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Santee Sioux Wetland Conservation Plan (SSWCP)
Knox County, Nebraska

Office of Environmental Protection Department
New Century Environmental LLC

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INTRODUCTION-

The Santee Sioux Nation of Nebraska (SSN) is a federally recognized Tribal Nation pursuant to the 1934 Indian Reorganization Act. They are one of the four bands of the Dakota Nation including the Mdewakantonwan, Wahpekute, Sisitonwan, and the Wahpeton. The Santee Sioux Indian Reservation (SSIR) is approximately 185 square miles in Northeastern Nebraska, which was established pursuant to a Presidential Order on February 27, 1866, and further defined by the Fort Laramie Treaty of 1868. The SSN possesses authority consistent with the 1936 Santee Sioux Constitution and Bylaws Section IV (l) to monitor and assess environmental conditions on the SSIR in an effort to protect and enhance resident's quality of life. The SSN has approximately 3,000 members of which approximately 1,200 reside on the reservation. The majority of the population live in Santee, Nebraska which is located along the northern boundary of the SSIR.

The SSN, in response to public concern, established the Santee Sioux Office of Environmental Protection (OEP) and charged the Tribal agency with the responsibility to plan, design, implement, and evaluate environmental programs for the protection of human health and the environment. In response to one element of public concern, the OEP sought funding in 1996 for the establishment of Tribal authority to

monitor, assess, increase compliance, and enforce Tribal standards in relation to water quality, wetlands, and watersheds within the jurisdictional boundaries of the SSIR.

The SSIR is in Northeastern Nebraska within the Missouri River watershed. Primary geographical features of the reservation include waterways, rolling hills, prairies, and deciduous forests. The northern zone of the reservation features moderate to steep hills and valleys and is within the boundaries of the Missouri Rivers watershed. There are four major drainage basins (Bazile, Lost, Howe and the Missouri River) within the Reservation's boundaries. The Missouri River provides drainage for this area of the reservation. The central zone of the reservation features minimal to moderate hills and valleys, agricultural lands, and prairies, and shares features of the Missouri River, Bazile, Howe, and Lost Creek watersheds. Bazile, Howe, and Lost Creek provide drainage of this area of the SSIR. The southern zone features minimal to moderate hills and valleys, agricultural lands, and prairies, and shares features of the Bazile and Howe Creek watersheds. Bazile and Howe Creek and their respective tributaries provide drainage for this area.

Previous investigations (2010), based on the National Food Security Act Manual, 3rd Edition, March 1994 wetlands definition, a modified Cowardin Classification System, the National Wetland Inventory Maps and NRCS aerial photographs, established a wetlands acreage baseline for the Tribe. The Tribe classified its wetlands resources into seven major categories: lacustrine, palustrine aquatic bed, palustrine emergent, palustrine forested, palustrine scrub-shrub, palustrine shore and riverine.

The protection of water quality is important to the Santee Sioux Nation. Wetlands are a vital resource in this effort, often providing a transition zone between land and ground water, filtering pollutants, and providing habitat for wildlife. There are approximately 10,348 acres of wetlands on the Reservation. The protection of these resources is a priority of the Santee Sioux Office of Environmental Protection. This priority strives to meet the long-term goal of the Tribe which is to provide adequate protection measures for wetland resources on the Reservation.

In the summer of 2021, a small budget was derived by the Santee Sioux Tribe of Nebraska. The Environmental Protection Department took the first step into their Tribal Wetlands Program. Since being awarded the EPA grant in April 2022, we have worked thoroughly and diligently since then gathering data and compiling information for our plan. Once fully developed, the Santee Wetlands Program can protect the multitude of valuable wetland resources on the Reservation. There are currently many impacts occurring to Reservation wetlands and the Tribe wants a program that assesses the impacts to Reservation wetlands and what will work to reduce those impacts.

The Tribes' goal is to halt wetland and riparian losses on the Reservation and ultimately work to restore quantity and quality of these important aquatic resources. To help achieve these goals the tribe chose to develop a plan referred to as the Santee Sioux Wetlands Conservation Plan (SSWCP). This plan would develop a program to assess wetland and riparian status and trends through field assessments and NWI updates; examine issues and projects affecting Reservation wetland and riparian areas; provide technical assistance, tribal public outreach, and education; potentially develop standards and criteria specific to the reservation and articulates Tribal wetland conservation goals and objectives.

The Wetland Conservation Plan sets both an interim goal and a long-term goal for the wetland and riparian resources of the Reservation. The interim goal is to halt the loss of the remaining wetlands and riparian areas and the decline in wetland and riparian quality. The long-term goal is to increase the acreage of wetlands and riparian areas and improve the quality of the resource.

Tribal Wetland Definition-

The State of Nebraska has adopted the federal definition that wetlands are "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1987).

Wetland delineation in Nebraska is currently based on the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the regional supplements for the Midwest and the Great Plains. The manual uses three diagnostic environmental characteristics to delineate wetlands. These are:

1) Vegetation - Defined by a prevalence of hydric plants adapted to growing in inundated or saturated conditions.
2) Hydric soils - The presence of soils that developed under inundated or saturated conditions that limit oxygen (anaerobic conditions).
3) Hydrology - Defined by inundation or saturation by water at some time during the growing season.

This general definition provided the baseline necessary to design and implement a plan for our wetland restoration and management program. Going forward, important tribal attributes of existing and future improved sites include, but are not limited to:

- The wildlife they contain
- The role wetlands play in water management
- Their attractiveness as an on-farm/reservation feature
- Their potential as a recreational area
- Natural history and cultural historical importance to the Tribe

Freshwater wetlands serve important roles in water quality, floodwater control and wildlife habitat; and damage to freshwater wetlands can affect waters below the watershed. The primary purpose of the plan is to provide detailed wetland information to local, state, and federal governments, businesses, nonprofit organizations and the public, so they can make better resource management decisions as the tribe expands its economic development profile.

The Wetlands Conservation Plan has several components:

- Wetland inventory of all biota occupying the parcel
- Functional assessment value and how to improve it in all reservation wetlands
- Wetland restoration for improved ecosystem service values and human use and enjoyment
- Agency coordination regarding the Reservation area and Missouri River wetland policies
- Local land-use planning efforts and OEP

The tribe is in the on-going process of wetlands inventory, using geographic information systems (GIS)-based wetlands mapping program combined with field ground truthing on or near tribal land parcels. The tribe has recently completed baseline functional assessments of representative and selected wetlands which examine the ecological and functional significance of wetlands. We are starting with 23 identified wetland areas that will be our focus of attention. Desktop review makes this assessment using a GIS-based landscape analysis of each wetland in a watershed. Our analysis can also evaluate the contribution each wetland has for water quality, hydrology and wildlife habitat, and the risk to the watershed integrity should a wetland be removed.

Wetland restoration, agency coordination, development of wetland policies and land-use planning all are means by which the wetlands maps and functional assessment will be used to improve wetland protection and management going forward. Our biggest priority going forward will be to get some level of monitoring in place, so we have a better understanding of year to year and time period to time period changes.

Wetland Function-

Our knowledge of how wetlands function has increased dramatically in the past few decades. Wetlands are now known to serve numerous functions, many of which have value to society as a whole. Examples of lower functioning wetlands include declining wildlife diversity and abundance, increased flooding that has occurred in some watersheds, and deteriorating water quality that has become a problem in many identified wetlands on our reservation. The results of the functional assessments by our program will provide additional information about the ecological significance of wetlands on the reservation. The information provided in this report will help the department understand the importance of protecting a particular wetland site in the event a wetland is impacted. It will also enable development projects to be planned so as to avoid, at all reasonable cost, the most ecologically important wetlands.

Wetland Functions include:

•Improving water quality
•Providing habitat for wildlife, fish, and unusual plants
•Reducing flooding and soil erosion
•Supplying water, including groundwater recharge
•Producing food and fiber
•Providing recreation and education

It is important to note that not all wetlands serve all the functions listed above. Nor will a given wetland necessarily serve these functions equally within a year or over a series of years.

Nebraska's wetland resources are as diverse and dynamic as those of any state in the nation. They include marshes, lakes, reservoirs and ponds, river and stream backwaters, oxbows, wet meadows, playas, basins, fens, forested wetlands, and seep areas. These wetlands vary greatly in nature and appearance due to physical features such as geographic location, water source and permanence, and chemical properties. Some wetlands hold water for only a few weeks or less during the spring while others never go completely dry. Many wetlands receive their water from groundwater aquifers while others are totally

dependent on precipitation and runoff. And finally, the water chemistry of wetlands ranges from fresh to saline and from acidic to basic. These descriptions identify the extremes of wetland characteristics. Nebraska's wetland resources possess these extremes and virtually every combination in between.

Threats and Stresses to Wetlands on the Reservation-

The primary existing threats and stresses to Santee Sioux Nation wetlands are listed below:

1) **Conversion to Other Uses** - This threat exists especially for temporary and seasonal wetlands that are easier to convert. Agricultural conversion and development for building sites, roads, feedlots, etc. are the primary conversion threats these areas face.

2) **Alterations in the Watershed** - Often not as obvious as direct impacts within the wetland itself, alterations within the watershed, or catchment area can be equally as damaging by disrupting the natural hydrology of the area. Concentration pits, terraces, diversions, stream channelization, ditches, etc. that either divert water away or stop water from reaching the wetland can have severe negative consequences for the area.

3) **Siltation** – For wetlands located in watersheds dominated by row crops or urban development, culturally-accelerated sedimentation is a serious problem. This sediment alters the natural depths and hydro-periods of the wetlands and can also encourage the dominance of invasive plant species.

4) **Invasive speci**es – In addition to the woody species mentioned below, there are a number of other species that can be invasive in wetlands. These include reed canary grass, hybrid cattail, common reed, river bulrush, purple loosestrife, and salt cedar. These species can form dense monotypic stands that reduce habitat and wildlife diversity.

5) **Woody Invasion** - Historically, most of Nebraska's wetlands were part of a prairie ecosystem and did not contain trees or shrubs with the exception being some riverine wetlands. In recent times, tree invasion has become a serious problem in wetlands, especially in the eastern two thirds of Nebraska. When left untreated for a long period of time, managers will be forced to resort to more expensive tree removal methods to restore the wetland to an herbaceous community. Trees in wetlands also provide habitat and perch sites for predators such as raccoons and raptors.

6) **Extended Rest** - Long-term rest has been a normal practice on public lands and has occurred on many private wetlands where the owners do not use the area as a source of forage. Long-term rest from disturbance leads to loss of native plant diversity along with increased abundance and invasion by non-native and aggressive wetland plant species. River bulrush, cattail, and reed canary grass are especially adept at outcompeting other vegetation and establishing a monoculture in wetlands lacking management.

7) **Fragmentation** - Fragmentation of wetlands by crop fields, roads, fences, berms, or other factors increases edge effect. This usually leads to increased and more rapid invasion by non-native and aggressive species, loss of genetic diversity, and degradation of wildlife habitat.

8) **Repetitive Management** - Conducting the same management action every year at the same time can also lead to a reduction of plant diversity and invasion of non-natives. Using a variety of techniques and applying them at different times of the year will increase diversity.

9) **Agricultural-Overgrazing** - Heavy grazing occurs when repeated severe defoliation of plants occurs without adequate recovery periods between defoliations which ultimately greatly reduce root development. Continued heavy grazing can shift the plant community by killing plants and reducing the number of young replacement plants. Continued heavy grazing, or poor grazing management has impacted many of Nebraska's wetlands, leading to loss of native plant diversity and abundance, invasion by non-native species, and uniform vegetative structure. However, periodic, intensive heavy grazing can produce positive results for wetlands depending on the goals and objectives. Some wetland complexes in the state provide critical migratory habitat for many species of water birds. The migratory species that use these wetlands benefit from a strategy of heavy grazing since it provides open water, bare shorelines, and early succession vegetation. Periodic intensive heavy grazing should be followed by periods of rest to enable plant regrowth, if that is the desired objective.

More Specific Threats to our Reservation-

a) Agriculture

There are numerous ways agriculture is detrimental to wetlands and will be discussed more fully. See BIA report (Gutzmer et al, 2021). Although primarily a prairie state, Nebraska has many diverse habitats ranging from eastern deciduous forests to short and tallgrass prairies (actually six different grassland types), a large section of Sand Hills Prairie (19,000 sq. mi.), and a small western component of Rocky Mountain Forest. The vegetation in Nebraska has undergone considerable change since the pioneers first began settling here in the 1800s. Probably the three most significant changes are loss of many native prairies to agriculture, the introduction of trees in urban areas where once there were few, and the growth of woody vegetation in eastern Nebraska's gullies and draws (Ratcliffe and Hammond 2002). These changes in the flora have affected the insects because vegetation is a limiting factor for them, both as food and shelter. In some cases, floristic changes have been mirrored by the loss of insects to a particular habitat while in others, it has resulted in a net gain in diversity (Ratcliffe and Hammond 2002).

The interplay between plant and animal distribution is dynamic, and the human factor has substantially changed this relationship. The sense of living in a prairie environment or being in a prairie state has been largely lost because of the almost complete destruction of the original prairie by modern agriculture. This is especially true in eastern Nebraska where the once-dominant tallgrass prairie, stretching as far as one could see, has been 99% eliminated by intense cultivation and urbanization. Concomitant with this has been a corresponding loss in the insects adapted to grassland habitats. Because of human interference and landscape development, the reservation may be more susceptible to aquatic and upland establishment of invasive species (Gutzmer, 2008).

Gutzmer, M.P., J.M. Kort, A. Bartling, and J. Avery. 2021. *A Baseline Inventory of Invasive Floral and Aquatic Species With Management Control Recommendations of the Santee Sioux Tribe of Nebraska*. Office of Environmental Protection. Santee Sioux Indian Tribe. Unpublished report for the Bureau of Indian Affairs. 37 p.

b) Grazing

It is best to keep stock away from wetland areas as they can damage soils, disturb native plants and animals, and dirty the water. You can reduce damage to wetlands by grazing pasture near them in mid-summer – mid autumn. Troughs can be placed under outflows.

Stock with uncontrolled access to wetland areas can:
•increase nutrient levels through their urine and dung
•pug and compact the soil
•cause erosion
•disturb the wildlife
•graze on and trample wetland plants
•open sites for weed invasion
•carry weed seeds in their hooves, coats, or dung
•become trapped and costly to rescue.

Grazing on pasture near wetlands can also cause plugging and affect the quality of water draining into the wetland, particularly during wet periods.

Protecting Wetlands from Stock

You can encourage native plants to regenerate from natural seed sources by fencing off wetlands. It will prevent stock getting trapped in the swamp and in some areas may reduce the incidence of liver fluke. It also helps to improve water quality. Fencing off and planting the edges of streams flowing into wetlands helps to keep excess nutrients out of the wetland. Farmers using wetlands for stock drinking water may wish to place a drinking trough for stock under the outflow pipe of a dam outside the wetland's fence. This is a good idea if the outflow does not flow into a natural waterway. However, if it flows into a natural waterway, this may stop native fish from reaching your wetland.

Minimize Stock Damage

It is better to graze sheep rather than cattle near wetlands, as sheep are less likely to enter water, pug soil or ring-bark trees. It can be useful in special situations to graze the edge of wetlands, for example if the dominant species are non-native and will be eaten by the stock (for example, young willows). However, in most cases it is best to keep stock out of wetlands and control weeds by hand. As a general rule it is better in mid-summer to mid- autumn to graze land near wetlands as it will be drier, and most bird breeding will have ended.

Peat bogs should never be grazed as they naturally have low nutrient levels. An increase in nutrients (from stock dung or urine) can allow undesirable invasive flora to invade.

c) Climate Change/Drought

A wetland with a high-water table or steady water supply will stay damp throughout most of the year. However, if the area has been drained you may need to restore the original water level by blocking a nearby ditch or drain. Often it is natural for some wetlands to dry out during the summer and that some species of fish and birds have evolved with changing weather and climates.

In some instances, we may consider:

•build a low head berm around a water body
•install a partially submerged weir
•build a low dam across a stream or river (make sure fish can still get through) or
•dig out an area to create a palustrine depression adjacent to the stream or flowing surface water.

To make sure that water levels don't rise unnaturally high, these structures must allow for generous overflows. A resource consent is required if your dam or diversion raises water levels on an adjacent property or the impounded water is deeper than 1.5 m or over 1 ha in area. Earthworks within 10 m of a flowing watercourse may also require a potential USACOE permit. A dammed pond will diversify your wetland habitat for plants and animals. However, algae control and other water quality manipulations may be required as needed.

d) Wetland Dynamics

Reservation and Nebraska's pre-settlement wetlands were highly adapted to disturbance. They were frequently burned by prairie fires, grazed by both large (e.g., bison and elk) and small herbivores (e.g., muskrats), and endured droughts and flooding. Periodic disturbance is essential to maintain and enhance wetland quality, plant and animal communities, and ecosystem processes. Natural disturbances operate at a variety of scales, intensities, and duration. Climate operates at a large scale, fire and grazing at intermediate scales, and insect herbivory and numerous other factors at small scales. Interaction of disturbances, for example, flooding and grazing, increase the range of patch types within wetlands resulting in more complex systems of species composition and structure. Now, most wetlands are managed within a fragmented landscape with a limited disturbance regime applied at regular intervals. This has resulted in much simpler systems and a reduced flora inventory (Gutzmer and Kaul, 2008).

A primary goal of wetland management (described in a later section in this plan) is to mimic the natural disturbance regimes to the greatest extent possible. Wetland restoration and protection actions should also consider the importance of the role that these disturbance regimes play. Circumstances in today's world often have reduced natural disturbances. For example, a wetland may be located near a housing subdivision making prescribed burning a challenge, or a small wetland may not have the infrastructure such as fencing, or livestock water facilities needed for grazing. In addition, specific management challenges may require alteration of the natural disturbance regime.

For example, control of the invasive flora in a wetland may require several consecutive years of early spring fire followed by intense spring grazing to reduce the expression of rapidly expanding invasives. Dense stands of unwanted or undesirable flora in a wetland may need several passes with a disk followed by an herbicide application.

e) Partnership Approaches

National and regional efforts have long recognized that implementing wetland conservation is complex and best accomplished by working in partnerships among landowners, agencies, and organizations. Partnerships play a very foundational role in the core elements of any wetland program.

Some examples of partnerships that are working to implement wetland conservation in Nebraska include the Nebraska Natural Legacy Project (our state's Wildlife Action Plan), Lower Niobrara Natural Resource District, Sandhill's Task Force, Wetlands Reserve Program Subcommittee, Missouri River Ecosystem Coordination Group, Knox County Natural Resource Conservation District, Nebraska Game and Parks Commission and the United States Fish and Wildlife Service. The structure of each of these partnerships can vary, but most have governing boards and implementation plans. As the tribe evolves in wetland management it can decide who they want to collaborate with over time and what the best funding opportunities are.

The tribe may be interested in teaming with Pheasants Forever, Ducks Unlimited, The Nature Conservancy, USACOE or other entities not listed. OEP will also consider and apply to the Nebraska Environmental Trust Fund for wetland project funding where it makes the most sense.

