Biological Assessment for the Intake Diversion Dam Modification, Lower Yellowstone Project

Introduction

This appendix is a Biological Assessment (BA) for Endangered Species Act (ESA) Section 7 consultation for the proposed Intake Diversion Dam Modification, Lower Yellowstone Project (Intake Project). It also contains detailed information to support the Federally-Listed Species and State Species of Special Concern section in chapter four of the Intake Project Environmental Assessment (Intake EA). Where appropriate, this BA incorporates by reference details in the Intake EA.

The U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the U.S. Army Corps of Engineers (Corps) are proposing to modify Intake Diversion Dam to improve passage for the endangered pallid sturgeon and other native fish and to reduce entrainment of fish into the Lower Yellowstone Project's main canal at Intake, Montana (see Intake EA chapter one, figure 1.1). The Intake EA analyzes and discloses effects associated with proposed modifications to the Intake Diversion Dam and Lower Yellowstone Project's main canal headworks. Reclamation and the Corps are joint-lead agencies for preparation of the Intake EA. Reclamation is the administrative lead agency for the National Environmental Policy Act (NEPA) activities associated with the proposed Intake Project.

On May 12, 2009, Reclamation, the Corps, and the U.S. Fish and Wildlife Service (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. The formal Section 7 consultation addresses operation of the new proposed Intake Project structures, in addition to operation of the overall Lower Yellowstone Project. Therefore, this BA focuses only on construction of the proposed fish passage and entrainment structures.

Background and History

Federal Action History and Project Section 7 Consultation History

Identification of the Rock Ramp Alternative as the preferred alternative in the Intake Project EA was a result of Section 7 consultation that began in 1992 and Intake EA preparation that began in September 2008. The pallid sturgeon was listed as endangered in 1990. This Section 7

consultation history is briefly discussed in chapters one and five of the Intake EA. Important milestones in Reclamation's Section 7 consultation with the Service are listed in table D.1.

A number of important ESA consultation documents are referred to in table D.1 and in this BA. The first is the *Draft Biological Assessment: Future Operation of the Lower Yellowstone Project with Proposed Conservation Measures* prepared by Reclamation in 2005 (Lower Yellowstone Project Operation BA). The second is the *Biological Opinion on Missouri River Operations* prepared by the Service in 2000 (Missouri River BO). Third is the BA presented in this Appendix, *Biological Assessment for the Intake Diversion Dam Modification, Lower Yellowstone Project* (Intake Project BA).

Table D.1 - History of Reclamation Actions Taken During Section Consultation on Lower Yellowstone Project.

Date	Report Name	Author	Summary
September 1992	Memorandum	Service	Documented Service staff conversation with Reclamation staff that Section 7 consultation should be initiated on fish passage issues at Intake Diversion Dam.
November 1993	*Pallid Sturgeon Recovery Plan*	Service	*The Pallid Sturgeon Recovery Plan* report prepared by a multi-disciplinary recovery team includes an introduction on pallid sturgeon issues, recovery objectives, and implementation schedule. It recommends federal agencies address passage and entrainment issues.
February 1996	Memorandum	Reclamation	Reclamation requested Service provide a species list for potential title transfer at Intake.
February 1996	Memorandum	Service	Service transmitted list of species to be included in consultation on title transfer of the Lower Yellowstone Project.
1997	*Lower Yellowstone River Fish Passage and Protection Study,* (Reclamation and Montana Fish, Wildlife & Parks (FWP) 1997)	Reclamation and FWP	Cooperative effort between Reclamation and FWP to address fish passage at Intake, Montana.
1997	*Fish Passage and Protection Program in the Yellowstone River Basin, Montana. Literature Summaries for Key Fish Species*	Reclamation	Reclamation synthesized available fisheries data.
September 1999	Interagency Meeting	Service and Reclamation	Discussed the need to recognize fish passage and entrainment as significant issues to be addressed through Section 7 consultation.
Fall 1999	Memorandum with preliminary draft Lower Yellowstone Operation BA	Reclamation	Shared preliminary draft Lower Yellowstone Operation BA with the Service.
November 1999	Memorandum	Service	Service commented on preliminary draft stating that the project at Intake is "likely to adversely affect" pallid sturgeon, sturgeon chub (candidate species), and sicklefin chub (candidate species). Requested modifying the Lower Yellowstone Operation BA on operations to include fish passage and protection.

