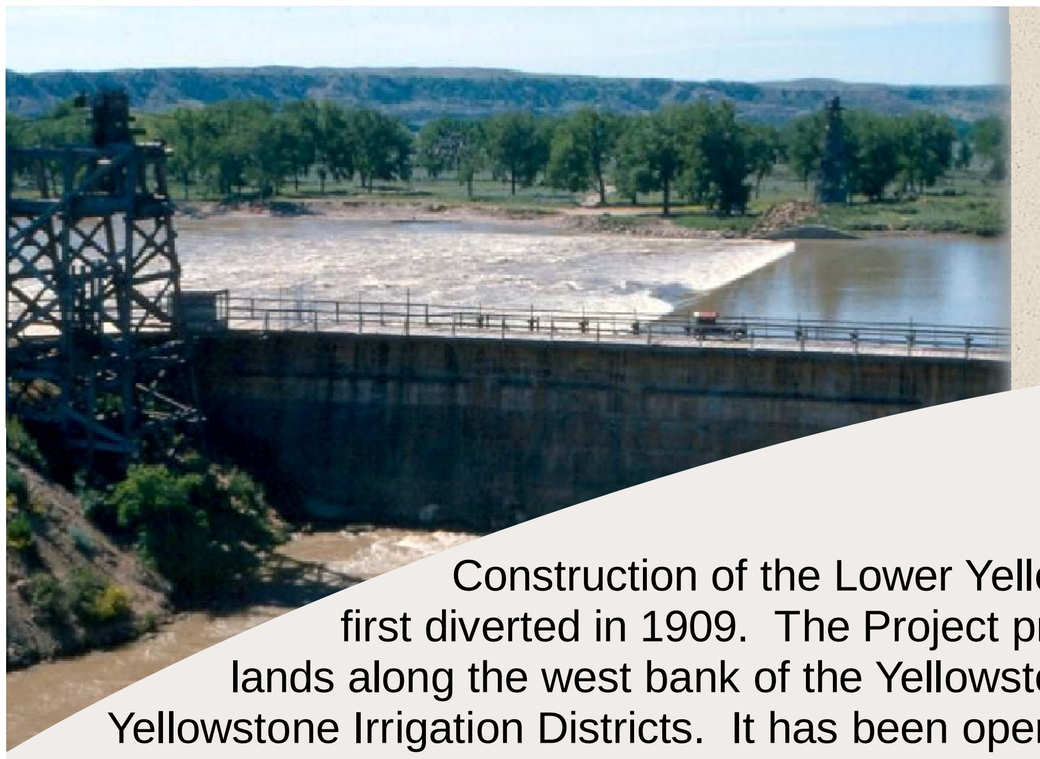
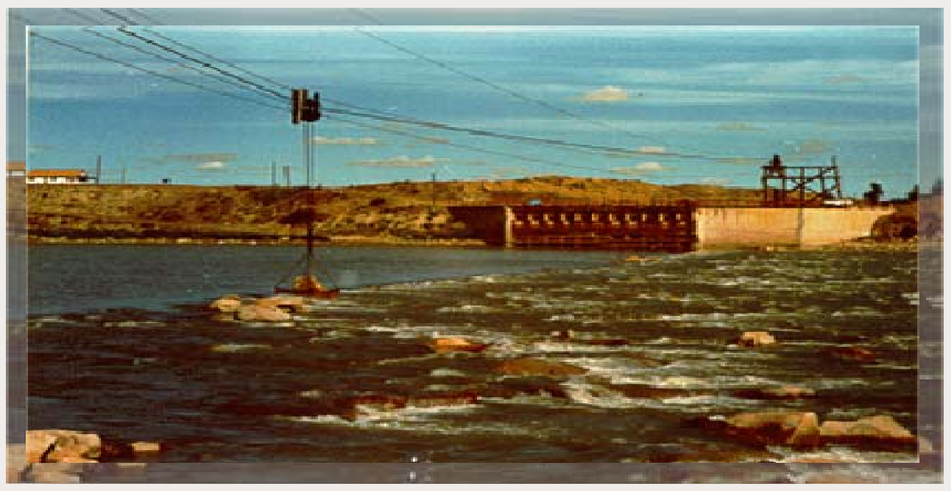


Lower Yellowstone Project

Construction of the Lower Yellowstone Diversion Dam began in 1905. Water for irrigation was first diverted in 1909. The Project provides a dependable supply of irrigation water for 55,000 acres of lands along the west bank of the Yellowstone River in the Lower Yellowstone Irrigation Districts. It has been operating since the early part of the century without major changes to its form or function. Approximately two-thirds of the irrigated lands are in Montana with the remaining located in North Dakota.

The Project diverts approximately 325,000 acre feet of water annually from the Yellowstone River into the Main Canal at the Diversion Dam near Intake, Montana, about 18 miles downstream of Glendive. Water flows by gravity through 71 miles of the Main Canal and a 225-mile lateral system toward the confluence of the Yellowstone and Missouri rivers to service most of the irrigated lands.



The Diversion Dam was originally constructed as a rock-filled timber crib weir about 12 feet high and containing about 23,000 cubic yard of material. Two-thirds of the timber was replaced in the early 1970s. On an as-needed basis, 300-1200 cubic yards of large quarried rock are placed across the crest of the Diversion Dam to replace rock displaced by high flows and/or ice. The rock is transported over the river via an overhead cable system and dropped on the crest of the dam.

This work is necessary to maintain sufficient upstream water elevations to allow diversions into the Main Canal during periods of low flow.

Approximately 500 farms served by the Lower Yellowstone Project produce diverse crops, including sugar beets, small grains, hay and corn. Annual gross crop values are currently about $25-$30 million. The Project irrigation districts are responsible for operating and maintaining the irrigation facilities under a contract with Reclamation.

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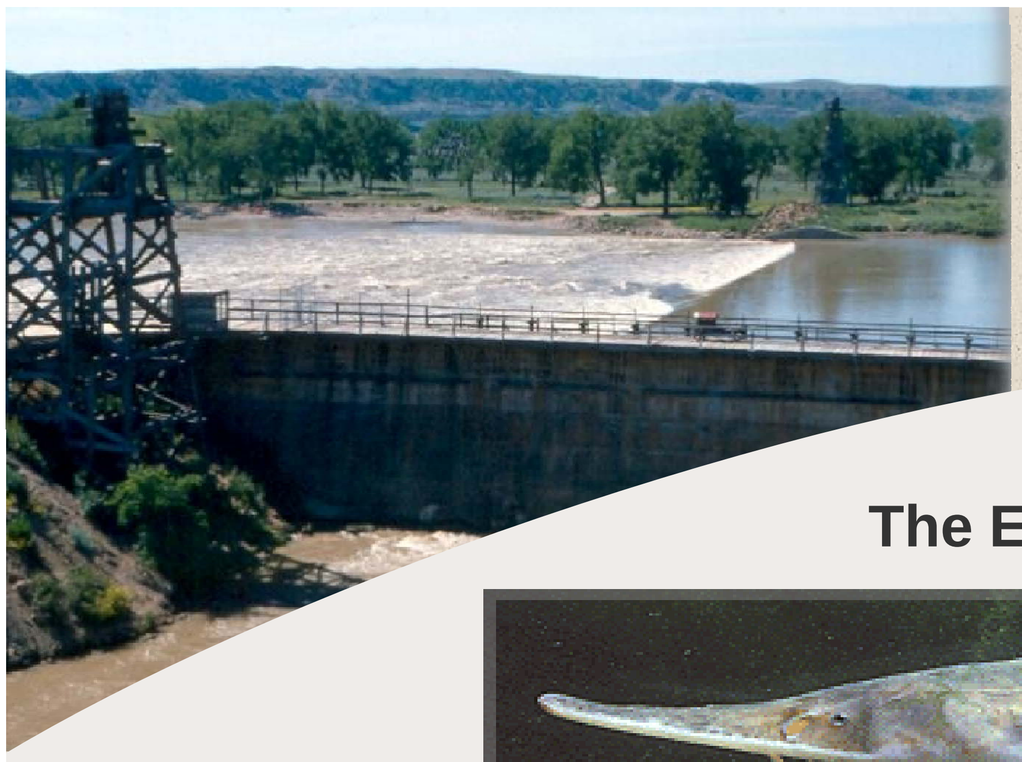
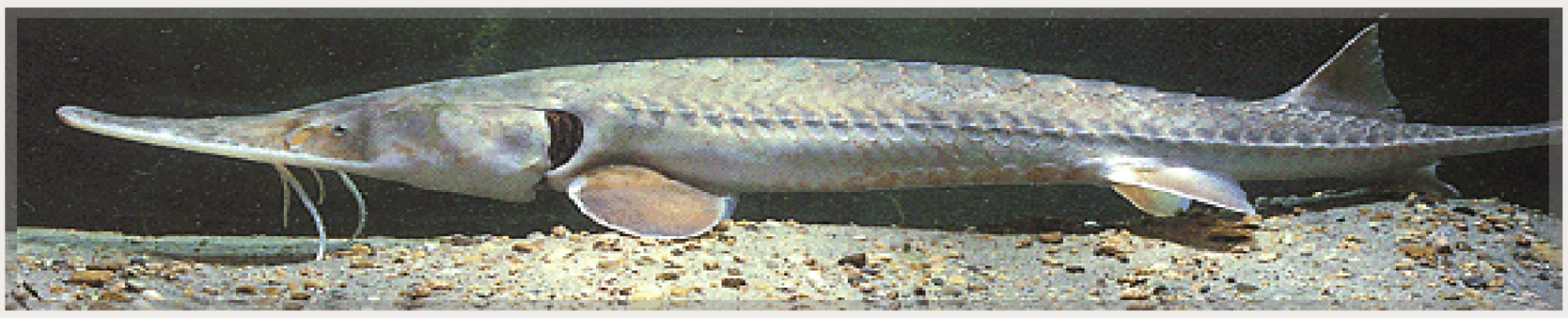


A Living Fossil!

The Endangered Pallid Sturgeon



Status

- The pallid sturgeon is a descendant of fish that lived 70 million years ago.
- It was described as a species in 1905 and the U.S. Fish and Wildlife Service listed the pallid sturgeon as “endangered” in 1990.
- Their historical range spanned parts of the Missouri River, lower Mississippi River, and Yellowstone River but has been significantly reduced by dams. Very little reproduction is occurring in the wild.
- Pallid sturgeons in the Missouri and Yellowstone Rivers of Montana are at risk of dying out if natural recruitment (addition of young fish to the population) is not restored soon. There are currently less than 300 wild adults in this area.