II. TRIBAL WETLAND CONSERVATION PLAN COMPONENTS-

1. Statement of Needs, Goals, and Objectives

Identify and initiate discussions with appropriate private and public groups to seek their involvement and support. Draft a statement defining the overall purpose of the plan or strategy and the general problem or need. Include goal(s) to achieve, at a minimum, an equivalent to "no overall net loss" of the Tribe's remaining wetland resource base. Other goals and objectives may set for more specific directions or time horizons.

Overall Purpose

The purpose of the Wetlands Conservation Plan (SSWCP) is to provide direction to Tribal programs for the protection and restoration of all wetland and riparian resources of the Reservation. The Plan provides a framework for linking and coordinating regulatory and non-regulatory programs (Tribal, State, and Federal) and wetland-related activities so all function together as a comprehensive wetlands protection and restoration program.

Wetland and riparian resources have always been highly valued by the Santee people. The great abundance and diversity of wetland and riparian resources on the Santee Sioux Nation Reservation have been adversely impacted by logging, grazing, and agricultural practices; construction and operation of hydroelectric-upstream (Fort Randall Dam), and facilities; land conversion for agriculture, development and roads; long-term drought, and surface and ground-water withdrawals; and introduction of non-indigenous aquatic invasive species. The reservation has one of the most diverse wetland types in the State, from side hill seeps, river bottomlands, to upland bluff stock ponds and palustrine expressions. Surface water is prevalent in streams, small lakes, and ponds throughout the reservation with associated wetland complexes. We assume this served our ancestors in many ways in the past.

The Tribes' goal is to halt wetland and riparian losses on the Reservation and ultimately work to restore quantity and quality of these important aquatic resources. To help achieve these goals the Wetlands Conservation Program assesses wetland and riparian status and trends through field assessments and NWI updates; examines issues and projects affecting Reservation wetland and riparian areas; provides technical assistance, public outreach and education; and articulates Tribal wetland conservation goals and objectives.

Proposed Action Objective

The Wetlands Conservation Plan sets both an interim goal and a long-term goal for the wetland and riparian resources of the Santee Indian Reservation. The interim goal is to halt the loss of the remaining wetlands and riparian areas and the decline in wetland and riparian quality. The long-term goal is to increase the acreage of wetlands and riparian areas and improve the quality of the resource.

In sum, the following are offered.

1. Gain a greater understanding of the functionality and condition of wetland systems within the reservation boundary by way of wetland monitoring and condition assessment – Monitoring and Assessment

2. Work to improve wetland condition and functionality through coordinating resources and collaborating with landowners and partners – Restoration and Protection

3. Maintain a comprehensive inventory of wetlands to assist with potential development of wetland water quality standards – Water Quality Standards.

4. Promote public interest and knowledge of wetlands through education and information distribution – Restoration and Protection

5. Maintain a comprehensive inventory of wetlands – Restoration and Protection, Monitoring and Assessment

6. Develop and enforce wetland definitions and regulations to further protect the land and its resources. – Regulatory

2. Inventory and Assessment of Wetland Resources

The reservation is blessed with some unique wetland communities. The Missouri River forms the north border of the reservation with excessive siltation creating sand bar environments with *Phragmites australis* and 3 *Typha spp*. established firmly along the flowing riverine habitats.

Bazile Creek is the major tributary to the Missouri River in this reach of the river and contains hundreds of riverine forested wetland acres along with a floodplain corridor before reaching the river. In the bluff areas there are numerous isolated open-water palustrine wetlands in various conditions which extend west into the heavy agricultural areas. Our inventory efforts over the past five years have documented over 200 species of flora, between 50-100 are classified as wetland plants and are found on the reservation.

Most aquatic vegetation is found in standing waters or wetlands adjacent to rivers and streams. Most purely aquatic species in Nebraska and the Great Plains are difficult to find in flowing waters. Plant growth is limited primarily by temperature, light, and the availability of nutrients. Nutrients from urban, agricultural, municipal, and industrial sources can cause excessive algal and macrophytic plant growth and reduced light penetration. The increased growth can be beneficial in oligotrophic waters, where primary productivity is nutrient limited, but not in eutrophic and mesotrophic waters, where increased growth can lead to increased respiration (Symoens 1988).

The most noticeable effect of excessive concentrations of nutrients is acceleration in the natural eutrophication process in lakes and slow-moving streams. Rooted macrophytes are influenced more by nutrients in sediment than by those in the water; consequently, growth is greatest in nutrient-enriched sediments (Harris and Gutzmer 1996). Aquatic plants include the various submergent, floating leafed, and emergent vascular plant species found in aqueous environments.

Before Euro American settlement, Nebraska's river floodplains were a mosaic of oxbow lakes, backwater marshes, wet meadows, and woodlands. Annual spring and early summer floods were vital to the ecological health of these floodplain ecosystems. The floods cut new channels, leaving the old channels to form backwater wetlands and saturated the floodplain soils. The majority of Nebraska's floodplain wetlands have been ditched, drained and converted to cropland. In addition, stream channelization, dam construction and reduced stream flows, have greatly altered the hydrology of remaining floodplain wetlands beyond the Sandhill's (Steinauer 2003). Woodlands occupied only about 2 percent of eastern Nebraska's pre-settlement landscape.

Flora species vary from location to location depending on soil type, moisture requirements, elevation, nutrient reserves, and sunlight. Generally, aquatic (riparian and wetland) plants are very similar within large regions that have common characteristics related to geology and climate. The major requirement for riparian plants is that water be present either all or most of their life cycle and this explains the presence of many wetland and aquatic species in river floodplain environments. There are many exceptions that come into play when investigations begin into wetland, wet meadow and riparian habitats and what floras are present.

Native woodlands are found throughout the reservation scattered in valleys. The primary native flora consists of riparian forests and upland deciduous forests. The riparian community (bottomlands) consists of open woodlands and dense forests comprised of cottonwoods, elms, and willows.

Initial functional assessment scores of representative wetlands were conducted 2021 and the results of those are found in the appendix.

3. Evaluation of Existing and Needed Protection Mechanisms

The Santee Sioux Wetlands Conservation Plan is not intended to replace existing wetlands protection and restoration mechanisms; rather the intention is adoption and incorporation. The wetlands conservation plan provides the framework linking and coordinating Tribal programs with wetland or wetland-related duties so all function together as a comprehensive wetlands' protection program. Objectives of the wetlands' conservation plan are presented throughout the plan.

Wetlands regulatory and permit programs in general consist of a few basic elements: a jurisdictional scope, a method to authorize impacts to aquatic resources and assess proposed authorizations, and a method of assuring compliance. State and tribal wetland and aquatic resource regulatory programs are defined by the authority under which they operate (i.e., Clean Water Act (CWA) §404, CWA §401, Nebraska Title 117) and how the program is implemented.

The State of Nebraska considers wetlands, including geographically isolated wetlands, to be waters of the state. Beneficial uses of wetlands are listed by the Nebraska Department of Energy and the Environment, and these uses are protected from degradation.

4. Strategy Development and Implementation Plans

Identify and establish mechanisms to carry out specific actions including target dates and responsible groups. Consider tools for change such as executive orders, legislation, administrative agreements, and other policy mechanisms. Overlay approach on existing tribal wildlife code and environmental protection guidelines.

5. Plan Approval

Obviously the first step will be to get tribal approval of the SSWCP. Secondly to work with EPA, or other organizations with funding when receiving financial assistance to outline and implement expectations

through a cooperative agreement. Establish processes for plan approval for the Santee Sioux Nation tribal sign-off. This overall template will provide the initial data, the initial locations, and the framework to begin an effective management program for these resources.

6. Monitoring and Assessment

Establish procedures to monitor and implement the plan or strategy. Establish a TRIBAL process to amend agreements in the SSWCP based on changing conditions and monitoring results.

EPA refers to a three-tier framework for wetlands monitoring and assessment.

Level 1 or landscape assessments rely entirely on GIS data, utilizing landscape disturbance indices to assess wetland conditions. This approach involves characterizing the lands that surround wetlands through the use of landscape metrics (e.g., percent forest cover and land use category). Assessment results can provide a coarse gauge of wetland conditions within a watershed.

Level 2 or rapid assessments (WSES form) use relatively simple metrics to assess wetland conditions. They are customarily based on the readily observable hydro-geomorphic and plant community attributes of wetlands. They also can employ the use of a "stressor checklist." Rapid assessment methods typically produce a single score that describes where a wetland generally falls along a gradient of human disturbance and with respect to ecological integrity.

Level 3 or intensive site assessments provide a more thorough and rigorous measure of wetland condition by gathering direct and detailed measurements of biological taxa and/or hydro-geomorphic functions.

Well designed and executed wetland monitoring and assessment programs are a critical tool to better manage and protect wetland resources. They allow establishment of a baseline in wetlands extent, condition, and function, to detect change, to assess value, and to characterize trends over time. Monitoring and assessment play a foundational role in the other core elements of wetlands programs. Monitoring and assessment can also inform planning and prioritization at both the individual wetland and watershed scales.

Potential Monitoring and Assessment Action Items-

Action: Fill in our numerous knowledge gaps about wetland conditions and functions in selected and representative wetlands.
Activities: Implement the items listed in this plan’s Information Needs section.
Timeline: To be determined

Action: Update SSWCP wetland inventory periodically as feasible.
Activities: Generate the most up-to-date GIS information to update the tribe’s wetland inventory data.
Timeline: To be determined

Action: Set wetland priorities based on updated inventory and condition assessment information.
Activities: Within each wetland complex, work with the resources available to develop or refine priorities for wetland protection, restoration, and management.

Timeline: To be determined

Core Element: Monitoring and Assessment

A monitoring and assessment program is defined as the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, compile, and analyze data on the condition of wetlands (adapted from Elements of a State Water Monitoring and Assessment Program, March 2003). Monitoring is the systematic observation and recording of current and changing conditions, while assessment is the use of that data to evaluate or appraise wetlands to support decision-making and planning processes. Wetlands can be characterized both by their condition and functions. Wetland condition is the current state as compared to reference standards for physical, chemical, and biological characteristics, while functions represent the processes that characterize wetland ecosystems. Condition and functional wetland assessments are currently lacking in many areas of the Reservation.

Goal 1 – Gain a greater understanding of the functionality and condition of wetland systems within the reservation boundary by way of monitoring and wetland condition assessment.

Goal 5 – Maintain a comprehensive inventory of wetlands.

Action	Activities	2023	2024	2025	2026	2027	Possible Partners	Potential Funding
Identify, monitor, and evaluate wetlands as specified in SSN monitoring strategy								
	Coordinate with relevant partners	X	X	X	X	X		
	Update wetland inventory to monitor acreage and condition		X		X		NCE,	EPA
	Evaluate wetland function for BMP recommendations	X	X	X	X	X	NCE	EPA
	Evaluate monitoring and assessment strategies to ensure they meet long term wetland resource goals	X		X				EPA
	Ensure scientific validity of monitoring and laboratory activities through approved quality assurance mechanisms	X	X	X	X	X	SHL	
Establish a baseline quantity and quality of tribal wetlands								
	Compare past data with current monitoring to identify trends and patterns in wetland losses/gains and condition	X					USFWS,	EPA

Track selected monitoring sites								
	Identify sites to sample repeatedly for a trend network	X	X	X	X	X		EPA
	Develop appropriate collection/storage process for collected wetland data	X						
Establish reference condition								
	Define reference condition (gradient from unimpaired to impaired)	X	X	X	X	X		
	Define reference standard condition	X	X	X	X	X		
	Determine process for measuring reference standard condition	X	X	X	X	X		
	Select reference sites	X	X	X	X	X		

Core Element: Voluntary Restoration & Protection-

Wetland protection is defined as removing a threat or preventing the decline of wetland conditions (US EPA, 2007). Wetland restoration is the manipulation of a former or degraded wetland's physical, chemical, or biological characteristics to return its natural functions. Restoration practices include:

•*Re-establishment, the rebuilding a former wetland; and*
•*Rehabilitation, repairing the functions of a degraded wetland (US EPA, 2007).*

Wetland restoration and management projects are often complex and require expertise in biology, engineering, hydrology, and soils. Because of this, wetland projects will be designed by an interdisciplinary team (bio-engineering team) possessing the necessary expertise (biology, engineering, hydrology, and soils). Wetland restoration projects often will include collaborating with our numerous partners. This partnering is highly encouraged. Some programs, such as the Wetlands Reserve Program, and Partners for Fish and Wildlife Program, can provide essential funding for project completion. EPA also has funding for wetland programs.

Goal 2 – Improve wetland condition and functionality through coordinating resources and collaborating with landowners and partners.

Goal 4 – Promote public awareness and wetlands through education and information distribution.

Goal 5 – Improve wetland condition and functionality through coordinating resources and collaborating with landowners and partners.

Action	Activities	2023	2024	2025	2026	2027	Possible Partners	Potential Funding
Establish goals that are consistent or compatible across relevant agencies								
	Define restoration and protection goals throughout tribal territory	X	X					
	Gather information on wetland location, class, and condition/			X	X	X		

	function							
	Set restoration goals based on agency objectives and available information			X	X	X		
Establish partnerships to leverage more restoration								
	Utilize tribal and other resources to provide technical assistance (see CEF for Activity examples)	X	X	X	X	X	EPA	
	Coordinate technical assistance for the Tribe and private landowners in the reservation boundaries.							
Coordinate financial assistance for the tribe and private landowners within the reservation boundaries								
	Identify funding sources to assist landowners in wetland restoration and rehabilitation activities	X	X	X	X	X		
Consider watershed planning, wildlife habitat, and other objectives when selecting restoration/protection sites.								
	Use a watershed approach to protect and restore wetlands by integrating the tribes CWA 319, 106, and other water resource goals with wetland goals	X	X	X	X	X		
	Coordinate funding and implementation of recommended BMPs							
	Compile information on assessment and projects into a GIS system	X	X	X	X	X		
	Distribute brochures, flyers, etc. at community events	X	X	X	X	X		
	Present at local schools or community events on the importance and functions of wetlands	X	X	X	X	X		

	Utilize the SSN OEP social media to share information on wetlands and projects	X	X	X	X	X		
Maintain an up-to-date knowledge of wetland topics regarding BMP, funding sources, and other water topics								
	Attend trainings, workshops, webinars, etc. to remain up to date on wetland topics	X	X	X	X	X		

Core Element: Wetland Water Quality Standards-

Goal 3 – Maintain a comprehensive inventory of wetlands to assist with potential development of wetland water quality standards.

Action	Activities	2023	2024	2025	2026	2027	Possible Partners	Potential Funding
Gather and analyze monitoring data and other information that will become basis of water quality standards								
	Define wetland types/classes		X		X			
	Continue to sample selected tribal wetlands Establish reference conditions for defined wetland types in terms of functional/condition performance and other physical measurements	X	X	X	X	X		

Core Element: Wetland Regulatory-

Goal 6 – Develop and enforce wetland definitions and regulations to further protect the land and its resources.

Action	Activities	2019	2020	2021	2022	2023	Possible Partners	Potential Funding
Develop definitions and jurisdictional scope in case the tribe decides to develop wetland specific regulatory program								
	Develop a working definition of what the tribe considers a wetland				X			
	Delineate wetlands in a manner that is at least equivalent with the federal program							

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WETLAND MANAGEMENT-

The protection and restoration of wetlands is not adequate to maintain their full suite of natural functions. Management actions are a critical component in the overall conservation of Santee Sioux Nation wetlands.

The following information is adapted from a document developed by the Nebraska Game and Parks Commission for use on Wildlife Management Areas that our consultant developed in Platte County. The document should be consulted for detailed information that may apply to Santee wetlands. The examples are provided as a template for Santee Sioux Nation Wetland Conservation Plan going forward. These management techniques are applicable to both tribal and private lands. Examples of prescribed management techniques discussed include grazing, prescribed burning, haying/shredding/mowing, herbicide application, mechanical (e.g., disking), water-level manipulation, and tree removal. Usually, there is not one "magic bullet" treatment that can be applied just one time to accomplish objectives. Multiple management activities usually need to be prescribed to obtain the desired effect. Management should be prescribed based upon site conditions and biological justification.

Prior to undertaking wetland management, the need for wetland restoration should be assessed, both within the wetland and for the entire watershed. Although the project area may be only on a part of the wetland, it needs to be remembered that the wetland is being impacted by alterations in the entire watershed. Addressing the watershed alterations may require different tools (e.g., private lands programs).

Customized Santee Wetland Site Evaluation Summary

This preliminary desktop activity and then field evaluation incorporates several criteria related to each wetland site we selected. Wetland habitat assessment involves a fundamental understanding of eco-assets, surface and groundwater, all habitat types, biodiversity, land use, recreation, industry, agriculture, and various ecological parameters. Current and future land use, external pressures, risk reduction, opportunity cost, hard asset values (e.g., water resources), current conditions, accessibility and size were generally considered during this process. We reserve the right to change, amend, update our scoring, weighting factors or current conservation emphasis as our program evolves.

The criteria we apply in this improvement process established baseline perception on varying levels of biodiversity and what can be done to improvement. However, tribal interests, cultural and historical concerns, other human concerns and safety can also play a role and contribute to best professional development designation. The wetland site evaluation summary process provides a preliminary indication of eco-asset value found on reservation property and insight into integral wetland characteristics. Our sub-classification criteria depicts existing habitat conditions, general landform information and species account observations critical to prioritization and improvement opportunities on reservation property.

Consultation

OEP will provide their expertise to tribal council and members regarding all wetland issues related to wetland loss, delineation, determination, federal or state permitting and/or mitigation required for subsequent wetland impacts that arise from human development.

Mitigation

If impacts occur and mitigation would be required, the following template from the United States Corps of Engineers is included as a convenience.

12 COMPONENTS FROM 'THE RULE' (starts on page 19677)-

(1) ***Objectives***. A description of the wetland resource type(s) & amount(s) that will be provided, the method of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed, ecoregion, physiographic province, or other geographic area of interest.

(2) ***Site selection***. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and the practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the compensatory mitigation project site. (See § 332.3(d).)

(3) ***Site protection instrument***. A description of the legal arrangements and instruments, including site ownership, that will be used to ensure the long-term protection of the compensatory mitigation project site (see § 332.7(a)).

(4) ***Baseline information***. A description of the ecological characteristics of the proposed compensatory mitigation project site and, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other site characteristics appropriate to the type of resource proposed as compensation. The baseline information should also include a delineation of waters of the United States on the proposed compensatory mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site, not the mitigation bank or in-lieu fee project site.

(5) ***Determination of credits***. A description of the number of credits to be provided, including a brief explanation of the rationale for this determination. (See § 332.3(f).) (I) for permittee-responsible mitigation, this should include an explanation of how the

compensatory mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity. (ii) For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these were determined.

(6) ***Mitigation work plan***. Detailed written specifications and work descriptions for the compensatory mitigation project, including, but not limited to, the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water, including connections to existing waters and uplands; methods for establishing the desired plant community; plans to control invasive plant species; the proposed grading plan, including elevations and slopes of the substrate; soil management; and erosion control measures. For stream compensatory mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

(7) ***Maintenance plan***. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

(8) ***Performance standards***. Ecologically based standards that will be used to determine whether the compensatory mitigation project is achieving its objectives. (See § 332.5.)

