

**Black Hills Area Botanist & Ecologist Workshop
(BHABEW XI)
March 7, 2013**

Posters – up all day

- Baasansuren & Davaa– **Climate Change Impact on Water Regime and Resources in Mongolia**
- Chowanski et al. – **Assessing Wetland Restoration with Phosphorus Forms: Linking Biogeochemical Function and Plant Community Structure**
- Drons & Johnson – **The Native Bee Inventory of the Black Hills**
- French – **Using Partnerships to Treat Weeds after the WhoopUp Fire**
- Symstad et al. – **Using a Global Vegetation Model to Plan Local Natural Resource Management in a Changing Climate**

8:30 – 9:00 Coffee's On!

This would be a good time to peruse the posters and ask the authors questions.

9:00 – 9:10 Welcome and Introductions

9:10 – 10:25 Session 1

- Rolfsmeier – **The “Lost” Endemic Flora of the Black Hills** (25 minutes)
- Sprague & van Ee – **Diversity of Coralroot Orchid Taxa (*Corallorhiza*, Orchidaceae) in South Dakota's Black Hills** (15 minutes)
- Robertson & Dixon – **Assessment and Management of Hybrid Aspen Stands (*Populus xsmithii*) in the Niobrara River Valley of Northwest Nebraska** (20 minutes)
- Nelson & van Ee – **Species Range Boundaries in Central North America: Paraphyly and Hybridization in *Juniperus* (Cupressaceae)** (15 minutes)

10:25 – 10:35 Break

10:35 – 12:00 Session 2

- Haar et al. – **New Native and Exotic Species for Badlands National Park** (15 minutes)
- Butler et al. – **Investigating a New Exotic Plant Species: An Example from the Fort Pierre National Grasslands** (30 minutes)
- Symstad et al.– **Climate Change Vulnerability of Select Black Hills Karst-Associated Species** (20 minutes)
- Bolka – **Invasive Plant Orientation** (20 minutes)

12:00 – 1:15 Lunch (on your own)

1:15 – 2:45 Session 3

- Nancy Drilling – **Small Owl Banding in Western South Dakota: 2012 Results** (20 minutes)
- Wilson & Wakamiya – **Landbird Long-term Monitoring Protocol for the Northern Great Plains I&M Network** (20 minutes)
- Ott & Hartnett – **Bud Bank and Tiller Dynamics of Three C₃ Perennial Grasses in Mixed-grass Prairie** (20 minutes)

- Turner et al. – **To Plow or Not to Plow: Investigating Grassland-to-Cropland Conversion in the Northern Great Plains Using Systems Dynamics** (30 minutes)

2:45 – 2:55 Break

2:55 – 4:15 Session 4

- Swanson & Wienk – **Reducing Crown Fire Potential at Mount Rushmore National Memorial Using Mechanical Treatments** (20 minutes)
- Juntti – **Monitoring Residual Vegetation on Meadows in the Northern Black Hills, 2010-2012** (20 minutes)
- Cahlander-Mooers – **Present and Historic Riparian Vegetation and Communities of the White River in Northwestern Nebraska and Southwestern South Dakota** (20 minutes)
- Burkhart & Kovacs – **Condition Assessment of Streambanks and Streamside Vegetation on Perennial Streams in Wind Cave National Park 2009-2012** (20 minutes)

4:15 Wrap-up

Abstracts

(Alphabetical by first author's last name)

