BUREAU OF RECLAMATION

St. Mary Diversion Dam Replacement Project

Environmental Assessment

Milk River Project – St. Mary Unit

Missouri Basin Region

Montana Area Office

US Department of the Interior **2023**

Mission Statements

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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St. Mary Diversion Dam Replacement Project Environmental Assessment

1. Introduction

The Bureau of Reclamation (Reclamation), Montana Area Office has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended and the Council on Environmental Quality's (CEQ) implementing regulations at 40 CFR 1500-1508. This EA examines the potential environmental impacts of replacing major components of the St. Mary Diversion Unit to meet the continuing demand for irrigation water for the Milk River Project and compliance with the Endangered Species Act (ESA).

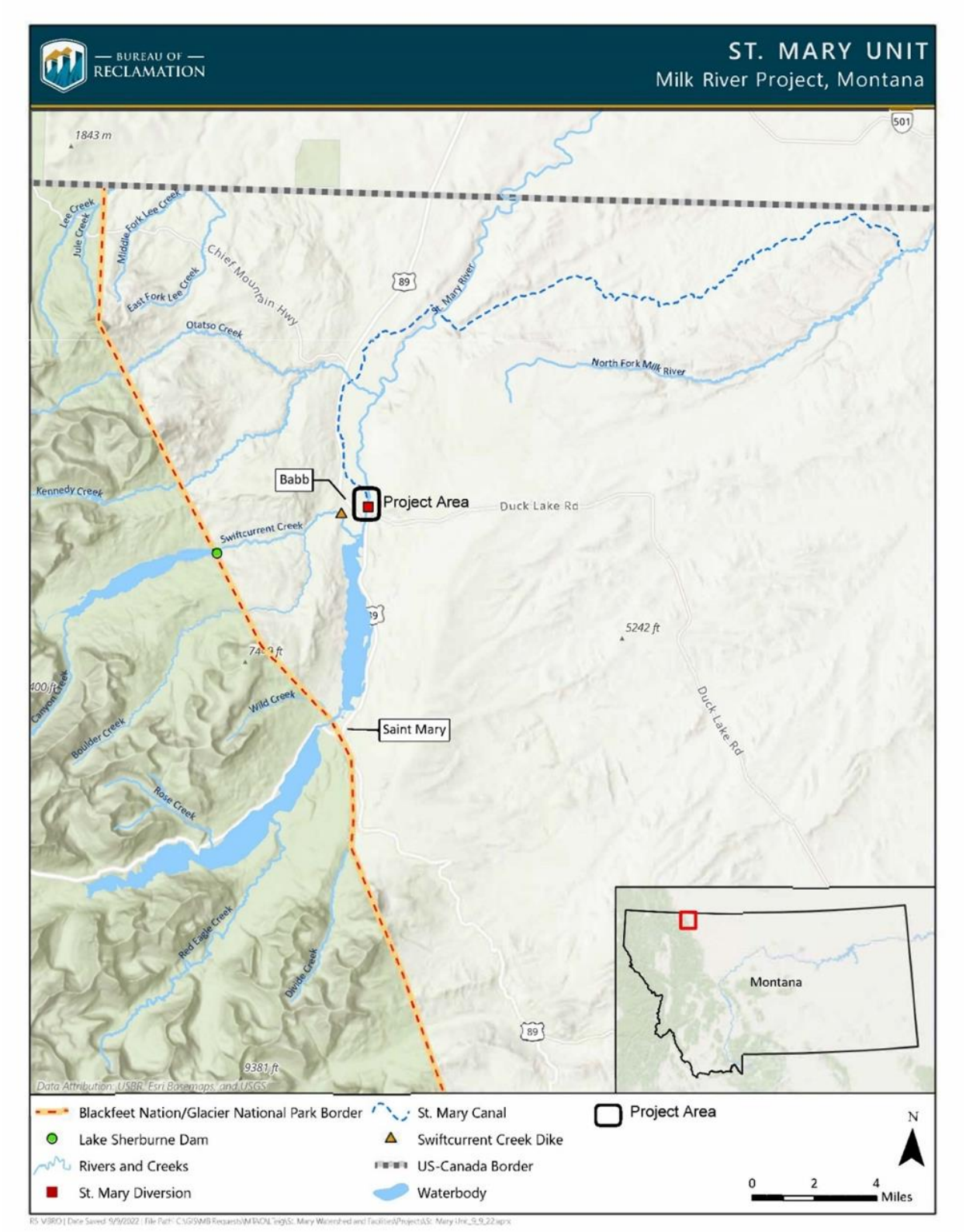
2. Project Location

The St. Mary Diversion Unit is part of Reclamation's Milk River Irrigation Project (Project) in north-central Montana. The Proposed Action is located within Section 27, Township 36 North, Range 14 West, Glacier County, MT, within the confines of the Blackfeet Indian Reservation.

3. The Milk River Project

Conditional approval of the Project occurred on March 14, 1903, by the Secretary of the Interior under the Reclamation Act (PL 57-161, 32 Stat. 388). Project features are Lake Sherburne, Nelson, and Fresno Storage Dams; St. Mary, Dodson, Vandalia, and Paradise Diversion Dams; Dodson Pumping Plant; 200 miles of canals; 219 miles of laterals; and 295 miles of drains. The Project diverts water from the St. Mary River into the North Fork Milk River to increase downstream flows, particularly during the late summer months. The increased flows produced changes in the agricultural, recreational, and socioeconomic structure of the Milk River Basin in northcentral Montana.

Figure 1: Project Location Map



3.1 The St. Mary Unit