(9) ***Monitoring requirements***. A description of parameters to be monitored in order to determine if the compensatory mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting on monitoring results to the district engineer must be included. (See § 332.6.)

(10) ***Long-term management plan***. A description of how the compensatory mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management. (See § 332.7(d).

(11) ***Adaptive management plan***. A management strategy to address unforeseen changes in site conditions or other components of the compensatory mitigation project, including the party or parties responsible for implementing adaptive management measures. The adaptive management plan will guide decisions for revising compensatory mitigation plans and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect compensatory mitigation success. (See § 332.7(c).)

(12) ***Financial assurances***. A description of financial assurances that will be provided and how they are sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with its performance standards (see § 332.3(n)).

(13) ***Other information***. The district engineer may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the compensatory mitigation project.

Wetland Management Action Items-

Potential Tribal Protection and Restoration Action Items

Action: Consider watershed planning, wildlife habitat, and other objectives when selecting restoration/ protection sites.
Activities: Identify rare, vulnerable, or important wetlands and prioritize for restoration/protection. Most of this is being done by the local partnerships that were previously discussed. Apply tools (GIS, color-infrared photography, mapping, modeling, field inspection of soil, vegetation, and hydrologic conditions) to identify and prioritize restorable wetland.
Timeline: To be determined

Action: Provide clear guidance on appropriate restoration and management techniques and success measures.
Activities: Wetland restoration and a wetland management guide have been developed that are specific to Reservation wetlands. These guides will be kept updated and shared with other partners as requested.
Timeline: To be determined

Action: Establish and Institutionalize long term protection, using mechanisms such as incentives, purchase of land title or easements to protect wetlands. This of course is several years from now.

Potential Activities to develop and restore tribal wetlands in the future:

Action: The Wetlands Reserve Program, administered by the Natural Resources Conservation Service, has been a very important program to protect and restore wetlands throughout Nebraska. The state will continue to partner with NRCS to deliver this program.
Timeline: To be determined

Action: Increase wetland acreage through restoration (re-establishment and rehabilitation).
Activities: Wetlands will be restored on protected lands whenever possible. Much of this will be accomplished by existing local partnerships that have already been discussed. The Nebraska Game and Parks Commission will continue to offer its WILD Nebraska program that helps to restore wetlands on private lands.
Timeline: To be determined

Action: Develop a tracking system for wetland conservation activities.
Activities: Develop and populate a tracking database for restoration/protection sites. This is being done by the partners for their respective programs. Annually obtain an update from the partners to summarize wetland protection accomplishments.
Timeline: To be determined

Action: Monitor restoration/protection sites to ensure that they are implemented and managed correctly.
Activities: Select a subset of indicators (core indicators) to monitor effectiveness of all restoration and protection sites.

Action: Monitor effectiveness of restoration/protection sites using core indicators.

- Acres or % of restored/protected wetlands monitored for > 3 years using core indicators.
- Acres or % meeting established performance goals based on function/condition indicators.
- Update monitoring and performance records regularly.

•Based on ongoing monitoring efforts, information needs will be identified, and actions will be taken to address these needs.
Timeline: To be determined

Action: Modify restoration/protection techniques as needed.
Activities: Based on the monitoring work, an adaptive management framework will be used to modify projects as needed.
Timeline: To be determined

Wetland Management Action Items-

Action: Identify management needs for wetlands owned by Santee Sioux Nation.
Activities: Continue to identify unmapped wetlands to determine natural communities, including wetlands. These communities will be given a condition grade and then steps to improve the grade will be identified and implemented when feasible.
Timeline: To be determined.

Action: Continue to implement management activities on wetlands owned by Santee Sioux Nation
Activities: OEP staff will continue to identify needs and carry out management actions as necessary.
Timeline: To be determined
Action: Assist with the management of other tribal owned wetlands and privately owned wetlands as requested.

Activities: The OEP staff and their tribal biologist offer technical assistance to managers of other public and private lands. Continue to work with NRCS to implement management on properties enrolled in the Wetlands Reserve Program.
Timeline: To be determined.

Action: Evaluate the effectiveness of management activities.
Activity: Based on these evaluation efforts, information needs will be identified, and actions will be taken to address these needs. Modify management activities as needed.
Timeline: To be determined.

WATER QUALITY STANDARDS FOR TRIBAL WETLANDS-

Water quality standards are the foundation of the water quality-based pollution control program mandated by the Clean Water Act (CWA). They define the goals for a water body by designating its highest attainable uses, setting criteria that reflect the current and evolving body of scientific information to protect those uses, and establishing provisions to protect water bodies from further degradation. Federal regulations (40 CFR part 230.3) implementing the CWA include wetlands as "waters of the U.S." and therefore require water quality standards. Water quality standards developed specifically for wetlands

help ensure that the provisions of the Clean Water Act, which apply to all surface waters, are consistently applied to wetlands; they also provide a more relevant scientific basis for applying these provisions.

Water Quality Standards

(WQS) regulations at 40 CFR Parts 131 and 132 provide specific requirements for development of state and tribal standards including specifying appropriate water uses to be achieved and protected, providing appropriate criteria to support those uses, and applying anti-degradation policy to all waters, including wetlands. The regulation also provides states and tribes with the flexibility to adopt sub-categories of uses and associated criteria to allow for differentiation between types of wetlands, their expected uses, functions, and condition.

The State of Nebraska considers wetlands, including geographically isolated wetlands, to be waters of the state. The Nebraska Department of Energy and the Environment has developed water quality standards for wetlands.

Water Quality Standards Action Items

Action: Maintain the water quality standards for tribal wetlands that have been developed for Nebraska's wetlands by the Nebraska Department of Energy and the Environment.
Activities: Assess the need to make wetland water quality standards revisions as part of the regular triennial review of the State's water quality standards and incorporate as the tribe sees they apply.
Timeline: To be determined

Outreach and Education-

There is an ongoing need and demand from the tribe, public, schools, conservation partners, and community organizations for education and outreach materials specifically relating to Nebraska's wetland resources.

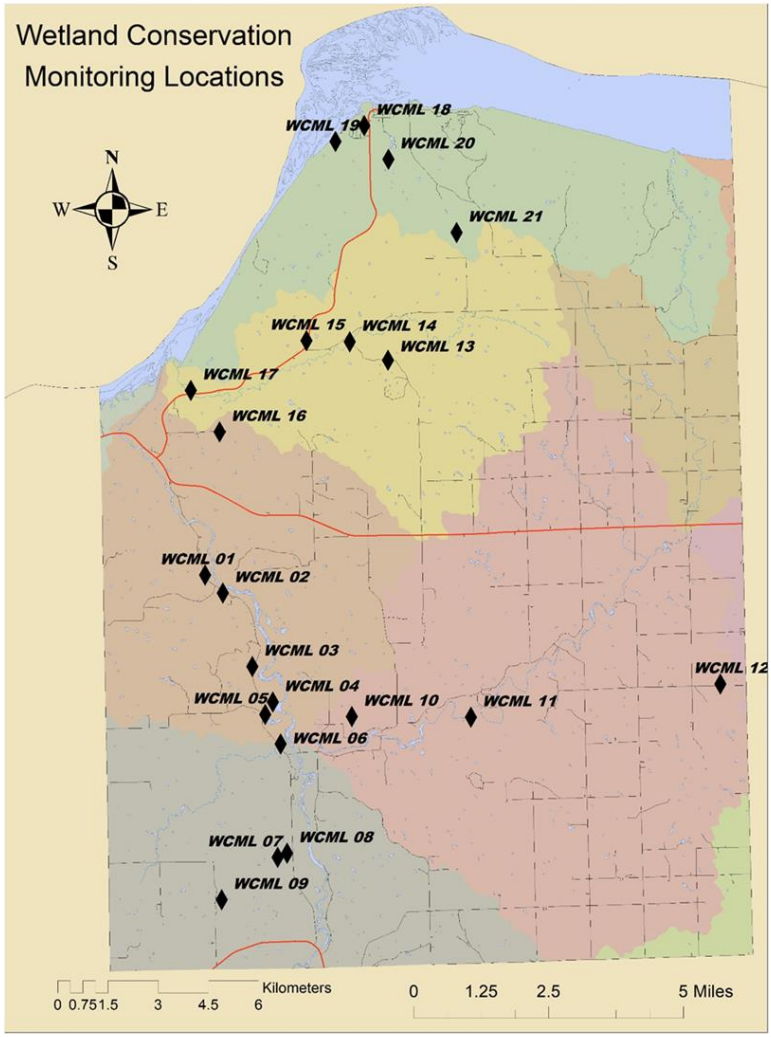
Outreach and Education Action Items

Action: Continue to provide outreach materials to the public about wetlands.
Activities: Maintain the tribal website, work with environmental agencies Information and Education staff to keep the public informed about wetland issues. Assess the need to update the SSWCP when necessary.
Timeline: To be determined.

Action: Continue to provide support to local schools' and colleges' outdoor educators to teach students ranging from grade school through college about tribal wetland resources.
Activities: Develop additional educational materials, such as **"Mammals of Santee Sioux Indian Reservation, Nebraska "**book for use by educators. Continue to lead field trips for students of all ages for hands-on wetland education. Deliver presentations to students in classroom settings as requested.
Timeline: To be determined

Information needs

Wetland conservation is a complex undertaking and there are many uncertainties that should be addressed to help improve our efforts. Broadly, we need better information on how wetlands function and how to best restore and protect wetlands. An itemized list of information needs is provided. This list is not all inclusive and is subject to change as we become aware of gaps in our knowledge base.



Number	*Watershed:*	*Monitoring ID:*	*Monitoring Location:*	*GPS Coordinates:*
1	Outlet Bazile Creek	WCML 01	Union Township 29-32-5 PT E2NESE Santee Sioux Tribe	
2	Outlet Bazile Creek	WCML 02	Union Township 33-32-5 N2NW United States Trustee	
3	Outlet Bazile Creek	WCML 03	Spade Township 4-31-5 S2NE, N2NW, NESE	

			Indian Allotment	
4	Outlet Bazile Creek	WCML 04	Spade Township 10-31-5 W2NW, S2SW, W2SE United States Trustee	
5	Outlet Bazile Creek	WCML 05	Spade Township 10-31-5 W2NW, S2SW, W2SE United States Trustee	
6	Lower Bazile Creek	WCML 06	Spade Township 10-31-5 W2NW, S2SW, W2SE United States Trustee	
7	Lower Bazile Creek	WCML 07	Spade Township 22-31-5 BAL S2SW Santee Sioux Nation	
8	Lower Bazile Creek	WCML 08	Spade Township 22-31-5 BAL S2SW Santee Sioux Nation	
9	Lower Bazile Creek	WCML 09	Spade Township 28-31-5 W2 Santee Sioux Nation	
10	Howe Creek	WCML 10	Spade Township 11-31-5 S2NE, N2SE Santee Sioux Nation	
11	Howe Creek	WCML 11	Spade Township 7-31-4 E2NE United States Trustee	
12	Howe Creek	WCML 12	Harrison Township 1-31-4 E2SW, W2SE United States Trustee	
13	Lost Creek	WCML 13	Union Township 1-32-5 S2SW Santee Sioux Tribe of NE	
14	Lost Creek	WCML 14	Union Township 2-32-5 PT NENE Santee Sioux Nation	
15	Lost Creek	WCML 15	Union Township 3-32-5 E2NE US of A in TRUST for the SST	
16	Outlet Bazile Creek	WCML 16	Union Township 16-32-5 SEC 16 LS TR NW4 Board of Education	
17	Lost Creek	WCML 17	Union Township 8-32-5 PT N2NE US of America in Trust	
18	Missouri River	WCML 19	Hill Township W2SW LS 2.5A ROW 13-33-5 Santee Sioux Tribe of NE	
19	Missouri River	WCML 20	Hill Township 14-33-5 PT NWSE, PT SWSE Santee Sioux Nation	
20	Missouri River	WCML 21	Hill Township 24-33-5 NE4, E2NW Santee Sioux Tribe	

21	Missouri River	WCML 22	Hill Township 30-33-4 E2SE Santee Sioux Nation	

Table 4. Summary of general information needs for tribal wetlands on the Santee Sioux Reservation, NE.

INFORMATION NEEDS FOR TRIBAL WETLANDS		WETLAND LOCATION NUMBER															
CATEGORY	TASK	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Fauna	Evaluate wildlife use	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Fauna	Survey the breeding and/or migrating birds	x	x	x						x							
Fauna	Census the invertebrate community	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Fauna	Survey the breeding and/or migrating birds	x	x	x	x									x			
Fauna	Survey the breeding bird community	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Fauna	Conduct a spring migration shorebird study	x	x	x	x	x										x	x
Fauna	Evaluate methods to allow fish passage around structures used to block head-cutting streams									x			x				
Fauna	Study the ecology of muskrats, esp. their response to sedimentation making wetland shallower	x	x	x	x			x			x						
Fauna	Study reptile/amphibian use	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Flora	Conduct vegetation monitoring	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Flora	Evaluate vegetation management actions	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Flora	Evaluate techniques to control cattail and reed canary grass	x	x	x							x	x					
Flora	Evaluate moist-soil management techniques	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Flora/Fauna	Evaluate the plant and animal community response to wetland restorations	T	O		B	E		D	E	T	E	R	M	I	N	E	D
Flora/Fauna	Evaluate Missouri River slough restoration response by plants and wildlife																X
Flora/Fauna	Evaluate grazing systems on wetland plants and wildlife		X	X	X												
Flora/Fauna	Evaluate grazing in wetlands: Influence of timing, stocking rate, and type of livestock		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Functions	Evaluate Missouri River mitigation projects																X
Functions	Quantify historic and current bluff numbers and assessment of function	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Functions	Evaluate overall changes in wetland distribution and condition -conduct EBE functional assessment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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APPENDIX A SITE PORTFOLIOS-

BAZILE CREEK NORTH (BCN SW01)

Vegetation List	
Abutilon theophrasti	Velvet leaf
Acer negundo	Boxelder
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Amorpha fruticosa	False indigo bush
Apocynum cannabinum	Indian hemp dogbane
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Carduus nutans	Musk thislte
Carex nebrascensis	Nebraska sedge
Ceanothus cuneatus	Buck brush
Chamaecrista fasciculata	Partridge pea
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Equisetum hyemale	Rough horsetail
Equisetum laevigatum	Smooth scouring rush
Euphorbia marginata	Snow on the mountain

Fraxinus pennsylvanica	Green Ash
Hordeum pusillum	Little barley
Ipomoea leptophylla	Bush morning glory
Juglans nigra	Blackwalnut
Lythrum salicaria	Purple loosestrife
Medicago sativa	Alfalfa
Melilotus officinalis	Yellow sweet clover
Oxalis stricta	Wood sorrel
Panicum vergatum	Switch grass
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Phragmites spp.	Phragmites
Physalis pruinosa	Ground cherry
Populus deltoides	Cottonwood
Quercus macrocarpa	Bur Oak
Rudbeckia hirta	Black-eyed susan
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Salix exigua	Sand bar willow
Schinia lynx	Fleabane
Scirpus atrovirens	Dark green bulrush
Setaria viridis	Green foxtail
Sisymbrium loeselii	Tall hedge mustard
Spartina pectinata	Prairie cordgrass
Teucrium canadense	American germander
Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Verbascum thapsus	Great mullein
Verbena hastata	Blue vervain
Verbena stricta	Hoary vervain
Vitis riparia	Wild grape

Total Mean C:	2.1	Tree:	8 (15.4%)
Native Mean C:	3.2	Shrub:	4 (7.7%)
Total FQI:	15.1	Vine: 1	1 (1.9%)

Native FQI:	18.7	Forb:	39 (75%)
Adjusted FQI:	25.9	Grass:	0 (0%)
% C value 0:	42.3%	Sedge:	0 (0%)
% C value 1-3:	26.9%	Rush:	0 (0%)
% C value 4-6:	28.8%	Fern:	0 (0%)
% C value 7-10:	1.9%	Bryophyte:	0 (0%)
Native Tree Mean C:	3.4		
Native Shrub Mean C:	4.7		
Native Herbaceous Mean C:	2.9		

Species Richness:		Species Wetness:	
Total Species:	52	Mean Wetness:	-0.2
Native Species:	34 (65.4%)	Native Mean Wetness:	-0.6
Non-native Species:	18 (34.6%)		

Duration Metrics			
Annual:	10 (19.2%)	Native Annual:	5 (9.6%)
Perennial:	37 (71.2%)	Native Perennial:	28 (53.8%)
Biennial:	5 (9.6%)	Native Biennial:	1 (1.9%)

Birds		
Common Name	**Genus Species**	**Number**
Bluejay	*Cyanocitta cristata*	5
Marsh wren	*Cistothorus palustris*	7
Red-headed Woodpecker	*Melanerpes erythrocephalus*	10
Red-winged Blackbird	*Agelaius phoeniceus*	9
Sharp-shinned Hawk	*Accipiter striatus*	1
House wren	*Troglodytes aedon*	1
Cliff Swallow	*Petrochelidon pyrrhonota*	20
Great Blue Heron	*Ardea herodias*	1
European Starling	*Sturnus vulgaris*	3
Bob-white Quail	*Colinus virginianus*	1
Mourning Dove	*Zenaida macroura*	3
American Robin	*Turdus migratorius*	1

Fish

Common Name	Genus Species	Number
Channel Catfish	*Ictalurus punctatus*	8
Brassy Minnow	*Hybognathus hankinsoni*	1
Yellow Bullhead	*Ameiurus natalis*	162
Creek chub	*Semotilus atromaculatus*	13
Fathead minnow	*Pimephales promelas*	3
Green sunfish	*Lepomis cyanellus*	7
Longnose dace	*Rhinichthys cataractae*	2
Orange spotted sunfish	*Lepomis humilis*	7
Plains Minnow	*Hybognathus placitus*	7
Red shiner	*Cyprinella lutrensis*	132
River shiner	*Notropis blennius*	15
Sand shiner	*Notropis stramineus*	98
White Sucker	*Catostomus commersonii*	1
Common Shiner	*Luxilus cornutus*	3
Plains Topminnow	*Fundulus sciadicus*	1

Amphibians/Reptiles		
Common Name	**Genus Species**	**Number**
American Bullfrog	*Lithobates catesbeianus*	16
Boreal Chorus Frog	*Pseudacris maculata*	6
Painted Turtle	*Chrysemys picta*	12
Blanchard Cricket frog	*Acris blanchardi*	2
Woodhouse Toad	*Anaxyrus woodhousii*	4
Snapping Turtle	*Chelydra serpentina*	8

SAND CREEK (BCN SW04)

Plants-

Genus Species	Common name
Acer negundo	Boxelder
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Amorpha fruticosa	False indigo bush
Apocynum cannabinum	Indian hemp dogbane
Arctium lappa	Burdock
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Carduus nutans	Musk thislte
Ceanothus cuneatus	Buck brush
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Elymus virginicus	Virginia wildrye

