

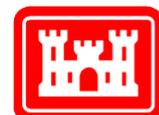
Executive Summary

Intake Diversion Dam Modification Lower Yellowstone Project, Montana, Final Environmental Assessment

April 2010



**U.S. Department of the Interior
Bureau of Reclamation**



**US Army Corps
of Engineers®**



IN REPLY REFER TO:
MT-221
ENV-6.00

United States Department of the Interior

BUREAU OF RECLAMATION
Great Plains Region
Montana Area Office
P.O. Box 30137
Billings, Montana 59107-0137



Dear Ladies and Gentlemen:

The *Final Environmental Assessment for the Intake Diversion Dam Modification, Lower Yellowstone Project* (Final Intake EA) is enclosed. The Executive Summary is provided in hardcopy format. The main report, appendices, and supporting documents are in electronic format on a compact disk located on the inside back cover of the Executive Summary. You may also find the document on the following website: <http://www.usbr.gov/gp/mtao/loweryellowstone/index.html>. If you would like a hardcopy of the document, please contact Ms. Alicia Waters at 701-221-1206, or by e-mail at AWaters@usbr.gov.

The U.S. Department of the Interior, Bureau of Reclamation, and the U.S. Army Corps of Engineers (USACE), Omaha District, are joint lead agencies, and have prepared the Intake Final EA pursuant to Section 3109 of the 2007 Water Resources Development Act (WRDA), and the National Environmental Policy Act of 1969. Section 3109 of the 2007 WRDA authorizes the USACE to assist Reclamation with compliance of Federal laws, design, and construction modifications to the Lower Yellowstone Project, for the purpose of ecosystem restoration.

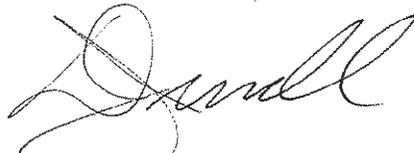
The environmental effects of three alternatives were analyzed, including the no action alternative. The Rock Ramp alternative and rotating drum fish screens have been chosen as the preferred alternative. The Final Intake EA discloses impacts associated with constructing and operating the preferred alternative and will be used to determine whether there are any significant environmental impacts that could result from the project.

This Final Intake EA has been slightly modified from the Draft EA. A list of the changes can be found in the Overview of the Final Intake EA Section of the Executive Summary. Additionally, all public comments received during the public comment period and responses to substantive comments are included in Appendix N.

If you have any questions, please feel free to contact Mr. Jeff Baumberger, Bureau of Reclamation, Montana Area Office, at 406-247-7314.

Sincerely,


Robert J. Ruch
Colonel, Corps of Engineers
District Commander


Dan Jewell
Area Manager
Montana Area Office
Bureau of Reclamation

Enclosure

Acronyms

Corps	U.S. Army Corps of Engineers
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
Intake Draft EA	Intake Draft Environmental Assessment
Intake Final EA	Intake Final Environmental Assessment
Intake Project	Intake Diversion Dam Modification Project
NEPA	National Environmental Policy Act
Reclamation	Bureau of Reclamation
Service	U.S. Fish and Wildlife Service

Executive Summary



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Introduction

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, a feature of the Lower Yellowstone Project, 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 (see map on page 4). The Lower Yellowstone Project furnishes a dependable supply of irrigation water for approximately 54,000 acres of fertile land along the west bank of the Yellowstone River in Montana and North Dakota.

Pallid sturgeon are one of the rarest native fish in the Missouri and Mississippi River basins. The declining population of mature pallid sturgeon in the Yellowstone River and Missouri River between Fort Peck Dam and Lake Sakakawea is expected to be locally extinct by 2018 if reproduction and survival of young fish does not improve. According to the U.S. Fish and Wildlife Service (Service), "the value of restoring the Yellowstone River as a natural migratory route for sturgeon and making the middle Yellowstone function as spawning and nursery grounds for pallids cannot be overstated."

Overview of the Final Intake EA

Reclamation and the Corps jointly prepared this final environmental assessment (Intake Final EA) for the Intake Diversion Dam Modification, Lower Yellowstone Project (Intake Project). Reclamation and the Corps are joint lead agencies for preparation of the Final Intake EA. Reclamation is the administrative lead agency for the National Environmental Policy Act (NEPA) activities associated with the proposed Intake Project.

Entrainment means to carry along in a current. In this case fish are involuntarily carried by water flowing into the irrigation canal system through an unscreened intake.