Date	Report Name	Author	Summary
December 1999	Fax	Reclamation	Sent Service's comments to Intake Board of Control
January 2000	*Intake Diversion Dam Fish Protection and Passage Concept Study Report*	Reclamation	Summarized baseline fishery data, as well as entrainment fish data, to identify future headwork modifications.
February 2000	Memorandum with final Lower Yellowstone Operation BA	Reclamation	Identified adverse impacts to pallid sturgeon, sicklefin chub and sturgeon chub
March 2000	Memorandum	Service	Acknowledged receipt of Lower Yellowstone Operation BA and estimated that a biological opinion (BO) on the Lower Yellowstone Project would be completed by August 2000.
April 2000	*Fish Entrainment at the Lower Yellowstone Diversion Dam, Intake Canal, Montana 1996-1998*	Reclamation	Analyzed fishery data collected on the lower Yellowstone River and entrained fish data to use in modifying the Lower Yellowstone Project main canal headworks. From 1996 to 1998 fish entrained into the Intake main canal were sub-sampled and enumerated.
May 2000	Field Trip	Reclamation and Board of Control	Site visits to Yakima, Washington, and Redding, California, to look at fish screen and passage options.
July-August 2000	Telephone call and Site visit	Reclamation and Service	Service requested extension of consultation deadline and a site visit to the Intake Diversion Dam site.
August 2000	Memorandum	Reclamation	Notified Service that timeline is critical to the title transfer process and set deadline for BO by September 2000.
August 2000	Meeting	Reclamation and Service	Initiated internal discussions of whether to amend the Lower Yellowstone Operation BA to include fish screen and passage as proposed actions. Service agreed to provide supporting information and that amending the Lower Yellowstone Operation BA could be done by letter to the Service.
September 2000	Memorandum	Service	Provided data supporting the need for fish passage and entrainment protection and requested Reclamation modify the Lower Yellowstone Operation BA, understanding that the Service would wait for Reclamation to decide whether to amend the BA before proceeding with preparation of a BO.
November 2000	Meeting	Reclamation, Service, and Board of Control	Discussed the Lower Yellowstone Operation BA, need for fish passage and protection, and Reclamation's decision to include conservation measures.
November 2000	*Biological Opinion on Missouri River Operations*	Service	Service completed and transmitted BO on Missouri River Operations to Corps of Engineers that included recommendation to work with Reclamation on modifying the Intake Diversion Dam.
January 2001	Meeting	Reclamation	Discussed development of fish passage

Date	Report Name	Author	Summary
		and Corps	alternatives with Corps write-in budget.
March 2001	Letter	Reclamation	Sent Board of Control amended draft Lower Yellowstone Operation BA for review that included conservation measures to build a rock fishway and flat plate linear screen.
March 2001	Memorandum	Reclamation	Sent the Service draft Lower Yellowstone Operation BA amended to include conservation measures to build rock fishway and flat plate linear screen.
April 2001	Meeting	Service and Reclamation	Status check on ESA issues in Montana including Intake Project.
May 2001	Memorandum	Service	Provided comments to Reclamation on Lower Yellowstone Operation BA. Recommended format change, proposed including fish passage and entrainment modifications as proposed action and doing effects analysis. Also asked for additional operational guidelines, analysis of efficiency of the system, genetic analysis between pallid and shovelnose sturgeon, and recommended additional discussion regarding the rock that has been displaced downstream creating a passage impediment.
May 2001	Meeting	Reclamation and the Corps	Discussed coordination of fish passage and protection concept development. The Corps agreed to fund a sturgeon swim study. Proposed looking at a wide range of fish passage alternatives, including Obermeyer weirs, as requested by the Service.
July 2001	Letter	Reclamation	Requested final comments on revised Lower Yellowstone Operation BA from the Board of Control.
July 2001	Letter	Board of Control	Sent letter to Reclamation on Lower Yellowstone Operation BA including questions about the Service's concerns that rock displacement below the dam impedes fish passage.
August 2001	Memorandum with final Lower Yellowstone Operation BA	Reclamation	Transmitted Lower Yellowstone Operation BA including modifications to the Intake Project.
November 2001	Memorandum	Reclamation	Requested the Service suspend work on formal consultation due to new information being developed on fish passage and protection concepts.
January 2001	Meeting	Reclamation, Corps, and Service	Discussed pallid sturgeon swim study.
January 2002	*Assessment of Behavior and swimming Ability of the Yellowstone River Sturgeon for Design of Fish Passage Devices*	Reclamation	Reclamation prepared report to help in alternative design for fish passage.
June 2002	*Lower Yellowstone River Intake*	Corps	The Corps completed an alternative

Date	Report Name	Author	Summary
	Dam Fish Passage Alternatives Study		analysis for fish passage at Intake Diversion Dam.
July 2002	*Value Engineering Final Report: Intake Diversion Dam Fish Protection and Passage Concept Design, Lower Yellowstone*	Reclamation	The Value Study Team developed several preliminary proposals for improving fish screening and passage at Intake Diversion Dam.
February 2003	Meeting	Reclamation, Service, FWP, and Western Area Power Administration	Discussed research to determine available pallid sturgeon habitat above Intake Diversion Dam.
May 2003	*Test Results of Intralox Traveling Screen Material*	Reclamation	Intralox, Inc., requested that a section of their conveyor belt material be tested in Reclamation's Water Resources Research Laboratory to determine if it would be suitable for use as a vertical traveling positive fish screen barrier.
October 2003	Staff communications	Reclamation and Service	Concern raised that Obermeyer weir would not provide sufficient passage. Service preferred Obermeyer weir over uncertainties associated with a rock ramp.
April 2004	*Intake Diversion Dam Fish Protection and Passage Concept Study Report II*	Reclamation	This report evaluated additional concepts that were not included in the January 2000 *Intake Diversion Dam Fish Protection and Passage Concept Study Report.*
March 2004	Staff communication	Reclamation and Service	Concerns discussed about screen bypass working under high flows. Service suggested 80,000 cubic feet/second as criteria for screen bypass to function.
March 2005	Meeting	Reclamation, Corps, FWP, Service, and the Nature Conservancy	Established partnership with MOU signed in July 2005.
April 2005	Conference	Reclamation, Corps, FWP, Service, and the Nature Conservancy	Public announcement of partnership to resolve fish passage and entrainment issues at Intake.
April 2005	*Draft Biological Assessment: Future Operation of the Lower Yellowstone Project with Proposed Conservation Measures*	Reclamation	Reclamation prepared a Lower Yellowstone Project Operation BA to evaluate the potential effects of future operation of the Lower Yellowstone Project on federally-listed threatened or endangered species and designated critical habitat. It included proposed conservation measures.
May 2005	Meeting	Corps, FWP the Nature Conservancy, Reclamation, and others	Agencies expressed concern for effectiveness of proposed fishway. Reclamation and partners agreed to take another in-depth look at fish passage alternatives and to develop other alternatives.