Baasansuren S. (Mongolian University of Science & Technology) and G. Davaa (Hydrology Section, Institute of Meteorology, Hydrology and Environment) – **Climate Change Impact on Water Regime and Resources in Mongolia.** Water resources in Mongolia consist of lake water (500 cu km), Glaciers (63 cu km), Rivers (34.6 cu km), Groundwater (10.8 cu km), surface water (599 cu km). Water resources of Mongolia are limited and unevenly distributed within the country and there are three main hydrological Basins: Arctic Ocean basin, Pacific Ocean basin and Central Asian Internal Drainage basin that are divided into 29 river basins (IWRM, 2009). In 2007 a hydrological inventory showed that 884 (17.2%) streams, 1189 (31.6%) lakes and 2260 (24.3%) springs were dried out. The following common issues and problems have been identified in the 29 river basins located in Mongolia: (1) Temperature and Dryness are increased due to variation and change; (2) Use of Forests; (3) Overgrazing and Mining; (4) Unsustainable Use of Water; (5) Environmental Pollution. These factors (climate change and human activity) have led to desertification in Mongolia. Integrated River Basin Management (IRBM) could be developed and implemented as a solution. (*Poster*)

Eugene Bolka (Mystic Ranger District, Black Hills National Forest, USDA Forest Service) – **Invasive Plant Orientation.** Invasive plants: How they spread, why control is needed, cost, treatments, and new plants around the corner.

Beth Burkhart & Kevin Kovacs (Wind Cave National Park, National Park Service) – **Condition Assessment of Streambanks and Streamside Vegetation on Perennial Streams in Wind Cave National Park 2009-2012.** A pilot project was developed and implemented at Wind Cave National Park (WICA) using the BLM Multiple Indicator Monitoring of Streambanks and Streamside Vegetation (MIM) protocol. The purpose of the project was to collect data in order to assess condition of WICA perennial surface water streams relative to production of ecological services including forage and browse production; wildlife use; species richness (plant and animal); compositional, structural, and functional diversity; watershed health; and hydrologic function. MIM data was collected for baseline condition assessment in 2009-2010 from nine transects on the three perennial streams in the park: Beaver Creek, Highland Creek, and Cold Spring Creek. MIM data was again collected in 2012 to provide information on condition change. MIM transect data/information was extrapolated to the full lengths of Beaver Creek and Highland Creek (by ground-truthed identification of segments representable by different MIM transects) to develop preliminary condition assessments for the streams as a whole.

Jack Butler (Rocky Mountain Research Station, USDA Forest Service), Brian Korman (Missouri National Recreational River, National Park Service), Gary Larson (Dept. of Natural Resources, South Dakota State University), Madhav Nepal, Sarbottam Piya (Dept. of Biology and Microbiology, South Dakota State University) & Stefanie Wacker (Rocky Mountain Research Station, USDA Forest Service) – **Investigating a New Exotic Plant Species: An Example from the Fort Pierre National Grasslands.** We report the first investigation of sickleweed (*Falcaria vulgaris* L.) in the United States. Sickleweed is native to Eastern Europe and Western Asia and was first reported in the United States in 1922. In recent years, abundance and distribution of sickleweed has increased dramatically in and around the Fort Pierre National Grasslands (FPNG). Management of new exotics is hampered by a lack of information on their biology and ecology. We used an environmental gradient approach to describe the abundance and distribution of sickleweed on the FPNG. We also investigated germination characteristics and population genetics of sickleweed.

Alex Cahlander-Mooers (University of South Dakota) – **Present and Historic Riparian Vegetation and Communities of the White River in Northwestern Nebraska and Southwestern South Dakota.**

The White River runs from northwestern Nebraska through Pine Ridge, the South Dakota Badlands, and southwestern South Dakota into the Missouri River at Lake Francis Case. At 816 km (508 miles), the White River is one of the longest undammed rivers in the lower 48. Because the flow is unimpounded, the riparian corridor contains native communities and vegetation not commonly found in rivers with altered hydrologic regimes. This talk will discuss the vegetation and plant communities of the White River as they change across various major ecoregions, and historically, using aerial photography.

