U.S. Fish & Wildlife Service

Inventory and Monitoring Plan

Kulm Wetland Management District

Credit: Cole Morris

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Kulm Wetland Management District

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Signature Page

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Introduction

The Kulm Wetland Management District (District) was established in 1971 to conserve habitat for the benefit of waterfowl and other migratory birds. The District protects wetland and grassland habitat in perpetuity on 126,519 acres of wetland easements and 61,029 acres of grassland easements and manages 45,302 acres of fee-title waterfowl production areas (WPAs; N = 201). Limited-interest conservation easements are purchased voluntarily from willing landowners to conserve important wetland and grassland habitats to meet the breeding requirements for waterfowl and other migratory birds. Waterfowl production areas (WPA) are purchased using funds generated primarily from the sale of federal Migratory Bird Hunting and Conservation Stamps in fee-title to protect and restore habitat for waterfowl production.

This Inventory and Monitoring Plan (IMP) documents natural resource surveys that will be conducted for Kulm Wetland Management District from 2015 through 2030, or until the Comprehensive Conservation Plans (CCP; 2008), Habitat Management Plan (HMP; 2015) or this IMP are revised. The majority of surveys considered in this plan address resource management objectives identified in the HMP. Other surveys are a continuation of past monitoring conducted for tracking long-term trends in specific resources, understanding ecological interactions, or are part of regional and national survey efforts. This IMP was developed as per the Inventory and Monitoring (I&M) policy (701 FW 2) for the National Wildlife Refuge System. An IMP was not developed for Bonehill, Dakota Lake, and Maple River Easement Refuges that occur within the District because no biological surveys will be conducted through 2030.

In July 2014, the staff at Kulm Wetland Management District (Biologist Chris Swanson, Project Leader Mick Erickson, Deputy Project Leader Wayne Henderson, and Assistant Refuge Manager Krista Lundgren) and Regional Inventory and Monitoring staff (I&M Coordinator Steve Kettler, Zone Biologist Cami Dixon, and Data Managers Jennifer Zorn and Jo Ann Dullum via phone/webex) participated in the IMP workshop with the goal of prioritizing and selecting surveys to include in the IMP. The meeting was started with a discussion of the IMP process and required content, as well as a review of the I&M policy. The team discussed the tools and the other applications that would be used to help complete the IMP such as the Service Catalog (ServCat), Planning and Review of I&M activities on Refuges (PRIMR), and the Simple Multi-Attribute Rating Technique (SMART) tool (A User's Guide for a SMART Survey Prioritization Tool, Version 2.1, January 2014) used to prioritize surveys.

Biologist Chris Swanson presented the Strategic Habitat Conservation (SHC) framework used to develop the HMP and associated goals and objectives, as well as a list of current and future surveys that are related to each objective to the team. The SHC framework utilizes three tiers of conservation delivery (Figure 1):

1) Conservation Easements – "*Acquire and Protect What We Can*"
    - Easements form the base for population-level sustainability of waterfowl and other migratory bird populations in the Prairie Pothole Region (PPR). Therefore, all wetland and grassland habitats in priority areas should be protected first.

2) Partners for Fish and Wildlife Program – "*Enhance What We Can*"
   - Maximize the extent of suitable wetland and grassland habitat on private lands in landscapes highly attractive to waterfowl first.

3) Fee-title Lands – "*Manage What We Have*"
   - Ensure that fee-title lands located in landscapes with high potential to contribute to the production of waterfowl and other resources of concern (ROC) are optimally managed.

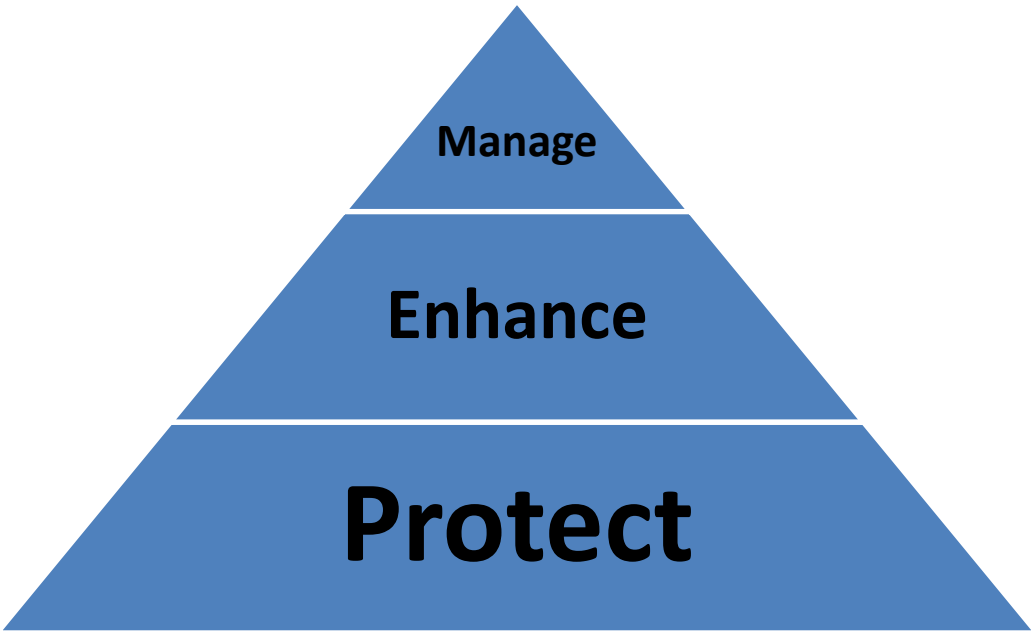

Figure 1. Three-tier conservation delivery approach developed for the Kulm Wetland Management District Habitat Management Plan to sustain waterfowl and other migratory bird populations in the Prairie Pothole Region in the most effective and efficient manner possible. Conservation easements (Protect) provide the base for sustaining populations, private lands (Enhance) provide the opportunity to enhance and/or restore function to landscapes important to waterfowl and other migratory birds, and fee-title lands (Manage) provide the potential to maximize production of waterfowl and other migratory birds in functional landscapes.

Methods

In August 2013, District staff identified and entered a list of 23 current and anticipated surveys in the PRIMR database. During the July 2014 meeting, an overview of the SMART tool, including a description of the 24 criteria used to prioritize surveys, was provided to the meeting participants by Jennifer Zorn. Staff selected 15 of 24 criteria (Appendix A) to evaluate and calculate individual prioritization scores for each survey (Figure 2; Appendix B). One of the 15 selected criteria (3A) was modified to replace priority species with the ROC from the HMP. The team eliminated 9 of 24 criteria (rank = 0) for the following reasons:

- Criteria currently not applicable or too vague for the District based on definitions provided in the SMART tool user's guide (NWRS objective [1C], other legal mandates [4B]).
- Criteria that could not be objectively scored across all surveys due to the insufficient knowledge (attribute quality and scope [6E], sampling design [7A], field methods [7B], and data management/analysis/reporting criteria [7C]).
- Criteria that would over-emphasize refuge capacity in the prioritization process (monetary [8A], personnel [8B], and security/source of funding criteria [8C]).

The three limited-interest easement refuges (Bone Hill, Dakota Lake, and Maple River) did not have a current or expected biological survey and were not included in the prioritization for the District.

The team discussed the results of the survey prioritization using the SMART tool and decided that the final prioritized list (excluding non-selected surveys) be modified to coincide with the SHC conservation delivery approach used to develop the HMP. The team grouped the surveys by tier of conservation delivery (Protect, Enhance, or Manage) whereby those in the "Protect" tier (N = 2) associated with conservation easements were assigned the highest priority. No surveys were assigned to the "Enhance" tier. The remaining surveys were assigned to the "Manage" tier (N = 21) with the exception of three surveys (1.11, 1.12, and 1.13). These surveys did not contribute to the SHC conservation delivery approach but were selected because they required minimal staff time and resources to conduct and they contributed to population monitoring of migratory birds at larger geographic scales.

The team followed the survey prioritization results within both the Protect and Manage tiers to determine the final survey priority ranking for current surveys. The team modified the results of the survey prioritization for expected surveys for several reasons. First, although weed mapping ranked 11th in the prioritization, managers decided that this was the most important expected survey because completion of the survey allows them to implement early-detection rapid response procedures for noxious weed control on WPAs and comply with North Dakota state law (NDCC § 4.1-47-02) which requires noxious weeds to be controlled. Secondly, the team decided that the 7th ranked survey from the prioritization tool should be the second ranked expected survey because it would be necessary to complete the ecological site inventory survey before the 4th ranked survey from the prioritization tool, community state monitoring of ecological sites, would be initiated since the monitoring is based on the inventory results.

The final prioritized list of surveys was then divided into two groups: selected and non-selected surveys. ***Selected*** surveys included *current* surveys which are the highest priority surveys that can be completed with current District resources (e.g., staff, funding) whereas *expected* surveys are those that should be conducted if additional resources can be obtained during the implementation of the IMP. ***Non-selected*** surveys included *future* surveys that ranked low in priority, and would require additional internal and external resources for completion and *historic* surveys that were recently completed or discontinued (Appendix D).

Staff also developed a list of future research needs (Appendix C) that were not included in the survey ranking because significant internal and external resources would need to be obtained

through a competitive grant process to start each project. However, staff believed that it was important to identify priority research needs current to the date of this IMP.

Results

Selected Surveys

Staff selected 13 current surveys to be completed for the duration of this IMP (Table 1.1, Figure 2). The remaining 7 *expected* surveys would be conducted if additional funds and/or staff can be obtained. Three surveys were not selected and assigned a status of *future* and four surveys were changed to *historical* status and were not considered for this IMP (Appendix D).

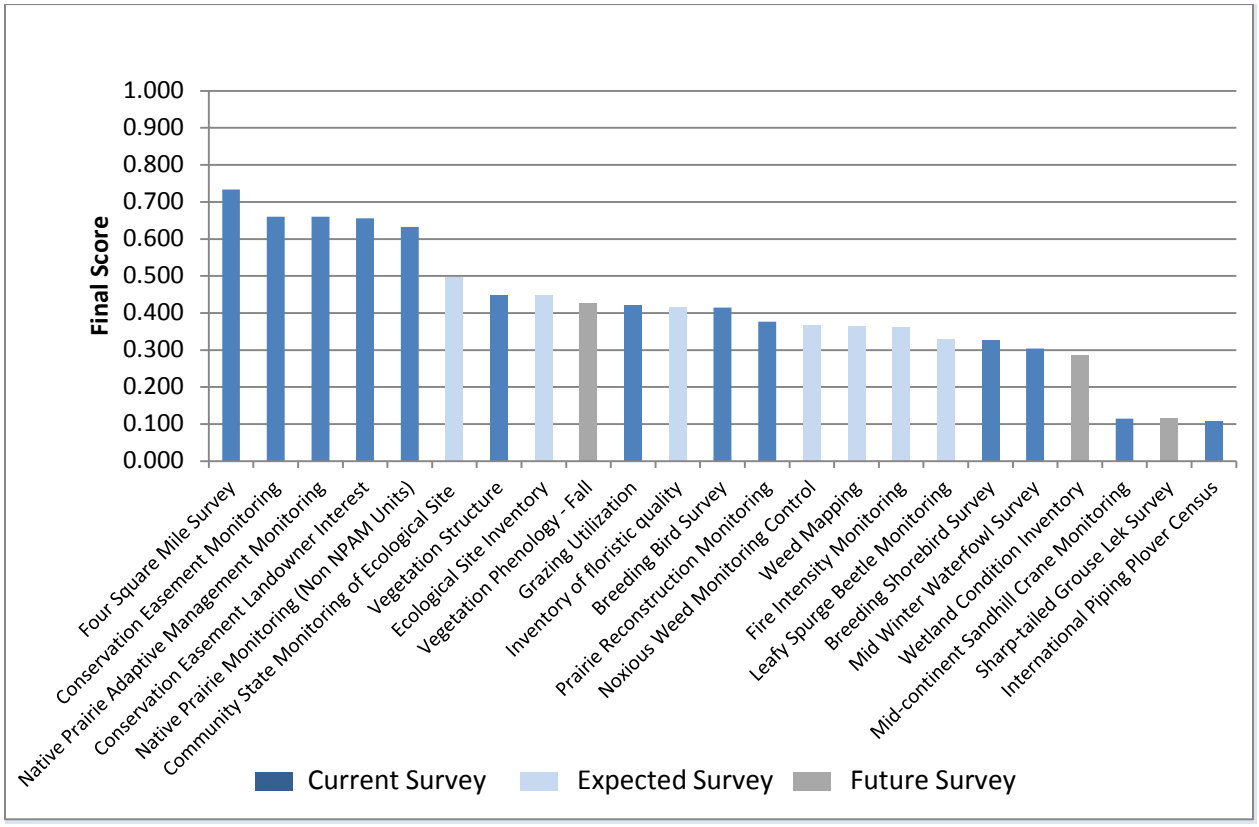

Figure 2. Final output from survey prioritization tool for Kulm Wetland Management District.

