

## Recent Trends in U.S. Prairie Pothole Wetlands

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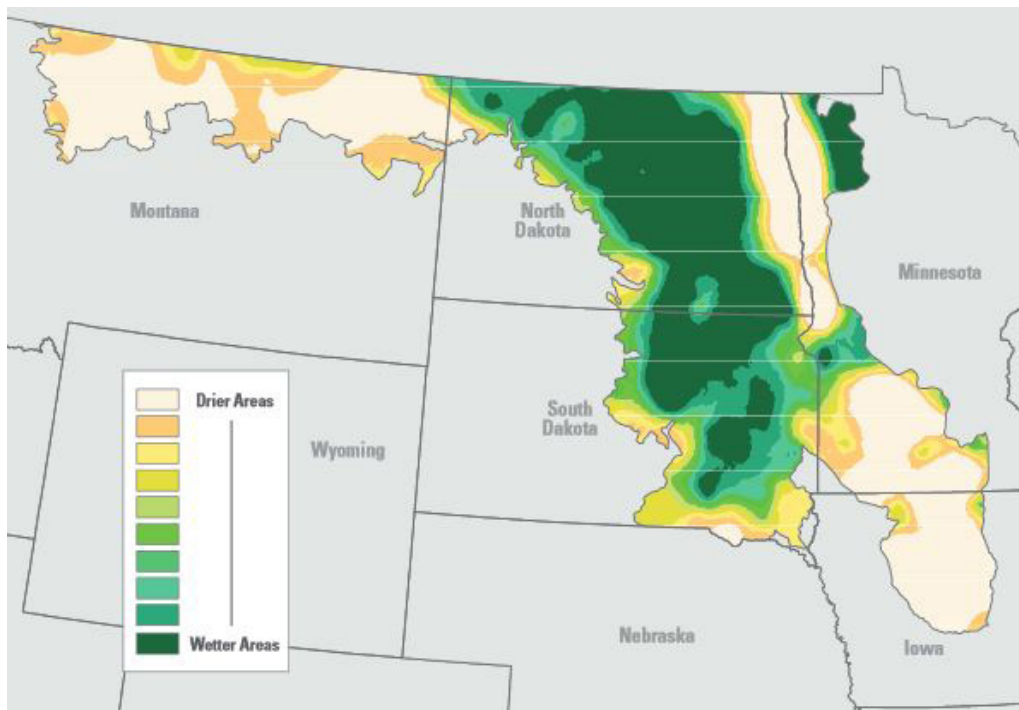


Figure 1. Location of the Prairie Pothole Region in the United States showing differences in wetness across the region. Wetter areas support the highest density of wetlands - more than 100 basins per square mile in places.

The U.S. Fish and Wildlife Service (USFWS) is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands. The most recent report released in July of 2014 presents the latest status information on the extent, type and trends of wetland resources in the Prairie Pothole Region (PPR) of the United States and provides estimates of losses or gains that occurred between 1997 and 2009.

The PPR in the U.S. encompasses an area of about 150,930 square miles and extends from central Iowa north to the Canadian border and includes portions of the states of Iowa, Minnesota, North Dakota, South Dakota and Montana (Figure 1). The region is characterized by numerous small landscape depressions left behind as the glaciers receded from this part of the continent. These landscape depressions, termed "potholes", collect rainfall and snowmelt forming small shallow wetlands and ponds (Figure 2).

1. [mitch\\_bergeson@fws.gov](mailto:mitch_bergeson@fws.gov) The findings and conclusions in this article are those of the author and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

During the past century, prairie wetlands were extensively drained and in some areas only isolated tracts of wetland habitat remain. Drainage for agriculture during the years preceding the 1980s was pervasive as tile and open-ditch drains eliminated large numbers of wetland basins and converted lands to crop production.

For this study changes in wetland area were measured by the examination of high resolution imagery for 755 randomly selected sample plots covering the PPR. The analysis of this imagery in combination with field verification provided a scientific basis for estimations of wetland extent, type and distribution that had occurred between 1997 and 2009. Important procedural enhancements

to this study of the PPR included the addition of wetland and water basin morphology, hydrologic descriptors and the addition of an upland grassland category to track changes in grassland area.

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Figure 2. Aerial view of pothole wetlands in Day County, South Dakota (2010).

*This section is intended to inform readers about ongoing wetland research by various universities, government agencies, NGOs and others. When studies are completed, WSP invites short articles that address key findings, while more technical papers are submitted to Wetlands or other peer-reviewed journals. Researchers interested in posting short or more detailed summaries of their investigations are encouraged to contact the WSP editor (please include "WSP Research News" in the email subject box).*

*This issue highlights graduate research at the **Department of Environmental Science and Biology, The College at Brockport, State University of New York, Brockport, New York**. Special thanks to Doug Wilcox for coordinating this contribution. Also see monthly issues of Wetland Breaking News for news clips on wetland research (<http://www.aswm.org/news/wetland-breaking-news/892-current-issue#science>).*

### **Water chestnut: germination, competition, seed viability, and competition in Lake Ontario**

#### **Objectives:**

1. Determine germination rate of invasive, exotic water chestnut (*Trapa natans*) under varying light and temperature.
2. Analyze intraspecific and interspecific competition between water chestnut and white water lily (*Nymphaea odorata*).
3. Find and monitor water chestnut patches throughout Braddock Bay.
4. Determine the viability of water chestnut seeds in different stages of development.
5. Inventory known occurrences of water chestnut in Lake Ontario wetlands.

