RECLAMATION

Managing Water in the West

Platte River Recovery Implementation Program, Proposed First Increment Extension

Draft Environmental and Biological Assessment

GP-2018-01-EA

U.S. Department of the Interior
Bureau of Reclamation
Great Plains Region

EMPS inc.

February 2018

MISSION STATEMENT

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The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Cover photos – Background (David Batts, EMPSi); Inset photos (U.S. Fish and Wildlife Service)

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Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
AHR	associated habitat reach
AMP	adaptive management plan
BA	biological assessment
BO	biological opinion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CLMU	Central Lowlands Management Unit
CNPPID	Central Nebraska Public Power and Irrigation District
Corps	U.S. Army Corps of Engineers
CPRV	central Platte River valley
CWA	Clean Water Act of 1972
Department	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
°F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FR	Federal Register
FSM	flow-sediment-mechanical
FWCA	Fish and Wildlife Coordination Act of 1934
IMRP	Integrated Monitoring and Research Plan
MBTA	Migratory Bird Treaty Act of 1918
MCM	mechanical creation and maintenance
NDNR	Nebraska Department of Natural Resources
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NPPD	Nebraska Public Power District
NRC	National Research Council
NRHP	National Register of Historic Places
NVCS	National Vegetation Classification System
PEM	Palustrine Emergent
PFO	Palustrine Forested

P.L.	Public Law
Program	Platte River Recovery Implementation Program
Program Agreement	Platte River Recovery Implementation Program Cooperative Agreement
PSS	Palustrine-Shrub
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
ROD	record of decision
SDHF	short-duration high flows
Secretary	U.S. Secretary of the Interior
Service	U.S. Department of the Interior, Fish and Wildlife Service
SHPO	State Historic Preservation Officer
USC	United States Code
USGS	U.S. Geological Survey
WNS	white-nose syndrome

1.0 Purpose of and Need for Action

1.1 Introduction

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) has prepared this environmental assessment (EA) to analyze the environmental effects of extending the Platte River Recovery Implementation Program's (Program) First Increment by 13 years, through 2032. In addition, this EA serves as a biological assessment (BA) for Endangered Species Act of 1973 (ESA) consultation with the U.S. Department of the Interior (Department), Fish and Wildlife Service (Service).

The First Increment of the Program began in 2007 and extends through 2019. Its long-term goal is to improve and maintain the associated habitats of target species (specific species listed for protection under the ESA[1]). This includes the following:

- Improving and maintaining migrational habitat for whooping cranes (*Grus americana*) and reproductive habitat for interior least terns *(Sternula antillarum*) and piping plovers (*Charadrius melodus*)
- Reducing the likelihood of future listing of other species found in this area
- Testing the assumption that managing flow in the central Platte River[2] also improves the pallid sturgeon's (*Scaphirhynchus albus*) lower Platte River habitat

This EA has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S. Code [USC] 4321, et seq.), the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500–1508), the Department's NEPA regulations (43 CFR 46), and other relevant federal and state laws and regulations.

1.2 Background

1.2.1 The U.S. Fish and Wildlife Service's Instream Flow Recommendations

In 1994, the Service developed instream flow recommendations for restoring and maintaining river habitat for a myriad of species in the central Platte River habitat area, including the whooping crane, interior least tern, and piping plover (Bowman 1994; Bowman and Carlson 1994). In these documents, the Service recommended and prioritized minimum flows for specific

[1]The four target species are whooping crane, interior least tern, piping plover, and pallid sturgeon. All depend on habitat in the central Platte River basin, and the Program cooperative agreement was developed to protect them.
[2]"Central Platte River" refers to the center section of the Platte River; unlike the North Platte River and the South Platte River, there is no Central Platte River.

periods of the year under wet conditions, dry conditions, and normal conditions. (See the Service Draft Instream Flow Recommendations in volume 2 of the Platte River Recovery Implementation Program Final Environmental Impact Statement (EIS) [Reclamation and Service 2006]).

The flow recommendations are broadly categorized into species flows, annual pulse flows, and peak flows. All of these categories are relevant to, and must be considered in, the Service's evaluation of the adequacy of proposed actions (Program 2006a); however, only the first two of these categories are being used as benchmarks for measuring Program flow improvements, as follows:

- Species flows are flow levels at Grand Island, Nebraska, that are needed to provide good physical aquatic habitat conditions for the whooping crane, interior least tern, and piping plover when they are using the river. They promote favorable aquatic conditions throughout the year, for example, to maintain healthy populations of fish for interior least tern to eat.
- Annual pulse flows are those in excess of species flows that are needed to help maintain the variety of ecological processes of the river channel and adjacent low areas. They provide favorable physical, chemical, and biological conditions for the species (including a wide channel that is generally free of vegetation, adjacent backwaters, and wet meadow areas).

1.2.2 Program Cooperative Agreement

On July 1, 1997, the governors of Nebraska, Colorado, and Wyoming and the U.S. Secretary of Interior (Secretary) signed the Platte River Recovery Implementation Program Cooperative Agreement (Program Agreement). The Program Agreement outlined a proposed basin-wide recovery implementation Program for endangered species in the central and lower Platte River basins. Thereafter, a Governance Committee began formulating details of the Program to be evaluated by the Department under NEPA and the ESA. The Governance Committee consisted of representatives of the three basin states; Reclamation; the Service; water users from each of the three basin states; and environmental groups.

In 2006, Reclamation released a final programmatic EIS (Reclamation and Service 2006), and the Service issued a final biological opinion (BO) (Service 2006). The Secretary then signed the Record of Decision (ROD) on September 27, 2006, supporting the Program (Department 2006).

The Program became effective January 1, 2007, after the Program Agreement was signed by the governors of Colorado, Wyoming, and Nebraska and the Secretary. In 2008, Congress authorized the Secretary, acting through the Commissioner of Reclamation in partnership with the States, other Federal agencies, and other non-Federal entities, to continue implementing the Program and provided authorization of appropriations for it (Public Law [P.L.] 110-229). The Program is being implemented incrementally, with the First Increment covering the 13 years from 2007 through 2019. The Program is led by the Governance Committee and establishes key standing advisory committees to assist the Governance Committee in implementing the Program. Those committees include the Technical Advisory Committee, the Land Advisory Committee, the Water Advisory Committee, the Finance Committee, and Independent Scientific Advisory

Committee. In addition, an Adaptive Management Working Group has been formed to inform the Governance Committee on implementation of the Program's adaptive management plan (AMP).

The Program provides ESA compliance for water-related activities in the three states, while working to provide recovery benefits for the four endangered and threatened species. The Program signatories committed to achieving the objectives described in **Section 1.4** by the end of the First Increment of the Program.

During the First Increment, ESA compliance is measured by the progress in achieving ten Program milestones that are related to the First Increment objectives. Milestones and current Program status are presented in **Table 1-1**, below.

Table 1-1. Platte River Recovery Implementation Program ESA Compliance Milestones

Milestone	Program Status (as of November 2017)
1. The Pathfinder Modification Project will be operational and physically and legally capable of providing water to the Program by no later than the end of Year 4 of the First Increment.	Achieved
2. Colorado will complete construction of the Tamarack I and commence full operations by the end of Year 4 of the First Increment.	Achieved
3. Central Nebraska Public Power and Irrigation District (CNPPID) and Nebraska Public Power District (NPPD) will implement an environmental account[3] for storage reservoirs on the Platte system in Nebraska as provided in Federal Energy Regulatory Commission (FERC) licenses 1417 and 1835.	Achieved
4. The reconnaissance-level water action plan, as may be amended by the Governance Committee, will be implemented and capable of providing at least an average of 50,000 acre-feet per year of shortage reduction to target flows,[4] or for other Program purposes, by no later than the end of the First Increment.[5]	Not achievable by end of 2019
5. The land plan, as may be amended by the Governance Committee, will be implemented to protect and, where appropriate, restore 10,000 acres of habitat by no later than the end of the First Increment.	Achieved
6. The integrated monitoring and research plan (IMRP), as may be amended by the Governance Committee, will be implemented beginning Year 1 of the Program.	Achieved
7. The Wyoming depletions plan, as may be amended with the approval of the Governance Committee, will be operated during the First Increment of the Program.	Achieved

[3]The environmental account is a term used for a "block of water" set aside in Lake McConaughy to supplement flows in the Platter River. Water is added to the environmental account and stored in Lake McConaughy until the water is needed downstream. Water released from the account is tracked and protected by Nebraska water law so that the water may provide beneficial instream flows for endangered species.

[4]Target flows (also referred to as Service target flows) are Platte River flows of certain volumes. At certain times of the year, Service personnel identify them to improve habitat conditions for the target species in the central Platte River.

[5]As a water goal, the Program commits to reduce basin-wide target flow shortages by an average of 130,000 to 150,000 acre-feet per year. This is in lieu of the Service's requirement to replace 417,000 acre-feet of shortages to the target flows that it determines.

Table 1-1. Platte River Recovery Implementation Program ESA Compliance Milestones

Milestone	Program Status (as of November 2017)
8. The Colorado depletions plan, as may be amended with the approval of the Governance Committee, will be operated during the First Increment of the Program.	Achieved
9. The Nebraska depletions plan, as may be amended with the approval of the December 7, 2005 Milestones Document 2 Governance Committee, will be operated during the First Increment of the Program.	Not Achievable by end of 2019[6]
10. The federal depletions plan, as may be amended with the approval of the Governance Committee, will be operated during the First Increment of the Program.	Achieved

Source: Program 2017a

The First Increment land objective (Milestone #5) has been achieved (Program 2017a). The Program currently protects in excess of 12,000 acres in the associated habitat reach (AHR).

The First Increment water objective (Milestone #4) is not achievable by the end of 2019 (Program 2017a). The Program currently provides approximately 90,000 acre-feet toward the First Increment objective of 130,000 to 150,000 acre-feet. Pathfinder Modification, Tamarack I, and the Service's environmental Account in Nebraska (the combined, state water projects) were to provide an average reduction in shortage of 80,000 acre-feet per year (Program 2006a). The combined impact of the three original state projects and the reconnaissance-level water action plan under Milestone #4 is intended to achieve the Program objective of 130,000 to 150,000 acre-feet per year; therefore, the water action plan is intended to provide an average reduction of at least 50,000 acre-feet per year in shortage. This is in addition to the three state water projects (Program 2006a). Additional water projects in the planning or design phase are expected to provide an additional 40,000 acre-feet of water. However, they will not be operational before the end of the First Increment in 2019 and may require more funding than what is currently available during the First Increment (Program 2017a).

Due to the reliance on water projects being developed by the Governance Committee, the Nebraska Depletions Plan (Milestone #9), which is the responsibility of the State of Nebraska, is also not achievable by 2019 (Program 2017a). All state water projects and the Colorado, Wyoming, and federal depletions plans are operational.

Implementing the AMP, including IMRP activities, is ongoing and has focused on testing of the flow-sediment-mechanical (FSM) and mechanical creation and maintenance (MCM) management strategies. Accordingly, the Program's IMRP milestone has been achieved; however, the objective of examining Service target flows through the AMP has not yet been achieved. Design, implementation, and assessment of target flow-related management actions will not be possible before the end of 2019 (Program 2017a).

Section II.D of the 2006 Final Program Agreement makes provision for it to be extended or amended by the written agreement of all signatories (Program 2006b). This proposal presents a 13-year extension (2020-2032) of the First Increment. The extension would not change First

[6]The State of Nebraska is responsible for achieving this milestone.

Increment objectives, milestones, or the implementation framework. It would provide additional time to complete and operate Program water projects and to conduct the monitoring and research necessary to determine the best use of Program water to benefit the target species. This knowledge is necessary to provide a sound base on which to structure a second increment.

1.3 Proposed Federal Action

The Department, working with the three states, water users, and environmental and conservation organizations, proposes to extend the First Increment of the basin-wide, cooperative recovery implementation Program to meet its obligations under the ESA. The federal action described and evaluated in this programmatic EA is a 13-year extension to the First Increment of the Governance Committee Alternative, as described in the Platte River Recovery Implementation Program Final EIS (April 2006; Reclamation and Service 2006) and ROD (September 2006; Department 2006). The proposed First Increment extension activities are further described in the Addendum to the Final Platte River Recovery Implementation Program—First Increment Extension, as adopted by the Governance Committee on June 7, 2017 (Program 2017a). The resulting programmatic EA will evaluate and disclose the effects of this proposed 13-year extension and will support a determination as to whether there are significant effects warranting the preparation of an EIS.

1.4 Purpose and Need for Action

Federal action is needed to complete the remaining milestones not achieved within the prescribed 13-year timeline of the Program First Increment. Completion of the Program's First Increment is necessary in order to secure the defined benefits under that basin-wide approach for federally listed threatened and endangered species. This would provide continued compliance with the ESA for certain existing and future water-related projects and uses in the Platte River basin, upstream of the confluence with the Loup River.

The purposes of this action are as follows:

- Continue implementing projects that provide additional water to reduce shortages to Service target flows
- Continue land management activities necessary to provide habitat for target species
- Continue integrated monitoring, research, and adaptive management to assess the progress of the Program and to inform future management decisions

Activities need to be consistent with and support meeting the Program's First Increment objectives as follows:

- Provide water capable of improving the occurrence of Platte River flows in the central Platte River's associated habitats. This would be relative to the present occurrence of target species and annual pulse target flows (hereinafter referred to as reducing shortages to target flows) by an average of 130,000 to 150,000 acre-feet per

year, as measured at Grand Island, Nebraska. Target flows would be examined through the AMP and peer review and may be modified by the Service accordingly. These species and annual pulse target flows would continue to serve as an initial reference point for determining periods of excess and shortage in the operation of Program reregulation and water conservation/supply projects.

- Protect, restore where appropriate, and maintain at least 10,000 acres of habitat for the benefit of target species in the central Platte River area, between Lexington and Chapman, Nebraska, and continue progress toward the Program's long-term land objectives.

1.5 Federal Decisions to Be Made

This EA provides analysis to inform two primary federal decisions:

- The Secretary's approval of the June 7, 2017, addendum to the October 24, 2006, Platte River Recovery Implementation Program Cooperative Agreement, which seeks to extend the implementation in the Program's First Increment by 13 years (Program extension is subject to congressional authorization)
- Funding and continued participation in the Program by the Department, through Reclamation and the Service, subject to congressional authorization and appropriations, in cooperation with the States of Wyoming, Colorado, and Nebraska and other participating organizations.

1.6 Description of the Area of Analysis

The area of analysis for this EA are those areas in the Platte River basin that might be affected by Program actions. This includes the main stem, tributaries, and associated water projects of the North Platte River, in Wyoming, Colorado, and Nebraska; the South Platte River in Colorado and Nebraska; and the Platte River in Nebraska. See map of the basin (**Figure 1-1**).

1.6.1 Basins

When discussing river operations in this EA, the basins are defined to encompass river reaches that are operated as functional units, as follows:

- Platte River basin—Refers to the sum of all the sub-basins
- North Platte River basin—Refers to the river from its headwaters in northern Colorado through Wyoming and through Nebraska to its junction with the South Platte River in Nebraska east of the city of North Platte
- South Platte River basin—Refers to the river from its headwaters in Colorado to its junction with the North Platte River in Nebraska east of the city of North Platte

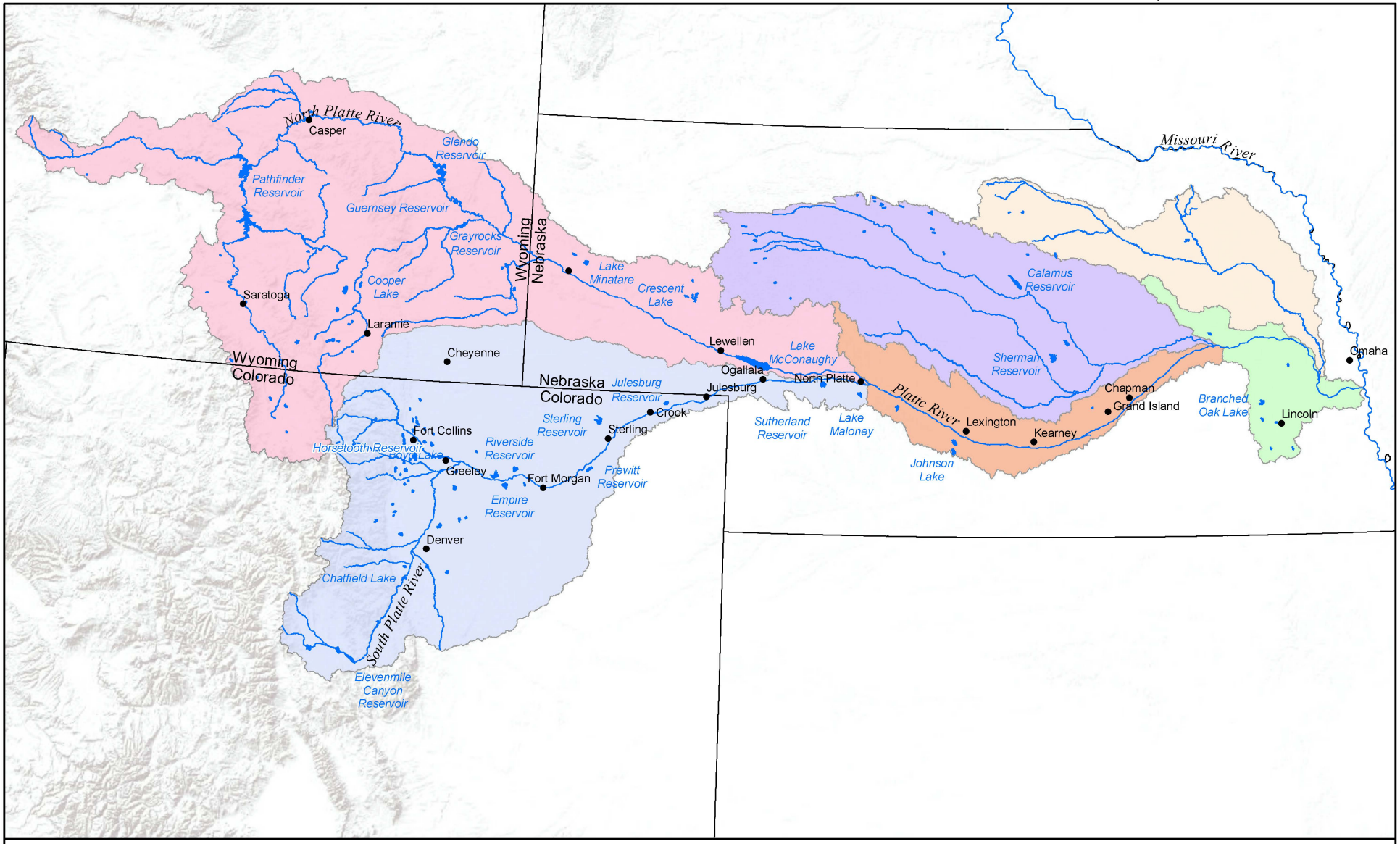

Figure 1-1
Area of Analysis

- Central Platte River basin—Refers to the river from the confluence of the North Platte River and South Platte River to its confluence with the Loup River east of Chapman, Nebraska
- Lower Platte River basin—Refers to the Platte River from the confluence with the Loup River, to its confluence with the Missouri River near Omaha, Nebraska

1.6.2 Habitat Areas

While elements of the proposed Federal action are throughout the basin, the intent of all elements is to improve habitat conditions in the following habitat areas along the Platte River in Nebraska:

- Central Platte River AHR (Lexington, Nebraska, to Chapman, Nebraska) for the whooping crane, piping plover, and interior least tern
- Lower Platte River AHR (from the mouth of the Elkhorn River to the Platte's confluence with the Missouri River) for the pallid sturgeon

1.6.3 Areas of Potential Impact

The area of analysis also includes lands irrigated with Platte River water, generally within a few miles of the river. Here, water could be leased or sold to the Program or other changes in water use could occur. For economic impacts, the affected environment includes the counties in which these irrigated lands occur and in which the regional impacts of changes in agricultural and related economic operations could result. Some minor effects could occur in the Missouri River, close to the mouth of the Platte River.

Reclamation's North Platte Project includes a series of small lakes (for example, Lake Minatare) in the Nebraska Panhandle. The lakes regulate flows of water from the large North Platte reservoirs down to the irrigated project areas near Scotts Bluff, Nebraska. These lakes are included in the area of analysis.

The study area and affected environment also include the lands along the central Platte River in Nebraska, where the habitat would be restored.

1.7 Issues Identified During Scoping

A public involvement program, beginning with public scoping meetings, encouraged the public, Government agencies, and other concerned groups to identify issues related to the proposed Federal action. Some overarching issues were identified during scoping and the planning process (**Table 1-2**) and were considered throughout the analysis.

Additional information concerning public involvement is included in **Chapter 5**.

Table 1-2. Key Issues and Indicators Addressed in the Draft EA

Issues and Indicators	Impact Topics Related to the Issues
1. Issue: Ability to meet target flows for species Indicator: River flows at the habitat (peaks, minimums, timing, frequency, velocity, useable river, and roost area)	Water resources; piping plovers and interior least terns; pallid sturgeon
2. Issue: Channel habitat for the target species Indicator: Extent of braided river, open areas, channel width, sediment erosion and transport, potential for channel incision, and potential for sandbar building	River geomorphology; whooping cranes; piping plovers and interior least terns
3. Issue: Land habitat (out-of-channel) for target species Indicator: Extent of wet meadow habitat, sandpit habitat, and palustrine wetland habitat	Central Platte River terrestrial vegetation communities; wetlands; whooping cranes; piping plovers and interior least terns
4. Issue: Extent of roosting habitat for sandhill cranes and extent of critical habitat for other special status species Indicator: Location of known species occurrences and critical habitats	Water resources; central Platte River terrestrial vegetation communities; sandhill cranes; other federally listed species and designated critical habitat; state-listed species of concern
5. Issue: Agricultural economics Indicator: Changes in agricultural lands irrigated, cropping patterns, production, and revenues	Agricultural economics
6. Issue: Regional economics Indicator: Changes in regional employment, income, indirect business taxes, and sales	Regional economics
7. Issue: Recreation Indicator: Changes in lake elevations, streamflows, and associated fisheries; visitation and projected expenditures for lake and stream recreation; recreation access on Program lands	Recreation; water resources; fisheries
8. Issue: Fisheries Indicator: Changes in fish habitat, reservoir productivity for key species, river flow, useable habitat, water temperature, and fish mortality	Fisheries; water resources; water quality
9. Issue: Wildlife Indicator: Changes in terrestrial habitat, changes in abundance and distribution, and fluctuations in population numbers	Central Platte River terrestrial vegetation communities; wetlands; wildlife
10. Issue: Water quality Indicator: Changes in river temperature, turbidity, and other constituents	Water quality
11. Issue: Land use Indicator: Changes in area of various land cover types and activities, including agriculture and mining operations	Land use/realty

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2.0 Description of Proposed Action and Alternatives

2.1 Introduction

This chapter describes the alternatives considered for extending the Program's First Increment by 13 years, through 2032. The alternatives development process incorporates a number of guiding principles, as provided by relevant laws and guidance: the CEQ's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508) and the Department's NEPA Regulations (43 CFR 46).

Collaboration is a critical component of the alternatives development process. Agencies seek agreement from diverse interests on the goals, purposes, and needs for agency plans and activities, as well as the methods anticipated to carry out those plans and activities (43 CFR 46.110(a)). Reclamation used public scoping to help identify issues and concerns that could be addressed through alternative actions. Additionally, it coordinated with cooperating agencies in developing the alternatives.

2.2 No Action Alternative

2.2.1 Program Dissolution

Under the No Action Alternative, the Program would not be extended beyond 2019. Federal funding and involvement would cease, and the Program would end. The Program's Governance Committee would be dissolved, and a signatory committee would be formed to satisfy the legal obligations of the Governance Committee and arrange for disposition of Program Assets. A detailed description of Program termination can be found in the Implementation Program Document: Attachment 1: Finance Document, Crediting and Exit Principles, and Program Budget (Program 2006a).

- Until an asset (e.g., property) is no longer the responsibility of the signatories, property taxes would continue to be paid, liability insurance would continue to be provided, and the property would be managed in compliance with the "good neighbor" policy.
- A signatory or a partnership of signatories may purchase the shares in the Program Assets of any signatory or signatories wishing to sell, under the condition that the Program Assets would continue to be managed to provide habitat for the target species. (A signatory state may offer to donate its interest in a Program Asset to another signatory or partnership of signatories and seek ESA credit from the Service in future reinitiated consultations in that state for the continuing benefits provided to the target species because of the donation.)

- If none of the signatories are interested in acquiring Program Assets, the signatory committee would entertain offers from water users and environmental entities to purchase the Program Assets under the condition that the Program Assets would continue to be managed to provide habitat for the target species.
- If the Program Assets are not purchased as described above, the signatory committee would oversee the sale of such assets. Such sale could be made without the condition that the Program Asset must be managed to provide habitat for the target species.

2.2.2 Endangered Species Act Credits

In the event of Program dissolution, if a state continues to carry out the responsibilities it had under the Program, such actions would be sufficient to provide ESA compliance with respect to all water-related activities in that state until any reinitiated consultations have been completed. When a state continues to carry out the responsibilities it had under the Program, that state and any water-related activities covered also retain the right to argue that the responsibilities undertaken are sufficient to constitute long-term ESA compliance for the reinitiated consultations.

In addition, to the extent the states respective contributions of cash, water (through the initial Program water projects), and land continue to benefit the target species beyond the dissolution of the Program, the states retain the right to argue that such future benefits resulting from their contributions should be considered in any reinitiated consultations.

If the Program dissolves and the states do not continue to carry out their responsibilities under the Program, each water project or activity in the basin that required, or will require, federal approval, permitting, or funding would undergo separate ESA Section 7 consultation, and separate mitigation measures would be implemented.

2.3 Proposed Action

Under the Proposed Action, the Program's First Increment would be extended by 13 years. The Program would continue to provide ESA compliance for existing and certain new water related activities throughout the Platte River basin upstream of the Loup River confluence. The Proposed Action incorporates the extension activities in the Addendum to the Final Platte River Recovery Implementation Program—First Increment Extension, as adopted by the Governance Committee on June 7, 2017 (Program 2017a). It would not change the Program's First Increment objectives, milestones, or implementation framework (Program 2006a). Extending the Program's First Increment by 13 years would continue the following aspects of the Program:

- Water action plan, as may be amended by the Governance Committee, to achieve the water-related milestone of reducing shortages to Service target flows
- Land plan to protect, restore where appropriate, and maintain habitat for the benefit of the target species
- IMRP and AMP, as may be amended in the extension

Proposed extension activities are organized according to the existing Program land, water, and AMP structure. These activities would be implemented from 2020 to 2032 and would reflect Governance Committee decisions through the end of the First Increment. Accomplishing the extension would depend on what is practicably achievable, given available funding and resources.

The proposed First Increment extension is described below.

2.3.1 Land Plan

Land plan activities would proceed under the same principles that have guided land acquisition and management since the Program began (Program 2017a). Land acquisition would proceed under a willing buyer/willing seller approach, and all management would be conducted in accordance with the Program's good neighbor policy.

Land Acquisition

- Review and renew (as appropriate) existing leases and management agreements[1]
- At the request of owners, evaluate existing conservation lands for inclusion in the Program under management or sponsorship agreements
- Acquire an interest in at least an additional 1,500 acres of complex habitat, with the intent of establishing a new habitat complex

Land Management

- Manage lands acquired by the Program for the benefit of the target species and species of concern, when this is not in conflict with the target species
- Manage the land within the framework of the land plan and the AMP

2.3.2 Water Plan

The Program would be committed to achieving the minimum water milestone of 130,000 acre-feet in annual reductions to target flow shortages. However, the Program recognizes there are fiscal constraints to achieving this milestone, and scientific investigations need to be completed to confirm the need for 130,000 acre-feet in annual reductions to target flow shortages (Program 2017a).

The Program would invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the extension. It would also invest in the science necessary to determine if the additional 10,000 acre-feet is justified (Program 2017a).

The Program would be committed to finding the additional resources necessary to achieve that additional 10,000 acre-feet, if justified by the science (Program 2017a).

[1]Renew Cottonwood Ranch sponsorship agreement (2,650 acres), Broadfoot South lease (15 acres), and complex management and land use agreements (1,140 acres)

Extension water plan activities would proceed under the same principles that have guided water supply and management since the Program began (Program 2017a).

Water acquisition would proceed under a willing buyer/willing seller approach, and all water management would be conducted in accordance with the Program's good neighbor policy (Program 2017a).

Water Conservation and Supply

- Design, construct, and implement water action plan projects in time to enable scientific evaluation before the end of the extension term (Program 2017a). The Governance Committee, through the Program's Executive Director's Office, would continue to be responsible for compliance with local, state, and federal laws and regulations as described in the Program document (Program 2006a) and practiced during the First Increment. Examples of water supply and conservation projects include:
  - Leasing federal storage in existing reservoirs, where available
  - Acquiring irrigated farmland from willing sellers and permanently retiring that land from irrigated agriculture
  - Leasing water from irrigators
  - Implementing farm conservation programs, such as no till cropping
  - Creating broad-scale recharge areas, such as flooding fields when there are excess flows in the spring and fall, so the water percolates to the river during lower flow periods. Recharge areas could occur in two ways, as the development of small, shallow recharge ponds over a large area at a single site or as the creation of many recharge sites over a regional-scale geographic area (i.e., the Platte River valley between Brady and Odessa, Nebraska).
  - Creating small-scale slurry wall pits (approximately 60 acres in size) to store water that can be pumped back to the river when needed. Slurry wall gravel pits involve the construction of a low-permeability barrier wall (slurry wall) to enclose a finite, controllable volume of below-grade storage capacity that is isolated from the surrounding alluvial aquifer. The barrier wall is keyed into a low-permeability bottom layer (which may be clay, shale, sandstone, or other geologic material) to prevent seepage of stored water or intrusion of groundwater; this bottom layer is typically 30-50 feet deep in the Platte River valley. A berm may be constructed around the storage pit to create additional above-grade storage capacity. The Program would divert Platte River flows in excess of Service targets and temporarily store the water for release back into the river channel during periods of shortage.
- Revise state and federal depletion plans to remain consistent with operational or statutory requirements (Program 2017a)[2]

[2]The Program would cooperate with the State of Nebraska as it finalizes its depletion plan.

- Renew water project agreements, as deemed necessary, to achieve water milestones (Program 2017a)

Program Water Management

- Aggressively continue to implement channel conveyance improvements at the North Platte choke point, through efforts directed toward achieving and maintaining at least 3,000 cubic feet per second (cfs) conveyance capacity, while remaining below flood stage, with additional capacity developed as practicably achievable with available resources (Program 2017a)
- Implement water releases, including short-duration high flows (SDHF) and target flows once the Program water projects are operational and choke point conveyance issues are resolved (Program 2017a)
- Continue to evaluate the efficacy of available Program water and choke point capacity, over time, to ensure that Program water meets its intended purposes (Program 2017a)

2.3.3 Adaptive Management Plan

During the extension, AMP implementation would include evaluating Service target flows, in addition to current Program management (Program 2017a).

Management Actions

- Continue implementing the management specified in the AMP related to SDHF, sediment augmentation, and least tern, piping plover, and whooping crane habitats
- Contribute to reach-scale phragmites and invasive species control
- Use Program water assets to implement and evaluate flow-related management actions, including SDHF and species-related target flows
- Continue implementing and evaluating mechanical habitat management (e.g., channel widening and vegetation clearing, off-channel sand and water, and wetlands and uplands), as necessary, to achieve the desired habitat conditions

Integrated Monitoring and Research

- The IMRP would continue to provide the framework for monitoring the implementation and effectiveness of Program management actions during the extension, including the efficacy of actions independently and in combination
- Pallid sturgeon activities in the extension would be guided by the results of an incremental four-step analytic process adopted by the Governance Committee (Program 2016a)
- In management and decision-making, the Program would continue to consider the emerging science related to climate change

Independent Science Review

- Retain a six-member (rotating panel) Independent Scientific Advisory Committee
- Continue peer review and publication of key Program science products relevant to decision-making

3.0 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes the existing conditions and potential impacts for resources that may be affected by the Proposed Action and No Action Alternative. Environmental consequences to these resources may be direct (as a result of construction) or indirect (generally after a direct effect but not directly resulting from the alternatives), positive (beneficial) or negative (adverse), and long term (permanent, long lasting) or short term (temporary). Potential cumulative effects are also described at the end of resource topics that could have these types of effects, including water resources, whooping cranes, piping plovers and least terns, and pallid sturgeon.

The No Action Alternative commonly represents a continuation of current trends and, as such, serves as the baseline for NEPA analysis over time. In this particular case, the No Action Alternative represents a deviation from current activities and could impact existing conditions; therefore, the existing conditions described under each resource topic area are used as the baseline for analyzing the potential impacts from the Proposed Action and No Action Alternative.

Measures that would be implemented to reduce, minimize, or avoid impacts (mitigation measures) are presented in **Chapter 4** as an inseparable part of the Program's environmental commitments, and discussed under each resource where necessary.

3.2 Resources Considered and Eliminated from Further Analysis

Considering Reclamation's environmental commitments (**Chapter 4**) and in response to comments received from the scoping notice, the Proposed Action would have no potential to affect certain resource areas, or its impact on certain resource areas is so minor (negligible) that it was discounted. These resources include cultural resources, Indian trust assets, social environment, public health and safety, and environmental justice (**Table 3-1**).

Table 3-1. Resources Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Cultural Resources	As part of the 2006 Platte River Recovery Implementation Program Final EIS, Reclamation assessed the potential for Program actions to affect the integrity of historic properties on a site-specific basis, primarily through construction, ground disturbance, and river and reservoir water level fluctuations (Reclamation and Service 2006; Cultural Resources Appendix); however, **Chapter 4** outlines environmental commitments designed to identify and avoid, minimize, or mitigate adverse effects on historic properties at the appropriate site-specific level; therefore, further analysis is not needed in this Draft EA, as cultural resource compliance would ensure that adverse effects are identified and resolved.
Indian Trust Assets	As part of the 2006 Platte River Recovery Implementation Program Final EIS, Reclamation assessed the existence and potential location of Indian trust assets according to applicable laws and regulations. Consultation was conducted with tribes that had aboriginal claims to the Platte River basin, including a request to provide information on any Indian trust assets in the Program area. Reclamation reviewed all applicable treaties, statutes, and executive orders (EOs), including findings of the Indian Claims Commission, and consulted with the Bureau of Indian Affairs. No Indian trust assets were identified in the Program area (Reclamation and Service 2006; Indian Trust Asset Appendix). Government-to-government consultation on the Program extension with any affected tribes or with the Bureau of Indian Affairs is not expected to identify any new Indian trust assets issues; therefore, no further analysis is needed in this Draft EA.
Social Environment	The 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006) assessed impacts on the social environment, including population and demographics. Compared with the existing conditions, it was determined in the 2006 Final EIS that the action alternatives would not influence population change in the Platte River basin or other components of the social environment. Due to continuation of this management under the proposed First Increment extension, similar impacts on the social environment are anticipated, and this topic was eliminated from further analysis. Additional site-specific NEPA analysis would be carried out for specific Program land and water actions when they are identified to assess local impacts, including potential impacts on the social environment.
Public Health and Safety	The 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006) assessed impacts from proposed actions on human health and safety, including mosquito-borne diseases, water contamination from waterfowl, and surface flooding. Compared with the No Action Alternative, it was determined in the 2006 Final EIS that the action alternatives would not significantly affect any human health components. Due to continuation of this management under the proposed First Increment extension, similar impacts on the public health and safety are anticipated, and this topic was eliminated from further analysis. Additional site-specific NEPA analysis would be carried out for specific Program land and water actions when they are identified to assess local effects, including potential impacts on public health and safety.

Table 3-1. Resources Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Environmental Justice	The 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006) assessed the impacts of proposed management on low-income, minority, and tribal populations per the requirements of EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The 2006 Final EIS concluded that there would likely be no disproportionate adverse impacts on low-income or minority populations based on proposed management. Due to continuation of this management under the proposed First Increment extension, no disproportionate adverse impacts are expected, and this topic was eliminated from further analysis.

3.3 Water Resources

3.3.1 Affected Environment

Overall, the Platte River basin (comprised of the North Platte, South Platte, and central Platte River basins) is a highly regulated and managed water system. Water is stored in reservoirs and released at certain times to meet specific needs and to fulfill contractual requirements (Reclamation and Service 2006). The primary focus of the Program's First Increment is the central Platte River basin in Nebraska (Reclamation and Service 2006). The central Platte River basin refers to the drainage of the main stem river and tributaries from the confluence of the North Platte and South Platte Rivers to the confluence with the Loup River (Program 2015). The focus of this section is the central Platte River.

Flow magnitude and timing in the central Platte River depend heavily on a large reservoir on the North Platte River (Lake McConaughy) and all the canals and reservoirs, in addition to flows from the South Platte River. In general, waters are released from Lake McConaughy year-round to support power generation at hydroelectric power plants and in the summer to deliver irrigation water (Reclamation and Service 2006).

The Water Resources section of the 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) describes river flow and is incorporated by reference. This includes average monthly flows at Overton and Grand Island, Nebraska. Where relevant, more current supplemental information is provided below.

Many Program activities operate to help achieve daily target flows in order to provide multiple benefits to the river ecosystem and the target species. The daily target flows at Grand Island are summarized in **Table 3-2**. These values are based on the Service's recommendations for both species target flows and annual target pulse flows. Species flows were established as "wet year", "dry year", and "normal year" minimum flows for various periods of the year. This was done to sustain the species and their habitats.

