



Intake Diversion Dam Modification Lower Yellowstone Project Environmental Impact Statement

February 2009

The Department of the Interior, Bureau of Reclamation (Reclamation) and the U.S. Army Corps of Engineers (Corps) are jointly preparing an environmental impact statement (EIS) to analyze and disclose effects associated with proposed modifications to the Intake Diversion Dam and irrigation canal headworks.

The proposed federal action would modify Intake Diversion Dam and canal headworks, features of Reclamation's Lower Yellowstone Project, to improve passage for endangered pallid sturgeon and other native fish in the lower Yellowstone River and reduce entrainment in the Yellowstone Project Main Canal.

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.

This newsletter provides information on the proposed project, alternatives, comments from the public, and how to get involved in the process.

Reclamation constructed the Lower Yellowstone Project under the Reclamation Act/Newlands Act of 1902. The Corps is a joint lead for the Intake EIS because the U.S. Fish and Wildlife Service (Service)

recommended in their Missouri River Master Manual biological opinion (2000 with 2003 amendment) that the Corps work with Reclamation in providing passage for pallid sturgeon at Intake Diversion Dam as a conservation recommendation. The lower Yellowstone River is considered to be one of the best opportunities for recovery of pallid sturgeon.

The Service listed the pallid sturgeon as endangered under the ESA in 1990. Section 7(a)(1) of the Endangered Species Act (ESA) authorizes all federal agencies to use their resources for the conservation and recovery of federally listed species, and under Section 7(a)(2) to ensure that federal activities do not jeopardize the continued existence of any federally listed species.

The 2007 Water Resources Development Act authorizes the Corps to use funds appropriated to carry out the Missouri River Recovery and Mitigation Program to assist Reclamation in the design and construction of Reclamation's Lower Yellowstone Project for the purpose of ecosystem restoration.

Cooperating agencies for preparation of the Intake EIS include the Montana Department of Environmental Quality; Montana Department of Natural Resources and Conservation; Montana Fish, Wildlife, and Parks; and the Service.



Pallid Sturgeon

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U.S. Department of the Interior
Bureau of Reclamation



US Army Corps
of Engineers

Background

Reclamation's Lower Yellowstone Project is located in eastern Montana and western North Dakota. Intake Diversion Dam is located near Glendive, Montana, approximately 70 miles upstream of the confluence of the Yellowstone and Missouri rivers.

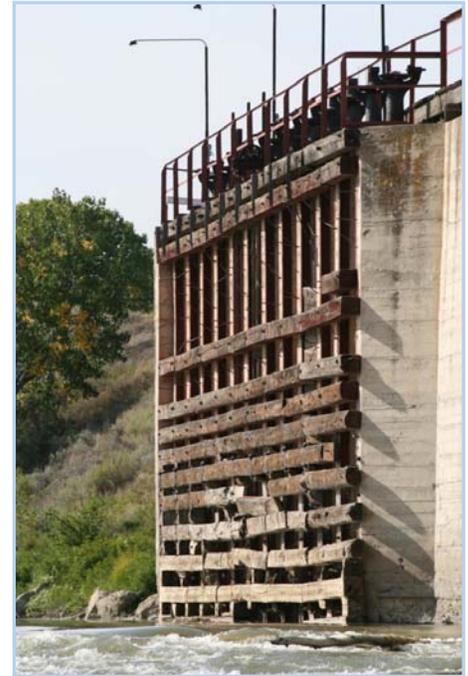
Construction of the Lower Yellowstone Project began in 1905 and included Intake Diversion Dam (also known as Yellowstone River Diversion Dam) – a 12-foot (ft) high wood and stone diversion dam that spans the Yellowstone River and diverts water into the Main Canal for irrigation.

The best available science suggests Intake Diversion Dam impedes upstream migration of pallid sturgeon. Currently pallid sturgeon may attempt to spawn below Intake Dam, and newly-hatched

pallid sturgeon may drift into Lake Sakakawea before they are able to swim, where their survival rate is low.

The proposed project would aid in recovery of pallid sturgeon by opening 165 additional miles of the Yellowstone River and its tributaries for spawning. In addition, installation of a fish screen would minimize entrainment of pallid sturgeon and other native fish in the Main Canal. Currently, research conducted by Reclamation and others indicates that thousands of native fish are being unintentionally trapped in the main irrigation canal.

The wild population of pallid sturgeon in the Yellowstone River and Missouri River between Fort Peck Dam and Lake Sakakawea is predicted to become extinct locally by 2017 if reproduction and recruitment of young fish does not improve.



Main Canal Intake



Intake Diversion Dam Impedes Fish Passage on the Lower Yellowstone River

Proposed Action

The proposed Federal action is to modify Intake Diversion Dam and canal headworks, features of Reclamation's Lower Yellowstone Project, to improve passage for endangered pallid sturgeon and other native fish in the lower Yellowstone River and to reduce entrainment in the Main Canal.

Purpose and Need

The purpose of the proposed action is correct unsatisfactory passage conditions for endangered pallid sturgeon and other native fish in the lower Yellowstone River and to reduce entrainment in the Main Canal.

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 in the Main Canal,
- continue effective operation of the Lower Yellowstone Project and comply with the ESA, and
- contribute to restoration of the lower Yellowstone River ecosystem.

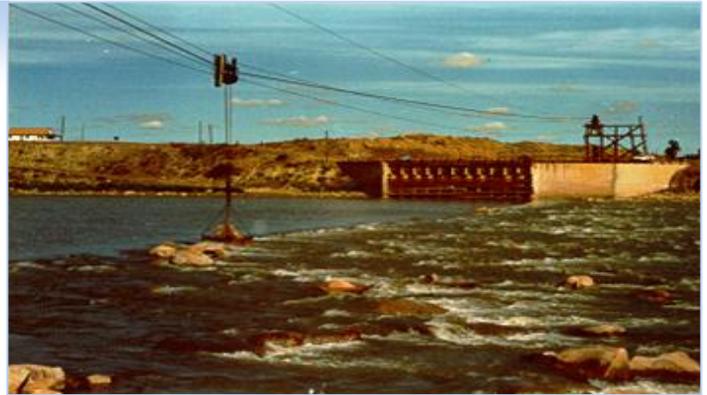
Alternatives Presented in Public Meetings

Prior to public scoping Reclamation and the Corps identified five alternatives and two fish screen options. These were presented in public meetings held in October 2008 for public comment. The alternatives included no action, four fish passage alternatives, and two fish screen options.