Estimating Capacity

Capacity (staff time and dollars needed to conduct a survey annually) was estimated by quantifying the time needed to complete all aspects of each survey including planning, field work, analysis, and reporting (Appendix E, F). Total staff time and annual costs for each survey are summarized in Table 1.1. Monthly estimates of staff time to complete planning and field work for all current surveys combined also were evaluated to inform annual work planning (Figure 3). These estimates are considered draft, as capacity changes from year to year due to

changes in staff availability and budgets. Survey capacity was used to determine if surveys were selected as *current* or *expected* (needing additional capacity that will likely be acquired during the span of the IMP) based on staff hours dedicated to conducting the surveys.

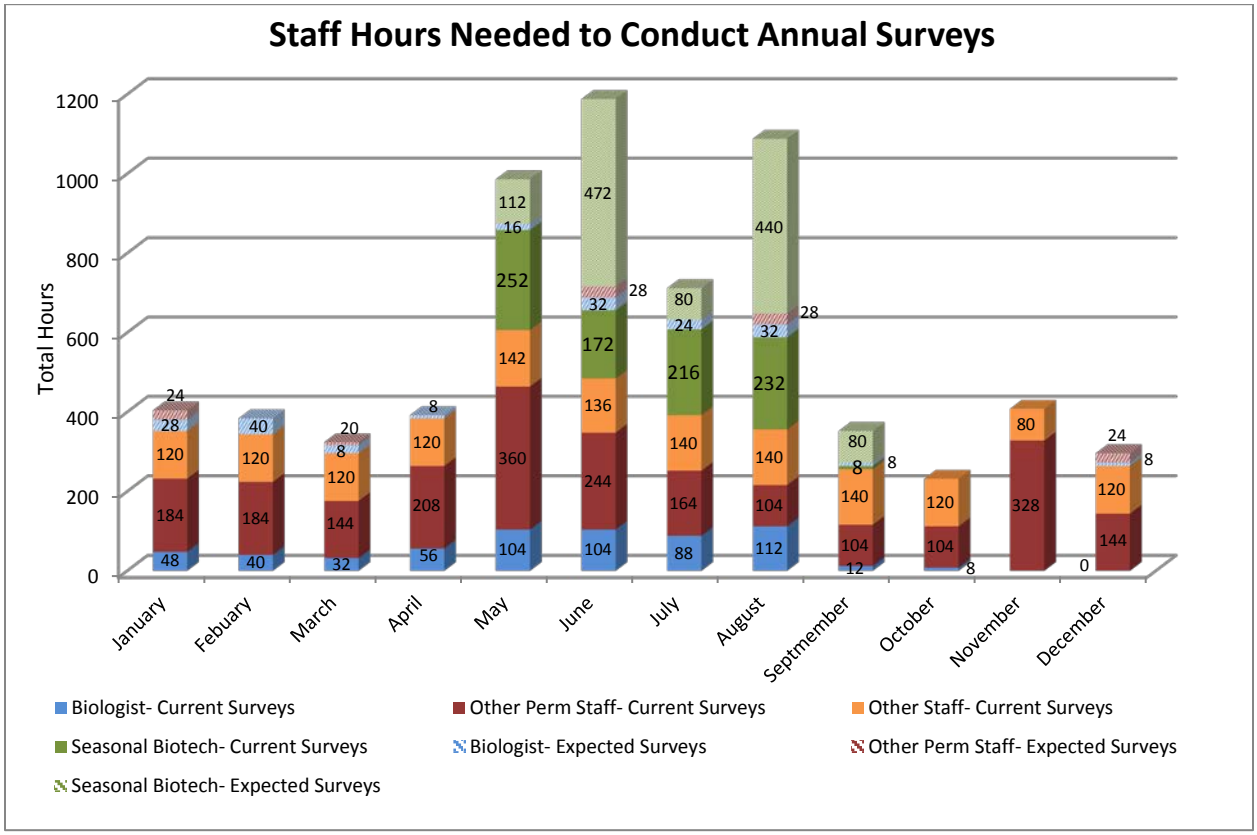

Figure 3. Monthly staff hours required to complete the planning and field work portions of all current annual surveys. Minimum staffing to complete current surveys each year will include 1 biologist, 4 other permanent staff, 1 other staff (Ducks Unlimited technician), and 5 seasonal biological technicians. Completion of expected surveys would require hiring an additional 3 seasonal biological technicians.

Table 1.1. Kulm Wetland Management District *Cost Center Code: FF06REKM00*

Survey Priority[1]	***Survey ID No.[2]***	***Survey Name / (Type)[3]***	***Survey Status[4]***	***Mgmt. Objective ID[5]***	***Survey Area[6]***	***Staff Time (FTE)[7]***	***Avg. Ann Cost (OPR)[8]***	***Survey Timing[9]***	***Survey Length[10]***	***Survey Coord.[11]***	***Protocol Citation[12]***	***Protocol Status[13]***
1.1	FF06REKM00-024	Conservation Easement Monitoring (M)	Current	HMP / Obj 1.1, Obj 1.2, Obj 1.3	Entire station	FWS: 0.85	$8,800.00	Year round/ Recurring -- every year	2014- 2025	Mick Erickson, Project Leader	(none)	Initial Survey Instructions
1.2	FF06REKM00-023	Conservation Easement Landowner Interest (BM)	Current	HMP / Obj 1.1, Obj 1.2, Obj 1.3	Entire station	FWS: 0.2, Other: 0.74	$5,750.00	Year around/ Recurring -- every year	2014- 2025	Mick Erickson, Project Leader	(none)	Initial Survey Instructions
1.3	FF06REKM00-004	Four-Square-Mile Breeding Waterfowl Survey (CB)	Current	HMP / Obj 1.1, Obj 1.2, Obj 1.3, Obj 1.4, Obj 1.5, Obj 1.6, Obj 1.7, Obj 2.1, Obj 2.2, Obj 2.3, Obj 2.4, Obj 3.1, Obj 3.2, Obj 3.3	National	FWS: 0.19, Other: 0.02	$4,150.00	May 1-15th, May 20-June 5/ Recurring -- every year	1987- 2025	Ned Wright, HAPET - Wildlife Biologist	(none)	Initial Survey Instructions
1.4	FF06REKM00-008	Native Prairie Adaptive Management Monitoring (M)	Current	HMP / Obj 2.1, Obj 2.2, Obj 2.3	National	FWS: 0.14	$510.00	June-August/ Recurring -- every year	2009- 2025	Cami Dixon, R6 Division of Biological Resource Zone Biologist (ND/SD)	(none)	Initial Survey Instructions
1.5	FF06REKM00-009	Native Prairie Monitoring (Non NPAM Units) (M)	Current	HMP / Obj 2.1, Obj 2.2, Obj 2.3	Multiple management units: WPAs	FWS: 0.17	$770.00	June-August/ Recurring -- every year	2009- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
1.6	FF06REKM00-013	Vegetation Structure (M)	Current	HMP / Obj 1.4, Obj 1.5, Obj 2.2, Obj 2.3, Obj 2.4, Obj 3.2, Obj 3.3	Multiple management units: WPAs	FWS: 0.17	$990.00	May 15-June 7/ Recurring -- every year	2012- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
1.7	FF06REKM00-034	Grazing Utilization (M)	Current	HMP / Obj 2.1, Obj 2.4, Obj 3.3, Obj 2.3, Obj 2.2, Obj 3.2	Multiple management units: WPAs	FWS: 0.06	$430.00	May-September/ Recurring -- every year	2015- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions

1.8	FF06REKM00-002	Breeding Bird Survey (CB)	Current	HMP / Obj 1.1, Obj 1.2	National	FWS: 0.01	$170.00	May 28th - July 7th/ Recurring -- every year	1990- 2025	Keith Pardieck, Biologist	(none)	Initial Survey Instructions
1.9	FF06REKM00-008	Prairie Reconstruction Monitoring (M)	Current	HMP / Obj 2.4	Multiple management units: WPAs	FWS: 0.12	$770.00	July 15- August/ Recurring -- every year	2015- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
1.10	FF06REKM00-003	Breeding Shorebird Survey (BM)	Current	HMP / Obj 1.1, Obj 1.2	Regional	FWS: 0.02	$170.00	First two weeks of May, First two weeks of June/ Recurring -- every year	2004- 2025	Neil Niemuth, HAPET - Wildlife Biologist	(none)	Initial Survey Instructions
1.11	FF06REKM00-007	Mid-winter Waterfowl Survey (CB)	Current	N/A	National	FWS: 0.0	$170.00	Dec-Jan/ Recurring -- every year	1985- Indefinite	Mike Szymanski, Migratory Waterfowl Biologist - NDGF	(none)	Initial Survey Instructions
1.12	FF06REKM00-021	Mid-continent Sandhill Crane Monitoring (CB)	Current	N/A	National	FWS: 0.0	$170.00	Late March/ Recurring -- every year	1985- Indefinite	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
1.13	FF06REKM00-005	International Piping Plover Census (BM)	Current	CCP / P. Plover Obj. 3	International	FWS: 0.07	$610.00	First two weeks of June/ Recurring -- every five years	1991- 2025	Kirsten Brennen, Piping Plover Biologist	(none)	Initial Survey Instructions
2.1	FF06REKM00-015	Weed Mapping (M)	Expected	CCP / Inv Plant Obj 2, Inv Plant Obj 3	Multiple management units: WPAs	FWS: 0.38	$3,130.00	June- September/ Recurring -- every year	2009- Indefinite	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
2.2	FF06REKM00-028	Ecological Site Inventory (I)	Expected	HMP / Obj 1.4, Obj 1.5, Obj 2.1, Obj 2.2, Obj 2.3	Multiple management units: WPAs	FWS: 0.17	$850.00	Occurs one time only	2018- 2020	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
2.3	FF06REKM00-029	Community State Monitoring of Ecological Site (M)	Expected	HMP / Obj 1.4, Obj 1.5, Obj 2.1, Obj 2.2, Obj 2.3,	Multiple management units: WPAs	FWS: 0.08	$550.00	15 July - August/ Recurring -- every year	2018- 2020	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
2.4	FF06REKM00-040	Inventory of Floristic Quality (I)	Expected	HMP / Obj 1.4, Obj 1.5, Obj 2.1, Obj 2.2, Obj 2.3,	Multiple management units: WPAs	FWS: 0.29	$750.00	Summer/ Occurs one time only	2020- 2022	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions

2.5	FF06REKM00-011	Noxious Weed Control Monitoring (M)	Expected	CCP / Inv Plant Obj 3	Multiple management units: None entered	FWS: 0.26	$810.00	May-September/ Recurring -- every year	2011- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
2.6	FF06REKM00-017	Fire Intensity Monitoring (M)	Expected	HMP / Obj 2.1, Obj 2.2, Obj 2.3	Multiple management units: None entered	FWS: 0.03	$250.00	April - May/ Recurring -- every year	2012- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions
2.7	FF06REKM00-006	Leafy Spurge Beetle Monitoring (M)	Expected	CCP / Inv Plant Obj 3	Multiple management units: None entered	FWS: 0.05	$320.00	Late June - Early July/ Recurring -- every year	1990- 2025	Chris Swanson, Wildlife Biologist	(none)	Initial Survey Instructions

[1] The rank for each survey listed in order of priority (e.g., numeric, tiered, alpha-numeric, or combination of these).
[2] A unique identification number consisting of refuge code-computer assigned sequential number. Refuge code comes from the FBMS cost center identifier.
[3] Short titles for the survey name, preferably the same name used in refuge work plans. Also include the PRIMR code for survey type in parentheses. These are: Inventory (I), Cooperative Baseline Monitoring (CB), Monitoring to Inform Management (M), Cooperative Monitoring to Inform Management (CM), Research (R), and Cooperative Research (CR).
[4] Surveys selected for the timespan of this IMP (i.e., Current, Expected).
[5] The management plan and objectives that justify the selected survey.
[6] Refuge management unit names, entire refuge, or names of other landscape units included in survey.
[7] Estimates of Service (FWS) and non-Service (Other) staff time needed to complete the survey (1 work year = 2080 hours = 1 FTE).
[8] Estimates of average annual operations cost for conducting the survey during the years it is conducted (e.g., equipment, contracts, travel) but not including staff time.
[9] Timing and frequency of survey field activities.
[10] The years during which the survey is conducted.
[11] The name and position of the survey coordinator (the Refuge Biologist or other designated Service employee) for each survey.
[12] Title, author, and version of the survey protocol (if there is no protocol to cite, enter None).
[13] Scale of intended use (Site-specific, Regional, or National) and stage of approval (Initial Survey Instructions, Complete Draft, In Review, or Approved) of the survey protocol.

