LOWER YELLOWSTONE IRRIGATION PROJECT INTAKE HEADWORKS AND FISH SCREENS OPERATIONS AND MAINTENANCE BIOLOGICAL ASSESSMENT

LOCATION:
Dawson County, Montana
Township 18 North, Range 56 East, Section 36
USGS Intake Quadrangle

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Introduction

The purpose of this biological assessment (BA) is to review the proposed operations and maintenance (O&M) of the new headworks and associated fish screens prior to construction and operation of an appropriate fish passage structure for the Lower Yellowstone Irrigation Project (LYIP) in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, or candidate species listed below. This BA is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (C)).

Consultation to Date

In 1992, the U.S. Fish and Wildlife Service (Service) initiated discussions with the Bureau of Reclamation (Reclamation) regarding Reclamation's obligations to address fish passage and entrainment issues at Intake Diversion Dam (Intake). Over the years these discussions continued in order to identify the best way to resolve these issues and avoid jeopardizing the continued existence of the federally-listed pallid sturgeon.

Reclamation prepared a preliminary draft BA for continued O&M of the LYIP. Acknowledging comments provided by the Service stressing the importance of fish passage and entrainment protection, Reclamation began researching and evaluating options to include fish passage and protection measures in a revised BA.

As a result of these discussions, studies and evaluations were conducted at Intake to further understand the irrigation features impacts upon pallid sturgeon and other fish species. These studies and other pallid sturgeon research revealed the importance of the Yellowstone River to pallid sturgeon recovery. Concurrently, the U.S. Army Corps of Engineers (Corps) was consulting with the Service on the operations of their main-stem dams and reservoirs on the Missouri River. At the conclusion of the Missouri River ESA consultation, the Service recommended that the Corps work with Reclamation to resolve pallid sturgeon passage issues at Intake. A value engineering study (Reclamation 2002) was the first product of this collaboration between Reclamation, the Corps and the Service.

Subsequently, in 2005 the Corps, Service, Reclamation, The Nature Conservancy and Montana Fish, Wildlife and Parks (FWP) signed a MOU agreeing to work together to resolve the passage and entrainment issues at Intake. By 2006, preliminary designs for passage and entrainment were being considered, in addition to continued research on fish passage and entrainment specific to pallid sturgeon.

In 2007, the Water Resources Development Act was passed authorizing the Corps to use funding from the Missouri River Recovery and Mitigation Program to assist Reclamation with compliance with federal laws and to design and construct modifications at Intake for the purpose of Yellowstone River ecosystem restoration. Subsequently, the FWS amended the Corps' Biological Opinion (BO) on the Missouri River to include fish passage and entrainment protection at Intake as a Reasonable and Prudent Alternative (RPA).

By 2008, alternatives to resolve the fish passage and entrainment issues were identified, and the joint-lead agencies initiated the National Environmental Policy Act (NEPA) process in September 2008. During the preparation of the environmental assessment (EA), Reclamation continued consultation with the Service and jointly determined that the EA would contain a Section 7 BA for construction of the Intake Project. During a May 12, 2009 meeting, Reclamation, the Corps, and the Service reached an agreement that informal section 7 consultation is appropriate for the construction of the proposed Intake project, so long as concurrent formal Section 7 consultation continues on operations of the Lower Yellowstone Project

Reclamation and the Corps submitted the *Biological Assessment for Construction Activities Associated with the Intake Diversion Dam Modification, Lower Yellowstone Project* (BA) to the Service on March 18, 2010. On April 8, 2010, Reclamation and the Corps received written concurrence from the Service that the proposed action was not likely to adversely affect listed species. This BA supplements previous Endangered Species Act (ESA) section 7 consultation for construction of the proposed Intake Diversion Dam Modification, Lower Yellowstone Project. Additional details related to consultation history are included in previous BA.

The *Intake Diversion Dam Modification Environmental Assessment* was prepared by Reclamation and the Corps to analyze and disclose effects associated with construction of the proposed modifications to the diversion dam and headworks. Reclamation and the Corps approved a finding of no significant impact (FONSI), dated April 2010, to complete the NEPA compliance process for construction of the fish passage and entrainment protection structures. The EA and FONSI described the predicted effects of the selected fish passage alternative – the Rock Ramp Alternative.

Since approval of the FONSI, it has been determined that additional alternatives to the proposed fish passage structure should be considered, and an amended EA is being prepared to address potential effects associated with additional passage options. Because there have been significant increases in estimated construction cost and increased concerns about potential ice damage to the rock ramp, it has been determined that additional alternatives to the proposed passage structure be considered. The final EA and FONSI are tentatively scheduled for completion on April 15,

2013. During that time frame, ESA consultation on the construction impacts of the proposed action would be completed.

Construction of the headworks and fish screens is ongoing and scheduled for completion in April 2012. This BA addresses the effects of O&M of the new headworks and associated fish screens prior to construction and operation of an appropriate fish passage structure. This action will include the ongoing placement of rock along the crest of the existing diversion dam to check water for diversion. Separate future formal section 7 consultations will address the construction of a fish bypass component and replacement of the existing weir, followed by a consultation on the joint operation of the passage and entrainment structures along with overall operation of the LYIP. The construction consultation would be undertaken subsequent to development of a proposed action alternative. The consultation on overall operations of the LYIP would take place prior to operation of the fish passage alternative. As part of the preferred alternative described in the EA and in the FONSI, Reclamation and the Corps proposed to construct the fish passage structure concurrently with the new headworks and fish screens. However, due to delays with the fish passage design process, the existing diversion structure would need to be raised approximately 0.27 meters (11 inches) by dumping rocks from the existing cableway, as needed. This action is required to produce sufficient head to operate the new headworks until the fish passage issue is resolved. The addition of rock typically occurs in mid-late July to replace rocks moved by spring ice movement and peak spring flows. The operation of the headworks and fish screens is further described in the EA.

If Reclamation does not successfully complete ESA consultation on operation of the new headworks and screens, then Reclamation's ability to continue to deliver project water to the Lower Yellowstone Project could be severely constrained. Reclamation has contractual obligations with water users to deliver water. Delivery of water is necessary to continue viable and effective operation of the Lower Yellowstone Project.

Description of the Proposed Federal Action and Action Area

The Lower Yellowstone Project was authorized under the Reclamation Act/Newlands Act of 1902 (Public Law 161) (Act). The Act authorized construction of irrigation projects in order to establish farms in the western United States. Reclamation retains ownership of the LYIP facilities, but the facilities are operated and maintained by the Board of Control of the LYIP under contract with Reclamation. The LYIP provides dependable irrigation water service for approximately 54,300 acres in four irrigation districts.

Water rights for water delivered to these districts are jointly held by the irrigation districts and Reclamation. Lower Yellowstone Districts 1 & 2, Intake Irrigation District, and the Savage Irrigation District all have repayment contracts with Reclamation and have met their full financial obligation for repayment of the diversion and supply works for the Project. With the exception of Savage Irrigation District, the repayment contracts have no expiration dates. The Savage water service contract is currently in the preliminary stages of the review and renewal process.

Reclamation and the Corps are modifying the Intake diversion dam and headworks to improve passage and reduce entrainment of pallid sturgeon and other native fish into the LYIP Main Canal at Intake, Montana. The purpose of the Intake Project is to correct unsatisfactory passage conditions for pallid sturgeon and other native fish in the lower Yellowstone River and reduce entrainment of fish into the LYIP Main Canal.

The proposed federal action is to operate the new irrigation canal headworks and fish screens as originally described in the EA. Operating the new headworks and fish screens would include the following actions:

- The track mounted fish screens would be lowered into place prior to the initiation of the irrigation season. The range of dates may vary due to ice off variability, but the screens would always be lowered before the gates are opened to divert water.
- Daily and seasonal adjustments to headworks gates by the irrigation district in response to flow conditions and crop demands, generally from May 1 to October 1. Weather and flow conditions could increase the irrigation season by up to 2 weeks earlier or later. Gates are fully automated and accessed from the bridge deck on the headworks.
- Diversions between 600 – 1,380 cfs from the Yellowstone River into the main canal during the irrigation season, depending on weather and crop demands.
- Periodic screen maintenance. Fish screen units may be periodically raised during the water diversion season for general maintenance. When a screen requires repair or maintenance, the gate to that screen would be closed and an auxiliary screen and gate employed. However, in the event that two or more screens need to be raised simultaneously, unfiltered water will enter the canal. Screens may also need to be raised in the event of inadequate water delivery, such as during extreme drought or screen blockage or congestion. All repairs and maintenance will be made as expeditiously as possible to minimize the duration of unfiltered water diversion. Screens are accessed by the bridge deck.
- The new headworks structure is approximately 35 meters upstream of the existing headworks. The existing diversion structure would need to be raised approximately 0.27 meters (11 inches) during the 2012 irrigation season to provide adequate head for the diversion of water into the new headworks. This would be completed by dumping rocks from the existing cableway as has historically occurred. This typically takes place once annually after the hydrograph descends, to replace rocks dislodged by ice and high spring flows. This activity would continue on an as needed basis until a suitable passage option and new weir are constructed.
- A coffer box that can be lowered on the fish screen tracks is being built that will allow a gate to be isolated from the river to allow maintenance and repair of gates without the need to dewater the structure. This coffer box would be used as needed when gates become damaged or in-operational. The gate would be closed, if functional, prior to removal of the fish screen and placement of the coffer box. If the gate is not functional, the coffer box would be on site prior to screen removal and installed immediately to minimize entrainment.
- Fish screen units will be raised on tracks when water is not being diverted to avoid potential damage from ice and debris.