No Action Alternative

No Action is the future operation of the Lower Yellowstone irrigation project without implementation of any of the proposed fish passage alternatives or fish screen options. No Action for this project means maintaining the diversion dam and continuing to divert water for irrigation as authorized.

A fish screen would not be constructed and pallid sturgeon and other native fish would continue to be trapped and lost in the Main Canal. The irrigation district would maintain the dam by periodic placement of rock via the overhead cable system. Maintenance of the crest of the dam is required after high river flows or ice damage. Upstream passage for pallid sturgeon and other native fish would continue to be affected by the diversion dam. Reclamation would be obligated by Section 7 of the ESA to continue consultation with the Service on the effects operation of the irrigation project may have on federally-listed species.



Cable System Placing Rock on Intake Diversion Dam

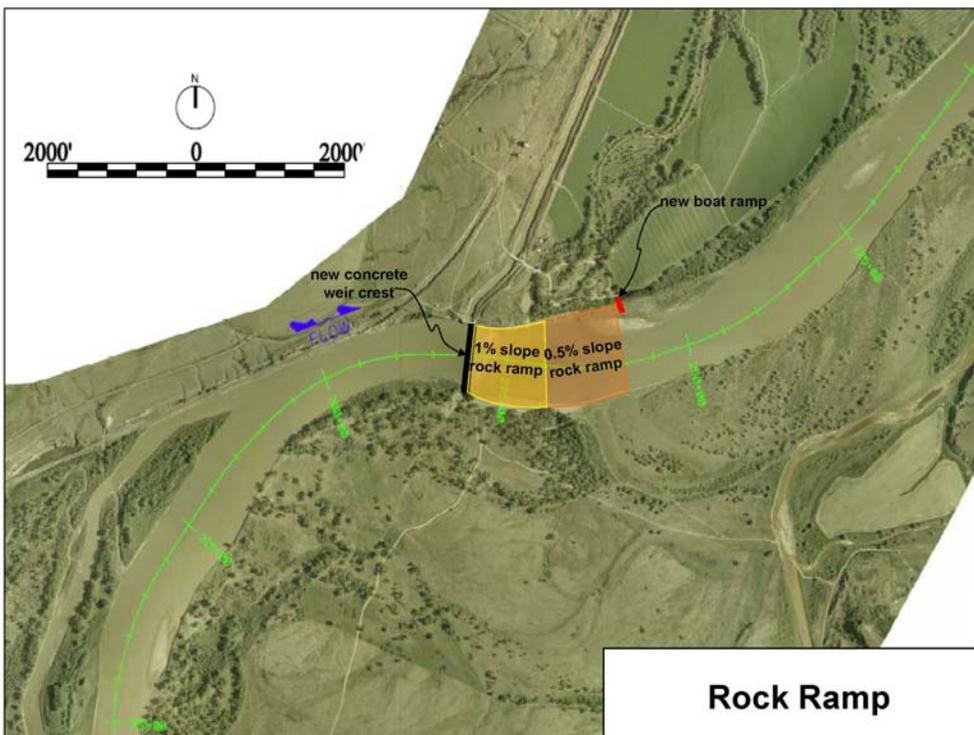
Fish Passage Alternatives

Rock Ramp Alternative

Rock ramps have been used elsewhere as fish ladders to help fish swim over relatively low dams. To modify the existing Intake Diversion Dam for fish passage, fill and rock would be placed downstream to flatten its slope into a ramp. The ramp would extend downstream from the dam approximately 200 to 2,000 feet, depending on the final slope and configuration. It would reduce flow speed and turbulence over the dam to levels tolerated by pallid sturgeon and other native fish.

The rock ramp would mimic the characteristics of a riffle-pool sequence. A riffle is a place in a stream where rushing water forms small rippled waves over rocks. A pool provides a resting place for fish trying to swim over the ramp. The rock ramp would be

constructed to simulate natural riffles and pools in the Yellowstone and Missouri Rivers.



To create the rock ramp, the existing timber and rock dam would be replaced with a reinforced concrete weir to improve structural integrity and reduce seepage. A weir is a small dam used to slow water and raise the water surface for diversion into a canal.

The ramp would have either concentric boulder weirs arranged in steps or a smooth slope. The rock ramp would be designed to meet velocity and depth criteria under a wide array of flow conditions.

Boulders could be incorporated to break up flow and provide resting places for fish as they swim over the ramp. Rock could be grouted along the crest of the structure and down the ramp to protect against ice damage.