Surveys Conducted With Current Capacity

1.1 Conservation Easement Monitoring (M); (FF06REKM00-024)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors existing wetland and grassland easements to identify violations to the conditions of a perpetual easement contract. Violations result from protected wetlands being drained, burned, filled, or leveled or protected grasslands being plowed, disked, or permanently altered and/or hayed prior to July 15 each year. Wetland easement enforcement surveys are conducted after crop harvest in the fall prior to snowfall or in early spring after snowmelt and prior to crop seeding. Grassland easement enforcement surveys are conducted in mid-July prior to the 15th. The District also identifies and monitors potential impacts to easements throughout each year from specific projects such as large drainage projects, tile drainage, energy development and construction of roads, transmission lines, pipelines, rural water lines and fiber optic cable lines.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey contribute to several conservation easement objectives by measuring compliance with wetland and grassland easement contracts. These objectives include CCP / Wetlands in Easements Obj 2 & Uplands in Easements Obj 2, and HMP / Obj 1.1, 1.2, & 1.3 (Appendix G).

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Data obtained during easement monitoring is critical to ensure that the legal interest that was purchased by the Service from willing landowners on each wetland or grassland easement is maintained. Annually completing easement monitoring is the highest priority survey for the District because it ensures that waterfowl and other migratory birds will continue to have breeding habitat to support their populations in perpetuity. When violations are detected as a result of the survey, federal wildlife officers contact individuals or landowners that may have intentionally altered protected wetland or grassland habitats. Officers follow easement enforcement guidance as described in the Region 6 Conservation Easement Manual to deal with each violation.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No. However, the District occasionally coordinates with adjacent Districts to complete surveys on an annual basis. It is more common for the District to coordinate with other Districts when large proposed projects such as wind energy developments or transmission line constructions have the potential to impact easements in several Districts.

5) Protocol status?

The District follows the standard operating procedures (SOP) described in the Region 6 Easement Manual to complete all conservation easement monitoring including wetland and grassland easement surveys and project specific administration on an annual basis. The District will submit the SOP for this survey for I&M-sponsored review during FY16.

1.2 Conservation Easement Landowner Interest (BM); (FF06REKM00-023)

1) What is the population or attribute of interest, what will be measured, and when?

Landowners are identified each year through solicitation letters and phone calls regarding interest in the program. If landowners express interest, staff will conduct ground verification surveys of potential wetlands for easement acquisition in early spring and late fall depending on the timing of crop seeding/harvesting operations and snow conditions, whereas potential grasslands are ground verified in June through November.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

The results of this survey are used to identify landowners interested in perpetual wetland and/or grassland conservation easement program. An offer is developed by the Service and provided to the landowner who is responsible for voluntarily accepting or declining the offer and enrollment in the program. This process supports accomplishments of CCP / Wetlands in Easements Obj 1 & Uplands in Easements Obj 1, and HMP / Obj 1.1, 1.2, & 1.3 (Appendix G).

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This survey is the second highest priority for the District to complete because it results in the acquisition and protection of wetland and grassland habitat in perpetuity. Acquisition and protection of these habitats directly supports both carrying capacity and production of waterfowl and other migratory birds in the PPR. Once the initial inventory of landowner interest has been completed for the District, staff can then annually monitor changes in landownership to determine if the new landowners having unprotected wetlands and/or grasslands may be interested in the easement program.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Yes. The District has partnered with Ducks Unlimited to staff one employee at Kulm WMD that focuses the majority of their efforts on securing new conservation easements.

5) Protocol status?

The District has developed initial survey instructions for this survey which will be submitted to I&M for review during FY16.

1.3 Four-Square-Mile Breeding Waterfowl Survey (CB); (FF06REKM00-004)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors trends in waterfowl population abundance (number of breeding pairs) and production (number of recruits) for five resources of concern identified in the HMP including mallard (*Anas platyrhyncos*), northern pintail (*Anas acuta*), blue-winged teal (*Anas discors*), gadwall (*Anas strepera*), and northern shoveler (*Anas clypeata*). Numbers of breeding pairs for all waterfowl species are counted twice annually (May 1–15 and May 20–June 5).

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results of the survey will be used to target conservation delivery via implementation of multiple HMP Objectives relating to grassland and wetland easement acquisition, management of habitat on fee-title lands, and partnerships with private landowners. These objectives include HMP / Obj 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.2, 2.3, 2.4, 3.1, 3.2, & 3.3 (Appendix G).

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

The survey provides spatially explicit information on trends in waterfowl abundance and production for the District. It is also used to assess contributions of the District to continental waterfowl populations. Data collected from this survey also will be used to update the SHC conservation design outlined in the HMP every 5 years.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

The USFWS Habitat and Population Evaluation Team (HAPET) coordinate the survey across the USPPR. HAPET is responsible for providing survey instructions including maps and data forms and analyzing the data. District staff is responsible for gaining access to survey ponds on private land, training new staff, conducting the surveys, and submitting completed data forms to HAPET.

5) Protocol status?

The HAPET office has well-developed protocol for this survey based on information in Hammond (1969); [ServCat] Protocol-2923. Survey methodology also utilizes Dzubin (1969) and Cowardin et al. (1995). Region 3 and 6 Refuges in cooperation with HAPET will submit the initial survey instructions to I&M for review during FY15.

1.4 Native Prairie Adaptive Management Monitoring (M); (FF06REKM00-008)

1) What is the population or attribute of interest, what will be measured, and when?

This survey measures frequency of occurrence of various plant community associations as defined by Grant et al. (2004) on select WPAs with native prairie. The survey is conducted as part of the Native Prairie Adaptive Management (NPAM) decision support framework which is a large-scale, long-term adaptive monitoring effort aimed at restoring native prairie on WPAs in the PPR. The Service has collaborated with the U.S. Geological Survey (USGS) to develop a decision tool that adaptively determines optimal management actions considering prior outcomes. (Gannon et al. 2013,USFWS 2013). The District annually implements specific management treatments that are recommended by the NPAM decision tool during the annual management year occurring from 1 September to 31 August. The survey is conducted annually when both cool- and warm-season grasses are identifiable in mid- to late summer.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Survey results document changes in plant communities through time in response to previous management treatments for the purpose of improving native prairie communities. This survey contributes to HMP Obj 2.1 (Appendix G) that aims to restore native prairie plant communities.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

The survey is important to conduct to annually update model weights within the decision tool that produce recommendations to target various defoliation treatments (principally grazing and/or fire) on nine WPA management units. The decision tool uses both the current vegetation composition and defoliation history to generate recommendations for each management unit. This approach coincides with a framework for adaptive management developed by the Department of the Interior (Williams et al. 2009).

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Yes. The NPAM effort is led by USFWS Biologists and Managers at 20 refuge complexes and wetland management districts in Regions 3 and 6. External partners include: USGS, North Dakota State University, South Dakota State University, Natural Resources Conservation Service, and Agriculture Research Service. Operation and maintenance of NPAM requires the effort of the Project Coordinator, the Database Coordinator, the network of partners, and the NPAM advisory team.

5) Protocol status?

The District currently follows the vegetation monitoring protocol used by the Native Prairie Adaptive Management project (USFWS 2013). This protocol is a peer reviewed published protocol (Grant et al, 2004; [ServCat] Protocol – 45318. Region 6 staff will submit the initial survey instructions to I&M for review during FY15.

1.5 Native Prairie Monitoring (Non-NPAM Units) (M); (FF06REKM00-009)

1) What is the population or attribute of interest, what will be measured, and when?

This survey measures frequency of occurrence of various plant community associations as defined by Grant et al. (2004) on tracts of native prairie. Specifically, dominance of individual plant community associations is measured using belt transects that are randomly positioned on native prairies. The survey is conducted when both cool- and warm-season grasses are identifiable from mid-July through August. The District typically monitors individual native prairie tracts once every five years or 20% of all native prairie tracts in the District on an annual basis.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Survey results document changes in plant communities through time in relation to previous management treatments for the purpose of improving management of native prairie tracts. The District follows strategies described under HMP Objectives 2.2 and 2.3 (Appendix G) that specify the maintenance, enhancement, and restoration of native prairie plant communities.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

The District has developed a set of decision criteria in the HMP based on native prairie composition thresholds (<25, 26-55, >55% native dominated vegetation) that describe the state of the plant community. The survey is important to complete because it provides managers with data to target specific management treatments on native prairies within each of the composition thresholds identified under HMP Obj 2.2 and 2.3.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

The District currently uses a peer reviewed published protocol (Grant et al, 2004; [ServCat] Protocol – 45318) to complete this survey. District staff will submit the initial survey instructions to I&M for review during FY15.

1.6 Vegetation Structure (M); (FF06REKM00-013)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors vegetation cover of grasslands on WPAs in relation to known nesting habitat preferences for waterfowl and other priority migratory bird species identified as ROC in the HMP. The survey is completed on an annual basis to measure vegetation structure (height, density, and litter depth) of native prairie, reconstructed prairie, and dense nesting cover (DNC; composed of intermediate wheatgrass [*Thinopyrum intermediu]*), tall wheatgrass [*T. ponticum*], and alfalfa [*Medicago sativa*] or sweetclover [*Melilotus officinalis*]). The District annually monitors vegetation structure from May 15 to June 7 on approximately 20% of all grassland tracts in the District.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Staff conducts vegetation structure surveys on WPAs to determine if the vegetation structure on individual management units meets the nesting habitat objectives described in HMP / Obj 1.4, 1.5, 2.2, 2.3, 2.4, 3.2, & 3.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This survey is necessary to determine if the District is achieving vegetation structure (height, density, and litter depth) that reflect local-scale nesting preferences for waterfowl and other ROC. Managers can use this information to modify the frequency, duration, and intensity of defoliation treatments on individual grassland management units to achieve HMP/ Obj 1.4, 1.5, 2.2, 2.3, 2.4, 3.2, & 3.3.

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4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

The District has previously used published methods for estimating vegetation structure (Robel 1970, Benkobi et al. 2000, Madden et al. 2000). The District will submit the initial survey instructions that include these published methods to I&M for review in FY16.

1.7 Grazing Utilization (M); (FF06REKM00-034)

1) What is the population or attribute of interest, what will be measured, and when?

This survey estimates grass utilization (percent plant weight consumed during a grazing treatment) by livestock within 2 weeks of removing livestock from a management unit. Accuracy of data is increased by completing this survey nearest to the date of livestock removal.. Estimates are derived by quantifying the average utilization of the most abundant individual grass species to represent livestock use of the management unit. Staff estimate grass utilization in the intermediate portions of a management unit that occur between overused and underused areas of the unit.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Monitoring grass utilization as part of an active grazing program provides managers with information to evaluate how effective previous grazing treatments have been at achieving HMP / Obj 2.1, 2.2, 2.3, 2.4, 3.2, & 3.3 (Appendix G).

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Estimating grass utilization of livestock on plant communities on WPAs is important because it provides managers with an index of treatment intensity that cannot be derived from animal unit months (AUM) alone. Managers will use results from grazing utilization monitoring to adjust the timing, intensity, duration, and frequency of future grazing treatments as part of an adaptive management process to restore native prairies, maintain reconstructed prairies, and enhance vegetation structure on WPAs for nesting waterfowl and other ROC.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

The District currently follows protocol used by the Native Prairie Adaptive Management project (USFWS 2013) which is based on methods published by Johnson et al. (1994) to estimate grass utilization on WPAs. The District will submit the initial survey instructions for this survey to I&M for review in FY15.