Date	Report Name	Author	Summary
August 2005	*Lower Yellowstone Fish Passage Alternatives Value Planning Study*	Reclamation	Completed value planning report on the riprap channel fishway with boulder weirs along the right abutment. The team included staff from Reclamation, Corps, Service, District, and The Nature Conservancy. Concepts included L-shape dam, create island, widen fishway, multiple pumping stations, use natural side channel, move intake upstream, rock ramp, collapsible dam, and electric pumping station.
2005	*Inspection of Proposed Rock Source for Riprap - Lower Yellowstone Project, Yellowstone River, Montana.*	Reclamation	Reclamation fieldwork for potential alternatives.
September 2005	Meeting	Reclamation, Corps, FWP, Service, Board of Control, and the Nature Conservancy	Agreed on plan to move forward with NEPA analysis of fish passage alternatives.
October 2005	Memorandum	Reclamation	Agreed with Service to look at other alternatives, including open river channel alternatives, through partnership effort and requested comments on other sections of the draft Lower Yellowstone Project BA sent in April 2005.
November 2005	Memorandum	Reclamation	Transmitted Value Planning analysis matrix to Service.
November 2005	Meeting	Reclamation, Corps, Service, FWP, Board of Control, and the Nature Conservancy	Met to identify best alternatives. Alternatives identified were the rock ramp, pumping plant, and move diversion upstream.
July 2006	*Lower Yellowstone River Intake Dam Fish Passage and Screening Preliminary Design Report*	Corps	Developed concepts to address fish passage and entrainment protection at the Lower Yellowstone Intake Diversion Dam and main canal headworks.
September 2006	*Summary of the Biological Review Team's Comments on Lower Yellowstone River Intake Dam Fish Passage and Screening Preliminary Design Report*	Service	Summarized comments and suggestions from a panel of experts convened by the Service to review the July 2006 *Lower Yellowstone River Intake Dam Fish Passage and Screening Preliminary Design Report*
February 2007	*Appendix I: Additional Ramp Alternative, Lower Yellowstone Project Fish Passage and Screening Preliminary Design Report, Intake Diversion Dam*	Corps	Written after the initial report was finalized, the appendix included a preliminary design of additional rock ramp alternatives for the Lower Yellowstone Project. Evaluated 0.5% and 1% slopes.
October 2007	Meeting	Reclamation, Corps, FWP, Service,	Discussed revisiting the entrainment proposal (fish screen) and agreed to consider an on-river fish screen (one

Date	Report Name	Author	Summary
		Board of Control, and the Nature Conservancy	structure instead of two) and introduced retractable fish screens option.
November 2007	*Intake Diversion Dam: Evaluation of Fish Screens for Protecting Early Life Stages of Pallid Sturgeon*	Reclamation	Reclamation prepared report on best available screening technology.
January 2008	Intake Diversion Dam Assessment of High Elevation Intake Gates	Reclamation	Assessed the viability of adding high elevation intakes in the existing canal headworks structure.
February 2008	*Lower Yellowstone Project Fish Screening and Sediment Sluicing Preliminary Design Report* *Appendix A: Hydraulics* *Appendix B: Geotechnical* *Appendix C: Engineering Design* *Appendix D: Cost*	Corps	Developed appraisal level designs and estimated costs for installing a combination fish screen and canal headworks structure on the Lower Yellowstone Project main canal.
February 2008	*Intake Diversion Dam Trashrack Appraisal Study for Intake Headworks*	Reclamation	Addressed the Biological Review Team's recommendation to install a removable 2-inch bar mesh trashrack and self-cleaning mechanism on the riverside of the canal intake to prevent entrainment.
February 2008	*Lower Yellowstone River Intake Diversion Dam Canal V Configuration Fish Screen Concept Fish Screen Operation and Maintenance*	Reclamation	Described operation and maintenance of the in-canal V-Shaped fish screen.
March 2008	*Summary of the Biological Review Team's comments of Lower Yellowstone River Irrigation Project Fish Screening Preliminary Design*	Service	Summarized the comments and suggestions from a panel of experts re-convened by the Service related to review the February 2008 *Intake Diversion Dam Trashrack Appraisal Study for Intake Headworks* & *Lower Yellowstone Project Fish Screening and Sediment Sluicing Preliminary Design Reports*
March 2009	*Summary of the Biological Review Team's comments of Lower Yellowstone River Irrigation Project Fish Passage and Screening Alternatives and Alternative Scoring Criteria*	Service	Made specific recommendations on the Rock Ramp, Relocate Main Channel, and Multiple Pumping Station Alternatives. A scoring system evaluated alternatives.
May 2009	Meeting	Reclamation, Corps, and Service	Agreed to prepare an Intake Project BA on construction of the proposed Intake Project and to update the Lower Yellowstone Project Operation BA to address incidental take for operations of the Lower Yellowstone Irrigation Project and the Intake Project. Concurred that formal Section 7 consultation would be completed on Lower Yellowstone Project operations before operating the new Intake Project features.