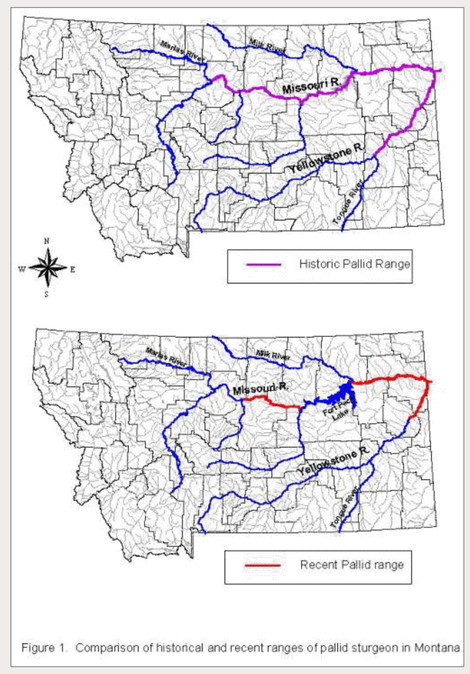


Figure 1. Comparison of historical and recent ranges of pallid sturgeon in Montana.

About Pallid Sturgeon

- The pallid sturgeon is covered by pale, bony plates, called scutes, instead of scales.
- They have a sucker-type mouth with whisker-like barbels. They feed on small fish, aquatic insects, mollusks and other food from the river bottom.
- Pallid sturgeons are related to shovelnose sturgeons, but are larger and usually paler. The two species can be differentiated by the length of their barbels.
- Pallid sturgeon can grow up to 6 feet long, weigh up to 80 pounds, and live more than 60 years. Females take 13-15 years to reach reproductive maturity and males usually mature to adulthood between the ages of 5 to 7 years.
- They are adapted to living on the bottom of large, turbid river systems and migrate great distances to fulfill their life history.

So, What is the Problem?

- Pallid sturgeons are strong swimmers in straight-line currents, but do not swim well in turbulent waters caused by the Intake Diversion Dam.
- They migrate upstream to spawn in the spring to lay eggs that adhere to the bottom of the river. As these eggs hatch, the larvae (newly hatched fish) cannot swim, but instead drift downstream until they are strong enough to swim and find suitable habitat. This takes about 13-15 days.
- If pallids spawn below the Intake Diversion Dam, the larvae are believed to drift into Lake Sakakawea and perish in the lake-like environment. The more common shovelnose sturgeon larvae drift shorter distances, which may explain why they are successfully reproducing in the Lower Yellowstone River and pallids are not.
- If adults could pass over or around the Intake Diversion Dam, they could spawn far enough upstream that the larvae could gather strength to survive before drifting into Lake Sakakawea.
- The Yellowstone River above the Intake Diversion Dam is historic spawning habitat and is suitable for pallid sturgeon restoration.
- Another problem for pallid sturgeon is entrapment (entrainment) in the irrigation canal.
- Federal agencies are required by law to consult with the U.S. Fish and Wildlife Service on the effects of projects on endangered species. Consultation with the Service on this project has identified fish passage and entrainment protection issues that need to be addressed to protect the pallid sturgeon.

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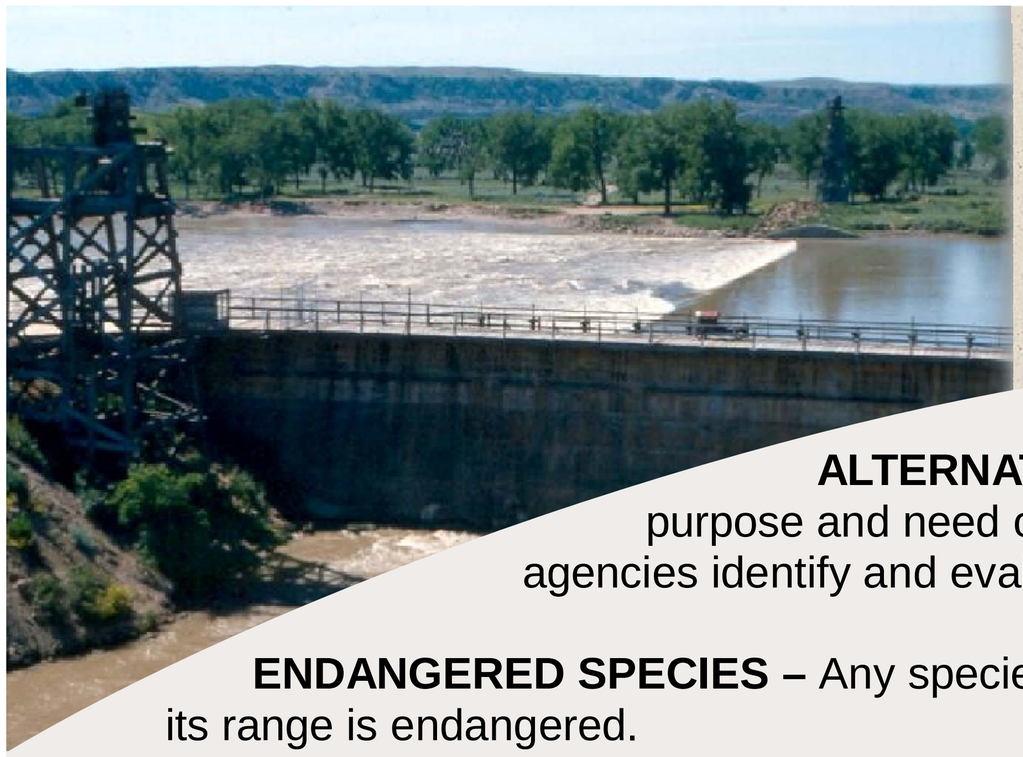


Words We Use

ALTERNATIVES – are different ways or options for meeting the purpose and need of a proposed federal action. NEPA requires that federal agencies identify and evaluate a full range of alternatives, including the No Action Alternative.

ENDANGERED SPECIES – Any species that is in danger of extinction throughout all or a significant portion of its range is endangered.

ENTRAINMENT – Term used to describe the involuntary entrapment of fish in an irrigation canal or other man-made structure. In this case, it is the unwanted and unintentional passage of fish through the Lower Yellowstone Project irrigation intake into the canal system.

EIS – An environmental impact statement is a document that provides full and fair discussion of significant environmental impacts of a proposed action. It describes reasonable alternatives that would avoid or minimize adverse impacts or enhance quality of the human environment.

ESA - The Endangered Species Act is a law passed by Congress to protect, conserve and recover federally listed threatened and endangered species.

FISH PASSAGE – Allows for the free and unobstructed movement of fish up the Yellowstone River.

GEOGRAPHIC SCOPE – That part of the Earth that would be either directly or indirectly affected by the proposed action. The EIS considers actions within the geographic scope of the proposed project that may be connected, cumulative, or similar.

NATIVE FISH – Any fish that naturally occurred in the Yellowstone River; not an introduced species.

NEPA – The National Environmental Policy Act was passed by Congress in 1969, and represents the most significant piece of environmental legislation enacted in the United States. NEPA provides national policy for Federal agencies by governing the decision-making and planning process used to reach significant environmental decisions. Through NEPA, the public is informed and involved in the decision-making process, and a systematic, interdisciplinary approach is used to consider the environmental impacts of a proposed project.

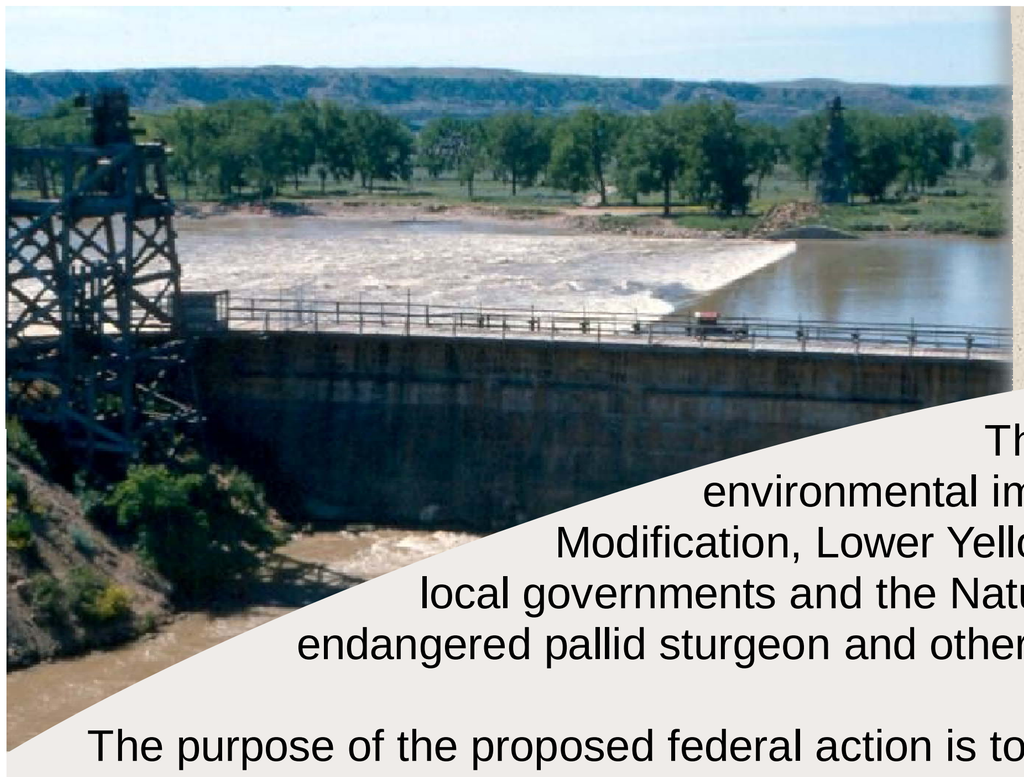
NO ACTION – Is the future without any of the proposed fish passage alternatives or a fish screen. No Action for this project means continuing to maintain the diversion dam as is currently maintained.