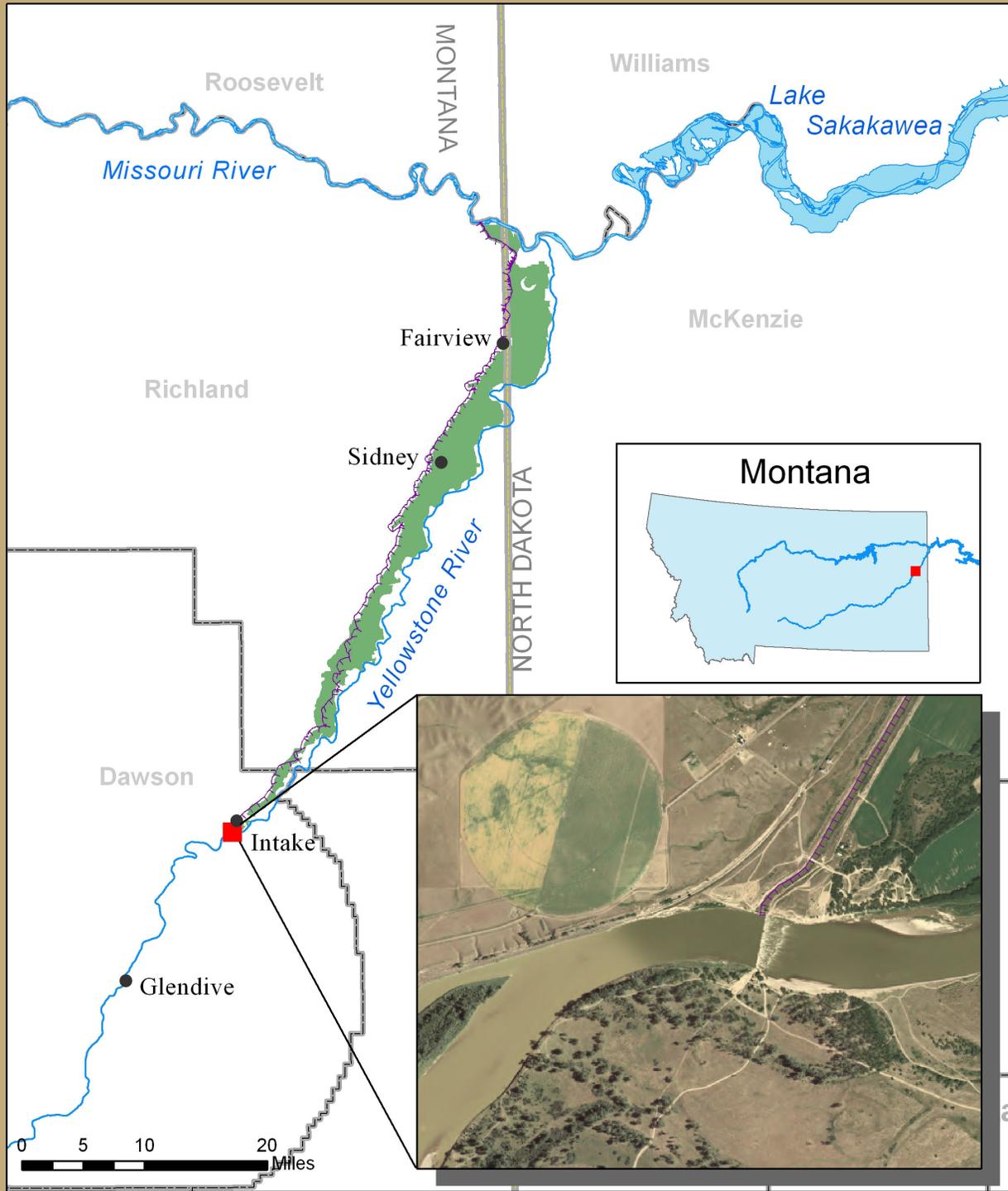
The Intake Final EA has been prepared in response to substantive comments on the Intake Draft EA related to environmental issues. Comments were received from state and federal agencies, organizations and interested members of the public. Some changes were incorporated into the Final EA in response to comments on the Draft EA, but these revisions do not significantly change the impact analysis or results presented in the Draft EA. Following are the primary changes from the Draft EA:

- The design of the rock ramp alternative has been optimized. Based on this design, the estimated construction costs for this alternative have been updated.
- Information has been added to the Geomorphology sections in chapters 3 and 4.
- The social and economic impact analysis was revised based on the updated construction cost estimates for the rock ramp alternative.
- The U.S. Fish and Wildlife Service provided a letter of concurrence for the Biological Assessment prepared for the Intake Project. This information is included in Appendix D.
- Appendix N contains responses to substantive comments received on the Intake Draft EA.

This Executive Summary highlights information presented in the Final Intake EA saved on the compact disk located in the



Overview of the Project Area



- Features**
- Intake Diversion Dam
 - Main Canal
 - Lower Yellowstone Irrigation Project

Intake EA General Project Area

inside pocket on the back cover of this summary. Appendixes and supporting documents contain more detailed information and are also on the compact disk.

A Finding of No Significant Impact (FONSI) will be signed after the Final EA is completed if no significant impacts are identified from the selected alternative that cannot be mitigated to insignificant levels. News releases and public service announcements will be distributed to the media announcing the availability of the FONSI. A copy of the FONSI will be available upon request, as well as posted on the project website: www.usbr.gov/gp/mtao/loweryellowstone

Proposed Action

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.

Purpose and Need

The purpose of the proposed action is to improve upstream and downstream fish passage for adult pallid sturgeon and other native fish in the lower Yellowstone River and minimize entrainment of pallid sturgeon and other native fish into the Lower Yellowstone Project main canal.

Purpose – Improve Fish Passage

Intake Diversion Dam likely has impeded upstream migration of pallid sturgeon and other native fish for more than 100 years. The best available science suggests that the diversion dam is a partial barrier to some fish species and is likely a total barrier to other fish species, such as pallid sturgeon. This is due to increased turbulence and velocities associated with the rocks at the dam and downstream. The proposed Intake Project would aid in recovery of pallid sturgeon by providing an additional 165 miles of the Yellowstone River for migration, spawning, and rearing.

Purpose – Minimize Entrainment of Fish

Installation of a fish screen on the canal headworks would minimize entrainment of pallid sturgeon and other native fish into the main canal. Trapping and monitoring indicate that an average of 500,000 fish of 36 species are annually entrained at Intake Diversion. Many of these are native fish and their death rate is high.

The proposed action is needed to:

- Continue effective operation of the Lower Yellowstone Project in compliance with the Endangered Species Act, and
- Contribute to restoration of the lower Yellowstone River ecosystem.



Pallid sturgeon (photograph courtesy Nebraska Game and Parks Commission)





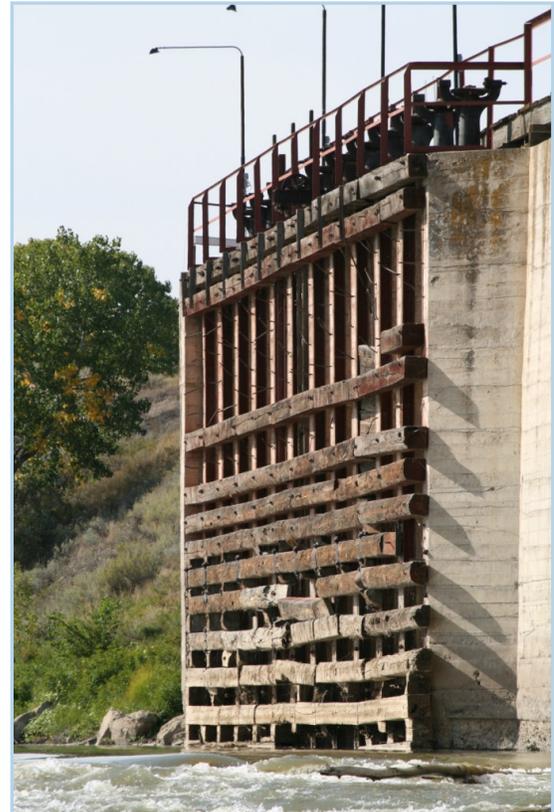
Intake Diversion Dam impedes fish passage on the lower Yellowstone River

Need – Continue Effective Operation of the Lower Yellowstone Project

The Lower Yellowstone Project diverts water from the Yellowstone River into the main irrigation canal on the north side of the river at a location 18 miles downstream of Glendive, Montana (see map on page 4). The irrigation canal system roughly parallels the Yellowstone River to its confluence with the Missouri River. The system conveys water to irrigate approximately 54,300 acres on about 398 farms along the canal system in Montana and North Dakota.