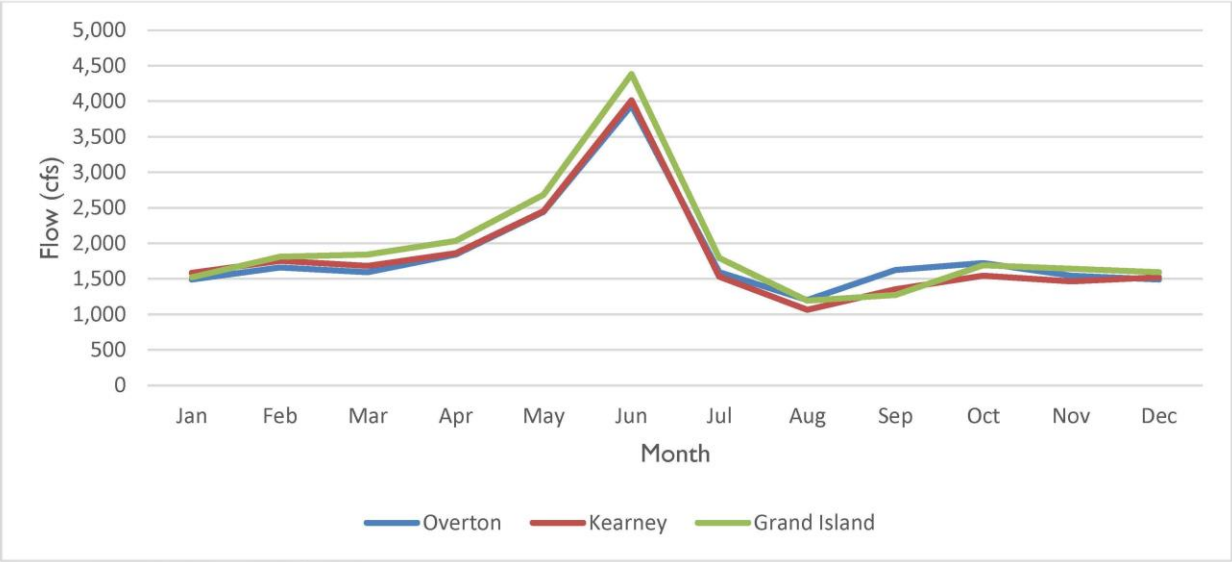
Table 3-2. Fixed Daily Target Flows at Grand Island

Period	Condition		
	Wet Year (cfs)	Normal Year (cfs)	Dry Year (cfs)
January 1–January 31	1,000	1,000	600
February 1–February 14	1,800	1,800	1,200
February 15–March 15	3,350	3,350	2,250
March 16–March 22	1,800	1,800	1,200
March 23–May 10	2,400	2,400	1,700
May 11–May 19	1,200	1,200	800
May 20–June 20	3,700	3,400	800
June 21–September 15	1,200	1,200	800
September 16–September 30	1,000	1,000	600
October 1–November 15	2,400	1,800	1,300
November 16–December 31	1,000	1,000	600

Source: Reclamation and Service 2006
Note: "Wet years" are defined as the wettest 33 percent, "dry years" as the driest 25 percent, and "normal years" all other years.
cfs = cubic feet per second

U.S. Geological Survey (USGS) stream gages are in Overton, Kearney, and Grand Island, Nebraska, for the central Platte River system. **Table 3-3** lists and **Chart 3-1** depicts the mean of monthly discharge in cfs at Overton, Kearney, and Grand Island during a 10-year period (2007–2016).

Chart 3-1. Mean of Monthly Discharge in the Platte River (2007-2016)



Sources: USGS 2017a, 2017b, 2017c

Table 3-3. Mean of Monthly Discharge in the Platte River (2007–2016)

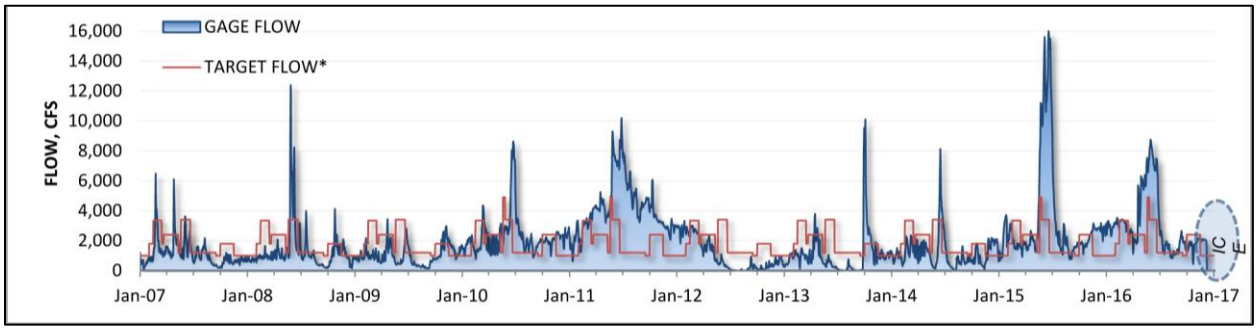
USGS Gage Number and Location	January (cfs)	February (cfs)	March (cfs)	April (cfs)	May (cfs)	June (cfs)	July (cfs)	August (cfs)	September (cfs)	October (cfs)	November (cfs)	December (cfs)
06768000: Platte River near Overton, Nebraska	1,490	1,660	1,590	1,840	2,440	3,940	1,590	1,200	1,620	1,720	1,540*	1,490*
06770200: Platte River near Kearney, Nebraska	1,580	1,750	1,680	1,860	2,450	4,010	1,530	1,060	1,350	1,540	1,460*	1,520*
06770500: Platte River near Grand Island, Nebraska	1,520	1,810	1,840	2,030	2,680	4,380	1,790	1,190	1,270	1,690	1,640	1,590

Sources: USGS 2017a, 2017b, and 2017c
*2016 discharge unavailable

The Program provides approximately 90,000 acre-feet toward the First Increment objective of 130,000 to 150,000 acre-feet. When compared with water flows at Overton and Grand Island, Nebraska, prior to implementation of the Program, Program water management has influenced flows in the Platte River. From approximately April through November, mean monthly discharge in the river increased at the Overton and Grand Island gages. During the rest of the year, it decreased or remained almost unchanged. The largest increase in mean monthly discharge was during June, and the largest decrease was during February and March. A large portion of the reduction in shortages to target flows is due to the retiming of water and not an additional volume of water. Changes to target flows are also influenced by natural variability.

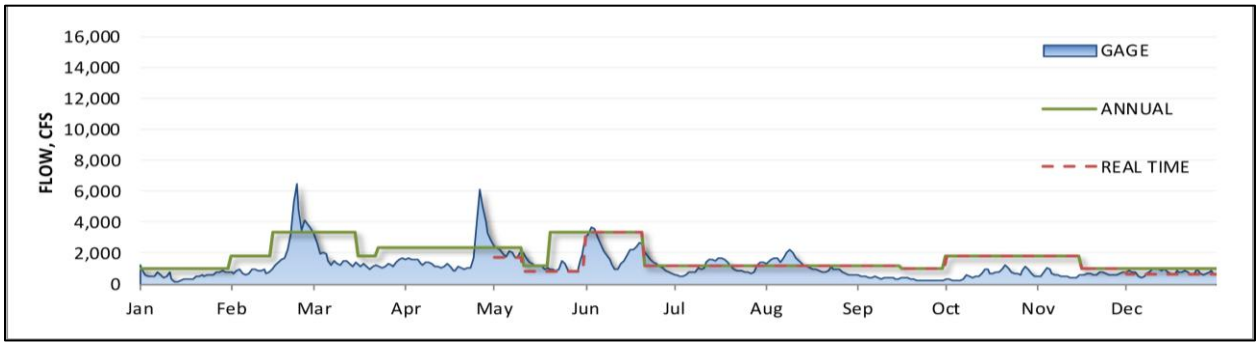
Chart 3-2 shows the Grand Island gage hydrograph from the beginning of 2007 through 2016 and the annual Service target flows. The summary chart is included to provide year-to-year flow comparisons and to indicate general flow trends over the course of the Program's existence. Hydrographs for individual years from 2007 to 2016 are included for further comparison (**Chart 3-3** to **Chart 3-12**) (Program 2017b).

Chart 3-2. Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows



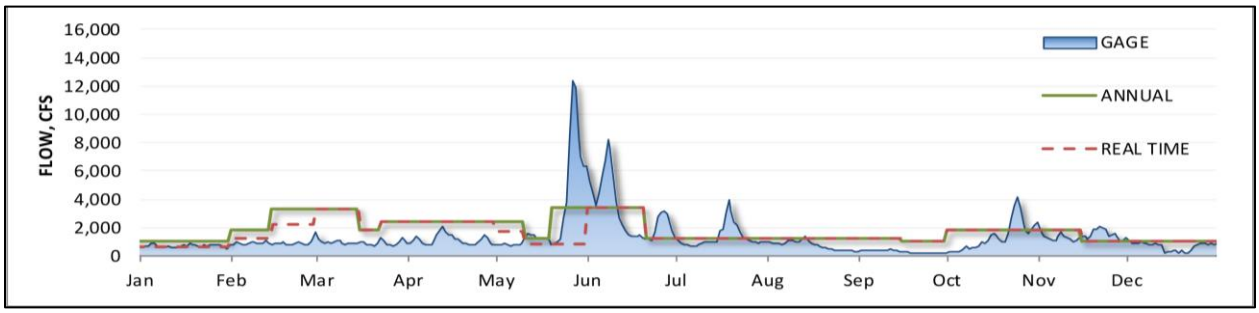
Source: Program 2017b
*Target flow based on annual hydrologic condition designation

Chart 3-3. 2007 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



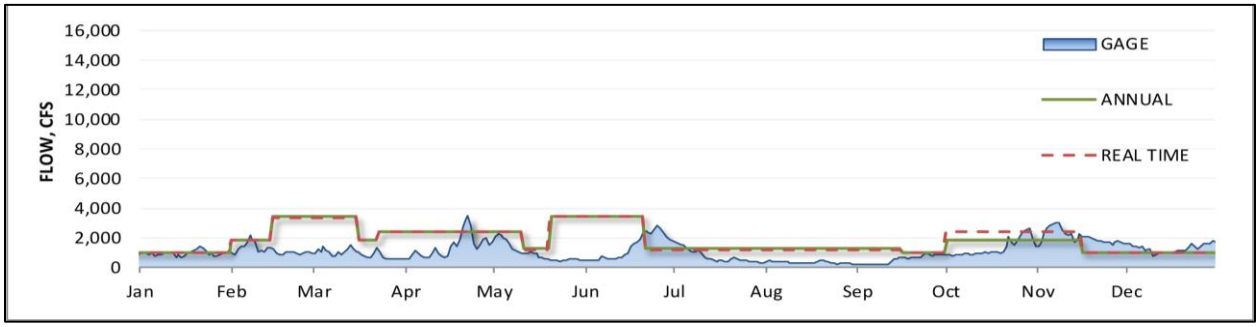
Source: Program 2017b

Chart 3-4. 2008 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



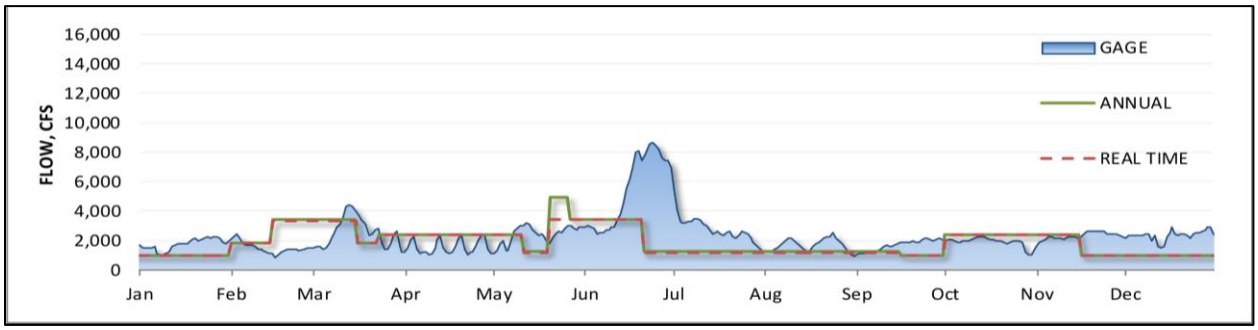
Source: Program 2017b

Chart 3-5. 2009 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



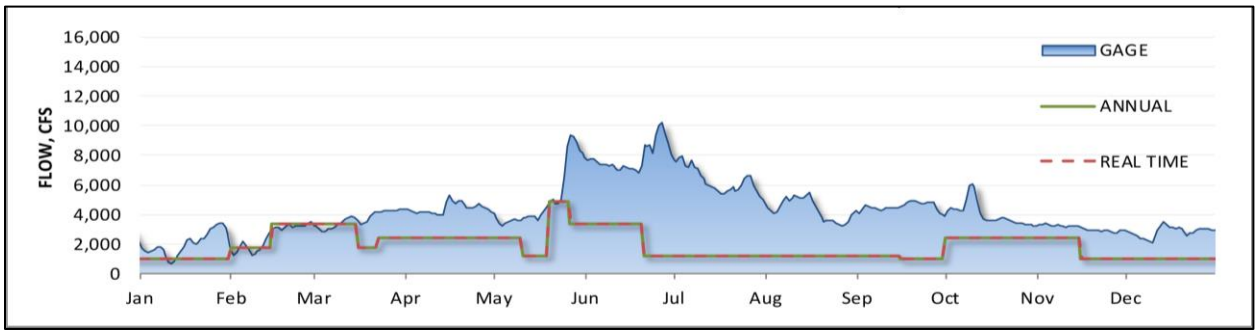
Source: Program 2017b

Chart 3-6. 2010 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Wet



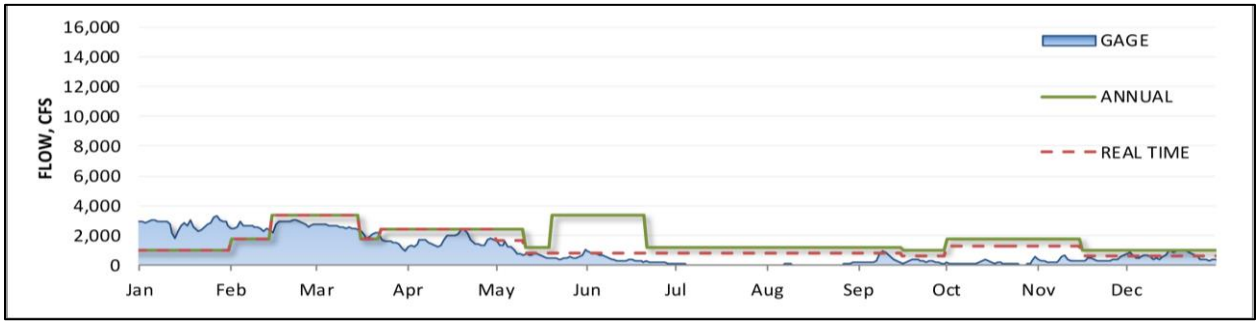
Source: Program 2017b

Chart 3-7. 2011 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Wet



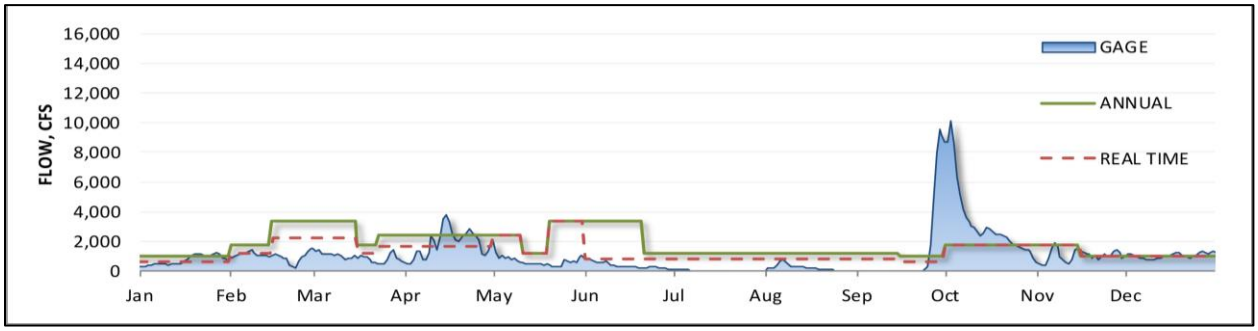
Source: Program 2017b

Chart 3-8. 2012 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



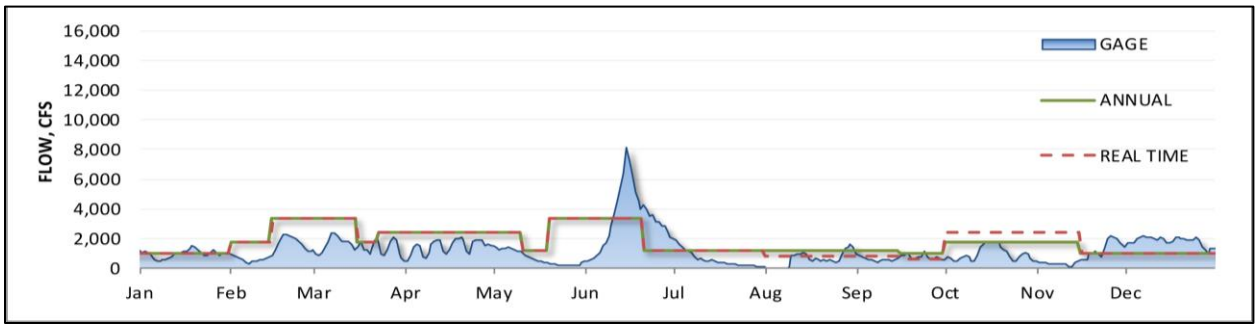
Source: Program 2017b

Chart 3-9. 2013 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



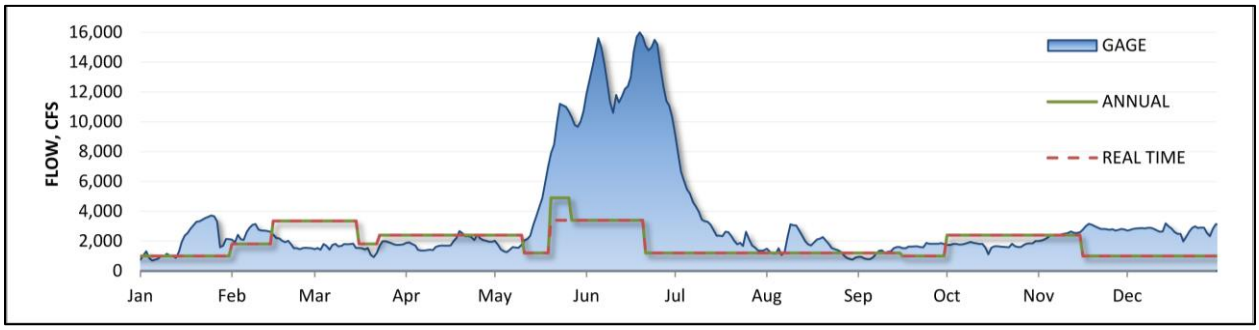
Source: Program 2017b

Chart 3-10. 2014 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



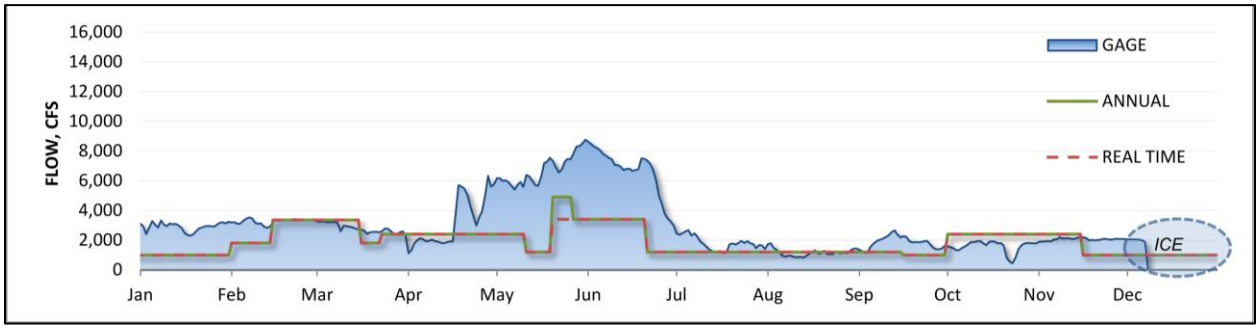
Source: Program 2017b

Chart 3-11. 2015 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



Source: Program 2017b

Chart 3-12. 2016 Grand Island Gage Hydrograph and U.S. Fish and Wildlife Service Target Flows, Year Type: Normal



Source: Program 2017b

From 2007 to 2014, the average annual shortage to target flows at Grand Island was 504,696 acre-feet, representing 8 total years of Program operation. There were 6 years classified as normal and 2 years classified as wet. No dry years were represented from 2007 through 2014; during those years the annual shortages to target flows ranged from 18,197 acre-feet in 2011 to 731,257 acre-feet in 2013 (Program 2017c).

The Service's environmental account in Nebraska and Tamarack Phase 1 were in place by 2007; Pathfinder Modification and Pathfinder Municipal projects were in place by 2012. With the addition of Pathfinder Municipal water, the combined annual reduction to Service target flows is approximately 83,650 acre-feet. Water from both Pathfinder projects are combined with the environmental account at Lake McConaughy, so releases from all three state water projects are tracked through the central Platte River through Grand Island, Nebraska. Contributions from Tamarack Phase 1 are tracked to the Colorado/Nebraska state line only (Program 2017c).

Not including contributions from Tamarack Phase 1, Program water delivered to Grand Island averaged 23,774 acre-feet from 2007 through 2014; the average reduction in shortages at Grand Island was 20,130 of 23,774 acre-feet. The range in annual reduction in target flows is 0 acre-feet in 2010 and 2011 to 47,751 acre-feet in 2013. No analysis has been completed to assess the Program's effects on average annual volume change to the lower Platte River approximating 90,000–100,000 acre-feet annually (Program 2017c).

Although the First Increment influenced water flows, factors outside the control of the Program, include local weather conditions and regional climate patterns. For example, water years 2009 and 2013 were relatively dry, and water year 2011 was one of the wettest years on record (Tetra Tech 2015). These types of influences on water resources would continue.

3.3.2 Impacts from the Proposed Action

The Program would invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the First Increment extension. As shown in **Chart 3-2**, Service target flows have been met during certain times of the year; however, there is also variability in the timing and duration for consistently meeting the target flows. The Program's influence on target flows is expected to continue under the Proposed Action. It is expected that knowledge gained during the First Increment can be used to continue improving flows during the extension of the First Increment under the Proposed Action. Retiming additional water is expected to improve the consistency for meeting target flows.

Cumulative Effects

Other non-Program projects involving water management can also alter water flows. For example, there is a non-Program proposal (Platte Republican Diversion Project) for water to be pumped from Canal E-65 into the east branch of Turkey Creek between Elwood and Smithfield. Canal E-65 starts just above the inlet to Johnson Lake. The water would be piped a short distance and then released into the open creek, which flows about 25 miles south to the Republican River. The Proposed Action seeks to improve river flows in the central and lower Platte Rivers that benefit the target species. Unlike the Proposed Action, diversion projects would remove water from the Platte River, thereby potentially reducing the amount and timing of water available in the Platte River for habitat enhancements for species. If activities outside the Program were to diminish flows at critical times of the year, flow improvements created by the Program could be undermined. This is the reason that each state and the federal government have developed, under the Cooperative Agreement, depletion management plans (Reclamation and Service 2006). The purpose of these plans is to offset or prevent additional depletions of species and annual target flows.

3.3.3 Impacts from the No Action Alternative

The Service's environmental account is a portion of the water stored in Lake McConaughy that is set aside and managed by the Service for the benefit of the target species. The Service manages the environmental account in coordination with the environmental account committee and reservoir coordination committee. This coordination would resume under the No Action Alternative.

Of the existing Program water and water action plan projects, the environmental account would remain in place under the No Action Alternative, because of FERC requirements; however, Tamarack, Pathfinder Modification water, and Program water action plan projects may or may not be in place under the No Action Alternative. The loss of the Program could limit acquisition or establishment of new water projects, thereby reducing the likelihood of meeting Program goals, such as target flows, in the central Platte River.

Cumulative Effects

As described above under the Proposed Action *Cumulative Effects* section, other projects involving water management can also alter water flows. Cumulative effects under the No Action Alternative would similar as under the Proposed Action, except the loss of the Program could limit acquisition or establishment of new water projects, thereby contributing to the reduction of any additional water to the Platte River.

3.4 River Geomorphology

3.4.1 Affected Environment

Braided river is the river plan form that provides the most roosting habitat preferred by whooping crane, and the most nesting and rearing habitat preferred by the interior least tern and piping plover along the river (Reclamation and Service 2006). Braided rivers exhibit numerous channels that split off and rejoin each other to give a braided appearance. The intent of the Program is to rehabilitate habitat in the central Platte River for certain target species by restoring a braided channel morphology with sand bars free of vegetation, increased channel widths, and unobstructed views (Tetra Tech 2015).

The River Geomorphology section of the 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) describes the river conditions of the central Platte River. It describes flows, sediment transport, topography, and river plan form and is incorporated by reference. Additionally, more current river condition information is provided below.

A Channel Geomorphology and Vegetation Monitoring Program was implemented to collect and analyze a suite of data over a multi-year time frame. One of the objectives was to document trends in channel geomorphology parameters throughout the central Platte River during the 13-year First Increment (2007-2019) of the Program, including shape, width, planform, aggradation/degradation trends, bed-material grain sizes, and sediment loads. The most recent information is documented in Channel Geomorphology and In-channel Vegetation (Tetra Tech 2015).

The area of interest for geomorphology and vegetation monitoring consisted of channels within approximately 0.5 miles on either side of the centerline of the Platte River, beginning at the

Source: EMPSi
Platte River west of Kearney

junction of U.S. Highway 283 and Interstate 80 near Lexington, Nebraska, and extending eastward to Chapman, Nebraska (approximately 100 miles). With the 2014 field season, the Platte River Geomorphic and Vegetation Monitoring Program completed 6 years of detailed field monitoring, and the data have been used to quantify at least 35 individual performance metrics. The report presents a summary of all 6 years of data and is incorporated by reference.

According to the report, braiding, sediment aggradation/degradation, and channel width results from the Program involve mixed outcomes and vary by location. For example, Geomorphic Reaches 4 (Elm Creek to Odessa) and 6 (Minden to Gibbon) typically had the highest braiding indices, and Reaches 1 (Lexington to Overton), 2 (south channel at Jeffreys Island), 3 (Overton to Elm Creek), and 8 (Wood River to Grand Island) typically had the lowest indices. Also, the reach-wide average total channel width showed a modest (not statistically significant) increasing trend from 2009 through 2011, and has remained essentially the same since 2011.

In general, the changes in year-to-year width were very small. Geomorphic Reaches 4, 6, 7 (Gibbon to Wood River), and 9 (Grand Island to Chapman) had the largest total channel width (all exceeding 1,000 feet in all years), while Reaches 1 and 2 had the narrowest (in the range of 500 to 550 feet; Tetra Tech 2015).

The Program has compiled unvegetated channel width analyses, between the Overton Bridge and Chapman, from 2007 through 2016 (Program 2017d). The analyses, which are summarized in **Chart 3-13** and **Chart 3-14**, show that vegetation removal, weed management, overall wet conditions, and a higher than normal frequency of peak flows have increased the unvegetated channel width over time. Unvegetated widths can be influenced by many factors, including vegetation management and preceding year peak flow. More information on vegetation management and treatment is provided in **Section 3.6**.

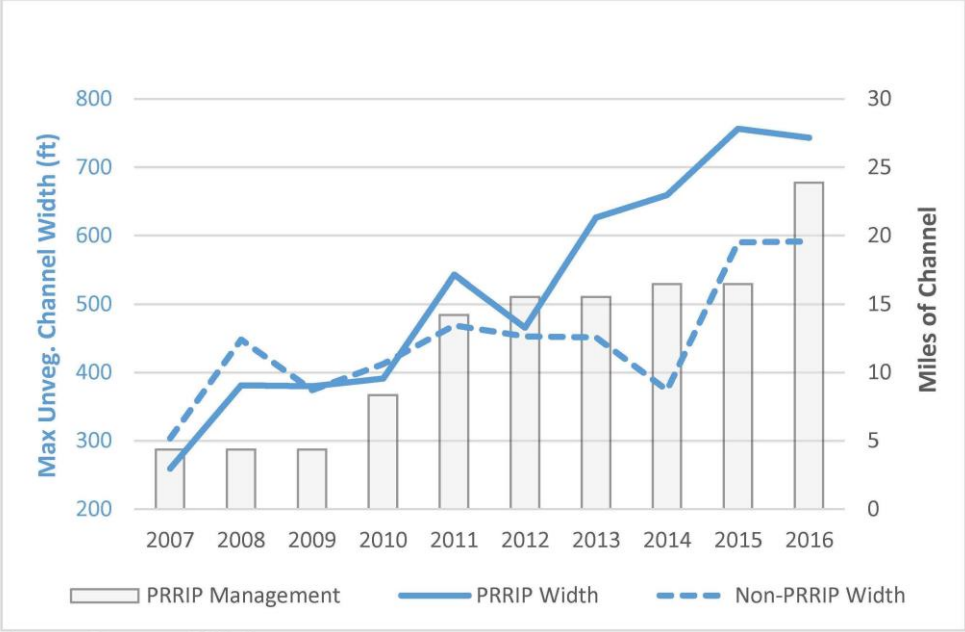
The Annual Platte River Surface Water Flow Summary (Program 2017b) provides an overview of the surface water behavior in the central Platte River. The document provides a summary of central Platte River flows through the Program associated habitat, spanning from Lexington to Chapman, Nebraska, through the 2016 calendar year, and is incorporated by reference. The average annual flows in cfs at Overton, Kearney, and Grand Island, Nebraska, that are provided in the document are listed in **Table 3-4** and depicted in **Chart 3-15**. Lower flows equate to lower stream power. The stream power of a river may drop below the threshold needed to maintain a braided plan form. When this occurs, a meandering plan form can develop and then vegetation colonizes areas of the channel where the riverbed sands are no longer mobilized by annual floods.

Table 3-4. Average Annual Flow and Instantaneous Peak Flow in the Platte River (2007–2016)

Year	Overton Gage Average Annual Flow (cfs)	Overton Gage Instantaneous Peak Flow (cfs)	Kearney Gage Average Annual Flow (cfs)	Kearney Gage Instantaneous Peak Flow (cfs)	Grand Island Gage Average Annual Flow (cfs)	Grand Island Gage Instantaneous Peak Flow (cfs)
2007	800	4,420 on June 2	857	5,430 on February 25	1,121	7,300 on February 23
2008	791	11,200 on May 25	929	13,400 on May 26	1,300	13,600 on May 27
2009	942	3,700 on April 19	916	3,350 on April 20	1,039	3,540 on April 22
2010	2,157	7,500 on June 27	2,069	8,510 on June 17	2,289	8,840 on June 24
2011	3,877	8,820 on June 20	3,972	9,460 on June 25	4,214	10,400 on June 27
2012	1,114	3,500 on January 20	1,032	3,430 on January 26	978	3,590 on January 26
2013	1,140	13,100 on September 25	1,068	12,500 on September 28	1,024	10,600 on October 3
2014	1,249	7,580 on June 12	1,177	6,730 on June 14	1,199	8,800 on June 15
2015	3,506	15,500 on June 17	3,304	16,300 on June 18	3,341	16,100 on June 5
2016[1]	2,936	8,740 on May 29	2,945	8,820 on May 30	3,032	8,910 on May 31
Average	**1,851**	**8,406**	**1,827**	**8,793**	**1,954**	**9,168**

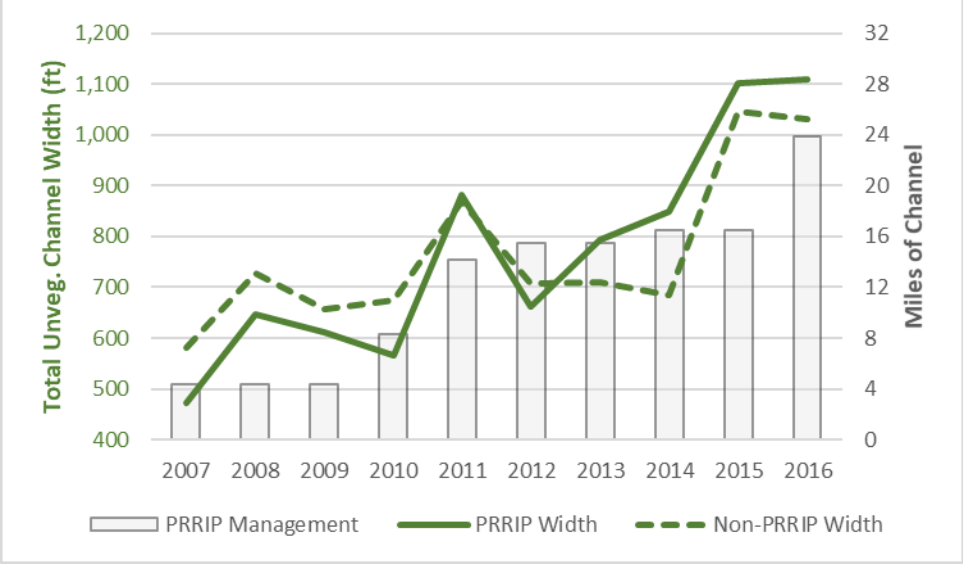
Source: Program 2017b
[1]Provisional data

Chart 3-13. Maximum Unvegetated Channel Width



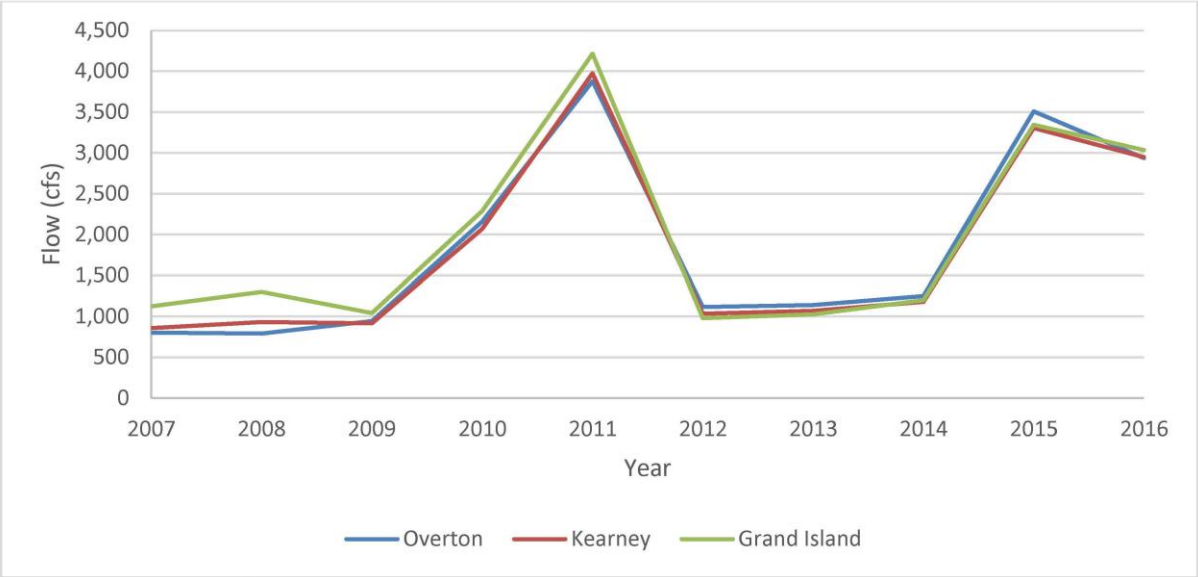
Source: Program 2017d
PRRIP=Platte River Recovery Implementation Program

Chart 3-14. Total Unvegetated Channel Width



Source: Program 2017d
PRRIP=Platte River Recovery Implementation Program

Chart 3-15. Average Annual Flow in the Platte River (2007-2016)



Source: Program 2017b

The Program provides approximately 90,000 acre-feet toward the First Increment objective of 130,000 to 150,000 acre-feet. Before the Program began, the average annual flow was 1,751 cfs at Overton and 1,746 at Grand Island (Reclamation and Service 2006). Since the implementation of the Program, the average annual flow at Overton has decreased slightly to 1,731 cfs and increased at Grand Island to 1,834 cfs (Program 2017b). Also, **Section 3.3.1** above addresses Service target flows at Grand Island, Nebraska.

Although the First Increment influenced water flows, local weather conditions and regional climate patterns are factors outside the control of the Program. For example, water years 2009 and 2013 were relatively dry, and water year 2011 was one of the wettest years on record (Tetra Tech 2015). These types of influences on water resources would continue.

3.4.2 Impacts from the Proposed Action

The Program would invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the First Increment extension. The Program's influence on braiding and average annual flow is expected to continue under the Proposed Action. It is expected that knowledge gained during the First Increment can be used to continue improving the average annual flow during the extension of the First Increment under the Proposed Action.

Sediment augmentation occurs to minimize riverbed degradation. It is also used to curtail increased bed and bank erosion that occurs when flows increase. While mechanically consolidating channels is no longer being considered to improve river plan form, other mechanical actions provide immediate improvements to the river plan form. Examples are clearing and lowering wooded banks and islands in the river channel. These actions increase the reach length of the braided plan form.

It is expected that knowledge gained during the First Increment can be used to continue improving braiding, sediment aggradation/degradation, and channel width during the extension of the First Increment under the Proposed Action.