Description of the Proposed Action and Action Area

Project Description

The purpose of the proposed action is to correct unsatisfactory passage conditions for endangered pallid sturgeon and other native fish in the lower Yellowstone River and reduce entrainment of fish into the Lower Yellowstone Project main canal.

The underlying need for the proposed action is that Reclamation needs to comply with the ESA by completing consultation under Section 7(a) (2) for continued operation of Intake Diversion Dam and the Lower Yellowstone Project. If Reclamation does not initiate and successfully complete consultation, then Reclamation's ability to continue to operate the dam and headworks to deliver project water to the Lower Yellowstone Project could be severely constrained or limited in the future. Reclamation has contractual obligations to water users to deliver Project water that it needs to fulfill. Project water is needed to continue viable and effective operation of the Lower Yellowstone Project.

The proposed action is needed to:

- Improve upstream and downstream fish passage for adult pallid sturgeon and other native fish in the lower Yellowstone River,
- Minimize entrainment of pallid sturgeon and other native fish into the Lower Yellowstone Project main canal,
- Continue effective operation of the Lower Yellowstone Project in compliance with the ESA, and
- Contribute to restoration of the lower Yellowstone River ecosystem.

The EA describes the reasonable alternatives developed to meet the purpose and need for this project in chapter two and Appendixes A.1 and A.2. The EA discusses the proposed Intake Project, including specifics of the preferred alternative – the Rock Ramp Alternative and rotating removable drum screens in a new headworks. This Intake BA describes the effects to listed species that would result from the construction of the preferred alternative, as evaluated in the Intake EA.

Legal Authority

Construction of the Lower Yellowstone Project was authorized by the Secretary of the Interior (Secretary) on May 10, 1904, under the Reclamation Act/Newlands Act of June 17, 1902 (Public Law 161). The Lower Yellowstone Project is authorized as a single-purpose project for irrigation. Project facilities are owned by the United States under the jurisdiction of Reclamation.

Under the authority of Section 5 of the Reclamation Extension Act of August 13, 1914, and subsection 9 of the December 5, 1924, Fact Finders' Act, operation and maintenance of the diversion and supply works were transferred to the Lower Yellowstone Districts in 1926, to Intake Irrigation District in 1945, and to Savage Irrigation District in 1951. The Districts are required to maintain the transferred works in full compliance with Reclamation laws and the regulations of the Secretary.

By policy, Reclamation is required to inspect the facilities every 6 years. Should the irrigation districts fail to maintain the facilities in compliance with Reclamation law, Reclamation will resume operations and maintenance and charge the irrigation districts for any costs incurred. Reclamation retains ownership of the Lower Yellowstone Project facilities, but the facilities are operated and maintained by the Board of Control of the Lower Yellowstone Project under contract with Reclamation. The contracts are as follows:

- ✓ Contract ILR-103, September 23, 1926, with Lower Yellowstone Irrigation District #1
- ✓ Contract ILR-104, Nov. 2, 1926, with Lower Yellowstone Irrigation District #2
- ✓ Contract ILR-1436, on March 30, 1945, with Intake Irrigation District
- ✓ Contract 1LR-1525, on July 14, 1948, with Savage Intake Irrigation District

The Lower Yellowstone Project provides water service for irrigation to the districts through contract with Reclamation. Water rights for the water supply delivered to these lands are jointly held by the irrigation districts and Reclamation. Lower Yellowstone Districts 1 & 2 and Intake Irrigation District have repayment contracts and have met their full financial obligation for repayment of the diversion and supply works for the Project. Savage Irrigation District is scheduled to repay their financial obligation in 2010. With the exception of Savage Irrigation District, the repayment contracts have no expiration dates. The Savage water service contract is anticipated to be renewed for water service with no capital cost once their repayment obligation has been completed.

Reclamation has also been delegated much of the authority of the Secretary of the Interior under the Fish and Wildlife Coordination Act, 16 U.S.C. 661 et seq., as is necessary to provide assistance, through grants or cooperative agreements, to public or private organizations for the improvement of fish and wildlife habitat associated with water systems or water supplies affected by Reclamation projects (Reclamation 1996).

Section 7 of the Endangered Species Act (Act) and the requirements of the Act's implementing regulations set out in 50 CFR Part 402 apply to all actions in which there is discretionary federal involvement or control. Section 7 (a) (1) does not confer any additional statutory authority on Reclamation. Rather, it is a direction from Congress to exercise existing authorities to further the purposes of the Act.

Reclamation and the Corps have worked cooperatively on this project. The Corps is a joint lead agency for the Intake EA, because the Service suggested in their Missouri River Master Manual BO (2000 and 2003 amendment) that the Corps work with Reclamation to provide passage for pallid sturgeon at Intake Diversion Dam as a conservation recommendation and as an adaptive management action for Missouri River recovery. Section 3109 of the 2007 Water Resources Development Act authorizes the Corps to use funding from the Missouri River Recovery and Mitigation Program to assist Reclamation in compliance with federal laws, and in the design, and construction of modifications to the Lower Yellowstone Project for the purpose of ecosystem restoration.

Alternatives Evaluated

Two action alternatives, the Relocate Main Channel Alternative and Rock Ramp Alternative, as well as a No Action Alternative were evaluated. These are discussed in chapter two and in Appendixes A.1 and A.2 of the Intake EA.

Proposed Federal Action

The proposed federal action described in this BA is identified as the preferred alternative in the Intake EA. The proposed federal action would modify Intake Diversion Dam and main canal headworks to improve passage for endangered pallid sturgeon and other native fish in the lower Yellowstone River and reduce entrainment of fish into the Lower Yellowstone Project main canal.