Fish Passage Alternatives

Relocate Diversion Upstream Alternative

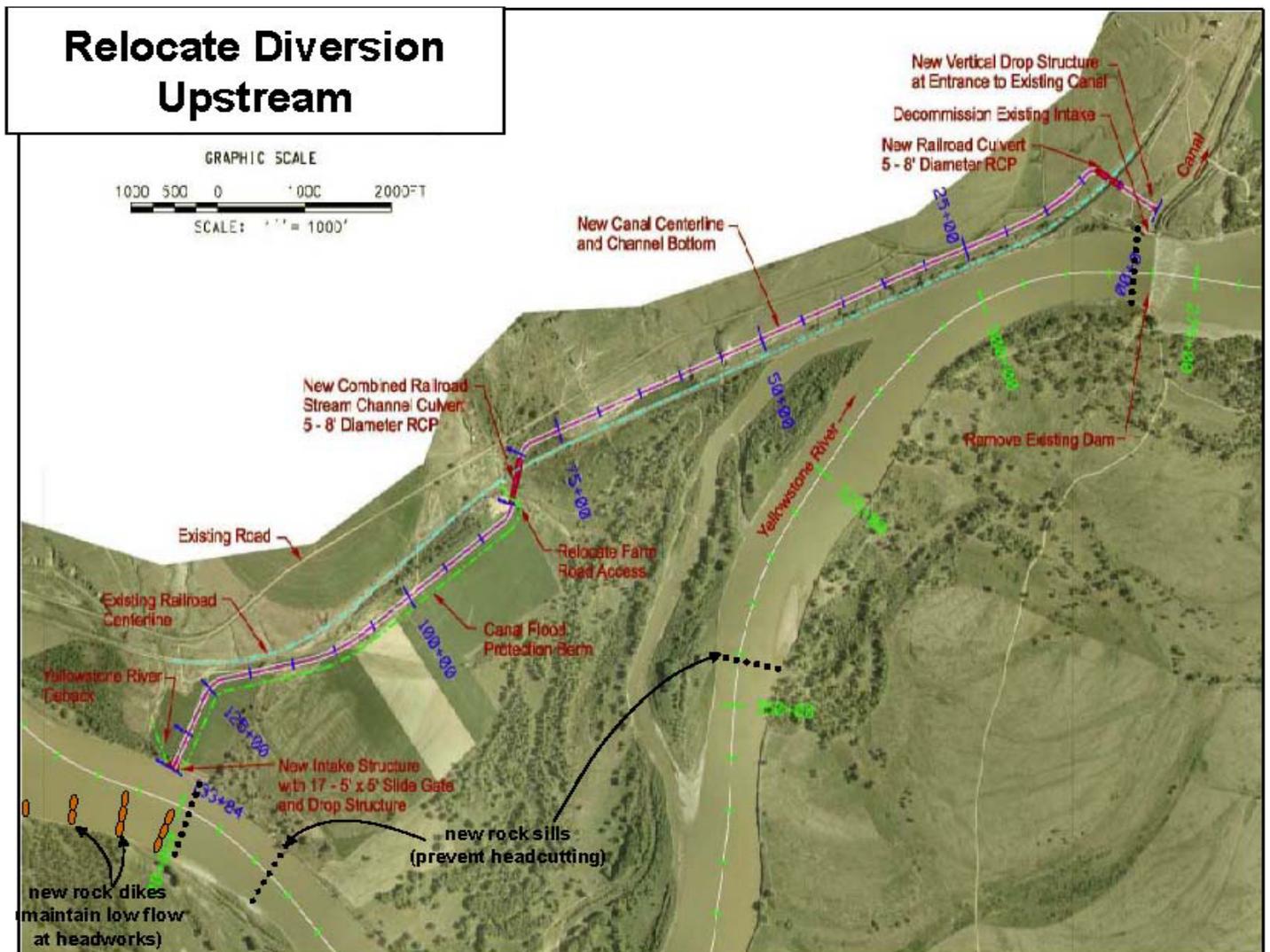
This alternative would relocate the diversion point for the canal approximately 2 miles upstream to take advantage of the natural slope of the lower Yellowstone River. Moving the diversion upstream would enable the irrigation district to divert sufficient water to meet irrigation demands (maximum of 1,374 cubic ft per second) under most flow conditions. The existing Intake Diversion Dam would be removed.

A new 2-mile section of irrigation canal would be constructed along the existing Yellowstone Valley Railroad to connect to the original irrigation canal. Two

crossings beneath the tracks would use inverted siphons with five 8-ft diameter concrete pipes per siphon. A new drop structure would be built to join the new canal to the existing irrigation canal. Most of the canal construction would require a 60-ft cut through a steep hillside removing 3.7 million cubic yards of soil. To protect the new canal from flooding and sediment runoff, levees would be constructed along the floodplain.

In order to divert water during low summer flow, more diversion pipes and screens would be needed than at the existing canal intake. The Yellowstone