1.8 Breeding Bird Survey (CB); (FF06REKM00-002)

1) What is the population or attribute of interest, what will be measured, and when?

The breeding bird survey (BBS) is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations. This survey monitors trends in migratory bird populations including all non-waterfowl ROC identified in the HMP. The survey is conducted annually on a single day between May 28 and July 7.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

The survey provides data on the status and trends of non-waterfowl ROC populations identified in the HMP. Information collected during this survey also supports HMP Objectives 1.1 and 1.2 (Appendix G) which aims to support migratory bird populations on important wetland and grassland habitat in perpetuation.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This survey monitors population level trends for non-waterfowl ROC in North Dakota and the PPR. The U.S. Fish and Wildlife Service, Canadian Wildlife Service, and Partners in Flight use BBS trends along with other indicators to identify important bird conservation areas. These data also are used by the HAPET to develop species-habitat relationship models that are used to assign conservation value to different landscapes and target conservation treatments for various species.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Yes. The USGS Patuxent Wildlife Research Center and the Canadian Wildlife Service (CWS) National Wildlife Research Center jointly coordinates the BBS program.

5) Protocol status?

Survey protocols were established by USGS and CWS (USGS 2000), and are distributed annually to participants across North America. [ServCat] Protocol-35641.

1.9 Prairie Reconstruction Monitoring (M); (FF06REKM00-008)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors changes in native plant community composition and diversity on WPA grasslands that were seeded with native vegetation. The District's HMP includes a strategy of monitoring the composition and diversity of established reconstructed prairies a minimum of once every 5 years to determine the retention of native plant species from the original seed mix and evaluate infestation by exotic cool-season grasses. Vegetation composition and diversity is monitored from mid-July through August each year when both cool- and warm-season grasses are identifiable. The District typically monitors 20% of all reconstructed grasslands in the District on an annual basis.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

The HMP has established targets for designing seed mixes that will provide suitable nesting habitat for waterfowl, various ROC, and other native fauna (e.g., pollinators). Results from this survey will be used by managers to adapt the timing, frequency, duration, and intensity of management treatments to maintain the desired plant community state on reconstructed grasslands identified in HMP objective 2.4 (Appendix G).

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This survey is important to conduct for managers to know if they are achieving Objective 2.4 in the HMP which aims to maintain ≥75% of native plant composition and diversity (based on the original seed mix) on all established reconstructions. Following establishment, reconstructions are managed similar to native prairies under specific management thresholds that are based on plant community composition. Monitoring results are also used to identify when less than 30% native plant composition remains which is the threshold to re-initiate reconstruction to more functional native plant communities.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District will work with the Dakotas Zone Biologist to develop the initial survey instructions and submit to I&M for review in FY16.

1.10 Breeding Shorebird Survey (BM); (FF06REKM00-003)

1) What is the population or attribute of interest, what will be measured, and when?

This survey documents landscape-level species-habitat relationships for five upland breeding shorebirds including American avocet (*Recurvirostra americana*), willet (*Tringa semipalmata*), marbled godwit (*Limosa fedoa*), upland sandpiper (*Bartramia longicauda*), and Wilson's phalarope (*Phalaropus tricolor*). Roadside surveys are conducted annually during the first two weeks of May and first two weeks of June.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey are used by HAPET to build habitat relationship models to target habitat conservation in the PPR for these species. Information collected during this survey also supports HMP Objectives 1.1 and 1.2 (Appendix G) which aims to support migratory bird populations on important wetland and grassland habitat in perpetuity.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Relatively little information exists regarding species-habitat relationships for breeding shorebirds in the PPR. This survey contributes to a larger geographic survey of breeding shorebirds that occurs across the PPR portions of Montana, North Dakota and South Dakota. Results from this survey are used by staff at HAPET to develop spatial models describing species-habitat relationships that can be used by various state and federal agencies to target conservation delivery for these species. The District also uses these spatial models to identify important conservation areas for marbled godwit which is an ROC in the HMP.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No. However, HAPET coordinates the survey across the PPR. They provide maps, data forms, protocols, and analyze the data. District staff is responsible for conducting the survey and submitting the completed data forms to HAPET.

5) Protocol status?

The HAPET office developed a protocol for this survey that is based on Niemuth et al. (2012). Region 3 and 6 Refuges in cooperation with HAPET will submit the initial survey instructions for this survey for review by I&M in FY16.

1.11 Mid-winter Waterfowl Survey (CB); (FF06REKM00-007)

1) What is the population or attribute of interest, what will be measured, and when?

This survey counts all waterfowl in all areas where open water is present in the District during a single day during mid-winter (January). The survey contributes to a larger nationally coordinated survey to record the distribution of waterfowl during winter.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

This cooperative survey is conducted does not provide information that can be used to directly evaluate biological objectives and inform management.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Results from this survey are used by managers outside of the District to identify important wintering habitat, determine population trends for some artic breeding waterfowl species, and adapt waterfowl harvest management in particular states.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Yes. Staff conducts the survey and sends the results to the North Dakota Game and Fish (NDGF) Department that coordinate the survey. The data is then sent to the USFWS Division of Migratory Bird Management (Flyway office) for processing.

5) Protocol status?

Information on the survey procedures can be found on the following website. https://migbirdapps.fws.gov/mbdc/databases/mwi/aboutmwi_allflyways.htm#CentralFlyway.
The District will submit the initial survey instructions for this survey to I&M for review in FY16.

1.12 Mid-continent Sandhill Crane Monitoring (CB); (FF06REKM00-021)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors the distribution of the mid-continent sandhill crane (*Grus Canadensis*) population as part of large scale coordinated effort from Texas to North Dakota on the fourth Tuesday of March each year. Information generated from this survey is the only index of population status and trend for the mid-continent sandhill cranes. This survey requires minimal effort (one afternoon of survey effort) to complete and does not conflict with other surveys on the District.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

This survey does not provide information that can be used to evaluate biological objectives and inform management on the District.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Results from this survey inform population management, including harvest management, of the mid-continent population of sandhill cranes. No management decisions are derived from this survey in the District.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Yes, it is a cooperative survey coordinated by the NDGF. District personnel conduct a ground survey and forward observations to NDGF who compiles the data and sends it to the USFWS Division of Migratory Birds.

5) Protocol status?

The District follows the survey protocol provided by the North Dakota Game and Fish Department to conduct the survey each year. The District will submit the initial survey instructions for this survey to I&M for review in FY16.

1.13 International Piping Plover Census (BM); (FF06REKM00-005)

1) What is the population or attribute of interest, what will be measured, and when?

Piping plover (*Charadrius melodus*), a threatened species, occurring on historical breeding sites are counted every five years as part of the International Piping Plover Census. The District visits all historical nesting areas identified in the census and records the number of piping plovers at each wetland basin. The survey is always conducted during the first two weeks of June.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

This survey supports the piping plover Objective 3 from the CCP (Appendix G) that states the station will continue to conduct the International Piping Plover Census.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Results from this survey provides information on population status and distribution of piping plover throughout North America. Survey data are also used to quantify habitat use, identify areas of conservation concern, and develop predictive population models. The survey results are not used to inform direct management decisions on WPAs in the District, but may be used to support biological criteria for purchasing wetland and grassland easements because of their threatened status.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

This is a cooperative survey between the Service and various state and federal agencies. The USGS Forest and Rangeland Ecosystem Science Center in Corvallis Oregon coordinates the survey.

5) Protocol status?

The District follows the protocol developed by the USGS to complete the survey. The District will submit the initial survey instructions for this survey to I&M for review in FY16.

Surveys Expected to Be Conducted With Additional Capacity

2.1 Weed Mapping (M); (FF06REKM00-015)

1) What is the population or attribute of interest, what will be measured, and when?

This survey aims to detect new infestations and monitor existing infestations of leafy spurge (*Euphorbia esula*) and yellow toadflax (*Linaria vulgaris*) on WPAs using global position system mapping to identify areas requiring control treatments to prevent further degradation of grassland plant communities. The survey monitors the presence, extent, and canopy cover of leafy spurge during the peak flowering period in June and during the peak flowering period for yellow toadflax in August. This information also would be used to evaluate the accuracy of existing spatially explicit models for leafy spurge and yellow toadflax (unpublished data, B. Sparklin, USFWS) developed for the District. These models would be improved in the future as additional data is collected across time and space. The District typically maps leafy spurge and yellow toadflax on 25% of all grassland tracts in the District on an annual basis.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey support CCP Invasive Plant Objectives 2 and 3 by increasing the efficiency of noxious weed control on WPAs in the District. Managers use the principles of early-detection rapid-response to target control of noxious weeds on individual WPAs.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Managers cannot effectively reduce prevalence of leafy spurge and yellow toadflax unless they have information that describes the location and canopy cover of existing infestations. Consistently mapping noxious weeds on WPAs provides managers with information on the extent and rate of spread of noxious weeds. Managers use data from this survey to identify where new and isolated infestations exist so they can be controlled before they become large and established or spread to adjacent private lands.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District will work with the Regional Invasive Species Biologist to develop the initial survey instructions and submit to I&M for review in FY16.

2.2 Ecological Site Inventory (I); (FF06REKM00-028)

1) What is the population or attribute of interest, what will be measured, and when?

This is an inventory on WPAs to verify ecological site descriptions occupied by native prairie. Ecological sites have unique physical characteristics (e.g., soil properties, slope, hydrology) that produce distinct plant communities (Sedivec and Printz 2012). Verification of ecological sites can conducted at any time during the summer months. The Soil Field Guide for Identifying Ecological Sites would be used to identify soil textures and other key soil features that are aligned with the respective ecological sites. This inventory serves as a method to ground-truth the ecological site description available through the Web Soil Survey.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this inventory provide the basis for a future inventory of plant community states on individual ecological sites occurring on WPAs. This information also would support several HMP objectives that describe the use of Natural Resource Conservation Service (NRCS) state-and-transition models (STM) for ecological sites to improve management of native prairie on WPAs. These objectives include HMP / Obj 1.4, 1.5, 2.1, 2.2, & 2.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Data have previously been collected for the vegetation components of these native prairie WPAs and existing spatial layers approximate the location of ecological sites. Verifying the ecological sites will strengthen the integrity of the data set, and tie the biotic and abiotic factors together. Gathering these inventory data further allows the District to identify potential restoration outcomes by utilizing the NRCS STM for the various ecological site descriptions, which may help prioritize management treatments on an annual basis. Additionally, these data are also useful in developing seed mixes for prairie reconstructions considering site-appropriateness of specific plant species. These data also may help to validate the STMs at a landscape scale for the NRCS. The NRCS will provide training as needed.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

http://efotg.sc.egov.usda.gov/references/public/ND/field_guide_ident_eco_sites_book_1_7version.pdf. The District will submit the initial survey instructions for this survey to I&M for review during FY16.

2.3 Community State Monitoring of Ecological Site (M); (FF06REKM00-029)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors plant community composition to identify community phase on individual ecological sites and target management recommended by STM on native prairie. The NRCS has developed ecological site descriptions (Sedivec and Printz 2012) with associated STM to aid managers in targeting specific defoliation treatments to shift plant communities to desired native dominated states. This survey would be conducted from mid-July through August when both cool- and warm-season grasses can be identified to determine the plant community state of each native prairie on WPAs. Community state would then be monitored once every five years on individual management units to identify potential changes in the plant community. The District would monitor approximately 20% of all native prairie grasslands in the District on an annual basis.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey would support several HMP objectives that describe the use of NRCS STM for ecological sites to target specific management treatments of native prairie on WPAs. These objectives include HMP / Obj 1.4, 1.5, 2.1, 2.2, & 2.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This survey is important because the District aims to continually improve the native prairie plant community towards the potential historic climax plant community (HCPC) state and improve habitat suitability for pollinator species. Results from the initial inventory of plant community states will establish an important baseline to implement the use of STM across native prairie tracts on WPAs. Native prairies can then be monitored through time at periodic intervals (e.g., every five years) to measure changes in community state and adapt management strategies as necessary.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District will work with the Dakotas Zone Biologist and NRCS staff to the initial survey instructions to I&M for review in FY16.

2.4 Inventory of Floristic Quality (I); (FF06REKM00-040)

1) What is the population or attribute of interest, what will be measured, and when?