Environmental Commitments

The following commitments have been considered in the EA and the following commitments will be implemented to avoid adverse impacts to resources:

Whooping Crane

- Monitoring of whooping crane sighting reports by the Service will be conducted to ensure that whooping cranes are not in the action area (project area) during construction.

Interior Least Tern

- Visual surveys will be conducted weekly from May 15 to August 15 at all potential least tern nesting areas (sparsely vegetated sandbars) within line of site of the construction area.
- All surface-disturbing and construction activities will be seasonally restricted from May 15 to August 15 within 0.25 mile or the line of site of any active interior least tern nest.

Pallid Sturgeon

- The construction activities within the wetted perimeter of the active channel will be observed and monitored by a qualified fisheries biologist to avoid direct impacts to adult or juvenile fish. In-stream construction activities will cease, if the fisheries monitor determines there is potential for direct harm or harassment of pallid sturgeon and other fish species in the immediate vicinity of any in-stream activity. This will include coordination with FWP to make sure radio-tagged pallid sturgeon and other monitored native fish continue to be monitored, especially during the construction season.
- All pumps will use intakes screened with no greater than ¼" mesh when dewatering cofferdam areas in the river channel. Pumping will continue until water levels within the contained areas are suitable for salvage of any juvenile or adult fish occupying these areas. All fish will be removed by methods approved by the Service and FWP prior to final dewatering.
- Reclamation will consult with FWP to ensure that adequate flows are maintained during construction to support the fishery during low-flow periods (late summer/early autumn).
- Care will be taken to prevent any petroleum products, chemicals, or other harmful materials from entering the water.
- All work in the waterway will be performed in such a manner to minimize increases in suspended solids and turbidity that could degrade water quality and damage aquatic life outside the immediate area of operation.
- All areas along the bank disturbed or newly created by the construction activity will be seeded with vegetation indigenous to the area for protection against subsequent erosion and the establishment of noxious weeds.
- Clearing vegetation will be limited to that which is absolutely necessary for construction of the project.
- Any in-stream construction activity will be conducted during periods most likely to minimize the potential impact to the pallid sturgeon. The months to avoid and/or minimize impacts to pallid sturgeon are June and July.
- To avoid impacts, sheet pile installation and in-stream heavy equipment activity will be coordinated with fishery experts from the Service, FWP, Reclamation and the Corps to avoid and or minimize potential impacts.

Identification of Action Area

Identification of the action area can be found in chapter two of the Intake EA on pages 2-12 through 2-18.

Previous and Ongoing Projects in the Action Area

The following discussion is important for establishing the environmental baseline. The environmental baseline is a "snapshot" of a species health and a specified point in time. Therefore, a discussion of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area is necessary.

Yellowstone River Basin

Past and Present Federal, State, or Private Actions 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 diversion dams in addition to the one at Intake on the Yellowstone River downstream from Billings, Montana (Figure D.2). The uppermost is Billings Big Ditch Dam. Huntley diversion is federally-owned, while the middle four (Waco, Rancher's Ditch, Yellowstone, and Cartersville) are privately-owned and managed by local irrigation districts. All six dams present some degree of impediment to fish passage. The extent of fish blockage at these dams seems to depend 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. Currently several agencies are working on resolving fish passage issues at Cartersville Dam and are considering modifications at Huntley.

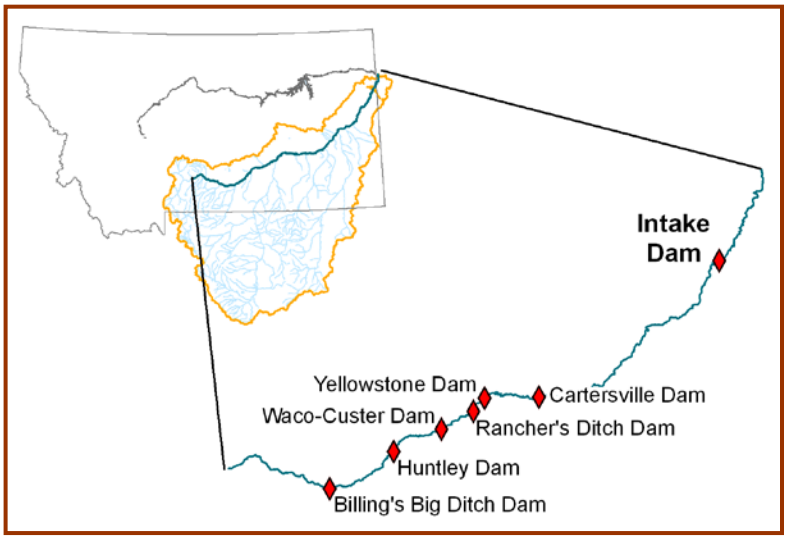


Figure D.2 - Diversion Dams along the Yellowstone River (adapted from Jenkins 2007).

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. Permitting is also required by Section 10 under the Rivers and Harbors Act, because the Yellowstone River is classified as a navigable water. Therefore, Section 7 consultation with the Corps would likely occur on any future projects. The action area has a total of four man-made structures that stabilize the river channel near the Project area. These bank stabilizing structures are the existing headworks, Intake Diversion Dam, the boulder field, and a boat ramp.

Riparian management has been a concern for the Yellowstone River ecosystem and conservation groups and others. They have been working with landowners to conserve and restore riparian areas.