Kurt Chowanski, Lisa A. Kunza, P.V. Sundareshwar (Dept. of Atmospheric Sciences, South Dakota School of Mines & Technology), Robert Gleason (Northern Prairie Wildlife Research Center, U.S. Geological Survey), Perry Pellachia (Dept. of Chemistry and Biochemistry, Nuclear Magnetic Resonance Facility, University of South Carolina) & Christine Sandvik (Dept. of Atmospheric Sciences, South Dakota School of Mines & Technology) – **Assessing Wetland Restoration with Phosphorus Forms: Linking Biogeochemical Function and Plant Community Structure.** We evaluated the use of soil phosphorus (P) forms as an index of biogeochemical function to assess wetland ecosystem restoration. We compared chemical P forms, soil properties, and plant community structure across a land use gradient of cultivated, restored and undisturbed reference wetlands in the Prairie Pothole Region. Our results show trends in the number of P forms and the relative abundance of orthophosphate across the land use gradient, and weak correlation between P forms and plant community structure.

Nancy Drilling (Rocky Mountain Bird Observatory) – **Small Owl Banding in Western South Dakota.** In 2012 we again banded small owls in the Black Hills and Custer National Forest during fall migration. In addition, we banded nestling owls during the summer. We caught many more owls than in 2011, including recaptures of a couple of our nestlings. However, we still have not captured an owl that was banded elsewhere.

David Drons & Paul J. Johnson (Insect Biodiversity Lab, South Dakota State University) – **The Native Bee Inventory of the Black Hills.** The native bees of the Black Hills were actively surveyed for two years with traps (ca. 88,000 trap-hours) and net collecting during the primary bee activity season from mid May to late September, representing 94 sample sites. All major habitat types sampled and the bulk of the Black Hills proper was represented. Floral resources used by bees were documented. Literature and museum records were collated for regional occurrence records of species. In summary, nearly 22,000 bees were collected that represented nearly 300 species, for an approximate increase of 30% of bee diversity. Sixty-seven (67) bees historically recorded were not found. One new species of *Dianthidium* is confirmed, while 118 species are newly recorded from the region. Collecting events by 35 volunteers contributed samples from 47 sites. The results indicate that additional collecting is needed to fully document the native bee biota of the Black Hills, especially if the savanna and shrub-steppe margins of the forested region are included. Additional attention to 102 morphospecies of the taxonomically difficult sweat bees may yet reveal additional new species or confirm identities of historical species. (*Poster*)

Sheila French (Hell Canyon Ranger District, Black Hills National Forest) – **Using Partnerships to Treat Weeds after the WhoopUp Fire.** This poster will discuss weed treatments on Elk Mountain post WhoopUp Fire. Partnerships on the project included Black Hills National Forest, State of Wyoming Forestry Division, State of Wyoming Department of Corrections Newcastle Honor Camp, Custer County Weed and Pest, and Nemo Job Corps Center. Treatments were made using trucks, UTV's and

lots of backpack spraying. In total over 1,000 acres were treated between June and August of 2013. Several Biological Control sites were also established. (*Poster*)

Milton J. Haar, Joshua A. Delger, and Paul J. Roghair (Badlands National Park, National Park Service) – **New Native and Exotic Species for Badlands National Park.** In the spring of 2011, moonwort (*Botrychium spp.*) was found for the first time in Badlands National Park. The identification, discovery, location, and the environment in which it was found will be described as well as efforts to return to the site for further study. An update on the spurge flax (*Thymelea passerina*) infestation at Badlands National Park will be given.

Thomas M. Juntti (Sierra Club) – **Monitoring Residual Vegetation on Meadows in the Northern Black Hills, 2010-2012.** Results of three years (2010- 2012) of residual vegetation data with average, above average and below average precipitation during the study will be presented. Direct (vegetation clipping) and indirect (Robel pole measurements) methods for measuring residual vegetation throughout the grazing period reveal high forage utilization and low residual vegetation in all three years. Robel pole data strongly correlated with direct clipping, demonstrating its usefulness for accurate and efficient monitoring of wildlife and livestock use by either forage utilization or residual vegetation paradigms.