Need – Contribute to Ecosystem Restoration

The Service listed the pallid sturgeon as endangered under the ESA in 1990. Section 7(a) (1) of the ESA authorizes all federal agencies to



Existing unscreened main canal headworks

use their resources for the conservation and recovery of federally listed species and the ecosystems upon which they depend, and under Section 7(a)(2), requires federal agencies to consult with the Service to ensure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of any federally listed species or to modify designated critical habitat. The lower Yellowstone River has been identified by the Service as an area of priority for pallid sturgeon recovery because sturgeon are still in the area, there is suitable habitat remaining in the river to assist in recovery, and the Yellowstone River exhibits a natural hydrograph.



Family farms use water from Intake for irrigating crops

Authorization and History

Reclamation constructed the Lower Yellowstone Project beginning in 1905 under the Reclamation Act/Newlands Act of 1902 (Public Law 161). As is the case for most authorized Reclamation projects, the long-term operation and maintenance of project facilities is the responsibility of the Lower Yellowstone Project water users. 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 terms of that contract would likely need to be revisited to accommodate the operation and maintenance needs and requirements for a modified intake and diversion structures.

The Corps is a joint lead agency for the EA, because the Service suggested in their Missouri River Master Manual biological



Pallid Sturgeon





Construction of the main canal just below the intake gates in November 27, 1908

opinion 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 with compliance with federal laws, design, and construction of modifications to the Lower Yellowstone Project for the purpose of ecosystem restoration. Funding for future construction, if a decision is made to proceed with the preferred alternative, would be provided by the Corps subject to Congressional appropriation.

Montana Fish, Wildlife & Parks, Reclamation, the Lower Yellowstone irrigation districts, the Service, and the Corps have been studying pallid sturgeon issues at Intake for 20 years. Since 1993, Reclamation has been coordinating and consulting informally with the Service about modifications to the Intake Diversion Dam and main canal headworks. In July 2005 Reclamation, the Corps, the Service, Montana Fish, Wildlife & Parks, and The Nature Conservancy entered into a Memorandum of Understanding and pledged to work together to aid in the recovery of pallid sturgeon through restoration of the lower Yellowstone River as a natural migratory route and to reduce fish loss to the irrigation canal.

Scope

In general, the geographic scope of this EA considers potential impacts on the Yellowstone River from just above the Intake Diversion Dam in Montana to the river's confluence with the Missouri River in North Dakota. It also includes lands within the boundaries of the Lower Yellowstone Project in Montana and North Dakota (see map). The scope of the affected environment may vary for each resource and is explained in detail in chapter three, Affected Environment.

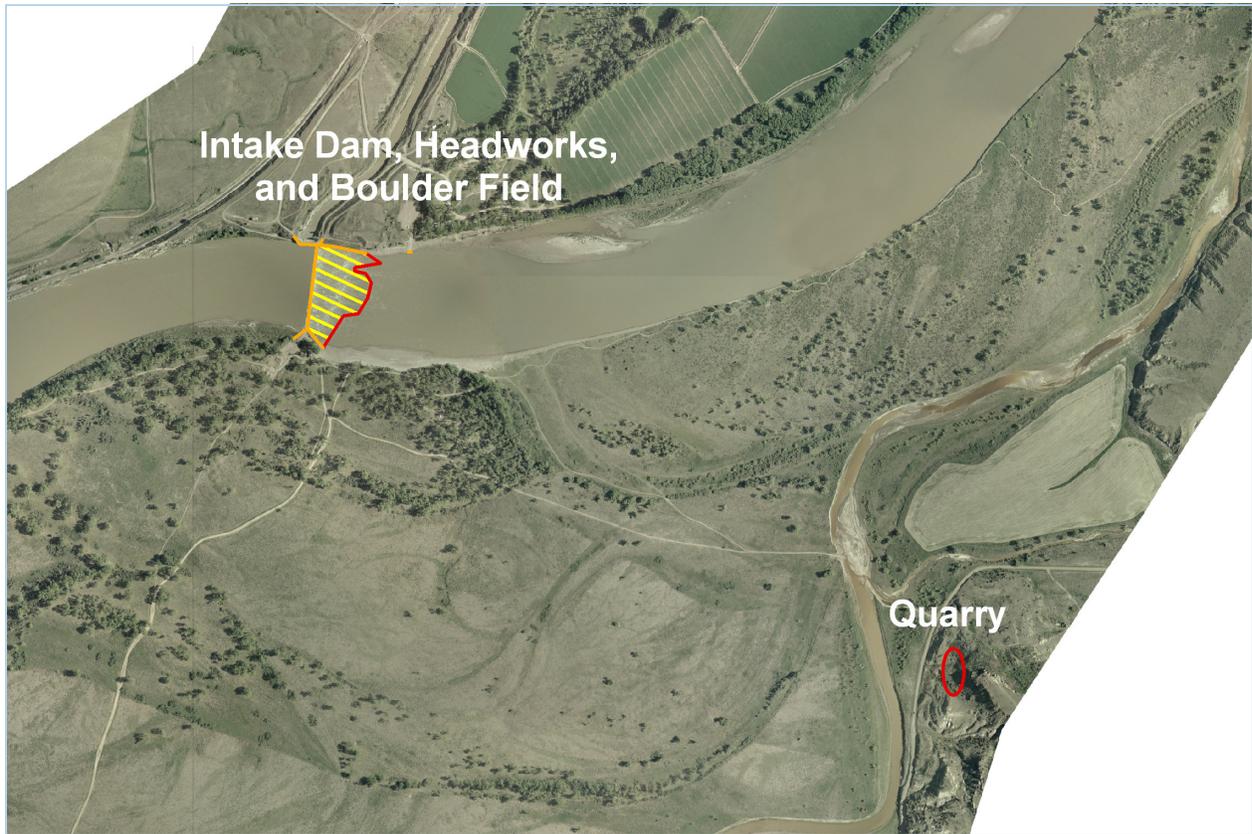
Alternatives

Two action alternatives and a no action alternative are evaluated. Appropriate actions to minimize effects have been incorporated into the two action alternatives.