- Continued O&M activities performed by the LYIP Districts (Districts), such as canal maintenance, inspections, upgrades, canal access road maintenance, and weed control.
- Continued conveyance of diverted water through LYIP canals, laterals, and drains.

Headworks and Fish Screen Description

The new headworks will control diversions of water into a new canal extension and includes 12 removable rotating drum screens located in the river to minimize fish entrainment. The top of the headworks is approximately 1.5 meters (5 feet) above the 100-year, ice-affected, water surface. Eleven of the screens will be used to divert the Districts' full water right, with one additional back-up screen that will be used if any of the primary screens need repair or maintenance.

Because screen design criteria specific to pallid sturgeon are lacking, the fish screens were designed to meet salmonid criteria established by the Service and the National Marine Fisheries Service (NMFS).

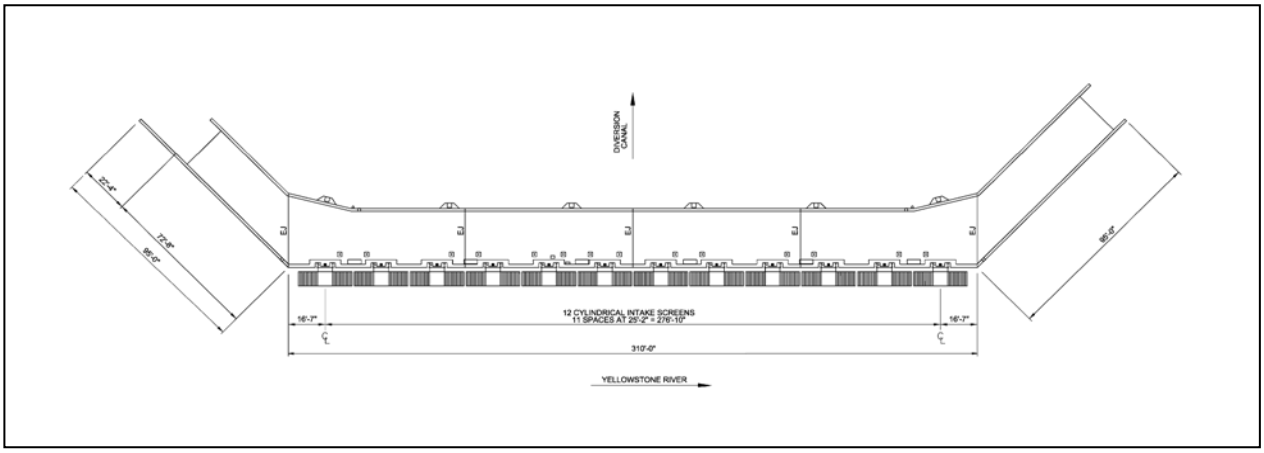

Figure 1 – New Headworks with 12 Rotating Removable Drum Screens

Each drum screen measures approximately 2 meters (6.5 feet) in diameter and 7.6 meters (25.2 feet) in length. The headworks structure supporting the screens measures 94.5 meters (310 feet) (Figure 1). The screens have a maximum mesh size of 1.75 mm with a profile bar of 2.38 mm woven wire. Maximum approach velocity in front of the screen is designed at 0.12 meters per second (0.4 feet per second), which will provide an even velocity distribution across the rotating screens. The cylindrical screens will draw water from lower in the water column. Water will gravity flow through the screens and through the slide gates where it will enter the canal.

Removable rotating drums allow each screen unit to be adjusted on a track and be raised above the river when not in use (Figure 2). This feature will minimize damage from ice flows and jams during winter and from other debris. Fixed brushes mounted on the inside and outside of the screens act as a cleaning system. Screen cylinders rotate against brushes to clean and remove debris that could impede flow through the screen and to remove fish and other aquatic organisms potentially impinged on the screens (Figures 3 and 4).

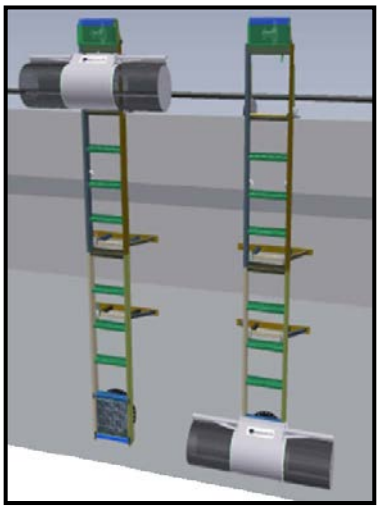

Figure 2 – Removable Rotating Drum Screens on Adjustment Track

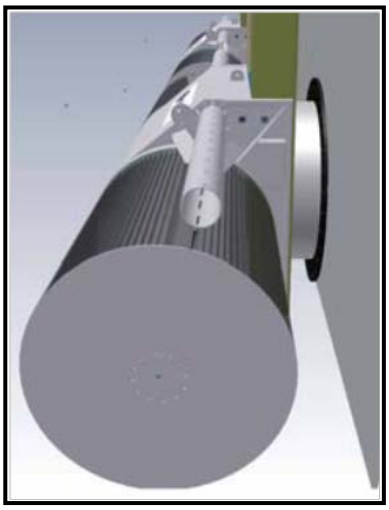

Figure 3 – Schematic of the Removable Rotating Drum Screen

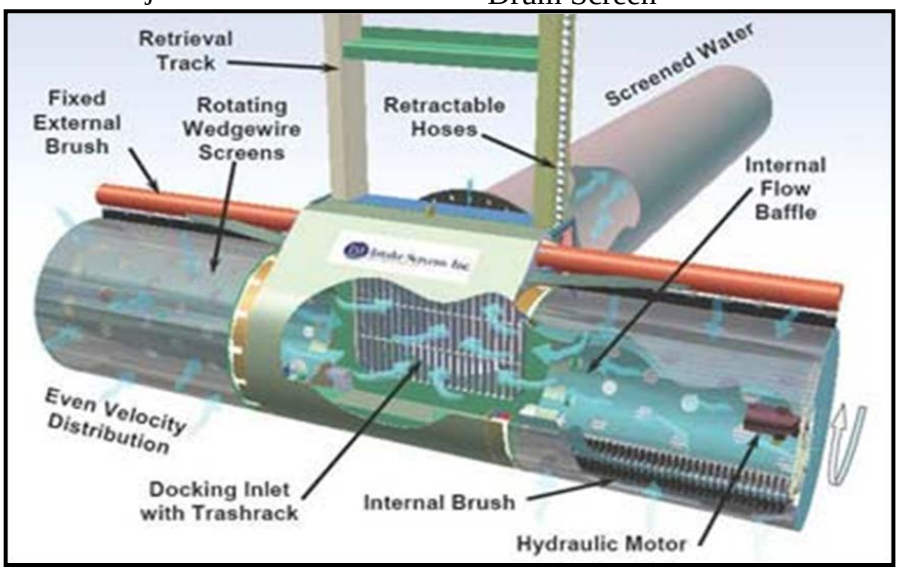

Figure 4 – Schematic of Removable Rotating Drum Screen

An extension of the main canal has been constructed to connect the new headworks structure to the existing canal. The new extension is trapezoidal with a 15.2 meter (50 feet) bottom and 1 to 3 sloping sides.

The control gates are housed within a reinforced concrete floodwall on steel piles across the face of the extended main canal. Reinforced concrete retaining walls upstream and downstream tie the facility into the adjacent banks.

Under the original Rock Ramp Alternative, a replacement concrete weir was to be constructed downstream of the new headworks to create sufficient water elevation to divert up to 1,374 cfs into the main canal. Until a permanent passage mechanism is constructed, approximately 0.27 meters (11 inches) of rock will be added as needed to the existing diversion structure.

Environmental Baseline

The environmental baseline is a "snapshot" of a species' health at a specified point in time. This section defines the environmental baseline including the effects of past and ongoing human and natural factors leading to the current status of the species, their habitats, and ecosystems in the action area.

Action Area

The action area for this consultation for pallid sturgeon is defined as the reach of the lower Yellowstone River and its tributaries from the Cartersville diversion dam at river kilometer 381 (river mile 237) downstream to its confluence with the Missouri River, the Missouri River downstream to Lake Sakakawea in North Dakota, and lands serviced by the Districts. District lands are located in Dawson, Wibaux, and Richland counties, Montana and McKenzie and Williams counties, North Dakota (Appendix A). The action area for interior least tern, whooping crane, greater sage-grouse and Sprague's pipit is a 1 mile radius surrounding the new headworks and fish screens.