This inventory would be completed to identify the floristic quality of individual native prairies to inform management and identify specific native prairie tracts having quality habitat for pollinator species. Estimating floristic quality on native prairies provides managers with an index of the remaining native flora on a site in comparison to the HCPC. Changes in floristic quality can then be monitored once every five years to identify trends in plant communities relative to management treatments. Floristic quality would be inventoried from mid-July through August when both cool- and warm-season grasses can be observed.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey would improve the targeting of defoliation treatments aimed at restoring native prairie communities, which would address HMP / Obj 1.4, 1.5, 2.1, 2.2, & 2.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

This inventory would be important to complete because other native prairie monitoring does not account for plant community diversity. This inventory also would provide managers with an additional metric for evaluating the success of native prairie restorations across individual management units on WPAs in the District. Results from this survey could be combined with the community state monitoring of ecological sites survey to improve management strategies aimed at shifting native plant communities towards the HCPC.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District would use an existing protocol for assessing floristic quality that was developed by the Northern Great Plains Floristic Quality Panel (2001). The District will submit the initial survey instructions for this survey to I&M for review during FY16.

2.5 Noxious Weed Control Monitoring (M); (FF06REKM00-011)

1) What is the population or attribute of interest, what will be measured, and when?

This survey monitors pre- and post-treatment noxious weed stem density, percent canopy cover, and extent of infestations to provide managers with data to evaluate the success of individual weed control treatments on WPAs. North Dakota state law (NDCC § 4.1-47-02) requires managers to implement a weed management program to control the spread of noxious weeds on WPAs. The four most commonly controlled noxious weed species include Canada thistle (*Cirsium arvense*), absinth wormwood (*Artemisia absinthium*), leafy spurge (*Euphorbia esula*), and yellow toadflax (*Linaria vulgaris*). Timing of control treatments (biological, chemical, or mechanical) varies by weed species from June through October each year. The District would monitor a sub-sample of treated grasslands on WPAs each year to evaluate the response of control treatments.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey would be used to determine if the District is controlling ≥50% of noxious weeds on priority WPAs as stated under CCP Invasive Plants Objective 3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Monitoring the control of noxious weeds is important to increase the efficiency of future treatments (biological, chemical, or mechanical) aimed at suppressing, containing, or eradicating infestations in the District. Results from this survey will be used to adapt treatment methods to ensure the long-term control of noxious weeds as part of an early detection and rapid response (EDRR) management strategy. The use of EDRR can make the difference between employing feasible control strategies versus retreating to a defensive strategy (e.g., containment) which usually requires a costly, long-term commitment.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District will work with the Regional Invasive Species Biologist to prepare and submit the initial survey instructions to I&M for review in FY16.

2.6 Fire Intensity Monitoring (M); (FF06REKM00-017)

1) What is the population or attribute of interest, what will be measured, and when?

This survey would monitor fire behavior during prescribed fires on WPAs to evaluate the effectiveness of fire treatments in improving nesting conditions or native plant community composition. Fire temperature is recorded using field data loggers equipped with a thermocouple to measure fire intensity for the duration of the burn. Monitoring should occur during all prescribed fires conducted from April through June on native prairie or reconstructed prairie.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey would be used to improve the timing of prescribed fires on WPAs to enhance nesting conditions or improve plant communities as stated under HMP / Obj 2.1, 2.2, 2.3, & 2.4.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Fire behavior monitoring facilitates a better understanding of the relationships between fire intensity, timing of the fire, and plant communities to improve habitat management for waterfowl, other migratory birds and pollinator species. Results from this survey will be used by managers to strategically target future prescribed fires during optimal conditions to achieve the objectives in the prescribed fire plan for the management unit and improve the effectiveness of using fire as a defoliation treatment to restore native prairies and improve vegetation structure.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

Various wetland management districts in the Dakotas are collecting data for a research study that is being conducted by New Mexico State University.

5) Protocol status?

A site-specific protocol has not been developed for the District. However, the District has followed a research protocol developed by Dr. Amy Ganguli located at New Mexico State University to monitor fire behavior in previous years. The District will submit the initial survey instructions for this survey to I&M for review during FY16.

2.7 Leafy Spurge Beetle Monitoring (M); (FF06REKM00-006)

1) What is the population or attribute of interest, what will be measured, and when?

The survey monitors sites where flea beetles (*Aphthona* spp.) have been previously released as a means to biologically control leafy spurge on WPAs. The annual survey is designed to monitor the density and distribution of beetles at each site through time. Monitoring typically occurs from late-June through early July on dry sunny days having little to no wind, temperatures >70° F, and between 10 a.m. and 3 p.m.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?

Results from this survey would be used to determine if the District is controlling ≥50% of noxious weeds on priority WPAs as stated under CCP Invasive Plants Objective 3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.

Monitoring flea beetles provides managers with information on both the status and the level of leafy spurge control at specific release sites. Establishment of flea beetle release sites is often a slow process occurring over several years where measurable reductions in leafy spurge stands can take several more years. Monitoring also allows managers to determine if additional releases are needed to supplement the population or if biological control is not a feasible option.

4) Is this a cooperative survey? If so, what partners are involved in the survey?

No.

5) Protocol status?

The District would follow the protocol developed by Lym (2013) to implement leafy spurge flea beetle monitoring. The District will submit the initial survey instructions for this survey to I&M for review during FY16.

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Appendix A. Criteria and Weights Used to Prioritize Surveys

Final Criteria Weighting Matrix

Criteria Category	Record	Criteria	Scoring Choices	Rating	3 Weights
1. Refuge Priorities and Management Needs	1	*1A. Refuge Purpose*	scale 1-4	80	**0.10390**
	2	*1B. CCP or Other Management Plan Objectives*	scale 1-4	100	**0.12987**
	3	*1C. NWRS Objectives*	scale 1-4	0	**0.00000**
	4	*1D. Management Utility (Decision Support) for the Refuge*	scale 1-4	100	**0.12987**
2. Partner Priorities and Management Needs	5	*2A. FWS Program Need*	scale 1-4	25	**0.03247**
	6	*2B. FWS Partner Need*	scale 1-4	10	**0.01299**
3. Ecological Application	7	*3A. ROC*	scale 1-4	75	**0.09740**
	8	*3B. Refuge Processes*	scale 1-3	50	**0.06494**
	9	*3C. Survey Breadth*	scale 1-4	35	**0.04545**
4. Additional Legal Mandates	10	*4A. Listed Species or Vegetation Communities*	scale 1-4	5	**0.00649**
	11	*4B. Other Legal Mandates*	scale 1-3	0	**0.00000**
5. Immediacy of Need	12	*5A. Controversy*	scale 1-4	10	**0.01299**
	13	*5B. Threat*	scale 1-4	75	**0.09740**
6. Scope and Scale	14	*6A. Baseline Data*	No/Yes (1-2)	60	**0.07792**
	15	*6B. Survey Scope*	scale 1-3	50	**0.06494**
	16	*6C. Spatial Scale*	scale 1-4	35	**0.04545**
	17	*6D. Integration with Other Survey*	scale 1-4	60	**0.07792**
	18	*6E. Attribute Quality and Scope*	scale 1-4	0	**0.00000**
7. Protocol	19	*7A. Sampling Design Stage*	scale 1-4	0	**0.00000**
	20	*7B. Field Methods Stage*	scale 1-4	0	**0.00000**
	21	*7C. Data Management, Analysis, and Reporting*	scale 1-4	0	**0.00000**
8. Cost	22	*8A. Monetary*	scale 1-4	0	**0.00000**
	23	*8B. Personnel*	scale 1-4	0	**0.00000**
	24	*8C. Security/Source of Funding*	scale 1-4	0	**0.00000**

Appendix B. Prioritization Scores and Status of All Ranked Surveys

Prioritization scores were generated for 23 candidate surveys using 15 criteria for each survey (Appendix A). Survey status was assigned by considering the capacity (staff time and funding) likely to be available for conducting each survey to completion. Current surveys are planned to be conducted for the duration of this IMP. Expected surveys would be conducted if additional capacity is obtained through non-station funding sources. Future surveys are those not very likely to be conducted because of low priority and the chance of obtaining required capacity is relatively low. Surveys selected for the IMP (status = Current or Expected) are shown in blue. Non-selected surveys (status = Future or Historical) are not included in Table 1 of the IMP.

Table of prioritization scores from the SMART tool for all considered surveys.

No.	Survey Name	Prioritization Score	Tier[a]	Survey Status	IMP Status	Survey Priority
1	Four Square Mile Survey	**0.734**	1	Current	Selected	1.3
2	Conservation Easement Monitoring	**0.660**	1	Current	Selected	1.1
3	Native Prairie Adaptive Management Monitoring	**0.660**	1	Current	Selected	1.4
4	Conservation Easement Landowner Interest	**0.656**	1	Current	Selected	1.2
5	Native Prairie Monitoring (Non NPAM Units)	**0.632**	1	Current	Selected	1.5
6	Community State Monitoring of Ecological Site	**0.496**	2	Expected	Selected	2.3
7	Vegetation Structure	**0.448**	1	Current	Selected	1.6
8	Ecological Site Inventory	**0.448**	2	Expected	Selected	2.2
9	Vegetation Phenology – Fall	**0.426**	3	Future	Not Selected	
10	Grazing Utilization	**0.420**	1	Current	Selected	1.7
11	Inventory of floristic quality	**0.416**	2	Expected	Selected	2.4
12	Breeding Bird Survey	**0.415**	1	Current	Selected	1.8
13	Prairie Reconstruction Monitoring	**0.377**	1	Current	Selected	1.9
14	Noxious Weed Control Monitoring	**0.367**	2	Expected	Selected	2.6
15	Weed Mapping	**0.363**	2	Expected	Selected	2.1
16	Fire Intensity Monitoring	**0.361**	2	Expected	Selected	2.5
17	Leafy Spurge Beetle Monitoring	**0.329**	1	Current	Selected	2.7
18	Breeding Shorebird Survey	**0.326**	2	Expected	Selected	1.10
19	Mid-winter Waterfowl Survey	**0.304**	1	Current	Selected	1.11
20	Wetland Condition Inventory	**0.285**	3	Future	Not Selected	
21	Mid-continent Sandhill Crane Monitoring	**0.063**	1	Current	Selected	1.12
22	Sharp-tailed Grouse Lek Survey	**0.115**	3	Future	Not Selected	
23	International Piping Plover Census	**0.108**	1	Current	Selected	1.13

[a] Tier 1--The highest priority surveys that the Project Leader estimates can be conducted with existing staffing and funding.
Tier 2--Surveys that the Project Leader sees as second priority for the station, or high priority surveys that would require an increase in operational capacity.
Tier 3--Lower priority surveys that are currently being conducted or are anticipated but would require the major reallocation of staff and capacity.

Appendix C. Priority Research Needs Identified for the District.

1. Waterfowl and Other Resources of Concern (ROC) Species Nesting Ecology

1) What is the population or attribute of interest, what will be measured, and when?
This research would quantify the relationship between local- and landscape-level factors and the density of grassland songbirds, including three ROC species (bobolink [*Dolichonyx oryzivorus*], grasshopper sparrow [*Ammodramus savannarum*], clay-colored sparrow [*spizella pallida*]), identified in the HMP. At the local level, research would evaluate the influence of management treatment intensity, vegetation structure, plant community composition management thresholds (0-24, 25-55, and >55%) selected for the HMP, and canopy cover of native and exotic species. At the landscape level, research would evaluate the influence of percent grassland and percent cropland at multiple scales (i.e., 200 m to 3,200 m), habitat juxtaposition, and size of patch. Fieldwork would be initiated in late-May and completed in mid-July each year. This project is intended to be a long-term project (5-10 years) that captures annual variation in environmental conditions (i.e., wet versus dry periods) in addition to local and landscape factors.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?
Managers across the mixed-grass prairie ecosystem could use the results of this study to target management on fee-title lands to meet the needs of specific species of grassland songbirds. Results from the study also test the assumptions of the SHC framework and multiple HMP objectives. These objectives include HMP / Obj 1.4, 1.5, 1.6, 1.7, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, and 3.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.
This study is important because it tests many of the assumptions of the SHC framework identified in the HMP in addition to current management approaches being implemented across WMDs in the PPR. Because waterfowl production is the highest priority for the District, it is critical to document relationships between local and landscape influences and waterfowl nesting success.

