MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Final Report to the U.S. Environmental Protection Agency, Region 7

Missouri Wetlands Monitoring and Assessment (CD 98790901-0)

A: Hydrologic and Meteorological Portion

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March 31, 2011

Disclaimer:

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Abstract

Missouri has lost a significant portion of its original wetlands to changes in land use. Agricultural land conversion, urban development, and hydrologic modifications have all contributed to this decrease. The health and status of these remaining wetlands has been the focus of many in the natural resources community. Only through monitoring and assessment of the hydrologic character of wetlands can we determine if wetlands that are being retained and protected are performing their functions well. The goal of this project is to create a hydrologic and biochemical wetlands monitoring pilot program. Six Missouri wetland sites were chosen to be part of this wetlands monitoring pilot program. The weather and hydrologic data from this project was made available via the internet in real time. Streaming real time data from these sites is a powerful tool for natural resource managers, wetland scientists and hydrologists trying to better understand wetland functions. An additional portion of this project included conducting a two-phase wetland awareness survey. The first survey phase was conducted on the wetland monitoring webpage without a public news release. The second phase was conducted after a statewide public news release was conducted that announced the survey. The wetland awareness public survey results are discussed.

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Acknowledgments

This project was made possible by funds from the U.S. Environmental Protection Agency, Region 7. This funding supports a vital need to promote wetland science and understanding. Additionally, Benita Hamilton and staff from EPA, Region 7 provided valuable guidance throughout the course of the project.

Select staff from the Missouri Department of Natural Resources, Water Resources Center also contributed greatly to the success of this project. First, Scotty Baumgartner and Richard Bates provided the essential technical “know-how” during installation of the monitoring instrumentation. Matt Vitello, Michael Weller, Diane Vitello and Charles DuCharme also provided assistance during installation and maintenance activities. Steve McIntosh provided project advice and management skills toward the completion of this grant project. Finally, Renee Williams-Wright with State of Missouri Office of Administration ITSD staff provided assistance with internet webpage data streaming applications and the internet based awareness survey.

Several agencies provided assistance with research permits for the monitoring sites. These permits allowed us to install monitoring devices and granted us access to public lands. The Missouri Department of Conservation issued permits for four conservation areas. The Missouri Department of Natural Resources, Division of State Parks issued research permits for two state parks. Managers at both state parks were also gracious enough to lend us utility vehicles to haul equipment to monitoring sites during installation and maintenance activities. The cooperation each agency displayed is greatly appreciated.

Introduction

Wetland health status is largely unknown in Missouri. U.S. Army Corps of Engineers Section 404 and USDA Farm Act require the mitigation of impacted jurisdictional wetlands. State executive orders also require State wetland impacts to be mitigated. Additionally, protecting, maintaining and understanding Missouri's remaining wetlands has been a large focus of the state and federal agencies. These include the Missouri Departments of Natural Resources and Missouri Department of Conservation and U.S. Fish and Wildlife Service.

There have been considerable efforts as seen by aerial observation to restore and create wetlands. However, few efforts to evaluate the health of existing natural, created, and restored wetlands are being made. Healthy wetlands can provide water quality improvement, flood attenuation, erosion control, recreational opportunities and varied species habitat. Wetlands that are stressed cannot perform these functions well. Wetlands having physical stressors such as a lack of water, cultivation, and excessive grazing can lose their capacity to grow healthy plants and eventually lose their hydric soils and nutrient cycling capacities. Only through monitoring and assessment of the hydrologic character of wetlands can we determine if the wetlands that are being retained and protected are performing their functions well.

Wetlands such as swamps, marshes, and bogs are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for aquatic organisms in saturated soil conditions (USEPA, 1991). Wetlands play a vital role in ecosystems and environmental sustainability. They provide many important functions such as storm and flood control, shoreline stabilization, sediment retention and nutrient removal, water purification, groundwater replenishment, wildlife and fisheries habitat, and are reservoirs of biodiversity. However, agricultural activities, land development, and hydrologic modifications have caused sharp areal reductions of natural wetlands. In the state of Missouri alone, more than 87% (Dahl, 1990, Mitsch and Gosselink, 2000) of the wetland areas have been altered or destroyed due to agriculture and land development. To achieve the goals of the EPA's wetland program to increase the quantity and quality of wetlands in the U.S., one of the state's efforts is to implement the Missouri State Wetland Conservation recommendations through continuing wetland monitoring and assessment.

According to the U.S. Fish and Wildlife Service, wetlands are transitional areas between terrestrial and aquatic systems that frequently support the growth of hydrophytes on predominantly unaltered hydric soil. Hydric soil formation is one of the key components of healthy wetland development. Under alternating anoxic/anaerobic conditions, microbe assisted chemical transformation plays an important role in maintaining healthy ecological functions of wetlands (Mitsch and Gosselink, 2000). The presence of reducing conditions in hydric soils leads to the complex transformation of many important elements including nitrogen, carbon, sulfur, iron, and manganese.

The overall goal of this project is to initiate a pilot program of wetlands monitoring and assessment. The pilot program consists of six wetland sites that serve a core wetland portion of an existing water resources monitoring system.

The objectives of this project are:

1. Develop and demonstrate a physical wetlands monitoring pilot program.
2. Develop and demonstrate near real-time hydrologic and meteorological wetland data accessible to the public through the internet.
3. Attempt to obligate future State general funds to enable the WRC to operate and maintain selected sites beyond the 3 year grant proposal.