Equisetum hyemale	Rough horsetail
Fraxinus pennsylvanica	Green Ash
Geum canadense	White avens
Hordeum pusillum	Little barley
Ipomoea leptophylla	Bush morning glory
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lythrum salicaria	Purple loosestrife
Malus domestica	Apple tree
Medicago sativa	Alfalfa
Melilotus officinalis	Yellow sweet clover
Panicum vergatum	Switch grass
Parthenocissus vitacea	Woodbine
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Phragmites spp.	Phragmites
Phyllanthus acidus	Gooseberry
Physalis pruinosa	Ground cherry
Plantago rugelii	Rugels plantain
Populus deltoides	Cottonwood
Quercus macrocarpa	Bur Oak
Rudbeckia hirta	Black-eyed susan
Rumex crispus	Curly dock
Salix exigua	Sand bar willow
Schinia lynx	Fleabane
Scirpus atrovirens	Dark green bulrush
Setaria viridis	Green foxtail
Sisymbrium loeselii	Tall hedge mustard
Solidago gigantea	Giant Goldenrod
Spartina pectinata	Prairie cordgrass
Stellaria media	Chickweed
Thlaspi arvense	Field pennycress
Tilia americana	Basswood
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus parvifolia	Chinese elm
Ulmus pumila	Siberian Elm
Verbascum thapsus	Great mullein
Verbena stricta	Hoary vervain
Vitis riparia	Wild grape

» Conservatism-Based Metrics:

Total Mean C: **2.1**
Native Mean C: **3.3**
Total FQI: **15.6**
Native FQI: **19.8**
Adjusted FQI: **26.7**
% C value 0: **41.8%**
% C value 1-3: **29.1%**
% C value 4-6: **25.5%**
% C value 7-10: **3.6%**
Native Tree Mean C: **3.3**
Native Shrub Mean C: **5.8**
Native Herbaceous Mean C: **2.9**

» Species Richness:

Total Species: **55**
Native Species: **36 (65.5%)**
Non-native Species: **19 (34.5%)**

» Species Wetness:

Mean Wetness: **0.3**
Native Mean Wetness: **-0.1**

» Physiognomy Metrics:

Tree: **10 (18.2%)**
Shrub: **4 (7.3%)**
Vine: **2 (3.6%)**
Forb: **39 (70.9%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **10 (18.2%)**
Perennial: **40 (72.7%)**
Biennial: **5 (9.1%)**

Native Annual: **5 (9.1%)**
Native Perennial: **30 (54.5%)**
Native Biennial: **1 (1.8%)**

Birds-

Common Name	Genus Species	Number
Red-headed Woodpecker	*Melanerpes erythrocephalus*	2
Red-winged Blackbird	*Agelaius phoeniceus*	9
House wren	*Troglodytes aedon*	7
European Starling	*Sturnus vulgaris*	1
Cardinal	*Cardinalis*	1
American Goldfinch	*Carduelis tristis*	2
American Robin	*Turdus migratorius*	4

Fish

Common Name	Genus Species	Number
Northern Pike	*Esox Lucius*	3
Brassy Minnow	*Hybognathus hankinsoni*	4
Yellow Bullhead	*Ameiurus natalis*	12
Creek chub	*Semotilus atromaculatus*	24
Fathead minnow	*Pimephales promelas*	33
Green sunfish	*Lepomis cyanellus*	19
Orange spotted sunfish	*Lepomis humilis*	2
Red shiner	*Cyprinella lutrensis*	14
Sand shiner	*Notropis stramineus*	8

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	5
Boreal Chorus Frog	*Pseudacris maculata*	5
Painted Turtle	*Chrysemys picta*	2
Rat Snake	*Elaphe pantherophis*	3

BAZILE CREEK WETLAND (BCN W01)-

Plants-

Genus-species	Common name
Acer negundo	Boxelder maple
Anemone canadensis	Canada anemone
Apocynum cannabinum	Indian hemp
Asclepias syriaca	Common milkweed
Bromus tectorum	Cheatgrass
Convolvulus arvensis	Field bindweed
Equisetum hyemale	Rough horsetail
Fraxinus pennsylvanica	Green ash
Hesperis matronalis	Dame's rocket
Hordeum jubatum	Foxtail barley
Humulus lupulus	Common hop
Melilotus officinalis	Yellow sweet clover

Phalaris arundinacea	Reed canary grass
Phragmites australis	Phragmites
Poa compressa	Canada bluegrass
Polygonatum biflorum	Smooth solomon's-seal
Populus deltoides	Cottonwood
Quercus macrocarpa	Bur oak
Rumex crispus	Curly dock
Salix amygdaloides	Peachleaf willow
Salix exigua	Sandbar willow
Sisymbrium loeselii	Tall hedge mustard
Spartina pectinata	Prairie cordgrass
Thlaspi arvense	Field penny-cress
Typha angustifolia	Narrowleaf cattail

» Conservatism-Based Metrics:

Total Mean C: **1.8**
Native Mean C: **2.9**
Total FQI: **8.8**
Native FQI: **11.2**
Adjusted FQI: **22.9**
% C value 0: **41.7%**
% C value 1-3: **33.3%**
% C value 4-6: **25%**
% C value 7-10: **0%**
Native Tree Mean C: **3.2**
Native Shrub Mean C: **3**
Native Herbaceous Mean C: **2.7**

» Species Richness:

Total Species: **24**
Native Species: **15 (62.5%)**
Non-native Species: **9 (37.5%)**

» Species Wetness:

Mean Wetness: **-0.1**
Native Mean Wetness: **-0.4**

» Physiognomy Metrics:

Tree: **5 (20.8%)**
Shrub: **1 (4.2%)**
Vine: **1 (4.2%)**

Forb: **17 (70.8%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **2 (8.3%)**
Perennial: **20 (83.3%)**
Biennial: **2 (8.3%)**

Native Annual: **0 (0%)**
Native Perennial: **15 (62.5%)**
Native Biennial: **0 (0%)**

Birds-

Common Name	Genus Species	Number
Bluejay	*Cyanocitta cristata*	1
Marsh wren	*Cistothorus palustris*	12
Red-headed Woodpecker	*Melanerpes erythrocephalus*	11
Red-winged Blackbird	*Agelaius phoeniceus*	69
House wren	*Troglodytes aedon*	9
European Starling	*Sturnus vulgaris*	1
Mourning Dove	*Zenaida macroura*	5
American Robin	*Turdus migratorius*	2
American goldfinch	*Spinus tristis*	2
Grey catbird	*Dumetella carolinensis*	3
Kingfisher	*Megaceryle alcyon*	2

Fish-

Common Name	Genus Species	Number
Yellow bullhead	*Ameiurus natalis*	342
Green sunfish	*Lepomis cyanellus*	41
Plains topminnow	*Fundulus sciadicus*	67

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	18
Boreal Chorus Frog	*Pseudacris maculata*	650
Painted Turtle	*Chrysemys picta*	15
Blanchard Cricket frog	*Acris blanchardi*	100
Snapping turtle	*Chelydra serpentina*	11
False Map turtle	*Graptemys pseudogeographica*	1
Plains Garter Snake	*Thamnophis radix*	2

OXBOW WETLAND (BCN W02)-

Plants-

Genus Species	Common name
Abutilon theophrasti	Velvet leaf
Acer negundo	Boxelder
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Ambrosia trifida	Giant Ragweed
Amorpha fruticosa	False indigo bush
Apocynum cannabinum	Indian hemp dogbane
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Ceanothus cuneatus	Buck brush
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cyperus esculentus	Yellow Nutsedge
Equisetum hyemale	Rough horsetail
Equisetum laevigatum	Smooth scouring rush
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lythrum salicaria	Purple loosestrife
Medicago sativa	Alfalfa
Monarda fistulosa	Wild burgamont
Nepeta cataria	Catnip
Oenothera biennis	Evening primrose
Oxalis stricta	Wood sorrel
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass

Phragmites australis	Common Reed
Phragmites spp.	Phragmites
Physalis pruinosa	Ground cherry
Plantago rugelli	Rugels plantain
Populus deltoides	Cottonwood
Quercus macrocarpa	Bur Oak
Rhus typhina	Staghorn sumac
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Salix exigua	Sand bar willow
Schinia lynx	Fleabane
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Scirpus atrovirens	Dark green bulrush
Setaria viridis	Green foxtail
Silphium perfoliatum	Cup plant
Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Taraxacum officinale	Dandellion
Teucrium canadense	American germander
Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Typha latifolia	Bulrush
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Urtica dioica	Stinging nettles
Veronica anagallis	Water Speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cockelbur

» Conservatism-Based Metrics:

Total Mean C: **1.8**
Native Mean C: **2.8**
Total FQI: **14.2**
Native FQI: **17.7**
Adjusted FQI: **22.5**
% C value 0: **46.8%**

% C value 1-3: **27.4%**
% C value 4-6: **24.2%**
% C value 7-10: **1.6%**
Native Tree Mean C: **3.1**
Native Shrub Mean C: **4.7**
Native Herbaceous Mean C: **2.6**

» Species Richness:

Total Species: **62**
Native Species: **40 (64.5%)**
Non-native Species: **22 (35.5%)**

» Species Wetness:

Mean Wetness: **-0.2**
Native Mean Wetness: **-0.6**

» Physiognomy Metrics:

Tree: **9 (14.5%)**
Shrub: **4 (6.5%)**
Vine: **2 (3.2%)**
Forb: **47 (75.8%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **13 (21%)**
Perennial: **45 (72.6%)**
Biennial: **4 (6.5%)**

Native Annual: **7 (11.3%)**
Native Perennial: **32 (51.6%)**
Native Biennial: **1 (1.6%)**

Birds-

Common Name	Genus Species	Number
Bluejay	*Cyanocitta cristata*	1
Marsh wren	*Cistothorus palustris*	12
Red-headed Woodpecker	*Melanerpes erythrocephalus*	1
Red-winged Blackbird	*Agelaius phoeniceus*	104
Red-tail Hawk	*Buteo jamaicensis*	1
Mourning Dove	*Zenaida macroura*	4
American Robin	*Turdus migratorius*	2

American goldfinch	*Spinus tristis*	7

Amphibians/Reptiles-

Genus-species	Common name	Observed
Lithobates pipiens	Northern Leopard Frog	3
Pseudacris maculata	Boreal Chorus Frog	45

HORSE PASTURE (BCN W03)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Ambrosia trifida	Giant Ragweed
Amorpha fruticosa	False indigo bush
Anemone canadensis	Canada anemone
Apocynum cannabinum	Indian hemp dogbane
Artemisia ludoviciana	White sagebrush
Asclepias incarnata	Swamp milkweed
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Carex hystericina	Bottlebrush sedge
Carex stipata	Saw-beak sedge
Carex vulpinoidea	Fox sedge
Ceanothus cuneatus	Buck brush
Ceratophyllum demersum	Coontail
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Cichorium intybus	Chichory
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cyperus esculentus	Yellow Nutsedge
Echinochloa galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis palustris	Spikerush
Equisetum hyemale	Rough horsetail
Equisetum laevigatum	Smooth scouring rush
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatem	Foxtail barley
Hordeum pusillum	Little barley

Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lactuca serriola	Prickly lettuce
Lemna minor	Duckweed
Lycopus americanus	American bugleweed
Lythrum salicaria	Purple loosestrife
Medicago lupulina	Black medic
Melilotus officinalis	Yellow sweet clover
Oenothera biennis	Evening primrose
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Physalis pruinosa	Ground cherry
Populus deltoides	Cottonwood
Potamogeton natans	Floating pondweed
Ranunculus aquatilis	White water-crowfoot
Reynoutria japonica	Japenese knotweed
Rubus occidentalis	Black raspberry
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Salix exigua	Sandbar willow
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus pungens	Three-square bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Scirpus atrovirens	Dark green bulrush
Scirpus pallidus	Pale bulrush
Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Spartina pectinata	Prairie cordgrass
Taraxacum officinale	Dandellion
Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Great mullein
Verbena stricta	Hoary vervain
Veronica anagallis-aquatica	water speedwell

Vitis riparia	Wild grape
Xanthium strumarium	Cockelbur
Zannichellia palustris	Horned pondweed

» Conservatism-Based Metrics:

Total Mean C: **2.3**
Native Mean C: **3.3**
Total FQI: **20.2**
Native FQI: **24**
Adjusted FQI: **27.4**
% C value 0: **39%**
% C value 1-3: **27.3%**
% C value 4-6: **29.9%**
% C value 7-10: **3.9%**
Native Tree Mean C: **3**
Native Shrub Mean C: **4.3**
Native Herbaceous Mean C: **3.3**

» Species Richness:

Total Species: **77**
Native Species: **53 (68.8%)**
Non-native Species: **24 (31.2%)**

» Species Wetness:

Mean Wetness: **-0.8**
Native Mean Wetness: **-1.5**

» Physiognomy Metrics:

Tree: **7 (9.1%)**
Shrub: **4 (5.2%)**
Vine: **2 (2.6%)**
Forb: **64 (83.1%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **15 (19.5%)**
Perennial: **55 (71.4%)**
Biennial: **7 (9.1%)**

Native Annual: **7 (9.1%)**
Native Perennial: **44 (57.1%)**
Native Biennial: **2 (2.6%)**

Birds-

Common Name	Genus Species	Number
Bluejay	*Cyanocitta cristata*	1
Marsh wren	*Cistothorus palustris*	8
Blue Winged Teal	*Spatula discors*	12
Red-winged Blackbird	*Agelaius phoeniceus*	29
American Crow	*Corvus brachyrhynchos*	2
Pied-billed Grebe	*Podilymbus podiceps*	1
Mourning Dove	*Zenaida macroura*	7
Red-tailed Hawk	*Buteo jamaicensis*	1
American goldfinch	*Spinus tristis*	5
Grey catbird	*Dumetella carolinensis*	1

Fish-

Common Name	Genus Species	Number
Green sunfish	*Lepomis cyanellus*	303

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	89
Boreal Chorus Frog	*Pseudacris maculata*	29
Painted Turtle	*Chrysemys picta*	17
Northern Leopard Frog	*Lithobates pipiens*	8
Snapping turtle	*Chelydra serpentina*	6
Plains Leopard frog	*Lithobates blairi*	8
Plains Garter Snake	*Thamnophis radix*	6

CENTER BRIDGE (BCS SW07)-

Plants-

Genus-species	Common name
Acer negundo	Boxelder maple
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Apocynum cannabinum	Indian hemp dogbane
Asclepias incarnata	Swamp milkweed
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carex stipata	Saw-beak sedge
Carex vulpinoidea	Fox sedge
Ceanothus cuneatus	Buck brush
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cyperus esculentus	Yellow Nutsedge
Descurainia pinnata	Tansy mustard
Echinochloa galli	Barnyard grass
Eleocharis palustris	Spikerush
Equisetum hyemale	Equisetum
Fraxinus pennsylvanica	Green Ash
Lemna minor	Duckweed
Lythrum salicaria	Purple loosestrife
Medicago lupulina	Black medic
Melilotus officinalis	Yellow sweet clover
Oenothera biennis	Evening primrose
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Polygonum pensylvanicum	Pennsylvania Smartweed
Populus deltoides	Cottonwood
Reynoutria japonica	Japenese knotweed
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Salix exigua	Sandbar willow
Schoenoplectus acutus	Hardstem bulrush

Schoenoplectus tabernaemontani	Softstem bulrush
Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Taraxacum officinale	Dandellion
Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus parvifolia	Chinese elm
Ulmus pumila	Siberian Elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Common mullein
Verbena stricta	Hoary vervain
Veronica americana	American speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cocklebur

» Conservatism-Based Metrics:

Total Mean C: **2.3**
Native Mean C: **3.3**
Total FQI: **16.3**
Native FQI: **19.2**
Adjusted FQI: **27.2**
% C value 0: **40%**
% C value 1-3: **30%**
% C value 4-6: **26%**
% C value 7-10: **4%**
Native Tree Mean C: **2.8**
Native Shrub Mean C: **4.5**
Native Herbaceous Mean C: **3.3**

» Species Richness:

Total Species: **50**
Native Species: **34 (68%)**
Non-native Species: **16 (32%)**

» Species Wetness:

Mean Wetness: **-0.9**
Native Mean Wetness: **-1.6**

» Physiognomy Metrics:

Tree: **6 (12%)**
Shrub: **2 (4%)**
Vine: **2 (4%)**
Forb: **40 (80%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **8 (16%)**
Perennial: **38 (76%)**
Biennial: **4 (8%)**

Native Annual: **4 (8%)**
Native Perennial: **29 (58%)**
Native Biennial: **1 (2%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	3
Marsh wren	*Cistothorus palustris*	1
Cliff Swallow	*Petrochelidon pyrrhonota*	12
Red-winged Blackbird	*Agelaius phoeniceus*	24
American Crow	*Corvus brachyrhynchos*	6
Barn Swallow	*Hirundo rustica*	4
Mourning Dove	*Zenaida macroura*	1
Red-tailed Hawk	*Buteo jamaicensis*	2
American goldfinch	*Spinus tristis*	3
Grey catbird	*Dumetella carolinensis*	4

Fish-

Common Name	Genus Species	Number
Longnose dace	*Rhinichthys cataractae*	13
Red shiner	*Cyprinella lutrensis*	45

River shiner	*Notropis blennius*	6
Common Carp	*Cyprinus carpio*	12
Sand shiner	*Notropis stramineus*	311

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	5
Boreal Chorus Frog	*Pseudacris maculata*	7
Painted Turtle	*Chrysemys picta*	2
Softshell Turtle	*Apalone spinifera*	1
Snapping turtle	*Chelydra serpentina*	2
Plains Leopard frog	*Lithobates blairi*	9

MILLS PASTURE (NORTH POND) (BCS W05)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Ambrosia trifida	Giant Ragweed
Artemisia ludoviciana	White sagebrush
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Carex scoparia	Pointed broom sedge
Ceanothus cuneatus	Buck brush
Ceratophyllum demersum	Coontail
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Convolvulus arvense	Field bindweed
Cornus alternifolia	Pale leaf dogwood
Echinochloa galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis palustris	Spikerush
Elymus elymoides	Wild rye
Equisetum laevigatum	Smooth scouring rush
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatem	Foxtail barley
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lemna minor	Duckweed
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Physalis pruinosa	Ground cherry
Populus deltoides	Cottonwood
Potamogeton natans	Floating pondweed

Reynoutria japonica	Japenese knotweed
Rumex crispus	Curly dock
Shepherdia argentea	Buffalo berry
Sisymbrium loeselii	Tall hedge mustard
Solanum rostratum	Buffalo bur
Solidago spp.	Goldenrod
Taraxacum officinale	Dandellion
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Xanthium strumarium	Cockelbur

» Conservatism-Based Metrics:

Total Mean C: **1.7**
Native Mean C: **2.6**
Total FQI: **11.3**
Native FQI: **14**
Adjusted FQI: **21.1**
% C value 0: **47.7%**
% C value 1-3: **25%**
% C value 4-6: **25%**
% C value 7-10: **2.3%**
Native Tree Mean C: **2.8**
Native Shrub Mean C: **5**
Native Herbaceous Mean C: **2.4**

» Species Richness:

Total Species: **44**
Native Species: **29 (65.9%)**
Non-native Species: **15 (34.1%)**

» Species Wetness:

Mean Wetness: **0.1**
Native Mean Wetness: **-0.3**

» Physiognomy Metrics:

Tree: **6 (13.6%)**
Shrub: **2 (4.5%)**
Vine: **1 (2.3%)**
Forb: **35 (79.5%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **12 (27.3%)**
Perennial: **29 (65.9%)**
Biennial: **3 (6.8%)**