Braiding, sediment aggradation/degradation, and channel width results from the Program involve mixed outcomes and vary by location, due to limitations in the ability to collect detailed sediment data required for analyses (Tetra Tech 2015); however, Program management, in addition to overall wet conditions and a higher than normal frequency of peak flows, has increased the unvegetated channel width from 2007 through 2016. Also, site-specific improvements during the First Increment can be used in other areas to continue improving the conditions of channel conditions during the extension of the First Increment under the Proposed Action.

3.4.3 Impacts from the No Action Alternative

Impacts from the Service's environmental account in Nebraska, Tamarack, Pathfinder Modification water, and Program water action plan projects would be similar to impacts described in **Section 3.3.3**. The loss of the Program could limit acquisition or establishment of new water projects, thereby reducing the likelihood for meeting Program goals, such as river braiding, in the central Platte River.

3.5 Water Quality

3.5.1 Affected Environment

The Water Quality section of the 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) describes the water quality conditions of the central Platte River. It describes water temperature, turbidity, and contamination and is incorporated by reference. Additionally, more current water quality information is provided below.

Monitoring central Platte River water quality near Program lands is relevant to the productivity and diversity of native fish and other aquatic species that support the interior least tern, piping plover, and whooping crane. The purpose of the Platte River monitoring is to characterize the water quality in the central and lower Platte River during the 13-year First Increment (2007–2019); this will form the basis for assessing the influence of the Program and Program-covered activities on Platte River water quality.

The Water Quality Monitoring Protocol defines the collection procedures to obtain scientifically credible data to meet the purpose. The water quality monitoring includes monitoring of the following (EA Engineering, Science, and Technology, Inc. 2011):

- Stage/discharge
- Water quality parameters (temperature, turbidity, dissolved oxygen, pH, and specific conductance)
- Representative water quality samples for metals (dissolved copper, dissolved lead, dissolved nickel, total selenium, total calcium, and total magnesium)
- *E.* coli

The Platte River Recovery Implementation Program Annual Data Summary Report (2013) presents the results of the action-based water quality monitoring for the 2012 monitoring season (mid-August through early December) (EA Engineering, Science, and Technology, Inc. 2013). Evidence of the Program's sediment augmentation impact on Platte River water quality was evident in the turbidity data.

Statistically, there is evidence that Program actions, specifically sediment augmentation by putting sediments in place mechanically, increased ambient turbidity levels in the Platte River (EA Engineering, Science, and Technology, Inc. 2013).

The 2016 Surface Water Quality Integrated Report (Nebraska Department of Environmental Quality 2016) lists Category 5 waters for the central Platte River. Category 5 is for a waterbody where one or more beneficial uses are determined to be impaired by one or more pollutants, and all the total maximum daily loads have not been developed. Category 5 waters constitute the Clean Water Act of 1972 Section 303(d) list subject to U.S. Environmental Protection Agency (EPA) approval/disapproval. Only two of the Category 5 waters, however, are listed for the Platte River: Waterbody Identification MP1-10000 (Platte River east of Columbus) and MP1-20000 (Platte River at Duncan). Both are listed for impairment by bacteria with *Escherichia coli* listed as the pollutant of concern. Both are downstream from Grand Island, Nebraska, and, therefore, could be influenced by activities outside of the Program.

There have been numerous fish kills in the central Platte River. Most of these fish kills have been attributed to water temperatures more than 90 degrees Fahrenheit (°F), which is the Nebraska water quality temperature standard in the central Platte River during the summer (June, July, and August). In the BO for the FERC license for the Kingsley Dam hydroelectric plant, the Service established a target flow of 1,200 cfs at Grand Island, Nebraska; the purpose was to maintain whooping crane roosting habitat (Service 1997).

The Service also indicated that a target flow of 1,200 cfs at Grand Island would be adequate to help meet the temperature standard (Reclamation and Service 2006). The species target flows are summarized above in **Table 3-2**. **Chart 3-3** to **Chart 3-12** in **Section 3.3.1** depict when summer target flows were met from 2007 through 2016.

Table 3-5 lists the number of days during a 10-year period (2008-2017) during the summer that Platte River water flow was greater than 1,200 cfs.

Table 3-5. Summer Flow for USGS Stream Gage ID 06770500 Near Grand Island, Nebraska (2008-2017)

Month	Number of Days with Flow Greater than 1,200 cfs	Percentage of Days with Flow Greater than 1,200 cfs
June	250	83
July	144	46
August	96	31

Source: USGS 2017d

The Program provides approximately 90,000 acre-feet toward the First Increment objective of 130,000 to 150,000 acre-feet. Prior to implementation of the Program, the 1,200 cfs target flow was exceeded on a little over half of the days in June, decreasing to about one-third of the days in

July, and less than one-tenth of the days in August. Since the implementation of the Program, the frequency for exceeding the 1,200 cfs target flow has increased.

Although the First Increment influenced water flows, factors outside the control of the Program are local weather conditions and regional climate patterns. For example, water years 2009 and 2013 were relatively dry, and water year 2011 was one of the wettest years on record (Tetra Tech 2015). These types of influences on water resources would continue.

3.5.2 Impacts from the Proposed Action

The Program would invest the resources available to achieve at least 120,000 acre-feet in annual reductions to target flow shortages as quickly as possible during the First Increment extension. As shown in **Chart 3-3** to **Chart 3-12** above, the Program has been able to meet summer target flows; however, there is also variability in the timing and duration for consistently meeting the summer target flows. The Program's influence on summer target flows is expected to continue under the Proposed Action. It is expected that knowledge gained during the First Increment can be used to continue improving the summer flows during the extension of the First Increment under the Proposed Action.

The Program is expected to improve stream temperatures if shortages to target flows are reduced during the summer. Furthermore, the Program would continue to monitor water quality during the First Increment extension.

There are no Category 5 waters for the central Platte River involving contaminants found in sediments discussed in the 2006 Final EIS. No water quality concerns involving contaminants found in sediments are expected to continue under the Proposed Action.

3.5.3 Impacts from the No Action Alternative

Impacts from the Service's environmental account in Nebraska, Tamarack, Pathfinder Modification water, and Program water action plan projects would be similar to impacts described in **Section 3.3.3**. The loss of the Program could limit acquisition or establishment of new water projects, thereby reducing the likelihood for meeting Program goals, such as summer target flows, in the central Platte River.

3.6 Central Platte River Terrestrial Vegetation Communities

3.6.1 Affected Environment

The 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) provides details of the terrestrial vegetation communities found in the area of analysis. In the 2006 Final EIS, land cover acres were determined by interpreting color-infrared aerial photography from 1998 (Friesen et al. 2000).

The results of an updated 2005 land cover mapping project (Brei and Bishop 2008) are incorporated and summarized in **Table 3-6**. This study generally mapped vegetation according to the National Vegetation Classification System (NVCS) alliance/association level, which characterizes vegetation by the dominant species that represents a community. Several additional

Table 3-6. Land Cover/Land Use Classification Summary

Land Cover/Land Use Type[1]	Acres	Percent
Agricultural fields	973,800	49.7
Bare ground/Sparse vegetation	4,180	0.2
Canal/Drainage	3,630	0.2
Floodplain marsh	20	<0.1
Irrigation reuse pit	350	<0.1
Lagoon	530	<0.1
Meadow sand ridge	2,500	0.1
Mesic wet meadow	15,460	0.8
Phragmites (common reed)	4,200	0.2
Purple loosestrife	220	<0.1
Reservoir	21,550	1.1
Riparian shrubland	18,950	1.0
Riparian woodland	65,311	3.3
River channel	7,850	0.4
River early successional	2,530	0.1
River shrubland	6,530	0.3
Roads	35,390	1.8
Rural developed	71,300	3.6
Sand pit	5,340	0.3
Stock pond	1,430	0.1
Undisturbed grassland	7,260	0.4
Unvegetated sandbar	5,530	0.3
Upland grassland	477,380	24.4
Upland shrubland	3,570	0.2
Upland woodland	34,380	1.8
Urban/suburban	43,298	2.2
Warmwater slough	190	<0.1
Xeric wet meadow	147,470	7.5
Total	**1,960,149**	**100**

Source: Program GIS 2017

[1]The analysis in Brei and Bishop (2008) may not be representative of current conditions because data relied upon to complete the analysis were collected during a period of poor conditions.

classes were developed to map invasive species of management concern, as well as habitat features important to bird species of management concern. Detailed descriptions of land cover/land use classifications are included in Brei and Bishop (2008).

The Program has compiled an analysis of unvegetated channel width, between the Overton Bridge and Chapman, from 2007 through 2016 (Program 2017d). The analysis, which is summarized in **Chart 3-13** and **Chart 3-14** (see **Section 3.4.1**), shows that Program vegetation removal, weed management, overall wet conditions, and a higher than normal frequency of peak flows have increased the unvegetated channel width over time.

Unvegetated widths can be influenced by many factors, including vegetation management and preceding year peak flow. (See **Table 3-4** for a summary of peak flows by river reach from 2007 through 2016.)

Purple loosestrife (*Lythrum salicaria*) and tamarisk (*Tamarix ramosissima*) are Nebraska noxious weeds (NDA 2017) discussed in the 2006 Final EIS (Reclamation and Service 2006) as

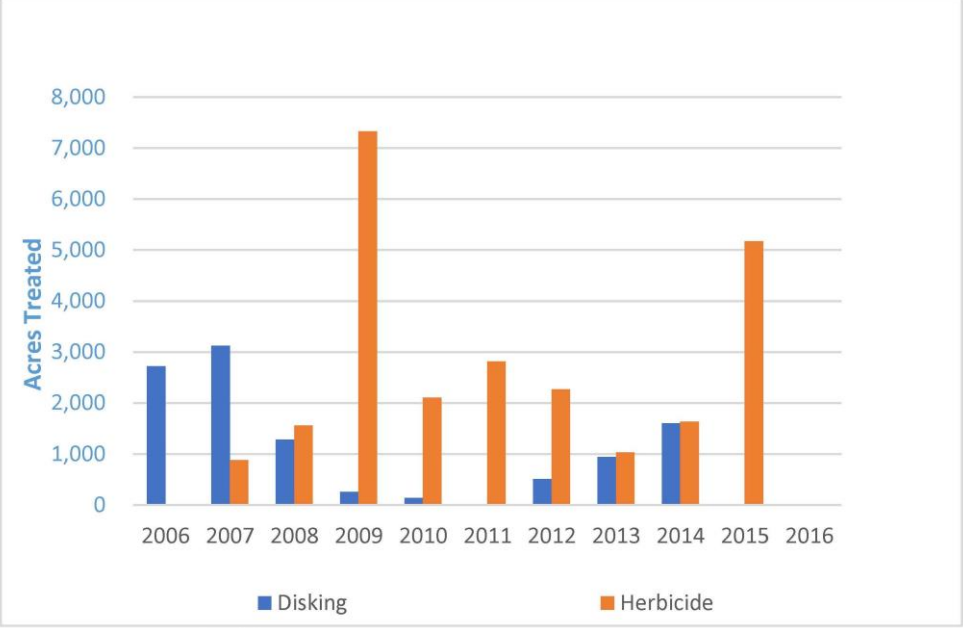
species that colonize disturbed wetland areas. Common reed (*Phragmites australis*) is also a Nebraska noxious weed; this is rhizomatous species that can form dense infestations on wet soils along riverbanks, ponds, wet meadows, and other wet areas (NDA 2017).

Vegetation treatments for these species have been conducted on an ongoing basis since 2006. The acres of herbicide treatment and disking conducted each year from 2006 through 2016 are summarized in **Chart 3-16**. Cumulative acres treated from 2006 through 2016 are shown in **Chart 3-17**.

Upon conclusion of the 2016 field season, the Program had completed 8 years of field vegetation monitoring. Data collected have been used to quantify many individual performance metrics, including those for vegetation. The Channel Geomorphology and In-Channel Vegetation 2016 Data Analysis Report (Tetra Tech 2017) presents a summary of all 8 years of data, including spatial and temporal trends in each of the metrics.

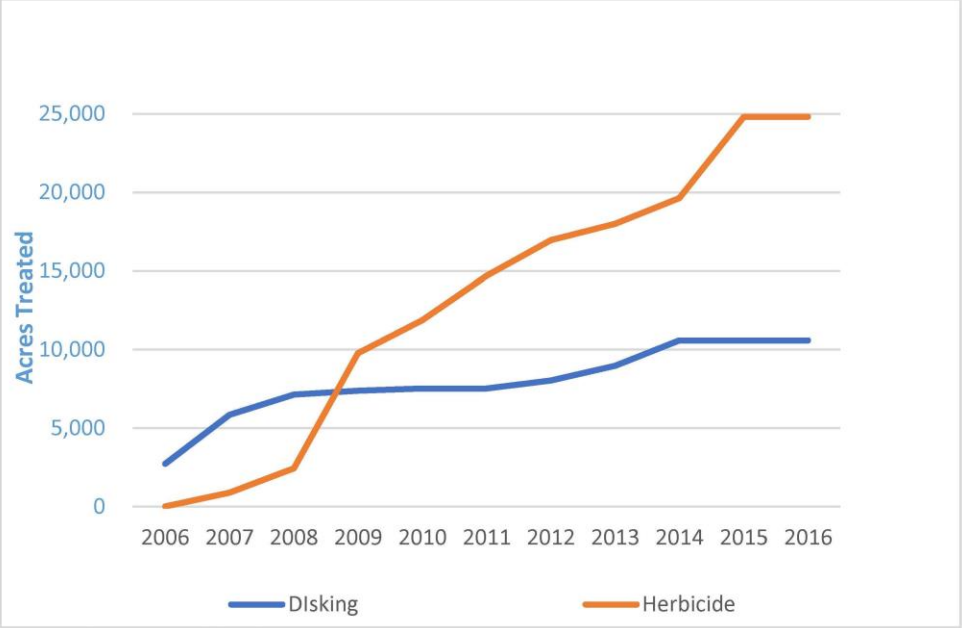
Monitoring has shown that the frequency of purple loosestrife and common reed declined substantially from 2009 through 2012, and then remained relatively consistent through the remainder of the 8-year monitoring period. Purple loosestrife is most common in the portion of the reach downstream from Minden, while common reed is most prevalent in the reaches between Elm Creek and Minden (Reaches 4 and 5), Gibbon and Wood River (Reach 7), and Grand Island and Chapman (Reach 9; Tetra Tech 2017).

Chart 3-16. Acres of Vegetation Treatment



Source: Program GIS 2017

Chart 3-17. Cumulative Acres of Vegetation Treatment



Source: Program GIS 2017

Common reed has been identified as a potentially important factor in preventing the river from sustaining the wide, braided character that is important to good quality habitat for the target species. Both the frequency of occurrence and percent cover of common reed declined during the monitoring period. Percent cover of common reed has shown a statistically significant negative correlation with herbicide spraying; in other words, spraying has been shown to reduce cover of this species. Other factors, such as maximum inundation depth and duration, low flow during the growing season, growing degree days, and precipitation, have not been shown to affect percent cover of common reed (Tetra Tech 2017).

3.6.2 Impacts from the Proposed Action

Under the Proposed Action, the nature and type of impacts on central Platte River terrestrial vegetation communities would be the same as described in the 2006 Final EIS (Reclamation and Service 2006). In general, vegetation would continue to be affected by maintaining habitat for the benefit of the target species. This would entail converting Program lands with woodlands or agricultural areas to wet meadows and removing shrubs and trees from river islands and banks, changing the acres of terrestrial vegetation communities as restoration activities were undertaken.

Removing vegetation for target species habitat may increase the potential for noxious weed infestations on newly cleared or leveled soils; however, the goal of vegetation clearing is to create and maintain unvegetated channel habitat for target species. Thus, under the Proposed Action, program management for purple loosestrife, tamarisk, common reed, and other noxious weeds that may colonize these areas would continue, as described in the 2006 Final EIS. Restoration activities would be closely monitored for weed establishment, and mechanical or chemical means would be used to manage the size of infestations.

3.6.3 Impacts from the No Action Alternative

When the Program ends in 2019, until Program Assets are sold, impacts on terrestrial vegetation communities, including noxious weeds, would include changes in terrestrial vegetation communities from converting wooded areas and agricultural lands to wet meadows, clearing trees and shrubs from river islands, and managing noxious weeds to improve target species habitat. If Program Assets are purchased by signatories that would continue to manage Program Assets to provide habitat for the target species, these impacts would also continue as described above.

Program Assets could be sold without the condition that they be managed to provide habitat for the target species. In this case, changes in the acres of terrestrial vegetation communities may occur, but for other reasons, depending on how the purchaser decides to manage Program Assets. Further, the potential for noxious weed establishment and spread may increase if the purchaser does not continue active monitoring and management of these species on Program Assets.

3.7 Wetlands

3.7.1 Affected Environment

In the 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006), each wetland undeveloped land cover/land use type (see 2006 Final EIS Table 4-WT-1, Central Platte River Study Area Summary of Land Cover/Land Use Classifications, Cowardin Classifications, and Wetland Determination Criteria) was classified using the Cowardin Wetland and Deepwater Habitat Classification system (Cowardin et al. 1979).

As described in **Section 3.6**, land cover types in the project area were updated based on 2005 land cover mapping (Brei and Bishop 2008); however, land cover/land use classifications in Brei and Bishop (2008) used the NVCS with several modified alliances, and these classifications do not match with the land cover/land use classes used in the 2006 Final EIS, nor the Cowardin Wetland and Deepwater Habitat Classification system for wetland land cover/land use classes. As a result, current wetland conditions in the project area are discussed qualitatively below.

Program management to increase habitat quality for target species has resulted in increases in wetland habitat in the project area. Management resulting in the greatest increases in wetlands has been wet meadow or lowland grassland (Cowardin class Palustrine Emergent [PEM]) restoration. This has been accomplished primarily by converting some Program lands with wooded wetlands (Palustrine Forested [PFO]) or non-wetland agricultural lands to wet meadows. To a lesser extent, conversion of shrub-dominated wetlands (Palustrine-Shrub [PSS]), herbaceous riparian areas (PEM), non-wetland upland grasslands, and croplands to wet meadows has also resulted in increases in wet meadows in the project area.

Additional Program management has removed wetlands to increase habitat quality for target species. This has primarily resulted from clearing woodland and shrub-dominated wetlands (Cowardin classes PFO and PSS) from in-stream islands to create additional open river channels (Cowardin class R3UB). To a lesser extent, other wetland types, including herbaceous riparian, lowland grasslands, and bare sand (PEM), have been converted to open river channels.

3.7.2 Impacts from the Proposed Action

Under the Proposed Action, the nature and type of impacts on wetlands would be the same as described in the 2006 Final EIS (Reclamation and Service 2006). In general, the acres of wetlands in the area of analysis would increase as Program management is carried out. This would result from converting Program lands with woodlands or agricultural areas to wet meadows for target species habitat improvement.

In some cases, wetlands on Program Assets may be converted to non-wetland habitat for target species habitat improvement. In these cases, acres of site-specific wetland habitat would decrease from removing wooded and shrub-dominated wetlands on river islands. In these cases, acres of open river channel, and channel width, would increase.

Wetlands may also be affected by conversion from one wetland type to another for target species habitat improvements. For example, wooded or shrubby riparian wetlands may be removed and converted to herbaceous, wet meadow wetlands; however, net acres of wetland habitat would not decrease where such management occurred.

Restoration work that involves temporary vegetation removal or ground disturbance (e.g., from vehicle access or recontouring) may increase the potential for noxious weed infestations. Noxious weed infestations may reduce wetland function, effectively reducing the acres of functioning wetlands. Under the Proposed Action, Program management for purple loosestrife, tamarisk, common reed, and other noxious weeds that may colonize wetland areas would continue, as described in the 2006 Final EIS. Restoration activities would be closely monitored for weed establishment, and mechanical or chemical means would be used to control infestations, reducing the potential for this impact.

All Program management would comply with the environmental commitments listed in **Chapter 4**, as applicable, including obtaining regulatory approvals from the U.S. Army Corps of Engineers (Corps) prior to initiating work in jurisdictional wetlands. All mitigation measures determined by the Corps would be strictly adhered to, minimizing impacts on wetlands. Residual impacts on wetlands following consideration of environmental commitments would be minimal.

3.7.3 Impacts from the No Action Alternative

When the Program ends in 2019, until Program Assets are sold, impacts on wetlands would include overall gains in wetland habitat in the project area, brought about by converting woody riparian areas and agricultural lands to wet meadows to improve target species habitat. If Program Assets are purchased by signatories that would continue to manage Program Assets to provide habitat for the target species, these impacts would also continue as described above.

Program Assets could be sold without the condition that they be managed to provide habitat for the target species; in this case, changes in the acres of wetlands may occur, depending on how the purchaser decides to manage Program Assets. Further, the potential for reduced wetland function from noxious weed establishment and spread may increase if the purchaser does not continue active monitoring and management of these species on Program Assets.

3.8 Whooping Cranes

3.8.1 Affected Environment

This section serves two purposes: first, it describes the affected environment of the whooping crane and documents potential effects of implementing the Proposed Action and No Action Alternative for NEPA documentation, and second, it is also intended to meet the needs of a BA under the ESA; therefore, this section has been organized to describe the species status and critical habitat, document baseline conditions, and communicate potential environmental effects. Potential cumulative effects are also described at the end of the section.

Source: Service
*Whooping crane (*Grus Americana*)*

Status of Species and Critical Habitat

The whooping crane is one of the world's most imperiled species and is a symbol of national efforts to recover endangered species. This bird, which was listed as endangered on March 11, 1967, was one of the very first species listed under the ESA. Critical habitat for the whooping crane along the Platte River was designated in 1978 and covers a stretch roughly 3 miles on each side of the river from Lexington to Shelton, Nebraska. The population estimate for the migrating Aransas-Wood Buffalo whooping crane population has increased from approximately 174 birds in 2001 to approximately 431 whooping cranes observed during the winter of 2016–2017 (Butler and Harrell 2017). The population has steadily increased by approximately 4 percent per year from 1938 to 2017; however, despite intensive management efforts, the whooping crane remains one of the rarest birds in North America, the only continent on which it occurs (Urbanek and Lewis 2015).

Distribution. Whooping cranes currently exist in four distinct populations: Aransas-Wood Buffalo population, Louisiana population, eastern migratory population, and Florida population. The Aransas-Wood Buffalo population is the only remaining wild and self-sustaining population that also migrate. The Aransas-Wood Buffalo population nests in or near Wood Buffalo National Park in the Northwest Territories and adjacent areas of northeastern Alberta, Canada, and it winters in Aransas National Wildlife Refuge on the Texas coast (Urbanek and Lewis 2015). Wintering habitat for the Aransas-Wood Buffalo population consists of estuarine marshes, shallow bays, and tidal flats, while nesting habitat consists of shallow wetlands separated by ridges that support narrow stands of spruce and willow (Urbanek and Lewis 2015). During migration, whooping cranes travel through portions of Canada, North Dakota, South Dakota, Nebraska, Oklahoma, Kansas, and Texas when using the Central Flyway.

Life history. The whooping crane, which has snowy white plumage with black markings on its head and the tip of its wings, has a very distinctive call. This wading bird is the tallest bird species in North America with males approaching 5 feet in height. Whooping cranes of the Aransas-Wood Buffalo population leave the nesting grounds in Canada in September and October and arrive at the Texas wintering grounds in October and November. Whooping cranes return to their nesting grounds in the spring, leaving the Texas coast in March and arriving in Alberta and the Northwest Territories in April and May.

During the twice-yearly migration across the Great Plains states, individuals of the Aransas-Wood Buffalo whooping crane population stop over at the central Platte River for periods of a few days to several weeks (Reclamation and Service 2006). The primary migration corridor, encompassing 95 percent of known sightings of whooping cranes, is about 2,400 miles long and 220 miles wide (Service 2017a). At its intersection with the Platte River, this migration corridor generally occurs between the cities of North Platte and Columbus, Nebraska. For whooping cranes, successful completion of migration requires suitable sites for birds to rest and reside for one or more nights; these sites are generally referred to as stopover sites (Pearse et al. 2015).

Whooping cranes are monogamous, forming pairs as early as 3 years of age, although most pairs begin breeding around 5 years of age. They frequent the same breeding territories year after year and spend nearly a month incubating their eggs until they hatch, usually in late May to early June. Whooping cranes lay two eggs on average per pair, but the survival rate of chicks per pair is generally less than one chick annually. This slow reproductive potential has been an important issue in trying to recover whooping crane populations.

Migratory stopover habitat. Suitable stopover habitat is necessary for whooping cranes to complete their migration in good condition (Pearse et al. 2015). During their migration, whooping cranes use a variety of habitats closely associated with river bottoms, prairie grasslands, and seasonally or semi-flooded palustrine wetlands; they use undisturbed, submerged sandbars commonly found in river channels to forage for food and to roost (or rest). When whooping cranes roost, they prefer to stand in shallow bodies of water, such as channel areas with fine sand and a shallow slow flow, having large unobstructed views (Reclamation and Service 2006). These habitat characteristics are thought to provide the cranes a barrier from predators and an opportunity to take flight to escape predators, if necessary.

Diet. Whooping cranes eat invertebrates, small vertebrates, and plant material, which they find on the ground and in shallow water. They also eat insects, berries, and seeds from low vegetation and take prey from the soil surface, using their bills to stab larger prey. During migration, whooping cranes primarily feed on frogs, fish, insects, and various types of plants often found in submerged or wetland areas (Service 2017a). Whooping cranes also eat waste grains, such as barley, wheat, and corn, from harvested fields during migration.

Threats. Major threats to whooping cranes during migration include collisions with power lines and poaching (Stehn and Strobel 2011; Urbanek and Lewis 2015). Collison with power lines is the greatest known source of mortality for fledged whooping cranes in the Aransas-Woods Buffalo population, representing 38 percent of all known mortalities to this population since 1956 (Stehn and Wassenich 2008). More recent findings of Stehn and Haralson-Strobel (2014) indicate that 20 percent of known mortalities for fledged whooping cranes from the Aransas-Wood Buffalo population are a result of collision (e.g., transmission lines and wind turbines), and 20 percent are from shooting. Mortality resulting from collision with power lines is most likely to occur during spring and fall migrations (Stehn and Wassenich 2008).

The impacts of climate are also a potential threat to whooping cranes during migration. Previous analyses have suggested whooping crane migration was seasonally constant in spring and fall; however, new analyses of observations from 1942 through 2016 demonstrate whooping cranes

now migrate earlier in spring by approximately 22 days and later in fall by approximately 21 days; this change is a result of warming temperatures (Jorgensen and Brown 2017).

Spring temperatures have increased along the migration corridor; however, there is no apparent temperature pattern during the fall (Jorgensen and Brown 2017). Warmer temperatures in the spring are likely to make certain food resources available earlier in the season, because wetland habitat and cultivated fields may thaw sooner than in previous years.

Other threats to this species are habitat loss and degradation from draining wetlands, converting prairie habitat to croplands (Urbanek and Lewis 2015), and modifying river hydrology. Hurricanes on the Gulf Coast also degrade wintering grounds.

3.8.2 Environmental Baseline

Population Estimates

The whooping crane population has steadily increased by approximately 4 percent per year from 1938 to 2017. As can be gleaned from **Table 3-7** and **Chart 3-18**, whooping crane use of the central Platte River during the spring migration season has increased substantially (2001–2017), while use during the fall has increased slightly. The lowest spring and fall combined count, which was only 5 individuals, occurred in 2005; the highest count occurred in 2017, when 94 birds were observed.

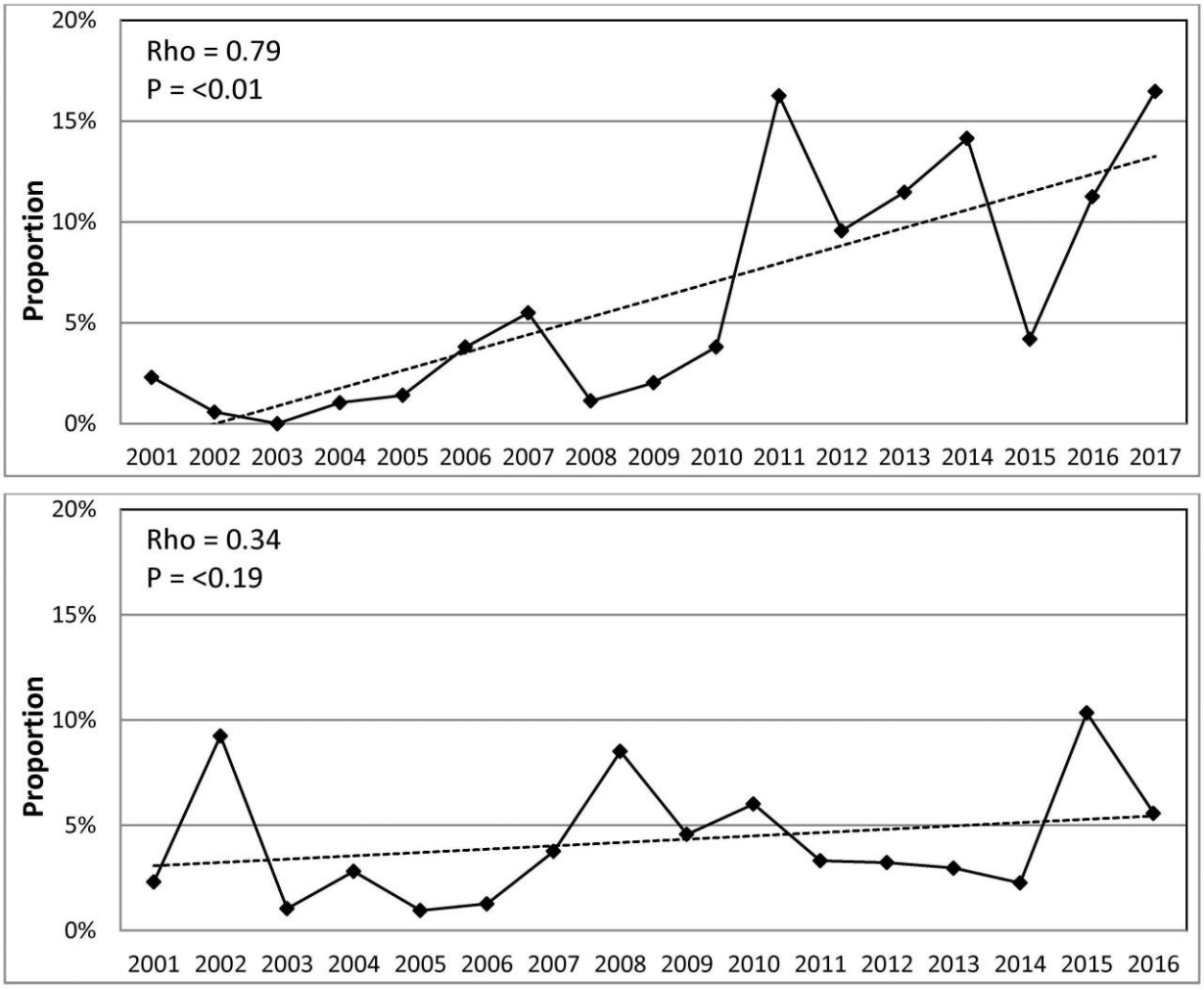
Table 3-7. Whooping Crane Use of the Program's Associated Habitat Reach (Lexington to Chapman) Along the Central Platte River (2001–2017)

Year	Number Observed within the AHR during the Spring Migration Season	Number Observed within the AHR during the Fall Migration Season	January Population Size at the Aransas National Wildlife Refuge	Proportion Observed within the AHR during the Spring Migration Season	Proportion Observed within the AHR during the Fall Migration Season
2001	4	4	174	2.30%	2.30%
2002	1	17	174	0.57%	9.24%
2003	4	2	184	2.17%	1.04%
2004	2	6	193	1.04%	2.80%
2005	3	2	214	1.40%	0.95%
2006	8	3	211	3.79%	1.27%
2007	13	10	237	5.49%	3.76%
2008	3	21	266	1.13%	8.50%
2009	5	12	247	2.02%	4.56%
2010	10	17	263	3.80%	6.01%
2011	46	9	283	16.25%	3.31%
2012	26	9	272	9.56%	3.23%
2013	32	9	279	11.47%	2.96%
2014	43	7	304	14.14%	2.26%
2015	13	34[1]	310	4.19%	10.33%
2016	37	24	329	11.25%	5.57%
2017	71	23	431	16.47%	NA

Source: Service 2017a

[1]Includes a 6-bird whooping crane group that was observed just downstream of the Chapman Bridge (i.e., outside the AHR).

Chart 3-18. Proportion of the Migrating Whooping Crane Population Observed Using the Program's Associated Habitat Reach (Lexington to Chapman) During the Spring (top) and Fall (bottom) Migration Seasons (2001–2017)



Source: Service 2017a
RHO=statistical dependence between the rankings of two variables
P=significance
Note: The fall of 2015 migration season includes a 6-adult whooping crane group that was observed just downstream of the Chapman Bridge (i.e., outside the AHR).

Service staff report that the actual number of whooping cranes using the central Platte River AHR during any one migration season is thought to be higher than those actually observed, based on results of recent decoy studies and an inability to perform the survey (flights) on many days throughout the migration season. From the spring of 2010 to spring 2017 a total of 1,222 survey flights were scheduled within the AHR to document the presence of whooping cranes; but only 76 percent were actually conducted. The others were cancelled because of inclement weather (Program 2018). Additionally, from the spring of 2010 to the spring of 2017 only 64 percent of a total of 149 decoys were randomly placed within the Platte River channels >100 meters wide during days when flights occurred of which only 64 percent were detected. Based on this information, Service staff believe that as many as half of the whooping cranes using the

Platte River as a stopover location may not be detected during their migration use of the Platte River as a stopover location.[1]

Proportions presented in **Table 3-7** were calculated as the number observed within the AHR during the migration season divided by the nearest annual Service population estimate obtained at the Aransas National Wildlife Refuge. Fall proportions are based on the subsequent year's population estimate.

Trends in whooping crane use of the central Platte River from spring 2001 to spring 2017 were analyzed for the Program. To account for the increase in the Aransas-Wood Buffalo population of migrating cranes that could potentially use the central Platte River, the proportion of the population using the central Platte River was determined (see **Chart 3-18**). Results of this analysis determined that the proportion of the crane population using the Program's AHR during the spring is increasing faster than the population overall; however, the fall use trend indicates use was only slightly increasing more than the overall crane population increase (see **Chart 3-18**).

Management Strategies for Developing and Maintaining Whooping Crane Habitat

The Program has two primary management strategies to achieve the objective of improving roosting and feeding habitat for whooping cranes during migration—MCM and FSM (Program 2017e). Presented below are the results of implementing these strategies and the associated performance monitoring and research issues investigated by the Program during the First Increment. Result summaries are in part extracted from the 2015 State of the Platte Report (Program 2017f). This report was prepared by and represents the opinions of the Program's Executive Director's office. Information presented below consists of a brief description of the issue, a summary of scientific findings, and notes on implications for the proposed extension.

Mechanical creation and maintenance. The MCM strategy focuses on ways to mechanically create and maintain both in- and off-channel habitats for whooping cranes. It includes channel widening through management activities (e.g., in-channel and bank-line vegetation removal), acquiring and restoring off-channel wetland habitat, and creating and preserving wet meadow habitat (Program 2017e). While the ability to mechanically create and maintain wide, open channels for whooping cranes has been clearly demonstrated, uncertainties remain regarding: 1) the most economical means of creating and maintaining these habitat types, and 2) the characteristics that influence whooping cranes to use these habitats (Program 2017e).

- Summary of scientific findings for MCM strategy (Program 2017f):
  - Locations that are mechanically maintained through herbicide application and disking have a higher probability of being a suitable width for whooping crane roosting.
  - Common reed is extremely erosion resistant; consequently, natural high flows are only sufficient to scour the very weakest individual plants.

[1]Matt Rabbe, Senior Wildlife Biologist, U.S. Fish and Wildlife Service, personal communication with EMPSi, December 2017.

  - The beneficial effects of mechanical management actions are largely limited to only the locations where they are implemented. These mechanical actions do not provide the system-scale beneficial effects typically associated with flow and sediment management actions.

- Anticipated program management actions for extension of the First Increment:
  - Herbicide application, disking, and mature tree removal are necessary at Program habitat complexes in most years to maintain suitably wide, open channel habitat.

Flow-sediment, mechanical. The FSM strategy is based on increasing and augmenting river flows to restore channel width and improve historical river channel conditions (i.e., a braided channel morphology with unobstructed channel width) and to improve sediment supply (Program 2017e). The FSM strategy is rooted in the view that the historical AHR once provided abundant stopover habitat conditions necessary for whooping crane survival and that the current conditions are insufficient to meet this need (Program 2017e); however, the difficulty of implementing these actions, particularly flow consolidation, because of regulatory permitting constraints and downstream flooding concerns, makes it challenging to implement this strategy (Smith 2011).

- Summary of scientific findings for FSM strategy (Program 2017f):
  - During wet years, the much greater magnitude and duration of natural peak flow events may eclipse any positive benefit of short-duration, high-flow managed releases.
  - Mechanical clearing and leveling are likely necessary to create suitable channel configurations and facilitate channel adjustments to changes in flow and sediment.
  - Mature common reed plants or plant patches that obstruct channel widening have a very low probability of being eroded at the highest flow magnitudes and velocities.
- Anticipated Program management actions for extension of the First Increment:
  - Data gathered by the Program suggests that implementation of the FSM strategy may not create or maintain suitable habitat for whooping cranes, although additional study is needed for a final determination.
  - Ongoing mechanical maintenance may be necessary to maintain suitable open channel habitat at Program complexes.

Additional Whooping Crane Habitat Issues

The two additional issues investigated by the Program during the First Increment related to creating and maintaining suitable stopover habitat for whooping cranes were: 1) the need to augment sediment in the river to maintain historical river conditions, and 2) additional knowledge on actual roosting habitat requirements.