PUBLIC SCOPING – Is an early and open process for determining the range of issues to be addressed in an EIS and for identifying the significant issues related to a proposed action.

SCOPE OF THE EIS - The scope of an EIS is the range of actions, alternatives, and potential impacts to be considered.

TURBULENCE – Departure in a fluid from a smooth flow.

VELOCITY - The quickness of flow of water, normally displayed in feet per second (ft/s).



Project Partners

The Corps and Reclamation are jointly preparing an environmental impact statement for the proposed Intake Diversion Dam Modification, Lower Yellowstone Project. In addition, other federal agencies, state and local governments and the Nature Conservancy are working together to aid in the recovery of the endangered pallid sturgeon and other native fish.

The purpose of the proposed federal action is to correct unsatisfactory passage and entrainment conditions for endangered pallid sturgeon and other native fish at the Intake Diversion Dam and canal headworks, Lower Yellowstone Project.

Partner Agencies Sign Memorandum of Understanding

The need for the proposed project is to:

- Minimize fish entrainment (incidental entrapment) into the irrigation canal.
- Improve fish passage.
- Continue the authorized operation of the Lower Yellowstone Project.
- Ensure that continued operation of the Lower Yellowstone Project complies with the Endangered Species Act.
- Contribute to Yellowstone River ecosystem restoration.

In 2005 Reclamation, Corps, U.S. Fish and Wildlife Service, Montana Fish Wildlife and Parks, and the Nature Conservancy 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 reduce fish loss to the irrigation canal.

History of the Partnership

- December 14, 2000 - The Nature Conservancy and Corps enter into an agreement at the National level
- February 11, 2005 - Reclamation and Corps sign an inter-agency agreement at the National level
- July 8, 2005 - Partner agencies sign Memorandum of Understanding
- November 9, 2007 – Passage of the Water Resources Development Act of 2007 gives Corps authority to assist Reclamation in the design and construction of the proposed project

The Yellowstone River Conservation District Council, representing conservation districts on the Yellowstone River, and the Lower Yellowstone Project Board of Control support and encourage these efforts, although neither the Council nor the Board signed the agreement.

Biological Review Team

Fisheries biologists with expertise in fish passage form the Biological Review Team, which was sponsored by the U.S. Fish and Wildlife Service to review preliminary alternatives. The team represents U.S. Geological Survey; U.S. Fish and Wildlife Service; Montana Department of Fish, Wildlife, and Parks and Reclamation

Cooperating Agencies

Reclamation and the Corps invited the Montana state agencies (Department of Environmental Quality; Fish, Wildlife, and Parks; Department of Natural Resources and Conservation); U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service to be cooperating agencies assisting in preparation of the environmental impact statement.

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What are the Concerns?

- Restoration of the Yellowstone River as a natural migration route for pallid sturgeon is essential to their recovery on the Upper Missouri. Reclamation, the Lower Yellowstone Irrigation District, the Corps, Fish and Wildlife Service, State of Montana and the Nature Conservancy have been working together to find a solution. Improving fish passage at Intake would allow sturgeon use of an additional 165 miles of the Yellowstone River as well as access to tributaries, like the Powder and Tongue Rivers.

- The continued delivery of irrigation water while addressing the needs of native fish, and the continued operation and viability of irrigated agriculture in the Lower Yellowstone Project is of concern.

- Impact to recreation is an issue of local concern.
  - Changes in water-based recreation, such as snagging paddlefish and catching other fish.
  - Economic impacts to the paddlefish caviar industry.
  - Land-based recreation, including possible changes to the fishing access point and river access.

- Social and economic conditions in affected communities associated with construction activities and with long-term operation and maintenance of the irrigation project.

- Short-term and long-term impacts to surface water quality.
- Impacts to floodplain, wetlands, and riparian communities.
- Changes in water quantity associated with operation of the irrigation project and climate change.
- Relevant cumulative environmental impacts to the Yellowstone River from past, present, and reasonably foreseeable future actions.
- Adverse effects to cultural resources, such as historic, archaeological, architectural, Tribal concerns or traditional properties.
- Environmental justice - would the proposed Project disproportionately adversely affect minority and low income populations?
- Compliance with all applicable Federal, State, and local statutes and regulations and with international agreements and required federal and state environmental permits, consultations, and notifications.
- Compliance with all applicable executive orders.

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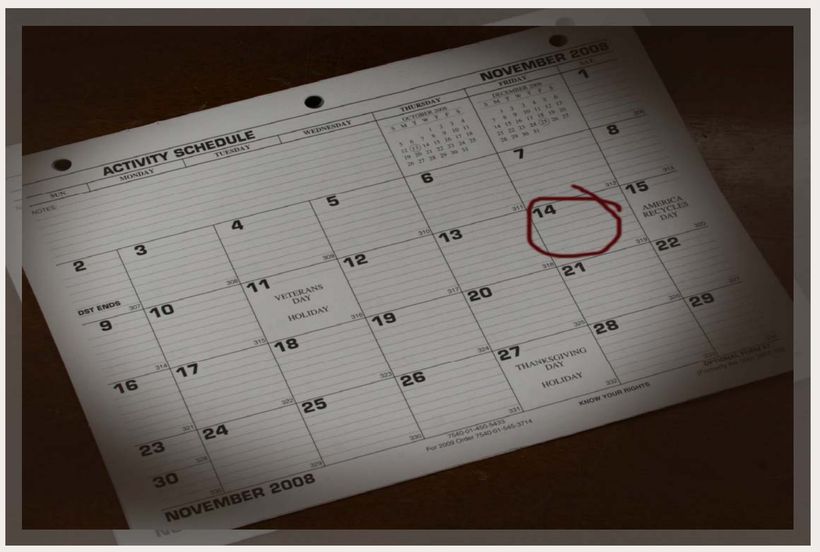
What Comes Next?

Public Scoping - After public scoping ends on November 14, 2008, a team of resource experts (biologist, economist, recreational planner, environmental specialist, agricultural engineer, civil engineer, archaeologist, geologist, hydrologist, etc.) will carefully consider public and agency input. The team will prepare a document that summarizes substantive comments. This information will be used to determine significant issues and the scope of those issues to be addressed in the EIS. Public involvement will continue as the EIS is prepared.



Preparation of the Draft EIS - An interdisciplinary approach will be used by the team in preparing a draft EIS drawing on expertise from Reclamation, the Corps of Engineers, cooperating agencies, public input and others with special interests, permit jurisdiction, or resource knowledge.

Analyses will focus on the environmental impacts of the proposed action and avoiding adverse impacts. An EIS will be prepared jointly by Reclamation and the Corps of Engineers that provides full and fair discussion of significant environmental impacts of the proposed action. It will describe reasonable alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

Public Review of the Draft EIS – When a draft EIS is ready for public review, a notice of availability will be published in the *Federal Register*. News releases will be sent to the news media announcing the release of the draft EIS. The draft EIS will be sent to everyone on a distribution list and will be posted on the project website at www.usbr.gov/gp/mtao/loweryellowstone. At least one public hearing will be held to receive comments from the public on the Draft EIS. Comments may be submitted in writing by fax, e-mail, or at the public hearing during the public comment period of at least 45 days.

Preparation and Distribution of the Final EIS – After careful consideration of all of the substantive comments received on the Draft EIS, the team will prepare a final EIS. The final EIS will identify and respond to substantive comments. It will identify a preferred alternative and an environmentally preferable alternative. Its availability will be announced just like the draft EIS and it will be distributed to the mailing list and posted.

Record of Decision – No sooner than 30 days after publication of the notice of availability of the final EIS by the Environmental Protection Agency, a Record of Decision can be issued. This document announces the alternative that has been selected by the deciding official and summarizes any significant comments received on the final EIS. It includes mitigation measures to avoid or minimize environmental harm. It also identifies the environmentally preferable alternative.

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How Do I Get Involved?

Tips for Effective Public Involvement

To Be Effective DO:

- Attend public meetings and learn about the proposed project.

- Periodically check the website for updates on the EIS:
  www.usbr.gov/gp/mtao/loweryellowstone

- Sign up to be included on the distribution list through the website.

- Read the draft EIS carefully.

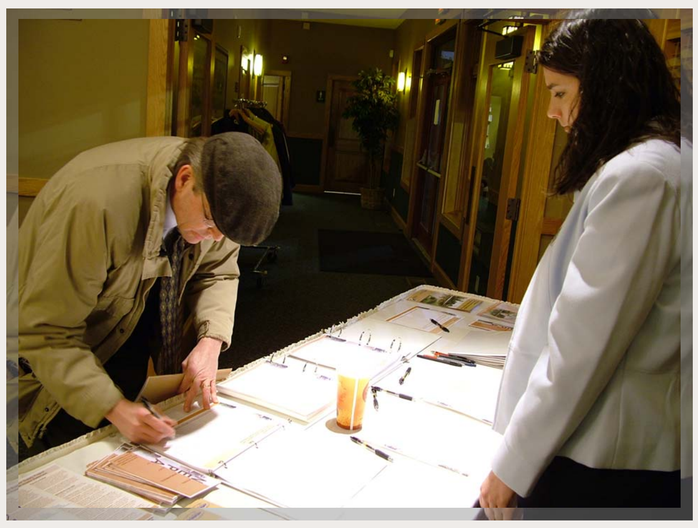
- Participate in a public hearing on the draft EIS and express a substantive comment either during the hearing or in writing.

- Substantive comments are specific in their criticism of analysis methods, identify new information or an Issue, raise a new alternative, or explain how an alternative could be modified.