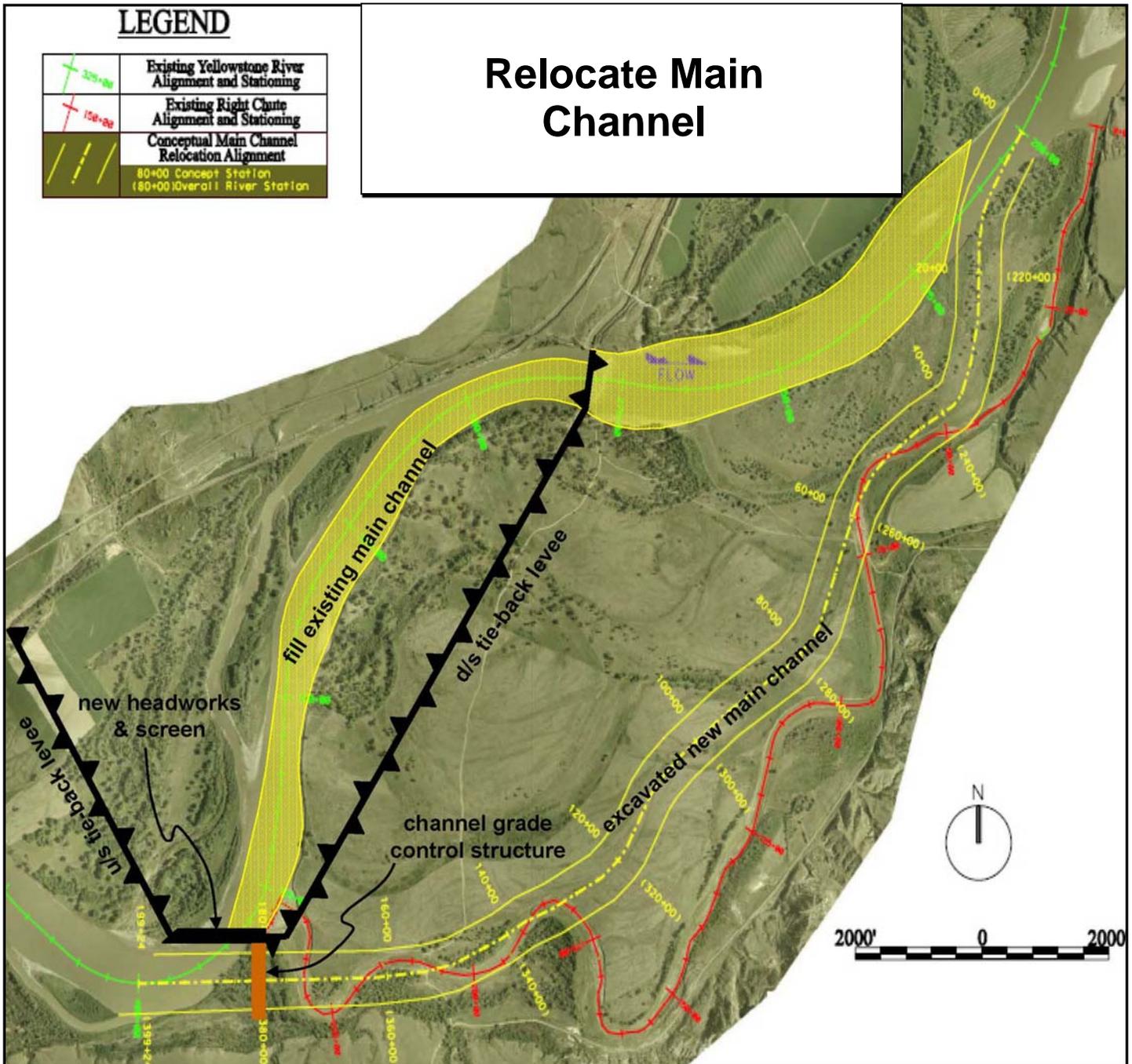
River channel would be modified substantially to maintain optimal channel depth adjacent to the canal intake. Rock structures, such as river training dikes and revetments, would be constructed near the new canal intake and upstream to maintain the channel. Several rock sills (lines of rock in the bottom of the river) spanning the width of the river would prevent vertical erosion after dam removal. During periods of extreme low flows or droughts it is likely that temporary weirs or channel work would be necessary to maintain sufficient diversion capacity for the canal.



LEGEND

	Existing Yellowstone River Alignment and Stationing
	Existing Right Chute Alignment and Stationing
	Conceptual Main Channel Relocation Alignment
	80+00 Concept Station (80+00) Overall River Station

Relocate Main Channel



Relocate Main Channel Alternative

This alternative would relocate the main channel of the lower Yellowstone River near Intake, Montana, to bypass the Intake Diversion Dam. It would follow approximately the alignment of an existing side channel. A newly-constructed channel would carry Yellowstone River flows around the diversion dam. Approximately 3-4 miles of the side channel would be excavated 600-ft wide by removing 5-8 million cubic yards of fill to form a new main channel.

The new main channel would be excavated to mimic the former main channel; however, without a diversion dam to back-up water, a structure would be constructed in the river at the entrance to new channel to ensure reliable diversions to the irrigation canal. The point of divergence of the new channel is under consideration, but it would converge with the existing channel near the Yellowstone River's current confluence with the side channel. A new inlet to the irrigation canal (headworks and control structure) would be constructed where the new main channel diverges from the existing channel.

The new main channel would have several stabilized rock sills extending across its full width to prevent vertical erosion, along with several other rock points and revetments to maintain shape, location, and function under a variety of flow conditions. Most of the former main channel would be filled and the remainder would be used to deliver water to the Lower Yellowstone Project irrigation canal. The irrigation inlet would be engineered to divert water during low flow and to protect against erosion. Levees would be built along the floodplain to protect against flood damage and sedimentation.



Fish Passage Alternatives

Single Pumping Plant Alternative

This alternative would remove the existing Intake Diversion Dam and replace it with a new pumping plant with the capacity to pump 1,400 cubic feet of water per second into the irrigation canal. The pumping plant would be constructed near the location of the existing intake and could pump water into the canal without a permanent diversion dam.

To ensure pumping operations during normal summer flows, the river channel would be stabilized and maintained adjacent to the pumping plant. Several stabilized rock sills spanning the width of the Yellowstone River main channel would inhibit the main channel from