Native Annual: **6 (13.6%)**
Native Perennial: **22 (50%)**
Native Biennial: **1 (2.3%)**

Birds-

Common Name	Genus Species	Number
Marsh wren	*Cistothorus palustris*	8
Blue Winged Teal	*Spatula discors*	6
Red-winged Blackbird	*Agelaius phoeniceus*	8
American Crow	*Corvus brachyrhynchos*	1
American goldfinch	*Spinus tristis*	2
Grey catbird	*Dumetella carolinensis*	2

Fish-

Common Name	Genus Species	Number
Green sunfish	*Lepomis cyanellus*	12

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	19
Boreal Chorus Frog	*Pseudacris maculata*	5
Northern Leopard Frog	*Lithobates pipiens*	11
Plains Garter Snake	*Thamnophis radix*	1

MILLS PASTURE BLADDERWORT POND (BCS W06)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Artemisia ludoviciana	White sagebrush
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Carex scoparia	Pointed broom sedge
Ceanothus cuneatus	Buck brush
Ceratophyllum demersum	Coontail
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Convolvulus arvense	Field bindweed
Cornus alternifolia	Pale leaf dogwood
Echinochloa galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis palustris	Spikerush
Elymus elymoides	Wild rye
Equisetum laevigatum	Smooth scouring rush
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatem	Foxtail barley
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lemna minor	Duckweed
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Physalis pruinosa	Ground cherry
Plantego rugelli	Rugels plantain
Polygonum cuspidatum	Japenese knotweed
Populus deltoides	Cottonwood
Potamogeton natans	Floating pondweed
Reynoutria japonica	Japenese knotweed

Rumex crispus	Curly dock
Shepherdia argentea	Buffalo berry
Sisymbrium loeselii	Tall hedge mustard
Solanum rostratum	Buffalo bur
Solidago spp.	Goldenrod
Taraxacum officinale	Dandellion
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Utricularia vulgaris	Bladderwort
Verbena hastata	Blue vervain
Verbena Stricta	Hoary vervain
Veronica spicata	Speedwell
Xanthium strumarium	Cockelbur

» Conservatism-Based Metrics:

Total Mean C: **1.9**
Native Mean C: **2.8**
Total FQI: **13.2**
Native FQI: **16.1**
Adjusted FQI: **23.2**
% C value 0: **43.8%**
% C value 1-3: **25%**
% C value 4-6: **29.2%**
% C value 7-10: **2.1%**
Native Tree Mean C: **2.8**
Native Shrub Mean C: **5**
Native Herbaceous Mean C: **2.7**

» Species Richness:

Total Species: **48**
Native Species: **33 (68.8%)**
Non-native Species: **15 (31.3%)**

» Species Wetness:

Mean Wetness: **-0.1**
Native Mean Wetness: **-0.6**

» Physiognomy Metrics:

Tree: **6 (12.5%)**
Shrub: **2 (4.2%)**
Vine: **1 (2.1%)**
Forb: **39 (81.3%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**

Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **11 (22.9%)**
Perennial: **33 (68.8%)**
Biennial: **4 (8.3%)**

Native Annual: **5 (10.4%)**
Native Perennial: **26 (54.2%)**
Native Biennial: **2 (4.2%)**

Birds-

Common Name	Genus Species	Number
Marsh wren	*Cistothorus palustris*	6
Sparrow Spp		3
Red-winged Blackbird	*Agelaius phoeniceus*	9
American Crow	*Corvus brachyrhynchos*	6
American goldfinch	*Spinus tristis*	2
Mourning dove	*Zenaida macroura*	4

Fish-

Common Name	Genus Species	Number
Green sunfish	*Lepomis cyanellus*	171

Amphibians/Reptiles-

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	102
Boreal Chorus Frog	*Pseudacris maculata*	2500
Northern Leopard Frog	*Lithobates pipiens*	59
Plains Garter Snake	*Thamnophis radix*	3

MILLS HOMESTEAD (BCS W07)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Artemisia ludoviciana	White sagebrush
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Carex scoparia	Pointed broom sedge
Ceanothus cuneatus	Buck brush
Ceratophyllum demersum	Coontail
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Convolvulus arvense	Field bindweed
Cornus alternifolia	Pale leaf dogwood
Echinochloa galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis palustris	Spikerush
Elymus elymoides	Wild rye
Elymus trachycaulus	Slender wheat grass
Equisetum laevigatum	Smooth scouring rush
Euphorbia esula	Leafy spurge
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatem	Foxtail barley
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lemna minor	Duckweed
Lycopus americanus	American water horehound
Lythrum salicaria	Purple loosestrife
Medicago lupilina	Black Medic
Nasturtium officinale	Water cress
Parthenocissus quinquefolia	Virginia creeper
Parthenocissus vitacea	Woodbine
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed

Physalis pruinosa	Ground cherry
Plantego rugelli	Rugels plantain
Polygonum cuspidatum	Japenese knotweed
Populus deltoides	Cottonwood
Potamogeton natans	Floating pondweed
Reynoutria japonica	Japenese knotweed
Rumex crispus	Curly dock
Ruppia cirrhosa	Widgeon grass
Scirpus pallidus	Pale bulrush
Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Stuckenia pectinata	Sago pondweed
Syngonium podophyllum	Arrowhead
Taraxacum officinale	Dandellion
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Verbena hastata	Blue vervain
Verbena Stricta	Hoary vervain
Veronica spicata	Speedwell

» Conservatism-Based Metrics:

Total Mean C: **2.1**
Native Mean C: **3.1**
Total FQI: **15.1**
Native FQI: **18.1**
Adjusted FQI: **25.1**
% C value 0: **44.2%**
% C value 1-3: **19.2%**
% C value 4-6: **36.5%**
% C value 7-10: **0%**
Native Tree Mean C: **2.8**
Native Shrub Mean C: **6**
Native Herbaceous Mean C: **3.1**

» Species Richness:

Total Species: **52**
Native Species: **34 (65.4%)**
Non-native Species: **18 (34.6%)**

» Species Wetness:

Mean Wetness: **-0.5**
Native Mean Wetness: **-0.8**

» Physiognomy Metrics:

Tree: **5 (9.6%)**
Shrub: **1 (1.9%)**
Vine: **2 (3.8%)**
Forb: **44 (84.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **9 (17.3%)**
Perennial: **40 (76.9%)**
Biennial: **3 (5.8%)**

Native Annual: **3 (5.8%)**
Native Perennial: **30 (57.7%)**
Native Biennial: **1 (1.9%)**

Birds-

Common Name	Genus Species	Number
Marsh wren	*Cistothorus palustris*	4
Eastern kingbird	*Tyrannus tyrannus*	2
Red-winged Blackbird	*Agelaius phoeniceus*	18
American Crow	*Corvus brachyrhynchos*	2
American goldfinch	*Spinus tristis*	9
Mourning dove	*Zenaida macroura*	3

Fish-

Common Name	Genus Species	Number
Green sunfish	*Lepomis cyanellus*	267

Amphibians/Reptiles

Common Name	Genus Species	Number
American Bullfrog	*Lithobates catesbeianus*	23
Boreal Chorus Frog	*Pseudacris maculata*	2
Northern Leopard Frog	*Lithobates pipiens*	8
Plains Garter Snake	*Thamnophis radix*	1
Painted Turtle	*Chrysemys picta*	6

MOUTH OF HOWE CREEK (HC SW01)-

Plants-

Acer negundo	Boxelder maple
Grindelia squarrosa	Curly cup gumweed
Sambucus canadensis	Elderberry
Apocynum cannabinum	Indian hemp dogbane
Solanum rostratum	Buffalo bur
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Ludwigia peploides	Floating primrose willow
Carex vulpinoidea	Fox sedge
Lysimachia ciliata	Fringed loosestrife
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cyperus esculentus	Yellow Nutsedge
Typha latifolia	bulrush
Echinochloa galli	Barnyard grass
Eleocharis palustris	Spikerush
Equisetum hyemale	Equisetum
Fraxinus pennsylvanica	Green Ash
Spartina pectinata	Prairie cordgrass
Lythrum salicaria	Purple loosestrife
Medicago lupulina	Black medic
Melilotus officinalis	Yellow sweet clover
Oenothera biennis	Evening primrose
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Polygonum pensylvanicum	Pennsylvania Smartweed
Populus deltoides	Cottonwood
Reynoutria japonica	Japenese knotweed
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Taraxacum officinale	Dandellion

Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus parvifolia	Chinese elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Common mullein
Verbena stricta	Hoary vervain
Veronica americana	American speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cocklebur
Verbena hastata	Blue vervain
Juniperus virginiana	Eastern Red cedar
Euphorbia marginata	Snow on the mountain

» Conservatism-Based Metrics:

Total Mean C: **2.3**
Native Mean C: **3.2**
Total FQI: **16.4**
Native FQI: **19.2**
Adjusted FQI: **26.9**
% C value 0: **39.2%**
% C value 1-3: **29.4%**
% C value 4-6: **27.5%**
% C value 7-10: **3.9%**
Native Tree Mean C: **2.5**
Native Shrub Mean C: **4**
Native Herbaceous Mean C: **3.3**

» Species Richness:

Total Species: **51**
Native Species: **36 (70.6%)**
Non-native Species: **15 (29.4%)**

» Species Wetness:

Mean Wetness: **-1.1**
Native Mean Wetness: **-1.6**

» Physiognomy Metrics:

Tree: **6 (11.8%)**
Shrub: **2 (3.9%)**
Vine: **2 (3.9%)**

Forb: **41 (80.4%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **8 (15.7%)**
Perennial: **38 (74.5%)**
Biennial: **5 (9.8%)**

Native Annual: **4 (7.8%)**
Native Perennial: **30 (58.8%)**
Native Biennial: **2 (3.9%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	2
Eastern Kingbird	*Tyrannus tryannus*	4
Bluejay	*Cyanocitta cristata*	2
Red-winged Blackbird	*Agelaius phoeniceus*	7
American Crow	*Corvus brachyrhynchos*	1
Cardinal	*Cardinalis cardinalis*	1
Mourning Dove	*Zenaida macroura*	1
Red-tailed Hawk	*Buteo jamaicensis*	1
American goldfinch	*Spinus tristis*	1
Grey catbird	*Dumetella carolinensis*	8

Fish-

Common Name	Genus Species	Number
Longnose dace	*Rhinichthys cataractae*	2
Red shiner	*Cyprinella lutrensis*	5
Creek Chub	*Semotilus atromaculatus*	4
Sand shiner	*Notropis stramineus*	8

Amphibians/Reptiles

Common Name	Genus Species	Number
Boreal Chorus Frog	*Pseudacris maculata*	2

HC SWMS 03 (ROCKY STREAM)-

Plants-

Genus-species	Common name
Acer negundo	Boxelder maple
Ambrosia artemisiifolia	Annual ragweed
Apocynum cannabinum	Indian hemp dogbane
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carex scoparia	Broom sedge
Chenopodium album	Lambsquarter
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cynanchum laeve	Honey vine
Cyperus esculentus	Yellow Nutsedge
Echinochloa galli	Barnyard grass
Echinocystis lobata	Wild cucumber
Eleocharis palustris	Spikerush
Equisetum hyemale	Equisetum
Erigeron philadelphicus	Fleabane
Fraxinus pennsylvanica	Green Ash
Impatience campsensis	bedstraw
Lactuca biennis	Blue lettice
Leersia oryzoides	Rice cutgrass
Lemna minor	duckweed
Louisiana artemisia	Cudweed sagewort
Medicago lupulina	Black medic
Melilotus officinalis	Yellow sweet clover
Morbus alba	Mullberry tree
Nasturtium officinale	watercress
Oenothera biennis	Evening primrose
Onethera suffrutescens	Scarlet gaura
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Phragmites australis	Common Reed
Plantego rugelli	Rugels plantain
Populus deltoides	Cottonwood
Rumex crispus	Curly dock

Sambucus canadensis	Elderberry
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Sisymbrium loeselii	Tall hedge mustard
Solanum rostratum	Buffalo bur
Spartina pectinata	Prairie cordgrass
Taraxacum officinale	Dandellion
Teucrium canadense	American germander
Thlaspi arvense	Field pennycress
Ulmus americana	American Elm
Ulmus pumila	Siberian elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Common mullein
Verbena hastata	Blue vervain
Verbena stricta	Hoary vervain
Veronica officinalis	speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cocklebur

» Conservatism-Based Metrics:

Total Mean C: **2.1**
Native Mean C: **3.1**
Total FQI: **15.4**
Native FQI: **18.9**
Adjusted FQI: **25.7**
% C value 0: **40.7%**
% C value 1-3: **27.8%**
% C value 4-6: **29.6%**
% C value 7-10: **1.9%**
Native Tree Mean C: **3**
Native Shrub Mean C: **4**
Native Herbaceous Mean C: **3.1**

» Species Richness:

Total Species: **54**
Native Species: **37 (68.5%)**
Non-native Species: **17 (31.5%)**

» Species Wetness:

Mean Wetness: **-0.6**
Native Mean Wetness: **-1.2**

» Physiognomy Metrics:

Tree: **6 (11.1%)**
Shrub: **2 (3.7%)**
Vine: **3 (5.6%)**
Forb: **43 (79.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **11 (20.4%)**
Perennial: **39 (72.2%)**
Biennial: **4 (7.4%)**

Native Annual: **5 (9.3%)**
Native Perennial: **30 (55.6%)**
Native Biennial: **2 (3.7%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	8
Eastern Kingbird	*Tyrannus tryannus*	1
Bluejay	*Cyanocitta cristata*	1
Red-winged Blackbird	*Agelaius phoeniceus*	15
American Crow	*Corvus brachyrhynchos*	6
Sparrow Spp.		3
Mourning Dove	*Zenaida macroura*	7
Red-tailed Hawk	*Buteo jamaicensis*	3
American goldfinch	*Spinus tristis*	6
Grey catbird	*Dumetella carolinensis*	1

Fish-

Common Name	Genus Species	Number
Longnose dace	*Rhinichthys cataractae*	15
Red shiner	*Cyprinella lutrensis*	12
Creek Chub	*Semotilus atromaculatus*	22

Sand shiner	*Notropis stramineus*	1
Common Carp	*Cyprinus carpio*	5
River Carpsucker	*Carpiodes carpio*	12
Grass Pickeral	*Esox americanus*	1

Amphibians/Reptiles

Common Name	Genus Species	Number
Snapping turtle	*Chelydra serpentina*	2

LINDY BRIDGE (8 PM SW01)-

Plants-

Genus-species	Common name
Acer negundo	Boxelder maple
Ambrosia artemisiifolia	Annual ragweed
Apocynum cannabinum	Indian hemp dogbane
Asclepia verticillata	Whorled milkweed
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carduus acanthoides	Plumess thistle
Carex scoparia	Broom sedge
Chenopodium album	Lambsquarter
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Equisetum hyemale	Equisetum
Erigeron philadelphicus	Fleabane
Fraxinus pennsylvanica	Green Ash
Glycyrrhiza lepidota	wild licorice
Louisiana artemisia	Louisiannna wormwood
Lythrum salicaria	Purple loosestrife
Melilotus officinalis	Yellow sweet clover
Mimosa microphylla	Sensitive briar
Morbus alba	Mullberry tree
Nepeta cataria	Catnip
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Physalis pruinosa	Ground cherry
Poa pratensis	Kentucky bluegrass
Rumex crispus	Curly dock
Salix amygdaloides	Peach leaf willow
Silphium laciniatum	Compas plant
Solanum rostratum	Buffalo bur
Solidago canadensis	Canada goldenrod
Spartina pectinata	Prairie cordgrass
Thlaspi arvense	Field pennycress
Ulmus americana	American Elm
Urtica dioica	Stinging nettles

Veronica officinalis	speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cocklebur

» Conservatism-Based Metrics:

Total Mean C: **2**
Native Mean C: **3**
Total FQI: **12.5**
Native FQI: **15.3**
Adjusted FQI: **24.5**
% C value 0: **43.6%**
% C value 1-3: **28.2%**
% C value 4-6: **25.6%**
% C value 7-10: **2.6%**
Native Tree Mean C: **3.2**
Native Shrub Mean C: **n/a**
Native Herbaceous Mean C: **3**

» Species Richness:

Total Species: **39**
Native Species: **26 (66.7%)**
Non-native Species: **13 (33.3%)**

» Species Wetness:

Mean Wetness: **0.2**
Native Mean Wetness: **0.2**

» Physiognomy Metrics:

Tree: **5 (12.8%)**
Shrub: **0 (0%)**
Vine: **1 (2.6%)**
Forb: **33 (84.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **6 (15.4%)**
Perennial: **31 (79.5%)**
Biennial: **2 (5.1%)**

Native Annual: **4 (10.3%)**
Native Perennial: **22 (56.4%)**
Native Biennial: **0 (0%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	1
English sparrow	*Passer domesticus*	1
American goldfinch	*Spinus tristis*	4
Red-winged Blackbird	*Agelaius phoeniceus*	4

Fish-

Common Name	Genus Species	Number
Creek Chub	*Semotilus atromaculatus*	68
Sand Shiner	*Notropis stramineus*	2
Red Shiner	*Cyprinella lutrensis*	21
Longnose Dace	*Rhinichthys cataractae*	4
Green Sunfish	*Lepomis cyanellus*	6
Common Carp	*Cyprinus carpio*	2

Amphibians/Reptiles

Common Name	Genus Species	Number
Bullfrog	*Lithobates catesbeianus*	5
American toad	*Bufo Anaxyrus americanus*	3

HC WMS 09 (DUCK POND) (HC W09)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Common ragweed
Ambrosia psilostachya	Western ragweed
Ambrosia trifida	Giant Ragweed
Amorpha fruticosa	False indigo bush
Anemone canadensis	Canada anemone
Apocynum cannabinum	Indian hemp dogbane
Artemisia ludoviciana	White sagebrush
Asclepias incarnata	Swamp milkweed
Asclepias syriaca	Common milkweed
Bolboschoenus fluviatilis	River bulrush
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carduus acanthoides	Plumless thistle
Carduus nutans	Musk thislte
Carex hystericina	Bottlebrush sedge
Ceanothus cuneatus	Buck brush

Ceratophyllum demersum	Coontail
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Cichorium intybus	Chichory
Cirsium arvense	Canada thistle
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Cornus alternifolia	Pale leaf dogwood
Cyperus esculentus	Yellow Nutsedge
Echinochloa galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis palustris	Spikerush
Equisetum hyemale	Rough horsetail
Euphorbia marginata	Snow on the mountain
Fraxinus pennsylvanica	Green Ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatem	Foxtail barley
Hordeum pusillum	Little barley
Juglans nigra	Blackwalnut
Juniperus virginiana	Eastern Red Cedar
Lactuca serriola	Prickly lettuce
Lemna minor	Duckweed
Louisiana artemisia	Louisiana wormwood
Lycopus americanus	American bugleweed
Lythrum salicaria	Purple loosestrife
Melilotus officinalis	Yellow sweet clover
Oenothera biennis	Evening primrose
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Physalis pruinosa	Ground cherry
Populus deltoides	Cottonwood
Potamogeton natans	Floating pondweed
Rumex crispus	Curly dock
Salix amygdaloides	Peach-leaf willow
Salix exigua	Sandbar willow
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus pungens	Three-square bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Scirpus atrovirens	Dark green bulrush
Scirpus pallidus	Pale bulrush