In 1905, Congress authorized the construction of the St. Mary Unit which comprises the upper extent of the Project. Between 1906 and 1924, Reclamation built several water-control and delivery structures in the St. Mary River basin as part of the St. Mary Unit. The Milk River conveys water so that the United States (US) share of the St. Mary River can be utilized for irrigation in the lower portion of the Milk River basin in northcentral Montana (MT). Streamflow is divided between Canada and the US, following the 1909 Boundary Waters Treaty and International Joint Commission (IJC) 1921 Order.

Within the St. Mary Unit, Lake Sherburne Reservoir stores water behind Lake Sherburne Dam, and its outflow forms Swiftcurrent Creek. The Swiftcurrent Creek Dike, located downstream from the Swiftcurrent and Boulder Creek confluence, directs the collective flow into Lower St. Mary Lake near its outlet, the St. Mary River. The river carries the water downstream to the St. Mary Diversion Dam and Headworks where it is either diverted into the St. Mary Canal system and transferred to the North Fork Milk River or allowed to pass the St. Mary Diversion Dam, continuing downstream to Canada. The water then flows through Canada for 216 miles before returning to the US where it is stored in Fresno Reservoir, located west of Havre, MT.

3.1.1 St. Mary Diversion Dam

The St. Mary diversion works, located on the St. Mary River 0.75 miles downstream from Lower St. Mary Lake, consist of a 6-foot-high concrete buttress weir.

The eastern portion of the dam has a crest length of 190 feet. The western portion of the dam includes a six-bay, three-sluiceway segment with a total width of 56 feet. A 2-span abandoned truss bridge across the river sits atop the diversion structure. Portions of this bridge have been removed, while the remainder consists of rotted timber decking and is a safety hazard.

The diversion dam and canal headworks structures are both made of reinforced concrete and exhibit substantial freeze-thaw damage including exposed rebar and disintegrating concrete. Metalwork associated with the sluiceway gate, diversion slide gates, lifting stems, and guard railings has been repaired several times because of the harsh winter environment at the site. The probability of a dam failure is high due to the poor condition of the fixed weir concrete. Each year modifications and repairs are made to the facility to help reduce the risk of catastrophic failure of the structures.