Previous and Ongoing Projects in the Action Area

Yellowstone River Basin

Existing conditions in the action area are described in chapter three of the Intake EA. The Yellowstone River is essentially free-flowing. The river is not impounded by storage reservoirs, and the mainstem of the river is not regulated. However, there are six additional diversion dams upstream of Intake on the Yellowstone River (Figure 5). The uppermost is Billings Big Ditch Dam. Huntley diversion is Reclamation-owned and managed by the local irrigation district, while the middle four (Waco, Rancher's Ditch, Yellowstone, and Cartersville) are privately-owned and managed by local irrigation districts. Intake is Reclamation-owned and managed by the local irrigation district. All six dams present some degree of impediment to fish passage. The extent of fish blockage at these dams depends on river stage and the swimming ability of the various species trying to negotiate the dams. Huntley has a riprap-lined fish bypass channel built to help fish migrate around the dam when water conditions permit, although the feature is currently non-operational. Buffalo Rapids has a total of six pumping plants; five of the pumping plants pump water directly from the Yellowstone and one re-lift pumping plant which provides irrigation water for lands in the vicinity of Glendive, Fallon, and Terry, Montana. Currently, several agencies are working on resolving fish passage issues at Cartersville Dam and at the Shirley Unit of the Buffalo Rapids

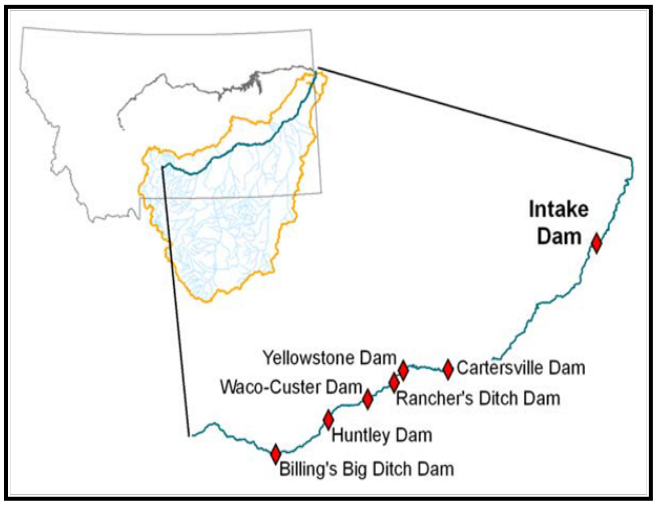

Figure 5 – Diversion Dams along the Yellowstone River (adopted from Jenkins 2007)

project, and are also considering additional modifications at Huntley to make the passage operational.

Bank stabilization projects have proliferated over the years, but many require permitting by the Corps of Engineers under Section 404 of the Clean Water Act (CWA). Permitting is also required by Section 10 under the Rivers and Harbors Act because the Yellowstone River is classified as a navigable water for much of its length. Therefore, any future bank stabilization projects requiring a permit under section 404 of the CWA or section 10 of the River and Harbors Act of 1899 would be subject to section 7 consultation between the permitting agency and the Service. The Intake area has a total of five man-made structures that stabilize the river channel. These structures are the existing headworks, the new headworks, Intake Diversion Dam, a boat ramp, and a field of loosely placed boulders extending about 91.4 meters (300 feet) downstream of the dam. The boulders originally served as an erosion control measure and a means to raise the water surface elevation for diversion into the LYIP Main Canal.

Conservation groups have been working with landowners to conserve and restore riparian areas. The Natural Resource Conservation Service continues to work with landowners adjacent to the Yellowstone River on a wide variety of conservation efforts including water and natural resource conservation. Recently, the Corps has been requiring screening to minimize fish entrainment in irrigation intakes on the Yellowstone River. However, many older irrigation projects have unscreened intakes. Changes are presently being implemented at the Buffalo Rapids intake to minimize fish entrainment. Buffalo Rapids is another Reclamation project on the Yellowstone River and is managed by the local irrigation district.

Reclamation is currently engaged in informal consultation with the Service regarding the effects to listed species from the continued operation of the LYIP. Reclamation will continue to work with the Service to complete formal section 7 consultation on operations prior to the end of the construction of the fish passage and protection measures at Intake.

Additionally, the Corps will be initiating consultation with the Service regarding the effects to listed species from the construction of the selected fish passage alternative following identification of that alternative.

Yellowstone and Missouri Rivers

Although construction of the Intake Project is on the Yellowstone River, the pallid sturgeon population under consideration is part of a larger population in the Missouri River Basin. More specifically the Intake Project would affect pallid sturgeon in Recovery-Priority Management Area (RPMA) 2, which includes the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up to the confluence of the Tongue River, Montana (Figure 6). The same connection to the Missouri River can be said for nesting interior least terns and migrating whooping cranes. Therefore, a reference to both of these rivers when considering the environmental baseline is appropriate.

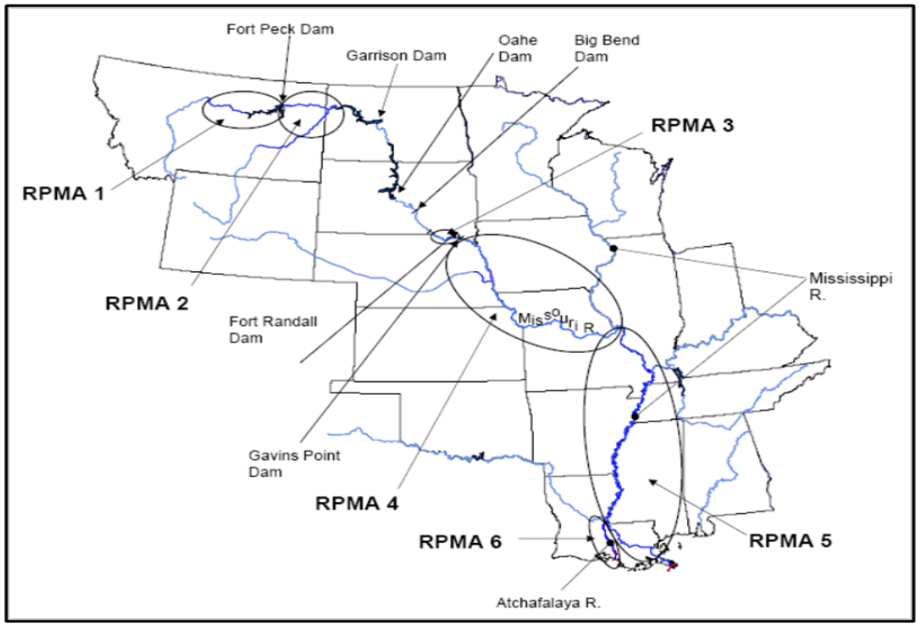

Figure 6 – Pallid Sturgeon Recovery Priority Management Areas (adapted from Service 2007)

Past and present impacts in the Missouri River basin, which includes the Yellowstone River, have been well-described in previous BAs (Corps 1998 and 2003; Reclamation and Service 2006) and subsequent BOs (Service 2000a; Service 2003 and amendments; Service 2006a) and will not be reiterated here. Appendix B displays reports documenting environmental baseline actions/impacts for other resources important to the species being considered.

Habitat restoration programs are ongoing on both the Yellowstone and Missouri rivers. The Corps has been working with the Service and other federal agencies, states, and tribes on restoration efforts on the Missouri River while others have been working on restoration efforts on the Yellowstone River through the Yellowstone River Conservation District Council. This council was formed to address conservation issues on the entire river. Ongoing actions on both rivers that would benefit the pallid sturgeon, interior least tern, and whooping crane include habitat restoration, fish hatchery supplementation, fish passage, fish entrainment protection, riparian restoration, bank stabilization studies, flow modeling, and water conservation.

Threatened, Endangered, and Candidate Species

The Endangered Species Act seeks to recover and conserve listed species and the ecosystems on which they depend. The species listed below are provided by the United States Department of the Interior Fish and Wildlife Service website at: www.fws.gov/montanafieldoffice/Endangered_Species/Listed_Species.html and include their status. The species list was updated November 2011.

ESA Species and Status in the Project Area		
Scaphirhynchus albus	Pallid Sturgeon	Listed Endangered
Sterna antillarum athalassos	Interior Least Tern	Listed Endangered
Grus americana	Whooping Crane	Listed Endangered
Mustella nigripes	Black Footed Ferret	Listed Endangered
Centrocercus urophasianus	Greater Sage-Grouse	Candidate
Anthus spragueii	Sprague's Pipit	Candidate

Critical Habitat
The action addressed within this BA does not fall within critical habitat (CH) of any of the listed species. No CH rules have been published for the pallid sturgeon and interior least tern. Critical habitat was designated for the whooping crane under "Proposed Critical Habitat for the Whooping Crane, Final Rule" Federal Register 43 (05 May 1978) 20938-20942. However there is no CH within the proposed project area.