Recently the Corps has been requiring screening to minimize larval fish entrainment in irrigation intakes along the Yellowstone River. However, many older irrigation projects have unscreened intakes. Changes are presently being considered at the Buffalo Rapids Intake to minimize fish entrainment.

The Natural Resource Conservation Service continues to work with landowners adjacent to the Yellowstone River on a wide variety of conservation efforts, including water conservation and natural resource conservation.

Proposed Federal Projects with Section 7 Consultation

Reclamation is currently coordinating with the Service on the completion of the Lower Yellowstone Project Operations BA on continued operations of the Lower Yellowstone Project. Completion of this formal consultation process is expected prior to operation of the proposed Intake Project.

Status of Species

Species List from the U.S. Fish and Wildlife Service

In response to a request by Reclamation, the Service provided a list of endangered, threatened, and candidate species and their designated critical habitat that may be present in the action area. This list was most recently confirmed at the May 12, 2009, meeting among Reclamation, the Corps, and the Service. The Service identified the whooping crane, interior least tern, and pallid sturgeon.

Recovery Plans 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 least tern and pallid sturgeon are outdated, i.e. 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.

Status of the Species

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.

Interior least tern (photo courtesy of www.fws.gov)

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 (2005) 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 (Lott 2006). A total of 17,587 interior least terns were counted in association with 491 different colonies. Just over 62% of these birds were on the lower Mississippi River (10,960 birds on 770+ river miles). Four additional river systems accounted for 33.9% of the remaining least terns, with 12.1% on the Arkansas River system, 10.4% on the Red River system, 7.1% on the Missouri River system, and 4.3% on the Platte River system. Smaller numbers were counted on other rivers, including the Ohio River system (1.5%), the Trinity River system in Texas (1.5 %), the Rio Grande/Pecos river system in New Mexico and Texas (0.8%), and the Kansas River system (0.5%) (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, and there are 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.

Typical interior least tern nesting habitat, Yellowstone River, Montana (photo courtesy of FWP)

Although Montana supports one of the smallest populations of interior least terns, Montana's Yellowstone and Missouri rivers may 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.

Probably the most intensive survey of the Yellowstone River was conducted during the 1994-1996 breeding seasons by Bacon (1997). During this time the river reach between Miles City and Seven Sisters Recreation Area supported an average of 27 birds (Atkinson and Dood 2006). This represents the highest number of terns reported along the Yellowstone River since the birds were federally listed. Since 1997, fewer adult birds have been recorded along this section of the Yellowstone than were recorded during the intensive survey years of 1994 -1996, but numbers between years have remained stable (1997-2005 mean =16.6) (Atkinson and Dood 2006). While

surveys conducted prior to 1994 did not cover the entire reach, the high numbers of terns recorded between 1994-1996, compared to those reported more recently may be, as is often the case, associated with sampling intensity (Atkinson and Dood 2006).

More recent least tern surveys (A. Dood FWP- Helena, Montana, personal communication) for the Yellowstone River are as follows:

- 2006 - 10 adults (surveys conducted June 12-13 when river was high with little suitable habitat)
- 2007 - 11 adults (surveys conducted June 26-28)
- 2008 - 5 adults (surveys conducted July 16-18, the river was very high and no habitat was available in June)

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 2,000 adults in specific distributions assigned by state.

In 2005 a range-wide survey was conducted that provides the first complete summary of the distribution and abundance of the interior population of the least tern, since this species was originally listed as endangered almost 20 years ago (Lott 2006). This 2005 survey counted 17,591 interior least terns, of which 1,217 birds were counted in the “upper” Missouri River (above Sioux City, Iowa) and its tributaries (Lott 2006). 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).

The range-wide survey would suggest that overall the interior population of the least tern has surpassed the 7,000 birds recovery goal but that the distribution of those numbers and management of those areas is not yet 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. The rangewide fluctuation has been suggested by some to be the result of immigration of least terns to the lower Mississippi River and low fledgling success (Kirsch and Sidle 1999).

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. This group includes 91 members representing 11 Corps districts, 4 Service regions, 14 state wildlife agencies, 8 academic institutions, 4 U.S. Geological Survey science centers, 3 joint ventures, and several non-profit groups. 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 gulf 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).

Whooping Crane
(whoopers.usgs.gov)

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, North Dakota. The sightings were in areas outside of the proposed construction zone (M. Tacha - Fish and Wildlife Service Grand Island, Nebraska, personal communication). 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).

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 newly revised recovery plan (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 70 miles of the Yellowstone River to downstream of Fallon, Montana, in the headwaters of Lake Sharpe, and near Plattsmouth, Nebraska (Jordan 2006).

Pallid Sturgeon (photo courtesy of the Service)

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 upper 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 Recovery-Priority Management Areas (RPMAs) were identified in the Recovery Plan (figure D.3). 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 data and biogeographical data (figure D.4). 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.