Sediment augmentation. The Program has observed that portions of the central Platte River (south channel reach from the J2 Return to the Overton Bridge) is incising and narrowing because of degradation from clear-water hydropower returns (Program 2017f). This degradation has resulted in a portion of that reach transitioning from a wide, braided configuration into a narrow, wandering form, which is less suitable for whooping crane use. The prevailing hypothesis is that sediment augmentation is necessary to: 1) slow incision and narrowing, and 2) prevent degradation from progressing downstream (past the Overton Bridge).

- Summary of scientific findings for sediment augmentation (Program 2017f):
  - Narrowing and associated change in the south channel results in a channel configuration that is not suitable for use by the Program's target species, including whooping cranes.
  - In absence of sediment augmentation to offset the south channel deficit, incision and narrowing would progress downstream past the Overton Bridge and negatively affect habitat suitability at the Program's Cottonwood Ranch complex.
  - Augmentation of 80,000 tons of sand annually downstream of the J2 Return should be sufficient to allow the benefits of augmentation to be evaluated.
- Anticipated Program management actions for extension of the First Increment:
  - If the south channel sediment deficit persists, incision and narrowing will progress downstream past the Overton Bridge, negatively influencing migrating whooping crane habitat suitability for an increasingly larger portion of the AHR.
  - Full-scale sediment augmentation may be effective in halting the long-term trend of incision and narrowing. The beneficial effects of augmentation need to be assessed through 5 to 7 years of implementation and effectiveness monitoring. (Note: This activity started in the fall of 2017.)
  - Measuring augmentation effectiveness would require an assessment of changes (or lack thereof) in channel slope, volume, width, and bed material and will be challenging to quantify.

Whooping crane habitat selection. The Program's goal of providing suitable habitat conditions for whooping cranes was studied during the First Increment to: 1) analyze in-channel habitat selection by whooping cranes in the central Platte River, and 2) assess trends in whooping crane habitat use (Howlin and Nasman 2017). Program researchers monitored whooping crane group use in the central Platte River through daily systematic aerial surveys during spring and fall migrations. Study results, which provide information that can be used in determining habitat characteristics associated with the highest selection ratios by whooping cranes, will help to inform future management actions implemented under the Program during the proposed extension of the First Increment (Howlin and Nasman 2017).

- Summary of scientific findings for habitat selection (Program 2017f):
  - Whooping cranes prefer unobstructed channels of widths of approximately 600–700 feet and unforested corridor widths of approximately 1,100 feet.
  - During the day, whooping cranes use cornfields close to the previous night's roost with limited potential for human disturbance (Howlin and Nasman 2017).
  - Habitat availability (wide unobstructed sections of river at suitable depth) increased during the First Increment. As a result, overall use of the central Platte AHR has increased (more in the spring than in the fall).
  - During the day, whooping cranes are more likely to choose riverine habitat over corn cover and choose corn cover more than grassland, soybean, and wet meadow cover (Howlin and Nasman 2017).
- Anticipated program management actions for extension of the First Increment:
  - Based on the findings of the habitat selection analysis, the Program should continue to provide unobstructed channel widths that are ≥600 feet and unforested channel widths that are ≥1,100 feet.

During implementation of the First Increment, a companion study was conducted to collect information regarding the characteristics of crane nocturnal roost sites, information that until recently has been limited and largely based on incidental observations (Pearse et al. 2017). The study was designed to characterize sites used by cranes as either roost or day-use sites to assist the Program in designing more suitable habitat. Data for the study were collected from radio-tagged whooping cranes at 504 roost sites and 83 day-use sites in Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, and Montana (Pearse et al. 2017).

An important determination from this study is that the habitat criteria thresholds for roost sites initially conceived by the Program are different from those used by cranes over a large portion of their migration route. The study found that whooping cranes are apparently able to tolerate a wider range of habitat conditions than those initially used by the Program to develop the habitat criteria thresholds. The one exception was the Program's metric for distance to the nearest disturbance feature; the collected data suggested whooping cranes are less tolerant than the Program's criteria thresholds (Pearse et al. 2017).

The information discussed in the paragraph above represents new scientific learning, currently undergoing review for publication, that would be presented to the Governance Committee for action during the extension of the First Increment, with regard to altering habitat criteria thresholds. Once this new information has been presented, the Governance Committee could consider whether changes to the metrics are warranted or that, despite new information, the habitat criteria and metrics are still appropriate.

Incidental Take

The total allowable take of whooping cranes that would remove an individual from the population is one individual during the 13 years of the First Increment from monitoring and research activities. As of November 30, 2017, the Program has not resulted in take (e.g., lethal,

crippling, harm, or harassment,) of any whooping cranes (Program 2017g). Given the programmatic nature of the Program and the associated BO, if an individual measure of allowable take for whooping cranes were exceeded, consultation under the ESA would begin on that aspect of the federal action resulting in that take, rather than the federal action as a whole.

3.8.3 Impacts from the Proposed Action

One of the goals of the International Whooping Crane Recovery Plan is to ensure the protection of key stopover locations along the Central Flyway because they have the highest use by whooping cranes (Service 2007). The string of protected areas along the north-south migration route assists the species by decreasing the distance between stopover locations. Cranes use these stopover habitats to meet their immediate needs for food and rest and can spend up to several days while waiting for appropriate weather conditions to continue their migration (Service 2007). The central Platte River is one of these protected stopover locations. Protecting stopover habitat and reducing mortality are critical to achieving the objectives of the International Whooping Crane Recovery Plan. An important element of this plan is to maintain and enhance critical habitat along the central Platte River.

Extension of the Program's First Increment would allow continued improvement and enhancement of habitat for whooping crane use of the central Platte River as a stopover location. Habitat improvement would also accommodate an increasing Aransas-Wood Buffalo whooping crane population by meeting the growing demand for suitable roosting and feeding habitat. Extending the First Increment would contribute to achieving the primary goal of the International Whooping Crane Recovery Plan—to allow the overall whooping crane population to reach a level of ecological and genetic stability so that it can be reclassified to threatened status (Service 2007). A study completed in 2015 (Pearse et al. 2015) found a large portion of the whooping crane migration range is under some measure of land protection (27 percent). Continuation of the Program helps to maintain this level of protection.

All the First Increment habitat management efforts implemented to benefit whooping cranes would continue under the extension. These efforts include, but are not limited to, removing trees and bank-line disking to increase unobstructed view widths, channel disking and widening to increase unobstructed channel widths, and releasing flows and augmenting sediments to improve habitat conditions related to increasing river braiding and areas of suitable depth for whooping crane roosting. Continued purchase or lease of additional lands bordering key roosts would protect these sites from human disturbance and provide additional wet meadow habitat that supplies an important source of food for the growing whooping crane population. Continuation of the Program's adaptive management approach would allow data gaps to be filled with new knowledge and creation of improved habitat conditions both in-channel and off-channel for whooping cranes.

When all the Program elements are implemented, should the First Increment extension be approved, these elements may affect, and are likely to adversely affect, whooping cranes and their designated critical Platte River habitat (see **Appendix A**). A summary of these potential adverse impacts on whooping cranes, including water management activities, are as follows:

- Decrease in late spring river elevations and peak flow in the wettest years that would negatively affect groundwater elevations that sustain wetland habitats and crane food sources
- Decrease in short-duration peak flows that create overbank flows into wet meadows and facilitate surface water connections between meadows
- Changes to system hydrology that further decrease and negatively affect the river's natural sediment transport processes

Given Program monitoring and research and that land restoration and management would continue at existing or higher levels, the Service anticipates adverse impacts are likely from these activities. No incidental take was documented for whooping crane from these activities during the First Increment; nevertheless, the adverse impacts anticipated in the 2006 Final EIS (Reclamation and Service 2006) and the 2006 BO (Service 2006) are expected to continue for the extension of the First Increment, at levels previously described in the BO. These adverse impacts are lethal or crippling harassment, due to land management, restoration, monitoring and research activities, that could cause take.

The whooping crane would be affected beneficially from the increased availability of suitable stopover habitat. This would come about as the Program continues to mechanically develop suitable roosting habitat and acquire and restore blocks of land to protect cranes from human disturbance. This would be combined with natural improvements to the riverine processes that contribute to improved habitat conditions.

Following is a summary of potential beneficial impacts on whooping cranes by extending the First Increment:

- Increase in the amount and distribution of wide channels for roosting in deteriorated (i.e., narrowed) sections of the river
- Increase in the ability to sustain restored riverine habitats upstream of Kearney, Nebraska, by mechanically adding sediment
- Increase in the amount of grasslands and wet meadows available for crane foraging
- Minor increase in early-spring (mid-February to mid-March) water surface elevations in normal years to potentially improve groundwater levels and related improvements in wetlands maintenance during years with normal river flows (would generally benefit the lowest and wettest meadows)
- Increase in the length of stream bank and adjacent land area protected to minimize disturbance

Given the science to date on sediment, the Service believes the sediment deficit issue is highly correlated to the J-2 return. It anticipates that Program sediment augmentation at the J-2 return may reduce further adverse impacts at that location, preventing some of the adverse impacts on the river's natural transport processes.

Cumulative Effects

Cumulative effects include effects of future state, local, or private (nonfederal) actions that are reasonably certain to occur within the area of analysis. Two areas of concern related to cumulative impacts for whooping crane stopover habitat are construction of utility infrastructure (distribution and high-voltage transmission lines) and increased human disturbance.

Utility infrastructure, such as high-voltage electric transmission lines and wind farms consisting of numerous wind turbines, are scheduled to be constructed within the Central Flyway throughout Nebraska. This utility infrastructure poses an ongoing threat to migrating whooping cranes and represents the primary source of mortality for this species during migration. An estimated 80 percent of whooping crane mortality may occur during migration and primarily results from collisions with utility infrastructure (blades of wind turbines and shield wires associated with transmission lines) (Stehn and Strobel 2011).

Disturbance of roosting and feeding whooping cranes associated with human interaction, particularly associated with recreational activity, can increase stress to individual cranes and increase migration mortality.

Extension of the Program's First Increment would allow continued improvement and enhancement of habitat for whooping crane use of the central Platte River as a stopover location. Habitat improvement would also accommodate an increasing Aransas-Wood Buffalo whooping crane population by meeting the growing demand for suitable roosting and feeding habitat.

3.8.4 Impacts from the No Action Alternative

Selection of the No Action Alternative would put at risk the ability of the central Platte River to provide suitable stopover habitat for migrating whooping cranes and keep pace with the increasing Aransas-Wood Buffalo population. Elimination of the following Program elements would decrease available habitat for migrating whooping cranes and increase mortality, jeopardizing the recovery of this iconic species:

- The spread of common reed would go unabated and reduce the amount of open channel habitat along the Platte River, negatively influencing potential whooping crane roosting areas for a large portion of the AHR.
- South channel sediment deficit would persist, and incision and narrowing would progress downstream past the Overton Bridge, negatively influencing migrating whooping crane habitat suitability for an increasingly larger portion of the AHR.
- Locations that have historically been mechanically maintained through herbicide application and disking would no longer be managed to provide roosting habitat.
- Flow protection and enhancement that aids in maintaining or providing suitable roosting habitat would decrease or be eliminated.

Whooping cranes require two basic ecological needs at stopover locations during their migration: food and a resting place safe from natural predators and disturbance. The central Platte River has historically filled both needs. Because most deaths of whooping cranes occur during migration, mortality may be linked to the quality and/or quantity of stopover habitat. While the annual migration of whooping cranes only involves 20 percent of their annual cycle, up to 80 percent of

yearly mortality may occur during this period (Stehn and Strobel 2011); however, a recently completed whooping crane telemetry study suggests, based on a relatively small sample size, that mortality during migration may have been previously overestimated.

If the Platte River were no longer able to meet the increasing demand for suitable roosting and feeding habitat, whooping cranes would most likely shift their stopovers to other habitats in Nebraska; however, in 2005, a scientific committee of the National Research Council (NRC) determined that few, if any, suitable alternatives are available in Nebraska to replace the central Platte River in its function as stopover habitat for migrating whooping cranes (NRC 2005). Generally, about 7 percent, but up to 16 percent (2017 Service database), of migrating whooping cranes were documented using the central Platte River as a stopover location during an individual migration season; however, there was and still is great fluctuation from year to year (NRC 2005); however, an unknown additional number are likely using the Platte River but are undetected.

The NRC concluded that the loss of the Platte River habitat "…would have potentially serious consequences for the species" and further stated that if mortality were to increase by only 3 percent (which the committee felt was a likely scenario if the Platte River habitats should become unavailable), the entire migrating population would likely become unstable. Thus, implementing the No Action Alternative could contribute to increased mortality and an unstable whooping crane population because of the central Platte River's inability to accommodate an increasing Aransas-Wood Buffalo migrating population.

The Service has developed a numerical grading system for gaging the recovery potential of endangered species and has assigned a rating of 2C (i.e., high degree of threat and high recovery potential) for the whooping crane. While threats to the whooping crane population are currently high, the management techniques outlined in the International Whooping Crane Recovery Plan have facilitated continued growth of the whooping crane population; however, not granting an extension for the Program's First Increment could jeopardize this species' recovery and change the recovery priority categorization to a 5C (i.e., high degree of threat and low potential for recovery; Service 2011).

The Program satisfies the ESA's "reasonable and prudent alternative to avoid jeopardy" for previously completed consultations for federal actions. The Program functions as an offsetting measure to previous actions and is required to provide benefits to target species (e.g., whooping crane). Without extending the First Increment, if a state continues to carry out the responsibilities it had under the Program, such actions would be sufficient to provide ESA compliance with respect to all water-related activities in that state until any reinitiated consultations have been completed.

In addition, to the extent the states respective contributions of cash, water (through the initial Program water projects), and land continue to benefit the target species beyond termination of the Program, the states would retain the right to argue that such future benefits resulting from their contributions should be considered in any reinitiated consultations.

However, if the Program dissolves and the states do not continue to carry out their responsibilities under the Program, each water project or activity in the basin that required

federal approval, permitting, or funding would be required to undergo separate ESA Section 7 consultation. Also, separate mitigation measures would be implemented.

Without extension of the First Increment, implementation of the Program's AMP would terminate. The adaptive management program provides for collaborative monitoring and research of habitat restoration efforts, which, in turn, allows for scientific evaluation of actions and improvement of those actions through an adaptive management approach. The commitment of all Program parties to an adaptive management approach means that the Program's effectiveness can be increased as more knowledge and experience are gained. This cooperative effort would not occur if the No Action Alternative were to be selected and separate ESA consultations would be initiated.

The scientific community recognizes the importance and benefits of long-term monitoring to reach conclusions about whooping crane use of the central Platte River. Because of the annual fluctuations in hydrological conditions and whooping crane use of the river, trends of only a few years are not likely to be as informative as long-term (dozens of years) trends that are monitored and analyzed. These data and new understandings are needed to improve analyses and understandings of whooping crane habitat requirements. Selection of the No Action Alternative would not allow these long-term data to be collected so that data gaps could be filled regarding habitat needs and would decrease the effectiveness of the designated critical habitat along the central Platte River.

Cumulative Effects

As described above under the Proposed Action *Cumulative Effects* section, other actions can impact whooping crane stopover habitat (e.g., construction of utility infrastructure) and disturb roosting and feeding whooping cranes due to increased human disturbance. Not extending the Program's First Increment would put at risk the continued improvement and enhancement of habitat for whooping crane use of the central Platte River as a stopover location, and the habitat necessary to accommodate an increasing Aransas-Wood Buffalo whooping crane population by not meeting the growing demand for suitable roosting and feeding habitat.

3.9 Piping Plovers and Interior Least Terns

3.9.1 Affected Environment

This section serves two purposes: first, it describes the affected environment of the interior least tern and piping plover and documents potential effects of implementing the Proposed Acton and No Action Alternative for NEPA documentation purposes. Second, this section also meets the needs of a BA under the ESA; therefore, this section has been organized to provide a description of the species status and critical habitat, document baseline conditions, and communicate potential environmental effects. Potential cumulative effects are also described at the end of the section. Because this section evaluates potential impacts on two protected

Source: Nebraska Game and Parks Commission
*Interior least tern (*Sternula antillarum*)*

species, the species status and critical component is separated into two parts to accommodate both species.

Status of Least Tern and Critical Habitat

The interior least tern was listed as endangered in 1985; no critical habitat was ever designated for this species. In the initial listing, the interior population was defined as any least tern that nested more than 30 miles from the coast. On September 19, 1990, the Service approved the recovery plan for interior least terns. The recovery plan estimated the interior least tern population at 5,000 adults (1990) and established a recovery goal of 7,000 adults. This level would need to be maintained for 10 continuous years before the species could be considered for delisting. In 2006, Lott reported a population of 17,591 adult least terns in 2005 from 489 colonies in 68 distinct geographic locations (Lott 2006).

In 2013, the Service completed a 5-year status review and recommended delisting the interior least tern because of its biological recovery. The Service is in the process of establishing conservation agreements, population models, and range-wide monitoring plans in hopes of moving forward with a delisting soon (Service 2017b).

Distribution. The interior least tern historically bred along the Mississippi, Missouri, Arkansas, Red, Rio Grande, and Ohio River drainages. The range extended from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana (Service 2006). While the interior least tern continues to breed in most of its historical breeding range, its distribution is generally restricted to less-altered river segments (Service 2006). Least terns are believed to winter primarily along coastal areas adjacent to the Pacific and Atlantic Oceans.

Life history. The interior least tern is the smallest member of the tern family, measuring approximately 8 to 9 inches in length. The least tern has a black “crown” on its head, a white underside and forehead, grayish back and wings, orange legs, and a yellow bill with a back tip (Service 2006). Least terns arrive at breeding areas from late April to early June and typically spend 4 to 5 months at their breeding sites (Service 2006). Least terns nest in colonies, and the distance between nests varies widely. The nests can be as close as a few feet or widely scattered. Nests are generally shallow and inconspicuous depressions in an open sandy or gravel area. Small stones or twigs are usually nearby.

Egg laying begins in late May, and incubation generally lasts 20 to 25 days (Service 2006). Fledging occurs 3 weeks after egg hatching. Both juveniles and adults leave the nesting colonies by early September for their wintering grounds.

Nesting habitat. Least terns are colonial, and their preferred nesting habitat is open, sparsely vegetated sand and gravel substrates that can be used for both nesting and brood rearing. Historically, least terns made extensive use of sandbar habitat along major rivers (Service 2006). Interior least terns nest on the open ground near shallow water feeding areas. Other nest sites used by the least terns include dry alkali lakes, sandpits, industrial ponds, and gravel mining operations.

Diet. The least tern forages for fish in shallow water (e.g., the Platte River floodplain). Typical prey species include the emerald shiner (*Notropis atherinoides*) and sand shiner (*Notropis*

stramineus; Service 2006). The least tern catches food in its bill by swooping down to the water surface or by diving. It frequently hovers prior to diving.

Threats. The 1988 Least Tern Recovery Plan lists the loss of riverine sandbar habitat as the central threat to least terns; however, the species has proven to be resilient to the loss of this habitat type.

Climatic conditions that influence Platte River hydrology are a major factor influencing the quality of least tern nesting habitat throughout the basin. During periods of high rainfall, sandbars are scoured, which replenishes sand and removes vegetation, and new sandbars are created. During periods of drought, spring flows that form and maintain sandbars are reduced or absent. During these low-flow periods, vegetation increases on sandbars, reducing their quality for nesting terns.

Summer temperatures are projected to potentially increase, by 5°F to more than 10°F, by the end of the century. This will depend on future emissions from fossil fuel sources across the range of the least tern. Northern areas of the Great Plains are projected to experience a wetter climate by the end of this century. Most references agree that there will be less mountain snowpack accumulation and more winter precipitation falling as rain and that stream flows will increase in the future. Across the U.S. range of the piping plover and least tern, spring precipitation is expected to increase between 0 and 15 percent under a lower emissions scenario and between 0 and 40 percent under a higher emissions scenario. This shift in temperature and moisture could have negative impacts on piping plover and least tern nesting habitat. This would depend on wet-dry cycles to keep habitat clear of vegetation (Corps 2016).

Additionally, changing precipitation patterns, such as the timing of rainfall and snowmelt, are expected, with rain occurring later in the year and snowmelt occurring earlier in the spring. Extremes in climate, such as flooding and droughts, are expected to increase in magnitude in the future. This will magnify periods of wet or dry weather and will result in longer, more severe droughts and larger, more extensive flooding. The potential for an increase in floods could create nesting habitat, and an increase in droughts could expose more habitat. These conditions could be beneficial, because of the increased nesting habitat from flood-deposited sandbars and an increase in exposed sandbars under drought conditions (Corps 2016). Remaining threats are regional (e.g., water table and flow declines) and local (e.g., predation, vegetation encroachment on breeding and wintering habitat, and human disturbance). Natural disasters, such as floods and droughts, can also affect least tern nesting success.

Status of Northern Great Plains Piping Plover and Critical Habitat

The Northern Great Plains population of the piping plover was listed as threatened in January 1986. Critical habitat was designated on the Northern Great Plains piping plover breeding grounds in September 2002 (Service 2015a), and critical habitat was designated for all populations of piping plovers on the wintering grounds in 2001 and re-designated in 2008 and 2009 (Service 2015a). In 2009, the Service completed a 5-year status review of the piping plover and recommended retaining its classification of threatened (including the three states within the Program study area). The review indicated that while the piping plover's population has increased, numbers remain below the recovery goals established in the 1988 recovery plan (Service 2009a).

Every 5 years, an International Piping Plover Census is conducted for both the breeding grounds and wintering grounds. This census began in 1991 (Service 2015a), and results of the first census in the Northern Great Plains Region observed 3,469 adults. A population decline was observed during the next 2 census years with 3,286 birds in 1996 and 2,953 in 2001; however, this downward trend was dramatically reversed in 2006 when 4,662 adults were counted. Because of the extreme flooding in 2011, only 2,249 adults were observed in the Northern Great Plains.

Source: Service
*Piping plover (*Charadrius melodus*)*

Distribution. Piping plovers generally breed in three distinct regions of North America: 1) along the Atlantic coastline from South Carolina to Newfoundland, 2) along the shorelines of the Great Lakes, and 3) in wetlands and along rivers of the Northern Great Plains (Service 2006). The breeding population of the Northern Great Plains piping plover extends from Nebraska north along the Missouri River through South and North Dakota into Montana and Canada. Wintering grounds for the species include the south Atlantic coastline, the Gulf Coast from Florida to Mexico, and the Caribbean.

Life history. The piping plover is a small migratory shorebird with an average body length of 6 to 7 inches (Service 2006). Throughout the year, adults have sand-colored upper bodies, white undersides, and orange legs. Piping plovers only spend a short portion of their lives on their breeding grounds (e.g., Platte River), and those that breed in the Great Plains typically winter along the Gulf Coast from Florida to Texas.

Piping plovers arrive at the breeding grounds in early April, and courtship and nesting begin in mid-late April (Service 2006). Male birds create a shallow depression on the ground that both adults line with small pebbles. The average clutch size is four eggs. Incubation duties last approximately 25 to 28 days and are shared by both adults. Hatching begins in late May to early June and generally peaks in June to early July. Chicks fledge 25 to 29 days after hatching. Piping plovers generally only raise one brood during the nesting season, but will re-nest if the earlier nest fails. By July thru August, piping plovers begin the fall migration with adults leaving first followed by the juveniles a few weeks later (Service 2006).

Nesting habitat. Piping plovers are semi-colonial, and their breeding habitat preference is for open, sparsely vegetated sand and gravel substrates that can be used for both nesting and brood rearing. Historically, piping plovers made extensive use of sandbar habitat along major rivers (Service 2006). While much of the historically used areas have been altered by impoundments and hydrologic alterations, piping plovers still nest on rivers in many areas. While data suggest that habitat use of plovers is dynamic (Service 2006), alkali reservoirs and wetlands associated with the Prairie Pothole Region appear to support a large portion of the Great Plains piping plover population (Service 2006). Remaining nest sites used by the piping plover include dry alkali lakes, sandpits, industrial ponds, and gravel mining operations. Open, wet, sandy areas

provide feeding habitat for the birds on river systems and throughout most of the bird's nesting range (Service 2006).

Diet. The piping plover has been observed feeding on a variety of invertebrates, including worms, fly larvae, beetles, grasshoppers, crustaceans, and mollusks. Fecal evidence suggests that the piping plover selects prey at roughly the same rate as its availability (Service 2015a).

Threats. Reservoirs, channelization of rivers, and modification of river flows have been identified in the 2016 Draft Piping Plover Recovery Plan as major continuing threats because they reduce sandbar riverine habitat, increase flooding of remaining breeding habitat during the nesting season, and promote vegetation growth on sandbars seldom scoured by high flows (Service 2015a).

Predation by birds and mammals is also a major threat to piping plover productivity throughout the species' breeding range. Predation reduces egg-to-chick survival and chick-to-fledgling survival with the more mobile and experienced adults facing a much smaller impact. Predation has also been observed to be more prolific when habitat is limited, and nest densities are higher.

Climatic conditions influencing the quality of piping plover nesting habitat are similar or the same as those described previously for the least tern.

3.9.2 Environmental Baseline

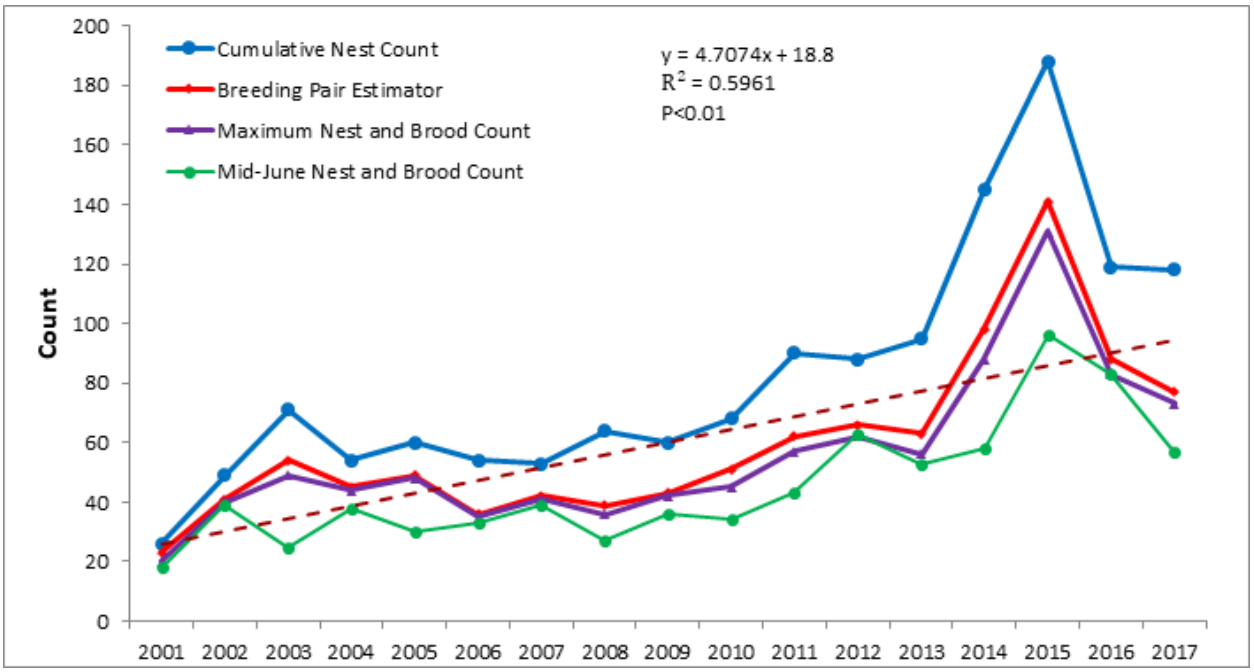
Presented below is a baseline description of conditions within the central Platte River AHR for the least tern and the piping plover. These topics are combined for both species. Topics discussed include:

- Breeding pair counts
- Nesting success
- Sandbar habitat creation
- Availability of suitable nesting habitat
- Habitat selection and use
- Forage habitat availability (least tern)
- Incidental take

Breeding Pair Counts

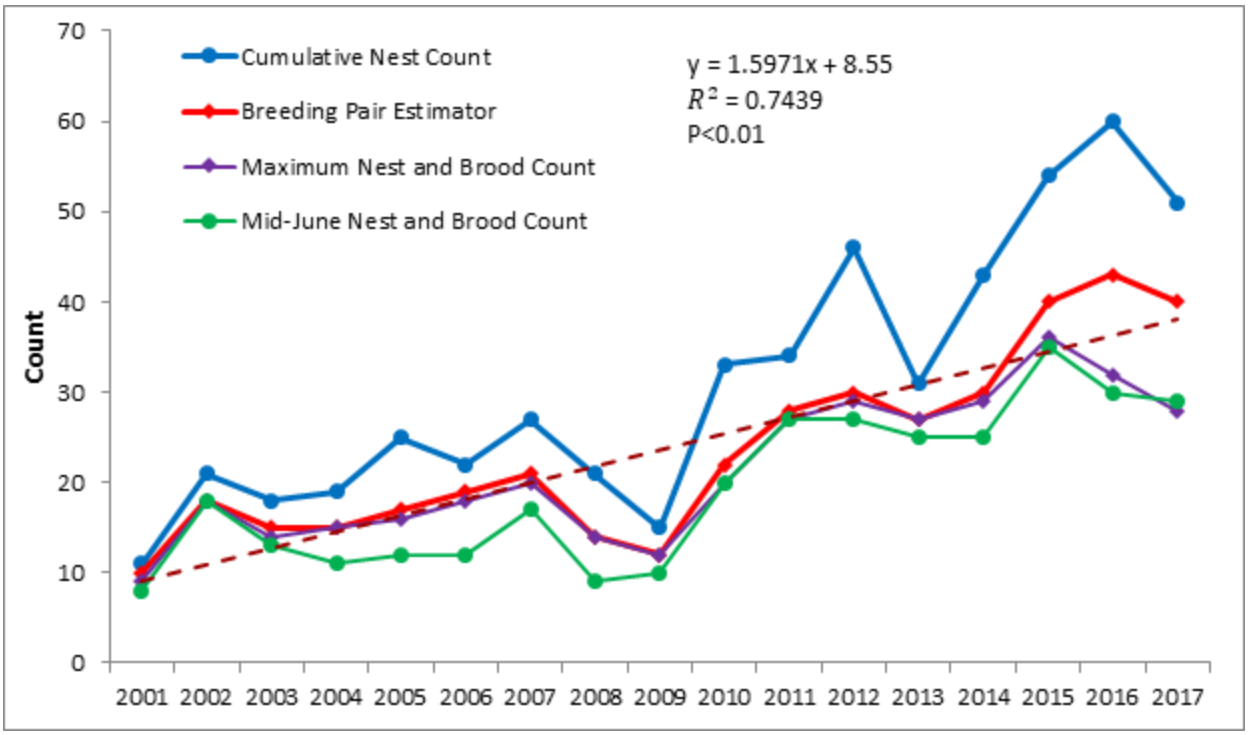
The total number of breeding pairs of least terns and piping plovers has increased for both species during the First Increment of the Program (**Chart 3-19** and **Chart 3-20**). In 2016, a total of 88 breeding pairs of terns and 43 breeding pairs of plovers was observed in the AHR. Piping plover breeding pair counts increased slightly from 2001 to 2007, declined during 2008 and 2009, and have increased since that time. The Program observed a decrease in least tern breeding pairs in 2016; however, these counts are still above the counts during the years prior to Program implementation. Though nesting has occurred on riverine sandbars and has an increase during 2015, off-channel sandpits have provided the most consistent nesting habitat for both species.

Chart 3-19. Least Tern Breeding Pair Counts on the Central Platte River AHR (2001-2016)



Source: Keldsen and Baasch 2016
y=regression
R^2=coefficient of determination
P=significance

Chart 3-20. Piping Plover Breeding Pair Counts on the Central Platte River AHR (2001-2016)



Source: Keldsen and Baasch 2016
y=regression
R^2=coefficient of determination
P=significance

Nesting Success

As can be gleaned from **Table 3-8**, **Table 3-9**, **Chart 3-21**, and **Chart 3-22**, nesting success for the least tern and piping plover has been on a steady increase since implementation of the First Increment in 2007. Not only have nest, chick, and fledgling counts increased greatly (primarily because of off-channel availability), but hatch ration has increased, while fledglings ratios have remained steady.

Sandbar habitat creation. The Program has two primary management strategies to achieve the objective of developing nesting habitat for least turns and piping plovers—MCM and FSM (Program 2017f). The MCM strategy focuses on ways to mechanically create and maintain both in- and off-channel habitats for the least tern and piping plover. It includes channel widening through management activities (e.g., on-channel and bank-line vegetation removal), acquiring and restoring off-channel wetland habitat, and creating and preserving wet meadow habitat (Program 2017f). The FSM strategy is based on increasing and augmenting river flows to restore channel width and improve historical river channel conditions (i.e., a braided channel morphology with unobstructed channel width) and to improve sediment supply (Program 2017f).

Table 3-8. Summary of Least Tern Reproductive Success at Off-Channel and On-Channel Nesting Sites on the AHR Portion of the Central Platte River in Nebraska (2007–2016)

Reproductive Parameter	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Adults Observed	132	80	97	123	125	116	136	166	224	157
Breeding Pairs	39	37	42	53	60	64	58	98	141	88
Total Nests	53	64	60	76	90	88	95	145	188	119
Successful Nests (at least one egg)	22	27	37	43	52	63	51	80	116	74
Apparent Nest Success	0.42	0.42	0.62	0.57	0.58	0.72	0.54	0.55	0.62	0.62
Chicks Observed (less than 15 days)	50	54	71	105	124	144	118	180	258	170
Hatch Ratio (Chicks/Nest)	0.94	0.84	1.18	1.38	1.38	1.64	1.24	1.24	1.37	1.43
Fledglings (21 days)	—	—	—	64	89	84	64	91	146	80
Fledge Ratio (21-day Chicks/Nest)	—	—	—	0.84	0.99	0.95	0.67	0.63	0.78	0.67

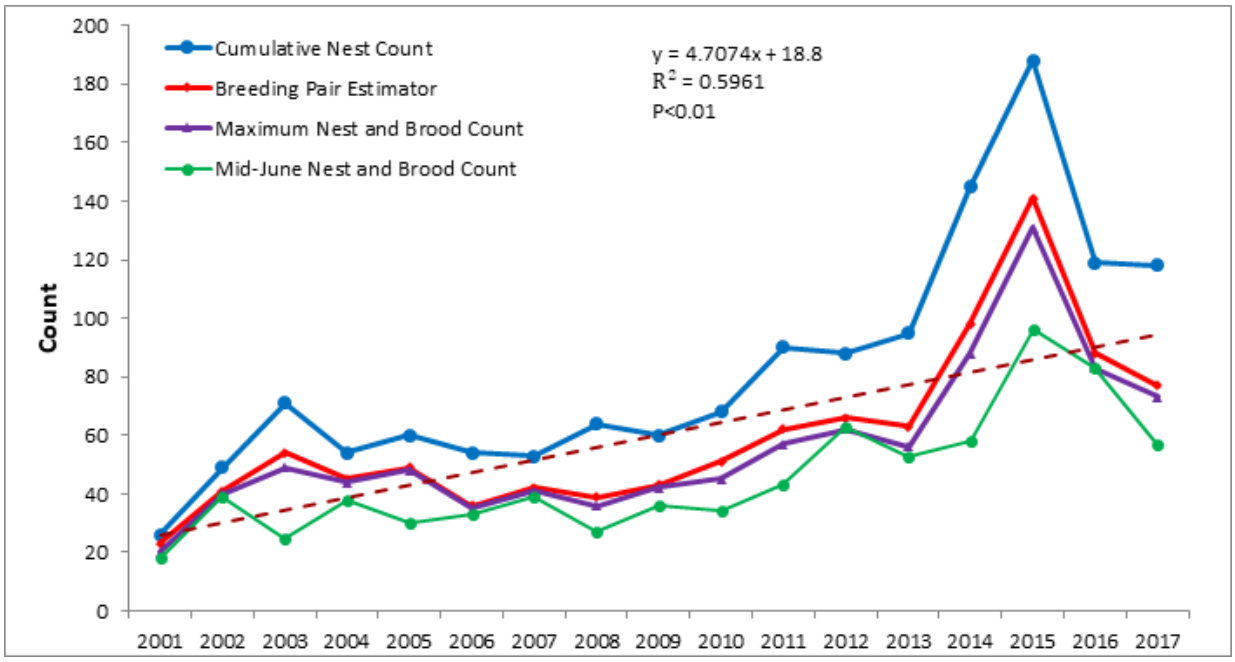
Source: Keldsen and Baasch 2016
Note: — indicates these data were not reported.