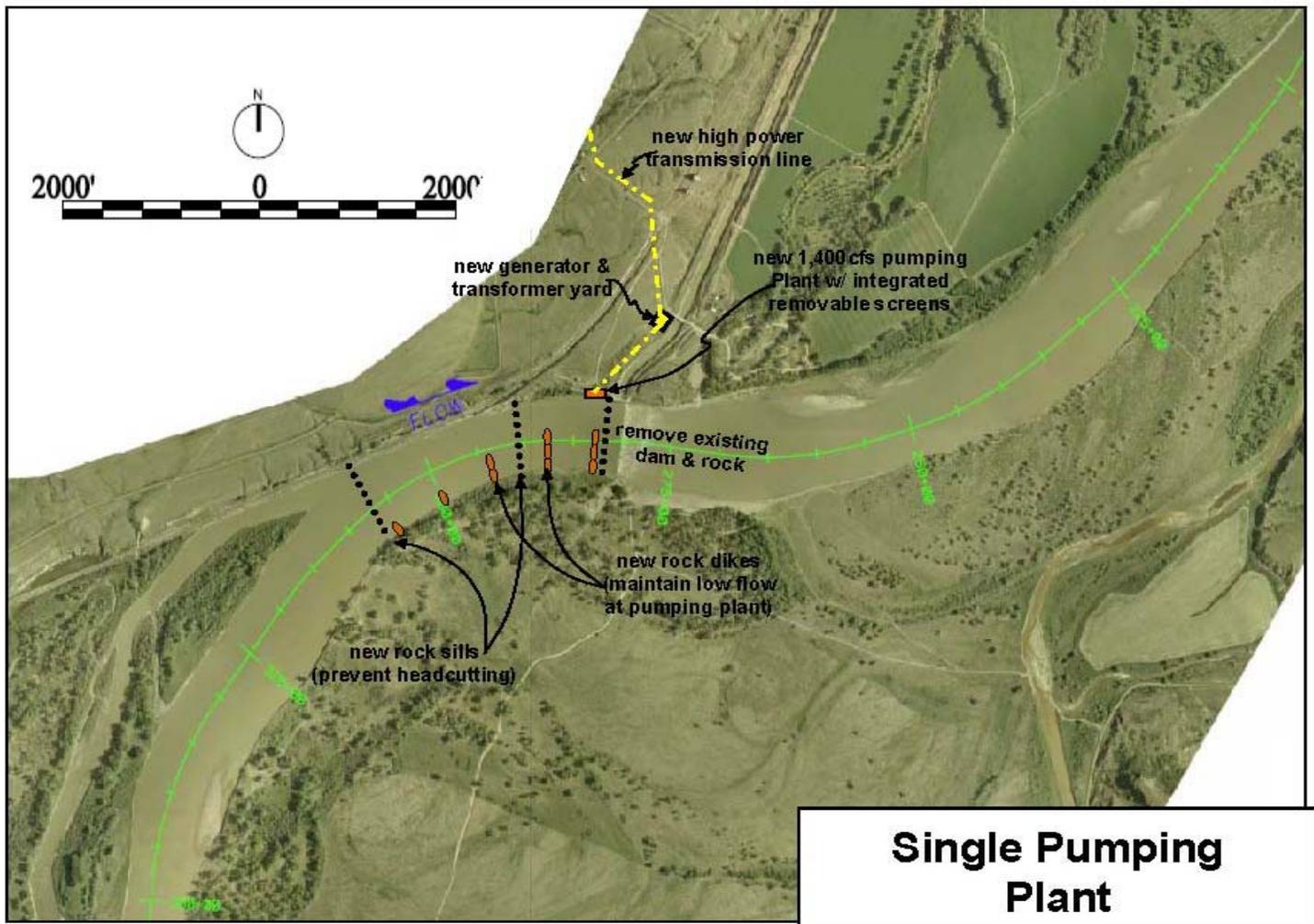
moving away from the plant. Rock dikes and other rock structures would be constructed in the vicinity of the new pumping plant and upstream to maintain the channel and prevent erosion that could occur after removing the dam.

During periods of extreme low flows, it is likely that temporary weirs or some type of structure in the channel would be necessary to maintain sufficient diversion capacity for the canal.

To operate the pumps, a new high-power transmission line and transformer yard would be built to connect the plant to the local power grid. A new high-capacity generator would be

placed on-site to provide backup power in the event of a power outage.

Preliminary evaluation of the pumping plant estimates an annual power demand of 7,000,000 kilowatts per year. The pumps and motors in the plant would require routine maintenance approximately once every 8 years with total replacement occurring once every fourth maintenance cycle (or every 32 years).



Single Pumping Plant

Fish Screen Options

Removable Rotating Drum Screen Option

A fish screen option that could be used if a new canal intake is constructed is the Removable Rotating Drum Screens Option. Drum screens with 1.75 millimeter (mm) stainless steel wedge wire mesh would be installed on the river side of the intake canal to keep fish out of the irrigation system. Fourteen 6-ft diameter drum screens, each approximately 20-ft long, would cover the outside of the canal intake structure.

To prevent damage by the severe ice jams typical of the lower Yellowstone River during early spring, each screen would slide on a track that could be raised and lowered manually using a winch.

Each screen would have fixed brushes on the inside and outside; the drum would rotate against the brushes to prevent clogging. The manifold inside each screen would connect to a trash rack on the canal intake when the screen is in its lowered position.

The riverward location of the removable screens would eliminate the need for an additional trash rack, as well as a bypass pipe, because fish would stay in the main river channel.



Removal Rotating Drum Fish Screen Option

Individual screens could be removed for maintenance while canal operations continue. A trash rack and bypass pipe would not be needed.

V-Shaped Fish Screen Option

A V-shaped, flat panel screen fish screen could be installed inside the canal. This design is commonly used in the western and the northwestern United States to keep fish out of irrigation systems. Stainless steel wedge wire mesh (1.75 mm) in the screen would

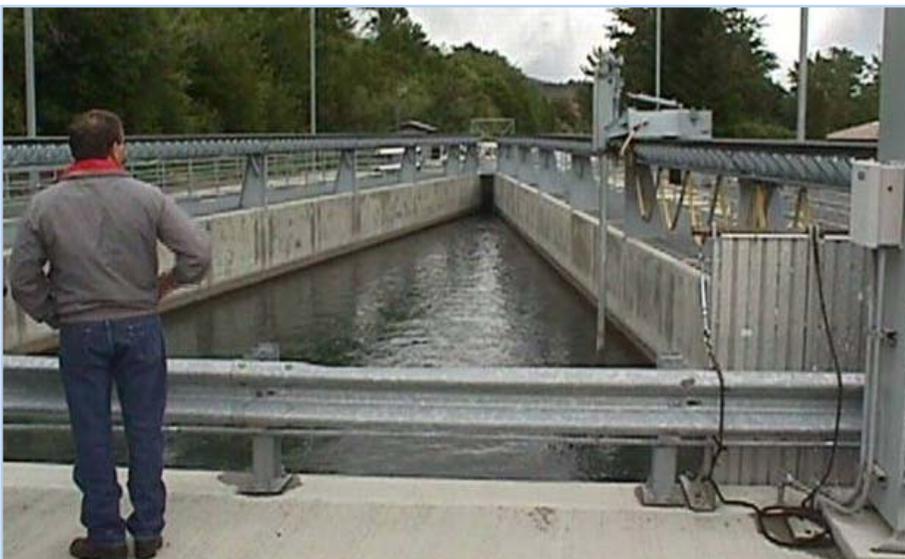
block adult and juvenile fish from entering the irrigation system.