4) Is this a cooperative survey? If so, what partners are involved in the survey?
Yes, Kulm, Tewaukon, and Sand Lake WMDs in the Dakotas are collecting data for this research study that is being conducted by a Ph.D. Student at Southern Illinois University.

5) Protocol status?
This research is currently being conducted by Dr. Mike Eichholz at Southern Illinois University. The project began in 2014 and fieldwork will occur through 2016.

2. Density of Grassland Songbirds on WPAs

1) What is the population or attribute of interest, what will be measured, and when?
This research would quantify the density of grassland songbirds including three ROC species (bobolink [*Dolichonyx oryzivorus*], grasshopper sparrow [*Ammodramus savannarum*], clay-colored sparrow [*spizella pallida*]) identified in the HMP on WPAs relative to local- and landscape-level relationships. At the local level, research would evaluate the influence of management treatment intensity, vegetation structure, plant community composition management thresholds (0-24, 25-55, and >55%) selected for the HMP, and canopy cover of native and exotic species. At the landscape level, research would evaluate the influence of percent grassland and percent cropland at multiple scales (i.e., 200 m to 3,200 m), habitat juxtaposition, and size of patch. Fieldwork would be initiated in late-May and completed in mid-July each year. This should be a long-term project (5-10 years) that models annual variation in environmental conditions (i.e., wet versus dry periods) in addition to local and landscape effects on songbird density.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?
Managers across the in the mixed-grass prairie ecosystem could use the results of this study to target management on fee-title lands to meet the needs of specific species of grassland songbirds. Results from the study also test the assumptions of the SHC framework and multiple HMP objectives. These objectives include HMP / Obj 1.4, 1.5, 1.6, 1.7, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, and 3.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.
This study is important because it tests many of the assumptions of the SHC framework identified in the HMP in addition to current management approaches being implemented across WMDs in the PPR. Managers currently lack sufficient information describing: 1) the response of grassland songbirds to plant communities on reconstructed prairies, 2) the effect of management treatments aimed at restoring native prairies on songbird densities, and 3) the role of vegetation structure on grasslands on WPAs.

4) Is this a cooperative survey? If so, what partners are involved in the survey?
Yes. The study would be led by a Ph.D. student at a University. Because grassland songbirds exhibit variation in annual settling due to environmental variation, the District would partner with multiple other WMDs to ensure that the study is sufficiently distributed across space and time.

5) Protocol status?
The District could follow the landbird monitoring protocol developed by Knutson et al. (2008) to conduct this project.

3. Influence of Management Treatments on Native Prairie Plant Communities

1) What is the population or attribute of interest, what will be measured, and when?
This research evaluates the response of a range of native- to exotic-dominated plant communities on WPAs to precise defoliation treatments described under several HMP objectives. Currently, 78% of all native prairies on WPAs are dominated (0-25% native plant composition) by Kentucky bluegrass (*Poa pratensis*) and/or smooth brome (*Bromus inermis*) invasive grasses and only 19.8% of all prairies have 26-55% native plant composition and 2.3% of prairies have >56% native plant composition remaining. Managers aim to provide suitable nesting cover for waterfowl and other migratory birds while also restoring native prairies dominated by invasive grasses. However, limited information is available describing how to effectively use defoliation treatments such as prescribed grazing or prescribed fire to restore invaded prairies to a more desirable native plant dominated community capable of supporting a higher diversity of wildlife. Research would focus on evaluating relationships between timing, frequency, duration, and intensity of defoliation treatments on response by invaded and native plant species. Fieldwork would be initiated in late-April through September when native prairies typically receive defoliation treatments.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?
Results from this study are needed to precisely target defoliation treatments to native sod plant communities having the highest potential to be restored and test the assumptions of HMP / Obj 1.4, 1.5, 2.1, 2.2, and 2.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.
This study is important to document relationships between defoliation treatments and the potential of the 3 native plant community thresholds (0-25, 26-55, and >56% native plant composition) from the HMP that are used to guide management of native prairies on WPAs.

4) Is this a cooperative survey? If so, what partners are involved in the survey?
Yes, the District would aim to partner with experts at universities and other federal agencies.

5) Protocol status?
Research protocol would need to be developed for this study. However, it would be important for this study to also be a long-term study (7-10 years) to account for environmental variation through time.

4. Efficacy of Overseeding to Enhance Degraded Native Prairie Plant Communities

1) What is the population or attribute of interest, what will be measured, and when?
This research would evaluate the feasibility of overseeding native plant species onto native prairies to increase competition against exotic grasses and shift the plant community towards a native-dominated state. Managers lack sufficient information to restore existing native prairies that are completely dominated by exotic cool-season grasses. The District's HMP requires that highly degraded native prairies (0-25% native plant composition) be managed exclusively as nesting habitat for waterfowl and other ROC. Thus, these prairies would not be targeted for restoration for the duration of the HMP. Enhancing these communities by overseeding would increase the structural heterogeneity of these grasslands that would occur with the establishment of seeded native grasses and forbs and improve the capacity of these grasslands to support ROC species, pollinators, and other native fauna. Research would focus on evaluating relationships between native plant establishment on ecological sites and seeding rates, site preparation, seeding method, individual native plant species and functional group response, and grassland management treatments. Fieldwork would be initiated following overseeding to monitor establishment of native plant species during the growing season (May through September depending on each species) for approximately five years post seeding.

2) Which refuge management objective does the survey support? Is the objective derived from the CCP, interim objectives, an HMP, or other?
Results from this study would contribute to the enhancement of native plant communities as described under HMP / Obj 1.4, 1.5, 2.1, 2.2, and 2.3.

3) Why is it important to conduct the survey? Describe how survey results will be used to make better informed refuge management decisions. If survey results are used to trigger a management response, identify the management response and threshold value for comparison to survey results.
A focused research project is needed to determine if overseeding native grasses and forbs is a feasible option to enhance plant communities dominated by Kentucky bluegrass and/or smooth brome. Managers would benefit from this study by identifying best practices for overseeding to enhance degraded native sod plant communities on WPAs.

4) Is this a cooperative survey? If so, what partners are involved in the survey?
Yes, the District would aim to partner with experts at universities and other federal agencies.

5) Protocol status?
Research protocol would need to be developed for this study. However, it would be important for this study to be of sufficient duration (≈5 years) to identify when individual native plant species express following overseeding.

References:

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Appendix D. Brief Description of Non-selected Surveys

Table D.1. The following surveys will be conducted in the future if new capacity becomes available.

Survey Name	Description	Survey Status
Sharp-tailed Grouse Survey	This survey is coordinated by the North Dakota Game and Fish Department. Monitoring this species is important because they are a grassland obligate species that is an indicator of ecological health of grasslands. Sharp-tailed grouse leks may occur on WPAs. However, data from this survey would not inform management of grasslands for upland nesting waterfowl or other resources of concern (ROC). Further, no staff time is currently available to assist with this survey.	Future
Wetland Condition Inventory	A water resources inventory and assessment (WRIA) would be conducted to evaluate water quantity and quality of wetlands to identify restoration or management needs. This baseline assessment also informs monitoring of specific threats to water resources through time.	Future
Vegetation Phenology – Fall	The District currently lacks precise information on the timing of a fall management window to negatively impact exotic cool-season grasses. This survey would monitor changes in phenology of exotic cool-season grasses from mid-August through mid-October to identify the management window.	Future

Table E.2. Non-selected surveys or non-survey activities excluded from further consideration.

Activity Name	Description	Reason for Exclusion
Vegetation Phenology - Spring	The District completed a 3-year survey of exotic cool-season grass phenology during the spring growing season from 2012-2014. Results from this survey and a similar study associated with the Native Prairie Adaptive Management project will be used to identify a spring management window for controlling exotic cool-season grasses.	Terminated; Changed to Historical Status
Wind Energy Breeding Shorebird Survey	This survey was completed by the Region 6 Habitat and Population Evaluation Team in 2012. Information from the survey was used to evaluate potential impacts from wind turbines on the presence of breeding shorebirds in the Dakotas. No additional surveys are planned for the District.	Terminated; Changed to Historical Status
Mallard Migration	The District has decided not to conduct reconnaissance monitoring of the fall distribution of mallards each year. This survey was coordinated by biologists with the Missouri Department of Conservation and does not inform management of waterfowl in the PPR.	Not a survey; Reconnaissance
Land Conversion Risk Assessment	The District is aware of the rapid land use change that has occurred in the past few years which has converted important wetland and grassland habitat for agricultural purposes. The Prairie Pothole Joint Venture is currently conducting a study to identify where the greatest land-use change is occurring in the PPR. This information can be used to target future conservation easements to reduce habitat conversion in important landscapes to waterfowl.	Determined to be a product need versus a survey

Appendix E. Survey Cost Summary

Survey Name	Survey Priority	Status	Survey Frequency	Staff Hours (total hours required during year of survey)				Annual Operating Cost	Estimated # of Seasonal Positions Needed to Conduct the Survey
				Biologist	Other Perm. Staff	Seasonal BioTech	Other Staff (Ducks Unlimited Technician)		
Conservation Easement Monitoring (M)	1.1	Current	Annual	0	1776	0	0	$8,800	0
Conservation Easement Landowner Interest (BM)	1.2	Current	Annual	0	408	0	1546	$5,750	0
Four-Square-Mile Breeding Waterfowl Survey (CB)	1.3	Current	Annual	74	168	144	48	$4,150	3
Native Prairie Adaptive Management Monitoring (M)	1.4	Current	Annual	104	0	184	0	$510	2
Native Prairie Monitoring (Non NPAM Units) (M)	1.5	Current	Annual	144	0	216	0	$770	2
Vegetation Structure (M)	1.6	Current	Annual	144	0	208	0	$990	2
Grazing Utilization (M)	1.7	Current	Annual	76	16	40	0	$430	1
Breeding Bird Survey (CB)	1.8	Current	Annual	18	0	12	0	$170	1
Prairie Reconstruction Monitoring (M)	1.9	Current	Annual	112	0	136	0	$770	2
Breeding Shorebird Survey (BM)	1.10	Current	Annual	26	0	20	0	$170	1
Mid-winter Waterfowl Survey (CB)	1.11	Current	Annual	9	0	0	0	$170	0
Mid-continent Sandhill Crane Monitoring (CB)	1.12	Current	Annual	9	0	0	0	$170	0
International Piping Plover Census (BM)	1.13	Current	Every 5 years	48	0	104	0	$610	2
Weed Mapping (M)	2.1	Expected	Annual	16	140	624	0	$3,130	3
Ecological Site Inventory (I)	2.2	Expected	Occurs 1 time only	168	0	176	0	$850	1
Community State Monitoring of Ecological Site (M)	2.3	Expected	Annual	96	0	64	0	$550	1
Inventory of floristic quality (I)	2.4	Expected	Occurs 1 time only	228	0	376	0	$750	2
Noxious Weed Monitoring Control (M)	2.5	Expected	Annual	176	0	368	0	$810	2
Fire Intensity Monitoring (M)	2.6	Expected	Annual	24	0	48	0	$250	2
Leafy Spurge Beetle Monitoring (M)	2.7	Expected	Annual	14	8	80	0	$320	2

Appendix F. Survey Cost Analysis

1.1 Conservation Easement Monitoring (M); (FF06REKM00-024)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff	144					144					104					104	32				104	160				104	32			
Seasonal Biotech																														
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff	104					104					104					104					104	224				104				
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	Travel	Contracts
$8,800	0	0

Additional Information:

- **Equipment** = 1 truck per field day x 100 miles/day = 100 miles/day x 40 vehicle use days = 4,000 total miles / 15 mpg = 53 gal x $3/gal = **$800 in fuel + $500 miscellaneous equipment maintenance/repair + $7,500 survey equipment/gear = <u>$8,800</u>**

1.2 Conservation Easement Landowner Interest (BM); (FF06REKM00-023)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					**February**					**March**					**April**					**May**					**June**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff	40			16		40			8		40			8		40			8					8		20	40		16	
Seasonal Biotech																														
Other	120			8		120			8		120			8		120			8			110		8		80	40		8	
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff	20	40		16																						40			8	
Seasonal Biotech																														
Other	100	40		8		100	40		8		100	40		8		40	80		8			80		8		120			8	