4. Develop hydrologic criteria to assess the functions of wetlands to help ensure "no net loss in quality and quantity of wetlands.
5. MDNR's Water Resources Center will develop an access port to the telemetry data as part of their wetlands web site.
6. Public education on the wetland conditions will be enhanced through internet access. Internet access will promote additional evaluation and research on the wetlands being monitored.

Selection Process for Wetland Monitoring Sites

Selecting worthy wetland monitoring sites was foremost in this project. A selection committee was formed to gather collective insight on candidate sites. Prospective sites were nominated and categorized in spreadsheets. The committee considered potential sites for accessibility, human modifications, and wetland classification. Additional considerations include ownership, physiographic setting and habitat diversity. Selections for field reconnaissance were based on those criteria. Six sites were chosen to represent a variety of wetland types and geographic settings found in Missouri. All six monitoring sites are located on state owned land.

Wetland Monitoring Site Locations and Descriptions

Wetland monitoring locations are mapped in Figure 1. Three sites are located in north central Missouri. Bee Hollow Conservation Area (CA) is located south of the town of Macon in Macon County. Pershing State Park (SP) is in Linn County near the town of Brookfield. Van Meter SP, located in Saline County, is northwest of Marshall. Marion Bottoms CA is in Cole County, Missouri in the central part of the state. Little Bean CA is in Platte County in western Missouri, north of Kansas City. Finally, Four Rivers CA is located in Bates and Vernon Counties near the southwest Missouri town of Nevada. Monitoring site descriptions are provided in the following paragraphs.

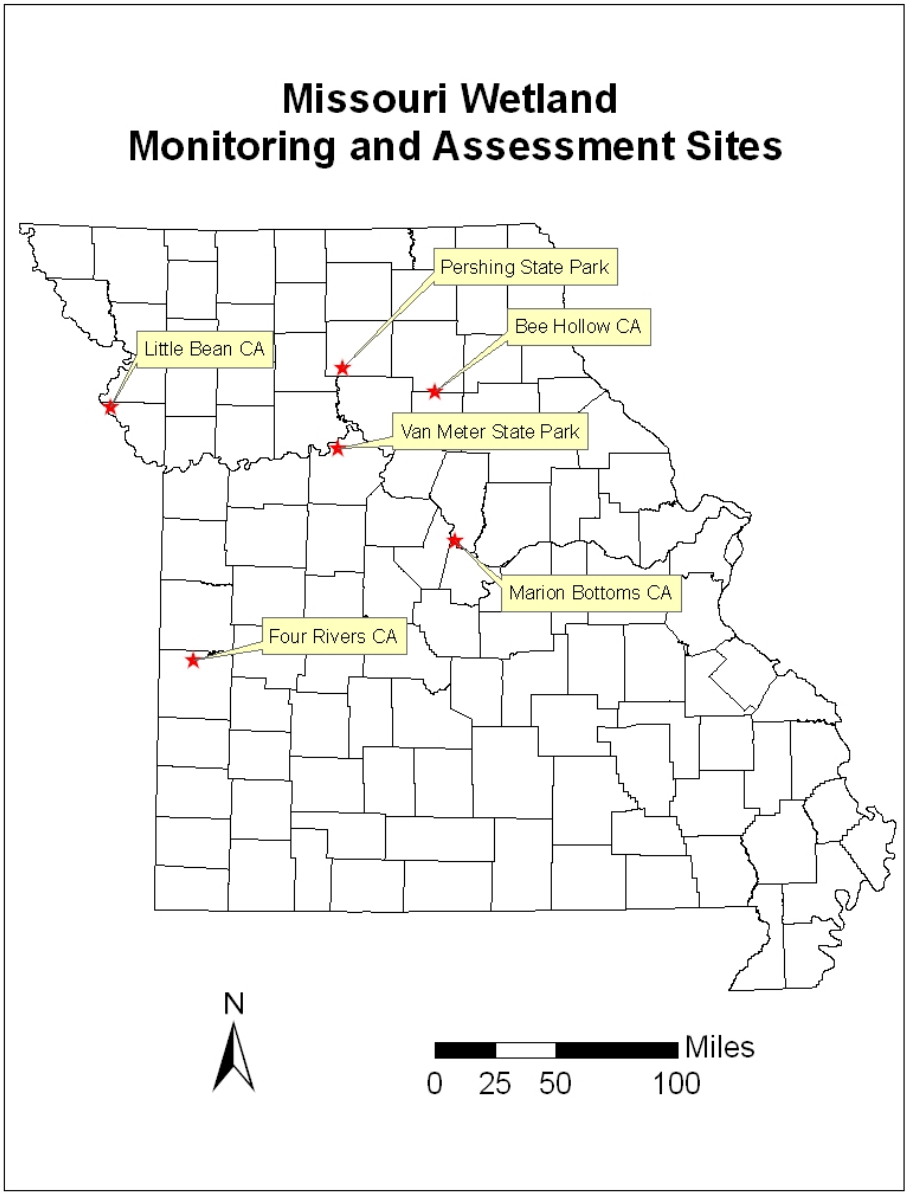

Figure 1 Map of wetland monitoring sites.

Bee Hollow Conservation Area

Bee Hollow CA is located in southern Macon and northern Randolph counties, Missouri. This 271 acre area is managed for fish and wildlife habitat by the Missouri Department of Conservation. This area contains both wooded uplands and bottomland fields and wetlands. Portions of the uplands were previously mined for coal as there are numerous unclaimed mining piles and pits located throughout the area. The bottomland has several oxbow wetlands that were formed when the East Fork of the Little Chariton River was channelized (Figure 2). Flooding of this area has been nullified by Long Branch Lake located about 10 miles upstream of Bee Hollow CA. The wetlands are recharged mostly by upland runoff and precipitation. The U.S.

Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) classifies this wetland as a PUBF (Palustrine Unconsolidated Bottom, Semipermanently Flooded.

Figure 2 Oxbow wetland at Bee Hollow CA.

Four Rivers Conservation Area

Four Rivers CA is located in northern Vernon and southern Bates counties, Missouri. This 13,929 acre area is managed primarily for waterfowl habitat and hunting. A large amount of acreage is dedicated to crop fields that are flooded in fall to provide migrating waterfowl with food and habitat. The monitoring site is located in the Horton Bottoms Natural Area. This is a bottomland hardwood forest along the Little Osage River that is not protected by levees and therefore subject to flooding (Figure 3). The natural flooding hydrology of this parcel makes it a worthwhile monitoring location. The soil type mapped at the monitoring site is Osage silty clay which ponds surface water during wet periods. The NWI classification for this wetland is Palustrine Forested Broad-Leaved Deciduous Temporarily Flooded (PFO1A).

Little Bean Marsh Conservation Area

The 427 acre Little Bean Marsh Conservation Area is located in Platte County, Missouri. This wetland area is part of a remnant oxbow in the Missouri River floodplain. The area also contains bottomland forests and diverse plant life in the sloughs and marshes (Figure 4). The bottomland around this area is protected from flooding by agricultural levees. The Little Bean wetlands receive water from precipitation and runoff from the uplands and local bottomland fields. The Missouri Department of Conservation manages this area for fish and wildlife habitat. The NWI classification for this wetland is Palustrine Emergent Semipermanently Flooded (PEMF).

Figure 3 Bottomland hardwoods at Four Rivers CA.

Figure 4 Little Bean marsh.

Marion Bottoms Conservation Area

Marion Bottoms CA is located in Cole County, Missouri. This 2997 acre Missouri River floodplain tract is managed by the Missouri Department of Conservation for hunting, fishing and other outdoor recreation. Bottomland forests, sloughs, scour holes and seasonal wetlands all provide essential habitat to a variety of wildlife species (Figure 5).This area was acquired by the state after the damaging floods of 1993 causing much of the fertile ground to be covered with sand. Levees that once protected the crop fields were breached during the massive flooding. The levee breaches were not repaired and flooding is allowed to replenish nutrients to floodplain

wetlands and forests. The wetland slough at the Marion Bottoms monitoring site was formed as a result of the 1993 flooding. It does not have a NWI classification but it would best be classified as a Palustrine Unconsolidated Bottom, Mud, Intermittently Exposed (PUBMG).

Figure 5 Slough at Marion Bottoms CA.

Pershing State Park

Pershing State Park is located in Linn County, Missouri. The park is 3565 acres of mostly wetlands occurring as bottomland hardwoods, swamps, marshland and wet prairie (Figure 6). Hiking, camping and nature study are popular activities. There are several interpretive trails and overlooks that lead visitors through the wetland types. Locust Creek meanders through the park, periodically flooding these wetlands. There are also numerous oxbows and cutoff sloughs formed from Locust Creek's meanderings. The park has experienced significant sedimentation in the wetlands due to recent and frequent flooding events. Hydrologic alteration by channelization has affected the streaflow of Locust Creek in its reaches upstream of Pershing SP. The NWI classification for the wetland monitoring site is Palustrine Emergent, Temporarily Flooded, partially drained/ditched (PEMAd).

Van Meter State Park

Van Meter State Park is located in Saline County, Missouri. This wetland area is a remnant Missouri River floodplain marsh (Figure 7). The marsh has a diverse hydrologic input, receiving its water from precipitation, runoff from the uplands and numerous springs that are in the area. Agricultural levees are in place and prevent Missouri River flood waters from entering the marsh. The vegetation at the monitoring site is diverse but is predominantly cattails and the sedge *carex hyalinolepis*. The NWI classification for this wetland is Palustrine, Forested, Broad-Leaved Deciduous, Temporarily Flooded (PFO1A). However, changes in landuse and hydrology have caused this wetland to transform into a Palustrine, Emergent, Semipermanently Flooded (PEMF).

Figure 6 Wet prairie at Pershing State Park**.**

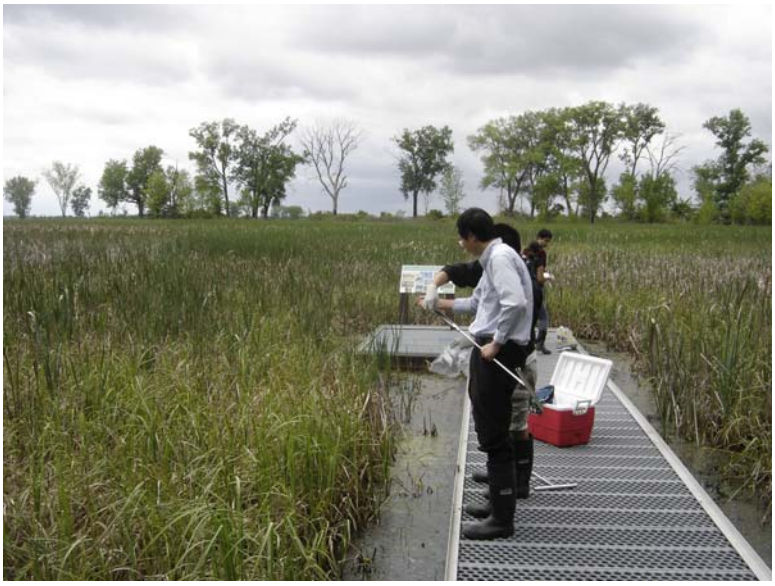

Figure 7 Marsh at Van Meter SP

Monitoring Site Instrumentation and Design

Instrumentation Common to All Sites

All six monitoring sites have certain common instrumentation in spite of the differing wetland settings. Each station consists of a base station platform, meteorological instruments and a groundwater monitoring well. Additional instrumentation not common to all sites, such as surface water monitoring sensors and soil moisture probes, are described later in site specific paragraphs.