- **E-mail comments to**: IBR6MTADLWRYELL@gp.usbr.gov

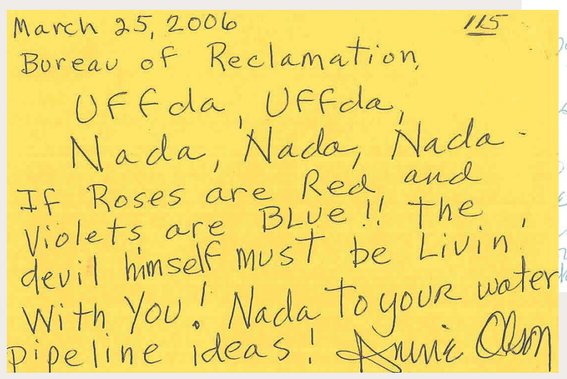
- **Write to:**
  Paula Holwegner—Bureau of Reclamation, Montana Area Office
  P.O. Box 30137
  Billings, Montana 59107

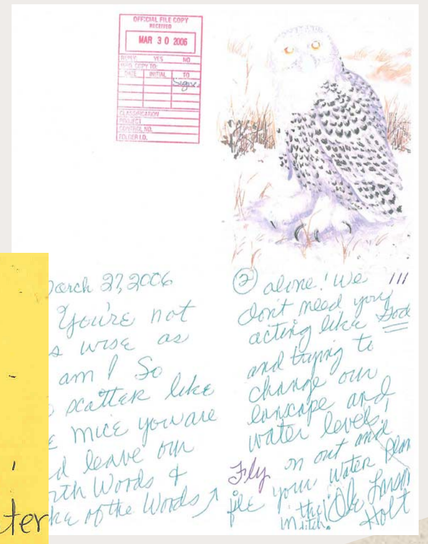
- **FAX comments to:** 406.247.7338 **ATTENTION** Paula Holwegner



To Be Effective DON'T:

- Vote for an alternative.
- Offer an unsubstantiated personal opinion.
- Ignore the draft EIS and comment on the final EIS. Comments on the final EIS do not get a response.





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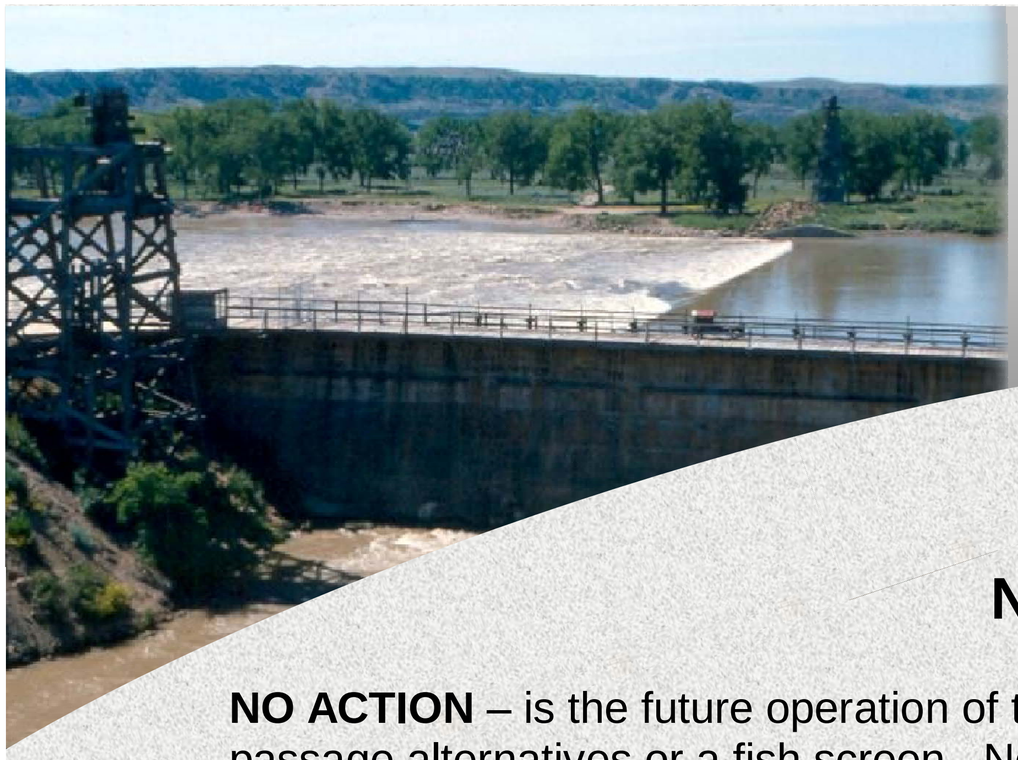


Alternatives

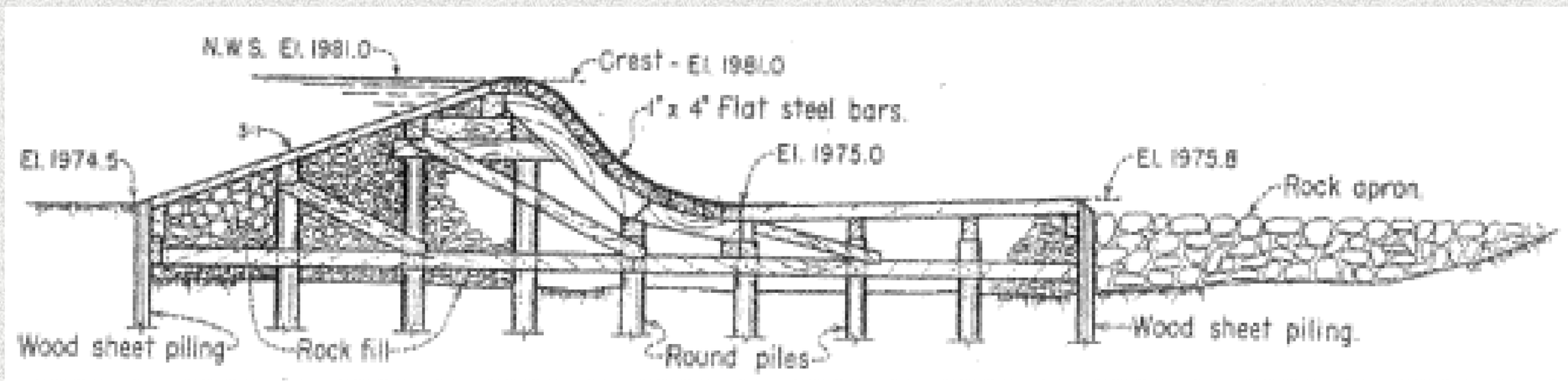
No-Action Alternative

NO ACTION – is the future operation of the Project without implementation of any of the proposed fish passage alternatives or a fish screen. No Action for this project means maintaining the diversion dam and continuing to operate the irrigation project as authorized.

The Intake Dam would continue to divert water into the irrigation system. 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.

Reclamation would be obligated by Section 7 of the Endangered Species Act to continue consultation with the U.S. Fish and Wildlife Service. Consultation would be on the effects to federally-listed species due to continued operation and maintenance of the Lower Yellowstone Irrigation Project.

Current Dam/ Weir Conditions



Original Design Plan View of Dam and Headworks

Alternatives

Alternatives Considered but Eliminated

Since 2000 many alternatives have been considered to improve passage and reduce entrapment of endangered pallid sturgeon and other native fish in the lower Yellowstone River. Two problems have eliminated many of these alternatives:

1) the challenge of identifying a passage alternative that works for pallid sturgeon, a bottom dwelling species, in a river the size of the Yellowstone and

2) engineering, construction challenges, and consideration of future operation and maintenance concerns related to the proposed modifications to the diversion dam and irrigation intake.

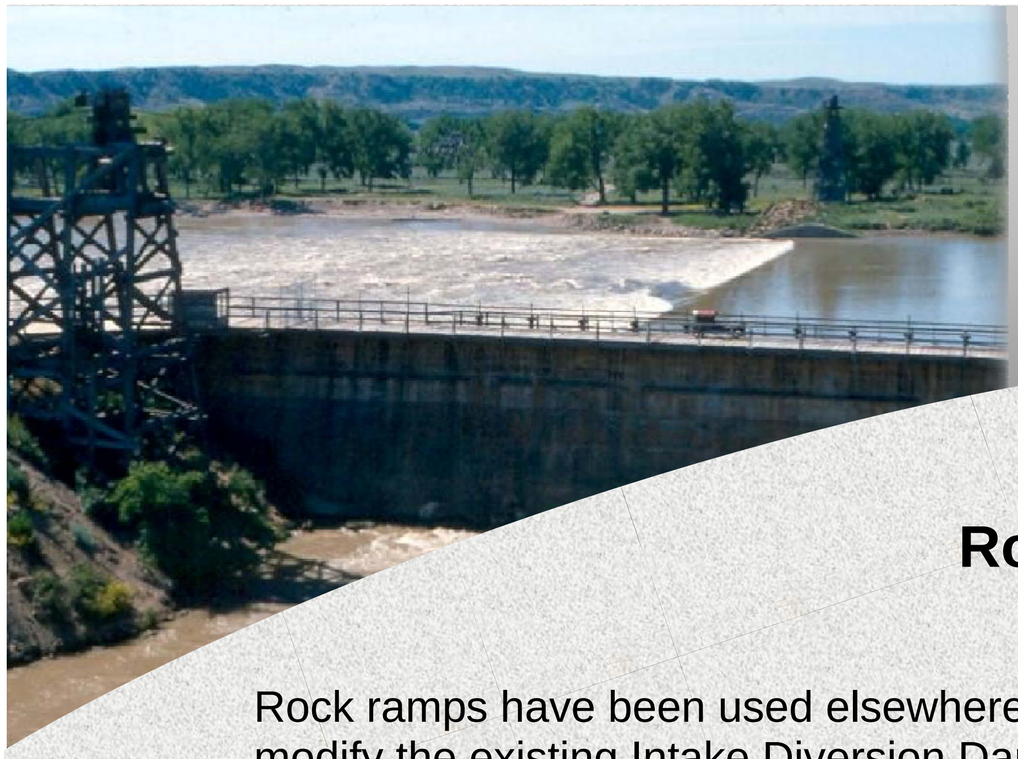
In 2005, a team of engineers and biologists examined a wide range of alternatives together. The study team started with 110 alternatives and pared the list down to 10, including the No Action Alternative.

Examples of alternatives that were considered and eliminated during the planning process include:

- catch fish and release them upstream of the dam;
- return the irrigation district to dry land farming;
- use irrigation wells as a irrigation water source rather than a diversion dam;
- pipe water from Fort Peck to supply irrigation;
- remove part of dam and convert the rest to an infiltration gallery (a sand bed in the river that collects water that can be pumped into the canal); or
- construct a seasonal dam to temporarily back up water for diversion into the canal.

The team identified four alternatives that merited additional study. The team recommended further study of a long, low-gradient channel, rock ramp; constructing a single pumping plant and removing the dam; and a widened fish ladder.