Fish biologists also recommend inclusion of a “trash rack” facility on the river-side of the existing canal intake. The trash rack would consist of parallel bars cleaned by a rake which slides in grooves. It would block large debris and adult and large juvenile fish from entering the canal and being exposed to the screen.

The V-shaped screen and trash rack would have automated cleaning devices (a walking brush, spray cleaning system, rake system, and conveyor) to prevent clogging. A 48-inch bypass pipe would return fish to the main river channel from the screen if they make it through the trash rack.

Alternatives Considered in the EIS

All of these fish passage alternatives and fish screen options are being revised in response to comments received during the public involvement process described in the next section. A new fish passage alternative with multiple pumping stations is also being considered.



V-Shaped Fish Screen Option



Summary of Public Comments

Public Involvement Process

Seeking public input (scoping) is an important part of the NEPA process. It serves as the public's opportunity to provide comment and direction on the Intake EIS throughout its preparation.

Reclamation and the Corps developed a public involvement strategy that included publishing a Notice of Intent in the *Federal Register*, holding three formal public scoping meetings, meeting with state and federal agencies, distributing newsletters, mailing scoping information to agencies and the public, contacting tribes, forming a cooperating agency team, issuing news releases, posting information on a web site and distributing a *Public Scoping Summary Report*.

Input analyzed for the report and this newsletter came from the following:

1. Series of open houses and public scoping meetings held from 5:30 – 8:30 PM in three locations in Montana. The meetings were at the Community Services Building in Sidney on October 21, Dawson Community College in Glendive on October 22, and Montana State University Downtown Campus in Billings on October 23.
2. Public field trip to Intake Diversion Dam at 2:30 PM on October 22.
3. Consultation meetings with federal, state, and local agencies in Montana.
4. Cooperating agency team meetings.
5. Written comments submitted by agencies, organizations, and the public.
6. Comments submitted online through the web site.

The initial scoping period was originally scheduled to end on November 14, 2008, but was extended to December 15, 2008, in response to requests for additional time for comments.



Open House and Public Scoping Meeting in Sidney, Montana

Issues

During public scoping a total of 46 letters and e-mails were received in addition to the oral comments presented at three public scoping meetings. All comments were carefully considered by the interdisciplinary team. A total of 222 comments were identified and grouped into 18 issue categories.

The issue categories were air quality, alternatives, aquatic resources, Clean Water Act, climate change, cumulative effects, environmental justice, ESA, fish and wildlife, historic properties, hydrology and geomorphology, Indian trust assets, natural resource lands, NEPA, recreation, socioeconomic, water conservation, and water quality. This section summarizes those comments.

General responses to these comments appear in the January 2009, *Public Scoping Summary Report, Intake Diversion Dam Modification, Lower Yellowstone Project, Montana, Environmental Impact Statement*.

This report is posted on the Montana Area Office, Reclamation website at:

<http://www.usbr.gov/gp/mtao/loweryellowstone>.



Open House and Public Scoping Meeting in Billings, Montana

To receive a printed copy of the Public Scoping Summary Report contact:

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406.247.7300



Public Comments

Air Quality Analysis

Provisions for air quality analysis should be included in the Intake EIS.

Alternatives

A number of comments suggested revisions to the four alternatives described at public meetings. The proposed revisions included modifying the rock ramp design, providing gravity flow diversion along with pumping, and assessing different locations and types of fish screens. A question was raised about the source of rock for the ramp, and it was suggested that the rock be acquired in Montana.

Several new alternatives were offered. One would construct individual irrigation pivots and pumping systems for landowners that currently use the canal system, use groundwater rather than surface water for some pivots, and offer an optional “non-irrigate” clause to irrigators. Another would capture fish below the dam and relocate them above the dam or release fish hatchery sturgeon above the dam.

There were a number of concerns about the alternatives. Damage to the new proposed structures by ice, flood waters, and debris was an issue mentioned in some comments, while concerns about operation during low flow were raised in others.

Some questioned the cost of the project and asked who would pay for construction, operation, and maintenance. Irrigators expressed a need for a reliable water system. Local property owners were afraid of impacts to their property. Many wanted the dam and irrigation intake left alone.



Adult Pallid Sturgeon

Aquatic Resources

Several individuals commented that they believed that very few fish are entering the canal now, and therefore, a fish screen is not needed.

The EIS should evaluate impacts on stream habitat, including bank/channel stability, streambed substrate, spawning and rearing habitats, pools and riffles, and riparian areas. It should evaluate effects on the species composition and abundance of fish and other components of the aquatic community. Paddlefish and other important recreational fishery resources should be addressed.

The EIS should evaluate the flow and habitat needs of the fish species in the Yellowstone River and develop alternatives that protect and enhance habitats and habitat connectivity for these species. Measurable biological objectives and clear biological criteria should be developed to define project success, including the effectiveness of proposed modifications to improve fish passage and reduce entrainment.

Clean Water Act

Analysis of the environmental effects of proposed projects should show consistency with the goals and objectives of the Clean Water Act. Integrate 404(b) 1 guidelines into the NEPA process. Include a 404(b)1 evaluation of the preferred alternative as an appendix in the EIS. A 404 permit under the Clean Water Act may be required through recapture clause in 404(f)2.

Climate Change

The EIS should analyze the potential effects of climate change on Yellowstone River flows and how altered flows could affect irrigation diversions and practices.

Cumulative Effects

A thorough cumulative effects analysis should be completed for all resources areas. Are there other dams on the Yellowstone River that are barriers to pallid sturgeon, and what will happen to them?