Estimated Annual Cost		
Equipment	Travel	Contracts
$5,750	0	0

Additional Information:

- **Other** = Ducks Unlimited Technician
- **Equipment** = 1 truck per field day x 100 miles/day = 100 miles/day x 75 vehicle use days = 7,500 total miles / 15 mpg = 1,133 gal x $3/gal = **$1,500 in fuel + $750 miscellaneous equipment maintenance/repair + $3,500 survey equipment/gear = $5,750**

1.3 Four-Square-Mile Breeding Waterfowl Survey (CB); (FF06REKM00-004)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist											8					16						38					12				
Other Permanent Staff											8					16						96		4			48		4		
Seasonal Biotech																						96					48				
Other																						32					16				
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$4,150	0	0

Additional Information:

- Assumes that 3 Seasonal Biotechs are hired to assist with field work
- **Other** = Ducks Unlimited Technician
- **Equipment** = 5 trucks operating per field day x 100 miles/day = 500 miles/day x 34 vehicle use days = 17,000 total miles / 15 mpg = 1,133 gal x $3/gal = **$3,400 in fuel + $500 miscellaneous equipment maintenance/repair + $250 survey equipment (binoculars) = $4,150**

1.4 Native Prairie Adaptive Management Monitoring (M); (FF06REKM00-008)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	20															8						4				8	8			
Other Permanent Staff																														
Seasonal Biotech																										16				
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	0	16				0	32		8			4	0	0																
Other Permanent Staff																														
Seasonal Biotech	32	64					64		8																					
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$510	0	0

Additional Information:

- Assumes that 2 Seasonal Biotechs are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 8 vehicle use days = 800 total miles / 15 mpg = 53 gal x $3/gal = **$160 in fuel + $100 miscellaneous equipment maintenance/repair + $250 survey equipment= $510**

1.5 Native Prairie Monitoring (Non NPAM Units (M); (FF06REKM00-009)I

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist						20					8					8										8				
Other Permanent Staff																														
Seasonal Biotech																										16				
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		32					32					4																16	16	
Other Permanent Staff																														
Seasonal Biotech		64					96	16	8				16																	
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$770	0	0

Additional Information:

- Assumes that 2 Seasonal Biotechs are hired to assist with field work
- **Equipment** = 1 truck per field day x 100 miles/day = 100 miles/day x 11 vehicle use days = 1,100 total miles / 15 mpg = 153 gal x $3/gal = **$220 in fuel + $300 miscellaneous equipment maintenance/repair + $250 survey equipment= $770**

1.6 Vegetation Structure (M); (FF06REKM00-013)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	20					20															8	32					32	16		
Other Permanent Staff																														
Seasonal Biotech																					8	128					64	8		
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																							8	8						
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$990	0	0

Additional Information:

- Assumes that 2 Seasonal Biotechs are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 17 vehicle use days = 1,700 total miles / 15 mpg = 113.33 gal x $3/gal = **$340 in fuel + $400 miscellaneous equipment maintenance/repair + $250 survey equipment= $990**

1.7 Grazing Utilization (M); (FF06REKM00-034)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																12						8					8			
Other Permanent Staff																16														
Seasonal Biotech																						8					8			
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		8					8					8					8						8	8						
Other Permanent Staff																														
Seasonal Biotech		8					8					8																		
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$430	0	0

Additional Information:

- Assumes that 1 Seasonal Biotech is hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 9 vehicle use days = 900 total miles / 15 mpg = 60 gal x $3/gal = **$180 in fuel + $200 miscellaneous equipment maintenance/repair + $50 survey equipment= $430**

1.8 Breeding Bird Survey (CB); (FF06REKM00-002)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																					2					4	8		4	
Other Permanent Staff																														
Seasonal Biotech																										4	8			
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$170	0	0

Additional Information:

- Assumes that 1 Seasonal Biotech is hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 1 vehicle use days = 100 total miles / 15 mpg = 6.7 gal x $3/gal = **$20 in fuel + $100 miscellaneous equipment maintenance/repair + $50 survey equipment= $170**

1.9 Prairie Reconstruction Monitoring (M); (FF06REKM00-008)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist											8					8										8				
Other Permanent Staff																														
Seasonal Biotech																														
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	8	24				8	32																8	8						
Other Permanent Staff																														
Seasonal Biotech	16	32		8			64	8	8																					
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$770	0	0

Additional Information:

- Assumes that 2 Seasonal Biotechs are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 16 vehicle use days = 1,600 total miles / 15 mpg = 106 gal x $3/gal = **$320 in fuel + $200 miscellaneous equipment maintenance/repair + $250 survey equipment= $770**

1.10 Breeding Shorebird Survey (BM); (FF06REKM00-003)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																4					4	8					8		2	
Other Permanent Staff																														
Seasonal Biotech																					4	8					8			
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$170	0	0

Additional Information:

- Assumes that 1 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 1 vehicle use days = 100 total miles / 15 mpg = 6.7 gal x $3/gal = **$20 in fuel + $100 miscellaneous equipment maintenance/repair + $50 survey equipment= $170**

1.11 Mid-winter Waterfowl Survey (CB); (FF06REKM00-007)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		8		1																										
Other Permanent Staff																														
Seasonal Biotech																														
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$170	0	0

Additional Information:

- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 1 vehicle use days = 100 total miles / 15 mpg = 6.7 gal x $3/gal = **$20 in fuel + $100 miscellaneous equipment maintenance/repair + $50 survey equipment= $170**

1.12 Mid-continent Sandhill Crane Monitoring (CB); (FF06REKM00-021)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist												8		1																
Other Permanent Staff																														
Seasonal Biotech																														
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$170	0	0

Additional Information:

- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 1 vehicle use days = 100 total miles / 15 mpg = 6.7 gal x $3/gal = **$20 in fuel + $100 miscellaneous equipment maintenance/repair + $50 survey equipment= $170**

1.13 International Piping Plover Census (BM); (FF06REKM00-005)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																										16	24		8	
Other Permanent Staff																														
Seasonal Biotech																										16	80		8	
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$610	0	0

Additional Information:

- Assumes that 2 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 8 vehicle use days = 800 total miles / 15 mpg = 53 gal x $3/gal = **$160 in fuel + $200 miscellaneous equipment maintenance/repair + $250 survey equipment= $610**

2.1 Weed Mapping (M); (FF06REKM00-015)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	8																													
Other Permanent Staff	24																									12	16		12	
Seasonal Biotech																										24	288			
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																										8				
Other Permanent Staff						12	16		24																	24				
Seasonal Biotech						24	288																							
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$3,130	0	0

Additional Information:

- Assumes that 3 Seasonal Biotech are hired to map leafy spurge for 3 weeks in June and Yellow Toadflax for 3 weeks in August
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 24 vehicle use days = 2,400 total miles / 15 mpg = 200 gal x $3/gal = **$480 in fuel + $150 ATV fuel + $500 miscellaneous equipment maintenance/repair + $2,000 survey equipment (e.g., Trimble GPS) = $3,130**

2.2 Ecological Site Inventory (I); (FF06REKM00-028)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	40					40															8	8					8			
Other Permanent Staff																														
Seasonal Biotech																					16	32					32			
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		8					8					8																24	16	
Other Permanent Staff																														
Seasonal Biotech		32					32					32																		
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$850	0	0

Additional Information:

- Assumes that 1 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 25 vehicle use days = 2,400 total miles / 15 mpg = 166.67 gal x $3/gal = **$500 in fuel + $200 miscellaneous equipment maintenance/repair + $150 survey equipment= $850**

2.3 Community State Monitoring of Ecological Site (M); (FF06REKM00-029)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	20					20																								
Other Permanent Staff																														
Seasonal Biotech																														
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		16					16						12	12																
Other Permanent Staff																														
Seasonal Biotech		32					32																							
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$550	0	0

Additional Information:

- Assumes that 1 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 10 vehicle use days = 1,000 total miles / 15 mpg = 66.7 gal x $3/gal = **$200 in fuel + $200 miscellaneous equipment maintenance/repair + $150 survey equipment= $550**

2.4 Inventory of Floristic Quality (I); (FF06REKM00-040)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	20					20					20																			
Other Permanent Staff																														
Seasonal Biotech																														
Other																														
	July					**August**					**September**					**October**					**November**					**December**				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist	8	40					40						40	40																
Other Permanent Staff																														
Seasonal Biotech	16	80					160						80	40																
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$750	0	0

Additional Information:

- Assumes that 2 Seasonal Biotechs are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 20 vehicle use days = 2,000 total miles / 15 mpg = 133 gal x $3/gal = **$400 in fuel + $200 miscellaneous equipment maintenance/repair + $150 survey equipment= $750**

2.5 Noxious Weed Control Monitoring (M); (FF06REKM00-011)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist						20					20											8				8	8			
Other Permanent Staff																														
Seasonal Biotech																						80				16	48			
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist		8				8	8					8	40	40																
Other Permanent Staff																														
Seasonal Biotech		48				16	80					80																		
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$810	0	0

Additional Information:

- Assumes that 2 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 23 vehicle use days = 2,300 total miles / 15 mpg = 153 gal x $3/gal = **$460 in fuel + $200 miscellaneous equipment maintenance/repair + $150 survey equipment= $810**

2.6 Fire Intensity Monitoring (M); (FF06REKM00-017)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																8						8					8			
Other Permanent Staff																														
Seasonal Biotech																						32					16			
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$250	0	0

Additional Information:

- Assumes that 2 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 5 vehicle use days = 500 total miles / 15 mpg = 33 gal x $3/gal = **$100 in fuel + $100 miscellaneous equipment maintenance/repair + $50 survey equipment= $250**

2.7 Leafy Spurge Beetle Monitoring (M); (FF06REKM00-006)

Estimated # hours needed for the survey based on calendar year.

- **P** = Planning (design, training, and or coordination, **F** =Field Work, **A** =Analysis, **R**= Reporting (includes archiving), **O** =Other

	January					February					March					April					May					June				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																											8	2	4	
Other Permanent Staff																														
Seasonal Biotech																											80			
Other																														

	July					August					September					October					November					December				
Staff	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**	**P**	**F**	**A**	**R**	**O**
Biologist																														
Other Permanent Staff																														
Seasonal Biotech																														
Other																														

Estimated Annual Cost		
Equipment	**Travel**	**Contracts**
$320	0	0

Additional Information:

- Assumes that 2 Seasonal Biotech are hired to assist with field work
- **Equipment** = 1 trucks per field day x 100 miles/day = 100 miles/day x 6 vehicle use days = 600 total miles / 15 mpg = 40 gal x $3/gal = **$120 in fuel + $100 miscellaneous equipment maintenance/repair + $100 survey equipment= $320**

Appendix G. Goals and Objectives from the Kulm Wetland Management District Comprehensive Conservation Plan and Habitat Management Plan

The following objectives are referenced in this document and provide specific targets for land acquisition, enhancement or restoration of private lands, and management of fee-title waterfowl production areas until 2023 when the next comprehensive conservation plan (CCP) and habitat management plan (HMP) are scheduled to be completed.

North Dakota Wetland Management District CCP (2008):

A. Habitat and Wildlife Goal:

1. Protect, restore and enhance the ecological diversity of grasslands and wetlands of the North Dakota Prairie Pothole Region. Contribute to the production and growth of the continental waterfowl populations to meet the goals of the North American Waterfowl Management Plan. Also support healthy populations of other migratory birds, threatened and endangered species, and other wildlife.

B. Habitat and Wildlife Objectives:

1. Wetlands in Easements – Objective 1 – During the 15 years after CCP approval, secure protected status on 40,000 wetland acres, with efforts focused on unprotected temporary and seasonal basins that are partially or totally embedded in cropland and that occur in areas that support ≥25 breeding duck pairs per square mile.

2. Wetland in Easements – Objective 2 – Over a 15-year period, through active monitoring and law enforcement, protect all wetland areas under perpetual Service easement according to the provisions of the conservation easement contracts.

3. Uplands in Easements – Objective 1 – Over a 15-year period, secure protected status on 425,000 acres of grassland. Focus on grasslands ≥55 acres located in areas that support ≥25 breeding duck pairs per square mile.

4. Uplands in Easements – Objective 2 – Over a 15-year period, protect all grassland areas under perpetual Service easement according to the provisions of the conservation easement contracts.