Recovery Plan Overview
Recovery plans are available for all listed species covered in this document at http://ecos.fws.gov/tess_public/SpeciesRecovery.do?sort=1. The recovery plan for the whooping crane was updated in 2007, but the plans for the black-footed ferret, least tern, and pallid sturgeon are greater than five years old. The Service is currently working on a status report for the least tern and is in the process of updating the recovery plan for the pallid sturgeon.

The recovery plans for the interior least tern, piping plover, and pallid sturgeon all include recovery goals for habitats on the Yellowstone River. The recovery plan for the whooping crane requires protection of this species' habitat, including migratory habitat in Montana. However, whooping crane recovery goals are more focused and specific to maintaining and increasing breeding populations.

The biological and life requirements for the species covered in this BA have been described in previous BAs (Corps 1998 and 2003; Reclamation and Service 2006) and subsequent BOs (Service 2000a; Service 2003 and amendments; Service 2006a). A brief summary of the status of the species is included in this document with an emphasis on their status rangewide and in the action area.

Greater Sage-grouse (Candidate)
Rangewide Status Sage grouse are native to the sagebrush steppe of western North America and usually in close proximity to sagebrush, primarily big sagebrush (*Artemisia tridentate*) (Montana Sage Grouse Work Group 2005). Historically, sage grouse occupied portions of 16 states and three Canadian provinces. Currently, the species is limited to 11 western states and two provinces, including Washington, Oregon, Idaho, Montana, North Dakota, South Dakota, Wyoming, Colorado, Utah, Nevada, and California. A 2004 status review estimated rangewide populations between 100,000 to 500,000 individuals (Service 2005b).

Local Status In Montana, sage grouse inhabit roughly 27 million acres spanning 39 counties in the eastern half and southwestern corner of the state (Montana Sage Grouse Work Group 2005). Statewide, sage grouse populations increased from the mid-1960's through 1973 and fluctuated

slightly until peaking in 1984. Sage grouse populations again declined from 1991 through 1996 before increasing through 2001 to a level above 30 males per lek (Montana Sage Grouse Work Group 2005). Population estimates from 2003 indicated approximately 27.7 males per lek (Montana Sage Grouse Work Group 2005).

Sprague's Pipit (Candidate)

Rangewide Status The Sprague's pipit is endemic to the mixed-grass prairies of the northern Great Plains, including breeding habitat in Minnesota, Montana, North Dakota and South Dakota as well as south-central Canada. Wintering occurs in Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico. Long-term surveys have indicated a rangewide population decline of 3.9 percent annually (Jones 2010). Global population estimates have projected as many as breeding 870,000 birds, although this calculation is unverified with existing data and is likely a maximum estimate (Jones 2010).

Local Status The breeding range extends through the north-central and eastern counties of Montana. Breeding in the southeastern and south-central counties was last reported in 1991 (Jones 2010). Breeding population estimates range from as many as 400,000 in Alberta, Canada to as few as 3,000 in South Dakota (Jones 2010).

Black-footed Ferret (Endangered)

Rangewide Status The black-footed ferret once ranged throughout the Great Plains, including the intermontane regions of the interior Rocky Mountains and Southwest and always in close proximity to prairie dog towns (Service 1988). Populations declined dramatically in the 1980's. Reasons for this decline include eradication of prairie dogs, which comprise the majority of the ferret's diet and provide abandoned burrows which ferrets use for shelter (Service 1988). Disease has also contributed to population declines.

The last known wild population was found at Meeteetse, Wyoming, in 1981. The remaining 18 individuals from this population were captured and transferred to a captive breeding facility in 1987 (Service 1988). The first reintroduction of captive animals occurred during the fall of 1991, when 49 captive animals were reintroduced in Wyoming. Additional ferrets have been introduced each year since 1991. Population estimates from 2008 indicate a rangewide population of approximately 700 individuals (Service 2008).

Local Status The Montana recovery goal is to reestablish two viable populations with a minimum of 50 breeding adults in each population. Reintroductions have occurred at the UL Bend National Wildlife Refuge (beginning in 1994), the Fort Belknap Indian Reservation (beginning in 1997), locations within the BLM "40 Complex" in the northeastern portion of the state (beginning in 2001), and the Northern Cheyenne Indian Reservation (beginning in 2008) (Service 2008). Predation and outbreaks of plague have resulted in varying survival success of released animals, although successful reproduction of ferrets in the wild has been documented (Service 2008).

Recovery Plan The recovery plan for the black-footed ferret recommends removal of this species from the endangered species list once the captive population reaches 200 breeding adults and a pre-breeding population of 1,500 free-ranging adults in 10 or more populations with no

fewer than 30 breeding adults in any population has been established. Approximately 290 black-footed ferrets remain in captivity (Service 2008).

Interior Least Tern (Endangered)

Rangewide Status The interior least tern nests on the Mississippi, Missouri, Arkansas, Red, Rio Grande, Kansas, Platte, Loup, Niobrara, Canadian, Cheyenne, Ohio, and Yellowstone rivers. Rangewide estimates from 1999 were about 7,400 birds (Service 2000a). More recent estimates by the Service (2005) report a considerable increase of up to about 12,000 birds. It is important to note that this does not represent a complete census, because segments of some rivers are surveyed in one year but not in another. The Service (2005a) reports that the total estimate is likely a minimum estimate.

Rangewide numbers have increased in the 1999-2003 period. The interior least tern recovery plan established a goal of 7,000 terns rangewide maintained for 10 consecutive years. The current estimate of over 12,000 terns greatly exceeds this goal; however, recovery plan goals for least terns in all drainage basins have not been reached, and most areas have not been monitored for 10 years. The recovery plan has not been revised since it was written in 1990, and recovery goals may need to be updated.

In 2005, the first complete rangewide survey for interior least terns was conducted since the species was originally listed as endangered almost 20 years ago (Lott 2006). A total of 17,591 interior least terns were counted in association with 489 different colonies. Just over 62% of these birds were on the lower Mississippi River (10,960 birds on 1239+ river kilometers/770+ river miles). The Arkansas River, Red River, Missouri River, and Platte River systems accounted for 33.3% of the remaining least terms. Birds were counted in smaller numbers in the Ohio River system, the Trinity River system, the Rio Grande/Pecos River system, the Wabash River system, and the Kansas River system (Lott 2006). The survey counted 1,217 birds in the Missouri River above Sioux City, Iowa. On the Missouri River, 904 adults were counted while tributaries accounted for the remainder, including 289 on the Niobrara and smaller numbers on the Cheyenne (4) and Yellowstone (16) rivers (Lott 2006).

Local Status Interior least terns nest on sparsely vegetated sandbars on the Missouri and Yellowstone rivers in Montana and North Dakota. On the Yellowstone River, nesting is on bare sands and gravels on the upstream portions of vegetated channel bars below Miles City (Bacon and Rotella 1998). Most breeding sites on the Yellowstone River are in a section where channel meandering increases with more channel bars and islands (Service 2003). Interior least terns feed mostly on small fish. Their breeding season lasts from May through August with peak nesting occurring from mid-June to mid-July.

Although least terns in Montana represent a small proportion of interior least terns throughout their range, Montana's Yellowstone and Missouri rivers offer suitable habitat for breeding birds during years when more southern reaches have abnormal weather and river conditions (Atkinson and Dood 2006). The recovery plan goal for this species is 50 birds for the state of Montana.

More recent least tern surveys (A. Dood FWP- Helena, Montana, personal communication with G. Davis, BOR, 2010; L. Brown FWP- Helena, Montana, personal communication with C. Lasater, BOR, 2011) for the Yellowstone River are as follows:

- 2006 – 10 adults (surveys conducted June 12-13 when the river was high with little suitable habitat)
- 2007 – 11 adults (surveys conducted June 26-28)
- 2008 – 5 adults (surveys conducted July 16-18 when the river was very high and no habitat was available)
- 2009 – 17 adults (surveys conducted in July)
- 2010 – 0 adults (surveys conducted on June 20th, when the river was high with little suitable habitat)
- 2011 – No surveys conducted due to very high water

The highest number of terns reported along the Yellowstone River since the birds were federally listed occurred during the 1994-1996 breeding season when the river reach between Miles City and Seven Sisters Recreation Area supported an average of 27 birds (Atkinson and Dood 2006).

Using a 10-year trend average, as set forth in the Interior Least Tern Recovery Plan (1990), Montana has averaged 72.9 birds (ranging from 40-181) (Atkinson and Dood 2006). However, Montana has elected to use a 5-year running average for trend analysis and management planning. The population over the past 5-year period (2001-2005) averaged 51.6 birds ranging from 49-58. The state has met and/or exceeded its specific recovery goal of 50 adult birds in the past 20 years when counting birds both on the Yellowstone and Missouri rivers (Atkinson and Dood 2006).