The Base Station

Each station consists of a 7 ft. tower with a 4 ft. x 4 ft. steel mesh platform mounted to the platform. This surface provides a sturdy fixture on which to mount instruments. The elevated platform serves to protect sensitive instruments from standing water and minor flooding at the monitoring site. The 10 ft. antenna mast, constructed from a 1 ¼ inch galvanized steel pipe is affixed alongside one of the platform legs. The mast is also used to mount meteorological instruments.

Datalogging and telemetry equipment are housed inside a stainless steel box. The box protects the sensitive equipment from weather and theft. The datalogger, Sutron Corporation's Satlink 2, is the central component of the monitoring station. It logs all data from each sensor and transmits it via satellite to the United States Geological Survey's server.

Solar power is used to power the wetland monitoring station. Deep cell batteries at each station are charged with a photovoltaic (solar) panel and regulating system. The solar panel is mounted to the antenna mast it shares with other instruments. This 12 volt system provides enough power to keep the Satlink 2 logging data and transmitting near real-time data on an hourly basis.

Meteorological Instrumentation

There are five different instruments that measure seven different meteorological parameters. These meteorological sensors are mounted to both the platform and antenna mast. Like the datalogger, the weather monitoring equipment was purchased from Sutron Corporation. The Accubar barometric pressure sensor gives atmospheric pressure readings in inches of mercury. Precipitation is monitored with a tipping bucket rain gauge measured in inches of precipitation. Wind speed and wind direction are measured with the Windsonic wind sensor. Wind speed is graphed as miles per hour and wind direction is plotted as degrees clockwise from true north. Solar radiation is monitored with the LI-COR silicon pyranometer. Solar radiation is graphed as total solar radiation (direct + diffuse radiation on a horizontal surface), watts per square meter. Air temperature and relative humidity sensors are combined into the same device. Temperatures are recorded in degrees Fahrenheit and relative humidity is recorded as a percentage.

Groundwater Monitoring

Groundwater monitoring wells were installed at each monitoring site. Drive-point wells constructed of 1 1/4" galvanized steel pipe were chosen as the means to penetrate alluvial materials without drilling expensive wells. Additionally, because of saturated soils and vegetation damage, using a truck mounted drill rig was unfeasible. The drive-point is a 48 inch screened pipe with an affixed hardened steel tip to break through unconsolidated alluvial material. The desired well depth was reached by jack hammering 48 inch lengths of 1 ¼ inch galvanized pipe incrementally until the desired depth was reached. The drive-point well was driven into the alluvium with a Pionjar gas powered jackhammer. Esterline Corporation's submersible pressure transducer is used to monitor static water levels in the well. This device operates on the SDI-12 format and is wired to the Satlink 2 for datalogging.

Bee Hollow Instrumentation

Hydrologic and meteorological equipment was installed on May 19, 2010.The base station was placed adjacent to the oxbow slough in a manner in which groundwater and surface

water could both be monitored (Figure 8). Groundwater monitoring was accomplished using a drive-point well installed to a 20 ft. depth. The drive-point well was driven to a depth of 20 ft into the alluvium along the East Fork of the Little Chariton River.

Surface water monitoring of the oxbow slough was also accomplished using a submersible pressure transducer. The pressure transducer is calibrated with water depth and pressure to detect any changes in water level. The assembly employs a PVC conduit routed from the platform out into the slough and is anchored to the oxbow bottom with concrete blocks. The transducer was then placed inside the permeable conduit to allow interaction with the surface water in the oxbow. The transducer is wired to the datalogger and records surface water stage on a half-hourly basis.

Figure 8 Monitoring equipment at Bee Hollow CA

Four Rivers CA Instrumentation

Wetland monitoring equipment was installed on March 17, 2010. The 7 ft. mounting tower/platform is especially important here because of flooding that occurs in the Horton Bottoms Natural Area (Figure 9). The drive-point groundwater monitoring well was installed to a depth of 20 feet. The bottomland soil, Osage silty clay, was very cohesive and moderately difficult to penetrate with the well.

There is no surface water monitoring being conducted at Four Rivers CA. Surface water only occurs in shallow ponded areas (only several inches) during wet periods. However the soils can remain saturated for long periods of time especially during the winter.

Soil moisture and temperature probes were installed in a pit next to the monitoring station. The sensors measure soil volumetric water content and soil temperature at varying depths. The probes are installed at 5, 10, 25, 50 and 100 centimeter depths. The soil material from the excavated pit was then back-filled into the open pit to cover the instruments.

Figure 9 Monitoring equipment at Four Rivers CA.

Little Bean Marsh CA Instrumentation

The Little Bean Marsh monitoring station (Figure10) was installed on April 27 -28, 2010. Levees along the Missouri River keep floodwaters from inundating the surrounding bottomlands, so flooding was not a main concern. The drive-point groundwater monitoring well was installed to a depth of 20 ft. into the Missouri River alluvium.