These alternatives are described in detail in chapter two and the actions to minimize effects are explained in chapter four and are compiled in Appendix I. Appendix A.1 explains how alternatives were developed, the alternatives screening process, and identifies the alternatives that were considered but eliminated from detailed study and the reason(s) for doing so.

Five fish passage alternatives and two fish screen options were initially identified for further analysis based on previous studies of the Lower Yellowstone Project. Using input from cooperating agencies and the public, these alternatives were analyzed using screening criteria. As a result of the screening process, the number of alternatives was reduced to three, which are described in chapter two. A value engineering study was completed to modify the alternatives to maximize efficiencies. The alternatives evaluated are No Action (Continue Present Operation), Relocate Main Channel, and Rock Ramp.





No Action Alternative (Continue Present Operation)

No Action (Continue Present Operation)

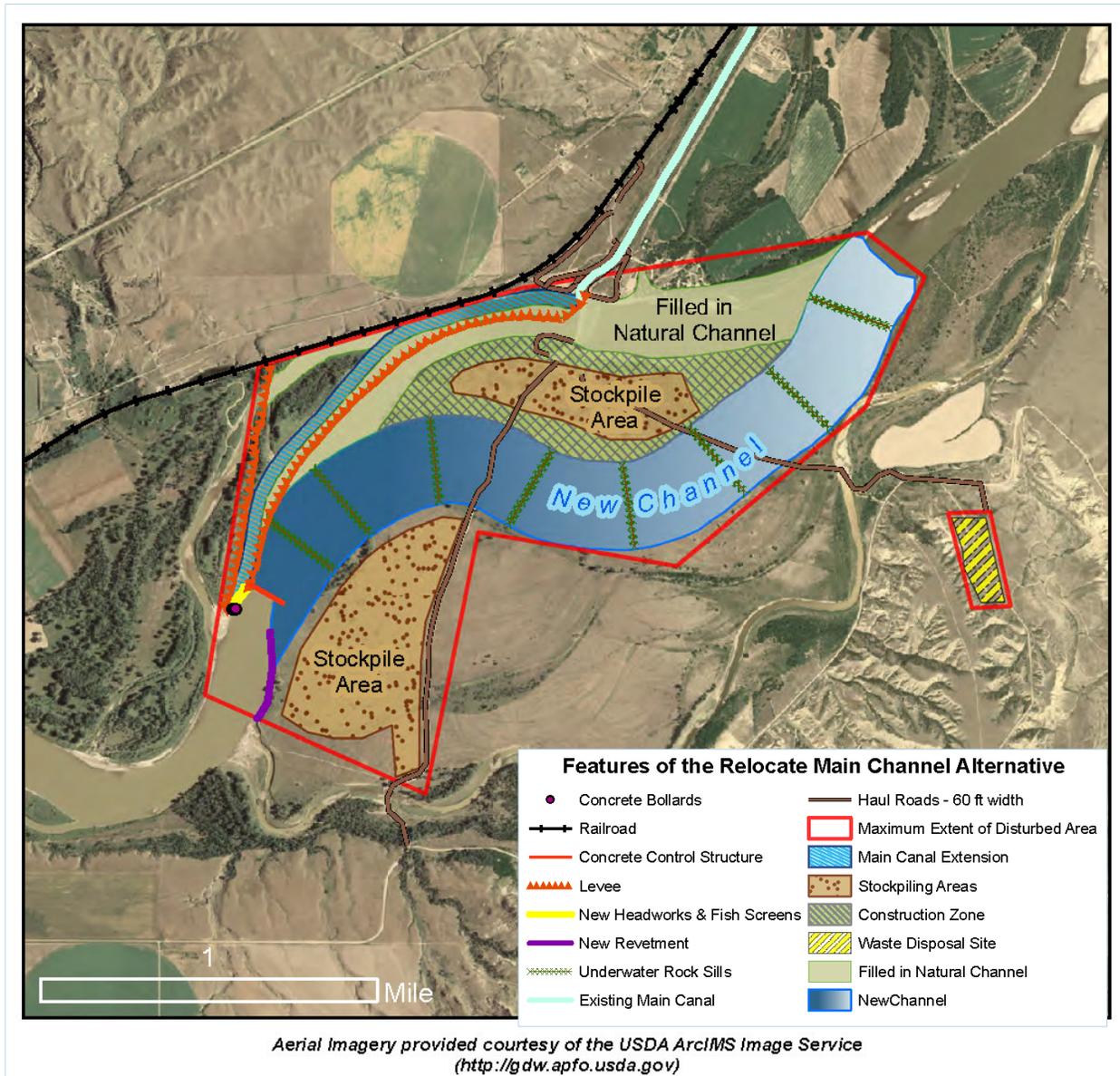
If this alternative is selected, Reclamation would continue present operation of the dam and headworks to divert water from the Yellowstone River for irrigation purposes, as authorized. This means operating the irrigation project without any modifications to provide fish passage alternatives or reduce entrainment until Reclamation completes required ESA consultation activities with the Service and implements any ESA requirements regarding fish passage and entrainment resulting from that consultation.

The cost estimate for operation and maintenance of the existing Intake Diversion Dam, headworks, and first mile of the main canal would be \$139,281 annually; however, these

costs would likely increase substantially as other actions would be needed to bring the Lower Yellowstone Project into compliance with ESA.