Samantha Nelson & Benjamin van Ee (Black Hills State University) – **Species Range Boundaries in Central North America: Paraphyly and Hybridization in *Juniperus* (Cupressaceae).** The ranges of three species of *Juniperus* (Cupressaceae) overlap in Western South Dakota, the western *J. scopulorum*, the eastern *J. virginiana*, and the northern *J. horizontalis*. Given the lack of an erect stem, the creeping juniper (*J. horizontalis*) can be unambiguously distinguished from the other two, which are small trees, but otherwise these species are morphologically difficult to tell apart. We sequenced the nuclear ribosomal internal transcribed spacer (ITS) and the chloroplast trnC–D intergenic spacer for several accessions of these three species from across South Dakota to identify species boundaries and to look for genetic introgression within them.

Jacqueline P. Ott & David C. Hartnett (Division of Biology, Kansas State University) – **Bud Bank and Tiller Dynamics of Three C₃ Perennial Grasses in Mixed-grass Prairie.** Annual regeneration and sustainability of perennial grass populations rely heavily on the belowground bud bank. We quantified bud production and bud bank dynamics as they relate to aboveground tiller dynamics and/or belowground rhizome development in *Hesperostipa comata*, *Nassella viridula*, and *Pascopyrum smithii* at Wind Cave National Park over an entire growing season. Although all three species maintained small numbers of buds per tiller, the caespitose grasses maintained multiple generations of aboveground tillers in a single growing season while the rhizomatous grass exhibited a spring period of aboveground tiller elongation and a late summer period of rhizome elongation.

James M. Robertson & Mark Dixon (University of South Dakota) – **Assessment and Management of Hybrid Aspen Stands (*Populus xsmithii*) in the Niobrara River Valley of Northwest Nebraska.** The Niobrara River Valley has long been recognized as an area of great ecological diversity in Nebraska. It features a mix of eastern and western species which are often far-removed from their native ranges. A taxon of particular interest is *Populus xsmithii*, a hybrid of quaking aspen (*Populus tremuloides*) and bigtooth aspen (*Populus grandidentata*). Verified collections of this hybrid have been taken from a stand in Smith Falls State Park, and other stands are nearby. Currently, aspens across the western United States are experiencing decline associated with fire suppression, invasive red cedar (*Juniperus virginiana*), and climate change. In my study I hope to assess the age structure, health, and reproductive integrity of the hybrid stands at Smith Falls, and offer insight regarding their management.

Steven B. Rolfsmeier (High Plains Herbarium, Chadron State College) – **The “Lost” Endemic Flora of the Black Hills.** As there are several subspecies of animals known only from the Black Hills, one would expect endemic plant species as well. Although a handful of endemic plant taxa have been named or described historically, botanists have tended to express doubt (or denial) of their validity. The likelihood of endemic plants occurring in the Black Hills is discussed, and three examples of proposed endemics (a spruce, a phlox, and a meadow-rue) are examined in detail.

Rylan Sprague (northern Hills Ranger District, Black Hills National Forest, USDA Forest Service) & Benjamin van Ee (Black Hills State University) – **Diversity of Coralroot Orchid Taxa (*Corallorhiza*, Orchidaceae) in South Dakota’s Black Hills.** The most recent regional floristic treatments for South Dakota, such as *The Vascular Plants of South Dakota* (Van Bruggen, 1996) and *Plants of the Black Hills and Bear Lodge Mountains* (Larson and Johnson, 2007), treat *Corallorhiza* (Orchidaceae) to the species level. However, some of the five species of *Corallorhiza* present in the Black Hills may be represented by more than one infraspecific variety. We sequenced the nuclear ribosomal internal transcribed spacer (ITS) and the RuBisCo large subunit chloroplast gene (*rbcL*) for several accessions of *Corallorhiza* from the Black Hills to evaluate whether infraspecific varieties are present.