Surface water fluctuations in the slough are monitored using a submersible pressure transducer installed inside a PVC conduit. The conduit was placed in the water and anchored with concrete blocks amongst the water lotus plants. The deepest portion of the slough was about 4 ft. during installation. This was the same technique used to monitor the oxbow at Bee Hollow CA.

Figure 10 Monitoring equipment at Little Bean Marsh CA.

Marion Bottoms CA Instrumentation

Flooding at the Marion Bottoms CA is an important consideration. Since the area is no longer protected by levees, site design had to incorporate plans for minor flooding. The tower was erected in late October of 2009 and weather instruments were affixed to it (Figure11). The groundwater monitoring well was established using the drive-point assembly that was driven into the Missouri River alluvium to a depth of 24 feet.

Surface water monitoring in the slough is accomplished with a submersible pressure transducer. The transducer and cabling were placed in 100 ft. of PVC conduit and positioned in the deepest part of the slough. The transducer/conduit assembly was then anchored to the bottom of the slough with concrete blocks. The transducer was wired and calibrated to the datalogger like the other instruments.

Figure 11 Monitoring equipment at Marion Bottoms CA.

Pershing SP Instrumentation

The base station and weather monitoring equipment were installed on December 17, 2009 (Figure 12). Later, on March 2, 2010 the groundwater monitoring well was installed. The drive-point well was driven to a depth of 24 ft. in the Locust Creek alluvium.

Soil moisture and temperature probes were installed in a pit next to the monitoring station. The sensors measure soil volumetric water content and soil temperature at varying depths. The probes are installed at 5, 10, 25, 50 and 100 centimeter depths. The soil material from the excavated pit was then back-filled into the open pit to cover the instruments.

Figure 12 Monitoring equipment at Pershing SP.

Van Meter SP Instrumentation

Installation occurred on February 4, 2010 in the Van Meter marsh after 1-2 inches of ice was broken. The steel platform was anchored in about 6-8 inches of water in a dense stand of *carex hyalinolepis* or shoreline sedge (Figure 13).Groundwater hydrology is monitored with a drive-point well installed to a depth of 24 ft. into the Missouri River alluvium.

Surface water fluctuations in the marsh are being monitored with a system similar to Marion Bottoms. PVC conduit was used to run a submersible pressure transducer into the marsh. Portions of the PVC conduit were made permeable with holes to allow interaction with surface water. Concrete blocks were used the anchor the conduit assembly to the bottom of the emergent wetland. The transducer was wired and calibrated to the datalogger like the other instruments.

Figure 13 Monitoring equipment at Van Meter SP.

Real-time Data on the Internet

Hydrologic and meteorological data for each monitoring site is recorded every half-hour. It is updated on the MDNR's website every hour. Data is also streamed cooperatively through the USGS on the Missouri groundwater monitoring portion of their website. Data is displayed in graph form, but can also be queried and examined in a tabular format. Links to the real-time data are provided here:

Missouri DNR - http://www.dnr.mo.gov/env/wrc/wetlands.htm

USGS - http://nwis.waterdata.usgs.gov/mo/nwis/current/?type=gw

Wetland Awareness Internet Survey

Partial requirements for the grant project included issuing a wetlands awareness survey. This survey was issued in two phases between September 2009 and May 2010. The first phase was conducted from September 2009 to February 2010. Next, a March 2010 news release was circulated throughout the state announcing the survey. The first survey phase received 99 responses. The second survey phase received 75 responses. The survey entailed eleven questions about wetland knowledge and the demographics of the respondents. It is important to remember this survey was conducted on the internet and is not considered scientific.

Survey Questions

The survey questions as posted on the internet:

1. How knowledgeable would you say you are about wetlands?
   - ☐ Very much
   - ☐ Somewhat
   - ☐ Not very much
   - ☐ Not at all

2. Have you seen or visited a wetland in the last five years?
   - ☐ Yes ☐ No ☐ Not sure

3. When you go to a wetland, what do you do there? (Check all that apply)
   - ☐ Fish
   - ☐ Hunt
   - ☐ Farm
   - ☐ Conserve and manage the wetland
   - ☐ Watch for birds or other wildlife
   - ☐ Look for plants or wild flowers
   - ☐ Enjoy the outdoors
   - ☐ Other
   - ☐ I have never been to a wetland

4. Should wetlands be protected?

☐ Yes ☐ No ☐ Not sure

5. What are some benefits, if any, that wetlands provide society? (Check all that apply)

☐ Recreation
☐ Flood water storage
☐ Water filtration
☐ Wildlife habitat
☐ Wetlands have no benefits

6. Wetlands are unique ecosystems that occur as: (Check all that apply)

☐ Swamps and marshes
☐ Bogs and fens
☐ Sloughs and bottomland forests
☐ Tidal marshes and peatlands
☐ River channels
☐ Deep oceans and lakes

7. Wetland areas are determined using what essential criteria? (Check only one)

☐ Endangered species, cattail density and lack of trees
☐ Amphibian and fish counts
☐ Soils, hydrology and plant species
☐ Waterfowl and aquatic insect surveys
☐ Satellite imagery and water quality tests

8. Does your current or former employment have anything to do with environmental protection or conservation?

☐ Yes ☐ No

9. Does your current or former employment have anything to do with real estate or development?

☐ Yes ☐ No

10. What is the highest grade of school or college that you have completed?

☐ Less than high school graduate
☐ High school graduate
☐ Some college
☐ College graduate
☐ Master's degree or law degree
☐ Doctorate degree or MD degree

11. Please enter your gender.

☐ Male ☐ Female

Responses

The following charts show the result counts from each question. However, percentages are used to explain some of the result counts which vary from question to question. The bar charts are configured to show the response differences between the survey pre and post public news release. Response patterns, proportion wise, were very similar before and after the public announcement.