Historic photograph showing replacement of rock on Intake Diversion Dam

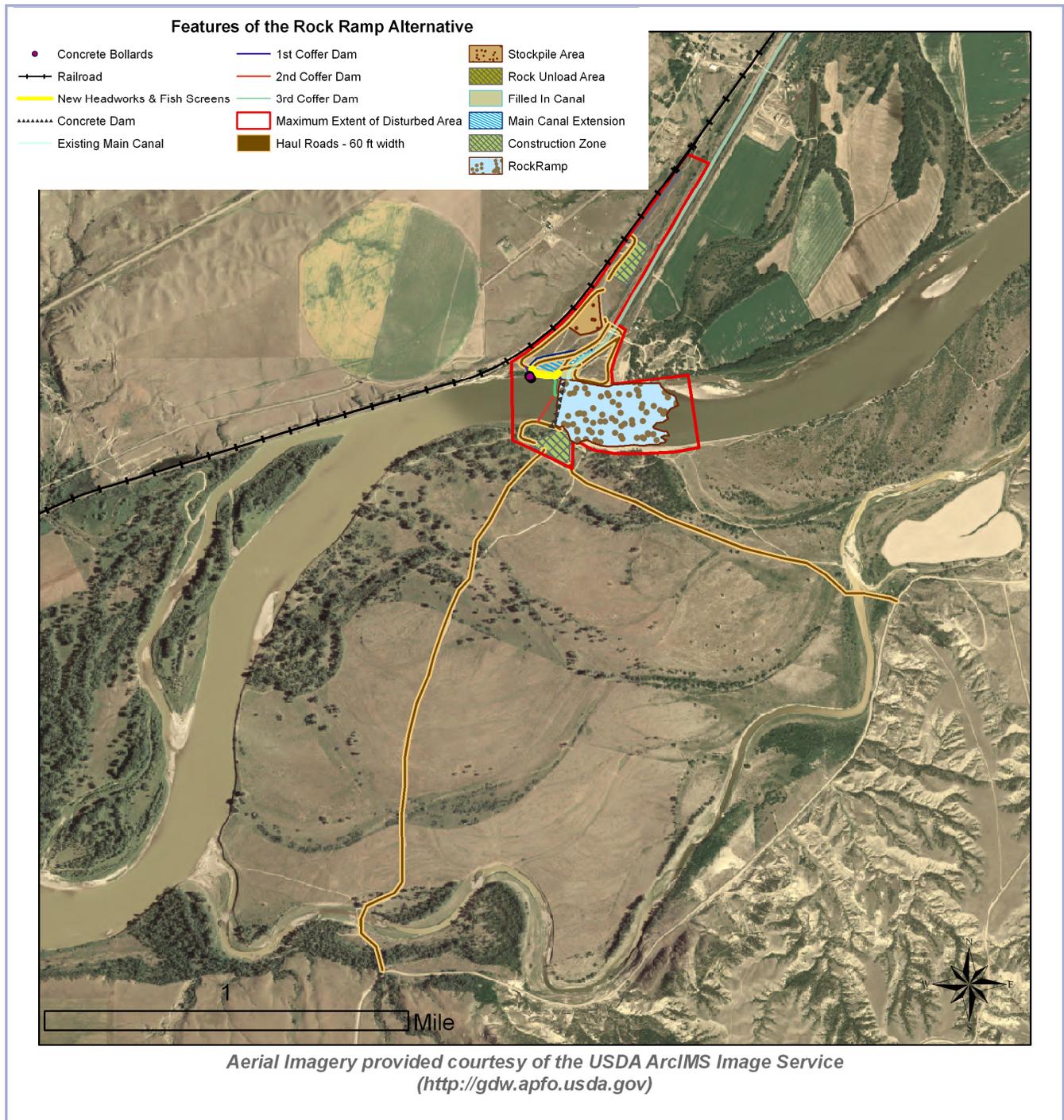


Relocate Main Channel

The primary action in this alternative would be to excavate a 2.4 mile-long new main channel for the Yellowstone River through Joe’s Island to improve fish passage and contribute to ecosystem restoration. This alternative would also include construction of a new main canal headworks structure with removable rotating drum screens or other screens that meet the criteria to minimize entrainment while delivering water to the Lower Yellowstone Project main canal. The existing Yellowstone River channel would be partially filled and the existing dam buried.

The estimated cost of construction is \$68.9 million. This would include \$38.6 million to excavate the main channel and build dikes; \$4.7 million for the concrete control structure; \$2.5 million for in-channel grade control structures (sills); \$21.8 million for a new headworks, canal extension, and fish screens; and \$1.4 million for revetment, clearing and grubbing, temporary improvements to haul roads, and seeding and mulching. The preliminary cost estimate for operation and maintenance of the Relocate Main Channel Alternative is \$333,755 annually.





Rock Ramp

Primary features of this alternative would be replacing Intake Diversion Dam with a concrete weir and rock ramp. This would maintain the existing surface elevation of the river upstream of the weir for diversion into the main canal, while improving fish passage

and contributing to ecosystem restoration. A new main canal headworks structure with removable rotating drum screens or other screens that meet the criteria to minimize entrainment also would be constructed. The estimated cost of construction is \$38.8 million. This would include \$18.2 million

for the new headworks, canal extension, and fish screens, \$13.5 million for the rock ramp and \$7.1 million for non-contract costs. The preliminary cost estimate for operation and maintenance of the Rock Ramp Alternative is \$272,807 annually.

Affected Environment

Resources that could be affected by the proposed alternatives are located throughout the geographic scope of the Intake Project. The existing conditions of these resources are described in chapter three. These are the resources identified in scoping that would be potentially affected by the Intake Project.

Climate

Climate of the lower Yellowstone River basin is temperate and semiarid. Because the basin is located near the center of the continent, the weather is characterized by fluctuations and extremes. Air masses originating in the arctic



Ice blocks removed from Yellowstone River during construction of Lower Yellowstone Project



View of the Yellowstone River looking upstream near Intake, Montana

dominate in the winter, while air masses from the Gulf of Mexico influence the spring and early summer weather.

Air Quality

Air quality in the project area meets the national and state standards for the criteria pollutants of carbon monoxide, lead, particulate matter, and sulfur dioxide. There are few industries located in the area, with the exception of a recent expansion in oil production which has the potential to affect air quality. There is one air quality monitoring station in Sidney, Montana. This monitoring station monitors nitrogen oxide, ozone, particulate matter, and meteorological data. Air quality is generally regarded as good.

Hydrology

The Yellowstone River is a principal tributary of the Missouri River. Most of the flow in the lower Yellowstone River is due to the melting snowpack in the mountains of the Yellowstone Basin. The Yellowstone River drains a large basin that extends from the Rocky Mountains in Yellowstone



National Park through the plains of southern Montana and northern Wyoming. It flows into the Missouri River near Buford, North Dakota just upstream from Lake Sakakawea.