Daniel J. Swanson (Northern Great Plains Fire Ecology Program, National Park Service) & Cody L. Wienk (Midwest Regional Office, National Park Service) – **Reducing Crown Fire Potential at Mount Rushmore National Memorial Using Mechanical Treatments.** Mount Rushmore National Memorial has an extensive ponderosa pine forest, and the elimination of fire changed the historically open, heterogeneous forest structure to one that consisted primarily of closed stands with high densities of young trees. Higher tree density and lower crown base heights increased the risk of passive and active crown fire. To reduce the potential for crown fire, nearly all ponderosa pine trees less than 10 inches DBH were cut and chipped or piled at the Memorial in 2010. Forest structure data collected in sixty plots before and two years after thinning are being used to assess the treatment’s effect in reducing tree density and crown fire potential.

Amy Symstad (Northern Prairie Wildlife Research Center, U.S. Geological Survey), David King (Oregon State University), Dominique Bachelet (Conservation Biology Institute), Beth Burkhart, Dan Roddy, Greg Schroeder (Wind Cave National Park, National Park Service), and Dan Swanson (Northern Great Plains Fire Ecology Program, National Park Service) – **Using a Global Vegetation Model to Plan Local Natural Resource Management.** Wind Cave National Park (WICA) management goals include maintaining viable populations of bison, elk, pronghorn, and prairie dogs. These animals depend on the park’s mixed-grass prairies, and an important part of the park’s scenery is its transition from ponderosa pine forest to grassland. The nature and extent of prairie and forest are strongly influenced by climate, fire, grazing pressure, and their interactions. This poster presents the results of vegetation model simulations examining the interactions of management strategies and climate change at WICA. (*Poster*)

Amy J. Symstad (Northern Prairie Wildlife Research Center, U.S. Geological Survey), John Stamm, Andy Long (South Dakota Water Science Center, U.S. Geological Survey), Mary Poteet (University of Texas), Barbara Mahler, MaryLynn Musgrove (Texas Water Science Center, U.S. Geological Survey) – **Climate Change Vulnerability of Select Black Hills Karst-Associated Species.** Regionally downscaled climate projections and hydrological models for a select set of streams in the Black Hills are used to evaluate the vulnerability of seven plant and animal species associated with karst-fed streams or caves.

Benjamin L. Turner, Roger Gates (West River Ag Center, South Dakota State University), Timothy Nichols, Melissa Wuellner, Barry Dunn (South Dakota State University) & Luis Tedeschi (Texas A&M University) – **To Plow or Not to Plow: Investigating Grassland-to-Cropland Conversion in the Northern Great Plains Using Systems Dynamics.** From 1997 to 2007, 23.7 million acres of grassland were converted to cropland. Fifty seven percent were located in the Northern Great Plains (NGP). Since 2007, another 23.7 million U.S. acres have been converted with the majority located in the NGP. The short term positive benefits have been increased food production and returns to farmers. However, there could be unintended consequences through loss of ecosystem services like water quality degradation, wildlife habitat loss/fragmentation, and decreased carbon sequestration. The principal objective of this work was to: 1) identify structural features influencing land use decisions, 2) quantify implications for land management, and 3) forecast potential unintended consequences from those decisions.

Marcia Wilson & Sarah Wakamiya (Northern Great Plains I&M Network, National Park Service) – **Landbird Long-term Monitoring Protocol for the Northern Great Plains I&M Network.** Northern Great Plains I&M Network and Rocky Mountain Bird Observatory (RMBO) have developed a sampling design for monitoring landbirds at the Network parks. The Network will use the Integrated Monitoring in Bird Conservation Regions (IMBCR) sampling design. This design is based on a 1 km² grid system with 16 points evenly spaced within each grid. Grids will be selected using Generalized Random-tessellation Stratification sampling to ensure a spatially balanced design. The IMBCR design is hierarchal allowing estimates of density and occupancy at the park level as well as contributing to estimates at the State and Bird Conservation Region levels. The information will be used by park managers to aid in their resource decision-making processes.