Floating trees, stumps, and other debris hang up on the dam crest and piers, block the sluiceways, and often prevent the closure of gates. Debris removal is a major safety issue and increasing maintenance cost. Operational issues of the existing diversion dam include:

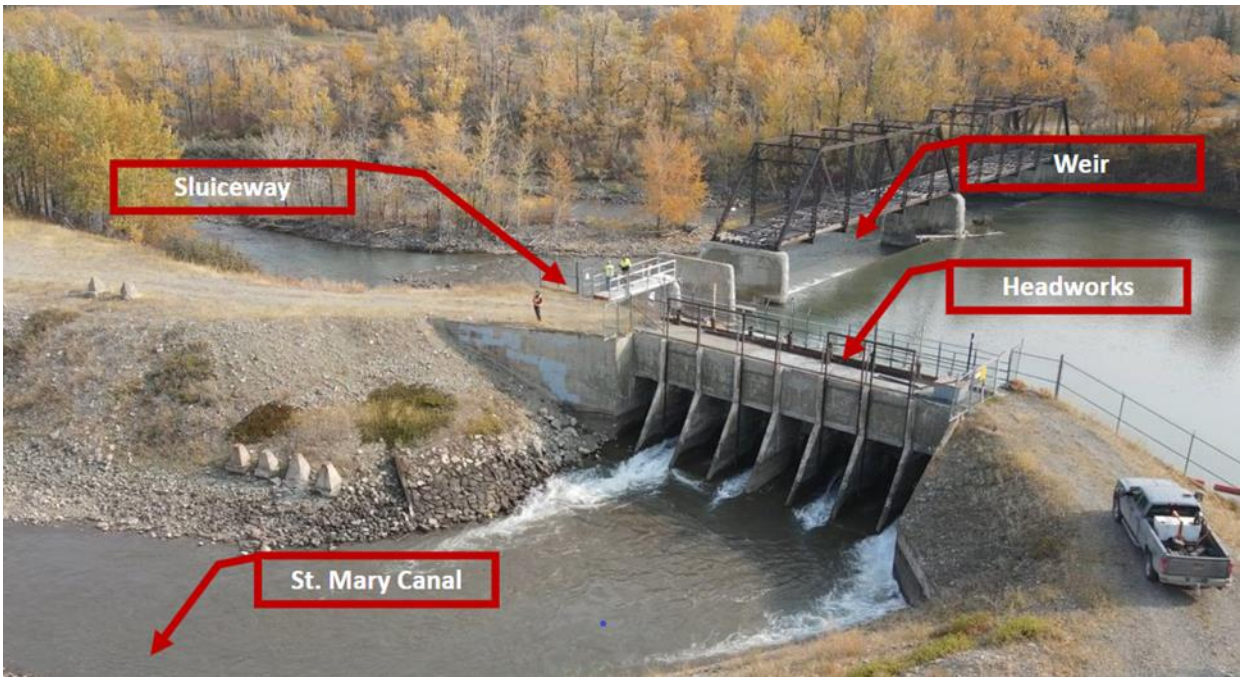
- Severe concrete deterioration.
- Stop logs can only be added or removed to the sluiceway by entering the river.
- Canal gates are partially submerged and tend to freeze shut.
- Prevents fish passage during the diversion period.
- Occasional mid-season trash removal.
- Requires manual monitoring and operation.
- Limited safety features.