Table 3-9. Summary of Piping Plover Reproductive Success at Off-Channel and On-Channel Nesting Sites on the AHR Portion of the Central Platte River in Nebraska (2007-2016)

Reproductive Parameter	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Adults Observed	52	23	31	46	55	60	68	69	74	64
Breeding Pairs	19	13	12	20	27	30	27	30	39	43
Total Nests	27	21	15	33	34	46	31	43	54	60
Successful Nests (at least one egg)	15	8	9	21	27	32	23	34	34	40
Apparent Nest Success	0.56	0.38	0.60	0.64	0.79	0.70	0.74	0.79	0.63	0.68
Chicks Observed (less than 15 days)	44	26	27	76	87	99	80	116	119	120
Hatch Ratio (Chicks/Nest)	1.63	1.24	1.80	2.30	2.56	2.15	2.58	2.70	2.2	2.00
Fledglings (28 days)	—	—	—	42	45	59	28	55	52	55
Fledge Ratio (28-day Chicks/Nest)	—	—	—	1.27	1.32	1.28	0.90	1.28	0.96	0.92

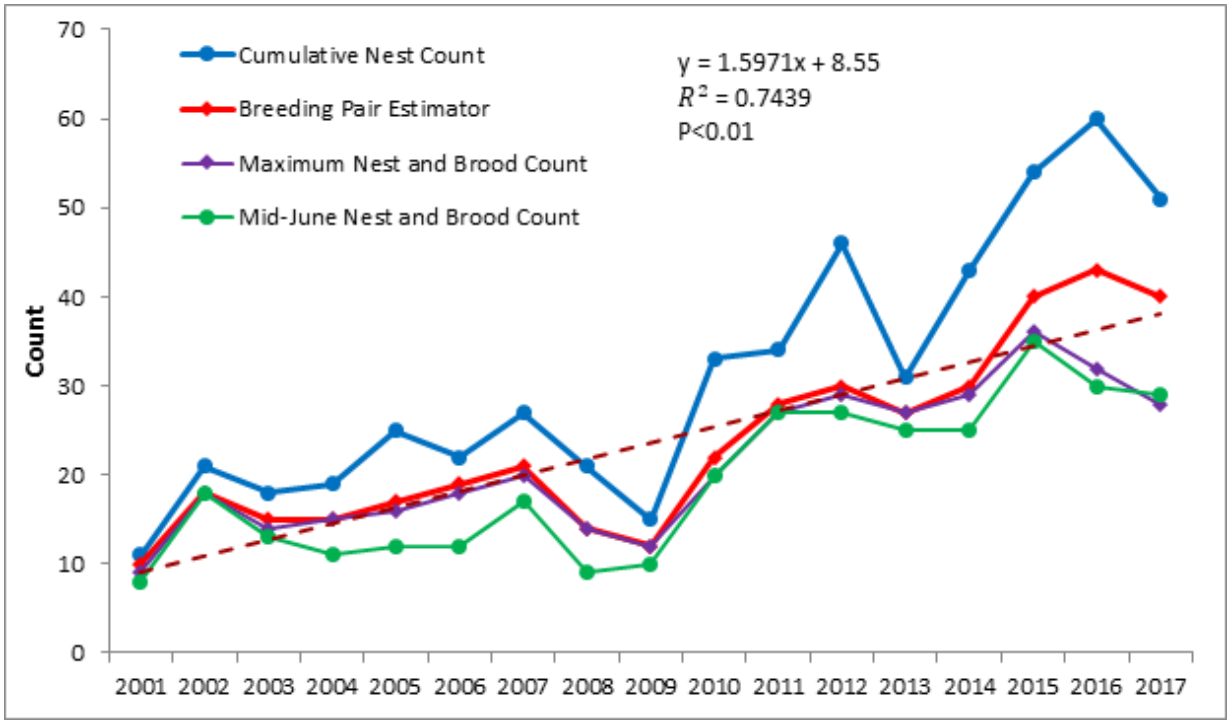
Source: Keldsen and Baasch 2016
Note: — indicates these data were not reported.

Chart 3-21. Comparison of Numbers of Least Tern Cumulative Nests, Program-Defined Breeding Pairs, Maximum Nest and Brood Quantities, and the Mid-June Nest and Brood Quantities Observed within the Program AHR (2001–2016)



Source: Keldsen and Baasch 2016
y=regression
R^2=coefficient of determination
P=significance

Chart 3-22. Comparison of Numbers of Piping Plovers Cumulative Nests, Program-Defined Breeding Pairs, Maximum Nest and Brood Quantities, and the Mid-June Nest and Brood Quantities Observed within the Program AHR (2001-2016)



Source: Keldsen and Baasch 2016
y=regression
R^2=coefficient of determination
P=significance

The FSM strategy is rooted in the view that the historical AHR once provided abundant emergent sandbar nesting habitat for the least tern and piping plover and that the current conditions are insufficient to meet this need. Targeted short-duration, high-flow releases are one component of the FSM strategy; however, one of the original hypotheses to be tested under the Program during the First Increment was whether these targeted short-duration, high-flow releases would produce suitable habitat for least terns and piping plovers on an annual or nearly annual basis. While the Program has not been able to implement short-duration, high flow releases, learning from natural events and success of tern and plover reproduction on both the river and off-channel has helped to inform the Program on how to provide suitable habitat and increase tern and plover productivity.

- Summary of scientific findings for sandbar habitat creation (Program 2017f):
  - The original analysis of targeted high-flow release performance assumed sandbars would be built to the water surface during peak flow events; the median height of sandbars formed during natural high-flow events in 2010, 2011, 2014, and 2015 was 1.2 to 2.3 feet below peak stage (Program 2016b).
  - Four peak flow events—in 2010, 2011, 2013, and 2014—exceeded the proposed short-duration, high flow releases in terms of magnitude and

duration, but did not produce sandbar habitat exceeding the minimum height criterion established under the Program.

  - Sandbars created by a full short-duration, high-flow magnitude of 8,000 cfs would be 0.5–1.0 foot lower than the minimum height criterion and would be inundated at flows experienced in the AHR during most nesting seasons.
  - A peak flow magnitude of 15,000 cfs of a sufficient duration would produce sandbars that exceed the minimum height criterion.
  - Even at a discharge magnitude of 15,000 cfs, the total suitable sandbar area would be well below the Program's adaptive management plan goal of 10 acres per river mile.

- Anticipated Program management actions for extension of the First Increment:
  - The Program intends to continue implementing alternative methods to mechanically create and maintain on- and off-channel nesting habitat for the piping plover and least tern during the proposed First Increment extension.

The Governance Committee has agreed to mechanically maintain up to 10 acres of on-channel habitat to ensure suitable habitat is available for the least tern and piping plover and to avoid releasing water solely for least tern/piping plover nest initiation. The Program's Governance Committee has used the knowledge gained, as discussed above, as information needed to inform the Program that flows in the range of short duration, high flow releases are unlikely to create the necessary nesting habitat for the least tern and piping plover as originally hypothesized.

Additionally, the frequency of flows believed to create on-channel nesting habitat (approximately 15,000 cfs) occurs infrequently enough that additional habitat creation and management actions are necessary to achieve the stated goals of improving habitat and reproductive success of terns and plovers; however, the Program is committed to implementing at least one field test of short-duration, high flow releases once the capacity to release 5,000 cfs is gained during the proposed First Increment extension. The Program's Governance Committee has agreed to implement management actions using information gained from naturally occurring high flows and has successfully implemented alternative tern and plover habitat creation.

Availability of suitable nesting habitat. The Program used the best available scientific data to aid in implementing actions that would increase the amount of tern and plover habitat available. For example, during the First Increment, the Program implemented management actions designed to increase nesting habitat (bare sand) and the reproductive success of least terns and piping plovers within AHR. These actions were conducted at on- and off-channel sites. Management activities have generally been site specific and have included using mechanical means, such as dozers, scrapers, and backhoes, to create nesting habitat; using mechanical actions, such as disking, removing trees, and mowing, to improve nesting conditions and remove vegetation cover; applying chemical herbicides during the spring or fall to kill or prevent the emergence of vegetation; and using fencing and trapping to control predators. The numbers of acres of constructed habitat by the Program and its partners annually for both off-shore and on-shore habitat are listed in **Table 3-10**.

Table 3-10. Constructed On- and Off-Channel Habitat in the AHR Within the Central Platte River by Year (2007−2016)

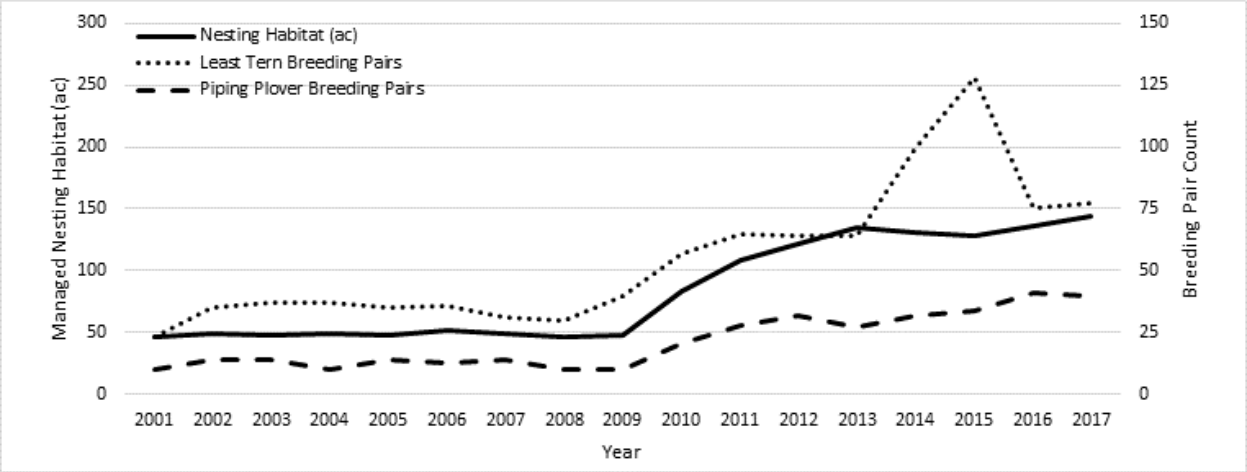
Year	On-Channel Habitat (Acres)			Off-Channel Habitat (Acres)		
	Program	Others	Total	Program	Others	Total
2007	0	24	24	0	48	48
2008	0	21	21	0	48	48
2009	0	15	15	0	48	48
2010	0	5	5	32	48	80
2011	0	5	5	60	48	108
2012	0	0	0	72	48	120
2013	55	0	55	72	48	120
2014	19	0	19	80	48	128
2015	47	0	47	90	48	138
2016	4	0	4	87	61	149
Mean	**12.5**	**7.0**	**19.5**	**48.8**	**49.9**	**98.7**

Source: Keldsen and Baasch 2016

- Summary of scientific findings for availability of suitable nesting habitat (Program 2017f):
  - Habitat availability (nesting habitat) has increased during the First Increment (see **Chart 3-23**). As a result, overall numbers of least tern and piping plover breeding pairs within the AHR have increased. This has corresponded to an increase in reproductive success (e.g., number of nests and fledglings). A high, positive correlation between least tern and piping plover breeding pair counts and habitat availability has been observed throughout the First Increment period. Program data also indicate that breeding pair counts have increased as habitat availability has increased.
  - Reproductive success, as measured by fledglings/breeding pairs, has remained high and generally above Program objectives for maintaining stable-to-increasing populations within the AHR.
  - A high correlation exists between habitat availability and breeding pair counts, and as the Program increases suitable off-channel nesting habitat, numbers of least tern and piping plover breeding pairs within the AHR should increase until habitat availability exceeds population demands.
- Anticipated Program management actions for extension of the First Increment:
  - The Program will continue to increase on- and off-channel habitat availability at agreed upon levels or until numbers of least terns and piping plovers within the AHR no longer continue to increase.

Because of Program efforts to increase available nesting habitat during the First Increment, least tern and piping plover populations on the central Platte River have increased proportionately to the increased habitat availability.

Chart 3-23. Least Tern and Piping Plover Use of Available Habitat (2001-2017)



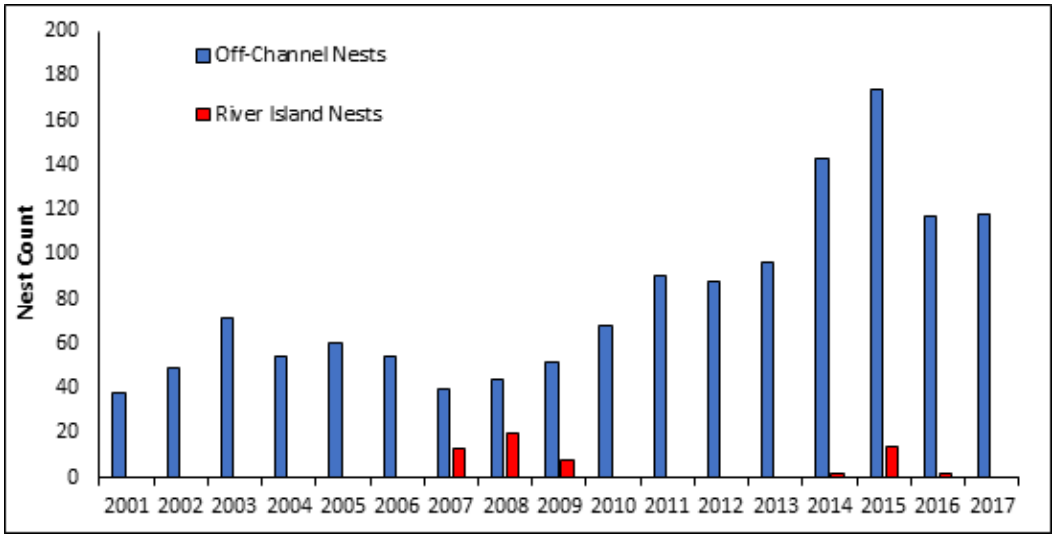
Source: Keldsen and Baasch 2016
Ac=acre

Habitat Selection and Use by Least Terns and Piping Plovers

During the First Increment, both suitable on-channel and off-channel habitat were created by the Program. Approximately 48 acres of managed off-channel nesting habitat were present in the AHR at the beginning of the First Increment (**Table 3-10**). The Program began acquiring and restoring off-channel sites in 2009, and the total off-channel habitat in the AHR increased to 138 acres during the period from 2009 through 2015 (Keldsen and Baasch 2016). The limited amount of on-channel nesting observed at the beginning of the First Increment declined because on-channel habitat was lost during high-flow events (**Table 3-10**). For example, only two on-channel riverine sites had nesting habitat available during the 2016 monitoring season. During the First Increment, monitoring and research were conducted to inform the Program how these two habitat types functioned to increase use and reproductive success of least tern and piping plover populations.

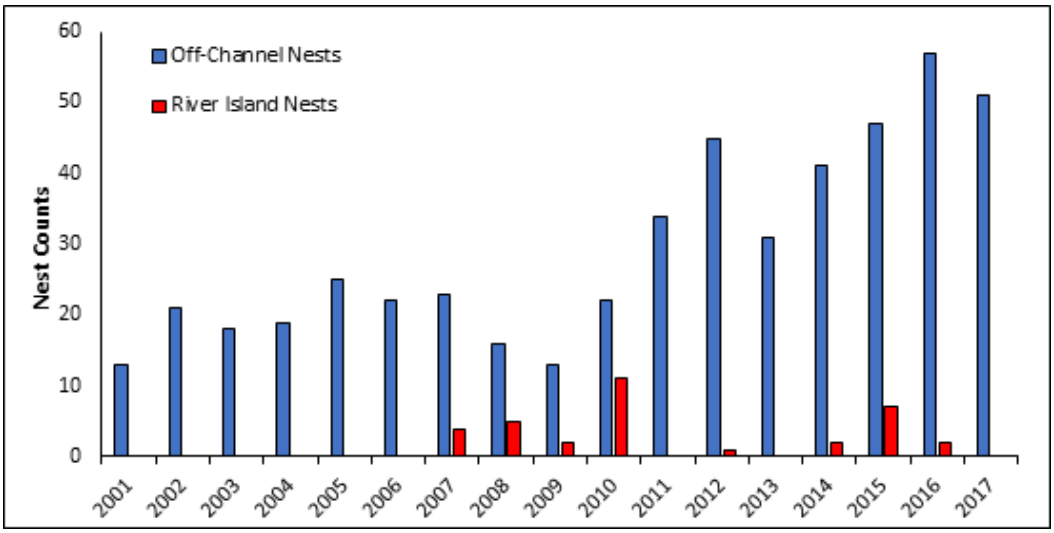
- Summary of scientific findings for habitat selection and use (Program 2017f):
  - The Program and partners created in-channel (sandbars) and off-channel (sandpits) nesting habitat to evaluate relationships between in- and off-channel habitat availability and selection by least terns and piping plovers. (Note: Early Program efforts largely focused on off-channel nesting sites, as flows and permitting challenges precluded construction of in-channel nesting islands.)
  - Creating and maintaining off-channel nesting habitat has resulted in substantial use and productivity of least terns and piping plovers since 2001 (see **Chart 3-24** and **Chart 3-25**). During this same time frame, in-channel habitat availability and least tern and piping plover nesting and productivity have been sporadic and at low levels. In-channel habitat availability under Program implementation has only contributed marginally to the maintenance of the central Platte River least tern and piping plover populations.

Chart 3-24. Comparison of Least Tern Off-Channel (blue bars) and On-Channel (red bars) Nests within the Program AHR (2001–2017)



Source: Keldsen and Baasch 2016

Chart 3-25. Comparison of Piping Plover Off-Channel (blue bars) and On-Channel (red bars) Nests within the Program AHR (2001-2017)



Source: Keldsen and Baasch 2016

  - While populations of both species have increased within the central Platte River AHR, increases of similar magnitude have not been observed throughout the species' range.
  - Efforts to create suitable on-channel nesting habitat have necessarily been opportunistic but were met with numerous challenges.
  - The probability of interior least tern and piping plover use of available nesting habitat was maximized when distance to the nearest wooded area was ≥150 meters, distance to water habitat was ≥30 meters, and elevation above the waterline was ≥3 meters.

- Anticipated Program management actions for extension of the First Increment:
  - The Program is anticipated to continue to increase and maintain off-channel nesting habitat, while providing a small amount of in-channel habitat, where possible, to continue improvement of least tern and piping reproductive success.
  - During extension of the First increment, construction and maintenance should include removal of potential predator perches less than or equal to 150 to 200 meters from off-channel nesting areas.

During the Program's First Increment, the observed increase of least tern and piping plover populations on the central Platte River resulted primarily from the use of and productivity of off-channel nesting habitats (Program 2017f); however, monitoring data indicate the river is a valuable source of forage for both species because forage abundance appears to be lower on off-channel habitats (Program 2017f). Thus, off-channel nesting habitat appears to be an effective management strategy capable of supporting least terns and piping plovers in the central Platte River. Combined with the small amount of on-channel habitat currently being created and maintained on an annual basis, this approach is anticipated to contribute to stabilizing and increasing least tern and piping plover populations.

During the First Increment, the Program evaluated 15 years of data to assess the influence that various physical site attributes and inter- and intra-specific interactions have on off-channel nest site selection by interior least terns and piping plovers. The Program found nest site selection by interior least terns and piping plovers was influenced by factors that could be managed by the Program, such as distance to predator perch and elevation above waterline, as well as some factors that cannot be managed. The Program found inter- and intra-specific interactions influenced nest site selection by both species. For example, piping plovers avoid nesting in proximity to each other, while interior least terns, being colonial, select nest sites in proximity to each other.

The Program also identified several parameters that can be used to improve nesting success through improved habitat management. As such, habitat management activities considered during the extension of the First Increment at off-channel sites would include removing potential predator perches less than or equal to 150 to 200 meters from off-channel nesting areas, and any constructed habitat provided to maximal amounts of elevated nesting habitat distant to water.

Forage Habitat Availability (Least Tern)

Foraging habitat for least terns includes side channels, sloughs, tributaries, and shallow-water habitats adjacent to sand islands associated with the main river channels (Dugger 1997). To successfully reproduce, productive foraging habitat must be located within a short distance of least tern nesting habitat (Dugger 1997). During the First Increment, studies were undertaken to determine whether the availability of forage fish in the central Platte River is sufficient to ensure least tern reproductive success.

- Summary of scientific findings for forage habitat availability (Program 2017f):
  - Forage availability does not limit least tern productivity on the central Platte River.
  - The Program found no relationship between least tern productivity and flow volumes during the nesting and brood rearing season (Baasch et al. 2017).
  - Although in-channel nesting habitat has contributed little to the sustainability of both populations during the First Increment, ephemeral islands and river channels appear to provide an important source of forage for both the least tern and the piping plover. This abundant forage base provided by the river has likely contributed to the high productivity observed at off-channel nesting sites since 2001.
- Anticipated Program management actions for extension of the First Increment:
  - Data analyses indicate least terns are unlikely to be affected because forage fish availability is lacking under most circumstances (e.g., flows in the range of 200 to 600 cfs).

Foraging habitat is needed in the central Platte River to sustain nesting least terns, but data analyses indicate that availability of small forage fish is sufficient during most flow levels during the summer nesting season to meet this need.

Incidental Take

The total allowable take (i.e., lethal, crippling, harm, and harassment) of either least terns or piping plovers as defined by the Program's BO (Program 2017g) is presented in **Table 3-11**, along with the observed results. Given the programmatic nature of the Program and the associated BO, should the allowable take for least tern or piping plover be exceeded, Reclamation would again begin ESA consultation on only that aspect of the federal action resulting in that take, rather than the federal action as a whole.

Table 3-11. Incidental Take During Implementation of the First Increment

Allowable Take	Observed Take
Inundating Flow: Take is allowed during 4 of 5 years associated with inundating flow release from the Service's environmental account.	No flow-related take caused by the Service's environmental account releases has been observed.
Sandpits (Off-Channel Habitat): Incidental take may be occurring if there is repeated catastrophic losses of nests and chicks due to predation at individual sites. Catastrophic losses are defined to be the loss of 70 percent of nests or 80 percent of chicks to predation in	As of December 31, 2016, a very limited amount of predation mortality at any of the off-channel sites the Program owns or manages has been observed and has not exceeded the Service's threshold any year.

Table 3-11. Incidental Take During Implementation of the First Increment

Allowable Take	Observed Take
3 of 5 years for sites that average at least 5 least tern nests or at least 3 piping plover nests. For sites that average less than 5 least tern nests or 3 piping plover nests, the Program is allowed take related to predation of 100 percent in 4 of 5 years.	
Habitat Restoration and Land Management Activities: One incidence of take in the form of harassment is exempted per site owned or managed by the Program during the Program's First Increment. The amount of take in the form of harm is limited to three least tern nests or broods and three piping plover nests or broods.	As of December 31, 2016, the Program observed the take of one piping plover chick and no least terns.
Research and Monitoring Activities: The Program is allotted take in the form of mortalities of three least tern eggs or chicks and four piping plover eggs or chicks during 2015 to 2020.	Prior to December 31, 2014, the Program observed a total of two research-related piping plover mortalities during 2011 and 2013. As of December 31, 2016, the Program has observed take of two least tern eggs due to monitoring or research activities under the existing permit.

Source: Program 2017g

3.9.3 Impacts from the Proposed Action

Selection of the Proposed Action would allow the Program to continue to increase and maintain both off-channel and on-channel nesting habitat for the least tern and piping plover at the same levels as agreed to through the end of 2020. These actions would include using dozers, scrapers, and backhoes to create nesting habitat; using mechanical actions, such as disking, removing trees, and mowing, to improve nesting conditions and remove vegetation cover; applying chemical herbicides during the spring or fall to kill or prevent the emergence of vegetation; and using fencing and trapping to control predators. During the extension of the First Increment, construction and maintenance activities would remove potential predator perches less than or equal to 150 to 200 meters from off-channel nesting areas.

The Program is scheduled to mechanically maintain up to 10 acres of on-channel habitat to ensure suitable nesting habitat is available on the river and to avoid releasing water solely for least tern/piping plover nest ignition. Up to 60 acres of additional off-channel habitat would be acquired. The Governance Committee has agreed to continue this initiative through 2019; for the purposes of this effects analysis, Reclamation has assumed that this action would continue through the extension of the First Increment.

As experienced during the First Increment, least tern and piping plover populations have been growing proportionately to increases in available habitat. This trend is anticipated to continue during extension of the First Increment until the habitat increases/creation stabilizes and the population of the least tern and piping plover using this available habitat correspondingly stabilizes. This increase in least tern numbers would support the potential delisting of the least tern by improving reproductive success and the overall population of the least tern.

The targeted short-duration, high-flow release (5,000 cfs) is scheduled to be implemented during the extension of the First Increment and should provide data on how mechanically created habitat is affected by these releases.

Least terns and piping plovers have been observed to nest on lands off the river and outside the central Platte River AHR (Service 2006). Least tern and piping plover may be affected by Program activities on Reclamation's North Platte Project in Nebraska from nests or chicks flooded or displaced on the shorelines of inland lakes, such as Lake Minatare (Service 2006); however, the levels of potential take of least terns and piping plovers on the shorelines of inland lakes are expected to be low. In the 2006 Program BO, the Service determined that the amount of nesting that could occur at the inland lakes during the First Increment would be up to two nests each year (Service 2006). Because past nesting had not been successful in the years before 2006, the Service determined that the amount of exempted take would be 26 total nests during the First Increment of the Program (13 years).

The analysis of impacts undertaken for this EA assumes that the same level of nesting and presumed take would occur under an extension of the First Increment; however, areas in the North Platte River basin outside the central Platte River AHR, Program activities are not considered to be important for the recovery of these species. This is due to the limited number of incidences of observed nesting (Service 2006). The Service stated in the 2006 BO that the adverse impacts and mortality that could occur from Reclamation operations would be a small proportion of the piping plover or least tern populations and would, therefore, not result in a population-level impact on these species (Service 2006).

Under the proposed extension, the Program would continue to serve as the ESA Reasonable and Prudent Alternative to Avoid Jeopardy determinations for consultations for federal actions subject to the ESA. The Program functions as an offsetting measure to previous actions and is required to provide benefits to the target species.

Another important aspect of extending the First Increment is the undertaking of additional research mentioned above that would improve understanding of the nesting patterns of both least terns and piping plovers and improve reproductive success.

When all the Program elements are implemented, should extension of the First Increment be approved, these elements may affect, and are likely to adversely affect, the least tern and piping plover (see **Appendix A**). However, the least tern and piping plover may be affected in a positive manner from increased availability of suitable nesting and foraging habitat.

A summary of beneficial and adverse impacts from extending the First Increment is provided below.

- Summary of continued beneficial impacts from extending, through water management and sediment augmentation
  - An 53,000-foot increase in the length of braided channel in the central Platte River

  - Increased nesting substrate available at Lake McConaughy and managed sandpits
  - A slight increase in July flows at Grand Island, Nebraska, resulting in decreased probability of water temperatures dangerous to fish; this would be a slight benefit to least terns food resources
- Summary of adverse impacts from extending the First Increment (Service 2006)
  - A substantial reduction in the frequency of and a significant reduction in the magnitude of spills from Lake McConaughy, which would exacerbate the decline of ecosystem processes maintained by a normative hydrologic regime and sediment transport through the system
  - An increased probability of continued channel narrowing and habitat degradation from North Platte to Lexington, Nebraska, that may negatively affect the availability of resources to piping plovers and interior least terns that use that reach of the Platte River
  - A slight increase in the possibility of inundation of least tern or piping plover nests downstream of Chapman through slightly elevated July flows at Grand Island, Nebraska

However, some of the anticipated adverse and beneficial impacts may change, based on the results of FSM consideration. If the FSM is successful in improving channel conditions to an acceptable level, these adverse impacts would remain. The FSM could be abandoned in favor of a strategy that protects higher peak flows or higher summer base flows, which is a strategy that is commonly discussed. If this were to happen, the list of anticipated positive or negative impacts would change accordingly, which would improve natural riverine processes.

Cumulative Effects

Cumulative effects include effects of future state, local, or private (nonfederal) actions that are reasonably certain to occur within the area of analysis. Two areas of concern related to cumulative impacts for least tern and piping plover nesting are human disturbance during recreational activities and continued sand and gravel mining along the central Platte River.

Disturbance to nesting least terns and piping plovers associated with human interaction, particularly associated with recreational activity, can decrease nesting success. Nests may be lost to direct mechanical disturbance, such as trampling or through indirect means if the parent birds are away from the nest for long periods. Human restriction measures, such as posting signs that restrict access to breeding areas, placing barricades to exclude human access, and conducting outreach efforts, can help to reduce human disturbance during the nesting season.

Sand and gravel mining occurs throughout Nebraska and is expected to continue within the foreseeable future along the central Platte River AHR. Existing mining is anticipated to continue expanding, and new mines are anticipated to be developed. If actively managed for least tern and piping plover conservation, this could supplement existing nesting habitat being created by the Program. Piping plovers and least terns have demonstrated a positive repose to the creation of additional habitat; however, if not managed for the benefit of the two species, this could be a source of disturbance and lethal take.

Extension of the Program's First Increment would continue to increase and maintain both off-channel and on-channel nesting habitat for the least tern and piping plover, increasing the availability of suitable nesting and foraging habitat.

3.9.4 Impacts from the No Action Alternative

Under the No Action Alternative, off-channel nesting habitat developed and managed by the Program would no longer be maintained, and, over time, the number of breeding pairs of least terns and piping plovers on the central Platte River would decline; however, another entity could voluntarily resume management of nesting habitat currently maintained by the Program; under this scenario the only direct impact would be the loss of future land acquisitions and the creation of additional nesting habitat.

One effect that would not change under the No Action Alternative is the availability of the least tern forage fish base, which was found not be a limiting factor for least tern nesting success during the First Increment. Most of confirmed mortalities have been attributed to adverse weather and predation.

Additionally, proposed research into least tern and piping plover habitat colonization patterns, re-nesting events, and comparisons of use and reproductive success of riverine versus off-channel sand and water habitat would not be conducted. This would reduce the ability of the scientific community to benefit from this new learning and develop even more suitable nesting habitat for breeding least terns and piping plovers, and potentially affecting the proposed delisting of the least tern.

The Program serves as the ESA Reasonable and Prudent Alternative to Avoid Jeopardy for previously completed consultations for federal actions subject to ESA consultation that would have received a "jeopardy" biological opinion. The Program functions as an offsetting measure to previous actions and is required to provide benefits to the target species, such as least tern and piping plover. Without extension of the First Increment, such actions would be sufficient to provide ESA compliance with respect to all water-related activities in that state until any reinitiated consultations have been completed.

In addition, to the extent the states' respective contributions of cash, water (through the initial Program water projects), and land continue to benefit the target species beyond the Program, the states would retain the right to argue that such future benefits from their contributions should be considered in any reinitiated consultations; however, if the Program were to dissolve and the states do not carry out their responsibilities, each water project or activity in the basin requiring, federal approval, permitting, or funding would have to undergo separate ESA Section 7 consultation. Also, separate mitigation measures would be required.

Cumulative Effects

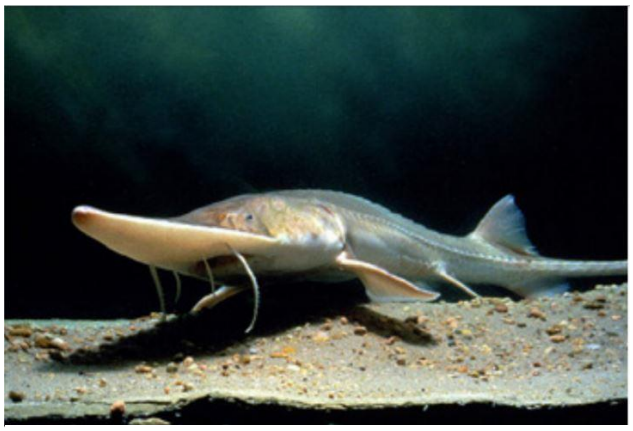
As described above under the Proposed Action *Cumulative Effects* section, other actions can impact least tern and piping plover habitat (e.g., gravel mining) and disturb least terns and piping plovers due to increased human disturbance. Not extending the Program's First Increment would stop maintenance of off-channel nesting habitat developed and managed by the Program, and, over time, the number of breeding pairs of least terns and piping plovers on the central Platte River would decline; however, another entity could voluntarily resume management of nesting

habitat currently maintained by the Program; under this scenario the only direct impact would be the loss of future land acquisitions and the creation of additional nesting habitat.

3.10 Pallid Sturgeon

3.10.1 Affected Environment

This section serves two purposes: first, it describes the affected environment of the pallid sturgeon and documents potential effects of implementing the Proposed Action and No Action Alternative for NEPA documentation, and second, it is also intended to meet the needs of a BA under the ESA; therefore, this section has been organized to describe the species status and critical habitat, document baseline conditions, and communicate potential environmental effects. Potential cumulative effects are also described at the end of the section.



Source: Service
*Pallid sturgeon (*Scaphirhynchus albus*)*

Status of Species and Critical Habitat

The pallid sturgeon was listed as endangered on September 6, 1990 (55 Federal Register [FR] 36641–36647). Critical habitat has not been designated for pallid sturgeon (Service 2014). A recent revision of the species recovery plan notes the species status has improved and is currently stable because of artificial propagation and stocking efforts under the Pallid Sturgeon Conservation Augmentation Program (Service 2014); however, the revised recovery plan also notes that if the stocking were to cease, pallid sturgeon would face local extinction in several reaches of the Missouri River (Service 2014).

The Service (2014) defines four pallid sturgeon recovery management units, one of which falls within the geographic scope of the Program. The Central Lowlands Management Unit (CLMU) extends from Fort Randall Dam, South Dakota, downstream to the confluence of the Missouri River with the Grand River, Missouri, including major tributaries such as the Platte River. Reliable population estimates for the entire CLMU are not currently available (DeLonay et al. 2016). Based on an intensive study of a 50-mile reach of the Missouri River below its confluence with the Platte River, Steffensen et al. (2013) estimated 6,000 wild pallid sturgeon and 42,000 hatchery stocked pallid sturgeon may be present in the lower Missouri River downstream of Gains Point Dam.

While natural recruitment of pallid sturgeon within the CLMU probably does not occur (Steffensen et al. 2013) and thus is not a self-sustaining population, the CLMU is considered stable due to the high frequency of stocked pallid sturgeon maintained through the augmentation program (Service 2014). The Service has determined that a self-sustaining genetically diverse population of 5,000 adult pallid sturgeon is needed in each management unit for two generations (20 to 30 years), including the CLMU, before it would reconsider the species for reclassification from endangered to threatened (Service 2014).

With improved sampling methods and increased sampling events, both hatchery reared and wild pallid sturgeon have been observed in increasing numbers in the lower Platte River (i.e., the Loup River Power Canal outlet near Columbus, Nebraska, downstream to the confluence with the Missouri River) since the species was listed (Service 2014). While pallid sturgeon have been frequently observed within the lower-most reaches of this river (i.e., up to the Elkhorn River confluence; Peters and Parham 2008), more recently, observations of pallid sturgeon have increased upstream of the confluence of the Platte and Elkhorn Rivers (Service 2014).

Distribution. Jacobson et al. (2016) describes the natural geographic range of the pallid sturgeon to include the Mississippi and Missouri River basins in which turbid, fast-flowing waters flow over predominately sandy substrates. This range includes the Yellowstone and rivers downstream to the confluence with the Mississippi River and Iowa to the Gulf of Mexico (including the Atchafalaya River system). Also included in the natural range are lower parts of some Missouri River tributaries, including the Milk River in Montana, Niobrara and Platte Rivers in Nebraska, Big Sioux River in Iowa, Kansas River in Kansas, and Grand and Osage Rivers in Missouri (Jacobson et al. 2016). The lower Platte River habitat represents river conditions like the original, unaltered habitat of pallid sturgeon.

Life history. The pallid sturgeon is adapted to large, free-flowing, warm-water, turbid rivers with a high sediment load (Service 2014). The pallid sturgeon has physical features that support turbid, fast-flowing rivers (e.g., lower Platte River), such as a flattened shovel-shaped snout; a long, slender, and completely armored body; barbels;[2] and a protrusible mouth (i.e., capable of being extended and withdrawn from its natural position) that supplement their small eyes in detecting and capturing food (Service 2014). Pallid sturgeon have been documented over a variety of substrates, but are more often associated with sandy and fine bottom materials, preferring that to mud, silt, or vegetated river bottoms (Jacobson et al. 2016).

- *Egg life stage.* Pallid sturgeon eggs are deposited on the bottoms of rivers; they are adhesive and dark colored, adhering to substrate at the spawning site (DeLonay et al. 2016). Currently, it is unknown how substrate characteristics, adhesion, and hydraulic conditions interact to influence survival and development of fertilized eggs (Jacobson et al. 2016).
- *Free embryo/larvae life stage.* An embryo is a developing fish within an egg membrane and covers the period from fertilization to hatching, which typically lasts from 5 to 8 days dependent on water temperature (DeLonay et al. 2016). Once a fish no longer resides within the egg membrane it becomes a free embryo. This stage lasts between 8 to 12 days and ends when the fish begins to feed (DeLonay et al. 2016).

  Drifting free embryos use their yolk sac for nutrition as they develop swimming abilities, after which they settle into habitat that is conducive to feeding and growth. DeLonay et al. (2016) based on a review of existing literature indicates: 1) pallid sturgeon free embryos drift and disperse at a rate slightly less than the mean water column velocity; 2) downstream dispersal and drift occur both day and night; 3) duration of the free embryo drift period depends on water temperature and rate of

[2]A fleshy filament growing from the mouth or snout of a fish.

development; and 4) free embryos can drift and disperse over long distances (greater than 100 miles) during development into feeding larvae. This is a critical period for survival of pallid sturgeon because the larvae must find sufficient food of the correct size and type or it will starve.

- *Juvenile life stage.* Juvenile life stage consists of sexually immature fish and lasts until the fish reach sexual maturity. During the late spring through early fall below Gavins Point Dam, adults tended to be collected in cooler water temperatures than juveniles (Jacobson et al. 2016); however, during this same season juveniles tended to be collected in shallower water with less current than adults. During late fall through early spring, juveniles tended to collect in warmer water than adults. This notable difference in habitat preference between juveniles and adults is most likely explained by differences in diet (Jacobson et al. 2016).
- *Adult life stage.* Pallid sturgeon can be long lived, with females reaching sexual maturity later than males (Service 2014). Based on information collected from wild fish, the estimated age at first reproduction for females is 15 to 20 years and approximately 5 to 7 years for males (Keenlyne and Jenkins 1993). Pallid sturgeon generally spawn from April through May in the CLMU (lower Missouri River, including the lower Platte River; DeLonay et al. 2016). Reproductively ready pallid sturgeon generally follow a pattern of upstream migration before spawning, although males are less regular.