5. Invasive Plants – Objective 2 – Within 5 years of CCP approval, establish a baseline inventory of all invasive plants, including noxious weeds, on Service lands.

6. Invasive Plants – Objective 3 – Carry out measures to reduce and control 50% of invasive plants, including noxious weeds, on priority WPAs by 15 years after CCP approval.

7. Piping Plover – Objective 3 – Over a 15-year period, continue the International Piping Plover Census for the presence of piping plovers in 100% of the wetland basins across the Audubon, Crosby, and Lostwood wetland management districts, which have historical nesting habitat for piping plover.

Kulm Wetland Management District Habitat Management Plan (2015):

Landscape Conservation

A. Landscape Conservation Goal:

1. Maximize the contribution of the District to the sustainability of waterfowl and other migratory bird populations in the PPR through implementation of strategic habitat conservation that targets conservation delivery within landscapes having the highest biological potential to maximize waterfowl carrying capacity, nest success, and brood occupancy, while sustaining contiguous portions of the mixed-grass prairie ecosystem for the benefit of the ROC and associated native wildlife and plant communities.

A. Landscape Conservation Delivery Objectives:

1. Objective 1.1 – Acquisition of Wetland Conservation Easements – Over the next 8 years, continue to secure protected status on 100% of wetlands offered by willing landowners in wetland priority zones as identified in the North Dakota WMD CCP (USFWS 2008a) in the District that support ≥25 breeding duck pairs per square mile (1A to 4C landscapes) to contribute to maximizing the current carrying capacity for waterfowl and other wetland-dependent migratory bird populations in the Prairie Pothole Region.

2. Objective 1.2 – Acquisition of Grassland Conservation Easements – Over the next 8 years, as funding sources become available, secure protected status on 100% of grasslands offered by willing landowners in grassland priority zones, as identified in the North Dakota WMD CCP (USFWS 2008a), in the District. Also, focus grassland protection in landscapes that have the highest potential

to maximize waterfowl production (1A, 1B, 4A), support high brood occupancy rates for waterfowl, and support high densities of ROC.

3. Objective 1.3 – Conservation Easements – By 2017, contact 100% of landowners located in 1A to 4C landscapes within the District to determine their interest in obtaining a wetland and grassland conservation easement, conduct 100% of easement evaluations within 6 months of determining individual landowner interest, and submit 100% of completed evaluations to the USFWS Region 6 Division of Realty for further evaluation to ensure that all potential conservation easements are purchased from willing landowners in a reasonable amount of time.

4. Objective 1.4 – Fee-title Waterfowl Production Areas in 1A to 3B Landscapes – During the next 8 years, target 80% of all habitat management activities on 136 WPAs (32,870 ac) located in 1A [n = 61], 1B [n = 72], 2A [n = 1], 2B [n = 2], 3A, and 3B landscapes that support ≥25 duck pairs per square mile and contain ≥40% grass cover within a 4 mi2 area that that yield ≥15-20% waterfowl nest success. Managers aim to provide diverse, heterogeneous nesting habitat that meets the habitat requirements of waterfowl (Anas spp.) and other ROC, including grasshopper sparrow, clay-colored sparrow, bobolink, marbled godwit, and northern harrier.

5. Objective 1.5 – Fee-title Waterfowl Production Areas in 4A to 4C Landscapes – During the next 8 years, target 20% of all habitat management activities on 64 WPAs (12,542 ac) located in 4A [n = 51], 4B [n = 10], and 4C [n = 3] landscapes that support ≥25 duck pairs per square mile and contain <40% grass cover within a 4 mi2 area to maximize upland nesting waterfowl (Anas spp.) nest success and benefit other habitat generalist migratory birds such as Savannah sparrow and sedge wren.

6. Objective 1.6 – Grazing Systems on Private Lands – By 2016, partner with private landowners to annually establish a minimum of 20 rotational grazing systems on grassland tracts (≥160 acres) within 1A and 1B landscapes to improve nesting conditions for waterfowl (*Anas* sp.) and other ROC such as clay-colored sparrow, bobolink, grasshopper sparrow, and northern harrier.

7. Objective 1.7 – Adaptive Landscape Conservation – At 5-year intervals, update the District's SHC conservation design to incorporate changes in landscape types that coincide with changes in land use trends and/or ROC habitat requirements to continue to adaptively deliver conservation in areas having the greatest biological potential to benefit resources of concern.

Local Conservation Delivery

A. Native or Reconstructed Prairie Sub-Goal:

1. Maximize native vegetation diversity and composition on individual tracts of native sod and reconstructed native prairie on WPAs using adaptive management to provide heterogeneous vegetation structure required by upland-nesting resources of concern (ROC) and contribute to biological integrity, diversity, and enhancement (BIDEH) within the mixed-grass prairie ecosystem.

B. Native and Reconstructed Prairie Objectives:

1. Objective 2.1 – Native Prairie on Native Prairie Adaptive Management Units – Over the next 8 years, restore 391 acres of native prairie occurring on 9 Native Prairie Adaptive Management study units using the full adaptive management process to apply appropriate and precise disturbance as recommended in each management year (September 1 to August 31), optimally increasing native plant frequency by an average of ≥1 to 5% during any 5-year interval, to increase resistance to invasion by exotic cool-season grasses, improve habitat condition for migratory birds and other prairie obligate species (e.g., pollinators), and enhance ecological services such as BIDEH on individual WPAs included in the study.

2. Objective 2.2 – Native Prairie on WPAs in 1A to 3B Landscapes – Over the next 8 years, restore or maintain native prairie community assemblage on native prairie occurring on WPAs located in 1A to 3B landscapes using appropriate and precise disturbance in each management year (September 1 to August 31) to provide suitable nesting habitat for waterfowl and other migratory birds while shifting the existing native plant community towards the potential historic climax plant community state for specific ecological sites and enhancing BIDEH on individual WPAs. Specific management thresholds include:
    - Manage tracts with 25 to 55% native vegetation remaining to increase native plant vigor, density, and seedling recruitment and prevent further degradation within ecological sites.
    - Manage tracts with >55% native vegetation remaining to maintain or enhance native plant communities on ecological sites.
    - Manage tracts with <25% native vegetation remaining exclusively as nesting habitat for waterfowl and other ROC.

3. Objective 2.3 – Native Prairie on WPAs in 4A to 4C Landscapes – Over the next 8 years, maintain or enhance native prairie community assemblage on native prairie occurring on WPAs located in 4A to 4C landscapes using appropriate and precise disturbance in each management year (September 1 to August 31) to provide nesting habitat for waterfowl and other migratory birds while preventing further degradation within the existing native plant community state for specific ecological sites. Specific management criteria include:
   - Manage tracts with 25 to 55% native vegetation remaining to increase native plant vigor, density, and seedling recruitment and prevent further degradation within ecological sites.
   - Manage tracts with >55% native vegetation remaining to maintain or enhance native plant communities on ecological sites.
   - Manage tracts with <25% native vegetation remaining exclusively as nesting habitat for waterfowl and other ROC.

4. Objective 2.4 – Reconstructed Prairie – During the next 8 years, maintain ≥75% native plant composition and diversity representative of stable plant communities on ecological sites on all established (typically 3–7 years after initial seeding) reconstructed prairie tracts on WPAs using active management to provide attractive heterogeneous nesting habitat for waterfowl and other ROC while contributing to BIDEH within the mixed-grass prairie ecosystem.

C. Seeded Introduced Grasslands Sub-Goal:

1. Provide suitable nesting habitat on existing seeded introduced grasslands to maximize waterfowl (*Anas* spp.) nest success and occupancy by ROC on WPAs and reconstruct seeded introduced grasslands on WPAs located in 1A to 3B landscapes throughout the District to diverse native vegetation to benefit upland nesting ROC and enhance ecological services within the mixed-grass prairie ecosystem.

D. Seeded Introduced Grasslands Objectives:

1. Objective 3.1 – Reconstruction of Seeded Introduced Grasslands – Over the next 8 years, reconstruct an average of 1,000 acres of seeded introduced grasslands on 1A to 3C WPAs at 5-year intervals using functionally diverse seed mixtures (approximately 50% grasses [minimum of 9 species] and 50% forbs [minimum of 10 species] by weight) that are representative of a stable plant community on ecological sites post-establishment (typically 3–7 years) while providing heterogeneous nesting habitat for upland nesting ROC including waterfowl (*Anas* spp.), clay-colored sparrow, grasshopper sparrow, bobolink, and northern harrier.

2. Objective 3.2 – Seeded Introduced Grasslands on WPAs in 1A to 3B Landscapes - Over the next 8 years, provide moderate to tall nesting habitat consisting of a minimum of ≥7.8 inches of horizontal vegetation cover density and average vegetation height of ≥11 inches by late May on seeded introduced grasslands in ≥4 of 6 management years prior to initiation of reconstruction to diverse native vegetation on WPAs located in 1A to 3B landscapes. This would be done to maximize nest success of upland nesting waterfowl (*Anas* spp.) and other grassland-obligate migratory birds.

3. Objective 3.3 – Seeded Introduced Grasslands on WPAs in 4A to 4C Landscapes – Over the next 8 years, opportunistically manage seeded introduced grasslands on 4A to 4C WPAs to provide moderate to tall vegetation structure consisting of a minimum of ≥7.8 inches of horizontal vegetation cover density and average vegetation height of ≥11 inches by late-May in ≥4 of 6 management years to maximize nest success of upland nesting waterfowl (*Anas* spp.) and other grassland-generalist migratory birds such as Savannah sparrow, western meadowlark, and sedge wren.

Appendix H. Environmental Action Statement (EAS)

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (40 CFR 1500-1508), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the following proposed action does not require additional NEPA documentation.

Proposed Action, Alternatives, and NEPA Documentation

The proposed action is to implement an Inventory and Monitoring Plan (IMP) for the Kulm Wetland Management District, Bone Hill NWR, Dakota Lake NWR, and Maple River NWR (hereafter referred to as the District). This IMP is a refinement of the 2006 North Dakota Limited-interest National Wildlife Refuges, 2008 North Dakota Wetland Management District Comprehensive Conservation Plan (CCP), and 2015 Kulm Habitat Management Plan associated Environmental Assessments (EA). This IMP provides more-specific guidance for surveys of District's wildlife, plant, habitat, and abiotic resources to fulfill the District's purposes and help achieve the goals and objectives identified in the CCPs and HMP.

The EAs for the District's CCPs and HMP included goals and objectives for the District and assessed the impacts associated with a range of reasonable alternatives to achieve those goals and objectives. The rationale for selection of one specific alternative for implementation is explained in the Finding of No Significant Impact (FONSI) accompanying the final CCP and HMP. The goals, objectives, and survey strategies included in this IMP fall within the bounds of those described and assessed in the CCPs and HMP and associated EAs.

Pursuant to 40 CFR 1502.9, no additional NEPA documentation is required to implement this IMP beyond the EAs and FONSIs prepared concurrently with the CCPs and HMP. No substantial changes to the proposed action alternative that was identified, analyzed, and selected for implementation within the CCPs and HMP, EAs, and FONSIs are proposed through this IMP. Similarly, no significant new information or circumstances exist relevant to environmental concerns and bearing on the proposed action or its impacts.

In accordance with 43 CRF 46.205 and 40 CFR 1508.4, some surveys within this IMP are covered by the following Departmental categorical exclusion because they would not have significant environmental effects.

"Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality or habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem." 516 DM 8.5B(1)

Mark Vanhorn
Project Leader/Refuge Manager

8/28/2015
Date

Reference:

U.S. Fish and Wildlife Service 2006. Comprehensive Conservation Plan. North Dakota Limited-interest National Wildlife Refuges. U.S. Department of the Interior, Fish and Wildlife Service, Mountain-Prairie Region.

_____. 2008. Comprehensive Conservation Plan. North Dakota Wetland Management Districts. U.S. Department of the Interior, Fish and Wildlife Service, Mountain-Prairie Region.
_____. 2015. Habitat Management Plan. Kulm Wetland Management District. Kulm, North Dakota. U.S. Department of the Interior, Fish and Wildlife Service, Mountain-Prairie Region.

IMP Revision Signature Page

IMP Revisions
Kulm Wetland Management District

Action	*Signature /Printed Name*	*Date*
Survey list and priority changed:		
Submitted By:	Refuge Manager/Project Leader	
Reviewed By:	Regional I&M Coordinator	
Approved By:	Refuge Supervisor	