Recovery Plan The recovery plan for the interior least tern recommends removal of this species from the endangered species list if essential habitat throughout its range is properly protected and managed and the species distribution and population goals are reached and maintained for 10 years (Service 1990). Recovery goals for the entire population are habitat protection, management, and attaining a population of 7,000 birds distributed across specific areas, including the Missouri River system. Recovery goals for the Missouri River system are habitat protection and reaching population levels of 2,100 adults in specific distributions assigned by state.

The range-wide survey would suggest that overall the interior population of the least tern has surpassed the 7,000 birds recovery goal but, in fact, the distribution of least tern populations does not yet meet the criteria/goals as envisioned by the Service when the recovery plan was written. Populations have apparently increased over time in some areas, e.g., the Mississippi River system, while others have declined, e.g., the Platte River. While questions remain on the status of interior least terns, an Interior Least Tern Working Group was formed to address these concerns and to work toward developing a range-wide strategy for monitoring population status and trends. A monitoring program coordinator position was created by American Bird Conservancy, with the support of the Corps, to coordinate range-wide monitoring efforts.

Recent and ongoing recovery efforts on the Missouri River by the Corps should assist in the continued recovery of this species. The recent signing of the Platte River Recovery

Implementation Program by the Secretary of the Interior and the Governors of Colorado, Nebraska, and Wyoming should also boost recovery actions for the interior least tern on the Platte River system.

Whooping Crane (Endangered)

Rangewide Status The species lives exclusively in North America. Historically, these birds bred primarily in wetlands of the northern tall- and mixed-grass prairies and aspen parklands of the northern Great Plains. Their principal nesting area is in Wood Buffalo National Park, Canada. They winter on and near the Aransas National Wildlife Refuge along the Texas coast. That population is referred to as the Aransas-Wood Buffalo population, and it migrates through the action area twice each year. During migration, the birds use a variety of feeding and roosting habitats, including croplands, marshes, shallow reservoirs and sheet-water areas, and submerged sandbars in rivers along the migration route. Approximately 343 individuals live in the wild at 3 locations, and 135 whooping cranes are in captivity at 9 sites. Only the Aransas-Wood Buffalo National Park population is self-sustaining with approximately 220 in the flock (Canadian Wildlife Service and Service 2007).

Local Status The whooping crane passes through Montana and North Dakota during both spring (April-mid-June) and fall migration (late August to mid- October). These migration flights are between its breeding territory in northern Canada and wintering grounds on the Gulf of Mexico. Frequently, whooping cranes migrate with sandhill cranes. Whooping cranes inhabit shallow wetlands but may also be found in upland areas, especially during migration. The whooping crane prefers freshwater marshes, wet prairies, shallow portions of rivers and reservoirs, grain and stubble fields, shallow lakes, and wastewater lagoons for feeding and loafing during migration.

Whooping crane sightings have been recorded in adjacent Richland County, Montana. The sightings were in areas outside of the proposed construction zone (M. Tacha - Fish and Wildlife Service, Grand Island, Nebraska, personal communication with G. Davis, BOR, 2010). The peak of spring migration in Montana is April 26 while the peak of fall migration is October 22 (Austin and Richert 2000). Austin and Richert (2000) also reported that spring observations are more common than fall and that riverine habitats have accounted for only 36% of the sightings in Montana. No whooping crane sightings have ever been recorded on the Yellowstone River, but have been recorded on the Missouri and Poplar rivers (M. Tacha - Fish and Wildlife Service, Grand Island, Nebraska, personal communication with G. Davis, BOR, 2010).

Recovery Plan Whooping crane recovery efforts have made great strides over the years with new populations being established in Florida and Wisconsin. The Aransas-Wood Buffalo population that migrates through the proposed action area is also doing favorably. There was a successful breeding season at Wood Buffalo National Park in 2006, which resulted in record numbers on the wintering grounds at Aransas National Wildlife Refuge. The International Recovery Plan for the Whooping Crane (Canadian Wildlife Service and Service 2007) includes scientific information about the species and provides objectives and actions needed to down-list the species. Recovery actions designed to achieve these objectives include protection and enhancement of the breeding, migration, and wintering habitat for the Aransas-Wood Buffalo National Park population to allow the wild flock to grow and reach ecological and genetic

stability; reintroduction and establishment of geographically separate self-sustaining wild flocks to ensure resilience to catastrophic events; and maintenance of a captive breeding flock to protect against extinction that is genetically managed to retain a minimum of 90% of the whooping crane's genetic material for 100 years.

Pallid Sturgeon (Endangered)

Rangewide Status The pallid sturgeon is native to the Missouri River, the lower reaches of the Platte, Kansas, and Yellowstone rivers, the Mississippi River below its confluence with the Missouri River, and the Atchafalaya River. Although the species' range is large, catch records are rare, with few captures of sub-adults in recent years. Pallid sturgeon observations have been reported on the Missouri River between the Marias River and Fort Peck Reservoir, between Fort Peck Dam and Lake Sakakawea, within the lower 112.6 kilometers (70 miles) of the Yellowstone River to downstream of Fallon, Montana, in the headwaters of Lake Sharpe, and near Plattsmouth, Nebraska (Jordan 2006).

The species appears to be nearly extirpated from large segments of its former range and may be close to extinction (Service 1993). Population size in the Missouri River basin above Gavins Point Dam is estimated to be between 325 and 550 adult fish with an aging population and no indication of recruitment at that time (Duffy et al. 1996).

Although critical habitat has not been designated, six RPMAs were identified in the Recovery Plan (Figure 7). Four of these RPMAs are on the Missouri River (Service 1993). However, the Pallid Sturgeon Recovery Team (Service 2006b) replaced the RPMA concept with Management Units which are based on genetic and biogeographical data (Figure 7). Because past research used the RPMA system and it is more specific to the action area, both the RPMA and Management Units will be used in this document to avoid confusion.

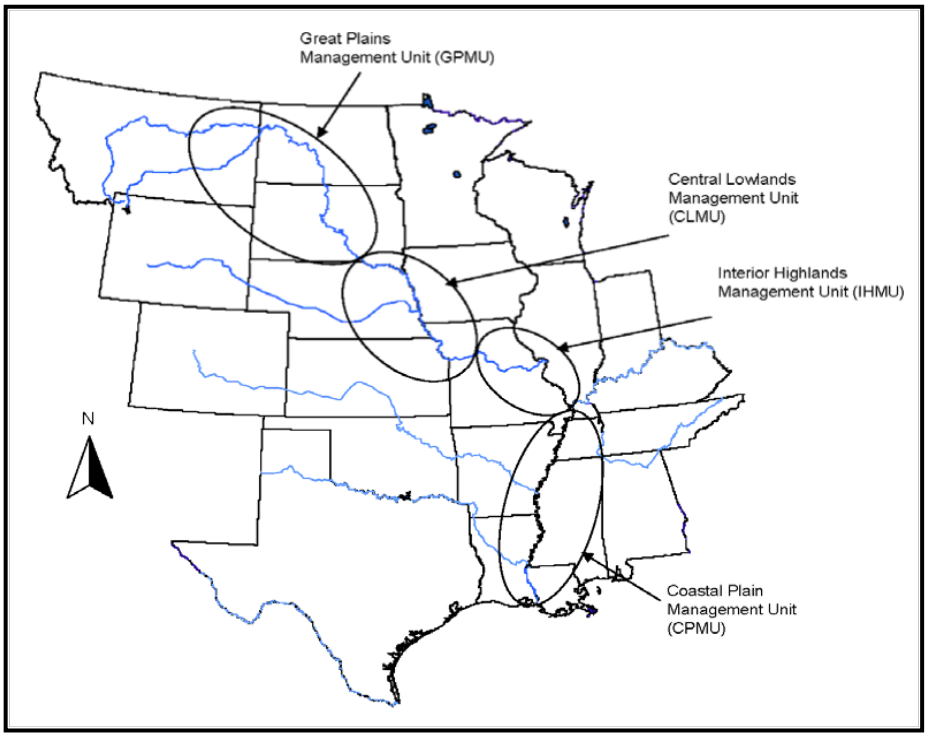

Figure 7 – Pallid Sturgeon Management Units (Service 2006)

Local Status Pallid sturgeon occupy the Missouri and Yellowstone rivers in Montana and North Dakota. These sturgeon use the Missouri River year round and the Yellowstone River primarily during spring and summer spawning. Adults primarily move into the Yellowstone River in the spring and summer. Jaeger et al. (2008) found reaches of the Yellowstone River to be suitable rearing habitat for hatchery-reared juvenile pallid sturgeon that were likely used year-round.

The action area is in the Great Plains Management Unit (GPMU). This unit includes the Missouri River from Great Falls, Montana, to Ft. Randall Dam, South Dakota (Figure 7). This unit includes the former RPMA 2 (Figure 6). The lower Yellowstone River in RPMA 2 (GPMU) is believed to have high potential reproductive habitat for the pallid sturgeon. While there are documented recent occurrences of natural reproductive success in RPMAs 2, 4, and 5, there are little to no data indicating substantial natural recruitment of pallid sturgeon in RPMAs 1, 2, 3, and 4 (Service 2007). Linear regression of population declines indicate that the pallid sturgeon population in RPMA 2 will likely be extirpated between 2018 and 2024, but extirpation could occur sooner as individuals reach an old-age threshold (Kapuscinski 2003a; 2003b, and Klungle and Baxter 2005).