  Migrating pallid sturgeon in the Missouri River selected shallow places in the primary channel with velocities on the low end, indicating selection of migrating pathways that optimize energy expenditure (DeLonay et al. 2016), While spawning has been observed to occur in various environmental conditions, it is not known under what circumstances spawning is successful (DeLonay et al. 2016). Pallid sturgeon do not spawn on a 12-month cycle; males spawning cycles may exceed a year and females more than 2 years (DeLonay et al. 2016).

Diet. The diet of the pallid sturgeon shifts from macroinvertebrates to fish as they grow (Service 2014). Larval pallid sturgeons have been reported to consume the larvae and pupae of midges and mayflies (DeLonay et al. 2016) with the feeding patterns shifting more to fish as the pallid sturgeon mature from juveniles to adult life stages.

Threats. The Service's Revised Pallid Sturgeon Recovery Plan (Service 2014) described known and potential threats to pallid sturgeon throughout its range with habitat modification described as one of the primary threats. In the Missouri River basin, the primary habitat-related threats include river channelization, bank stabilization, and dam construction. These alterations have potentially affected pallid sturgeon by blocking spawning migrations, isolating populations, limiting genetic exchange, trapping large quantities of sediment, altering larval drift, altering water chemistry (e.g., dissolved oxygen and temperature), minimizing natural flow pulses, minimizing floodwater movement onto the floodplain, and reducing habitat diversity by eliminating riverine habitat (Service 2014).

Although not developed to accommodate navigation, the Platte River has been influenced by anthropogenic alterations that likely affect pallid sturgeon habitat (Service 2014). Upstream

water demands for industrial, municipal, and agricultural purposes have led to construction of low-head diversion dams on the upper Platte River as well as large impoundments on the Platte River (Service 2014); however, the availability and quality of pallid sturgeon habitat within the lower Platte River can be affected by water withdrawal in conjunction with periods of drought (NRC 2005).

Because of the continued incidental and illegal harvest of pallid sturgeon, the Service determined it necessary to treat shovelnose sturgeon as threatened under the similarity of appearance provisions of the ESA and thereby reduce harvest of pallid sturgeon. This similarity of appearance rule extends take prohibitions to shovelnose sturgeon, shovelnose-pallid sturgeon hybrids, and their roe.[3] This would be the case where commercial fishing is in areas where pallid sturgeon and shovelnose sturgeon commonly coexist. This rule became effective October 1, 2010.

3.10.2 Environmental Baseline

Present Status of Pallid Sturgeon on the Lower Platte River

The Platte River is a part of the CLMU and does not contain a self-sustaining population of pallid sturgeon but rather is dependent upon annual stocking of the augmentation program (Steffensen et al. 2013). An estimate of 926 pallid sturgeon in the lower Platte River was developed by Hamel in 2013. This is a rough estimate for a dynamic pallid sturgeon population with individuals from the CLMU migrating in and out of the Platte River (DeLonay et al. 2016; Peters and Parham 2008). **Table 3-12** and **Table 3-13** present the results of a recent survey of pallid surgeon presence in the lower Platte River.

Table 3-12. Annual Total Number of Pallid Sturgeon Captures in the Lower Platte River

	Year			
	2009	**2010**	**2011**	**2012**
Segment 1[1]	66	34	14	10
Segment 2[2]	3	5	3	2

Source: Hamel et al. 2014a, as modified by the Service and reported in Service 2016a
[1]Lower Platte River from Elkhorn River confluence to mouth (approximately 32 miles)
[2]Lower Platte River upstream of the Elkhorn River confluence (approximately 66 miles)

Table 3-13. Pallid Sturgeon Captures by Season and Location in the Lower Platte River

	Average Number per Year		Range in Observed Numbers	
	Segment 1[1]	**Segment 2[2]**	**Segment 1[1]**	**Segment 2[1]**
Spring	9.8	1.8	5–21	1–3
Summer	6.5	1.0	1–16	0–2
Fall	14.8	0.5	1–42	0–1

Source: Hamel et al. 2014a, as modified by the Service and reported in Service 2016a
[1]Lower Platte River from Elkhorn River confluence to mouth (approximately 32 miles)
[2]Lower Platte River upstream of the Elkhorn River confluence (approximately 66 miles)

[3]Roe refers to the mass of eggs contained in the ovaries of a female fish or shellfish, typically including the ovaries themselves, especially when they ripe and used as food, such as caviar.

Distribution of Pallid Sturgeon in the Lower Platte River

While pallid sturgeon have been captured throughout the entire lower Platte River, they are more abundant downstream of the confluence with the Elkhorn River. Of the 137 individuals collected by Hamel (2013), only 13 individuals were collected upstream of the confluence with the Elkhorn River. This is an important development for extension of the First Increment, as the Program may want to extend the AHR for pallid sturgeon in the lower Platte River upstream of the confluence of the Platte and Elkhorn Rivers.

When the pallid sturgeon was initially listed, the Elkhorn River served as a reference point demarking its confluence with the Platte River as the upstream extent of pallid sturgeon in the Platte River; however, this river has been demonstrated to possess many characteristics of streams currently used by pallid sturgeon, and there are documented occurrences of pallid sturgeon in the Elkhorn River (Service 2014).

Reproduction in the Lower Platte River

The absence of natural recruitment limits species recovery in the CLMU (Service 2014). It is unknown to what degree the conditions on the Platte River may or may not limit natural recruitment. Long-term telemetry monitoring of pallid sturgeon have documented several instances where male and female individuals have migrated into the Platte River in a likely attempt to spawn (DeLonay et al. 2016). Different life stages of the pallid sturgeon have been documented in the Platte River. For example, Peters and Parham (2008) noted that both adult and juvenile pallid sturgeon have been captured in the lower Platte River. This observation is important because it demonstrates that the habitats of the lower Platte River are suitable for both adults and juveniles.

Factors Affecting Pallid Sturgeon in the Lower Platte River. While the Platte River provides some of the most intact hydrographic and morphologic pallid sturgeon habitat in the degraded CLMU, the river has also been substantially altered.

- *River flow reductions.* Spring flows in the central Platte have declined since the early 1900s (Service 2006). The depletion of flows in the upper Platte River basin alone accounts for an approximate 35 percent decrease in May and June flows in the lower Platte River (Service 2006). This reduction in flow results in substantially weaker spawning cues, and a considerably reduced capacity to form and maintain bottom substrates used by pallid sturgeon for feeding and spawning.
- *Habitat connectivity.* In 2005, the NRC suggested the loss of habitat connectivity during years of low discharge may be an important factor limiting the use of the lower Platte River by pallid sturgeon. A study conducted by Peters and Parham (2008) demonstrated that connectivity of pallid sturgeon habitats rapidly declined as flows were reduced from 5,600 cfs to 3,200 cfs, while available habitat was nearly fully connected at a flow of 8,000 cfs (as reported in Service 2016a).

  High river connectivity allows for the movement of individuals to avoid adverse conditions such as times when the lower Platte River water temperatures reach lethal levels (e.g., drought of 2012). Maintaining connectivity also allows for individuals to easily move between the Platte and Missouri Rivers. Habitat connectivity is also an important recruitment feature, as newly hatched free embryos must be able to exit the

primary channel in sufficient numbers to avoid starving. Habitat connectivity depends on the right hydraulic conditions to transport the free embryos into supportive floodplain habitat that provides food and protection (Jacobson et al. 2016).

- *Hydropower operations.* The lower Platte River is the only affected area within the pallid sturgeon's range that is directly affected by hydropower peaking operations daily (Service 2006). Hydropower peaking operations of the Loup River Hydroelectric Project are concentrated within certain time frames, which in turn results in rapid, large magnitude, daily flow fluctuation in the reach below the generating facility (water is diverted from the Loup River and returned to the Platte River).

  Median 24-hour changes in flow at Louisville, Nebraska, range from 650 to 3,000 cfs per day, or 16 to 46 percent of the median monthly flow rate (Service 2006). The cumulative effects from hydropower peaking operations to the fisheries and aquatic community may adversely affect the pallid sturgeon's food base. Additionally, increased erosion of sandbars may have a direct adverse impact on sandbar complex habitats used by pallid sturgeon (Service 2006).

- *Water temperature.* Hamel et al. (2014a) found that pallid sturgeon were captured more frequently in cooler portions of the lower Platte River than other available habitat conditions but found water temperature is not a factor that limits species use of the lower Platte River (Hamel et al. 2014b); however, water temperatures are important to pallid sturgeon in three ways: temperature can affect food resources; high stream temperatures lead to a reduction in dissolved oxygen; and high temperatures can harm individuals and lead to direct mortality (Service 2016a).

  The relative condition of pallid sturgeon captured by Hamel et al. (2014a) in the Platte River was considered excellent; therefore, present stream temperatures have insignificantly affected food resources where it would be reflected by unfavorable conditions. Temperatures higher than 86°F have been shown to be stressful and detrimental to pallid sturgeon (Blevins 2011). During the summer drought of 2012, water temperatures exceeded the 86°F threshold for most of the month of July stressing and causing mortality of many fish in the lower Platte River, including pallid sturgeon. A major fish kill was observed during July, including two pallid sturgeon (Service 2016a).

- *Climate trends.* In the Platte River, water temperature is directly influenced by air temperature; therefore, under a scenario of increased temperatures, warmer river water temperatures could result. This could benefit primary and secondary productivity and in turn indirectly benefit some pallid sturgeon life stages. Pallid sturgeon growth rates could also be influenced by warmer water temperatures; this is because free embryos and larvae develop faster at higher water temperatures. In some areas where water temperatures are high, increased air temperature could increase river water temperatures, which would stress pallid sturgeon (Hupfeld et al. 2015).

  Across the U.S. range of the Northern Great Plains, spring precipitation is expected to increase between 0 and 40 percent under different carbon emission scenarios. This shift in temperature and moisture could have substantial impacts on pallid sturgeon. Additionally, changing precipitation patterns in the Rocky Mountains would likely

have profound impacts on the amount of inflow into the Platte River system, affecting the amount of habitat available there.

In 2005, the NRC found that current conditions in the lower Platte River do not adversely affect the likelihood of survival or recovery of the pallid sturgeon; however, it did conclude that the loss of lower Platte River habitat would likely result in a catastrophic reduction of the pallid sturgeon population within the CLMU. In its BO for the Program (Service 2006), the Service concluded that "…while the lower Platte River is degraded in its ability to serve its apparent habitat function due to the effects of water resource development in the basin, the majority of which has occurred in the upper parts of the basin, and further degradation of this habitat would be catastrophic to the species."

Program Management Actions for Pallid Sturgeon

At the time of publication of the 2006 Platte River Recovery Implementation Program Final EIS, the primary issue regarding the pallid sturgeon was use of the lower Platte River by a small number of adult fish. While a great deal about the pallid sturgeon life cycle and its use of the lower Platte River is still unknown, as can be gleaned from the environmental baseline information provided above, substantial new knowledge has been learned since publication of the 2006 Final EIS. For example, evidence now indicates that pallid sturgeon use the Platte River year-round and as a spawning ground in the spring; however, discrete spawning locations are not known, and spawning habitat has not been mapped on the lower Platte River (DeLonay et al. 2016). Taken in totality, this new knowledge suggests the lower Platte River provides suitable habitat, supports multiple life stages of the species, and should be viewed as important for species recovery (Service 2014).

In response to this new knowledge, the Program's Governance Committee in September 2016 agreed to begin a step-wise incremental process to refine recovery goals, hypotheses and objectives related to the pallid sturgeon and, possibly, to conduct additional research in the form of an expanded increased flow discharge study and directed habitat selection observations. The first effort was an internal workshop convened by the Program in 2017 that resulted in publication of a report titled *Pallid Sturgeon State of the Knowledge Summary* (Program 2017c).

The issues and areas of disagreement reported in the *Pallid Sturgeon State of Knowledge Report* will be addressed by an independent expert workshop in 2018. Results of this workshop will guide activities implemented during the potential First Increment Extension. Both the internal workshop and the planned expert panel discussion are designed to help resolve the question about whether Program flow management actions in the central Platte River help to avoid adverse impacts on the pallid sturgeon in the lower Platte River. During this process, relevant Program goals, objectives, and hypotheses will be refined, decision criteria better defined, and potential pallid sturgeon research designed.

Incidental Take

No incidental take has been authorized under the 2006 BO (Service 2006) for Program water-related activities to investigate impacts from future diminishment of high flows and to negate or offset any such adverse impacts identified; however, incidental take of pallid sturgeon has been authorized within the 2006 BO for Program monitoring and research (Service 2006). If during the extension of the First Increment any further monitoring or research activities should be

undertaken, any incidental take would be documented by the Program. Given the programmatic nature of the Program and the associated BO, should there be a take, Reclamation would again consult under the ESA on that aspect of the federal action resulting in that take only, rather than on the federal action as a whole.

3.10.3 Impacts from the Proposed Action

The environmental baseline population of the pallid sturgeon in the lower Platte River AHR is estimated to be 926 individuals; however, for the reasons articulated below, the ability to predict the effects of the Proposed Action on pallid sturgeon downstream is limited because of the high level of uncertainty associated with influence of Program activities on hydrologic conditions in the lower Platte River.

Program provisions (Service 2006) to address the pallid sturgeon and its lower Platte River habitat during the first increment are as follows:

- Impacts on the pallid sturgeon that are caused by Program activities or by new water-related activities covered by the state or federal depletions plans will be assessed. The assessment will be conducted through the pallid sturgeon research and monitoring described in the Program's AMP and complementary research conducted by others involved with the Missouri River and its tributaries.
- An assessment stage change study will be completed by the end of the 3rd year during the First Increment. If such impacts are deemed to adversely affect the pallid sturgeon, appropriate conservation measures that either negate or offset the occurrence of adverse impacts on the pallid sturgeon will be implemented during the First Increment (Service 2006).

Adverse impacts on pallid sturgeon may result from future significant alterations in the natural hydrograph during spawning periods. This is because altered seasonal flows and changes in water constituents, such as a reduction in turbidity caused by flow reduction, may preclude spawning. It also could cause mortalities to sturgeon in the early life stages or significantly disrupt normal behavioral patterns. These include breeding, feeding, or sheltering within an important portion of the species' range.

As it is difficult to estimate the level or amount of take that could occur from this impact, the Program includes a measure to investigate impacts from future diminishment of high flows and to negate or offset any such adverse impacts if identified (text modified from the 2006 BO; Service 2006).

Changes in flow in the lower Platte River can affect pallid sturgeon in a beneficial manner through three main mechanisms: 1) more water increases channel connectivity and, therefore, increases mobility for the pallid sturgeon, 2) more water may increase availability of important habitats and overall habitat capacity, and 3) more water may minimize low flows related to fish kill events (Program 2017c).

Fewer water scenarios or changes in the timing of flows would most likely affect the pallid sturgeon in a negative manner. These scenarios could occur from Program actions, but the impacts would likely be minor or undetectable. Nevertheless, the understanding of the

connection between hydrology and pallid sturgeon use of the lower Platte River is incomplete and needs additional study. The combined effects of water management actions upstream of the central Platte River on hydrology in the lower Platte River, including both Program and non-Program uses, is uncertain. Some actions may provide benefits, while others may have adverse effects. For example, the combined effects of flow contribution from Tamarack 1 and depletions in excess of Service target flows, authorized under the new depletions plans, are not well understood.

One beneficial Program effect is the protection of Service target flows in the central Platte River through the state and federal new depletions plans, which limit degradation of lower Platte River flows and reduce the opportunity for lethal high-water temperatures.[4]

The Program has limitations in its ability to affect the hydrology of the lower Platte River through withdrawals or additions to the central Platte River because of the magnitude of the influence of flows from the Loup and Elkhorn Rivers. Daily hydro-cycling in the Loup River complicates the Program's ability to quantify the hydrologic contribution of the central Platte River; however, existing flow monitoring is sufficient to guide Program operations in the limited situations when hydrologic effects from the central Platte River may affect the lower Platte River.

The way that Program water management actions affect the hydrology of the lower Platte River, how changes in hydrology affect pallid sturgeon habitat, and, ultimately, how changes in habitat affect pallid sturgeon use of the lower Platte River are uncertain. Relationships between hydrology and the suitability of food resources, the suitability of spawning habitat, spawning cues, success of spawning, or larval survival are all unknown in the lower Platte River (Program 2017c).

Under the Proposed Action, knowledge gained during the Program's expert workshop scheduled for 2018 would allow the best available science to be put into action for the benefit of the pallid sturgeon. Additional research could be conducted to address remaining uncertainties regarding the pallid sturgeon life cycle and habitat use in the lower Platte River. This new learning could then be used to implement habitat improvements in the lower Platte River to benefit pallid sturgeon.

When all the Program elements are implemented, should extension of the First Increment be approved, these elements may affect, and are likely to adversely affect, the pallid sturgeon (see **Appendix A**). A summary of beneficial and adverse impacts from extending the First Increment is provided below.

[4]A primary First Increment objective of the Program is to reduce deficits to the Service's central Platte River annual species and pulse target flows by an average of 130,000 to 150,000 acre-feet per year at Grand Island, Nebraska. The Service formulated target flows, in their current form, in 1994 and submitted them to the FERC as Federal Power Act of 1920, Section 10(j), recommendations for relicensing Kingsley Dam and associated facilities in Nebraska. Reclamation subsequently incorporated the target flows into the Program as an initial reference point for determining periods of excess and shortage in the operation of Program reregulation. It did this so that Program water could be used to reduce those shortages. Target flows vary by season and month and include annual pulse flow targets.

- Summary of beneficial impacts from extending the First Increment (Service 2006):
  - Very small beneficial hydrological effects during food base production period
  - Small beneficial hydrologic effects during summer low flow period
  - Increased mean sediment transport rate[5] influencing habitat formation
  - Increased median sediment transport rate influencing habitat maintenance
- Summary of adverse impacts from extending the First Increment (Service 2006):
  - Very small adverse hydrologic effects during spawning
  - Very small adverse hydrologic effects during habitat formation period

Cumulative Effects

Cumulative effects are those from future state, local, or private (nonfederal) actions that are reasonably certain to occur in the area of analysis. A nonfederal action is "reasonably certain" to occur if the action requires the approval of a state or local resource or land-control agency, such agencies have approved the action, and the project is ready to proceed.

Continued operation of the Loup River Hydroelectric Project would result in daily fluctuations in flow release to the Platte River, but the Service has determined in a recent BO (Service 2016a) that this operation is not likely to jeopardize the continued existence of pallid sturgeon.

Cumulative effects on lower Platte River hydrology have been evaluated using a report titled 2014 Annual Evaluation of Availability of Hydrologically Connected Water Supplies (NDNR 2014, as reported in Service 2016a). The Nebraska Department of Natural Resources (NDNR) projects that future water development in the lower Platte River basin would result in an additional reduction in stream flows of 173 cfs at the Louisville stream gage by 2041 (NDNR 2014). Streamflow losses from future water development are in addition to expected declines from existing development reported as a 398-cfs reduction at the Louisville stream gage by the year 2041 (NDNR 2014).

Ongoing trends that are likely to occur include increased floodplain development (i.e., urban, industrial, and commercial); continued depletions and return flows from municipal, industrial, and agricultural uses on the Platte River; and ongoing construction and maintenance of bridges, highways, local roads, railways, and utility rights-of-way. Increased water temperatures from outfalls and introduction of contaminants from industrial, agricultural, and municipal sources may contribute to lack of pallid sturgeon recruitment by reduced egg quality and fitness of offspring, If the native fish community composition is altered, key prey species for pallid sturgeon may not be available for consumption, with implications for pallid sturgeon growth, condition, and reproductive success.

[5]Changes in sediment transport rate are expressed as change from previous contributions of the upper basins in the habitat area. Changes are determined near Chapman (approximately 125 river miles above uppermost extent of known habitat area), leading to some uncertainty on how the actual effects are realized in the habitat area.

The combined effects of Program water management actions upstream of the central Platte River on hydrology in the lower Platte River, including both Program and non-Program uses, is uncertain. Some actions may provide benefits, while others may have adverse effects. One beneficial Program effect is the protection of Service target flows in the central Platte River through the state and federal new depletions plans, which limit degradation of lower Platte River flows and reduce the opportunity for lethal high-water temperatures.

3.10.4 Impacts from the No Action Alternative

Because of the uncertainty associated with assessing the impacts of Program actions on the hydrology of the lower Platte River because of the magnitude of the influence of flows from the Loup and Elkhorn Rivers, distinguishing between the effects of the Proposed Action and the No Action Alternative is challenging with the current state of knowledge. Under the No Action Alternative, knowledge gained from the Program's expert workshop would not be put into action for the benefit of the pallid sturgeon; however, the lower Platte River habitats would deteriorate only if certain Program water projects and depletion plan protections were discontinued without the Program. The likelihood of this is uncertain under the No Action Alternative. The Service would continue to manage water for the benefit of the pallid sturgeon under the No Action Alternative. It has worked with non-Program entities to optimize species benefits and would continue to do so without the Program. The Program adds pallid sturgeon research, which is expected to improve how species' benefits are optimized; this would be lost under the No Action Alternative.

Cumulative Effects

As described above under the Proposed Action *Cumulative Effects* section, other actions can impact pallid sturgeon due to reduced stream flows, floodplain development and increased water temperatures. Not extending the Program's First Increment could result in the lower Platte River habitat deteriorating if certain Program water projects and depletion plan protections were discontinued without the Program; however, the likelihood of this is uncertain under the No Action Alternative.

3.11 Other Federally Listed Species and Designated Critical Habitat

3.11.1 Affected Environment

Table 3-14, below, shows other federally listed species and critical habitats that occur within the area of analysis and notes the state(s) in which each species occurs.

Table 3-14. Federally Listed Species and Critical Habitats in the Area of Analysis

Common Name	Scientific Name	Status	State
Federally Listed Species			
American burying beetle	*Nicrophorus americanus olivier*	Endangered	Nebraska
Black-footed ferret	*Mustela nigripes*	Endangered	Wyoming Colorado
Canada lynx	*Lynx canadensis*	Threatened	Wyoming Colorado

Table 3-14. Federally Listed Species and Critical Habitats in the Area of Analysis

Common Name	Scientific Name	Status	State
Colorado butterfly plant	*Gaura neomexicana* var. *coloradensis*	Threatened	Wyoming Colorado Nebraska
Eskimo curlew	*Numenius borealis*	Endangered	None[1]
Gray wolf	*Canis lupus*	Endangered; delisted	Wyoming[2] Colorado Nebraska
North Park phacelia	*Phacelia formosula*	Endangered	Colorado
Northern long-eared bat	*Myotis septentrionalis*	Threatened	Wyoming Nebraska
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	Threatened	Wyoming Colorado
Rufa red knot	*Calidris canutus rufa*	Threatened	Nebraska
Ute ladies'-tresses orchid	*Spiranthes diluvialis*	Threatened	Wyoming Colorado Nebraska
Western prairie fringed orchid	*Platanthera praeclara*	Threatened	Nebraska
Wyoming toad	*Bufo baxteri*	Endangered	Wyoming
Designated Critical Habitats			
Colorado butterfly plant	*Gaura neomexicana* var. *coloradensis*	Threatened	Wyoming
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	Threatened	Colorado

Source: Service 2017c
[1]The Eskimo curlew is believed to be extirpated from the area of analysis (Service 2016b).
[2]Distinct Population Segment found in Wyoming delisted due to recovery.

The species and critical habitats listed above are generally the same as those described in the 2006 Final EIS with the following exceptions:

- The bald eagle (*Haliaeetus leucocephalus*) was delisted in 2007 due to recovery (72 FR 37346).
- Critical habitat for Preble's meadow jumping mouse was revised in 2010, and designated critical habitat is now limited to Colorado (75 FR 78430).
- The rufa red knot was listed as a threatened species under the ESA in 2014 (79 FR 73705).
- The northern long-eared bat was listed as a threatened species under the ESA in 2015 (80 FR 17973).
- Gray wolf was not analyzed in the 2006 Final EIS, but is now believed to be present within the area of analysis.
- The status of the western prairie fringed orchid is threatened, not endangered as reported in the 2006 Final EIS.
- In addition to known populations in Wyoming and Colorado, described in the 2006 Final EIS, the Ute ladies'-tresses orchid is also believed to occur in western Nebraska, north of the North Platte River (Service 2017d).

Detailed descriptions of each species and their occurrence in the area of analysis are provided below.

American Burying Beetle

Status and distribution. The American burying beetle was listed as an endangered species under the ESA in 1989 (54 FR 29652). The beetle was historically abundant throughout most of the eastern United States and Canada, ranging north to Québec, east to Nova Scotia, south to the Gulf of Mexico, and west to Nebraska. Beetle populations collapsed dramatically during the twentieth century primarily from habitat loss and alteration, and the species is considered to be extirpated throughout most of its historical range. It is estimated that the beetle currently occurs in less than 10 percent of its historical range and occupies less than 1 percent of its historical habitat (Service 1991 and 2008). At the time of its ESA listing in 1989, the beetle was believed to occur at only two locations: Block Island, Rhode Island, and Latimer County, Oklahoma (Service 1991); however, additional surveys have been conducted since that time, and the beetle is now believed to occur in Massachusetts (isolated populations), South Dakota, Kansas, Oklahoma, Arkansas, Texas, and Nebraska. Extensive surveys in many other eastern U.S. states have failed to discover remnant beetle populations (Service 2008).

In Nebraska, the American burying beetle occurs in two separate geographically isolated populations: the Loess Hills population and the Sandhills population (Service 2008). Individuals that occur within the area of analysis in Nebraska are members of the Loess Hills population, which includes Dawson, Frontier, Gosper, and Lincoln Counties.

Life history. The American burying beetle is a scavenging species that uses carrion (i.e., animal carcasses) for food and brood rearing. These beetles locate carrion, typically consisting of small mammals and birds, then one male and one female beetle work together to bury the carrion. The female lays her eggs in the buried carcass, and the adult pair stays with the developing larvae until the grubs pupate. Both the adults and young feed on the buried carcass. The beetle buries into the ground to hibernate during the winter, and the next generation typically reemerges in late May or early June (in Nebraska; Ratcliffe 1996).

Habitat. This species occurs in wet meadows, streams, and wetlands and in association with relatively undisturbed, semi-arid, sandhill and loam grasslands. The American burying beetle is generally recognized as a habitat generalist; however, this species is intolerant of human disturbances (Service 2008).

Threats. The major threat to the beetle is habitat fragmentation, to which the massive overall decline of this species has been attributed (Service 1991). In Nebraska, loss of native grassland from conversion to irrigated row crop agriculture is the main cause of beetle habitat loss and fragmentation. Other potential threats to this species include use of artificial lighting and competition with avian and mammalian scavengers for carrion. Because the beetle’s life cycle depends on temperature and precipitation cues, global climate variation may also affect this species (Service 2008).

Black-footed ferret

Status and distribution. The black-footed ferret was listed as an endangered species in 1967 (32 FR 4001) pursuant to early endangered species legislation in the United States and was "grandfathered" into the ESA. This species was once abundant throughout North American intermountain and prairie grasslands. This species underwent extreme decline from the late 1800s to the 1960s because of the loss of habitat from conversion of native prairie to cropland, poisoning, and disease. The ferret was considered extremely rare before a small population was located in Mellette County, South Dakota, in 1964. In 1974, the remnant wild population of ferrets in South Dakota abruptly disappeared.

Captive breeding efforts were unsuccessful, and the last captive animal from the Mellette population died at Patuxent Wildlife Research Center in 1979, at which time the species was presumed to be extinct; however, in 1981 a small population of ferrets was discovered near Meeteetse, Wyoming. The population increased from 1981 through 1984, reaching a peak of nearly 130 ferrets, but the population declined to only 18 animals due to a disease outbreak in the early 1980s. All surviving wild ferrets at Meeteetse were removed during 1985 to 1987, after which no wild populations of black-footed ferrets have been found (Service 2013).

The 20 specific black-footed ferret reintroduction projects have met with varying success, beginning in 1991. The estimated number of black-footed ferrets remaining in the wild due to reintroduction efforts is 418 individuals. Approximately 280 additional animals are managed in captive breeding facilities in Arizona, Colorado, Montana, and New Mexico. The only known population in Wyoming is a reintroduced population in the Shirley Basin located in the northwest corner of Carbon County. In Colorado, black-footed ferrets have been released in the remote White River region in the northwest portion of the state, and a Nonessential Experimental Population has been established at the U.S. Bureau of Land Management's Wolf Creek Management Area (Service 2013); however, these areas are outside the area of analysis.

Life history. The black-footed ferret is generally a nocturnal predator, appearing above ground at irregular intervals and for varying durations. This species is an extreme specialist that depends on prairie dogs for food and shelter. Black-footed ferrets occupy prairie dog burrows and do not dig their own burrows. The black-footed ferret is solitary, except for the breeding period, which occurs from mid-March through early April in the wild (Service 2013).

Habitat. Habitat for the black-footed ferret is limited exclusively to prairie dog colonies, where they occupy existing burrows. Ferrets generally select for areas within prairie dog colonies that contain high burrow densities and thus high densities of prairie dogs (Service 2013).

Threats. Major threats to the black-footed ferret include habitat loss or fragmentation due to conversion of native prairie to cropland, urbanization, and disease (Service 2013).

Canada Lynx

Status and distribution. The Canada lynx was listed as a threatened species under the ESA in 2000 (65 FR 58). Within the contiguous United States, the lynx's range extends into different regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. These regions are the Northeast, Great Lakes, northern Rocky Mountain/Cascades, and

the Southern Rocky Mountains. The Canada lynx is currently believed to occur in 14 U.S. states, including Wyoming and Colorado, where it is found in isolated, high-elevation populations well outside the North Platte River basin.

Critical habitat for the Canada lynx was designated in 2014 (79 FR 54781). Designated critical habitat for the Canada lynx covers portions of five U.S. states, including a portion of western Wyoming outside the area of analysis.

Life history. The Canada lynx is a top-tier predator with a relatively large home range, generally between 12 and 83 square miles. Snowshoe hares are the primary prey of lynx, comprising the bulk of the lynx diet throughout its range. Breeding typically occurs March through April (Service 2017e).

Habitat. Canada lynx are associated with moist boreal forest habitats that have cold, snowy winters and a high-density snowshoe hare prey base (Service 2017e).

Threats. In all regions within the range of the lynx in the contiguous United States, habitat fragmentation and land uses, including timber harvest, recreation, and their related activities, are the predominant threats to this species. Declining populations of their primary prey item, snowshoe hare, are also a threat to this species (Service 2017e).

Colorado Butterfly Plant

Status and distribution. The Colorado butterfly plant was listed as a threatened species under the ESA in 2000 (65 FR 62302). Distribution of this species is limited to Colorado, Wyoming, and Nebraska. This regional endemic species is restricted to Laramie and Platte Counties in Wyoming, and Larimer, Jefferson, and Weld Counties in Colorado. It historically occurred in western Kimball County, Nebraska, where it is likely extirpated now (Service 2017f).

Critical habitat. Critical habitat for the Colorado butterfly plant was designated in 2005 (70 FR 1940). The designation consists of seven units within Platte and Laramie Counties, Wyoming. The area of analysis includes Colorado butterfly plant critical habitat.

Life history. The Colorado butterfly plant is a perennial herb that lives for several years before bearing fruit once and then dying. The establishment and survival of seedlings appears to be enhanced at sites where tall and dense vegetation has been removed by some form of disturbance. In the absence of occasional disturbance, the plant's habitat can become choked out by dense growth of willows, grasses, and exotic plants, which prevents new seedlings from becoming established and replacing plants that have died (Service 2017f).

Habitat. The Colorado butterfly plant occurs on sub-irrigated, alluvial (stream deposited) soils on level or slightly sloping flood plains and drainage bottoms at elevations of 1,524 to 1,951 meters (5,000 to 6,400 feet). Colonies are often found in low depressions or along bends in wide, active, meandering stream channels a short distance upslope of the actual channel. The plant requires early- to mid-succession riparian (riverbank) habitat. Colorado butterfly plant habitat is open, without dense or overgrown vegetation. The plant occurs on soils derived from conglomerates, sandstones, and tuffaceous mudstones and siltstones that are common in eastern Colorado and Wyoming (Service 2017f).

Threats. The primary threat to this species is habitat loss and fragmentation due to residential and urban development. Haying and mowing at certain times of the year, water development, land conversion for cultivation, competition with exotic plants, and nonselective use of herbicides are additional threats to the species (Service 2017f).

Eskimo Curlew

Status and distribution. The Eskimo curlew is listed as endangered under the ESA. The current population of Eskimo curlew is estimated at less than 50 individuals. It is highly possible that the species is extinct. The last documented sighting of the Eskimo curlew was in Texas in 1962. The Eskimo curlew was once very abundant with historical population estimates ranging from hundreds of thousands to millions. Unrestricted hunting for the market decimated Eskimo curlew populations leading to a dramatic decline between 1870 and 1890. There was no population recovery following the end of commercial harvest of the Eskimo curlew (Alaska Department of Fish and Game 2017).

Life history. The Eskimo curlew migrated incredible distances each year. In the spring, they migrated from South America through the central United States and the prairie provinces of Canada to their nesting areas in the Alaskan and Canadian arctic (Alaska Department of Fish and Game 2017). This northward migration likely began in late February or March with arrival on the breeding grounds in late May. In August they left the breeding grounds and travelled eastward to Labrador and Newfoundland to feed prior to beginning their non-stop southern migration. In the fall, they migrated down the east coast of North America to their wintering grounds in the grasslands of southern South America from southern Brazil and Uruguay to Argentina.

Eskimo curlew made nests by creating shallow depressions on bare ground in dry tundra areas of the Arctic and subarctic (Alaska Department of Fish and Game 2017). Females laid four eggs per clutch, one clutch per year. Eggs hatched in late June and early July. Eskimo curlews fed in open natural grassland and tundra, burned prairies, meadows, and pastures. They ate insect eggs found on the prairie grasslands of North America during their northward migration.

Habitat. The Eskimo curlew nested in arctic tundra areas in Alaska and northwestern Canada and fed in grassland, tundra, burned prairie, meadow, and pasture habitats. They spent the winter in grasslands in the South American countries of Brazil, Uruguay, and Argentina then migrated through North America to their summer breeding grounds in Alaska and northwestern Canada (Alaska Department of Fish and Game 2017).

Threats. If the Eskimo curlew still exists, the primary threat is habitat loss. The prairie habitat in central North America has been changed due to fire suppression and conversion to agricultural lands. In 1994, only 4 percent of the prairie habitat on their northern migration route remained (Alaska Department of Fish and Game 2017).

Gray Wolf

Status and distribution. Listed below are recent action taken by the federal government related to the status of the gray wolf and current populations trends (Service 2017g).

- On July 1, 2015, the Service determined that a petition to reclassify all gray wolves in the conterminous United States, except for the Mexican wolf (*Canis lupus baileyi*) in the Southwest, as a threatened species under the ESA does not present substantial information, indicating that reclassification may be warranted.
- On January 16, 2015, the Service finalized a rule listing Mexican wolves as a separate entity under the ESA and revised the regulations for the nonessential experimental population of the Mexican wolf under section 10(j) of the ESA to make it more effective in recovering this endangered subspecies, which became effective on February 17, 2015.
- On December 19, 2014, following two court orders, the Service reinstated regulatory protections under the ESA for the gray wolf in Wyoming and the western Great Lakes on February 20, 2015.
- On June 13, 2013, the Service concurrently proposed a rule in the *Federal Register* to remove the gray wolf from the Federal List of Threatened and Endangered Species and list the Mexican wolf subspecies as endangered and expand recovery efforts in the Southwest.
- The Service's 2013 comprehensive review determined that the current listing for gray wolf, which was developed 35 years ago, erroneously included large geographical areas outside the species' historical range. In addition, the review found that the then-current gray wolf listing did not reasonably represent only remaining range of the Mexican wolf population in the Southwest.
- On April 26, 2017, the Service delivered a final rule to comply with a court order that reinstated the removal of federal protections for the gray wolf in Wyoming under the ESA.

The gray wolf has rebounded from the brink of extinction to exceed population targets by as much as 300 percent. Today, an estimated 5,691 gray wolves are in the contiguous United States. Wolf numbers continue to be robust, stable, and self-sustaining (Service 2017g).

Life history. Gray wolves breed in late winter usually when they are 3 years of age. After a gestation period of 63 days, an average litter of 6 pups is born in a den in the ground, rock pile, hollow log, or other shelter. When the pups reach 8 weeks of age, the adults may move them to another den. By October the pups will weigh about 60 pounds and travel with the adults. Young gray wolves usually stay with the adults for 2 years, forming a pack. At 2 years of age, they may disperse hundreds of miles from their original home. Gray wolves usually hunt large animals such as moose and deer although beaver and other smaller animals supplement their diet. Gray wolves are often more successful taking old, weak, or injured prey. Gray wolves are territorial and will keep other gray wolves and coyotes out of their 50- to 100-square-mile home range. Howling is a way for pack members to communicate (Service 2017g).

Habitat. Wolves require large areas of contiguous habitat that can include forests and mountainous terrain. Suitable habitat must have sufficient access to prey, protection from excessive persecution, and areas for denning and taking shelter (Defenders of Wildlife 2017).

Threats. Perhaps the greatest threat to the gray wolf is from human adversaries who either shoot or poison them.

North Park Phacelia

Status and distribution. North Park phacelia was as an endangered species under the ESA in 1982 (47 FR 38540). This Colorado endemic species is only found in North Park in Jackson County. Within the North Park region, the species is found from Michigan Creek west to the headwaters of the North Platte River. Roughly 16,000 individuals are known from 6 separate populations and the entire species occurs within an area of approximately 10 square miles (Service 2017h).

Life history. North Park phacelia is a herbaceous plant species that grows 6 to 12 inches tall and bears bright purple flowers that are arranged in coils at the ends of stems. North Park phacelia blooms in July and August. This species is a biennial, surviving for 1 year as a rosette of leaves before flowering and dying the following year (Service 2017h).