The first three survey questions ask people to rate their knowledge and use of wetlands. Almost half, 49% responded they were "somewhat" knowledgeable about wetlands. Nearly 25% indicated they knew "very much" about wetlands (Figure 14). Survey participants were also asked if they had visited a wetland in the last five years. Over 77% indicated they had, while nearly 15% responded "no". The remainder were "not sure" if they had visited a wetland (Figure 15). The third question examined respondents' activities at wetlands. Most respondents visited wetlands to "enjoy the outdoors", "watch for birds or other wildlife" or "look for plants or wild flowers" (Figure 16). Fewer than 20 respondents replied with "I have never been to a wetland".

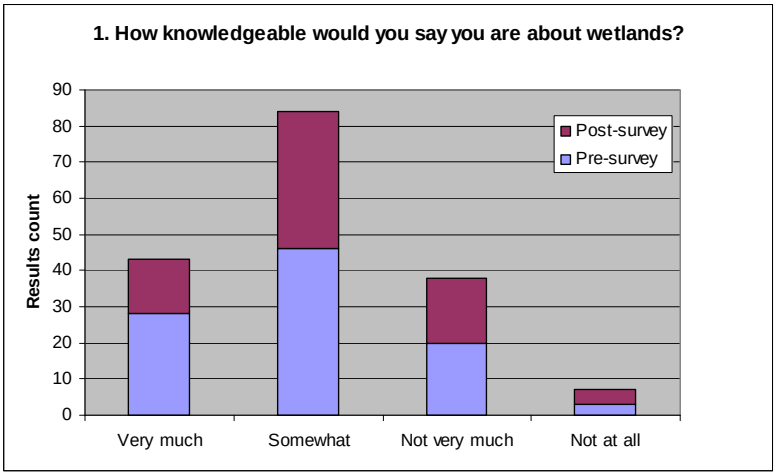

Figure 14 Wetland knowledge of respondents.

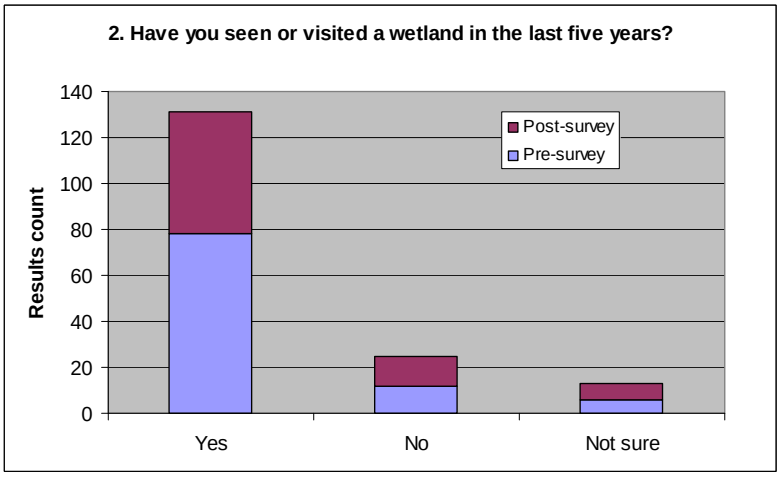

Figure 15 Wetland visits.

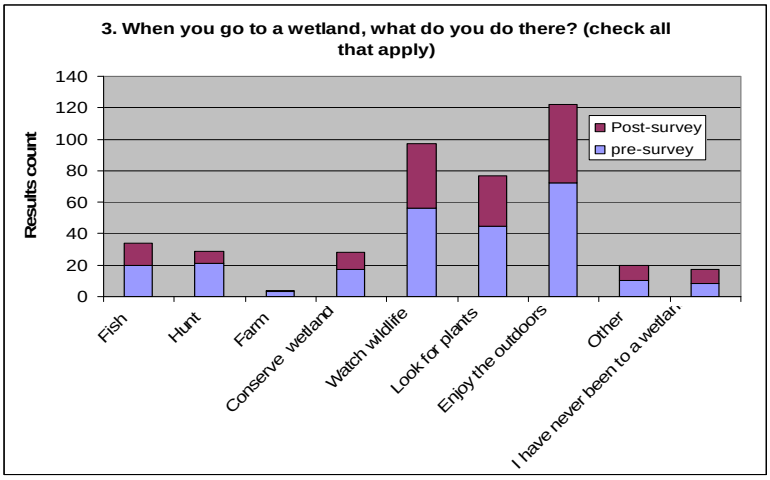

Figure 16 Wetland activities.

Questions four and five ask about respondents' attitudes about wetland values. When asked if wetlands should be protected, over 88% chose "yes" (Figure 17). About 2% answered no and 9% were "not sure" that wetlands should be protected. All of the "no responses occurred after the news release. Question five inquired about the societal benefits received from wetlands. Only four "wetlands have no value" responses were given (Figure 18). Most respondents agreed that wetlands provide "wildlife habitat", "flood water storage", "water filtration", and "recreation" benefits to society.