Geomorphology

The Yellowstone River main stem is very similar to that observed during the William Clark expedition of 1806. Although channel forms and processes are mostly natural, a number of man-made structures have affected the geomorphic character of the river. Artificial alteration of the river and riparian areas includes riprapping, diversions, closing side channels, and clearing bank vegetation. Riprapping to stabilize banks and to reduce erosion is the most common alteration along the lower Yellowstone River.

Surface Water Quality

In general, the waters of the lower Yellowstone River are suitable for most designated uses. Exceedances of most water



Yellowstone River flow along riprapped bank downstream from Intake



Turbid water downstream of Intake Diversion Dam on the Yellowstone River

quality standards are uncommon, and are often naturally caused. The water quality of the lower Yellowstone River is determined by interaction of water with the landscape, including upstream reaches and tributaries as well as human activities. Between Intake and the North Dakota border, the river is classified as “fully supporting” water use for agriculture, drinking water, industry, and primary contact recreation. Beneficial use for aquatic life and warmwater fisheries are classified as “partially supporting,” with impairments related to concentrations of some trace elements, nutrients, pH, sedimentation, and total dissolved solids. In addition, Intake Diversion Dam is listed as a probable source of impairment for warmwater fisheries and aquatic life related to fish passage.

Lakes and rivers are evaluated according to the degree that each beneficial use is achieved by placing them in one of four categories:

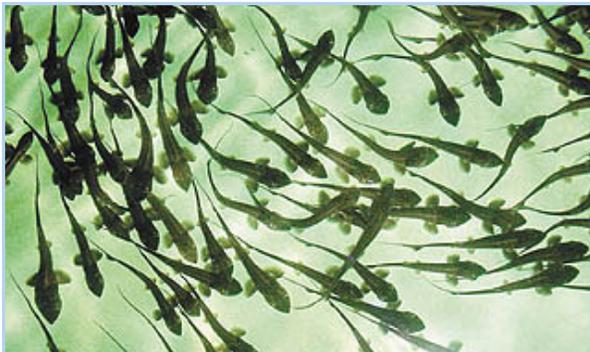
- 1) fully supporting
- 2) partially supporting
- 3) threatened or
- 4) not supporting



White sucker are abundant in all three river zones in the Yellowstone River (photograph by William D. Schmid www.hatch.cehd.umn.edu)

Aquatic Communities

Fifty-two species of fish have been recorded in the lower Yellowstone River. Of these, 31 species are native and 21 species are introduced. Currently pallid sturgeon migrate upstream to Intake Diversion Dam each year; however, very few adult pallid sturgeon have been documented above the barrier at Intake. Captures of juvenile pallid sturgeon above the Intake Diversion Dam have increased in recent years due to stocking efforts. Macroinvertebrates are abundant, and the community is dominated by species tolerant of silt.



Pallid sturgeon fingerlings

Federally-Listed Species and State Species of Special Concern

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 as occurring in the proposed project area. The list of state species is in Appendix C and a biological assessment is in Appendix D.



Crop production using Lower Yellowstone Project water

Lower Yellowstone Project Irrigation Districts

The Board of Control of the Lower Yellowstone Irrigation Project operates and maintains facilities associated with Intake Project (Intake Irrigation District), Savage Unit of the Pick-Sloan Missouri Basin Program (Savage Irrigation District), and the Lower Yellowstone Irrigation Project Divisions One and Two (Lower Yellowstone Irrigation Districts One and Two). The Lower Yellowstone Project is primarily a gravity diversion and distribution system, with approximately 1,400 cfs of water diverted from the Yellowstone River into the main canal by the Intake Diversion Dam during the irrigation season. This 700 ft long diversion dam is a 12-foot high, timber, stone-filled structure that spans the Yellowstone River. The crest of the diversion dam lies about 5 ft above the natural low water mark of the river and 9 ft above the riverbed.





Paddlefish snagging would be temporarily affected by construction of an action alternative at Intake Fishing Access Site and Joe's Island

Recreation

Several fish species provide substantial angling opportunities in the lower Yellowstone River. Paddlefish snagging at Intake Diversion Dam is a popular sport fishery, with a large spawning population moving upriver in the spring. Intake Fishing Access Site is located beside and immediately downstream of the Intake Diversion Dam main canal and headworks, and a recreation area on Joe's Island is on the opposite side of the Yellowstone River. On most summer holidays and during the paddlefish season campsites at Intake fill to overflowing. Roe from female paddlefish donated to the Chamber of Commerce at their free cleaning station is processed, marketed, and sold to fund historical, cultural, recreational, and fish and wildlife projects and as seed money for grants. Gross revenue from caviar sales from 1990 to 2007 averaged about \$146,600 per year over the 18 year period.

Social and Economic Conditions

The social and economic affected area includes Dawson, McCone, Prairie, Richland, Roosevelt, and Wibaux counties in Montana and McKenzie and Williams counties in North Dakota. The eight county impact area is rural in nature, with a total 2007 population of slightly over 56,700 people. As an overall region, the study area has relatively low income and high poverty rates compared to overall state averages.



Agriculture production is among the primary sectors of economic activity in the region

The relatively small, shrinking population indicates a decline in economic activity needed to support the population, as well as a decrease in the potential labor supply, which may inhibit future long-term commercial activity. The primary sectors of economic activity in the region include agriculture, recreation, transportation and utilities, government, wholesale and retail, and mineral extraction, including oil and natural gas production. Farm earnings in the eight county region totaled a little more than \$76.7 million in 2006. Recreation expenditures represent a substantial proportion of spending in the regional economy. Nonresident recreation spending in the 8 county area could be up to \$100 million.



Farmer using canal system lateral to irrigate sugar beet crop



Roosevelt, Prairie, and McKenzie counties have some potential environmental justice concerns because of low income and high poverty rates

Environmental Justice

Environmental justice refers to the distribution of effects from a federal action on people with respect to income, race, ethnicity, or some other group characteristic. Environmental justice recognizes that no group of people should bear a disproportionate share of negative impacts from an action. Negative impacts can be considered disproportionately distributed if the percentage of total impacts imposed on a specific group is greater than the percentage of the total population represented by that group. Alternatives that have a disproportionate adverse effect on Roosevelt County, Prairie County, or McKenzie County could potentially have environmental justice issues.