Habitat. Habitat for this species consists of eroded soil outcrops composed of barren exposures of the Coalmont Formation, a coal-bearing substrate. The species is found at about 8,000 to 8,300 feet in elevation (Service 2017h).

Threats. The primary threats to North Park phacelia are concentrated livestock use (trampling); off-highway vehicle recreation; land use changes, including energy development, commercial, and residential development; and range improvements. Because of its extremely limited distribution, the species is vulnerable to habitat modification and changes in the environment. North Park phacelia also relies on insect pollinators to maintain genetic diversity. The loss of pollinators and pollinator habitat is considered a threat to the species (Service 2017h).

Northern Long-Eared Bat

Status and distribution. The northern long-eared bat was listed as a threatened species under the ESA in 2015 (80 FR 17973). In 2016, the Service also issued a 4(d) Rule (81 FR 1900), which allows incidental take under certain conditions in areas that have not been affected by white-nose syndrome (WNS), a fungal disease (outside the WNS zone). This small bat species occurs across much of the eastern and north-central United States. Its range encompasses 37 states and all 13 Canadian provinces.

Life history. During the summer, the northern long-eared bat roosts underneath bark or in cavities of a variety of tree species, both live and dead, and may roost individually or in colonies. Summer roosting sites may also include caves, mines, or human-made structures, such as barns, other buildings, utility poles, window shutters, and bat houses (80 FR 17974). During the winter, the northern long-eared bat inhabits large caves or mines (Caceres and Pybus 1997).

Habitat. The northern long-eared bat may roost in trees along the Platte River east of North Platte, Nebraska, in the area of analysis. The only known hibernacula in the area of analysis are limestone quarries located in Cass County, Nebraska (80 FR 17974). The northern long-eared bat's range includes portions of northeastern Wyoming outside the area of analysis. Potential occurrences of this species in the area of analysis would be limited to the central and lower Platte

River Sub-basins. Most of this area is within the WNS zone, as defined in the Service's Final 4(d) Rule (81 FR 1900).

Threats. The predominant threat to this species is WNS, a fungal disease that has caused massive population declines in some portions of this species' range, prompting the Service to list this species under the ESA.

Preble's Meadow Jumping Mouse

Status and distribution. The Preble's meadow jumping mouse was listed as threatened by the Service on May 3, 1998, and occurs only in Colorado and Wyoming. Critical habitat for the mouse was designated in Colorado and has been amended several times. The mouse is known to occupy the counties along the Front Range from the Wyoming border through El Paso County. No range-wide population estimates are available for the species.

Life history. The Preble's meadow jumping mouse usually has two litters per year, with an average of five young born per litter. They are long lived for a small mammal (up to 3 years). The diet of the mouse shifts seasonally, consisting of insects and fungi after emerging from hibernation in May and shifting to fungi and moss during mid-summer with insects in the fall. Seeds are also an important part of the diet. They construct day nests composed of grasses, forbs, sedges, rushes, and other available plant material. An individual mouse can have multiple day nests that it uses for about a week. The Preble's meadow jumping mouse typically enters its hibernation nests between September and October, and emerge the following May. They do not store food, but rather survive off body fat accumulated prior to hibernation (Service 2017i).

Habitat. During summer, the most important wetland types occupied by Preble's meadow jumping mice include riparian areas and adjacent wet meadows. During the summer, they prefer dense shrub, grass, and forb ground cover along creeks, rivers, and associated waterbodies. From early fall through the spring, they hibernate underground in burrows that are typically at the base of vegetation (Colorado Parks and Wildlife 2017a).

Threats. Primary threats to the Preble's meadow jumping mouse population include habitat loss, alternation, degradation, and fragmentation resulting from urban development, flood control, other water development, and other human land uses, especially in riparian habitat.

Rufa Red Knot

Status and distribution. The rufa red knot was listed as a threatened species under the ESA in December 2014, following a rapid population decline from about 82,000 individuals in the 1980s to fewer than 30,000 individuals by 2010 (79 FR 73706). The rufa red knot is a subspecies of the red knot (*Calidris canudus*), the largest North American sandpiper species. Individuals of the Texas wintering subset have occasionally been documented in the states along the Central Flyway, including Nebraska (Baker et al. 2013; Jorgensen 2014); however, only 15 occurrences of the rufa red knot have been noted in the state of Nebraska in more than 100 years (Jorgensen 2014; Central Flyway Council 2013). Sites where the rufa red knot has been documented in Nebraska include Rainwater basin in south-central Nebraska and Lake McConaughy on the North Platte River. This species would potentially occur in the area of analysis only during spring and fall migrations, and the likelihood of occurrence is very low.

Life history. The red knot is noted for its extraordinarily long migrations, sometimes traveling up to 9,000 miles between breeding and wintering grounds. The rufa subspecies breeds in the Canadian Arctic and winters in Chile and Argentina, except for the small subset that winters along the Texas coast.

Habitat. Nesting habitat for the rufa red knot consists of barren tundra, while wintering habitat consists of sandy beaches, tidal flats, and mangroves.

Threats. Threats to the rufa red knot include loss of nesting and wintering habitat from climate variation (Baker et al. 2013), which affects weather conditions, seasons, and availability of food resources, most notably the availability of horseshoe crab eggs.

Ute Ladies'-tresses Orchid

Status and distribution. Ute Ladies'-tresses orchid was listed as a threatened species under the ESA in 1992 (57 FR 2053). Distribution of this species occurs within seven U.S. states, including Wyoming, Colorado, and Nebraska. It is believed to be extirpated throughout much of its historical range (Service 2017d).

Life history. Ute Ladies'-tresses orchid is a long-lived perennial forb that likely reproduces exclusively by seed. Its life cycle consists of four main stages: seedling, dormant, vegetative, and reproductive (flowering or fruiting). Fruits are produced in late August or September across most of the plant's range, with seeds shed shortly thereafter (Service 2017d).

Habitat. This orchid is found in moist soils near wetland meadows, springs, lakes, and perennial streams. It occurs generally in alluvial substrates along riparian edges, gravel bars, old oxbows, and moist to wet meadows at elevations from 4,200 to 7,000 feet. The orchid colonizes early successional riparian habitats such as point bars, sandbars, and low-lying gravelly, sandy, or cobbly edges, persisting in those areas where the hydrology provides continual dampness in the root zone through the growing season. The species occurs primarily in areas where the vegetation is relatively open and not overly dense, overgrown, or overgrazed. Plants usually occur as small scattered groups and occupy relatively small areas within the riparian system (Service 2017d).

Threats. Threats that initially led to the listing of this species included habitat loss and modification (through urbanization, water development, and conversion of wetlands to agriculture), over-collection, competition from exotic weeds, and the use of herbicides. Other threats that have been identified since that time include impacts from recreation, mowing for hay production, grazing by cattle or horses, changes in hydrology (modification of wetland habitats through development, flood control, de-watering, and other changes to hydrology), herbivory by native wildlife (particularly voles), reduction in the number and diversity of insect pollinators, drought, absence or rarity of mycorrhizal symbionts, and conflicting management with other rare species (Service 2017d).

Western Prairie Fringed Orchid

Status and distribution. The western prairie fringed orchid was listed as a threatened species under the ESA in 1989 (54 FR 39857). This species is extirpated throughout much it its historical

range and is currently known to occur in six U.S. states (including Nebraska) and one Canadian province. In Nebraska, the orchid is known to occur at 64 sites in 15 counties, and has been documented in the central Platte Valley (NRCS 2009). Within the area of analysis, the orchid has been documented in Hall County and Sarpy County, as noted in the 2006 Final EIS.

Life history. The western prairie fringed orchid is a smooth, erect, perennial herb that is 4 feet tall with 2 to 5 fairly thick, elongate, hairless leaves. The flowering stalk is a raceme bearing up to 24 showy, creamy white to white, or rarely greenish white flowers. The western prairie fringed orchid flowers from mid-June through mid-July (Service 1996; NRCS 2009).

Habitat. The western prairie fringed orchid is found in wet to moist soils with full sunlight in swales in tallgrass prairie and on wet meadows usually in calcareous silt loam or sub-irrigated sandy loam prairies. It may occur along ditches or roadsides (Service 1996).

Threats. As noted in the 2006 Final EIS, habitat dewatering and conversion to cropland are primary factors adversely affecting the western prairie fringed orchid throughout its range. Hydrologic alterations that draw down the water table near the root zone are associated with decreased flowering and increased plant mortality.

Because Platte River discharge and stage are dominant factors influencing groundwater levels in the Platte River valley, depletions during the spring contribute to reduced frequency and duration of saturated soil conditions. Depletions contribute cumulatively to flow reductions during the pulse flow season (May and June). This, in turn, influences the frequency and duration of soil saturation. Because of reduced flows, low-lying prairies and wet meadows near the Platte River have become drier. Conversion, fragmentation, and dewatering of low grassland and wet meadow habitats may adversely affect the western prairie fringed orchid by: 1) eliminating habitat; 2) reducing its potential range and distribution; 3) preventing or retarding expansion, colonization, or recolonization; and 4) decreasing the resilience of isolated populations to environmental stochasticity.

Other threats to the long-term survival of western prairie fringed orchid include the spread of invasive plants into prairie swales, the effects of herbicide and pesticide on the species and its pollinators, overgrazing, intensive haying, river channelization, and river siltation. Invasive plants that may displace the western prairie fringed orchid through competition include leafy spurge (*Euphorbia esula*), Kentucky bluegrass, and musk thistle (*Carduus nutans*; Service 2009b).

Wyoming Toad

Status and distribution. The Wyoming toad was listed as an endangered species under the ESA in 1984 (49 FR 1992). It is considered one of the four most endangered amphibian species in North America. The Wyoming toad is endemic to Wyoming and is only found in the Laramie River basin. It was common throughout this region until the 1970s, but the last ten toads believed to exist in the wild were taken into captivity in 1989 for breeding (Service 2015b).

Currently, all Wyoming toads are the product of captive bred releases and can be found in the Laramie River basin at Mortenson Lake located on the Service's Mortenson Lake Wildlife Refuge and on two properties covered under the Wyoming Toad Safe Harbor Agreement. No other populations are known to exist in the wild (Service 2015b).

Life history. The Wyoming toad breeding season is from mid-May to mid-June. Eggs are deposited in gelatinous strings resembling black pearl necklaces and are often intertwined with vegetation. Hatching occurs within several days, and metamorphosis occurs 4 to 6 weeks later. Adult Wyoming toads have an extremely small dispersal range, rarely venturing more than a quarter of a mile from their hatching location (Service 2015b).

Habitat. Remaining occupied habitat for Wyoming toad consists of Mortenson Lake, a 61-acre lake situated in the shortgrass prairie ecosystem of the Laramie River basin. The vegetation immediately around the lake consists of a mixture of rush, sedge, and grass communities. Uplands are arid and consist of grass with scattered shrubs (Service 2015b).

Threats. While the precise causes of the Wyoming toad's population decline are unknown, a variety of factors have likely contributed to the decline. Infectious disease, habitat alterations, and contaminants have been suggested as top contributors to the decline (Service 2015b).

3.11.2 Impacts from the Proposed Action

Under the Proposed Action, extension of the Program's First Increment would result in the continuation of the effects on other federally listed species that were described in the 2006 Final EIS. In general, potential effects on other federally listed species would occur because of changes in river flow, agricultural activities, and water use.

Because of the wide distribution of some listed species and the uncertainty regarding the specific location of some activities, such as land acquisition and management and water leasing, the potential for site-specific impacts on some listed species, habitats, and designated critical habitats within the area of analysis cannot be fully predicted; however, following consultation with the Service, actions that are likely to jeopardize listed species or adversely modify designated critical habitat would be avoided or offset. **Table 3-15**, below, and **Appendix A**, summarize effects of implementing the Proposed Action on other federally listed species and designated critical habitats. These effects are described in more detail below and are grouped by effect determination.

Table 3-15. Determination of Effect for Other Federally Listed Species and Designated Critical Habitats under the Proposed Action

Species	Effect Determination
Federally Listed Species	
American burying beetle	May affect, not likely to adversely affect
Black-footed ferret	No effect
Canada lynx	No effect
Colorado butterfly plant	May affect, not likely to adversely affect
Eskimo curlew	No effect
Gray wolf	No effect
North Park phacelia	No effect
Northern long-eared bat	May affect, not likely to adversely affect
Preble's meadow jumping mouse	May affect, not likely to adversely affect
Rufa red knot	No effect
Ute ladies'-tresses orchid	May affect, not likely to adversely affect
Western prairie fringed orchid	May affect, likely to adversely affect
Wyoming toad	May affect, not likely to adversely affect

Table 3-15. Determination of Effect for Other Federally Listed Species and Designated Critical Habitats under the Proposed Action

Species	Effect Determination
Designated Critical Habitats	
Colorado butterfly plant	May affect, not likely to adversely affect
Preble's meadow jumping mouse	May affect, not likely to adversely affect

No Effect

Implementing the Proposed Action would not affect the black-footed ferret or the Canada lynx because these species are not known to occur in the area of analysis. Both species are found in isolated populations that are far removed from areas potentially considered for water leasing.

Implementing the Proposed Action would not affect the rufa red knot because this species is extremely unlikely to be present in the area of analysis based on historical records and would potentially occur in the area of analysis only during spring and fall migrations.

Implementing the Proposed Action would not affect the North Park phacelia because no actions are anticipated to occur in the North Platte River headwaters where this species is found.

Implementing the Proposed Action would not affect the gray wolf because no actions are anticipated to result in loss of habitat for this species or its prey. Additionally, this species is extremely rare and transient in nature. Potential occurrences in the study area would be infrequent.

Implementing the Proposed Action would not affect the Eskimo curlew because this species is believed to be extirpated from the area of analysis (Service 2016b).

May Affect, not Likely to Adversely Affect

Implementing the Proposed Action could affect the American burying beetle through water leasing actions, as described in the 2006 Final EIS; however, site-specific NEPA compliance and ESA Section 7 consultation with the Service would be undertaken to ensure that the Proposed Action would not jeopardize the continued existence of this species; therefore, the Proposed Action may affect, but is not likely to adversely affect, the American burying beetle.

Under the Proposed Action, land management activities and other actions, including tree clearing, removing in-channel vegetation, disking, channel widening, and prescribed burning on grasslands, have the potential to adversely affect the northern long-eared bat along the central Platte River AHR. Tree removal may pose the greatest risk to this species because the northern long-eared bat uses trees along the central Platte River for summer roosting habitat. Under the final 4(d) rule, incidental take from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree(s) or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or within 0.25 miles of a hibernaculum.

Reclamation conducted informal consultation with the Service in August 2016 regarding potential impacts of the Program on the northern long-eared bat. The Service confirmed that the

portion of the central Platte River AHR where Program actions would occur meets the criteria for allowance of incidental take under the final 4(d) rule and determined that Reclamation could eliminate the risk of take by avoiding all tree removal activities from June 1 through July 31; therefore, the Proposed Action may affect, but is not likely to adversely affect, the northern long-eared bat.

Potential impacts on the Colorado butterfly plant, Preble's meadow jumping mouse, Ute ladies'-tresses orchid, and Wyoming toad cannot be fully predicted because of these species' distribution in the study area and the uncertainty regarding the specific location of land acquisition and management and water leasing activities under the Proposed Action; however, site-specific NEPA compliance and ESA Section 7 consultation with the Service would be undertaken to ensure that implementation of the Proposed Action would not result in a jeopardy determination for any of these species or result in damage or adverse modification of critical habitat; therefore, the Proposed Action may affect, but is not likely to adversely affect, these species or their designated critical habitats.

May Affect, Likely to Adversely Affect

Extension of the Program's first increment under the Proposed Action would result in ongoing effects on the western prairie fringed orchid if flow management activities resulted in decreased early and late spring peaks, as described in the 2006 Final EIS. Potential adverse effects could include:

- Decreased surface water interaction with wet meadows in the central Platte River
- Reduced groundwater sub-irrigation along the central and lower Platte Rivers

Therefore, the Proposed Action may affect, and is likely to adversely affect, the western prairie fringed orchid.

3.11.3 Impacts from the No Action Alternative

Under the No Action Alternative, the Program would not be continued. Discontinuation of the Program would have no effect on other federally listed species because none of the actions associated with the Proposed Action would occur, and the effects of those actions on other federally listed species, described above, would not occur.

3.12 State-Listed and Species of Concern

3.12.1 Affected Environment

Table 3-16, below, shows Wyoming, Colorado, and Nebraska state-listed endangered and threatened species and species of special concern that may occur in the area of analysis. Species that may occur in the area of analysis were determined based on lists provided by the three states. The State of Wyoming does not have listed threatened and endangered species, but it did supply a list of species of greatest conservation need that may occur in the area of analysis (Wyoming Game and Fish Department 2017a).

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Amphibians				
Great Basin spadefoot	*Spea intermontana*	Species of greatest conservation need		
Great Plains toad	*Anaxyrus cognatus*	Species of greatest conservation need		
Northern cricket frog	*Acris crepitans*		Species of special concern	
Northern leopard frog	*Rana pipiens*	Species of greatest conservation need	Species of special concern	
Plains leopard frog	*R. blairi*		Species of special concern	
Plains spadefoot	*Spea bombifrons*	Species of greatest conservation need		
Western boreal toad	*Bufo boreas*		Endangered	
Western tiger salamander	*Ambystoma mavortium*	Species of greatest conservation need		
Western toad	*Anaxyrus boreas*	Species of greatest conservation need		
Wood frog	*Rana sylvatica*	Species of greatest conservation need	Species of special concern	
Birds				
American bittern	*Botaurus lentiginosus*	Species of greatest conservation need		
American kestrel	*Falco sparverius*	Species of greatest conservation need		
American peregrine falcon	*F. peregrinus anatum*	Species of greatest conservation need	Species of special concern	
American pipit	*Anthus rubescens*	Species of greatest conservation need		
American white pelican	*Pelecanus erythrorhynchos*	Species of greatest conservation need		
Ash-throated flycatcher	*Myiarchus cinerascens*	Species of greatest conservation need		
Baird's sparrow	*Ammodramus bairdii*	Species of greatest conservation need		
Bald eagle	*Haliaeetus leucocephalus*	Species of greatest conservation need	Species of special concern	
Bewick's wren	*Thryomanes bewickii*	Species of greatest conservation need		
Black-backed woodpecker	*Picoides arcticus*	Species of greatest conservation need		
Black-billed cuckoo	*Coccyzus erythropthalmus*	Species of greatest conservation need		
Black-chinned hummingbird	*Archilochus alexandri*	Species of greatest conservation need		
Black-crowned night heron	*Nycticorax nycticorax*	Species of greatest conservation need		
Black-throated gray warbler	*Setophaga nigrescens*	Species of greatest conservation need		
Black rosy-finch	*Leucosticte atrata*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Black tern	*Chlidonias niger*	Species of greatest conservation need		
Blue-gray gnatcatcher	*Polioptila caerulea*	Species of greatest conservation need		
Blue grosbeak	*Passerina caerulea*	Species of greatest conservation need		
Bobolink	*Dolichonyx oryzivorus*	Species of greatest conservation need		
Boreal owl	*Aegolius funereus*	Species of greatest conservation need		
Brewer's sparrow	*Spizella breweri*	Species of greatest conservation need		
Brown-capped rosy-finch	*Leucosticte australis*	Species of greatest conservation need		
Burrowing owl	*Athene cunicularia*	Species of greatest conservation need	Threatened	
Bushtit	*Psaltriparus minimus*	Species of greatest conservation need		
Calliope hummingbird	*Selasphorus calliope*	Species of greatest conservation need		
Canyon wren	*Catherpes mexicanus*	Species of greatest conservation need		
Caspian tern	*Sterna caspia*	Species of greatest conservation need		
Cattle egret	*Bubulcus ibis*	Species of greatest conservation need		
Chestnut-collared longspur	*Calcarius ornatus*	Species of greatest conservation need		
Clark's grebe	*Aechmophorus clarkii*	Species of greatest conservation need		
Clark's nutcracker	*Nucifraga columbiana*	Species of greatest conservation need		
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	Species of greatest conservation need		
Common loon	*Gavia immer*	Species of greatest conservation need		
Common nighthawk	*Chordeiles minor*	Species of greatest conservation need		
Common yellowthroat	*Geothlypis trichas*	Species of greatest conservation need		
Dickcissel	*Spiza americana*	Species of greatest conservation need		
Ferruginous hawk	*Buteo regalis*	Species of greatest conservation need	Species of special concern	
Flammulated owl	*Psiloscops flammeolus*	Species of greatest conservation need		
Forster's tern	*Sterna forsteri*	Species of greatest conservation need		
Franklin's gull	*Leucophaeus pipixcan*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Golden eagle	*Aquila chrysaetos*	Species of greatest conservation need		
Grasshopper sparrow	*Ammodramus savannarum*	Species of greatest conservation need		
Great blue heron	*Ardea herodias*	Species of greatest conservation need		
Great gray owl	*Strix nebulosa*	Species of greatest conservation need		
Greater sage-grouse	*Centrocercus urophasianus*	Species of greatest conservation need	Species of special concern	
Greater sandhill crane	*Grus canadensis tabida*		Species of special concern	
Harlequin duck	*Histrionicus histrionicus*	Species of greatest conservation need		
Juniper titmouse	*Baeolophus ridgwayi*	Species of greatest conservation need		
Lewis's woodpecker	*Melanerpes lewis*	Species of greatest conservation need		
Loggerhead shrike	*Lanius ludovicianus*	Species of greatest conservation need		
Long-billed curlew	*Numenius americanus*	Species of greatest conservation need	Species of special concern	
MacGillivray's warbler	*Geothlypis tolmiei*	Species of greatest conservation need		
McCown's longspur	*Rhynchophanes mccownii*	Species of greatest conservation need		
Merlin	*Falco columbarius*	Species of greatest conservation need		
Mountain plover	*Charadrius montanus*	Species of greatest conservation need	Species of special concern	Threatened
Northern goshawk	*Accipiter gentilis*	Species of greatest conservation need		
Northern pygmy-owl	*Glaucidium gnoma*	Species of greatest conservation need		
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesii*		Endangered	
Purple martin	*Progne subis*	Species of greatest conservation need		
Pygmy nuthatch	*Sitta pygmaea*	Species of greatest conservation need		
Pygmy rabbit	*Brachylagus idahoensis*	Species of greatest conservation need		
Red-eyed vireo	*Vireo olivaceus*	Species of greatest conservation need		
Red-headed woodpecker	*Melanerpes erythrocephalus*	Species of greatest conservation need		
Red crossbill	*Loxia curvirostra*	Species of greatest conservation need		
Rufous hummingbird	*Selasphorus rufus*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Sage thrasher	*Oreoscoptes montanus*	Species of greatest conservation need		
Sagebrush sparrow	*Artemisiospiza nevadensis*	Species of greatest conservation need		
Short-eared owl	*Asio flammeus*	Species of greatest conservation need		
Snowy egret	*Egretta thula*	Species of greatest conservation need		
Snowy plover	*Charadrius nivosus*	Species of greatest conservation need		
Swainson's hawk	*Buteo swainsoni*	Species of greatest conservation need		
Upland sandpiper	*Bartramia longicauda*	Species of greatest conservation need		
Virginia rail	*Rallus limicola*	Species of greatest conservation need		
Virginia's warbler	*Leiothlypis virginiae*	Species of greatest conservation need		
Western grebe	*Aechmophorus occidentalis*	Species of greatest conservation need		
Western snowy plover	*Charadrius alexandrinus nivosus*		Species of special concern	
White-faced ibis	*Plegadis chihi*	Species of greatest conservation need		
Williamson's sapsucker	*Sphyrapicus thyroideus*	Species of greatest conservation need		
Willow flycatcher	*Empidonax traillii*	Species of greatest conservation need		
Woodhouse's scrub-jay	*Aphelocoma woodhouseii*	Species of greatest conservation need		
Fish				
Bigmouth shiner	*Notropis dorsalis*	Species of greatest conservation need		
Bluehead sucker	*Catostomus discobolus*	Species of greatest conservation need		
Brassy minnow	*Hybognathus hankinsoni*	Species of greatest conservation need	Threatened	
Burbot	*Lota*	Species of greatest conservation need		
Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	Species of greatest conservation need		
Common shiner	*Luxilus cornutus*	Species of greatest conservation need	Threatened	
Finescale dace	*Phoxinum neogaeus*	Species of greatest conservation need		Threatened
Flannelmouth sucker	*Catostomus latipinnis*	Species of greatest conservation need		
Flathead chub	*Platygobio gracilis*	Species of greatest conservation need		
Hornyhead chub	*Nocomis biguttatus*	Species of greatest conservation		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Iowa darter	*Etheostoma exile*	Species of greatest conservation need	Species of special concern	
Lake chub	*Couesius plumbeus*		Endangered	
Lake sturgeon	*Acipenser fulvescens*			Threatened
Northern plains killifish	*Fundulus kansae*	Species of greatest conservation need		
Northern redbelly dace	*Phoxinus eos*		Endangered	Threatened
Plains minnow	*Hybognathus hankinsoni*	Species of greatest conservation need	Endangered	
Plains orangethroat darter	*Etheostoma spectabile*		Species of special concern	
Plains topminnow	*Fundulus sciadicus*	Species of greatest conservation need		
Roundtail chub	*Gila robusta*	Species of greatest conservation need		
Sauger	*Sander canadensis*	Species of greatest conservation need		
Stonecat	*Noturus flavus*		Species of special concern	
Sturgeon chub	*Macrhybopsis gelida*			Endangered
Suckermouth minnow	*Phenacobius mirabilis*	Species of greatest conservation need	Endangered	
Yellowstone cutthroat trout	*Oncorhynchus clarkii bouvieri*	Species of greatest conservation need		
Invertebrates				
Ash gyro	*Gyraulus parvus*	Species of greatest conservation need		
Beavertail fairy shrimp	*Thamnocephalus platyurus*	Species of greatest conservation need		
Calico/papershell crayfish	*Orconectes immunis*	Species of greatest conservation need		
Creeping ancylid	*Ferrissia rivularis*	Species of greatest conservation need		
Cylindrical papershell	*Anodontoides ferussacianus*	Species of greatest conservation need	Species of special concern	
Devil crayfish	*Cambarus diogenes*	Species of greatest conservation need		
Dusky fossaria	*Galba dalli*	Species of greatest conservation need		
Fairy, tadpole, and clam shrimp	Class Branchiopoda	Species of greatest conservation need		
Forest disc	*Discus whitneyi*	Species of greatest conservation need		
Marsh rams-horn	*Planorbella trivolvis*	Species of greatest conservation need		
Pewter physa	*Physella heterostropha*	Species of greatest conservation need		
Plain pocketbook	*Lampsilis cardium*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Prairie fossaria	*Galba bulimoides*	Species of greatest conservation need		
Quick gloss	*Zonitoides arboreus*	Species of greatest conservation need		
Ringed crayfish	*Orconectes neglectus*	Species of greatest conservation need		
Rocky Mountain capshell	*Acroloxus coloradensis*		Species of special concern	
Subalpine mountainsnail	*Oreohelix subrudis*	Species of greatest conservation need		
Tadpole physa	*Physella acuta*	Species of greatest conservation need		
Umbilicate sprite	*Promenetus umbilicatellus*	Species of greatest conservation need		
Mammals				
Abert's squirrel	*Sciurus aberti*	Species of greatest conservation need		
American pika	*Ochotona princeps*	Species of greatest conservation need		
American pygmy shrew	*Sorex hoyi*	Species of greatest conservation need		
Bighorn sheep	*Ovis canadensis*	Species of greatest conservation need		
Black-tailed prairie dog	*Cynomys ludovicianus*	Species of greatest conservation need	Species of special concern	
Dwarf shrew	*Sorex nanus*	Species of greatest conservation need		
Eastern red bat	*Lasiurus borealis*	Species of greatest conservation need		
Eastern Spotted Skunk	*Spilogale putorius*	Species of greatest conservation need		
Fringed myotis	*Myotis thysanodes*	Species of greatest conservation need		
Hayden's shrew	*Sorex haydeni*	Species of greatest conservation need		
Hispid pocket mouse	*Chaetodipus hispidus*	Species of greatest conservation need		
Little brown myotis	*Myotis lucifugus*	Species of greatest conservation need		
Long-eared myotis	*M. septentrionalis*	Species of greatest conservation need		
Long-legged myotis	*M. volans*	Species of greatest conservation need		
Moose	*Alces alces*	Species of greatest conservation need		
North American wolverine	*Gulo luscus*	Species of greatest conservation need	Endangered	
Northern river otter	*Lontra canadensis*	Species of greatest conservation need	Threatened	Threatened
Northern flying squirrel	*Glaucomys sabrinus*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Olive-backed pocket mouse	*Perognathus fasciatus*	Species of greatest conservation need		
Pallid bat	*Antrozous pallidus*	Species of greatest conservation need		
Plains harvest mouse	*Reithrodontomys montanus*	Species of greatest conservation need		
Plains pocket mouse	*Perognathus flavescens*	Species of greatest conservation need		
Sagebrush vole	*Lemmiscus curtatus*	Species of greatest conservation need		
Sand Hills pocket gopher	*Geomys lutescens*	Species of greatest conservation need		
Silky pocket mouse	*Perognathus flavus*	Species of greatest conservation need		
Spotted ground squirrel	*Xerospermophilus spilosoma*	Species of greatest conservation need		
Swift fox	*Vulpes velox*	Species of greatest conservation need	Species of special concern	Endangered
Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	Species of greatest conservation need	Species of special concern	
Uinta chipmunk	*Tamias umbrinus*	Species of greatest conservation need		
Water vole	*Arvicola amphibius*	Species of greatest conservation need		
Western small-footed myotis	*Myotis ciliolabrum*	Species of greatest conservation need		
Western spotted skunk	*Spilogale gracilis*	Species of greatest conservation need		
White-tailed prairie dog	*Cynomys leucurus*	Species of greatest conservation need		
Wyoming pocket gopher	*Thomomys clusius*	Species of greatest conservation need		
Plants				
Saltwort	*Salicornia rubra*			Endangered
Reptiles				
Common garter snake	*Thamnophis sirtalis*		Species of special concern	
Eastern spiny softshell	*Apalone spinifera*	Species of greatest conservation need		
Great Plains earless lizard	*Holbrookia maculata*	Species of greatest conservation need		
Greater short-horned lizard	*Phrynosoma hernandesi*	Species of greatest conservation need		
Massasauga rattlesnake	*Sistrurus catenatus*		Species of special concern	Threatened
Northern many-lined skink	*Plestiodon multivirgatus*	Species of greatest conservation need		
Northern rubber boa	*Charina bottae*	Species of greatest conservation need		
Pale milk snake	*Lampropeltis triangulum*	Species of greatest conservation need		

Table 3-16. Wyoming, Colorado, and Nebraska State-Listed Species and Species of Concern in the Area of Analysis

Common Name	Scientific Name	Wyoming Status	Colorado Status	Nebraska Status
Plains black-headed snake	*Tantilla nigriceps*	Species of greatest conservation need		
Plains box turtle	*Terrapene ornata*	Species of greatest conservation need		
Plains garter snake	*Thamnophis radix*	Species of greatest conservation need		
Plains hog-nosed snake	*Heterodon nasicus*	Species of greatest conservation need		
Plateau fence lizard	*Sceloporus tristichus*	Species of greatest conservation need		
Prairie lizard	*Sceloporus consobrinus*	Species of greatest conservation need		
Prairie racerunner	*Cnemidophorus sexlineatus viridis*	Species of greatest conservation need		
Prairie rattlesnake	*Crotalus viridis*	Species of greatest conservation need		
Red-sided garter snake	*Thamnophis sirtalis*	Species of greatest conservation need		
Smooth green snake	*Opheodrys vernalis*	Species of greatest conservation need		
Western painted turtle	*Chrysemys picta*	Species of greatest conservation need		
Yellow mud turtle	*Kinosternon flavescens*		Species of special concern	

Sources: Wyoming Game and Fish Department 2017a, Nebraska Game and Parks Commission 2017, Colorado Parks and Wildlife 2017b

The federally listed species described in **Sections 3.8** through **3.10** are given a separate protected status at the state-level in Colorado and Nebraska. Federally listed species also listed at the state level are not included in **Table 3-16**, but their status at the state level in Colorado and Nebraska is the same as their federal status except for the Colorado butterfly plant, which is listed as endangered at the state level in Nebraska. Many of the federally listed species described in **Sections 3.8** through **3.10** are also considered to be species of greatest conservation need in Wyoming.

3.12.2 Impacts from the Proposed Action

Under the Proposed Action, potential impacts on state-listed species and species of concern within the area of analysis in Wyoming, Colorado, and Nebraska would generally be the same as those described in the 2006 Final EIS. Potential impacts of the Proposed Action on these species and their habitats are summarized by state. The Proposed Action is not anticipated to result in substantial adverse impacts for any state-listed species or other species of concern at the state level.

Wyoming

Under the Proposed Action, management of main stem reservoirs and the affiliated fluctuation in reservoir levels and North Platte River flows would result in only localized impacts on riparian and wetland habitats that provide habitat for species of concern in Wyoming.

Potential impacts may include increased predator access to bird islands at Pathfinder Reservoir resulting from low water levels during the nesting period (April through July) for ground-nesting birds such as American white pelican and Caspian terns; however, any potential increase in predator access would be extremely minimal (estimated at 2 percent) and is not likely to result in population-level effects on any species. Changes in pool elevation at Pathfinder Reservoir are not expected to be substantial enough to change the wetland vegetation and habitat values at the Pathfinder National Wildlife Refuge. Management of main stem reservoirs and the concomitant fluctuation in reservoir levels and North Platte River flows are not anticipated to affect cottonwood-riparian species, including Lewis' woodpecker.

Water leasing activities may result in localized impacts on riparian and wetland conditions associated with smaller canals and creeks, but any potential impacts would occur on a temporary basis, only during a few months of particular years.

The Proposed Action would not result in adverse impacts on species of greatest conservation need in Wyoming.

Colorado

The Tamarack Project, completed during the First Increment of the Program, resulted in improved habitat conditions for a variety of Colorado state-listed species that occupy riverine and wetlands habitat. The project resulted in elevated water tables in riparian meadows, increased groundwater return flows to the sloughs and river channels at the State Wildlife Areas, and creation of wetland habitat. Under the Proposed Action, continued operation of the project would result in ongoing benefits to a variety of Colorado state-listed species, including the boreal toad, northern leopard frog, northern cricket frog, wood frog, plains leopard frog, yellow mud turtle, brassy minnow, common shiner, Iowa darter, lake chub, plains minnow, stonecat, and suckermouth minnow. On the contrary, water leasing actions under the Proposed Action could adversely affect riparian habitats and species occupying habitats that depend on irrigation return flows to maintain water levels; however, potential adverse impacts would be localized and would not result in population-level effects on any listed species.

No other Colorado state-listed species or habitats are anticipated to be affected under the Proposed Action, and the Proposed Action would not result in adverse impacts on any state-listed species or species of special concern in Colorado.

Nebraska

Continuation of the Program under the Proposed Action could benefit the Massasauga rattlesnake because alteration of hydrology associated with flow management activities could improve wet meadow quality in drier years, as described in the 2006 Final EIS.

Similarly, flow management activities under the Proposed Action would result in ongoing benefits to the northern river otter associated with improved habitat conditions and increased prey abundance in major streams within the North Platte River Sub-basin.

No other Nebraska state-listed species or habitats are anticipated to be affected under the Proposed Action, and the Proposed Action would not result in adverse impacts on any state-listed species in Nebraska.

3.12.3 Impacts from the No Action Alternative

Under the No Action Alternative, the Program would not be continued. Discontinuation of the Program would have no effect on state-listed species and species of concern because none of the actions associated with the Proposed Action would occur, and the effects of those actions on state-listed species and species of concern, described above, would not occur. Any potential future benefits to state-listed species and species of concern associated with ongoing Program activities, such as improved conditions in riparian, wetland, and wet meadow habitats, would not be realized.

3.13 Sandhill Cranes

3.13.1 Affected Environment

Source: Service
*Sandhill crane (*Grus canadensis*)*

In the 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006), the sandhill crane (*Grus canadensis*) is listed by the Program as a species of concern. It is as a State of Colorado species of special concern, with additional protection under the Migratory Bird Treaty Act of 1918 (MBTA). The species was further evaluated in the 2006 Final EIS because of the potential of impact by the proposed alternatives, given that the North Platte and Platte Rivers (Platte Rivers) and surrounding lands serve as important stopover grounds within their migratory path. The Sandhill Cranes Appendix was developed within the 2004 Draft EIS as a technical appendix to further discuss the existing conditions and habitat and population trends of the species. It was subsequently modified in the 2006 Final EIS (Reclamation and Service 2006).

It was estimated in the 2006 Final EIS that more than 500,000 cranes, which make up approximately 80 percent of the entire U.S. population of cranes, use the Platte Rivers between February and April. In 2017, the Service published the administrative report Status and Harvests of Sandhill Cranes, Mid-continent, Rocky Mountain, Lower Colorado River Valley and Eastern Populations, which states the 2017 population estimate for sandhill cranes in the central Platte River valley (CPRV), Nebraska, shows a 40 percent population increase from the previous year (Dubovsky 2017). Overall, there has been a population increase of sandhill cranes in the CPRV of 5 percent between 2006 and 2017 (Dubovsky 2017).

The 2016 Service administrative report, Status and Harvests of Sandhill Cranes, Mid-continent, Rocky Mountain, Lower Colorado River Valley and Eastern Populations, suggests that agricultural practices in the CPRV are shifting to production of soy bean crops instead of the historic corn crops that the sandhill cranes are accustomed to (Dubovsky 2016 pg. 12). This shift in agricultural crops may affect the sandhill crane population due to the nutritional differences in the crops, as soybeans contain less fat than corn and would not meet the bird's high caloric

migration requirements; however, damage to croplands, caused by sandhill cranes, is leading to agricultural developments seeking alternative methods to protect the cropland.