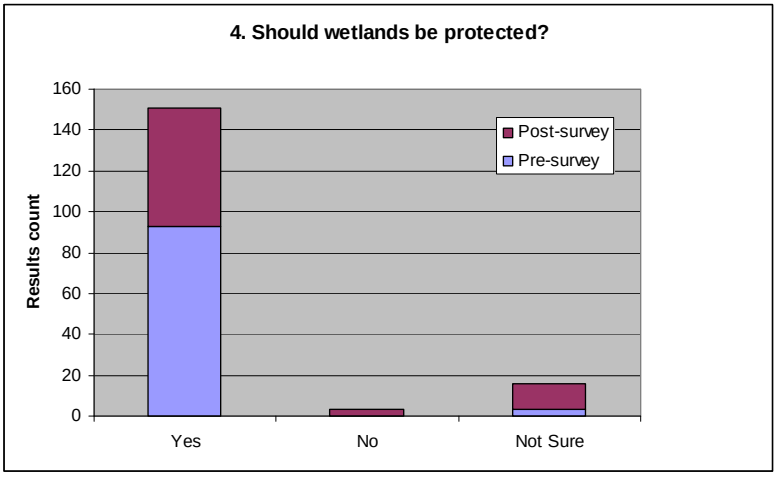

Figure 17 Wetlands protection question.

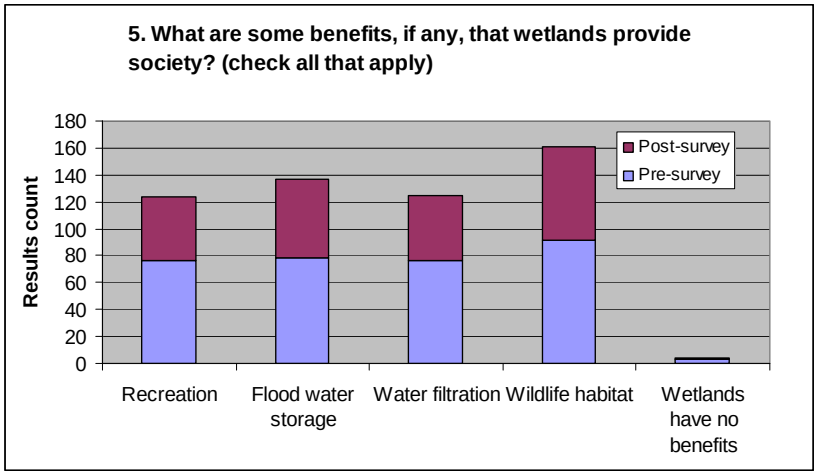

Figure 18 Benefits of wetlands.

Questions six and seven inquire about wetland type perceptions and criteria knowledge of the survey takers. Nearly all respondents agreed that "swamps and marshes" occur as wetlands. About 80% of respondents also agreed that "bogs and fens", "sloughs and bottomland forests", and "tidal marshes and peatlands" occur as wetlands. Only about 35% thought "river channels" were wetlands and less 12% thought "deep oceans and lakes" were wetlands (Figure 19). On the wetland criteria question, about 90% responded that "soils, hydrology and plant species" were used to determine wetland areas (Figure 20). The other criteria choices all received minimal responses.

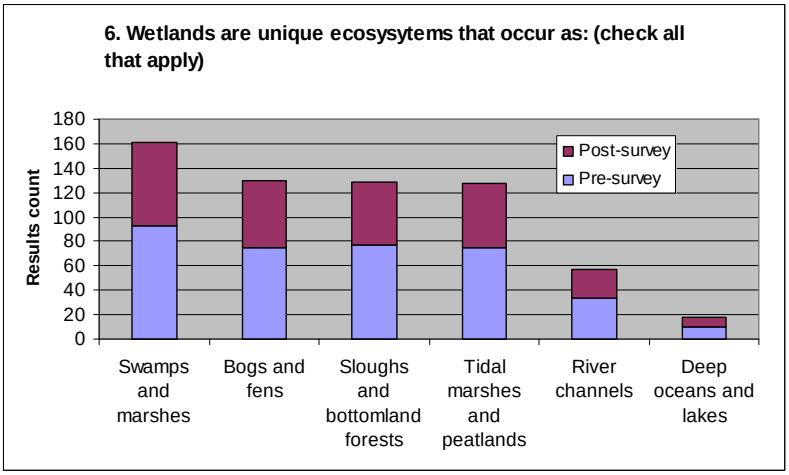

Figure 19 Respondents' view of wetland types.

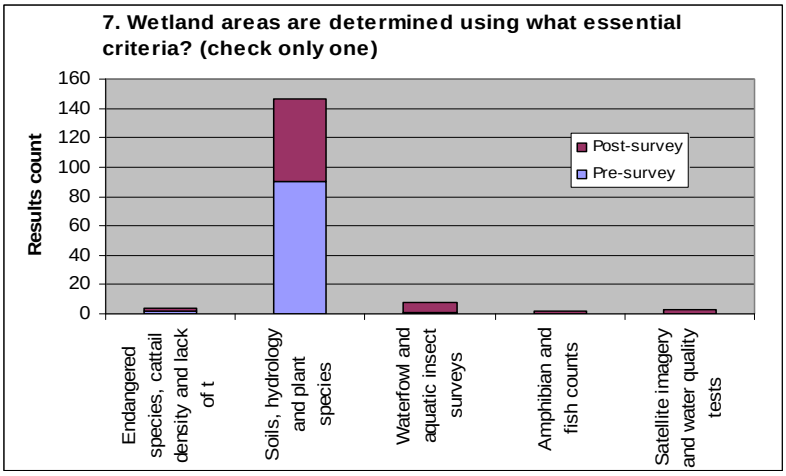

Figure 20 Wetland determination criteria.