Sisymbrium loeselii	Tall hedge mustard
Solidago spp.	Goldenrod
Spartina pectinata	Prairie cordgrass
Taraxacum officinale	Dandellion
Thlaspi arvense	Field pennycress
Tragopogon dubius	Yellow goats beard
Typha angustifolia	Narrow-leaf cattail
Ulmus americana	American Elm
Ulmus pumila	Siberian Elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Great mullein
Verbena stricta	Hoary vervain
Veronica anagallis-aquatica	water speedwell
Vitis riparia	Wild grape
Xanthium strumarium	Cockelbur
Zannichellia palustris	Horned pondweed

» Conservatism-Based Metrics:

Total Mean C: **2.2**
Native Mean C: **3.1**
Total FQI: **18.5**
Native FQI: **21.9**
Adjusted FQI: **26**
% C value 0: **39.4%**
% C value 1-3: **26.8%**
% C value 4-6: **31%**
% C value 7-10: **2.8%**
Native Tree Mean C: **3**
Native Shrub Mean C: **4.5**
Native Herbaceous Mean C: **3**

» Species Richness:

Total Species: **71**
Native Species: **50 (70.4%)**
Non-native Species: **21 (29.6%)**

» Species Wetness:

Mean Wetness: **-0.7**
Native Mean Wetness: **-1.3**

» Physiognomy Metrics:

Tree: **7 (9.9%)**
Shrub: **4 (5.6%)**
Vine: **2 (2.8%)**
Forb: **58 (81.7%)**

Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **13 (18.3%)**
Perennial: **51 (71.8%)**
Biennial: **7 (9.9%)**

Native Annual: **7 (9.9%)**
Native Perennial: **41 (57.7%)**
Native Biennial: **2 (2.8%)**

Birds

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	18
English sparrow	*Passer domesticus*	11
American goldfinch	*Spinus tristis*	8
Red-winged Blackbird	*Agelaius phoeniceus*	35
Blue winged Teal	*Spatula discors*	54
Mallard	*Anas platyrhynchos*	12

Fish-

Common Name	Genus Species	Number
Green Sunfish	*Lepomis cyanellus*	320

Amphibians/Reptiles

Common Name	Genus Species	Number
Bullfrog	*Lithobates catesbeianus*	192
Boreal Chorus	*Pseudacris maculata*	90
Painted Turtle	*Chrysemys picta*	75
Plains garter snake	*Thamnophis radix*	2

WIND FARM (AG WETLAND) (HC W10)-

Plants-

Genus-species	Common name
Amaranthus retroflexus	Red root pigweed
Ambrosia artemisiifolia	Annual ragweed
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Cannabis sativa	Hemp
Chenopodium album	Lambsquarter
Conzya canadensis	Marestail
Echinocystis lobata	Wild cucumber
Fraxinus pennsylvanica	Green ash
Helianthus tuberosus	Jerusalem artichoke
Hordeum jubatem	Foxtail barley
Phalaris arundinacea	Reed canary grass

Phragmites australis	Phragmites
Phragmites communis	Phragmites
Populus deltoides	Cottonwood
Salix amygdaloides	Peach-leaf willow
Sambucus canadensis	Elderberry
Solanum rostratum	Buffalo bur
Sonchus oleraceus	Sow thistle
Taraxacum officinale	Dandelion
Typha angustifolia	Narrowleaf cattail
Typha latifolia	Broad-leaf cattail
Urtica dioica	Stinging nettles

» Conservatism-Based Metrics:

Total Mean C: **1.4**
Native Mean C: **2.1**
Total FQI: **6.6**
Native FQI: **7.9**
Adjusted FQI: **16.8**
% C value 0: **50%**
% C value 1-3: **36.4%**
% C value 4-6: **9.1%**
% C value 7-10: **4.5%**
Native Tree Mean C: **3**
Native Shrub Mean C: **2**
Native Herbaceous Mean C: **1.9**

» Species Richness:

Total Species: **22**
Native Species: **14 (63.6%)**
Non-native Species: **8 (36.4%)**

» Species Wetness:

Mean Wetness: **-0.5**
Native Mean Wetness: **-1.1**

» Physiognomy Metrics:

Tree: **3 (13.6%)**
Shrub: **1 (4.5%)**
Vine: **1 (4.5%)**
Forb: **17 (77.3%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**

Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **6 (27.3%)**
Perennial: **16 (72.7%)**
Biennial: **0 (0%)**

Native Annual: **3 (13.6%)**
Native Perennial: **11 (50%)**
Native Biennial: **0 (0%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	6
English sparrow	*Passer domesticus*	4
American goldfinch	*Spinus tristis*	6
Red-winged Blackbird	*Agelaius phoeniceus*	255
Western kingbird	*Tyrannus verticalis*	5
Eastern kingbird	*Tyrannus tyrannus*	4
Redheaded woodpecker	*Melanerpes erythrocephalus*	3
Barn swallow	*Hirundo rustica*	2
Bluejay	*Cyanocitta cristata*	2
Coopers hawk	*Accipiter cooperii*	1
Forester Tern	*Sterna forsteri*	86
Marsh wren	*Cistothorus palustris*	1
Mourning Dove	*Zenaida macroura*	7
Northern Flicker	*Colaptes auratus*	1
Redtail Hawk	*Buteo jamaicensis*	1
European starling	*Sturnus vulgaris*	2

LOST CREEK BRIDGE (LC SW11)-

Plants-

Genus-species	Common name
Acer negundo	Boxelder maple
Ambrosia artemisiifolia	Annual ragweed
Arctium lappa	Burdock
Asclepias syriaca	Common milkweed
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Carduus acanthoides	Plumess thistle
Celtis occidentalis	Hackberry
Chenopodium album	Lambsquarter
Convolvulus arvense	Field bindweed
Conyza canadensis	Marestail
Echinochloa crus galli	Barnyard grass
Fraxinus pennsylvanica	Green Ash
Helianthus strumosus	Pale leaf dogwood
Heracleum maximum	Cow parsnip
Louisiana artemisia	Louisiannna wormwood
Lythrum salicaria	Purple loosestrife

Melilotus officinalis	Yellow sweet clover
Nepeta cataria	Catnip
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Physalis pruinosa	Ground cherry
Populus deltoides	Cottonwood
Ribes crispa	Gooseberry
Rubus idaeus	Wild Raspberry
Setaria viridis	Green foxtail
Sisymbrium loeselii	Tallhedge mustard
Sium suave	Water parsnip
Solanum rostratum	Buffalo bur
Ulmus americana	American Elm
Urtica dioica	Stinging nettles
Verbascum thapsus	Great mullein
Vitis riparia	Wild grape
Xanthium strumarium	Cocklebur

» Conservatism-Based Metrics:

Total Mean C: **2.1**
Native Mean C: **3.4**
Total FQI: **12.2**
Native FQI: **15.6**
Adjusted FQI: **26.7**
% C value 0: **50%**
% C value 1-3: **23.5%**
% C value 4-6: **17.6%**
% C value 7-10: **8.8%**
Native Tree Mean C: **2.8**
Native Shrub Mean C: **6.7**
Native Herbaceous Mean C: **2.9**

» Species Richness:

Total Species: **34**
Native Species: **21 (61.8%)**
Non-native Species: **13 (38.2%)**

» Species Wetness:

Mean Wetness: **0.1**
Native Mean Wetness: **-0.3**

» Physiognomy Metrics:

Tree: **5 (14.7%)**
Shrub: **3 (8.8%)**
Vine: **2 (5.9%)**
Forb: **24 (70.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **8 (23.5%)**
Perennial: **22 (64.7%)**
Biennial: **4 (11.8%)**

Native Annual: **3 (8.8%)**
Native Perennial: **18 (52.9%)**
Native Biennial: **0 (0%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	5
English sparrow	*Passer domesticus*	1
American goldfinch	*Spinus tristis*	2
Red-winged Blackbird	*Agelaius phoeniceus*	3
Bluejay	*Cyanocitta cristata*	1
Black-capped chickadee	*Poecile atricaoillus*	7
Crow	*Corvus brachyrhynchos*	3
American redstart	*Carduelis tristis*	1

BEAVER DAM (CROSLEYS) (LC W02/LC SW15)-

Plants-

Genus-species	Common name
Abutilon theophrasti	Velvet leaf
Agrostis gigantea	Redtop bent grass
Amorpha fruticosa	False indigo bush
Brassica juncea	Brown mustard
Bromus inermis	Smooth brome
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carduus nutans	Musk thistle
Chenopodium album	Lambsquarter
Cirsium arvense	canada thistle
Convolvulus arvensis	Field bindeweed
Cyperus esculentus	Yellow nutsedge
Euphorbia marginata	Snow on the mountain
Fraxinus pennsyvanica	Green ash
Grindelia squarrosa	Curly cup gumweed
Hordeum jubatum	Foxtail barley
Hordeum pusillum	Little barley

Juniperus virginiana	Eastern red cedar
Lemna minor	Duck weed
Lythrum salicaria	Purple loosestrife
Medicago lupulina	Black medic
Phragmites australis	Phragmites
Plantago rugelii	Blackseed plantain
Plantego rugelli	Rugels plantain
Poa annua	Annual bluegrass
Poa compressa	Canada bluegrass
Quercus macrocarpa	Bur oak
Ribes oxyacanthoides	Gooseberry
Rumex crispus	Curly dock
Salix amygdaloides	Peachleaf willow
Schoenoplectus acutus	Hardstem bulrush
Schoenoplectus americanus	Three square bulrush
Schoenoplectus tabernaemontani	Softstem bulrush
Scirpus fluviatilis	River bulrush
Scirpus pallidus	Pale bulrush
Setaria virdis	Green foxtail
Sisymbrium loeselii	Tall hedge mustard
Sium suave	Water parsnip
Solanum rostratum	Buffalo bur
Spartina pectinata	Prairie cordgrass
Taraxacum officinale	Dandelion
Teucrium canadense	American germander
Toxicodendron radicans	Poison ivy
Typha angustifolia	Narrowleaf cattail
Typha Spp.	
Ulmus americana	American elm
Ulmus pumila	Siberian elm
Veronica spp	Speedwell
Xanthium strumarium	Cockelbur

» Conservatism-Based Metrics:

Total Mean C: **1.4**
Native Mean C: **2.8**
Total FQI: **9.8**
Native FQI: **14**
Adjusted FQI: **20**
% C value 0: **57.1%**

% C value 1-3: **20.4%**
% C value 4-6: **22.4%**
% C value 7-10: **0%**
Native Tree Mean C: **3**
Native Shrub Mean C: **5**
Native Herbaceous Mean C: **2.5**

» Species Richness:

Total Species: **49**
Native Species: **25 (51%)**
Non-native Species: **24 (49%)**

» Species Wetness:

Mean Wetness: **-0.7**
Native Mean Wetness: **-1.7**

» Physiognomy Metrics:

Tree: **7 (14.3%)**
Shrub: **2 (4.1%)**
Vine: **0 (0%)**
Forb: **40 (81.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **13 (26.5%)**
Perennial: **34 (69.4%)**
Biennial: **2 (4.1%)**

Native Annual: **4 (8.2%)**
Native Perennial: **20 (40.8%)**
Native Biennial: **1 (2%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	12
English sparrow	*Passer domesticus*	4
American goldfinch	*Spinus tristis*	12
Red-winged Blackbird	*Agelaius phoeniceus*	87

Bluejay	*Cyanocitta cristata*	2
Black-capped chickadee	*Poecile atricaoillus*	10
Crow	*Corvus brachyrhynchos*	12
Baltimore Oriole	*Icterus galbula*	2
Bald Eagle	*Haliaeetus leucocephalus*	1
Osprey	*Pandion haliaetus*	1
European starling	*Sturnus vulgaris*	38
Blue-winged teal	*Spatula discors*	12
Mallard	*Anas platyrhynchos*	20
Mourning dove	*Zenaida macroura*	8
Great blue heron	*Ardea herodias*	2
Red tail hawk	*Buteo jamaicensis*	4

Fish-

Genus-species	Common name	Observed
Pimephales promelas	Fathead Minnow	29
Semotilus atromaculatus	Creek Chub	33
Esox americanus vermiculatus	Grass pickerel	24
Ameiurus melas	Black bullhead	21
Lepomis cyanellus	Green sunfish	64
Orconectes immunis	Crayfish	21
Cyprinella lutrensis	Red Shiner	47
Notropis stramineus	Sand Shiner	9
Hybognathus hankinsoni	Brassy Minnow	16
Ictalurus punctatus	Channel Catfish	3
Catostomus commersoni	White sucker	10
Ameiurus natalis	Yellow bullhead	6
Catostomus commersonii	White Sucker	8
Spp	Bulhead spp yoy	50

Amphibians/Reptiles

Genus-species	Common name	Observed
Plestiodon multivirgatus	Many-lined skink	1
Thamnophis radix	Plains garter snake	3
Lithobates catesbeianus	American Bullfrog	78
Pseudacris maculate	Boreal Chorus Frog	13
Chrysemys picta	Painted Turtle	4

BLUEGILL POND (MR W01)-

Plants-

Genus-species	Common name
Alisma subcordatum	American water plantain
Ambrosia artemesifolia	Annual ragweed
Ambrosia psilostachya	Western ragweed
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carex lanuginosa	Bull sedge
Carex vulpinoidea	Fox sedge
Echinochloa crus galli	Barnyard grass
Eleocharis acicularis	Needle spikerush
Eleocharis obtusa	Blunt spikerush
Eleocharis palustris	Spikerush
Fraxinus pennsylvanica	Green ash
Grindelia squarrosa	Curly-cup gumweed
Hordeum jubatum	Foxtail barley
Hordeum pusillum	Little barley
Impatiens capensis	Jewelweed
Juniperus virginiana	Eastern red cedar

Lemna spirodela	Duckweed
Lycopus virginicus	Water horehound
Lythrum salicaria	Purple loosestrife
Melilotus officinalis	Yellow sweet clover
Najas guadalupensis	Guppy grass
Phyla nodifloria	Frog fruit
Polygonum achoreum	Striate knotweed
Polygonum coccineum	Water smartweed
Potamogeton natans	Floating pondweed
Quercus macrocarpa	Bur oak
Ranunculus aquatilis	White water crowfoot
Ranunculus longirostris	Long beak buttercup
Ranunculus longirostris	Long beak water-crowfoot
Rosa multiflora	Multiflora rose
Rosa woodsii	Wood's rose
Rumex crispus	Curly dock
Salix amygdaloides	Peachleaf willow
Schoenoplectus tabernaemontani	Softstem bulrush
Sisymbrium loeselii	Tall hedge mustard
Stuckenia pectinata	Sago pondweed
Thlaspi arvense	Field penny-cress
Typha angustifolia	Narrowleaf cattail
Typha latifolia	Broad-leaf cattail
Verbena hastata	Hoary vervain
Verbena stricta	Blue vervain
Veronica anagallis-aquatica	water speedwell
Veronica spicata	Speedwell

» Conservatism-Based Metrics:

Total Mean C: **2.5**
Native Mean C: **3.7**
Total FQI: **15.6**
Native FQI: **18.9**
Adjusted FQI: **30.2**
% C value 0: **35.9%**
% C value 1-3: **23.1%**
% C value 4-6: **35.9%**
% C value 7-10: **5.1%**
Native Tree Mean C: **3**
Native Shrub Mean C: **4**
Native Herbaceous Mean C: **3.9**

» Species Richness:

Total Species: **39**
Native Species: **26 (66.7%)**
Non-native Species: **13 (33.3%)**

» Species Wetness:

Mean Wetness: **-1.8**
Native Mean Wetness: **-2.4**

» Physiognomy Metrics:

Tree: **4 (10.3%)**
Shrub: **2 (5.1%)**
Vine: **0 (0%)**
Forb: **33 (84.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **9 (23.1%)**
Perennial: **28 (71.8%)**
Biennial: **2 (5.1%)**

Native Annual: **4 (10.3%)**
Native Perennial: **21 (53.8%)**
Native Biennial: **1 (2.6%)**

Birds

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	12
English sparrow	*Passer domesticus*	1
American goldfinch	*Spinus tristis*	3
Red-winged Blackbird	*Agelaius phoeniceus*	21
Blue winged Teal	*Spatula discors*	12
Mallard	*Anas platyrhynchos*	6

Fish-

Common Name	Genus Species	Number
Green Sunfish	*Lepomis cyanellus*	39

Amphibians/Reptiles

Genus-species	Common name	Observed
Lithobates pipiens	Leopard frog	29
Lithobates catesbeianus	Bullfrog	61
Pseudacris maculata	Chorus frog	9
Chrysemys picta	Painted turtle	30
Chelydra serpentina	Snapping turtle	2
Anaxyrus woodhousii	Woodhouse's toad	4
Thamnophis sirtalis	Garter snake	4

MUNSEN PONDS (MR W02)-

Plants-

Genus-species	Common name
Ambrosia psilostachya	Western ragweed
Artemisia ludoviciana	Cudweed sagewort
Bromus tectorum	Cheatgrass
Carduus nutans	Musk thistle
Carex vulpinoidea	Fox sedge
Ceratophyllum demersum	Coontail
Fraxinus pennsylvanica	Green ash
Cannabis sativa	Hemp
Impatiens capensis	Jewelweed
Louisiana artemisia	Louisiannna wormwood
Juniperus virginiana	Eastern red cedar
Koeleria macrantha	June grass
Leersia oryzoides	Rice cutgrass
Lemna minor	Duckweed
Melilotus officinalis	Yellow sweet clover
Onosmodium bejariense	False groom well

Penstemon grandiflorus	Beardtongue
Plantago patagonica	Woolly plantain
Solanum rostratum	Buffalo bur
Poa compressa	Canada bluegrass
Psoralea esculenta	Prairie turnip
Quercus macrocarpa	Bur oak
Rosa arkansana	Prairie wild rose
Salix amygdaloides	Peachleaf willow
Sisymbrium loeselii	Tall hedge mustard
Stuckenia pectinata	Sago pondweed
Symphoricarpos albus	Western snowberry
Tilia americana	Basswood
Tradescantia occidentalis	Spiderwort
Ulmus americana	American elm
Verbena hastata	Blue vervain
Verbena stricta	Hoary vervain
Yucca glauca	Yucca

» Conservatism-Based Metrics:

Total Mean C: **3.1**
Native Mean C: **3.9**
Total FQI: **17.3**
Native FQI: **19.5**
Adjusted FQI: **35**
% C value 0: **22.6%**
% C value 1-3: **22.6%**
% C value 4-6: **51.6%**
% C value 7-10: **3.2%**
Native Tree Mean C: **3.3**
Native Shrub Mean C: **6**
Native Herbaceous Mean C: **3.7**

» Species Richness:

Total Species: **31**
Native Species: **25 (80.6%)**
Non-native Species: **6 (19.4%)**

» Species Wetness:

Mean Wetness: **-0**
Native Mean Wetness: **-0.5**

» Physiognomy Metrics:

Tree: **6 (19.4%)**
Shrub: **3 (9.7%)**
Vine: **0 (0%)**
Forb: **22 (71%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **6 (19.4%)**
Perennial: **22 (71%)**
Biennial: **3 (9.7%)**

Native Annual: **3 (9.7%)**
Native Perennial: **21 (67.7%)**
Native Biennial: **1 (3.2%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	6
Crow	*Corvus brachyrhynchos*	21
Red tail hawk	*Buteo jamaicensis*	5
Red-winged Blackbird	*Agelaius phoeniceus*	41
Blue winged Teal	*Spatula discors*	18
Mallard	*Anas platyrhynchos*	2
Mourning dove	*Zenaida macroura*	16

Fish-

Common Name	Genus Species	Number
Green Sunfish	*Lepomis cyanellus*	82

Amphibians/Reptiles

Genus-species	Common name	Observed
Diadophis punctatus	Ring-necked snake	3
Aspidoscelis sexlineata	Six-lined racerunner	1
Cryptoblepharus egeriae	Blue-tailed skink	1
Lithobates catesbeianus	Bullfrog	60
Chrysemys picta	Painted turtle	17
Pseudacris maculata	Chorus frog	7
Rana blairi	Plains leopard frog	21
Anaxyrus woodhousii	Woodhouse's toad	3

ARTESIAN WELL (MR W07)-

Plants-

Genus-species	Common name
Ambrosia trifida	Giant ragweed
Apocynum cannabinum	Indian hemp
Asclepias incarnata	Swamp milkweed
Bromus inermis	Smooth brome
Chamaecrista fasciculata	Partridge pea
Chenopodium album	Lambsquarter
Echinochloa crus galli	Barnyard grass
Elaeagnus angustifolia	Russian olive
Fraxinus pennsylvanica	Green Ash
Helianthus strumosus	Pale leaf dogwood
Mirabilis nyctaginea	Four o'clock
Panicum vergatum	Switch grass
Parthenocissus quinquefolia	Virginia creeper
Phalaris arundinacea	Reed canary grass
Physalis pruinosa	Ground cherry
Poa compressa	Canada bluegrass
Populus deltoides	Cottonwood

Rhus glabra	Smooth sumac
Rumex crispus	Curly dock
Taraxacum officinale	Dandelion
Ulmus americana	American elm
Ulmus pumila	Siberian elm

» Conservatism-Based Metrics:

Total Mean C: **1.5**
Native Mean C: **2.4**
Total FQI: **7**
Native FQI: **9**
Adjusted FQI: **19.1**
% C value 0: **50%**
% C value 1-3: **31.8%**
% C value 4-6: **18.2%**
% C value 7-10: **0%**
Native Tree Mean C: **2.7**
Native Shrub Mean C: **4**
Native Herbaceous Mean C: **1.9**

» Species Richness:

Total Species: **22**
Native Species: **14 (63.6%)**
Non-native Species: **8 (36.4%)**

» Species Wetness:

Mean Wetness: **0.9**
Native Mean Wetness: **0.4**

» Physiognomy Metrics:

Tree: **5 (22.7%)**
Shrub: **2 (9.1%)**
Vine: **1 (4.5%)**
Forb: **14 (63.6%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **4 (18.2%)**
Perennial: **18 (81.8%)**
Biennial: **0 (0%)**

Native Annual: **2 (9.1%)**
Native Perennial: **12 (54.5%)**
Native Biennial: **0 (0%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	2
European starling	*Sturnus vulgaris*	118
American goldfinch	*Spinus tristis*	4
Red-winged Blackbird	*Agelaius phoeniceus*	46
Sparrow Spp	*Spp*	5
Gray catbird	*Dumetella carolinensis*	1
Bluejay	*Cyanocitta cristata*	3

Fish-

Common Name	Genus Species	Number
Semotilus atromaculatus	Creek chub	4

Amphibians/Reptiles

Genus-species	Common name	Observed
Thamnophis sirtalis	Garter snake	2
Lithobates catesbeianus	Bullfrog	3
Coluber constrictor	Eastern Racer	2

CRAZY PEAK (MR W14)-

Plants-

Genus-species	Common name
Abutilon theophrasti	Velvet leaf
Alisma subcordatum	American water plantain
Ambrosia artemesifolia	Annual ragweed
Ambrosia psilostachya	Western ragweed
Ambrosia trifida	Giant Ragweed
Bromus tectorum	Cheatgrass
Cannabis sativa	Hemp
Carduus acanthoides	Plumless thistle
Cirsium arvense	Canada thistle
Echinochloa crus galli	Barnyard grass
Elaeagnus angustifolia	Russian olive
Elaeagnus umbellata	Autumn olive
Eleocharis palustris	Spikerush
Fraxinus pennsylvanica	Green ash
Helianthus strumosus	Pale leaf dogwood
Hordeum jubatum	Foxtail barley
Hummulus lupulus	Common hops

Juniperus virginiana	Eastern red cedar
Lactuca canadensis	Wild lettuce
Lemna spirodela	Duckweed
Lycopus virginicus	Water horehound
Lythrum salicaria	Purple loosestrife
Marah macrocarpa	Wild cucumber
Melilotus officinalis	Yellow sweet clover
Morus alba	White mulberry
Nasturtium officinale	Water cress
Parthenocissus vitacea	Woodbine
Phalaris arundinacea	Reed canary grass
Phragmites spp.	spp
Phyla nodifloria	Frog fruit
Polygonum achoreum	Striate knotweed
Polygonum coccineum	Water smartweed
Populus deltoides	Eastern Cottonwood
Potamogeton natans	Floating pondweed
Quercus macrocarpa	Bur oak
Ranunculus aquatilis	White water crowfoot
Ranunculus longirostris	Long beak buttercup
Ranunculus longirostris	Long beak water-crowfoot
Rosa multiflora	Multiflora rose
Rosa woodsii	Wood's rose
Rumex crispus	Curly dock
Salix amygdaloides	Peachleaf willow
Schoenoplectus tabernaemontani	Softstem bulrush
Sisymbrium loeselii	Tall hedge mustard
Sonchus oleraceus	Sow thistle
Stuckenia pectinata	Sago pondweed
Thlaspi arvense	Field penny-cress
Tilia americana	Basswood
Typha angustifolia	Narrowleaf cattail
Typha latifolia	Broad-leaf cattail
Urtica dioica	Stinging nettles
Verbena hastata	Hoary vervain
Verbena stricta	Blue vervain
Veronica anagallis-aquatica	water speedwell
Veronica spicata	Speedwell
Vitis riparia	Wild grape

» Conservatism-Based Metrics:

Total Mean C: **2**
Native Mean C: **3.3**
Total FQI: **14.1**
Native FQI: **18.4**
Adjusted FQI: **26**
% C value 0: **44%**
% C value 1-3: **24%**
% C value 4-6: **30%**
% C value 7-10: **2%**
Native Tree Mean C: **3.3**
Native Shrub Mean C: **5**
Native Herbaceous Mean C: **3.1**

» Species Richness:

Total Species: **50**
Native Species: **31 (62%)**
Non-native Species: **19 (38%)**

» Species Wetness:

Mean Wetness: **-1**
Native Mean Wetness: **-1.5**

» Physiognomy Metrics:

Tree: **8 (16%)**
Shrub: **3 (6%)**
Vine: **4 (8%)**
Forb: **35 (70%)**
Grass: **0 (0%)**
Sedge: **0 (0%)**
Rush: **0 (0%)**
Fern: **0 (0%)**
Bryophyte: **0 (0%)**

» Duration Metrics:

Annual: **10 (20%)**
Perennial: **37 (74%)**
Biennial: **3 (6%)**

Native Annual: **3 (6%)**
Native Perennial: **27 (54%)**
Native Biennial: **1 (2%)**

Birds-

Common Name	Genus Species	Number
American Robin	*Turdus migratorius*	2
Crow	*Corvus brachyrhynchos*	2
Red tail hawk	*Buteo jamaicensis*	2
Red-winged Blackbird	*Agelaius phoeniceus*	19
Blue winged Teal	*Spatula discors*	2
Mallard	*Anas platyrhynchos*	1
Mourning dove	*Zenaida macroura*	1
American coot	*Fulica americana*	1
Bonaparte gull	*Chroicocephalus philadelphia*	13
Canada goose	*Branta canadensis*	53
Cliff swallow	*Petrochelidon pyrrhonota*	1
Green Winged teal	*Anas carolinensis*	3
Herring gull	*Larus argentatus*	2
Marsh wren	*Cistothorus palustris*	3
Sandpiper spp	*spp*	4
American Goldfinch	*Spinus tristis*	4
Bluejay	*Cyanocitta cristata*	1
Gray catbird	*Dumetella carolinensis*	2

Amphibians/Reptiles-

Genus-species	Common name	Observed
Lithobates catesbeianus	Bullfrog	17
Chrysemys picta	Painted turtle	5
Pseudacris maculata	Chorus frog	19
Rana blairi	Plains leopard frog	2
Anaxyrus woodhousii	Woodhouse's toad	1

APPENDIX B- BENEFICIAL USES FOR EACH WETLAND-

Sites:	Beneficial Use:
BCNSW01	Bat hibernacula, Aquatic life, Wildlife/Aesthetics
BCNW01	Aquatic life, Wildlife
BCNW03	Agriculture, Wildlife
BCNW02	Wildlife
BCNSW04	Wildlife, Aquatic species
BCSW06	Agriculture, Aquatic species
BCSW05	Agriculture, Aquatic species
BCSW07	Aesthetics, Wildlife, Agriculture
BCSSW07	Aesthetics, Wildlife, Agriculture, Aquatics
HCSW01	Wildlife, Aquatic species
HCW10	Wildlife
HCW09	Wildlife
HCSW03	Wildlife, Aquatic species
HCSW20	Wildlife
LCSW11	Agriculture, Wildlife
LCW02	Agriculture, Wildlife, Aquatic species
MRW01	Agriculture, Wildlife, Aquatic species
MRW02	Agriculture, Wildlife, Aquatic species
MRW07	Aesthetics
MRW14	Wildlife

APPENDIX C- POTENTIAL TRIBAL PROTECTION ACTION ITEMS-

Sites:	Potential Tribal Protection Action Items:
BCNSW01	Improve wildlife habitat, Wildlife boxes
BCNW01	Dredge, excavation, wildlife boxes, floral diversity
BCNW03	Fencing
BCNW02	Diverse seed mixtures, wildlife, dredging
BCNSW04	Excavation, supplemental seeding, wood duck box
BCSW05	Fencing, excavation
BCSW06	Fencing, excavation, wildlife boxes
BCSW07	Fencing, excavation, wildlife boxes
BCSSW07	Wildlife enhancement
HCSW01	Supplemental seeding in depression areas, pond, palustrine development
HCW09	Fencing, seeding, excavation
HCSW03	Wildlife enhancement, inner connection possible
HCSW20	Aquatic life enhancement
HCW10	Create water storage, make it deeper
LCW03	Fencing
LCSW11	Fencing, wildlife enhancement platforms, shoreline stabilization, substrate benthic alteration, water control structures
MRW14	Wildlife enhancement, seeding, vegetation control
MRW07	Clean out, Kiosk, Trail, Aesthetics
MRW01	Fencing, water control structures, armoring banks, dredging, aquatic habitat
MRW02	Fencing, buffer enhancements, dredging

APPENDIX D- WETLAND MANAGEMENT ACTION ITEMS

Eco-asset Development Potential	BCNSW01	BCNSW04	BCNW01	BCNW02	BCNW03
Landscape pattern-connectivity to rural or undisturbed areas for consideration	Y	Y	Y	Y	Y
Natural Communities Representation	Y	Y	Y	Y	Y
Viability of occurrence of various eco-assets within zone	Y	Y	Y	Y	Y
Historic prominence of assets within the zone section	Y	Y	Y	Y	Y
Degree of disturbance is limited and offers opportunity	N	Y	Y	Y	Y
Restoration potential of ecological processes	N	Y	Y	Y	Y
Minimal level of threat to biodiversity	Y	N	Y	Y	N
Provides patch mosaic habitat configuration and interspersion	Y	Y	Y	Y	Y
Landscape composition (adjacent land use) is conducive to improvement	Y	Y	N	Y	Y
Riparian corridor continuity opportunity- present	Y	Y	Y	Y	N
General hydro-geomorphic character improvement possible	N	Y	Y	Y	N
Eco-asset enhancement/improvement opportunities					
Creation- additional acreage development	N	Y	Y	N	N
Elevation manipulation water and land	N	Y	Y	Y	Y
Vegetation establishment	Y	Y	Y	Y	Y
Vegetation manipulation	Y	Y	Y	Y	Y
Wetland animal species habitat improvements (nesting platforms, boxes, etc.)	Y	Y	Y	Y	Y
Fragmentation elimination- connectivity enhancement	Y	Y	N	Y	Y
Restoration of wetland functions loss	N	Y	Y	Y	Y
Passive phyto-remediation-plants	N	Y	N	N	N
Seasonal water introduction/retention	N	Y	Y	Y	Y
Stream Habitat Improvement or Palustrine					
Instream habitat enhancement (cover)	Y	Y	N	Y	Y
Bank stabilization (water quality and sediment control)	Y	Y	N	Y	Y
Substrate manipulation (water quality and sediment control)	N	Y	N	Y	N
Creation and/or protection of spawning habitat	Y	Y	Y	N	Y
Habitat alteration and re-configuration	Y	Y	Y	Y	Y
Riparian Improvements					
Fencing, increased sensitivity development	N	N	N	N	Y
Buffer strip enhancement	N	N	N	Y	Y
Contour buffer, filter strips	N	N	Y	Y	Y
Erosion prevention (silt dams, water control structures)	N	Y	Y	N	Y

Creation of shallow areas/deep areas	N	Y	Y	Y	Y
Sediment basins and grade stabilization structures	N	Y	Y	N	Y
Upland Site Improvements					
Native plant re-introductions	Y	Y	Y	Y	Y
Converting excess land//idle areas to grassland, other	N	N	N	N	N
Converting industrial to restored natural conditions, residential	N	N	N	N	N
Road closure	N	N	N	N	N
Grassed waterways	Y	N	N	N	N
Non-point nutrient source containment	N	Y	Y	Y	Y
No-till opportunity	N	Y	N	Y	N
Infrastructure complexity	N	N	N	N	N
Subtotal of Sections					

Eco-asset Development Potential	BCNW12	BCSSW07	BCSW05	BCSW06	BCSW07
Landscape pattern-connectivity to rural or undisturbed areas for consideration	Y	Y	Y	Y	Y
Natural Communities Representation	Y	Y	Y	Y	Y
Viability of occurrence of various eco-assets within zone	Y	Y	Y	Y	Y
Historic prominence of assets within the zone section	Y	Y	Y	Y	Y
Degree of disturbance is limited and offers opportunity	Y	N	Y	Y	Y
Restoration potential of ecological processes	Y	Y	Y	Y	Y
Minimal level of threat to biodiversity	N	Y	Y	Y	Y
Provides patch mosaic habitat configuration and interspersion	Y	Y	Y	Y	Y
Landscape composition (adjacent land use) is conducive to improvement	Y	Y	N	Y	Y
Riparian corridor continuity opportunity- present	N	Y	N	Y	Y
General hydro-geomorphic character improvement possible	N	N	Y	Y	Y
Eco-asset enhancement/improvement opportunities					
Creation- additional acreage development	N	N	Y	Y	Y
Elevation manipulation water and land	N	N	Y	Y	Y
Vegetation establishment	Y	Y	Y	Y	Y
Vegetation manipulation	Y	Y	Y	Y	Y
Wetland animal species habitat improvements (nesting platforms, boxes, etc.)	Y	Y	Y	Y	Y
Fragmentation elimination- connectivity enhancement	N	Y	Y	Y	Y
Restoration of wetland functions loss	N	N	Y	Y	Y
Passive phyto-remediation-plants	N	N	N	N	N

Seasonal water introduction/retention	N	N	Y	Y	Y
Stream Habitat Improvement or Palustrine					
Instream habitat enhancement (cover)	N	Y	Y	Y	Y
Bank stabilization (water quality and sediment control)	N	Y	Y	Y	Y
Substrate manipulation (water quality and sediment control)	N	N	Y	N	Y
Creation and/or protection of spawning habitat	N	Y	N	Y	Y
Habitat alteration and re-configuration	N	Y	Y	Y	Y
Riparian Improvements					
Fencing, increased sensitivity development	Y	N	Y	Y	Y
Buffer strip enhancement	Y	N	Y	Y	Y
Contour buffer, filter strips	Y	N	Y	Y	Y
Erosion prevention (silt dams, water control structures)	Y	N	Y	Y	Y
Creation of shallow areas/deep areas	Y	N	Y	Y	Y
Sediment basins and grade stabilization structures	Y	N	Y	N	N
Upland Site Improvements					
Native plant re-introductions	Y	Y	Y	Y	Y
Converting excess land//idle areas to grassland, other	N	N	N	Y	N
Converting industrial to restored natural conditions, residential	N	N	N	Y	N
Road closure	N	N	N	N	N
Grassed waterways	N	Y	N	N	N
Non-point nutrient source containment	N	Y	N	N	N
No-till opportunity	N	N	N	N	N
Infrastructure complexity	N	N	N	N	N
Subtotal of Sections					

Eco-asset Development Potential	HCSW01	HCSW03	PMSW01	HCWMS09	HCW10
Landscape pattern-connectivity to rural or undisturbed areas for consideration	Y	Y	N	Y	N
Natural Communities Representation	Y	Y	Y	Y	Y
Viability of occurrence of various eco-assets within zone	Y	Y	Y	Y	Y
Historic prominence of assets within the zone section	Y	Y	Y	Y	Y
Degree of disturbance is limited and offers opportunity	Y	Y	N	N	Y
Restoration potential of ecological processes	Y	Y	Y	Y	Y
Minimal level of threat to biodiversity	Y	Y	N	N	Y
Provides patch mosaic habitat configuration and interspersion	Y	N	Y	Y	Y

Landscape composition (adjacent land use) is conducive to improvement	Y	Y	Y	Y	Y
Riparian corridor continuity opportunity- present	Y	Y	Y	N	N
General hydro-geomorphic character improvement possible	N	Y	Y	Y	Y
Eco-asset enhancement/improvement opportunities					
Creation- additional acreage development	N	Y	N	Y	Y
Elevation manipulation water and land	N	Y	Y	Y	Y
Vegetation establishment	Y	Y	Y	Y	Y
Vegetation manipulation	Y	Y	Y	Y	Y
Wetland animal species habitat improvements (nesting platforms, boxes, etc.)	Y	Y	Y	Y	Y
Fragmentation elimination- connectivity enhancement	Y	Y	Y	Y	N
Restoration of wetland functions loss	N	Y	Y	Y	Y
Passive phyto-remediation-plants	N	N	N	N	N
Seasonal water introduction/retention	N	N	Y	Y	Y
Stream Habitat Improvement or Palustrine					
Instream habitat enhancement (cover)	Y	Y	Y	Y	N
Bank stabilization (water quality and sediment control)	N	Y	Y	Y	N
Substrate manipulation (water quality and sediment control)	N	Y	Y	Y	N
Creation and/or protection of spawning habitat	Y	Y	Y	Y	N
Habitat alteration and re-configuration	Y	Y	Y	Y	Y
Riparian Improvements					
Fencing, increased sensitivity development	N	N	N	Y	N
Buffer strip enhancement	N	Y	N	Y	N
Contour buffer, filter strips	N	Y	N	Y	N
Erosion prevention (silt dams, water control structures)	N	Y	Y	Y	N
Creation of shallow areas/deep areas	N	N	Y	Y	Y
Sediment basins and grade stabilization structures	N	N	Y	Y	Y
Upland Site Improvements					
Native plant re-introductions	Y	Y	Y	Y	Y
Converting excess land//idle areas to grassland, other	N	N	N	Y	Y
Converting industrial to restored natural conditions, residential	N	N	N	N	N
Road closure	N	N	N	N	N
Grassed waterways	N	N	N	Y	Y
Non-point nutrient source containment	N	N	Y	Y	N
No-till opportunity	Y	N	Y	N	Y
Infrastructure complexity	N	N	N	N	N
Subtotal of Sections					