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-

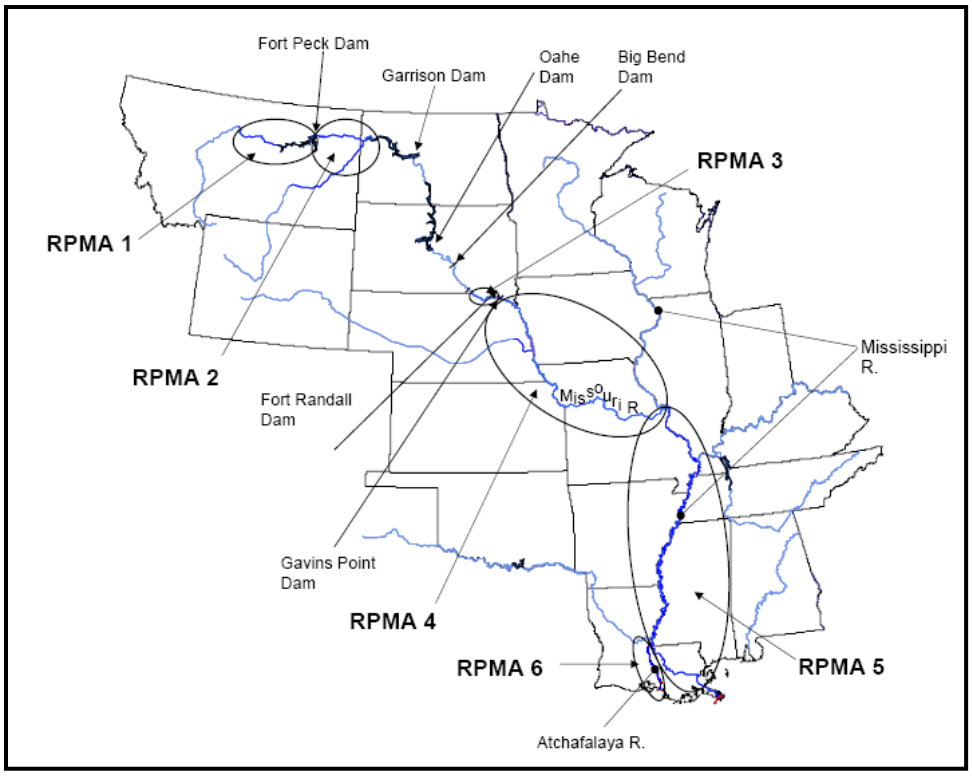
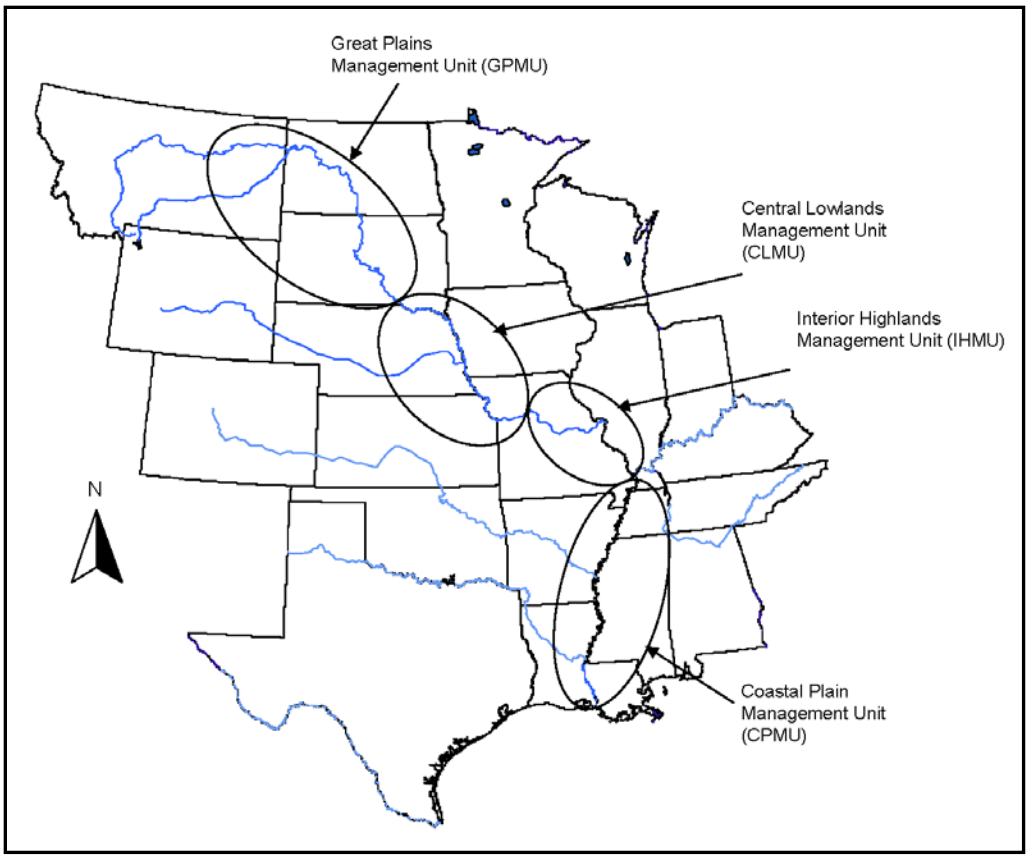


Figure D.3 - Recovery Priority Management Areas Identified for the Pallid Sturgeon (adapted from Service 2007).

round.