Kapuscinski (2003a) estimated the wild pallid sturgeon population in RPMA 2 at 151 adult fish, down from 255 adult fish in 1991. Klungle and Baxter (2005) estimated 158 wild adult pallid sturgeon inhabit RMPA 2. Bramblett (1996) documented that pallid sturgeon prefer the Yellowstone River over the Missouri River below Fort Peck under contemporary flow regimes. Evidence from Bramblett (1996) strongly suggests that pallid sturgeon spawning occurs in the lower Yellowstone River below Intake Dam. This evidence includes many fish moving into the lower Yellowstone River during spawning season, ripe fish in the Yellowstone River, and fish aggregating during the spawning season (late May and early June).

According to the Service (2007), the wild pallid sturgeon population in RPMA 2 continues to decline. The Service (2007) reported that data compiled from the National Pallid Sturgeon Database showed 245 unique individual pallid sturgeon (essentially all adults) were collected during 16 years of sampling (1990-2006). The population is being supplemented with hatchery-reared fish to prevent local extirpation (Service 2006c). The Service (2007) reports that pallid sturgeon from all stocking events have produced recaptures and are contributing to the current population structure. From 1998-2007, over 11,000 pallid sturgeon have been stocked in the Yellowstone River above the diversion dam (Krentz et. al. 2005; Upper Basin Pallid Sturgeon Recovery Workgroup 2007). Recapture has been as high as 6% and included five year classes (Jaeger et al. 2006).

Spawning has occurred in the Yellowstone River, but there is no evidence that the resulting young survive to adulthood and reproduce (Bergman et al. 2008; (reported as M. Jaeger and D. Fuller personal communication in 2009 Draft Recovery Plan for the Pallid Sturgeon)). In addition, although larvae were collected in RPMA 2 from the Missouri River in 2002, their post-hatch drift may carry them into the lentic waters of Lake Sakakawea which does not provide the necessary habitat for rearing (cited in Jordan 2006 as S. Krentz, Service, personal communication 2003).

Pallids in the Yellowstone River prefer sandy substrates and deep channels and select reaches with numerous islands (Bramblett and White 2001). Migrating pallids appear confined to about a 70-mile stretch of river below Intake Diversion Dam. More recently radio-tagged hatchery-reared pallid sturgeon have been placed above the dam (Jaeger et al. 2005). Most of these fish stayed above the Intake Diversion Dam, but some were entrained and found in the main canal of the Lower Yellowstone Project (Jaeger et al. 2004).

Spawning substrate has not been specifically identified in the upper Missouri River basin including the Yellowstone River. While detailed spawning behavior and substrate requirements for pallid sturgeon are poorly understood, inferences can be drawn from other sturgeon species. In general, sturgeon species of the United States spawn over hard substrates;

- Short nose sturgeon (*Acipenser brevirostrum*) spawn over rubble (Taubert 1980),
- Lake sturgeon (*A. fulvescens*) spawn over coarse gravel and rounded cobble (Manny and Kennedy 2002) and where substrates are predominantly cobble (Chiotti et al. 2008),
- White sturgeon (*A. transmontanus*) spawn over a diversity of substrates including boulder, bedrock, cobble, and sand (Parsley et al. 1993; Perrin et al. 2003),
- Gulf sturgeon (*A. oxyrinchus*) spawning areas consist of hard substrates and gravel (Heise et al. 2004).

This has led to the general conclusion that pallid sturgeon most likely spawn over hard substrates. Additionally, there are empirically derived data for pallid sturgeon spawning on the lower Missouri River. Spawning appears to occur over firm substrates, in deeper water, with relatively fast, turbulent flows, and is driven by several environmental stimuli including flow, water temperature, and day length (USGS 2007, DeLonay et all, 2009). This is supported by telemetry data from the middle and lower Missouri River where female pallid sturgeon in spawning condition are believed to have spawned over or adjacent to coarse substrates in relatively deep water on outside bends where flows converge (A. DeLonay, U.S. Geological Survey (USGS), personal communication with G. Davis, BOR, 2010). The predominant substrate types upstream of Intake Dam are coarse sand, sand gravel and gravel-cobble (Bramblett and White 2001). On the Yellowstone River, there are over 4,000 acres of bluff pool habitats (Jaeger et al. 2008). These habitats are characterized by deeper water with convergent flows along outside bends with bottom composition being predominantly bedrock or boulder materials (Bramblett and White 2001). Given the association of sturgeon spawning with hard substrates and the abundance of hard substrates and habitat diversity upstream of Intake Dam, it is reasonable to infer that suitable spawning substrate for the species exists upstream of Intake Dam.

Historically, pallid sturgeon have been documented at least 180 kilometers (112 miles) upstream of Intake, Montana, or about 430 kilometers (267 miles) above the present headwaters of Lake Sakakawea. Pallid sturgeon were observed at this location during times of the year when spawning is known to occur (Brown 1955; Brown 1971). Watson and Stewart (1991) captured a pallid sturgeon near Fallon, Montana in 1991 in conjunction with studies associated with the Tongue River Project. There are other reports from the 1920s and 1930s that document pallid sturgeon above Intake Dam and in the vicinity of the Tongue River (Service 2000b). Historic data also cites fifteen occurrences of pallid sturgeon at Intake Dam between 1977 and 1994 with all of these confirmed captures in May or June (Service 2000b).

Growth and survival of drifting larvae depend on being transported to suitable rearing habitats with abundant nutritional food and relatively benign environmental conditions (Wildhaber et al 2007). The Service (2000a and 2003) stressed the importance of shallow water habitats for larval rearing. Montana FWP (M. Jaeger, personal communication with G. Davis, BOR, 2010) has estimated that there are about 5,000 acres of shallow water rearing habitat between Intake and Cartersville diversions near baseflow conditions when this habitat type is important for rearing larvae. Jaeger et al. (2008) further indicated that spawning and rearing habitats upstream of Intake Diversion are suitable for pallid sturgeon restoration efforts.

Like most sturgeon species, pallid sturgeon move upstream to spawn, and spawning is believed to occur at or near the apex of this movement (A. DeLonay, USGS, personal communication with G. Davis, BOR, 2010). Yellowstone River telemetry data indicate that pallid sturgeon will move into the Yellowstone River in the spring, some will move upstream to Intake Dam but not above, and that the majority of study fish remained in the lower Yellowstone River (Bramblett and White 2001). None of these fish were of known reproductive condition. Subsequent work studying fish in known spawning condition documented at least one gravid female pallid sturgeon moving up to Intake Dam and then moving back downstream (M. Jaeger, unpublished data).

Despite recent evidence of spawning in the lower Yellowstone River, there are no detectable levels of recruitment occurring (reported as M. Jaeger and D. Fuller personal communication in 2009 Draft Recovery Plan for the Pallid Sturgeon). The Service (1993) has suggested that the Intake Diversion Dam is a barrier to upstream passage that may prevent pallid sturgeon from accessing upstream reaches. The best available science suggests that the Intake Diversion Dam is a partial barrier to some species (Helfrich et al. 1999; Jaeger et al. 2004; Backes and Gardner 1994; Stewart 1986, 1988, 1990, 1991). It is likely a total barrier to other species, including pallid sturgeon, due to impassable turbulence and velocities associated with the rocks at the dam and downstream (Jaeger et al. 2008; Fuller et al. 2008; Helfrich et al. 1999; White and Mefford 2002; Bramblett and White 2001; Service 2000a, 2003, 2007).

Braaten et al. (2008) suggests larval drift distance available below Intake Dam is insufficient in length and settling habitat. If these young fish reach the lake environment, their survival rate is believed to be very low because of unsuitable habitat (Kynard et al. 2007). Biologists also suspect that pallid sturgeon larvae are intolerant of sediments in the river-reservoir transition zone (Wildhaber et al. 2007). The cause of larval deaths in the reservoir is unknown but could be the lack of food, predation, or related to sedimentation in reservoirs (Bergman et. al. 2008). The Garrison reach of the Missouri River is outside the recovery priority areas identified in the Pallid Sturgeon Recovery Plan (Service 1993). Reaches outside the recovery priority areas are not excluded from recovery actions but are designated as lower priority because these areas have been altered to the extent that major modifications would be needed to restore natural physical and hydrologic characteristics.

As described in chapter 1 of the EA, an average of 500,000 fish of 36 species are annually entrained at Intake Diversion, of which as many as 8% are sturgeon (Hiebert et al. 2000). Many of the entrained fish are native and their death rates are high. For instance, about 86% of the sauger that are entrained in the main canal die compared to a mortality rate of 31% for un-

entrained sauger that remain in the Yellowstone River. All radio-monitored sauger and pallid sturgeon that have entered the canal system died somewhere in the system (Jaeger et al. 2005).

