of flow management techniques both upstream of, and within, the wetland complex.

## **Manning Lake Wetlands Tribal Wildlife Refuge Project**

Jeanne Spaur, Fort Peck Assiniboine and Sioux Tribes, Fish and Game Department, Poplar, MT

**Keywords:** Wetlands, Tribal, Migratory Birds, Refuge

**Abstract:** The Manning Lake wetland complex lies within the Big Muddy Creek floodplain on the Fort Peck Indian Reservation in northeast Montana. It is a unique landscape consisting of a vast complex of wetlands and adjacent prairie that together create incredible feeding, breeding, nesting, rearing, and stopover sites for thousands of waterfowl and other migratory birds, including many species of conservation concern. The area harbors one of Montana's only colonies of Franklin's gulls (a species noted to be of high national conservation concern by the US Fish and Wildlife Service Partners in Flight and National Audubon Society) and the only known nesting site of the white-faced ibis in eastern Montana. The wetlands are also an important foraging site for the nearby Medicine Lake white pelican nesting colony (one of the largest in North America). Additional species of concern using the area include the long-billed curlew, Le Conte's sparrow, Baird's sparrow, Sprague's pipit, and the marbled godwit. In order to ensure that the incredible wetlands, grasslands, and unique wildlife that inhabit the Manning Lake wetland complex are conserved, protected, and restored, the Fort Peck Tribes Fish and Game Department is working to obtain leases on or to purchase lands within the project area. The protection and conservation of this area as the Manning Lake Wetlands Tribal Wildlife Refuge (MLWTWR) is believed to create the first tribal wildlife refuge while increasing tribal land base. The MLWTWR project is made possible through an USFWS Tribal Landowner Incentive grant.

## **Plant Community Composition of Restored Prairie and Wetlands in the Prairie Pothole Region**

Breanna Paradeis, Edward Shawn DeKeyser, Don Kirby, North Dakota State University, Dept. Animal Range Sci, Fargo, ND

**Abstract:** Prairie and wetland ecosystems are ecologically important features throughout the Prairie Pothole Region (PPR). Ecosystems throughout the PPR have been impacted by various human activities including land conversion due to agricultural practices. Anthropogenic impacts on prairie and wetland ecosystems have led to a decline in ecosystem functions, limiting the amount of benefits received by humans, livestock, and wildlife throughout the PPR. Attempts have been made to improve the structure and function of prairie and wetland ecosystems via the restoration of native prairie and wetland vegetation. The goal of this study was to evaluate the species composition and physical characteristics of restored wetlands including their adjacent upland areas. Wetland plant communities were evaluated using the Index of Plant Community Integrity (IPCI) approach and upland plant communities were evaluated using a transect method. The vegetation data for each study site was divided into four subsets chosen to represent a gradient of landscape position, recognizing that plant community composition varies with slope position. Sites were further divided by location and land use history (native or restored). Data was analyzed using a Non-metric Multidimensional Scaling (NMS) ordination and a Multi-Response Permutation Procedure (MRPP). The results of these analyses may be used to identify the potential composition of wetland and prairie plant communities in restored areas and to evaluate the success of prairie and wetland restorations throughout the PPR.

### **Natural Wetland Restoration by Beaver (*Castor canadensis*)**

Carol A. Johnston, South Dakota State University, Department of Biology & Microbiology, Brookings, SD;

Marla Striped Face-Collins, Sitting Bull College, Ft. Yates, ND and United Tribes Technical College, Bismarck, ND

#### **Keywords: Beaver, Dam, Creek, Pond, Discharge**

**Abstract:** We investigated the role of beaver (*Castor canadensis*) in creating wetlands and promoting water retention by their dam building in western streams. Beaver dams across Oak Creek, on the Standing Rock Reservation near Wakpala SD, retained water in the creek channel during July 2006 despite extreme drought; portions of the creek that were not impounded by beaver were dry. Water depth was measured at six cross-sections across a dammed portion of the creek, and volumetric calculations indicated that significant amounts of water were being stored in the beaver "pond." Long-term discharge measurements at downstream U.S. Geological Survey gauging station 06354882 show that Oak Creek flow is highly variable, with minimum flows of 0 cfs and a maximum flow of 6,800 cfs that occurred on March 28, 1997. These findings substantiate anecdotal information gained from long-time area ranchers, which credited beaver-impounded water with saving their ranching operations from certain disaster during major drought conditions. By keeping the water in surface pools, beaver ponds mitigate a negative impact of climate change by making water available for use by livestock and other fauna that inhabit the riparian zone. Restoration of *Castor canadensis* to their rightful place in a balanced Northern Plains ecological system may contribute a significant portion of surface stored water, thereby locally mitigating the negative impact of current and future droughts and adverse climate changes on local ranching and wildlife management activities.

## **POSTERS**

### **Wetland Monitoring and Assessment in Minnesota**

John Genet, Minnesota Pollution Control Agency, St. Paul, MN

### **New Aerial Photography for Montana: Public Access and Applications in Wetland/Riparian Mapping**

Greg Kudray, Montana Natural Heritage Program, Helena, MT

### **GIS Tools for Level 1 Landscape Assessment**

Linda Vance, Montana Natural Heritage Program, Helena, MT

### **Building a Statewide Non-regulatory Wetland Program through Wetland Program Development Grants: Montana's Experience**

Lynda Saul, Montana Department of Environmental Quality, Helena, MT

### **Wetland Classification Approaches in Monitoring and Assessment Design**

Linda Vance, Montana Natural Heritage Program, Helena, MT

### **Wetland Restoration for Conservation Focus Areas**

Tom Hinz, Montana Fish, Wildlife and Parks, Helena, MT

### **EPA Region 8 Wetland Program Development Grants from FY2003 - 2007**

Jill Minter, US EPA Region 8, Wetlands Program, Denver, CO

### **2011 National Assessment of Wetland Condition**

Michael Scozzafava, US EPA Headquarters, Wetlands Division Monitoring and Assessment Coordinator, Washington, DC

### **Enhanced NWI updates from 2005 - 1m CIR and NAIP Imagery**

Susan Ball, Wetlands Conservation Program, Pablo, MT and Dennis Lichtenberg, USGS National Wetlands Research Center, Polson, MT

### **Springs of Bighorn Canyon NRA-An Inventory**

Denine Schmitz, Montana State University, Land Resources and Environmental Sciences, Bozeman, MT

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