The proposed action area is in the Great Plains Management Unit (GPMA). This unit includes

Figure D.4 - Management Units identified by the Pallid Sturgeon Recovery Team (Service 2006).

the Missouri River from Great Falls, Montana, to Ft. Randall Dam, South Dakota (figure D.4). This unit includes the former RPMA 2 (figure D.3). 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 extinct 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 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). Klungle and Baxter (2005) estimated 158 wild adult pallid sturgeons inhabit RMPA 2. 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 on the Yellowstone River (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 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). Pallids primarily inhabit 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 a. 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. 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 (Aaron DeLonay, U.S. Geological Survey (USGS), Personal Communication). 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, convergent flows

along outside bends along eroding terraces with bottom composition in these pools 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 112 miles upstream of Intake, Montana, which is about 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 their being transported to suitable rearing habitats with abundant nutritional food and relatively benign environmental conditions (Wildhaber et al 2007). The Service (2000 and 2003) stressed the importance of shallow water habitats for larval rearing. FWP (Matt Jaeger, personal communication) has estimated that there are there are about 5,000 acres of shallow water rearing habitat between Intake and Cartersville diversions in August near baseflow conditions. 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 summit of this movement (Aaron DeLonay, USGS, personal communication). Yellowstone River specific telemetry data indicates 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 (Matt 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 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.

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. A draft plan may be available for public review by the end of 2009. The draft Plan (G. Jordan - Service Pallid Sturgeon Recovery Coordinator, Billings, Montana, personal communication) 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.

Environmental Baseline

This section contains an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species previously discussed, their habitats (including federally designated critical habitat), and ecosystems in the action area. The environmental baseline used for these analyses represents the present condition and includes past effects of existing water-related activities.

Past and Present and Anticipated Impacts of Proposed Federal Projects with Section 7 Consultation and State or Private Actions

This section addresses the definition of "effects of the action" (50 CFR 402.02), which states that the environmental baseline includes past and present and anticipated impacts of all federal, state, or private actions in the action area, including those that that have already undergone formal Section 7 consultation. It includes those state and private actions that are contemporaneous with this proposed Intake Project.

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 RMPA 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 D.3). 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.

Past and present impacts on 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. Table D.2 displays reports documenting environmental baseline actions/impacts for other resources important to the species being considered.

Table D.2 - Research on the Yellowstone and Missouri Rivers Contributing to the Environmental Baseline for the Federal Action Area.

Resource	River	Report Title (year)[1]
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)

Resource	River	Report Title (year)[1]
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)

[1]These articles are in the literature cited section at the end of this appendix.

Habitat Restoration

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. As a result there are several ongoing actions on both rivers that would benefit the pallid sturgeon, interior least tern, and whooping crane. Different activities on both rivers include habitat resoration, fish hatchery

supplementation, fish passage, fish entrainment protection, riparian resoration, bank stabilization studies, flow modeling, and water conservation

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 settings, 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:

- *No effect* - the appropriate conclusion when the action agency determines its proposed action will not affect listed species or critical habitat, or
- *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.
- *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.

Whooping Crane

Direct Effect and Indirect Effects

Reclamation did not identify any impacts associated with proposed construction activity and historic migratory stopover sites for whooping cranes. Based on a review of past locations of this species, it would be unlikely that migrating whooping cranes would be near or on the proposed action area. Furthermore, environmental commitments identified in the Intake EA would avoid potential adverse effects by conducting pre-construction surveys and monitoring local whooping crane sightings. 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 is not likely to adversely affect the whooping crane.

Interior Least Tern

Direct and Indirect Effects
Analyses of impacts to resources (hydrology, surface water quality, and lands and vegetation) were used to identify potential impacts to federally protected species (see chapter four of the EA). Reclamation did not identify any impacts associated with proposed construction activity and nesting interior least terns. Based on a review of past locations of this species, the potential for least terns to be near or on proposed action construction sites would be considered rare. Furthermore, environmental commitments identified in the EA would be incorporated to further avoid potential adverse effects by conducting surveys and monitoring during the least tern nesting season. 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 is not likely to adversely affect the interior least tern.

Pallid Sturgeon

Direct and Indirect Effects Analyses of impacts to resources (hydrology, surface water quality, and lands and vegetation) were used to identify potential impacts to federally protected species (see chapter four of Intake EA). Reclamation has reviewed the proposed construction activities for this project and identified some direct and indirect effects to pallid sturgeon impacts due to construction. These impacts could include:

- Water quality issue related to temporary sediment dispersal and turbidity during construction.
- Dewatering for the installation of cofferdams that could leave fish stranded.
- Instream construction activity could impact fish directly or indirectly.
- Transition issues related to staging the construction and operation of the Intake Project.

However, implementation of environmental commitments noted above in the Project Description section would reduce any impacts of construction-related activities to less than significant. Furthermore, the overall purpose of the Intake Project will benefit pallid sturgeon recovery by allowing fish passage and minimizing entrainment. The overall effect of the Intake Project would provide future long-term benefits that would more than offset minor short-term impacts caused by construction. Any potential effect would be considered insignificant and discountable. Reclamation is unaware of any interrelated or interdependent actions that would adversely affect the pallid sturgeon in the action area. Incidental take is not anticipated.

Summary of Effects
The proposed action is not likely to adversely affect the pallid sturgeon.

Conclusions

With the implementation of the environmental commitments identified in this Intake Project BA and Intake Project EA, and in view of the previous discussion of potential impacts, Reclamation has determined that the construction activities associated with this proposed federal action are not likely to adversely affect the interior least tern, whooping crane, or pallid sturgeon. The overall effect of the Intake Project would provide future long-term benefits for pallid sturgeon recovery by allowing fish passage and minimizing entrainment. Furthermore, Reclamation will continue Section 7 consultation on the continued operations of the Lower Yellowstone Project and will work with the Service to finalize the Section 7 consultation process prior to operation of the Intake Project. Based on the foregoing analysis, Reclamation requests written concurrence from the Service that the proposed action is not likely to adversely affect the whooping crane, interior least tern, or pallid sturgeon.

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