Recovery Plan The Service, along with many state game and fish departments, have coordinated efforts to help recover pallid sturgeon. Other federal agencies like the Corps and Reclamation have also been involved with priority recovery activities. A monitoring and assessment program for pallid sturgeon on the Missouri River has been established among the recovery agencies. Avoidance of extirpation over the next 50 years in the upper Missouri River Basin may depend largely on the success of the pallid sturgeon artificial propagation program. These efforts are a part of the Pallid Sturgeon Recovery Plan and are assuming increasing importance because of the general absence of natural reproduction or recruitment in the upper Missouri River during the past 30 years (Jordan 2006). Both state and federal hatcheries are involved in these efforts. The Pallid Sturgeon Recovery Team and the Service completed a Pallid Sturgeon 5-year Review in 2007 (Service 2007). The Service has also been working with the Upper, Middle, and Lower Basin Pallid Sturgeon workgroups in developing recovery tasks and drafting a new and revised Pallid Sturgeon Recovery Plan. The draft Plan (G. Jordan - Service Pallid Sturgeon Recovery Coordinator, Billings, Montana, personal communication with G. Davis, BOR, 2009) recommends reclassification of pallid sturgeon status when identified threats are sufficiently reduced such that a self-sustaining and genetically-diverse population is achieved within each management unit. Delisting will be considered when identified threats are alleviated and a self sustaining genetically diverse population is achieved within each management unit for 3 generations (36-60 years). In this context, the population data must reflect year class strength, survival to age, and mortality rates sufficient to maintain long-term population stability sustained through natural reproduction.

At the request of Reclamation, a Science Review Panel (Panel) was convened in October 2009 to provide a third-party evaluation of the science involved in the Intake Diversion Dam Modification Project. The Panel concluded that the best available science supports the hypothesis that installation of new fish screens, as described in the Headworks and Fish Screen Description section of this document and chapter 2 of the EA, will effectively decrease entrainment of adult, juvenile, larval, and embryonic pallid sturgeon and other fish species (PBS&J 2009). Reclamation's screen design was found to be effective at avoiding entrainment of pallid sturgeon and other fish species over 38 mm (1.5 inches) total length. A subsequent lab study indicated that entrainment may be problematic for larval pallid sturgeon between 25 and 38 mm (1 and 1.5 inches) total length that spend an extensive amount of time in the immediate area of the diversion screens (reported as Mefford and Sutphin 2008 in PBS&J 2009). The Panel noted that a lack of behavioral and habitat use data for pallid sturgeon between 25 and 38 mm (1 and 1.5 inches) total length is lacking and therefore, any quantitative conclusions about entrainment risk are precluded (PBS&J 2009). The Panel also agreed that decreasing entrainment of other fishes would likely provide increased food resources and thus improve growth, survival, and maturation of pallid sturgeon (PBS&J 2009).

Effects of the Proposed Action

The term "effects of the action" refers to the direct and indirect effects of a proposed action on listed species and designated critical habitat, together with the effects of other activities that are

interrelated or interdependent with that action that will be added to the environmental baseline (50 CFR §402.2). Reclamation reviewed the action area, life history, habitat information, and environmental baseline for each of the federally listed species to evaluate potential effects.

The Service has identified 3 potential conclusions regarding analyses for impacts on listed species or critical habitat:

1. *No effect* - the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat, or
2. *Is not likely to adversely affect* – the appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial.
    - *Beneficial effects* are contemporaneous positive effects without any adverse effects to the species.
    - *Insignificant effects* relate to the size of the impact and should never reach the scale where take occurs.
    - *Discountable effects* are those extremely unlikely to occur.
3. *Likely to adversely affect* – the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial.

Black-Footed Ferret, Greater Sage-Grouse, and Sprague's Pipit

Direct Effect and Indirect Effects

Reclamation did not identify any impacts associated with the proposed operation activities for the black-footed ferret, the greater sage grouse, and the Sprague's pipit. Based on a review of habitat use patterns, it is unlikely that these species would be in the action area. Reclamation is unaware of any interrelated or interdependent actions that would adversely affect the black-footed ferret, the greater sage-grouse, or the Sprague's pipit.

Summary of Effects

The proposed action will have no effect on the black-footed ferret, the greater sage-grouse, or the Sprague's pipit.

Whooping Crane

Direct Effect and Indirect Effects

Reclamation did not identify any impacts associated with the proposed operation on or near historic migratory stopover sites for whooping cranes. Based on a review of past sightings for this species, it would be unlikely that migrating whooping cranes would be near or in the action area. Furthermore, monitoring for local whopping crane sightings, as identified in chapter four and in appendix I of the Intake EA, would avoid potential adverse effects. Reclamation is unaware of any interrelated or interdependent actions that would adversely affect the whooping crane in the action area.

Summary of Effects

The proposed action will have no effect on the whooping crane.

Interior Least Tern

Direct and Indirect Effects
Reclamation did not identify any impacts associated with proposed operation on foraging or nesting interior least terns. Based on a review of past sightings of this species, the potential for least terns to be near action area would be considered rare. Furthermore, restricting all surface-disturbing and construction activities related to headworks and screen O&M within 0.4 kilometers (0.25 miles), or within line of site, of any active interior least tern nest from May 15 to August 15 would avoid potential adverse effects. Reclamation is not aware of any interrelated or interdependent actions that would adversely affect the interior least tern in the action area.

Summary of Effects
The proposed action will have no effect on the interior least tern.

Pallid Sturgeon
Direct and Indirect Effects
Reclamation has evaluated the proposed operation activities under this action and identified potential direct and indirect effects that may affect pallid sturgeon. The effects to larval, juvenile, and adult pallid sturgeon could include:

- If larval pallid sturgeon between 25 and 38 mm (1 and 1.5 inches) are present in the river system upstream of the diversion dam, there is potential for entrainment into the main canal or impingement on the new screens. Reclamation is not aware of data documenting successful spawning of native or stocked individuals above the diversion dam. If present above the diversion dam, the lack of behavioral and habitat use information for pallid sturgeon of this size class precludes any quantitative conclusions regarding their entrainment or impingement risk. Larger larval and juvenile pallid sturgeon (>40 mm or 1.6 inches) do not appear to be at risk of entrainment or impingement (PBS&J 2009).
- Take of pallid sturgeon during operation of the headworks without the rotating drum screens in place is discountable. To minimize the probability of this scenario occurring, one additional gate and screen have been included to provide redundancy in the system. Additionally, a coffer box will be available which will allow expedient repair of damaged gates. This scenario is unlikely but could potentially occur during an emergency situation, such as damage to multiple screens when the back-up screen is already in use. The Service will be contacted immediately if unscreened water will be diverted into the canal.
- Placing rock onto the existing diversion dam until passage is resolved would continue to prevent upstream movement of pallid sturgeon.

Because it is unlikely larval pallid sturgeon are present in the Yellowstone River above the diversion dam, Reclamation has determined the potential adverse effects associated with entrainment and/or impingement of larval pallid sturgeon are discountable until fish passage limitations are corrected. Similarly, entrainment of pallid sturgeon during emergency screen repairs is unlikely and discountable.

Adding rock to the dam will continue to provide an upstream barrier to pallid sturgeon by obstructing upstream migration. However, the Corps and Reclamation are currently analyzing additional passage alternatives. Placing rock on the diversion dam, prior to providing passage, has the potential to indirectly affect pallid sturgeon. The rock will be placed at the crest of the

dam, which is currently unreachable by pallid sturgeon due to downstream turbulence and water velocities created by the existing dam and boulder field and will have no direct effect on pallid sturgeon.

The overall purpose of the Intake Project is intended to benefit pallid sturgeon recovery by improving passage and minimizing entrainment. The overall effect of the Intake Project is anticipated to provide future long-term benefits that would adequately offset minor short-term effects potentially caused by headworks and fish screen operation without fish passage in place. Reclamation is unaware of any interrelated or interdependent actions that would adversely affect the pallid sturgeon in the action area. Incidental take of larval pallid sturgeon is not anticipated until passage and spawning is achieved.

Summary of Effects

Until passage and spawning are achieved above the diversion dam, operation of the headworks and screens are not likely to adversely affect the pallid sturgeon. Dumping rock on the existing diversion dam is not likely to adversely affect juvenile and/or adult pallid sturgeon due to the boulder field and diversion dam hydraulics that have historically limited upstream passage of pallid sturgeon.