Alternative	Wetland (acres)	Riparian (acres)	Woodland (acres)	Grasslands (acres)
No Action	0	0	0	0
Relocate Main Channel Alternative	306	210	186	256
Rock Ramp Alternative	55	5	12	21

Lands and Vegetation

Lands and vegetation in the area that may be affected by the Intake Project include wetlands, grasslands, woodlands, riparian areas and noxious weed areas. Currently 15 different noxious weeds infest counties in the Intake Project area. Affected acres and types of lands and vegetation in the proposed project area are listed in the above table by alternative.

Wildlife

The habitat types in the ecoregion support various wildlife species within the Intake Project area. The diversity of habitats across this ecoregion sustains an abundant diversity of wildlife. The types of mammals, birds, amphibians, and reptiles in the Project area are described in chapter three. Appendix F lists the common and scientific names of species discussed.

Historic Properties

Surveys of the Intake Project area located and recorded 15 cultural resources within or adjacent to the area of potential effects of the three alternatives described in chapter two. Cultural resources are the physical remains of a site, building, structure, object, district, or



Dam tender residence constructed between 1905 and 1909 is eligible for listing on the National Register of Historic Places

property of traditional religious and cultural importance. Of the 15 resources, 7 are significant and eligible for listing on the National Register of Historic Places, and the significance of 2 prehistoric archaeological sites have not been determined. Most of the significant sites are associated with Lower Yellowstone Project.

Indian Trust Assets

The United States has a “trust responsibility” to protect and maintain rights and property reserved by or granted to federally recognized American Indian tribes or to Indian individuals by treaties, statutes, and executive

orders. This trust responsibility derives from the historical government-to-government relationship between the federal government and Indian tribes as expressed in treaties and federal Indian law. This responsibility requires that all federal agencies, including Reclamation, take all actions reasonably necessary to protect Indian trust assets. Reclamation contacted 25 tribes in the Upper Missouri River Basin and consulted with the Rocky Mountain Region of the Bureau of Indian Affairs. Reclamation is not aware of any treaty rights asserted in the area of the Intake.

Summary of Environmental Impacts

The potential impacts and benefits that may result from the proposed action and alternatives are direct, indirect, and cumulative. Potential impacts and benefits of the each alternative for specific resources are described in chapter four and summarized at the end of chapter two in a matrix table. In chapter four, the environmental impacts and benefits of each action alternative are compared to the No Action Alternative (Continue Present Operation), as well as between the other alternatives. Comparative environmental impacts are summarized at the end of chapter two.

Consequences of No Action Alternative (Continue Present Operation)

There would be consequences if Reclamation decides to continue present operation of the Lower Yellowstone Project. In general, incidental take of pallid sturgeon at Intake would continue. Permitting and minimization of incidental take of pallid sturgeon under no action would require either a Board of Control-negotiated habitat conservation plan under Section 10(a) of the ESA or completion of Section 7(a)(2) consultation by Reclamation. Either scenario to address incidental take would not diminish Reclamation's legal responsibility to comply with the ESA and correct the existing passage and entrainment impacts caused by the diversion dam and headworks.



Construction of a rock ramp near Miles City, Montana (photo courtesy of Fish, Wildlife and Parks)



For many resources, the No Action Alternative (Continue Present Operations) would have little or no effect; however, failure to achieve compliance with ESA could result in severe curtailment of project water deliveries over the long-term.

Comparison of the Environmental Impacts of the Alternatives

Although some resources would be affected in the same way by the two action alternatives, the degree or amount of effects would likely differ. To more clearly distinguish between the two proposed action alternatives, the advantages and disadvantages of each in comparison to No Action are listed in tables on the following pages. These tables take into account the actions to minimize effects listed in chapter four and Appendix I.



Turbulent water flowing over Intake Diversion Dam

Relocate Main Channel Alternative

Advantages	Disadvantages
<ul style="list-style-type: none"> ■ Would reconnect the lower Yellowstone River and contribute to ecological restoration by rerouting the river around a fish barrier. ■ Would allow passage of the endangered pallid sturgeon and other native fish up and downstream at Intake, Montana, opening 165 miles of the Yellowstone River for migration, spawning, and rearing. ■ Would minimize entrainment of pallid sturgeon and other native fish. ■ Would improve the river channel slope near Intake, Montana. ■ Access to Joe's Island would improve. ■ Recreational boat traffic would improve on the Yellowstone River at Intake. ■ Short-term positive regional economic benefits would result from construction. ■ Fewer historic properties would be impacted by construction of this alternative, as compared to other action alternative. 	<ul style="list-style-type: none"> ■ It would be the most expensive alternative, with an estimated cost of \$68.9 million. ■ Annual O&M costs would be more than the other action alternative. ■ This would be a fairly large construction project requiring excavation of 6.1 million cubic yards of soil. Of this, 2.5 million cubic yards would be disposed of by building a 40 ft high artificial hill on private land. ■ Construction would take 3 years, which is 6 months longer than the other action alternative. ■ Would increase the length of stabilization features on the Lower Yellowstone River by about 20% in the reach from Cartersville Dam to the confluence of the Missouri River when compared to No Action, and 18.4% when compared to the Rock Ramp Alternative. ■ More sediment would be disturbed during construction, but the effects on water quality and aquatic resources would be temporary. ■ Has lower pallid sturgeon hydraulic modeling scores than the Rock Ramp Alternative, indicating that it would be more difficult for sturgeon to navigate than the rock ramp (Appendix E). ■ The new headworks, screens, and extended main canal would be more difficult and more costly to maintain by the irrigation districts. ■ Temporary, periodic closure of the boat ramp, day use area, and campground during construction could reduce recreational use of Intake Fishing Access Site. After construction the boat ramp would be relocated. ■ The river would be moved farther from the campground and day use area reducing audio and visual aesthetics. ■ The undeveloped recreation area on Joe's Island would be smaller. ■ The hunting area on Joe's Island would be reduced. ■ Contractors, sub-contractors, and the Glendive Chamber of Commerce could lose money during the paddlefish season, as a result of temporary closure of the boat ramp during construction and long-term dispersal of paddlefish. ■ The construction footprint is larger, thus impacts to natural resources and wildlife would be greater, and the costs of actions to minimize effects would be higher.