Eco-asset Development Potential	LCSW11	LCW02	MRW01	MRW02	MRW07	MRW14
Landscape pattern-connectivity to rural or undisturbed areas for consideration	Y	Y	Y	Y	N	Y
Natural Communities Representation	Y	Y	Y	Y	Y	Y
Viability of occurrence of various eco-assets within zone	Y	Y	Y	Y	Y	Y
Historic prominence of assets within the zone section	Y	Y	Y	Y	Y	Y
Degree of disturbance is limited and offers opportunity	N	N	N	Y	N	Y
Restoration potential of ecological processes	Y	Y	Y	Y	Y	Y
Minimal level of threat to biodiversity	Y	N	N	Y	N	Y
Provides patch mosaic habitat configuration and interspersion	Y	Y	Y	Y	N	Y
Landscape composition (adjacent land use) is conducive to improvement	Y	Y	Y	Y	Y	Y
Riparian corridor continuity opportunity-present	Y	Y	N	Y	Y	Y
General hydro-geomorphic character improvement possible	Y	Y	Y	Y	Y	Y
Eco-asset enhancement/improvement opportunities						
Creation- additional acreage development	N	Y	N	N	Y	N
Elevation manipulation water and land	N	Y	N	Y	Y	N
Vegetation establishment	Y	Y	Y	Y	Y	Y
Vegetation manipulation	Y	Y	Y	Y	Y	Y
Wetland animal species habitat improvements (nesting platforms, boxes, etc.)	Y	Y	Y	Y	Y	Y
Fragmentation elimination- connectivity enhancement	Y	Y	Y	Y	N	Y
Restoration of wetland functions loss	Y	Y	Y	Y	Y	Y
Passive phyto-remediation-plants	N	Y	N	N	N	N
Seasonal water introduction/retention	N	Y	Y	Y	N	N
Stream Habitat Improvement or Palustrine						
Instream habitat enhancement (cover)	Y	Y	Y	Y	Y	Y
Bank stabilization (water quality and sediment control)	Y	Y	Y	Y	Y	N
Substrate manipulation (water quality and sediment control)	Y	Y	Y	Y	Y	Y
Creation and/or protection of spawning habitat	N	Y	Y	Y	N	N
Habitat alteration and re-configuration	Y	Y	Y	Y	Y	Y

Riparian Improvements						
Fencing, increased sensitivity development	Y	Y	Y	Y	N	Y
Buffer strip enhancement	Y	Y	Y	Y	Y	Y
Contour buffer, filter strips	Y	Y	Y	Y	Y	Y
Erosion prevention (silt dams, water control structures)	Y	Y	Y	Y	Y	N
Creation of shallow areas/deep areas	Y	Y	Y	Y	N	Y
Sediment basins and grade stabilization structures	Y	Y	Y	Y	Y	N
Upland Site Improvements						
Native plant re-introductions	Y	Y	Y	Y	Y	Y
Converting excess land//idle areas to grassland, other	N	N	N	N	N	N
Converting industrial to restored natural conditions, residential	N	Y	N	N	Y	N
Road closure	N	N	N	N	N	N
Grassed waterways	N	Y	N	N	N	N
Non-point nutrient source containment	N	Y	Y	N	Y	N
No-till opportunity	N	N	N	N	N	N
Infrastructure complexity	N	Y	N	N	Y	N
Subtotal of Sections						

APPENDIX E PLANT SPECIES

APPENDIX B-2

Major plant associations with diagnostic and most abundant species (Rolfsmeier and Steinauer, 2010).

Note: Invasive species are not counted in the calculations for the riparian reach variable.

Eastern Riparian Forest	
Species Name (synonymy)	**Common Name**
Acer saccharinum	**silver maple**
Cornus drummondii	**roughleaf dogwood**
Fraxinus pennsylvanica	**green ash**
Populus deltoides	**plains cottonwood**
Ulmus americana	**American elm**
Acer negundo	box-elder
Ageratina altissima	white snakeroot
Carex spp.	sedges
Celtis occidentalis	hackberry
Cornus drummondii	roughleaf dogwood
Elymus virginicus	Virginia wildrye
Festuca subverticillata	nodding fescue
Galium aparine	annual bedstraw
Galium triflorum	sweet-scented bedstraw
Geum canadense	white avens
Gleditsia triacanthos	honey-locust
Laportea canadensis	wood nettle
Leersia virginica	whitegrass
Maianthemum stellatum	starry false Solomon's seal
MORUS ALBA	WHITE MULBERRY
Morus rubra	red mulberry
Muhlenbergia spp.	muhlys
Osmorhiza longistylis	aniseroot
Parthenocissus quinquefolia	Virginia creeper
Ribes missouriense	Missouri gooseberry
Rudbeckia laciniata	goldenglow
Sanicula canadensis	Canada sanicle
Sanicula odorata	clustered sanicle
Solidago spp.	goldenrods
Symphoricarpos orbiculatus	coralberry
Toxicodendron radicans	eastern poison ivy
Ulmus rubra	slippery elm
Urtica dioica	stinging nettle
Viola spp.	violets
Vitis riparia	riverbank grape

Eastern Cottonwood-Dogwood Riparian Woodland	
Species Name (synonymy)	**Common Name**
Cornus drummondii	**roughleaf dogwood**
Equisetum hyemale	**common scouringrush**
Populus deltoides	**Plains cottonwood**
Ageratina altissima	white snakeroot
Galium triflorum	sweet-scented bedstraw
Parthenocissus quinquefolia	Virginia creeper
Toxicodendron radicans	eastern poison ivy
Urtica dioica	stinging nettle

Cottonwood-Peachleaf Willow Riparian Woodland	
Species Name (synonymy)	**Common Name**
Populus deltoides	**Plains cottonwood**
Salix amygdaloides	**peachleaf willow**
Salix interior	**sandbar willow**
Acer negundo	box-elder
Ageratina altissima	white snakeroot
Ambrosia artemisiifolia	annual ragweed
BROMUS INERMIS	SMOOTH BROME
Carex emoryi	Emory's sedge
Carex pellita	woolly sedge
Cornus drummondii	roughleaf dogwood
ELAEAGNUS ANGUSTIFOLIA	RUSSIAN-OLIVE
Elymus canadensis	Canada wildrye
Equisetum arvense	field horsetail
Equisetum hyemale	common scouringrush
Fraxinus pensylvanica	green ash
Galium triflorum	sweet-scented bedstraw
Glycyrrhiza lepidota	wild licorice
MORUS ALBA	WHITE MULBERRY
Nassella viridula	green needlegrass
Parthenocissus quinquefolia	Virginia creeper
Pascopyrum smithii	western wheatgrass
POA PRATENSIS	KENTUCKY BLUEGRASS
Populus deltoides	Plains cottonwood
Prunus americana	wild plum
Prunus virginiana	chokecherry
Salix amygdaloides	peachleaf willow
Salix interior	sandbar willow
Shepherdia argentea	buffaloberry
Spartina pectinata	prairie cordgrass
Sporobolus cryptandrus	sand dropseed
Symphoricarpos occidentalis	wolfberry
Toxicodendron radicans	eastern poison ivy
Urtica dioica	stinging nettle

Cottonwood Riparian Woodland	
Species Name (synonymy)	**Common Name**
Populus deltoides	**Plains cottonwood**
ELAEAGNUS ANGUSTIFOLIA	RUSSIAN OLIVE
Fraxinus pensylvanica	green ash
Panicum virgatum	switchgrass
POA PRATENSIS	KENTUCKY BLUEGRASS
Schizachyrium scoparium	little bluestem
Shepherdia argentea	buffaloberry
Symphoricarpos occidentalis	wolfberry
Ulmus americana	American elm

Cottonwood-Diamond Willow Woodland	
Species Name (synonymy)	**Common Name**
Amphicarpaea bracteata	**hog peanut**
Boehmeria cylindrica	**false nettle**
Carex emoryi	**Emory's sedge**
Desmodium paniculatum	**Panicled-Leaf Tick-Trefoil**
Equisetum arvense	**field horsetail**
Rudbeckia laciniata	**goldenglow**
Salix famelica	**diamond willow**
Populus deltoides*	**Plains cottonwood**
Carex emoryi and others	sedges
Cornus drummondii	roughleaf dogwood
Cornus sericea	red osier
Fraxinus pennsylvanica	green ash
Galium triflorum	sweet-scented bedstraw
POA PRATENSIS	KENTUCKY BLUEGRASS
Salix amygdaloides	peachleaf willow
Sanicula canadensis	Canandian sanicle
Symphoricarpos occidentalis	wolfberry
Vitis riparia	riverbank grape

Peachleaf Willow Woodland	
Species Name (synonymy)	**Common Name**
Salix amygdaloides	**peachleaf willow**
Salix famelica	**diamond willow**
Cornus sericea	**red-osier dogwood**
Parthenocissus vitacea	woodbine
PHALARIS ARUNDINACEA	REED CANARYGRASS
Ribes odoratum	buffalo currant
Solidago gigantea	late goldenrod
Typha latifolia	common cattail

Riparian Dogwood-False Indigobush Shrubland	
Species Name (synonymy)	**Common Name**
Amorpha fruticosa	**false indigobush**
Cornus drummondii	**roughleaf dogwood**
Cornus sericea	**red osier**
Ambrosia artemisiifolia	annual ragweed
Carex emoryi	Emory's sedge
Carex pellita	woolly sedge
Impatiens capensis	orange jewelweed
Panicum virgatum	switchgrass
PHALARIS ARUNDINACEA	REED CANARYGRASS
Phyla lanceolata	northern fog-fruit
POA PRATENSIS	KENTUCKY BLUEGRASS
Populus deltoides	Plains cottonwood
Salix exigua var. sericans	sandbar willow
Spartina pectinata	prairie cordgrass

Sandbar Willow Shrubland	
Species Name (synonymy)	**Common Name**
Salix interior	**sandbar willow**
AGROSTIS GIGANTEA	REDTOP
Ambrosia artemisiifolia	common ragweed
Amorpha fruticosa	false indigobush
Carex emoryi	Emory's sedge
Carex pellita	woolly sedge
Cornus sericea	red osier
Eleocharis erythropoda	bald spikerush
Equisetum hyemale	common scouringrush
Leersia oryzoides	rice cutgrass
Lycopus americanus	common water-horehound
MELILOTUS spp.	SWEETCLOVERS
Persicaria spp. (Polygonum spp.)	smartweeds
PHALARIS ARUNDINACEA	REED CANARYGRASS
Phyla lanceolata	northern fog-fruit
Populus deltoides	Plains cottonwood
Rumex spp.	docks
Salix amygdaloides	peachleaf willow
Salix famelica	diamond willow
Schoenoplectus pungens	three-square bulrush
Solidago spp.	goldenrods
Spartina pectinata	prairie cordgrass
Symphyotrichum lanceolatum	panicled aster
Urtica dioica	stinging nettle

Eastern Riparian Forest	
Species Name (synonymy)	**Common Name**
Acer saccharinum	**silver maple**
Cornusdrummondii	**roughleaf dogwood**
Fraxinuspennsylvanica	**green ash**
Populusdeltoides	**plains cottonwood**
Ulmusamericana	**American elm**
Acer negundo	box-elder
Ageratin aaltissima	white snakeroot
Carex spp.	sedges
Celtis occidentalis	hackberry
Cornus drummondii	roughleaf dogwood
Elymus virginicus	Virginia wildrye
Festucas ubverticillata	nodding fescue
Galiu maparine	annual bedstraw
Galium triflorum	sweet-scented bedstraw
Geum canadense	white avens
Gleditsia triacanthos	honey-locust
Laportea canadensis	wood nettle
Leersia virginica	whitegrass
Maianthemum stellatum	starry false Solomon's seal
Morus alba	White mullberry
Morus rubra	red mulberry
Muhlenbergia spp.	muhlys
Osmorhiz alongistylis	aniseroot
Parthenocissus quinquefolia	Virginia creeper
Ribes missouriense	Missouri gooseberry
Rudbecki alaciniata	goldenglow
Sanicula canadensis	Canada sanicle
Sanicul aodorata	clustered sanicle
Solidago spp.	goldenrods
Symphoricarpos orbiculatus	coralberry
Toxicoden dronradicans	eastern poison ivy
Ulmus americana	American elm
Ulmus rubra	slippery elm
Urtic adioica	stinging nettle
Viola spp.	violets
Vitis riparia	riverbank grape

Robert Kaul (left) and M. Gutzmer at the UNL Bessey Herbarium (2014).

Table 1. HGM Subclass in Nebraska for Santee and other Wetland Communities in Nebraska

For detailed information about Nebraska's wetlands, please see the Guide to Nebraska's Wetlands and their Conservation Needs (LaGrange 2005) or visit the website www.NebraskaWetlands.com.

Wetland communities of Santee and Nebraska			
Plant Community	*Cowardin Class*	*HGM Class*	*Location*
Eastern riparian forest	Palustrine forested, temporarily flooded	Riverine floodplain	Primarily river floodplains in the eastern fourth of the state
Eastern cottonwood-dogwood riparian woodland	Palustrine forested, temporarily flooded	Riverine floodplain	Primarily river floodplains in the eastern fourth of the state
Cottonwood-peach leaf willow riparian woodland	Palustrine forested, temporarily flooded	Riverine floodplain	Primarily river floodplains in the eastern fourth of the state
Cottonwood riparian woodland	Palustrine forested, temporarily flooded	Riverine floodplain	Primarily river floodplains in the eastern 2/3 of the state
Cottonwood-diamond willow woodland	Palustrine forested, temporarily flooded	Riverine floodplain	Primarily river floodplains and island along the Missouri, Middle Loup and Elkhorn Rivers
Freshwater seep	Palustrine emergent, saturated	Slope wetland	Occurs throughout the state
Riparian dogwood-false indigo bush shrubland	Palustrine scrub-shrub, intermittently flooded	Riverine floodplain	Along rivers and streams in the eastern half of the state, but scattered westward
Sandbar willow shrubland	Palustrine scrub-shrub temporarily and seasonally flooded	Riverine Channel	Primarily along rivers and larger steams throughout the state
Peachleaf willow woodland	Palustrine forested, temporarily flooded	Riverine floodplain	A single site in the Pine Ridge in Dawes County
Prairie fen	Palustrine emergent, saturated	Slope wetland	Only occurs in sandstone canyons and ravines in the Little

			Blue River drainage in Jefferson County
Sandhill fen	Palustrine emergent, saturated	Organic soil flat	Valleys and dunes in the Sandhill's of Cherry, Grant, Boone, Garfield, and Wheeler counties
Eastern cordgrass wet prairie	Palustrine, temporarily to seasonally flooded	Riverine floodplain	River valleys the tall-grass prairie region of eastern Nebraska

Wetland communities of Nebraska (cont.)			
Plant Community	*Cowardin Class*	*HGM Class*	*Location*
Eastern sedge wet meadow	Palustrine emergent, seasonally and semi-permanently flooded	Riverine floodplain	Eastern part of the state in the floodplain of the Missouri River and its tributaries
Northern cordgrass wet prairie	Palustrine emergent, temporarily flooded	Riverine floodplain	Extensive in permanent stream and river valleys from the Platte River valley northward
Sandhill's wet meadow	Palustrine emergent, temporarily to seasonally flooded	Mineral soil flat	Occurs throughout the Sandhill's and drainages of Sandhill's rivers
Western sedge wet meadow	Palustrine emergent, temporarily to seasonally flooded	?	Occurs in the Nebraska Panhandle
Western alkaline meadow	Palustrine emergent, temporarily flooded	Floodplain depression	Occurs in the North Platte River valley, its smaller tributary valleys, and in closed basins in the western Sandhill's
Western sub irrigated alkaline meadow	Palustrine emergent, temporarily flooded	Riverine floodplain	Extensive in the upper Niobrara River valley and patchy to locally common in the North Platte River valley

Reed marsh	Palustrine emergent, temporarily to seasonally flooded	?	Occurs in the northern half of the state from the Platter River valley northward
Playa wetland	Palustrine emergent, temporarily flooded	Playa depression	Occurs throughout the state but is most common in south-central and southwestern Nebraska
Eastern bulrush deep marsh	Palustrine emergent, semi-permanently flooded	?	Generally found along banks and in backwaters of rivers and large streams in the eastern half of the state
Spikerush vernal pool	Palustrine emergent, temporarily to seasonally flooded	?	Occurs in northwestern and north-central Nebraska
Cattail shallow marsh	Palustrine emergent, seasonally to semi-permanently flooded	Playa depression	Can occur virtually statewide but is most abundant in the eastern half of the state
Eastern saline marsh	Palustrine emergent, seasonally to semi-permanently flooded	Saline depression	Restricted to Lancaster and Saunders, primarily near Salt Creek, Little Salt Creek and Rock Creek
Wetland communities of Nebraska (cont.)			
Plant Community	*Cowardin Class*	*HGM Class*	*Location*
Western alkaline marsh	Palustrine emergent, seasonally to semi-permanently flooded	Sandhill's alkaline marsh	Most abundant in the western Sandhill's in Garden, Morrill, and Sheridan counties
Eastern pondweed aquatic wetland	Palustrine aquatic bed, permanently and semi-permanently flooded	Floodplain depression	Floodplains, lakes, ponds, and impoundments in the southern half and eastern quarter of the state
American lotus aquatic wetland	Palustrine aquatic bed, permanently and semi-permanently flooded	?	Occurs as a semi-natural community in artificial ponds in Lancaster and Platte counties and elsewhere

Northern pondweed aquatic wetland	Palustrine aquatic bed, permanently and semi-permanently flooded	Floodplain depression	Occurs in lakes and backwaters from the Platte River valley northward
Water-lily aquatic wetland	Palustrine aquatic bed, permanently and semi-permanently flooded	?	Confined to lakes and ponds in the Sandhill's
Saline/Alkaline aquatic wetland	Palustrine aquatic bed, permanently and semi-permanently flooded	Saline/Alkaline depression	Natural communities occur in the western Sandhill's, with semi-natural communities in Lancaster county
Sandbar/mudflat	Riverine unconsolidated bottom, temporarily to seasonally flooded	Riverine channel	Occurs within the channel of larger streams and rivers throughout the state