Young Pallid Sturgeon

Endangered Species Act

Several comments concerned the potential success of trying to address fish passage. Others expressed questions about the ESA, including recovery of endangered species, de-listing, and integration into the EIS process. Some questioned whether the fish passage and entrainment issues are real. Several comments concerned pallid sturgeon biology including larval drift, fingerling predation by pelicans or other fish, natural spawning, value of sturgeon, and history of their survival on the Yellowstone River.

Environmental Justice

The EIS needs to identify and address disproportionately high and adverse human health and environmental effects on minority populations and low-income populations.

Fish and Wildlife

Comments recommended working with state and federal biologists to address all natural resource issues. Others questioned the issue of fish entrainment.

Historic Properties

The EIS should identify historical, archeological, paleontological, native religious, sacred or other cultural resources that may be affected by dam modification. Potential impacts to the natural, cultural, and recreation resources of the Lewis and Clark Trail should be evaluated. In addition, the Lower Yellowstone Diversion Dam has been nominated for listing on the National Register of Historic Places by local residents.



Public Comments

Hydrology and Geomorphology

The EIS should evaluate and discuss Yellowstone River hydrology, flow variations, diversions, stability, and geomorphology in the area of the Intake Diversion Dam as well as upstream and downstream.

Indian Trust Assets

You need to assess all impacts to tribal trust resources and to consult with tribes.

Natural Resource Lands

The protection, improvement and restoration of riparian areas are a high priority. Cottonwood galleries are a riparian resource worthy of special attention during the EIS evaluation. Riparian areas should be protected to ensure the maintenance of water quality and hydrologic processes; maintenance of the physical integrity of aquatic ecosystems; adequate amounts and distribution of woody debris sufficient to sustain physical and biological complexity; adequate summer and winter thermal regulation, appropriate amounts and distributions of source habitats for riparian-or wetland-dependent species; and maintenance of naturally functioning riparian vegetation communities.

The EIS should identify wetlands potentially affected by the proposed project including acreage, type, ecological role, and function. The project should follow Executive Order 11990; no net loss of wetlands. Wetland impacts should be identified in the EIS and an explanation of how impacts if any will be mitigated. Heavy equipment use in wetland areas should be avoided or restricted to winter time use on frozen ground.

The EIS should include a strategy for prevention, early detection of invasion, and control procedures for weeds during and after construction including monitoring progress on effectiveness of weed control efforts. Revegetation (reseeding with native grass mix) should occur following construction activities as soon as possible to reduce potential for weed infestation and control erosion.

National Environmental Policy Act

Concerns were raised at the public meetings that the federal government had already made a decision about a course of action. It was suggested that working together to find a solution would be a better. There were also concerns that if modifications were made to the irrigation project that did not work, the problems would not be fixed.

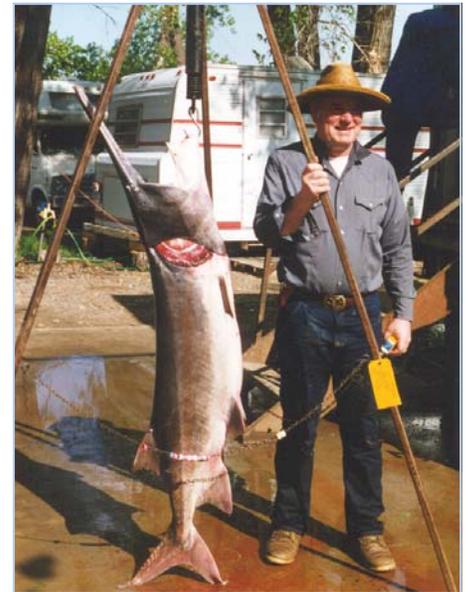
It was suggested that the EIS should have a clear and logical purpose and need statement and should follow NEPA regulations for analysis of alternatives. 40 CFR Section 1502.14(c) requires agencies to include reasonable alternatives not within their jurisdiction, so that all potentially reasonable alternatives are evaluated, even if they may require modification of Congressional approval or funding.

Existing conditions must be described, including but not limited to water resources, vegetation, wildlife, threatened and endangered species, land use, and tribal coordination. Establish analysis area boundary and extend to include potential impacts to resources. Use land ownership maps including resource features.

Impact analysis should reflect a level of analysis and data compilation so that the reader is able to establish whether the data support the conclusions and include appropriate mitigation measures. Impact analysis should follow 40 CFR 1502.16. Follow CEQ (Council on Environmental Quality) guidance - *"Incorporating Biodiversity Considerations into Environmental Impact Analysis Under the National Environmental Policy Act."*

Recreation

Primary concerns about recreation centered on impacts to the fishing access site and campground adjacent to the Intake Dam, fishing at the dam and loss of income from harvesting paddlefish caviar. It was pointed out that the Yellowstone Caviar Project operated by the Glendive Chamber of Commerce has



Intake is a Popular Paddlefishing Location as Evidenced by this Proud Angler Weighing His Catch.

given over \$650,000 in grants, is a local employer, and has supported 367 projects. Also, suggestions were made to protect the fishing ramp and to incorporate passage for boats over or around any structures.

Socioeconomic Issues

The EIS should discuss the social and economic consequences of proposed dam modifications, including effects on the local economy, agriculture, recreation, etc. Local landowners voiced concerns about impacts to private property and crops near Intake Diversion Dam. Impacts to the railroad and to the energy grid were also expressed. Impacts to existing power contracts with Reclamation was an issue.



Family Farms Depend on Water from Intake.

Future Public Involvement

Water Conservation

Comments on water conservation ranged from a request not to restrict or reduce water flow to the irrigation project to a question on how water conservation will be incorporated into the Project. In addition, an agency recommended that minimum in-stream flows be established below Intake Dam to sustain the ecosystem.