Rock Ramp Alternative	
Advantages	Disadvantages
<ul style="list-style-type: none"> ■ Would reconnect the lower Yellowstone River and contribute to ecological restoration providing passage over a fish barrier. ■ Would allow passage of the endangered pallid sturgeon up and downstream at Intake, Montana, opening 165 miles of the Yellowstone River for migration, spawning, and rearing. ■ Would minimize entrainment of pallid sturgeon and other native fish. ■ Would be less expensive than the other action alternative, with an estimated cost of \$38.8 million. ■ Annual O&M costs would be less than the other action alternative. ■ Construction would take 2.5 years, which is 6 months less than the other action alternative. ■ Would improve the channel slope and have 52,044 fewer feet of bank stabilizing structures on the lower Yellowstone River than the Relocate Main Channel Alternative. ■ Less sediment would be temporarily disturbed during construction. ■ This alternative has higher pallid sturgeon hydraulic modeling scores, indicating that it would be easier for pallid sturgeon to navigate than the other alternatives (Appendix E). ■ The river would remain beside the campground and day use area. ■ The undeveloped recreation area on Joe's Island would stay the same, but access would improve. ■ The hunting area on Joe's Island would be the same. ■ Changing the grade of the dam could allow more boat traffic up and downstream at Intake. ■ Short-term positive regional economic benefits would result from construction of this alternative. ■ The construction footprint is smaller than the other action alternative, so there would be fewer impacts to natural resources and wildlife, and fewer actions to minimize effects would be required. 	<ul style="list-style-type: none"> ■ This is a fairly large construction project requiring import of 119,000 tons of rock. ■ The new headworks, screens, and rock ramp would be more difficult and more costly to maintain by the irrigation districts. ■ Temporary, periodic closure of the boat ramp, day use area, and campground during construction could reduce recreational use of Intake Fishing Access Site. After construction the boat ramp would be relocated. ■ Contractors, sub-contractors, and the Glendive Chamber of Commerce could lose money during the paddlefish season, as a result of temporary closure of the boat ramp during construction and of long-term dispersal of paddlefish. ■ More historic properties would be impacted by construction of this alternative.

Preferred Alternative

Reclamation and the Corps have identified the Rock Ramp as the preferred alternative. It is the least cost alternative. Unlike the No Action Alternative, the Rock Ramp Alternative would meet the purpose and need of the proposed action and would improve fish passage and minimize entrainment.

In comparison to the other alternatives considered, the Rock Ramp would improve fish passage by decreasing channel slope and have 52,044 fewer feet of bank stabilizing structures on the lower Yellowstone River than the Relocate Main Channel Alternative. Hydraulic modeling indicates that the Rock Ramp Alternative would be easier for pallid sturgeon to navigate than the other alternatives.

Recreational resources would be less affected than with the other action alternative, because the river would stay beside the campground and day use area, and access would be improved to Joe’s Island. Because the construction footprint is in the same location but smaller than the other action alternative, there would be fewer impacts to natural resources and wildlife, and fewer actions to minimize effects would be required. Finally, it would cost about \$30.1 million less to construct than the other action alternative, would have lower annual O&M costs, and would take less time to build.



Rock Ramp Features

- | | |
|---|--|
|  Ice Protection Bollards |  Canal Extension |
|  Proposed New Weir |  Existing Headworks |
|  Rock Ramp |  Proposed New Headworks |



Actions to Minimize Effects

A key factor in successful construction and operation of this Project would be implementation of actions to minimize effects and monitoring. If a decision is made to construct an action alternative, Reclamation and the Corps will establish an Impact Mitigation Team to implement management practices to avoid, minimize or mitigate adverse impacts to Project area resources. This team will be comprised of federal, state, and local entities, which will develop the specific actions to minimize effects and monitoring programs and provide input to Reclamation and the Corps. Environmental commitments to address impacts are presented in chapter four by resource and in Appendix I.

The Impact Mitigation Team will use adaptive management principles or other methods to monitor the effectiveness of the actions to minimize effects and monitoring. The purpose of this team is to ensure that Project activities are completed concurrently and in full compliance with all environmental commitments in NEPA documents. This team will also address other relevant state and federal environmental rules and regulations, such as the Clean Water Act and the National Historic Preservation Act.



Wade King releasing pallid sturgeon during spawning period (Photo courtesy of the U.S. Fish and Wildlife Service)

Adaptive Management Adaptive Management is learning by doing and adapting what one does based on what is learned.

Consultation and Coordination

As explained in chapter five, Reclamation and the Corps established a public involvement program early in the process. The program was designed to provide the public and agencies with a variety of methods to learn about, participate in, and comment on the Project. The program included a scoping notice, multiple public scoping meetings, postings on the Montana Area Office Reclamation website, and periodic newsletter.

Extensive coordination with agencies and organizations occurred prior to initiation of the NEPA process and during preparation of the EA. The following cooperating agencies participated in periodic meetings, provided data and analyses, and reviewed preliminary chapters:

- Board of Control of the Lower Yellowstone Project
- Montana Department of Environmental Quality,
- Montana Department of Natural Resources and Conservation,
- Montana Fish, Wildlife & Parks
- U.S. Geological Survey
- U.S. Fish and Wildlife Service

The Environmental Protection Agency was invited to be a cooperating agency but declined the invitation due to lack of agency resources, workload, and other program commitments. However, the Environmental

Protection Agency participated in scoping, attended meetings, and reviewed preliminary and draft documents in accordance with its responsibilities under NEPA and Section 309 of the Clean Air Act.

The Intake Draft EA was distributed to the public for review on February 12, 2010. The 30-day comment period ended on March 16, 2010. The public was encouraged to provide written comment or participate in two public meetings hosted by Reclamation and the Corps in Glendive and Sidney, Montana during the comment period. Letters and comments received during the public meetings were posted on website (www.usbr.gov/gp/mtao/loweryellowstone). All comments were carefully considered and substantive comments are addressed in Appendix N.



Public meeting in Sidney, MT, Feb. 2010



Public meeting in Glendive, MT, Feb. 2010



Public meeting in Glendive, MT, Feb. 2010