Conclusions

Based upon the effects described in the Intake Project EA and BA, and in this biological assessment of the proposed federal action, Reclamation has determined that the operational activities will have no effects on the black-footed ferret, the greater sage-grouse, the Sprague's pipit, the whooping crane, and the interior least tern. Operation of the headworks and screens are not likely to adversely affect the pallid sturgeon during the period until passage and spawning above the diversion dam is achieved. Placing rock on the existing diversion dam is not likely to adversely affect pallid sturgeon. The overall effect of the Intake Project would provide future long-term benefits for pallid sturgeon recovery by improving passage and minimizing entrainment. Reclamation will proceed with Section 7 consultation on the continued operation of the Lower Yellowstone Project and intends to work with the Service to complete that Section 7 consultation process prior to completion of the fish passage structure(s). Formal consultation on the continued operation of the LYIP will include an assessment for potential take of larval pallid sturgeon through entrainment in the main canal. Based on the analysis in this BA, Reclamation requests the Service's concurrence regarding the effects of operation of the headworks and screens and dumping rock on the existing diversion dam during the period prior to completion of the appropriate fish passage.

Reclamation has vast expertise in scientific study design and entrainment monitoring in our Technical Service Center in Denver, CO. A site visit was conducted on February 1, 2012 and Reclamation will be drafting a proposed monitoring plan to evaluate the effectiveness of the new fish screen and headworks. Reclamation would work cooperatively with the Fish and Wildlife Service, Montana Fish, Wildlife and Parks and the Upper Basin Pallid Sturgeon Work Group to formulate a monitoring plan to analyze impacts to fish less than 40 mm in length related to entrainment into the canal or loss to impingement upon the screen.

Appendix A – Lower Yellowstone Project Irrigation District Lands

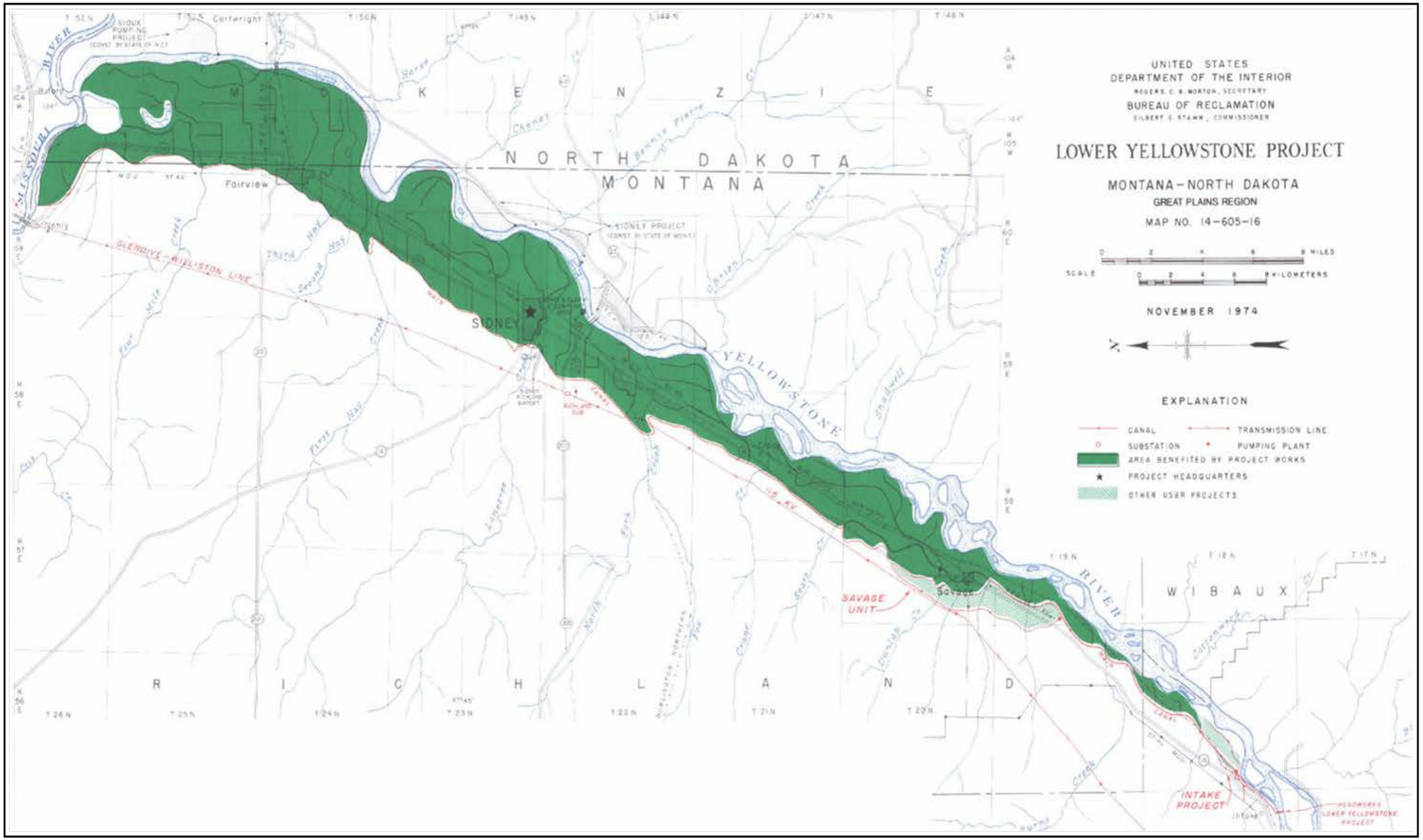

Figure A.1 – Lower Yellowstone Project Map

Appendix B

Table B.1 – Research on the Yellowstone and Missouri Rivers Contributing to the Environmental Baseline for the Federal Action Area.

Resource	River	Report Title (year)
Aquatic Invertebrates	Yellowstone	Aquatic Invertebrates of the Yellowstone River Basin, Montana: Montana (1977)
Bank stabilization and wildlife	Yellowstone	Toward Assessing the Effects of Bank Stabilization Activities on the Wildlife Communities of the Upper Yellowstone River, USA. (2001)
Bed sediments	Yellowstone	Element Concentrations in Bed Sediment of the Yellowstone River Basin, Montana, North Dakota, and Wyoming - A Retrospective Analysis (1999)
Birds	Yellowstone	Avian Communities of the Middle and Lower Yellowstone River: A Pilot Study (2006)
Birds	Yellowstone	The Affect of Altered Streamflow on Migratory Birds of the Yellowstone River Basin, Montana (1977)
Channel migration	Yellowstone	Yellowstone River Channel Migration Zone Mapping (2008)
Environmental setting	Yellowstone	Environmental Setting of the Yellowstone River Basin, Montana, North Dakota, and Wyoming (1999)
Fish communities	Missouri and Yellowstone	Ecology and Structure of Fish Communities in the Missouri and Lower Yellowstone Rivers (2000)
Fish communities	Missouri and Yellowstone	Fish Distribution and Abundance (2004)
Fish communities	Missouri and Yellowstone	Spatial Patterns of Physical Habitat (2001)
Fish communities	Yellowstone	The Yellowstone River: Its Fish and Fisheries (Unknown)
Fish communities	Yellowstone	The Affect Of Altered Streamflow on Fish of the Yellowstone and Tongue Rivers, Montana (1977)
Flows	Missouri and Yellowstone	Classification of Reaches in the Missouri and Lower Yellowstone Rivers Based on Flow Characteristics (2002)
Geomorphic	Yellowstone	Geomorphic Reconnaissance and GIS Development Yellowstone River, Montana (2004)
Geomorphology and flows	Yellowstone	The Effect of Altered Streamflow on the Hydrology and Geomorphology of the Yellowstone River Basin, Montana (1977)
Hydrologic modeling	Yellowstone	Future Development Projections and Hydrologic Modeling in the Yellowstone River Basin, Montana (1977)
Irrigation Projects	Yellowstone and Missouri (statewide inventory)	Irrigation in Montana: A Preliminary Inventory of Infrastructure Condition (2009)
Pallid sturgeon	Yellowstone	Assessment of Pallid Sturgeon Restoration Efforts in the Lower Yellowstone River - Annual Report for 2007 (2007)
Riparian and wildlife	Yellowstone	Riparian Habitat Dynamics and Wildlife along the Upper Yellowstone River (2003)
Riparian and wetlands	Yellowstone River	Yellowstone River Wetland/Riparian Change Detection Pilot Study (2006)

Walleye and Sauger	Yellowstone	Assessment and Requirements of Sauger and Walleye Population in the Lower Yellowstone River and Its Tributaries (1992)
Water quality	Yellowstone	Environmental Setting of the Yellowstone River Basin, Montana, North Dakota, and Wyoming (1999)
Water quality	Yellowstone	Organic Compounds and Trace Elements in Fish Tissue and Bed Sediment from Streams in the Yellowstone River Basin, Montana and Wyoming, 1998 (2000)
Water quality	Yellowstone	Water-Quality Assessment of the Yellowstone River Basin, Montana and Wyoming – Water Quality of Fixed Sites, 1999-2001 (2005)
Water quality	Yellowstone	Water Quality in the Yellowstone River Basin, Wyoming, Montana, and North Dakota, 1999-2001 (2004)
Water quality	Yellowstone	The Effect of Altered Streamflow on the Water Quality of the Yellowstone River Basin, Montana (1977)

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