Water Quality

The 2006 Montana Clean Water Act Section 303(d) report identifies the fish passage barrier at Intake as a probable cause of use impairment for the warmwater fishery. The Yellowstone River segment below the Intake Dam downstream to the North Dakota border is also listed with water quality impairments to warmwater fishery and aquatic life uses. Impairment issues include chromium, copper and lead.

The EIS should describe existing beneficial and summarize existing water quality in the project area. The Project should be planned and designed to protect water quality to maintain and/or attain compliance with water quality standards. Potential chemical, physical, and biological effects of proposed activities should be evaluated and disclosed.

The EIS needs to evaluate lower Yellowstone River water quality conditions that may affect the endangered pallid sturgeon and other fish species.

Draft Environmental Impact Statement

The release of the Intake Draft EIS will be announced along with the public review period and dates, times, and locations of public hearings. The public will have at least 45 days to review the Draft EIS.

A least one public hearing with a court reporter and a hearing officer will be held during the public review period. Participants also will be encouraged to make comments through several mechanisms – written comment cards, letters, e-mails, or oral comments at the hearings.

All comments received on the Intake Draft EIS and hearing transcripts will be posted on the website at:
<http://www.usbr.gov/gp/mtao/loweryellowstone>.

Final Environmental Impact Statement

Reclamation and the Corps will carefully consider comments and could respond to these by adjusting alternatives, adding new alternatives, supplementing or improving the analysis or making factual corrections. Each substantive comment will be carefully considered and will be responded to in the Intake Final EIS. The comments and responses will be published as an appendix to the Intake Final EIS.

Record of Decision

The Record of Decision cannot be issued until at least 30 days after the Environmental Protection Agency publishes its notice of availability for the Intake Final EIS in the *Federal Register*.

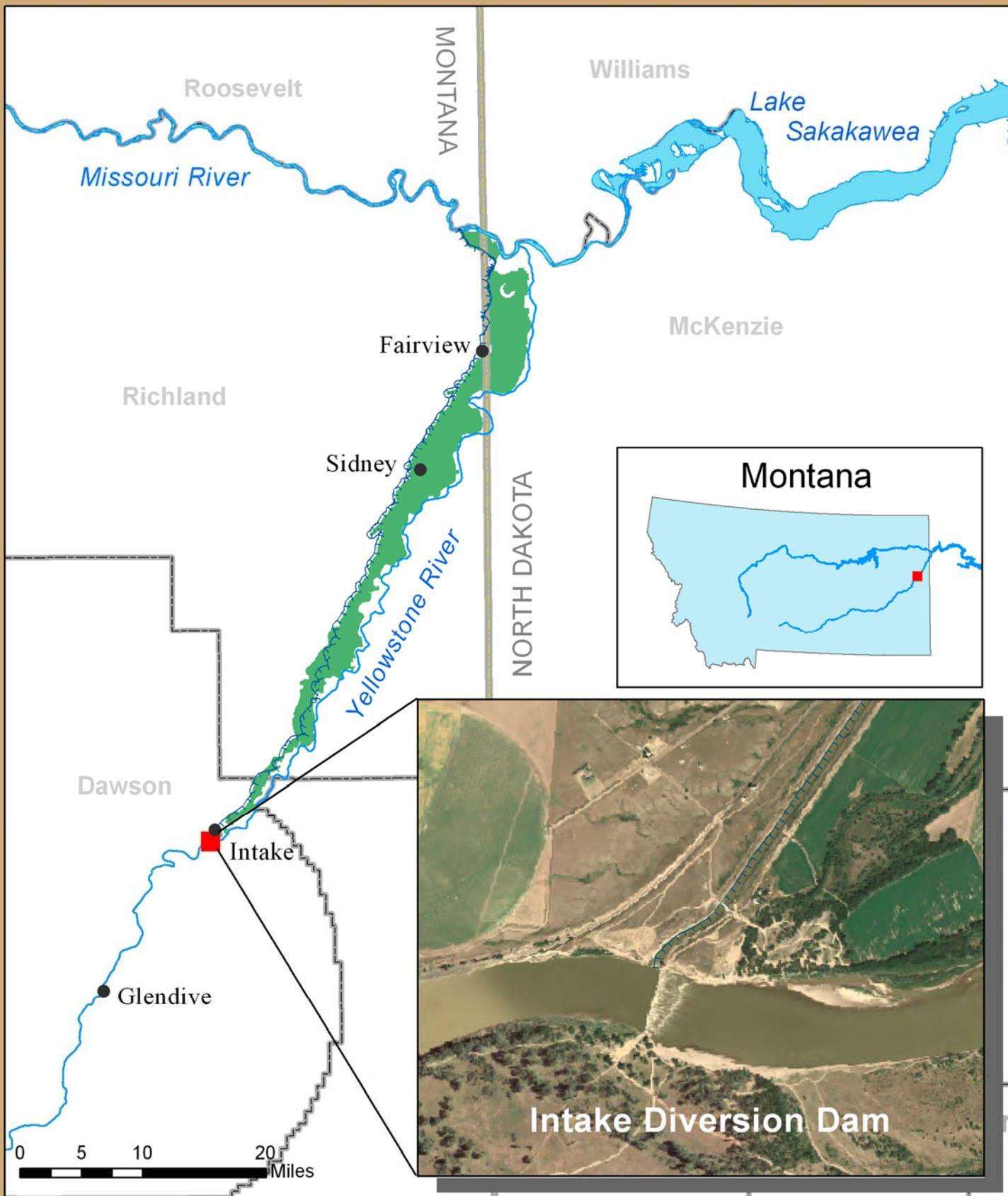
There is no requirement to formally publish the Record of Decision in the *Federal Register* or the media. However, the affected public will be made aware that the Record of Decision is available. News releases and public service announcements will be distributed to the media reporting availability of the Record of Decision.



Turbulent Water Flowing Over Intake Diversion Dam



Intake EIS General Project Area



Features



Intake Diversion Dam



Main Canal



Lower Yellowstone Irrigation Project