Use of chemical deterrents is being developed and proposed to keep sandhill cranes from consuming the corn and causing damage to the cropland (Blackwell et. al 2001). Although it may be beneficial to the crops and cropland, taking away the food source that sandhill cranes have become dependent on could have impacts on the population or health of the cranes if the food source is not replaced in an alternate nearby location.

Wide-channel habitat, used by sandhill cranes, is managed for protection of whooping cranes, a Service endangered species in the CPRV. The 53-mile stretch along the CPRV in Nebraska, referred to as Big Bend Ranch, is designated critical habitat for whooping cranes. Within the past 11 years, progress has been made in the management of wide-channel habitat under the Program. Between 2006 and 2016 approximately 24,807 acres of in-channel vegetation management (disking and herbicide application) was accomplished (Program GIS 2017). These activities, combined with natural peak flows, decrease the amount of vegetation within the river channels and in turn increase the surface area of the water, thereby improving the wide-channel suitable roosting habitat for sandhill cranes.

As of March 2016, the Program had acquired 12,650 acres of land along the Platte River (Program 2016c). The ability to directly manage the land may allow for more flexibility in the protection of the species.

3.13.2 Impacts from the Proposed Action

Under the Proposed Action, the Program would continue to support water and land use practices that would protect, restore, and maintain habitat for the target species. Although sandhill cranes are not one of the target species, they would indirectly be protected by these practices, as they depend on habitat like whooping crane habitat.

3.13.3 Impacts from the No Action Alternative

Direct impacts could be caused by habitat shifts that may cause changes in population numbers of sandhill cranes. If Program Assets are purchased by signatories that would continue to manage Program Assets to provide habitat for the target species, trends would also continue as described under the 2006 Final EIS. Program Assets could be sold without the condition that they be managed to provide habitat for the target species; in this case, habitat for sandhill cranes could be depleted depending on how the purchaser decides to manage the Program Assets.

3.14 Fisheries

3.14.1 Affected Environment

Although both rivers and reservoirs serve as habitat for fish species, the creation of 15 dams and reservoirs in the Platte River basin has altered the natural flow of the rivers and in turn has eliminated or altered habitat for native fish species. The reservoirs serve an important role in flood control and water supply management. The reservoirs that have been developed are subsequently used for recreation, including sport fishing. The species of fish that can tolerate life in a reservoir are different from those that are adapted to turbid, free-flowing rivers.

Three separate sections to evaluate impacts on fisheries along the Platte River system were developed in the 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006): the Central Platte Fishery, North Platte Fishery, and Nebraska Sport Fisheries. Individual technical appendices were developed for each and included in the 2006 Final EIS.

The overall 2006 Program First Increment objective includes increasing target flows by 130,000 to 150,000 acre-feet and providing 10,000 acres of managed and restored habitat (Program 2006a). Benefits of this goal include restoring natural habitat for native fish species in the river by the reintroduction of sufficient water levels at critical times of the year. The adverse effects on reservoir fisheries identified in the 2006 Final EIS include quality of fisheries and average fishing visitation caused by the decreased water levels at four of the major reservoirs on the north Platte River: Seminoe, Pathfinder, and Glendo in Wyoming and Lake McConaughy in Nebraska (Reclamation and Service 2006).

Although the Program goal of 130,000 to 150,000 acre-feet increased target flow has not been reached, three water projects have been developed since 2006 and have collectively gained 80,000 acre-feet per year for the system. Factors outside the control of the Program, such as local weather conditions and regional climate patterns, also had a notable influence on water flows. For example, water years 2009 and 2013 were relatively dry, and water year 2011 was one of the wettest years on record (Tetra Tech 2015). Increased flow in the river system during relevant periods improves habitat for fish by lowering water temperature, reducing the fluctuation of temperature, and increasing the amounts of available macronutrients (Reclamation and Service 2006).

Water levels in the four major reservoirs have not decreased, due to releases to meet the Program objectives, below levels suitable for maintaining successful fish populations or recreation between 2006 and 2017 (Reclamation 2017a).

Between 2006 and 2016, approximately 24,807 acres of in-channel vegetation management (disking and herbicide application) was accomplished (Program GIS 2017). These activities decrease the amount of vegetation within the river channels and in turn alter the fish habitat within the stretches of river.

3.14.2 Impacts from the Proposed Action

Impacts from the Proposed Action would likely remain similar to what has been observed since the implementation of the Program. The Program extension would allow for more progress toward meeting the goal of increasing the water during relevant times in the system by 130,000 to 150,000 acre-feet. This would help restore natural habitat for native fish species in the river by the reintroduction of sufficient water levels at critical times of the year. Water releases to meet Program objectives would not likely decrease reservoirs below levels suitable for maintaining successful fish populations.

The Program's influence on mean monthly discharge is expected to continue under the Proposed Action. It is expected that knowledge gained during the First Increment can be used to continue improving the mean monthly discharge during the extension of the First Increment under the Proposed Action.

3.14.3 Impacts from the No Action Alternative

Under the No Action Alternative, a less unified approach to management would occur, which would affect the central Platte River basin. This has the potential for introducing conflicting or inconsistent approaches to managing water quality and quantity in a highly dynamic, interconnected hydrologic system, thereby reducing the likelihood for meeting goals, such as target flows, in the central Platte River basin. This would likely degrade natural habitat for native fish species in the river.

3.15 Wildlife

3.15.1 Affected Environment

In the 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006) wildlife species in the area of analysis are described under Central Platte River Terrestrial Vegetation Communities and Land Use Types chapters. Common species include eastern cottontail (*Sylvilagus floridanus*), white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), and various mice (*Mus* spp.) and voles (*Microtus* spp.). These species are described in greater detail in the 2006 Final EIS (Reclamation and Service 2006).

The types of species and habitat associations are the same as those described in the 2006 Final EIS. Abundance and distribution have changed for some species, and population numbers for some species have fluctuated due to diseases and other stressors (Schneider et al. 2011; Colorado Parks and Wildlife 2015; Wyoming Game and Fish Department 2017b).

3.15.2 Impacts from the Proposed Action

Under the Proposed Action, the nature and type of impacts on wildlife would be the same as described in the Central Platte River Terrestrial Vegetation Communities and Land Use Types chapter of the 2006 Final EIS (Reclamation and Service 2006). Minor reductions in wildlife habitat types, such as agricultural lands, woodlands, and shrublands, would likely continue as described in the 2006 Final EIS; however, any impacts on wildlife that use these habitats would be localized.

Actions that focus on restoring, maintaining, and acquiring habitat for the benefit of the target species would likely indirectly benefit wildlife, particularly those species associated with wetland habitats.

3.15.3 Impacts from the No Action Alternative

If Program Assets are purchased by signatories who would continue to manage them to provide habitat for the target species, then trends for wildlife habitat would also continue as described under the 2006 Final EIS. Program Assets could be sold without the condition that they be managed to provide habitat for the target species; in this case, the number acres of wildlife habitat may change, but for other reasons, depending on how the purchaser decides to manage Program Assets.

3.16 Recreation

3.16.1 Affected Environment

Many state parks, state recreation areas, and state wildlife management areas have been developed around or along the lakes, reservoirs, and rivers of the Platte River basin. The 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) provides details of the recreation resources in the area of analysis (e.g., reservoirs, lakes, fisheries, wildlife areas, and state parks). Recreation access to Program lands is by written permission only, granted through the Platte River Recreation Access Program (internet website: www.platteaccess.org).

Allowed activities are deer hunting, turkey hunting, waterfowl hunting, small game hunting, fishing, mushroom collecting, birdwatching, and hiking. Some sites may have additional restrictions. Specific information on Platte River recreation areas, including location and restrictions, can be found at http://apps.outdoornebraska.gov/PlatteRiver/uploadedimages/Platte_River_Recreation_Access_Maps.pdf.

3.16.2 Impacts from the Proposed Action

Under the Proposed Action, access to current Platte River recreation areas and any newly acquired lands would be managed as described above. By maintaining habitat for the benefit of the target species, recreation opportunities would also be available. Acquired lands could offer more opportunities for recreation than currently exist for the general public. Increased recreational opportunities could lead to monetary benefits for the local economy as well.

3.16.3 Impacts from the No Action Alternative

When the Program ends in 2019, until Program Assets are sold, trends for recreation would continue as described under the 2006 Final EIS. If Program Assets are purchased by signatories that would continue to manage Program Assets to provide habitat for the target species, trends would also continue as described under the 2006 Final EIS. Program Assets could be sold without the condition that they be managed to provide habitat for the target species; in this case, opportunities for recreation could be depleted depending on how the purchaser decides to manage the Program Assets.

3.17 Land Use/Realty

3.17.1 Affected Environment

Lands along the main stems of the North Platte River, South Platte River, and Platte River consist largely of agricultural and urban uses. Some of these uses, particularly those within a few miles of the river, rely on water from the Platte River system for irrigation and municipal and industrial purposes. The South Platte River basin is the most densely populated and has the highest concentration of urban development, particularly in the western portion of the basin along the front range of Colorado. Public spaces, such as parks and open space, are also common throughout the area of analysis. These spaces provide an opportunity for the public to view river water and associated riparian habitats and wildlife.

There are approximately 12,000 acres of conservation lands in the area of analysis. These lands are either held in title by the Platte River Recovery Implementation Foundation, or managed by the Program via a contractual agreement, such as an easement or lease, with the landowner. Conservation lands are not available for future urban or agricultural development, unless the Program and landowner, where applicable, mutually agree to relinquish the conservation easement or related land encumbrance.

3.17.2 Impacts from the Proposed Action

Under the Proposed Action, the Program would acquire from a willing seller, or multiple sellers, up to 1,500 acres of lands. Acquired lands would be either purchased and held under title by the Platte River Recovery Implementation Foundation, or placed within a conservation easement, lease, or similar encumbrance that runs with the land in exchange for compensating the underlying landowner. The Proposed Action would change the predominate land use of the acquired lands from agriculture or general open space to protected open space. Uses on the acquired lands would be restricted to those that do not adversely affect the target species or may benefit them. The Program would continue operating under the good neighbor policy and, as such, would continue paying the applicable taxes at equivalent levels, which would ensure the tax base remains largely unchanged.

3.17.3 Impacts from the No Action Alternative

Upon the Program's termination, Program Assets would be made available for acquisition by another partnership or environmental entity, or sold to a willing buyer on the open realty market. If Program Assets are purchased by signatories or similar groups that would continue to manage Program Assets to provide habitat for the target species, land uses would also continue as described under the 2006 Final EIS. If Program Assets are sold without the condition that they be managed to provide habitat for the target species, lands may revert to agricultural, urban, or other non-conservation open space uses. This could increase the amount of non-conservation-related uses along the Platte River by up to 12,000 acres beyond 2019.

3.18 Agricultural Economics

3.18.1 Affected Environment

The 2006 Platte River Recovery Implementation Program Final EIS (Reclamation and Service 2006) described cropping patterns, yields, and estimated revenue for irrigated crops in the area of analysis from 1998 to 1997. Updated data is provided below as relevant. Data is limited to the economic regions for which an impact on agricultural economics was anticipated in the 2006 Final EIS, the central Platte River habitat area, Eastern Wyoming area, and North Platte Headwaters area.

Based on the data from the past two agricultural censuses, completed by the National Agricultural Statistical Service in 2007 and 2012, total irrigated acres in the economic regions of interest have remained stable over the past 10 years (see **Table 3-17**). As compared with data reported in the 2006 Final EIS, an increase was seen in irrigated harvested acres in the central Platte River habitat area, slight decrease in the Eastern Wyoming area, and decrease in the North

Table 3-17. Irrigated Harvested Cropland (Acres)

Year	Central Platte River Habitat Area	Eastern Wyoming Area	North Platte River Headwaters Area
2012	1,830,900	162,300	291,444
2007	1,897,700	157,000	296,511
1988-1997[1]	1,693,200	176,600	326,920

Source: USDA 2012; Reclamation and Service 2006
[1]As reported in the 2006 Final Platte River Recovery Implementation Program EIS.
Note: Acres are rounded to the nearest 100 acres

Platte Headwaters area; however, it should be noted that the 2006 Final EIS data represented a 10-year average and was based on specific field crop data, and may not be directly comparable to 2007 and 2012 data.

Estimated agricultural revenue based on primary crops, price of products, and average yield was estimated in the 2006 Final EIS. Price per acre from harvested crops can, however, vary dramatically based on market conditions, impacting associated revenues. Corn for grain is the primary product harvested on irrigated land in the economic area of interest. From 1996 to 2000, the price for corn for grain ranged from a low of $271 per plated acre in 1996 to a high of $761 in 2012 (USDA 2017).

3.18.2 Impacts from the Proposed Action

Acquiring up to a total of 130,000 acre-feet of water beyond current 90,000-acre-foot levels for Program conservation use would result in potential reductions to the acres of irrigated lands, and related production levels and revenues as detailed in the 2006 Final EIS. Because the total annual acre-feet for the First Increment may be reduced from the original maximum projections, related impacts on irrigated acres may also be decreased from projected levels. Reduction in farmed acres is most likely to occur in the central Platte River habitat area, Eastern Wyoming, and North Platte Headwater economic regions. Substitution of dryland farming, as discussed in the 2006 Final EIS, is likely to offset some economic losses only in the central Platte River habitat area, where the average precipitation levels necessitate this method.

As discussed in the 2006 Final EIS, reductions in irrigation consumptive use was estimated at 1 percent average annual use, minimizing Program impacts on regional agricultural economics. Acres irrigated, cropping patterns, and revenue would continue to vary based on factors independent of the Proposed Action, including precipitation levels and market conditions.

Acquiring and managing an additional 1,500 acres of land to provide improved habitat for the target species could have impacts on the agricultural economy when these lands are currently farmed. Impacts would be limited to the central Platte River habitat area, where acquisitions would primarily occur, and would be minor in nature due to the limited acreage involved and variable production levels of current lands that may be acquired.

3.18.3 Impacts from the No Action Alternative

Upon termination, Program Assets would be made available for acquisition by another partnership or environmental entity, or sold to a willing buyer on the open realty market. If Program Assets are purchased by signatories or similar groups that would continue to manage

Program Assets to provide habitat for the target species, the level of irrigated lands, cropping patterns, production, and associated revenues would remain similar to the 2006 Final EIS. If Program Assets are sold without the condition that they be managed to provide habitat for the target species, Program lands and water may be available for other uses, including more intensive irrigated agriculture, with higher crop yields and associated revenues; however, land may also be developed for other nonagricultural purposes, such as residential and commercial development, which would decrease the contribution from agricultural economics to the local economies.

3.19 Regional Economics

3.19.1 Affected Environment

The 2006 Final Platte River Recovery Implementation Program EIS (Reclamation and Service 2006) described regional sales, income, taxes, and employment in the area of analysis. Updated summary data is provided below for key indicators as based on Headwater Economics, Economic Profile System (Headwater Economics 2017). Headwater Economics compiles published government data from sources such as the U.S. Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics. Data is provided for the Platte River basin, excluding counties in the South Platte Headwater economic area and the Denver Metro area economic regions, for which no economic impacts were found in the 2006 Final EIS.

Following trends since 1970 in the Platte River basin, service industry employment has continued to rise since 2000, with over 61 percent of people employed in the service industry sectors. Non-service industries saw a decline over the same time period, with 20.7 percent employment in 2016. As seen in the 2006 Final EIS, farm industry employment has gradually declined, to 3.7 percent in 2016 (see **Table 3-18**).

Table 3-18. Platte Basin Employment by Sector

Total Employment	2001	2016
Non-services related	23.3%	20.7%
Farm	4.9%	3.7%
Forestry, fishing, and agricultural services	0.6%	0.7%
Mining (including fossil fuels)	1.2%	2.3%
Construction	7.2%	6.7%
Manufacturing	9.4%	7.3%
Services related	58.2%	61.6%
Utilities	0.2%	0.3%
Wholesale trade	3.1%	3.2%
Retail trade	12.1%	10.6%
Transportation and warehousing	3.1%	3.5%
Information	1.4%	1.2%
Finance and insurance	3.7%	4.2%
Real estate and rental and leasing	3.3%	4.9%
Professional and technical services	4.5%	5.1%
Management of companies and enterprises	0.4%	0.6%
Administrative and waste services	4.4%	4.3%
Educational services	0.7%	1.0%
Health care and social assistance	7.8%	8.2%

Table 3-18. Platte Basin Employment by Sector

Total Employment	2001	2016
Arts, entertainment, and recreation	1.6%	1.8%
Accommodation and food services	6.9%	7.2%
Other services, except public administration	5.3%	5.3%
Government	16.4%	16.1%

Source: Headwater Economics 2017

Contributions from farming represent 4.4 percent of labor income in 2016. Per-capita income in the Platte River basin counties increased at approximately 25 percent as compared to 15 percent for the United States overall from 2001 to 2016 (Headwater Economics 2017).

3.19.2 Impacts from the Proposed Action

The Proposed Action would continue to bring money into the economic region through payments for land and water acquired or leased by the Program from willing participants. Acquiring up to 130,000 acre-feet of water beyond current 90,000 acre-foot levels and an additional 1,500 acres conservation lands would continue to affect income through direct payment from the Program as discussed in the 2006 Final EIS. Location of impacts would depend on specific areas where water is acquired and the method used (i.e., purchasing or leasing).

Construction of Program features and facilities affects both local income and business receipts and taxes. The construction of large-scale projects detailed in the reconnaissance-level water action plan has not occurred to the extent anticipated in the 2006 Final EIS. As a result, contributions to local area economies from these elements may have been lower than projected in the 2006 Final EIS analysis. Assuming an emphasis on water action plan projects, such as slurry wall pits and recharge areas, this trend is likely to continue.

Impacts would continue to occur to agricultural sector employment and income where use of water for conservation purposes leads to a decrease in irrigated acres as discussed in **Section 3.18**. A decrease in irrigated acres would have variable impacts depending on the type of crop production lost and the associated employment, income, and taxes.

As detailed in the 2006 Final EIS, projected economic impacts are less than or equal to one-tenth of 1 percent of the economic activity in the region. While minor changes have occurred to existing conditions, this analysis is likely to remain true under the extension of the First Increment. The specific distribution of effects depends upon location of site-specific implementation of activities, including water leasing and water management activities.

3.19.3 Impacts from the No Action Alternative

Upon termination, Program Assets would be made available for acquisition by another partnership or environmental entity, or sold to a willing buyer on the open realty market. If Program Assets are purchased by signatories or similar groups that would continue to manage Program Assets to provide habitat for the target species, impacts on employment, income, taxes, and sales would remain like those described in the 2006 Final EIS. In addition, while assets remained the responsibility of the signatories, property taxes would therefore continue to be paid, and no impacts on local county tax revenues would occur. If Program Assets are sold without the condition that they be managed to provide habitat for the target species, land and water use may

revert to agricultural, urban, or other uses. As a result, employment, income, taxes, and sales would be dependent on the land uses and would vary throughout the area of analysis.

4.0 Environmental Commitments

4.1 Introduction

The following is a list of environmental commitments that would be undertaken by the Program, as appropriate, when carrying out Program activities. All Program activities undertaken with federal funds or require that federal permits or involve federal facilities, will be considered federal actions and subject to federal environmental laws, such as NEPA, ESA, and the Clean Water Act of 1972 (CWA).

These environmental commitments generally are intended to avoid, minimize, or compensate for adverse environmental impacts that would otherwise occur because of Program implementation activities. In some cases, these commitments help ensure that such activities are conducted in accordance with applicable laws and guidelines. Some actions may require compliance with other federal laws and regulations not listed here.

4.2 Federal Laws

4.2.1 National Environmental Policy Act

As described in **Section 1.4**, this EA covers the regional- and system-wide impacts of the Proposed Action, as far as they can be foreseen. Under the Proposed Action, feasibility studies would be undertaken for several Program facilities and individual projects selected. Also, procedures would be established to solicit offers for habitat land and Program water supplies that may be purchased or leased for the Program in whole, or in part, with federal funds. These actions may require evaluation and appropriate documentation under NEPA, tiered off this EA.

The following is a list of future Program activities that likely will require further NEPA analysis:

- Water action plan projects undertaken with federal funds, including water conservation and supply projects (site-specific impact analysis), such as leasing, acquiring and retiring farmland, creating broad-scale recharge areas, and small-scale slurry wall water storage pits
- Program land restoration with federal funds that is likely to affect the environment (site-specific impact analysis)

4.2.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act of 1934 (FWCA) reads as follows:

> [W]henever the waters or channel of a body of water are modified by a department or agency of the U.S., the department or agency first shall consult with the Service and with the head of the agency exercising administration over

> the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources. The Act provides that land, water, and interests may be acquired by federal construction agencies for wildlife conservation and development. In addition, real property under jurisdiction or control of a federal agency and no longer required by that agency, can be utilized for wildlife conservation by the state agency exercising administration over wildlife resources upon that property.

The specific reports and recommendations of the Secretary and the state agency on the wildlife aspects of such projects must be made part of the responsible federal agency's report. It is intended that the reports and recommendations be based on surveys and investigations to determine possible damage to wildlife resources and measures that should be adopted to prevent their loss or damage. Federal agencies must consider the reports.

It is likely that some of the specific Program implementation activities will trigger consultation under the FWCA. An example of this is water action plan projects undertaken with federal funds, including water conservation and supply projects (site-specific impact analysis), such as leasing, acquiring and retiring farmland, creating broad-scale recharge areas, and small-scale slurry wall water storage pits.

4.2.3 Clean Water Act

The habitat restoration activities under the Proposed Action are likely to involve significant efforts to restore river channel and wet meadow habitat in the Central Platte Habitat Area. Specific plans will be developed once the Program begins acquiring interests in habitat lands. The "Wetlands" section in Chapter 5 of the 2006 Final EIS (page 5-89) projects that the Proposed Action would lead to a significant increase in wetlands that fall under the CWA, Section 404, jurisdiction (Reclamation and Service 2006).

When Program lands are acquired and plans are developed for river channel and wet meadow restoration, Section 404 permits will be needed before restoration activities begin that may require discharging dredge or fill material to Waters of the U.S., such as moving river sand perched on islands back into the active river channel.

Where such actions are undertaken, specific proposals would be developed and subject to analysis under the CWA, Section 404, provisions to support a request for a permit. The development and analysis of these proposals would be coordinated with appropriate offices of the Corps and the EPA.

The following process is anticipated for obtaining site-specific Section 404 permits for the channel and wet meadow restoration in the Central Platte Habitat Area:

- Land and channel restoration may be subject to local, state, and federal permitting processes. Under the Program, on acquisition of lands, the Program would develop management plans to describe the appropriate restoration, maintenance, and other management activities. Generally, parcel-specific management plans are expected to be approved and implementation is to begin within 1 year of acquisition.

- Management activities would be subject to CWA, Section 404; permitting and development of these plans would require close coordination with the Corps in Omaha, Nebraska. Concurrently, site plans would be submitted to federal, state, and local regulatory agencies for a final determination of permit requirements and necessary approvals. Information to be included in the pre-construction review phase would include the following:
  - Statement of site restoration goals and objectives
  - Pre-construction site characterization
  - Description of restoration treatments and management plans
  - Description of site's anticipated response
  - Specification of performance standards, monitoring protocols, and identification of remedial management prescriptions, should performance standards and project targets be deficient
  - Documentation of site protection measures and maintenance methods
  - Documentation of final assurances (financial obligations, responsible parties, and schedules)

The Proposed Action's water action plan includes construction of off-stream reservoirs, slurry wall pits, and broad-scale recharge areas in the central Platte valley as part of the water action plan. As with all the water action plan elements, feasibility investigations of each element must occur before the element being adopted by the Program. If the Program chooses to proceed with any of these elements, site-specific NEPA analysis would be undertaken. If wetland impacts are likely, a site-specific analysis of wetland would be undertaken as part of the NEPA analysis of alternatives, to support application for a site-specific Section 404 permit.

4.2.4 Endangered Species Act

All site-specific Program actions that could affect listed species or their habitat would be assessed under the ESA beforehand. The Program will evaluate the potential impact of Program site-specific activities on other listed species when Program activities are proposed and before they are implemented. The Program will take appropriate actions if adverse impacts on other listed species or designated critical habitats are identified. Any adverse impacts would be avoided, or offset based on consultation with the Service.

4.2.5 Migratory Bird Treaty Act

The MBTA prohibits the take of migratory birds. EO 13186 requires federal agencies to avoid impacts on migratory birds. Under the Program, clearing woods and shrubs from riparian areas to restore river channel habitat and wet meadows would reduce migratory bird habitat and could result in unintentional take of these species. In compliance with EO 13186, such activities would be restricted to those periods of the year when nesting activities do not occur, to minimize the chances of unintentional take. Each site-specific NEPA analysis tiered to this EA will examine potential methods to reduce impacts on migratory birds and implement those methods found to be reasonable.

4.2.6 National Historic Preservation Act

According to the National Historic Preservation Act of 1966 (NHPA), where site-specific Program actions may affect cultural resources or sites and structures listed on or eligible for listing on the National Register of Historic Places (NRHP), consultation would be undertaken by the Program with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP). Appropriate surveys would be undertaken and incorporated into site-specific planning and evaluation. Programmatic agreements would be implemented with each state and interested tribes, providing a process for consultation and mitigation. This would take place when these Program actions and others are found likely to affect cultural or historic resources.

4.2.7 Farmland Protection Policy Act

According to the Farmland Protection Policy Act of 1981, for each site-specific NEPA compliance analysis for Program actions, the Program would coordinate with the Natural Resources Conservation Service. It would do this to identify prime farmlands that might, through Program actions, be permanently converted to nonagricultural uses and to consider conversion of these lands when deciding where to pursue construction and habitat restoration actions. The Program would strive to minimize unnecessary and irreversible conversion of prime farmlands.

4.3 Monitoring

The Proposed Action incorporates an extensive strategy of resource monitoring and research. The IMRP would continue to monitor key resource features. It would also provide ongoing feedback to Program decisionmakers about trends in environmental and species conditions and the impact of Program actions on those resources. The IMRP can be found in the Implementation Program Document: Attachment 3: Adaptive Management Plan (Program 2006a).

Two additional items were identified in the 2006 Final EIS analysis that will be incorporated into the IMRP:

- **Selenium—**As described in the "Water Quality" section in Chapter 5 (page 5-67) of the 2006 Final EIS, two elements of the Proposed Action (Groundwater Management in the Central Platte Groundwater Mound Area and Dry Creek/Fort Kearney Cutoffs) could increase inputs of selenium to the central Platte River (Reclamation and Service 2006). If these elements, or similar elements, were pursued by the Program, the associated feasibility studies should carefully assess, and avoid where possible, the risk of increasing selenium inputs to the river. Where Program actions ultimately may affect selenium concentrations in the river, monitoring of this element would be added to the Program IMRP.
- **Copper, Lead, and Nickel—**The "Water Quality" analysis in Chapter 5 (page 5-67) of the 2006 Final EIS indicates that there are levels of copper, lead, and nickel exceeding EPA advisory levels in the central Platte River sediments (Reclamation and Service 2006). Monitoring of these constituents in sediment, water, and biota will be added to the Program IMRP to track the impacts of channel management activities in the Proposed Action, specifically vegetation clearing, island leveling, sediment augmentation.

5.0 Consultation and Coordination

This chapter details the consultation and coordination among Reclamation and other federal, state, and local agencies, American Indian tribes, and the public in preparing this Draft EA.

5.1 Public Involvement

Public involvement is a vital part of the EA process. It provides an opportunity for those affected by project actions to take part in the decision-making process and facilitates full environmental disclosure. Guidance for implementing public involvement under NEPA is codified in 40 CFR 1506.6 and 43 CFR 46, ensuring that federal agencies make a diligent effort to involve the public in the NEPA process.

Public involvement is being conducted throughout the course of the EA process; the public has specific opportunities to comment during the following phases:

- Public scoping before NEPA analysis begins, to determine the scope of issues and alternatives to be addressed in the EA; this phase occurred during the 45-day, September 18 to November 2, 2017, scoping period and is summarized in a scoping report published in December 2017 (Reclamation 2017b)
- Public review of and comment on this Draft EA (February 28 through April 14, 2018)

Public outreach during the public scoping period included the following:

- Distributing a press release on September 18, 2017, announcing the public scoping period and public open houses
- Placing newspaper advertisements in the *Scottsbluff Star-Herald* on September 19, 2017, the *Grand Island Independent* and *Loveland Reporter Herald* on September 21, 2017, and the *Torrington Telegram* on September 22, 2017
- Announcing the public scoping meetings via Reclamation's project website, https://www.usbr.gov/gp/nepa/platte_river/index.html

Reclamation held a public scoping open house at each of the following locations, from 6:00 to 8:00 p.m. on the dates shown:

- Wednesday, October 4, 2017—Goshen County Fair Grounds, 7078 Fairgrounds Road, Torrington, Wyoming
- Thursday, October 5, 2017—The Ranch Events Complex, 5280 Arena Circle, Loveland, Colorado

- Wednesday, October 11, 2017—Hotel Grand, 2503 S. Locust Street, Grand Island, Nebraska
- Thursday, October 12, 2017—Program Executive Director's Office, 4111 4th Avenue, Suite 6, Kearney, Nebraska

Reclamation staff prepared the handouts, conducted the open houses, and answered questions during the open houses.

Six comment letters, emails, and forms were received during the scoping period, from individuals, public works departments, and state agencies. More information on the scoping process, including comments received, may be found in the Scoping Summary Report (Reclamation 2017b), which is available on the project website, https://www.usbr.gov/gp/nepa/platte_river/index.html. Reclamation took these comments into consideration in developing the Draft EA and incorporated this feedback, as appropriate, during alternatives development and impact analysis.

5.2 Cooperating Agency Involvement

In August 2017, Reclamation sent letters to 10 federal cooperating agencies on the 2006 Platte River Recovery Implementation Program Final EIS, inviting them to be cooperating agencies on the EA. To date, the following agencies have accepted:

- U.S. Department of Agriculture, Natural Resources Conservation District—West
- EPA, Region 7
- U.S. Forest Service, Rocky Mountain Region
- Corps, Omaha District

5.3 Native American Consultation

Reclamation sent letters to 39 tribes (see **Table 5-1**) in October 2017. In these letters, Reclamation informed them of the upcoming preparation of the Draft EA, notified them of the scoping meetings, solicited their comments, and offered to meet with the tribe at their request. Of the 39 letters sent, Reclamation received one response from the Lower Sioux Indian Community of Minnesota. They indicated their support of the project goal, declined to comment further, and deferred to the local tribes of Wyoming, Colorado, and Nebraska. Copies of the scoping postcard were emailed to tribes that provided email addresses.

Table 5-1. Native American Consultation

Spirit Lake Tribe, North Dakota	Shakopee Mdewakanton Sioux Community of Minnesota
Cherokee Nation	Pawnee Nation of Oklahoma
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation, South Dakota	Lower Brule Sioux Tribe of the Lower Brule Reservation, South Dakota
Cheyenne and Arapaho Tribes, Oklahoma	Jicarilla Apache Nation, New Mexico
Winnebago Tribe of Nebraska	Fort Sill Apache Tribe of Oklahoma
Otoe-Missouria Tribe of Indians, Oklahoma	Kiowa Indian Tribe of Oklahoma
Upper Sioux Community, Minnesota	Three Affiliated Tribes of the Fort Berthold Reservation, North Dakota
Flandreau Santee Sioux Tribe of South Dakota	Lower Sioux Indian Community in the State of Minnesota
Santee Sioux Nation, Nebraska	Northwestern Band of Shoshone Nation
Prairie Island Indian Community in the State of Minnesota	Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
Wichita and Affiliated Tribes	Ponca Tribe of Indians of Oklahoma
Assiniboine & Sioux Tribes of the Fort Peck Indian Reservation, Montana	Cheyenne River Sioux Tribe of the Cheyenne River Reservation, South Dakota
Crow Creek Sioux Tribe of the Crow Creek Reservation, South Dakota	Crow Tribe of Montana
Mescalero Apache Tribe	Northern Arapaho Tribe of the Wind River Reservation, Wyoming
Northern Cheyenne Tribe	Oglala Sioux Tribe
Omaha Tribe of Nebraska	Ponca Tribe of Nebraska
Rosebud Sioux Tribe of the Rosebud Indian Reservation, South Dakota	Shoshone-Bannock Tribes of the Fort Hall Reservation
Shoshone-Paiute Tribes of the Duck Valley Reservation, Nevada	Southern Ute Indian Tribe
Standing Rock Sioux Tribe of North & South Dakota	Ute Mountain Ute Tribe
Yankton Sioux Tribe of South Dakota	

5.4 U.S. Fish and Wildlife Service Consultation

To comply with ESA Section 7(a)(2), Reclamation is using this EA as a BA to address the potential impacts of the proposed First Increment Extension. The EA and BA analyze impacts on the target species (whooping cranes, interior least terns, piping plovers, and pallid sturgeons) and other federally-listed species. Any impacts on designated or proposed critical habitat will also be evaluated in the EA and BA.

Once Reclamation submits the BA to the Service, and once the Service considers it sufficient, formal consultation under ESA Section 7(a)(2) and 50 CFR, 402. will have begun. The Final EA will include the BO.

5.5 Cultural Resources

Section 106 of the NHPA requires federal agencies to take into account the impacts of their undertakings on historic properties. It gives the ACHP a reasonable opportunity to comment. Site-specific Program actions may affect cultural resources or sites and structures listed on or eligible for listing on the NRHP. To comply with Section 106, the Program would consult with the SHPO and the ACHP.

6.0 List of Preparers

A list of individuals with primary responsibility for conducting this study, preparing the documentation, and providing technical reviews is below:

Name	Title	Project Role
Bureau of Reclamation		
Brock Merrill	Special Projects Coordinator	Project Manager
Jennifer Beardsley	Natural Resource Specialist	NEPA Advisor/Program and environmental review
David Trimpe	Natural Resource Specialist/Biologist	ESA content review
Dr. George Shannon	Great Plains Regional Archaeologist	Cultural resource content review
U.S. Fish and Wildlife Service		
Matt Rabbe	Senior Wildlife Biologist	ESA consultation/Program and environmental review
Thomas Econopouly	Hydrologist	Hydrology review
Jeff Runge	Wildlife Biologist, Pallid Sturgeon Lead	Document review
Program Executive Director's Office		
Jerry Kenny, PhD	Executive Director	Program review
Jason Farnsworth	Director of Habitat Management and Rehabilitation	Program and environmental review
EMPSi – Environmental Management and Planning Solutions, Inc.		
David Batts	Principal	Project Manager/Quality control and assurance
Chad Ricklefs, AICP	Senior Environmental Planner	Environmental Coordinator/Document preparer
Katie Patterson, JD	Environmental Planner	Public Involvement Lead
Theresa Ancell	Biologist	Contributing author: wildlife, fisheries, threatened and endangered species, state species of concern
Kevin Doyle	Senior Cultural Resource Specialist	Contributing author: cultural resources, tribal interests
Zoe Ghali	Economist	Public involvement/Contributing author: agricultural economics, socioeconomics
Peter Gower, AICP	Senior Environmental Planner	Contributing author: land use and realty
Haley Holladay	Environmental Planner	Decision file
Derek Holmgren	Hydrologist	Contributing author: water resources, geomorphology
Jenna Jonker	GIS Specialist	GIS data and map production
Molly McCarter	Environmental Planner	Public involvement/Contributing author: recreation
Kevin Rice	Biologist	Contributing author: wildlife
Cindy Schad	Word Processor	Document production
Morgan Trieger	Biologist	Contributing author: vegetation, wetlands, riparian
Randy Varney	Writer-Editor	Technical editing

Name	Title	Project Role
Meredith Zaccherio	Senior Biologist	Contributing author: vegetation, wetlands, riparian
Louis Berger		
Thomas St. Clair	Project Manager	Scientific review and NEPA adequacy
Laura Totten	Principle Ecologist	ESA and Biological Assessment Lead/ Contributing author: wildlife, fisheries, threatened and endangered species, state species of concern
Joe Dalrymple	Biologist	Contributing author: wildlife, fisheries, threatened and endangered species, state species of concern

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Appendix A. Endangered Species Act Section 7 Effects Determination

Appendix A. Endangered Species Act Section 7 Effects Determination

Below is the effects determination for federally listed target and nontarget species and designated critical habitats under the Proposed Action.

Species	Status	Determination
Federally Listed Species		
Whooping crane	Endangered	May affect, likely to adversely affect
Least tern	Endangered	May affect, likely to adversely affect
Piping plover	Threatened	May affect, likely to adversely affect
Pallid sturgeon	Endangered	May affect, likely to adversely affect
American burying beetle	Endangered	May affect, not likely to adversely affect
Black-footed ferret	Endangered	No effect
Canada lynx	Threatened	No effect
Colorado butterfly plant	Threatened	May affect, not likely to adversely affect
Eskimo curlew	Endangered	No effect
Gray wolf	Endangered; delisted	No effect
North Park phacelia	Endangered	No effect
Northern long-eared bat	Threatened	May affect, not likely to adversely affect
Preble's meadow jumping mouse	Threatened	May affect, not likely to adversely affect
Rufa red knot	Threatened	No effect
Ute ladies'-tresses orchid	Threatened	May affect, not likely to adversely affect
Western prairie fringed orchid	Threatened	May affect, likely to adversely affect
Wyoming toad	Endangered	May affect, not likely to adversely affect
Designated Critical Habitats		
Whooping crane	Endangered	May affect, likely to adversely affect
Colorado butterfly plant	Threatened	May affect, not likely to adversely affect
Preble's meadow jumping mouse	Threatened	May affect, not likely to adversely affect

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