Questions eight through eleven inquire about respondent demographics. Specifically, questions eight and nine inquire about the current or former employment of respondents. Question eight asked "does your current or former employment have anything to do with environmental protection or conservation?" Over 61% responded "yes" and about 39% answered "no" (Figure 21). Question nine asked if the respondent's "current or former employment had anything to do with real estate or development". About 72% responded no and about 28% responded yes (Figure 22). Survey takers were asked their education level in question ten. People with college degrees made up the majority of the respondents. Over 41% had bachelors degrees and over 27% had masters degrees (Figure 23). Lastly, participants were asked to provide their gender. About 54% indicated they were male and 46% were female (Figure 24).

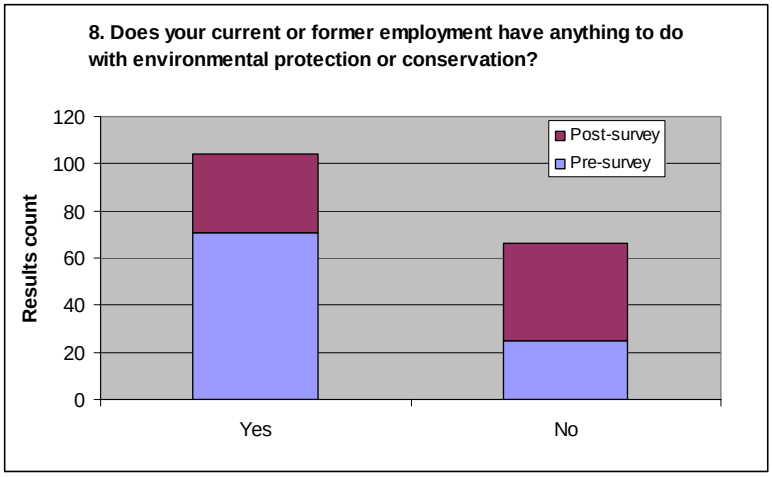

Figure 21 Employment question.

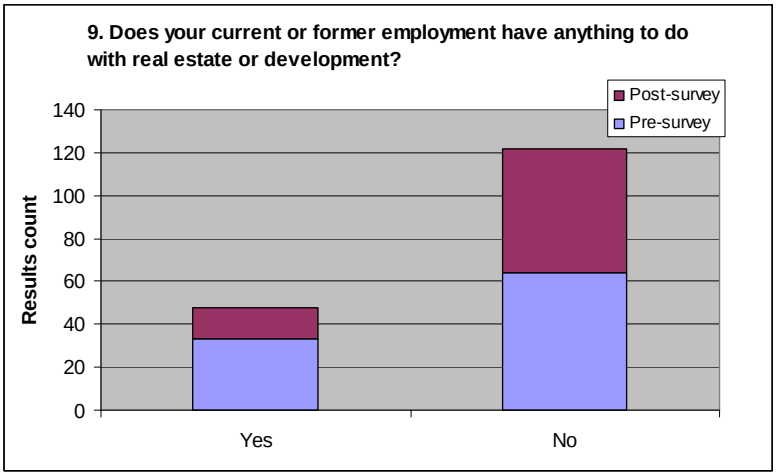

Figure 22 Additional employment question.

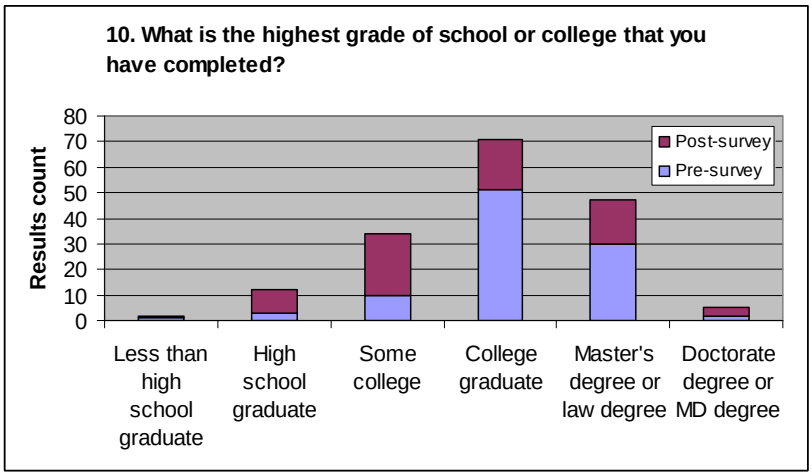

Figure 23 Respondents' education level.

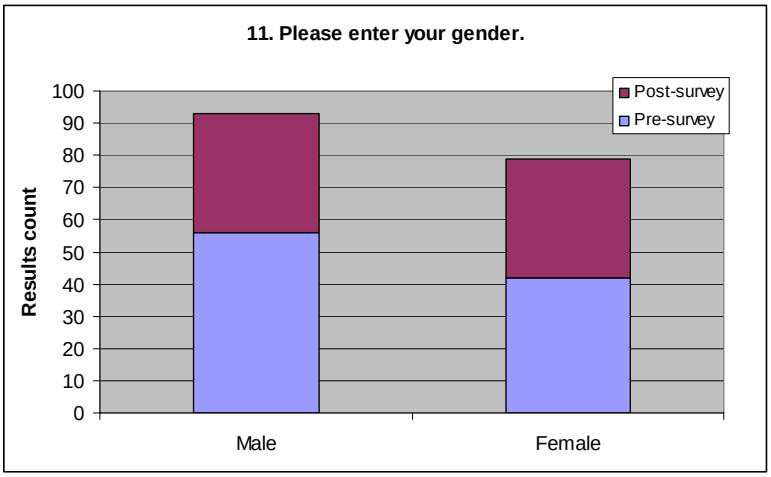

Figure 24 Respondents' gender.

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