Meeting to develop and evaluate potential alternatives to address fish passage at the Intake Diversion Dam



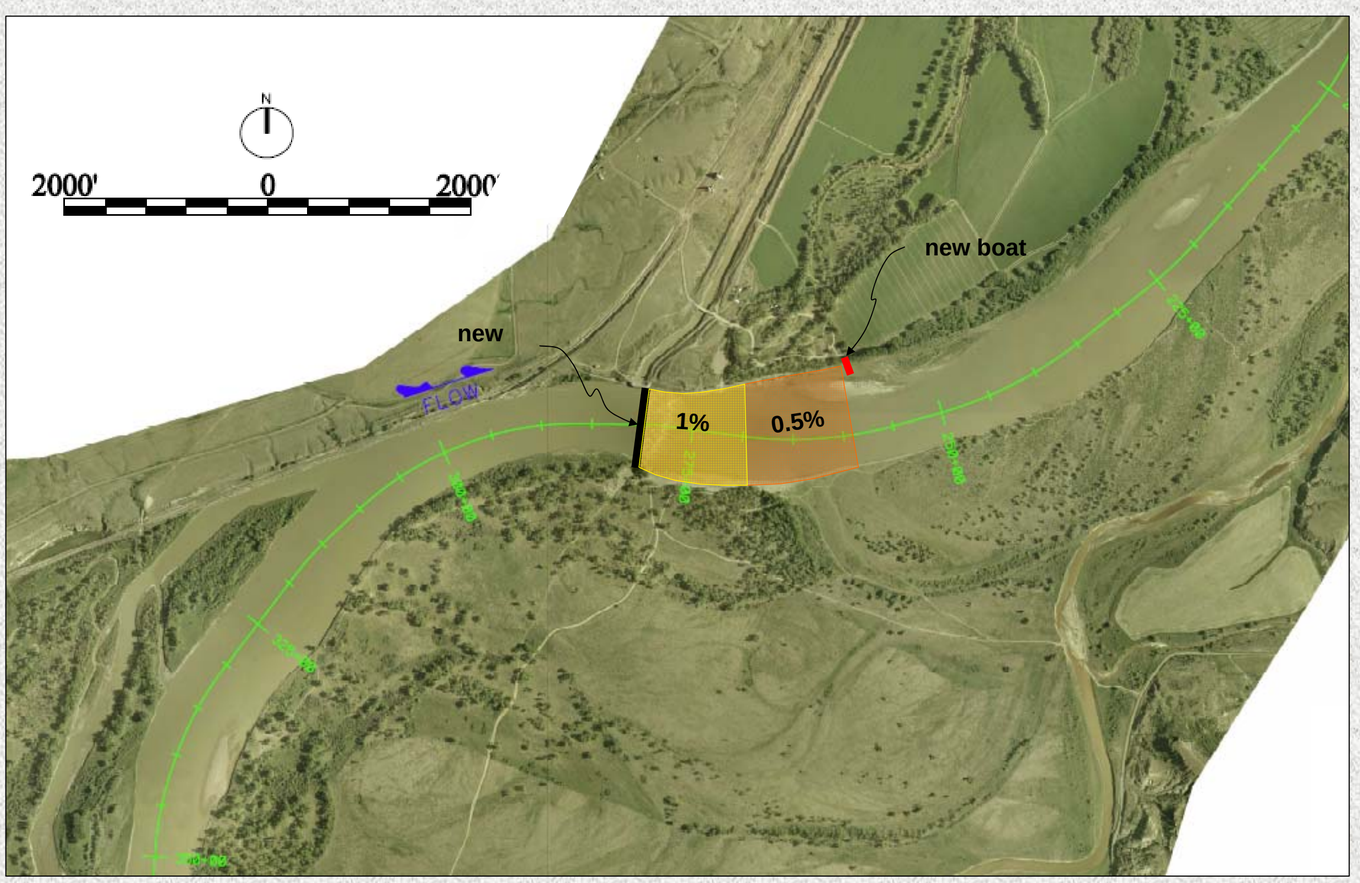
Alternatives

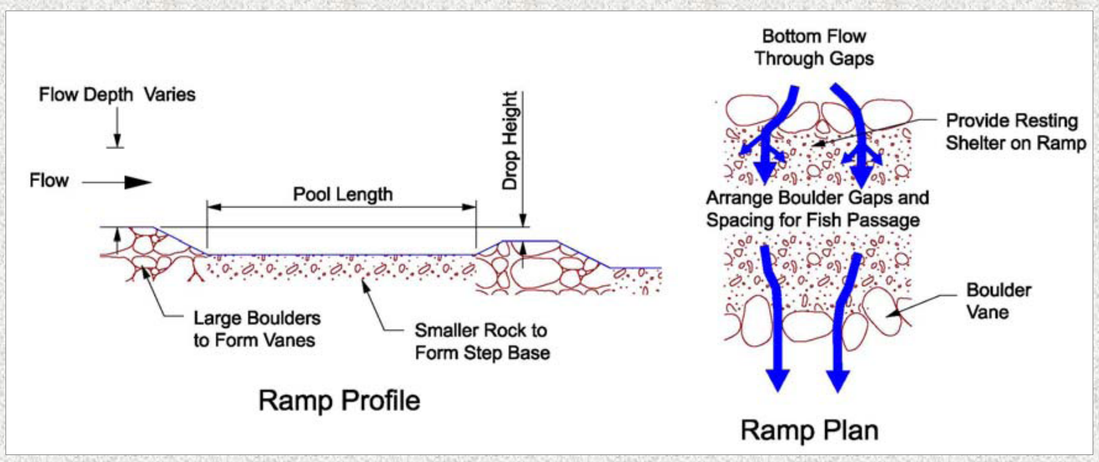
Rock Ramp Alternative

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. A riffle is a place in a stream where rushing water forms small rippled waves over rocks. The rock ramp would be designed to simulate natural riffles in the Yellowstone and Upper 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 smooth ramp is preferred by fish biologists. The rock ramp would be designed to meet velocity and depth criteria under a wide array of flow conditions. Several 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.

One of two options for fish screens would prevent fish entrapment in the canal. Removable rotating drum screens appear to be more feasible, but a V-shaped flat panel screen within the canal combined with a trashrack is also being considered (see fish screen exhibit for details).





Comparison of Rock Ramps with Various Slopes

Slope and Step Configuration	Approximate Ramp Length (ft)	Number of Steps	Average Length of Steps
Existing Dam, irregular rock debris displaced by high flows and ice (approximately 5-10% Slope)	100-180 depending on location	n/a	n/a
5% Slope Ramp, 1-ft drop	180	9	20
5% Slope Ramp, 0.5-ft drop	180	18	10
3.33% Slope Ramp, 1-ft drop	270	9	30
2% Slope Ramp, 1-ft drop	450	9	20
2% Slope Ramp, 0.5-ft drop	450	18	10
1% Slope Ramp, smooth	1,000	n/a	n/a
0.5% Slope Ramp, smooth	2,000	n/a	n/a

Alternatives

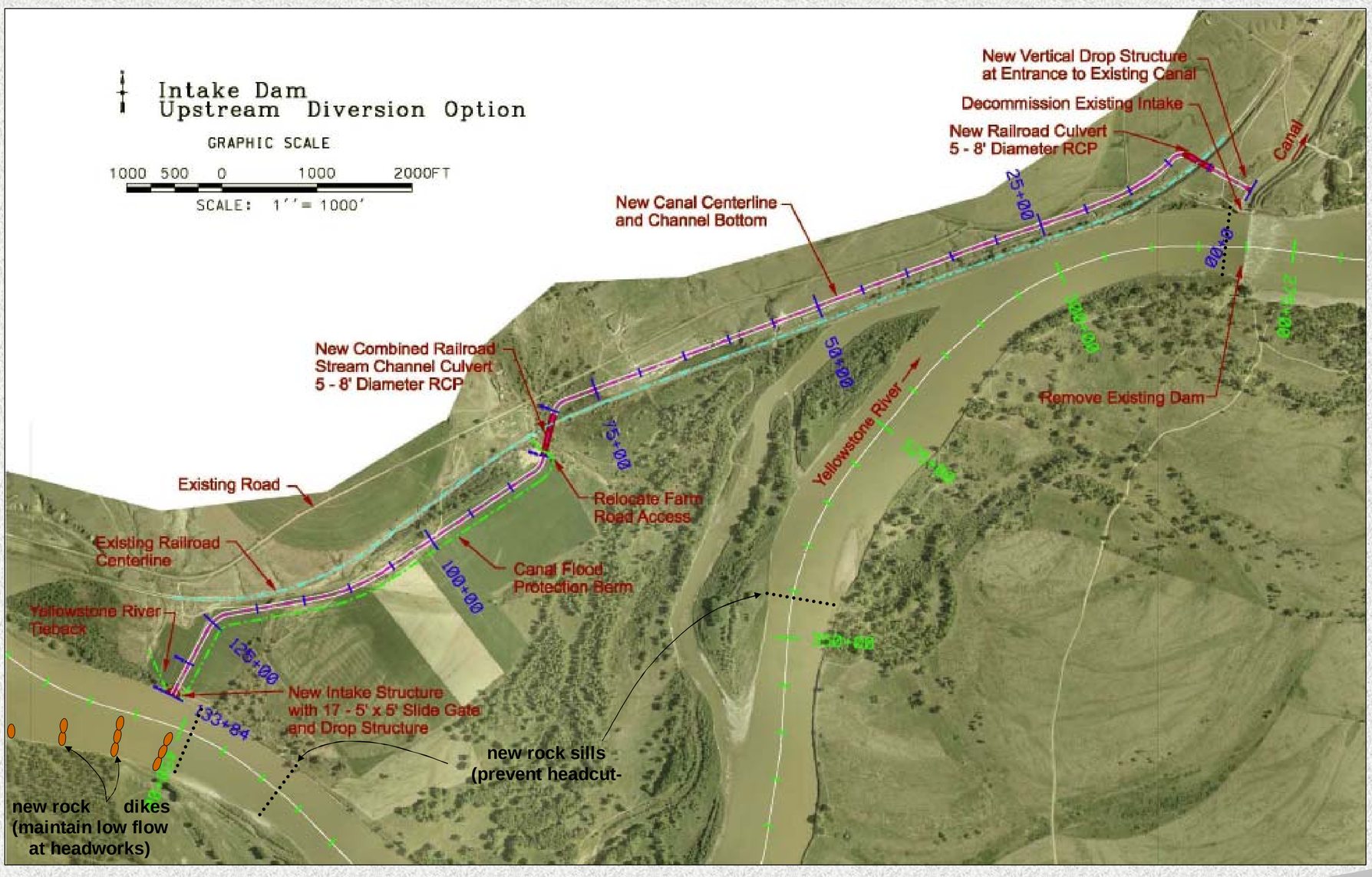
Relocate Diversion Upstream Alternative

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 to irrigation district to divert sufficient water to meet irrigation demands (maximum of 1,400 cubic feet 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 (river training dikes and revetment) 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 erosion after dam removal. During periods of extreme low flows or droughts it is likely that temporary weirs (low-head dam) or channel work would be necessary to maintain sufficient diversion capacity for the canal.