**Expected completion:** May 2015

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### **Predicting potential effects of climate changes on WRP wetland restoration projects in Genesee County, New York**

#### **Objectives:**

1. Identify USDA NRCS WRP wetland sites that are potentially sensitive to predicted changes in climate and therefore likely to be reduced in size or altered in function or value from the original goal of the restoration, thus allowing adaptive management procedures to be applied.
2. Conduct hydrological assessments using a water budget approach to determine main water sources and identify sites at risk.
3. Map plant communities and sample vegetation quantitatively to assess vegetative indicators of water sources.
4. Collect specific conductance, temperature, and pH water chemistry data to identify different sources of water.
5. Record observations of muskrat activity to provide additional biological indicators of water-level changes.

**Expected completion:** May 2015

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### **The Effects of a Marcellus Shale Gas Drilling Accident on Wallace Mine Fen in the Moshannon State Forest, Pennsylvania**

#### **Objectives:**

1. Determine if surface and subsurface hydraulic fracturing accidents at gas well on private land have impacted Wallace Mine Fen (WMF) in Moshannon State Forest, PA.
2. Collected tree core samples from five trees at WMF and analyzed using Gas Chromatography Mass Spectrometry to detect contamination within trees.
3. Conducted amphibian surveys (nocturnal auditory surveys and visual encounter surveys) at WMF and a control site, Crystal Spring Bog (CSB, which is actually a fen) to determine any differences in amphibian populations.
4. Conducted bird point-count surveys in WMF and CSB to determine any differences in bird populations.
5. Conducted macroinvertebrate sampling at WMF and compared with sampling conducted by PA DEP to determine any differences in macroinvertebrate population;
6. Conducted vegetation sampling at WMF and CSB to determine any differences in plant communities.

**Expected Completion:** August 2014

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### **Effects of stormwater ponds on calling amphibians**

#### **Objectives:**

1. Examined 40+ stormwater ponds across eight sites in Monroe County, NY
2. Determined how surrounding land use, pond placement, and conditions within the pond affect amphibian species richness
3. Developed a better understanding of how factors at the local and landscape scale affect the suitability of these ponds for amphibians to provide recommendations to land managers on pond design and placement

**Expected completion:** August 2014

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## Faunal responses to wetland restoration activities within Braddock Bay Fish and Wildlife Management Area, New York

### Objectives:

1. Examine leopard frog (*Lithobates pipiens*) use of newly-created sedge/grass meadow habitat
2. Evaluate suitability of restored and created habitat for Black Tern (*Chlidonias niger*) and other focal species
3. Measure the success of the restoration by comparing abiotic and biotic responses to different restoration techniques against controls

**Expected completion:** December 2015

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## Effects of phosphorus, hydrology, and agriculture on the invasive cattail *Typha x glauca* in Lake Ontario coastal wetlands

### Objectives:

1. Determine effects on above- and below-ground biomass by varying levels of phosphorus and hydroperiod on *Typha x glauca* in a greenhouse setting.
2. Determine density of *Typha x glauca* in 18 Lake Ontario coastal wetlands; six each of HGMs Barrier Beach, Riverine, and Lacustrine.
3. Analyze potential relationship between wetland HGM type, size of wetland watershed, proportion of agriculture in watershed, total phosphorus in wetland water, and cattail density.

**Expected completion:** August 2014

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## Evaluation of floristic recovery in Great Lakes coastal wetland restoration projects - Braddock Bay Fish and Wildlife Management Area

### Objectives:

1. Investigate groundwater hydrology to evaluate the timing, duration, and frequency of water-table changes during the growing season for sedge-grass meadow threshold criterion and *Typha* survival.
2. Conduct comprehensive geospatial surveys to serve as the basis for detailed plans illustrating microtopographical landform variations that may impact restoration objectives.
3. Ensure precise adequate elevations and water levels for channel and pothole creation and subsequent spoil placement for sedge regeneration.
4. Determine areas with viable remnant sedge-grass meadow and summarize the prevalence of native and non-native plant cover in each vegetation zone.
6. Characterize the likely species composition following a disturbance, particularly with respect to the potential for self-design following restoration implementation.
7. Summarize the occurrence of native and non-native germinated wetland plant seedlings to guide SGM restoration and evaluate target species propagation, with consideration given to eventual dredge spoil "upland" (seed-bank study).
9. Assess revegetation efforts to support sedge-grass meadow connectivity.

**Expected completion:** September 2016

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## WEB TIP

# Resources at your fingertips!

For your convenience, SWS has compiled a hefty list of wetland science websites, books, newsletters, government agencies, research centers and more, and saved them to [sws.org](http://sws.org). Find them on the Related Links page **at [sws.org](http://sws.org)**.

Know something we missed? Please forward your resource suggestions to [mczosek@sws.org](mailto:mczosek@sws.org).