Either fish screen option would work, but removable rotating drum screens would be preferable.



Alternatives

Relocate Main Channel Alternative

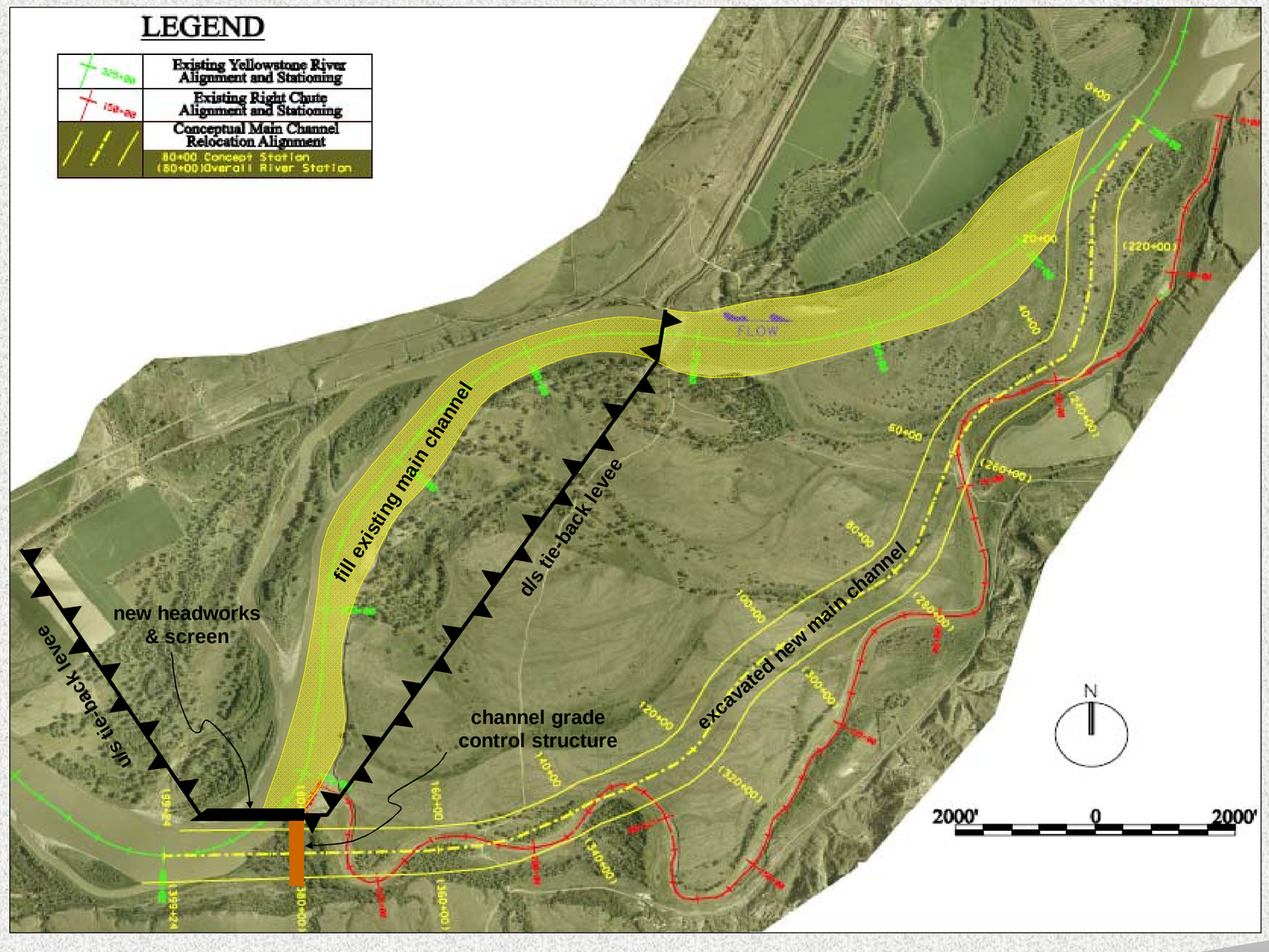
This alternative would relocate the main channel of the Lower Yellowstone River near Intake, Montana, to bypass the Intake Diversion Dam. It would approximately follow the alignment of an existing side channel. A newly constructed channel would carry Yellowstone River flows around the diversion dam. 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, the entrance to new channel would be elevated to maintain 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 one.

The new main channel would have several stabilized rock sills extending across its full width to prevent erosion, along with several other rock points and revetments to maintain shape, location, and function under a variety of flow conditions.

The former main channel would be used to deliver water to the Lower Yellowstone Project irrigation canal. Most of the former main channel would be filled; the remainder would convey flows to the canal for irrigation. 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.

One of two options for fish screens would prevent fish entrapment in the canal. Removable rotating drum screens appear to be more feasible, but a V-shaped flat panel screen within the canal combined with a trashrack is also being considered (see fish screen exhibit for details).



Alternatives

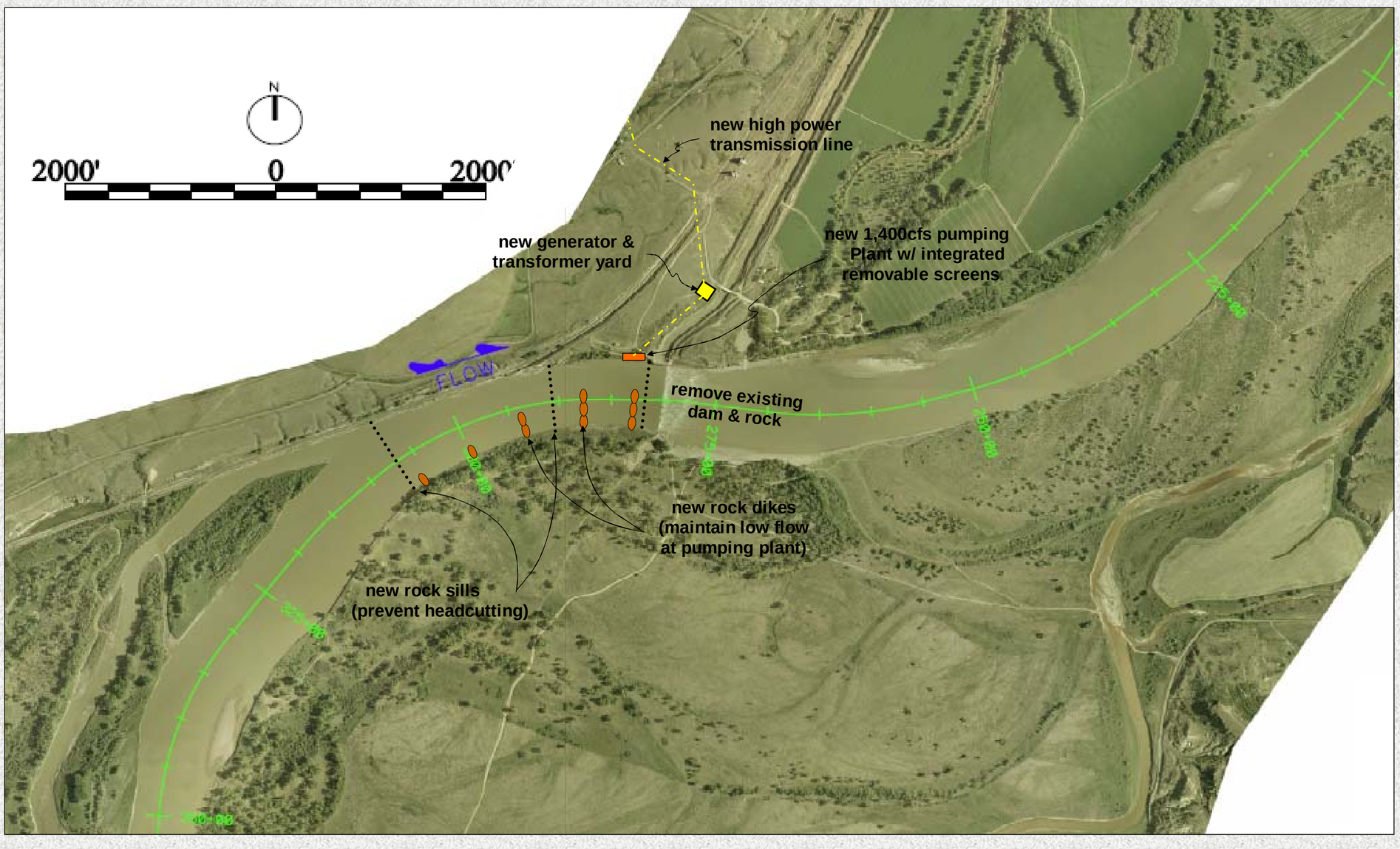
Single Pumping Plant Alternative

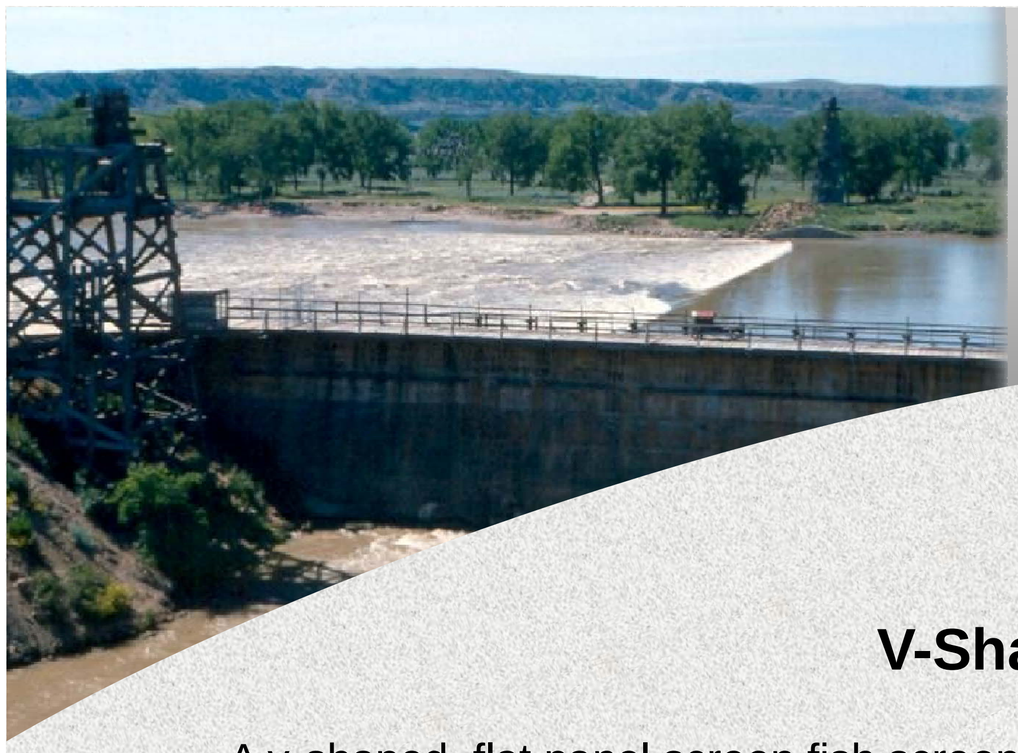
This alternative would remove the existing Intake Diversion Dam and replace it with a new plant with the capacity to pump 1,400 cubic feet of water per second into the irrigation canal. The plant would be constructed near the location of the existing intake and could pump water into the canal without 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. A minimum of 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 or droughts it is likely that temporary weirs or channel work 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 kW-hr/yr. 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).

Further development of the pumping plant concept and screen is currently underway, but may result in a customized screen different than the other alternatives.





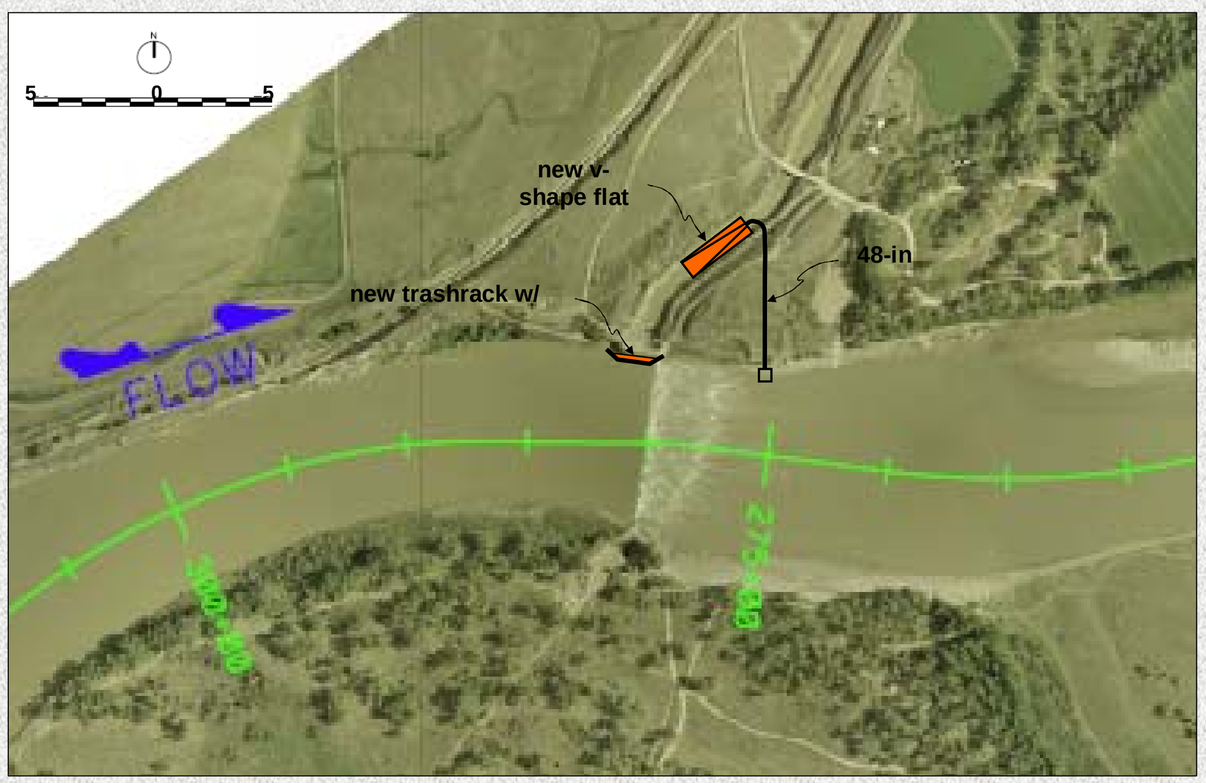
Alternatives

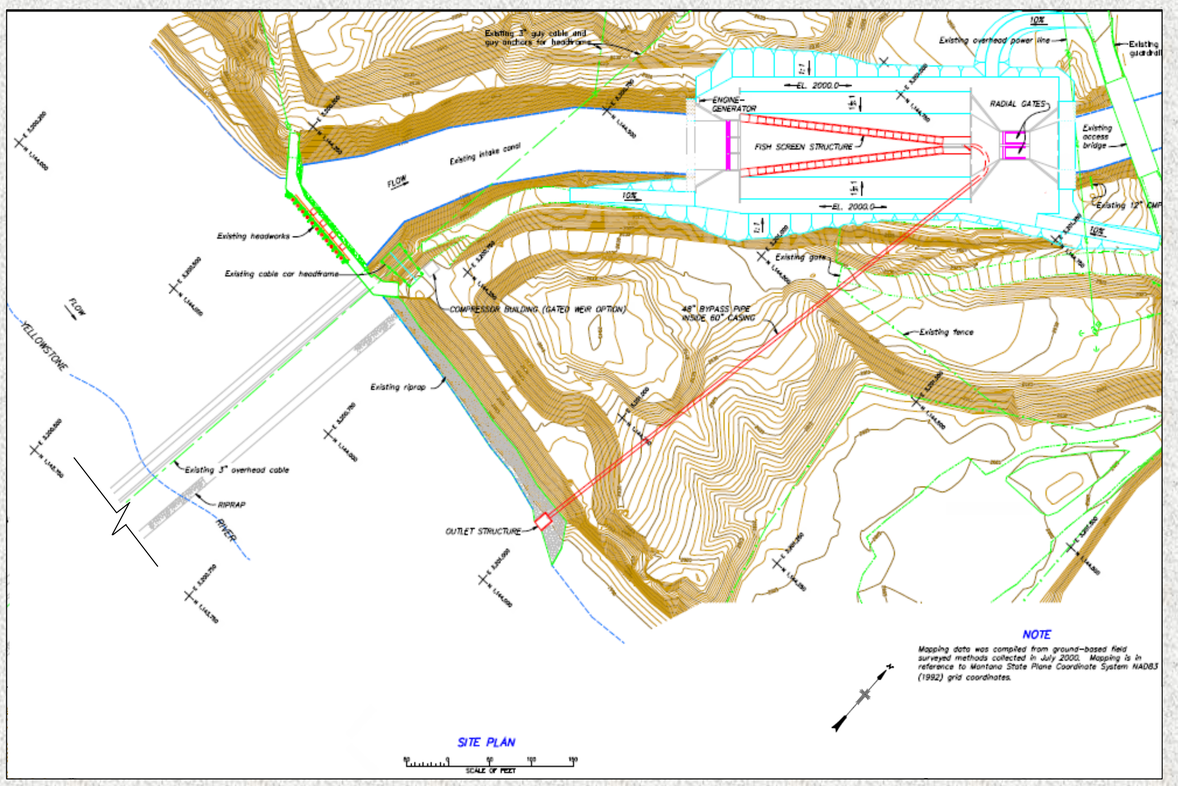
V-Shaped Fish Screen Option

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 forage 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 consists of parallel bars cleaned by a rake which slides in the grooves. It would block large debris and adult and 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-in bypass pipe would allow fish to swim back to the main river channel from the screen if they make it through the trash rack.

This option would probably work with all of the alternatives.





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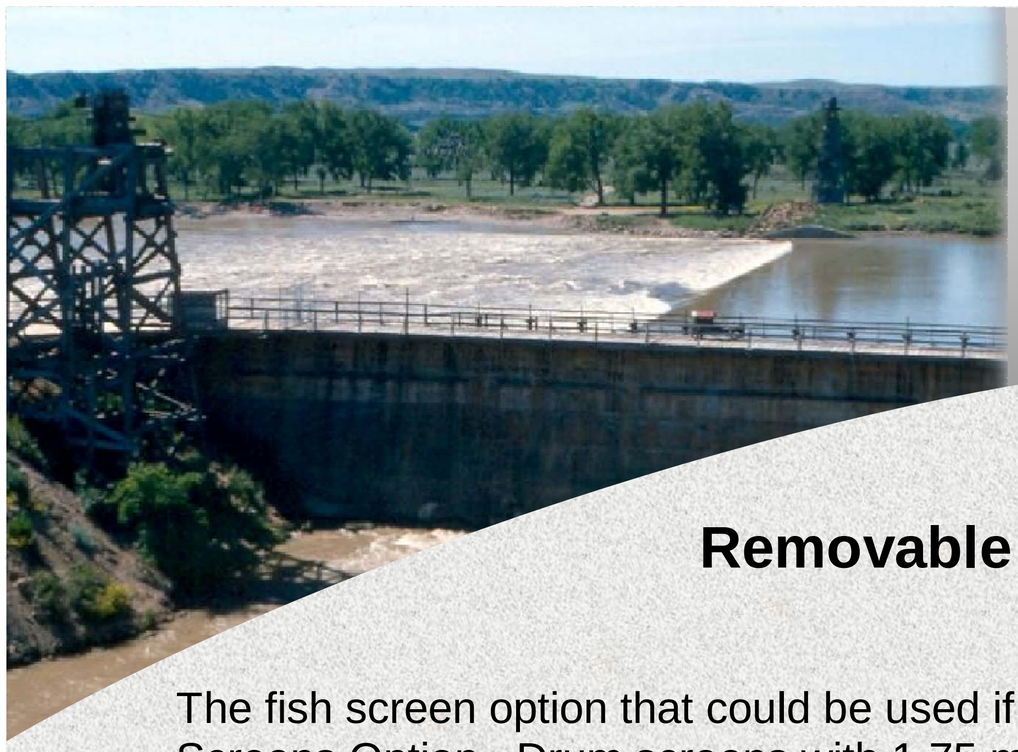
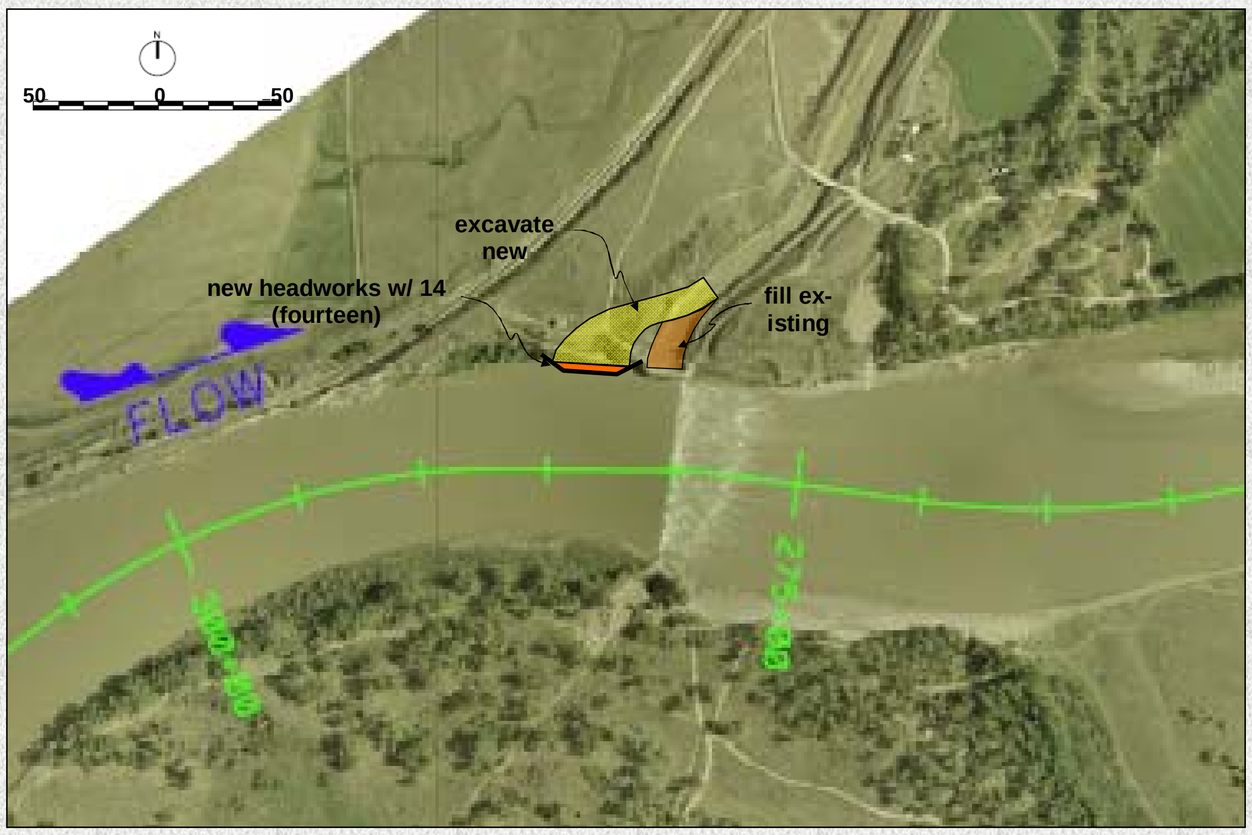


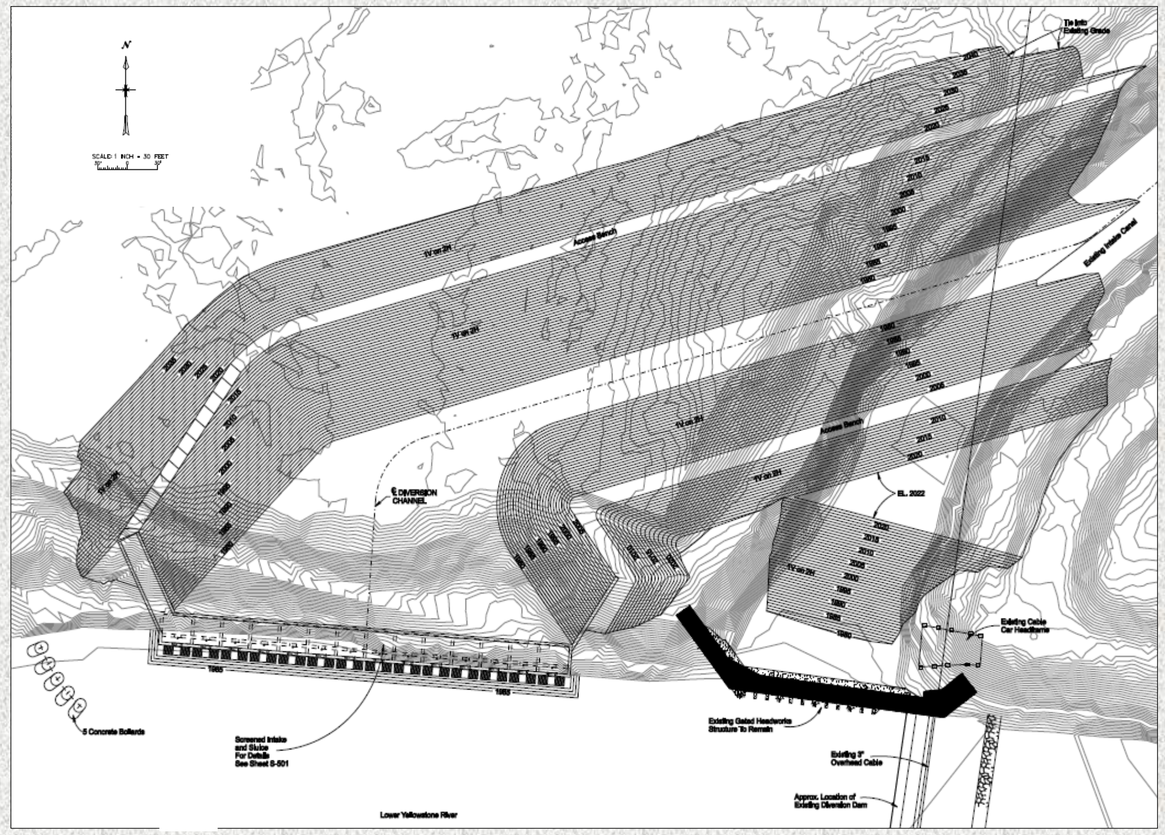
Alternatives

Removable Rotating Drum Screens Option

The 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 mm stainless steel wedge wire mesh would be installed on the riverside of the 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. 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 has fixed brushes on the inside and outside; the drum rotates against the brushes to prevent clogging. The manifold inside each screen connects 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. Because of simplicity, ability to remove individual screens for maintenance while canal operations continue, and eliminating the need for a separate trash rack and bypass pipe, this is the preferred fish screen option for most of the alternatives.






Priest Rapids Dam
Intake Screens, Inc.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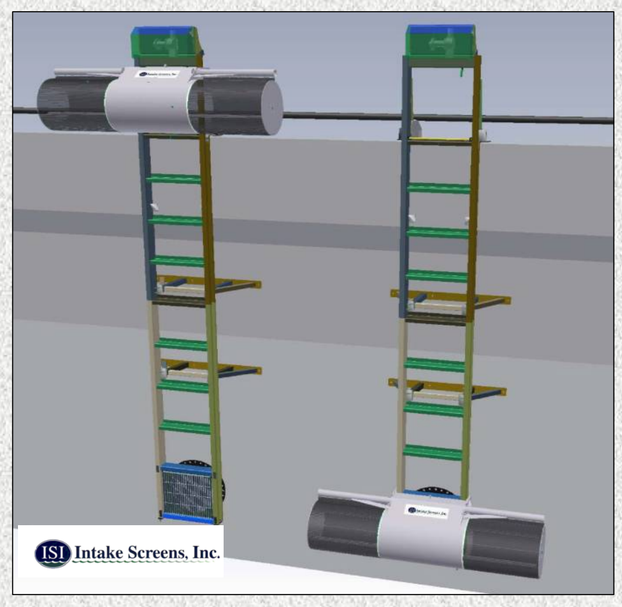

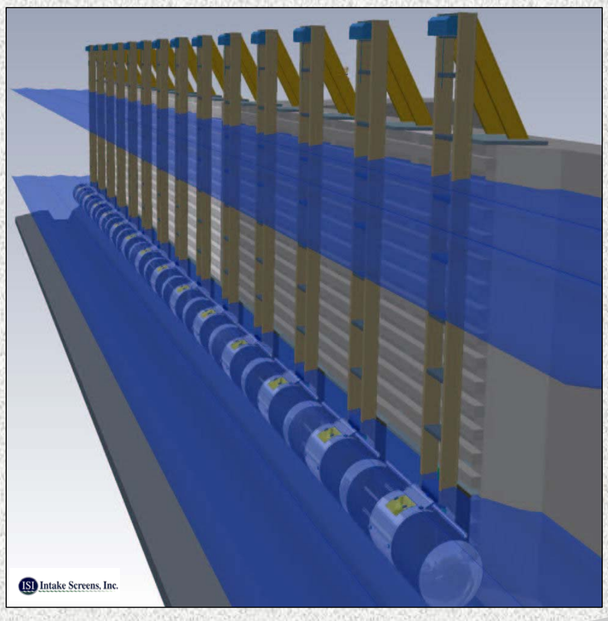

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