3.1.2 St. Mary Headworks and Canal

The headworks for the St. Mary Diversion Canal are on the left bank (west) of the St. Mary River. The design of the 29-mile unlined, gravity-fed, St. Mary Canal allows for the conveyance of 850 cubic feet per second (cfs) at a flow depth of 9 feet. The diversion dam diverts water into the canal during the diversion period from March through September. During March and early April, river flow over 100 cfs is typically diverted. From June to August, diversions often reach 75 percent of total river flow, then decrease sharply in late August and September. During the non-diversion period, the sluiceways are opened, and the canal headgates are closed. Although originally designed to convey 850 cfs, the current condition of the canal limits diversion to a maximum of 650 cfs with current operations typically around 600 cfs. Operational issues of the existing canal headworks include:

- Manually monitored and adjusted throughout the season depending on desired canal flow.
- Headgates do not seal adequately in off season, resulting in leakage and ice issues.
- Concrete deterioration.
- Fish are entrained in the canal.
- Trash buildup.
- Limited safety features.

Figure 2: St. Mary Diversion Dam and Canal Headworks



3.1.3 Boundary Waters Treaty & 1921 Order

The Boundary Waters Treaty governs division of the waters of the St. Mary River and specifies the proportion of the natural flow to which Canada and the US are entitled. The IJC Order, dated October 4, 1921, gives general procedural guidelines for determining natural flow.

Canada's share of the St. Mary River at the international boundary, as stipulated in the 1921 Order, is three-fourths of the natural flow when the flow is 666 cfs or less during the irrigation season (April 1 to October 31). Flow over that quantity is divided equally between Canada and the US. The flow is divided equally between the two countries during the non-irrigation season (November 1 to March 31).

To comply with the IJC 1921 Order, representatives of both countries make twice-monthly computations of the daily natural flow of the St. Mary River to determine the flow apportionment during the irrigation season. These 15- or 16-day "division periods" provide an opportunity for each country to respond to varying use and flow conditions. For example, if use by the US is more than its share during a division period, then a surplus of an equivalent volume of water is delivered to Canada.

3.1.4 Water Rights and Contracts

Reclamation holds water right 40T-40955-00 for 850 cfs to provide beneficial use by irrigation districts, individual users, and municipal use within the Milk River Project area. The enforceable priority date for this Reclamation-owned water right is May 29, 1912. The water made available by this water right (State of MT, DNRC, 1912) is diverted to storage and subsequently used through contracts with third parties or used for incidental, non-consumptive purposes.

Water diverted to the St. Mary Canal irrigates approximately 120,000 acres on eight irrigation districts (Fort Belknap, Alfalfa Valley, Zurich, Paradise Valley, Harlem, Malta, Dodson, and Glasgow), individual river pumpers, as well as to communities along the Milk River (Havre, Chinook, Hill County, and the Fort Belknap Agency) and the Bowdoin National Wildlife Refuge. The water is utilized for irrigation, drinking water, recreation, wildlife habitat, and is considered the "Lifeline of the Hi-line."

3.1.5 Blackfeet Water Rights Settlement Act

The Blackfeet Water Rights Settlement Act of 2016 (PL 114-322, Stat. Dec. 16, 2016) authorizes, ratifies, and confirms the water rights compact between the Blackfeet Nation and Montana. The Act relates to the Blackfeet Nation's water rights in the Milk River, Milk River Project, St. Mary River, instream flow rights, and rights in Lake Elwell and any water rights arising out of state law. The legislation authorized funding to the Blackfeet Tribe to provide clean drinking water and other water-related infrastructure projects to improve the health, safety, and welfare of the Tribe.

3.1.6 Bull Trout

In 1999, the U.S. Fish and Wildlife Service (Service) listed bull trout (native to the Saint Mary River) as a threatened species. The Service concluded that bull trout are negatively impacted by the Diversion Dam creating a passage barrier and entrainment of fish in the canal. The current dilapidated structural components of the dam and, the lack of fish passage and screening are the main concerns for the dam replacement and modification project.

3.1.7 Project Design - St. Mary Diversion Dam Physical Scale Model

Reclamation constructed a 1:12-scale physical hydraulic model of the St. Mary Diversion Dam Facility to examine the hydraulic performance of the proposed replacement of the existing facility. The efficacy of any fish passage structure, device, facility, operation, or measure is highly dependent on local hydrology, target species and life stage, obstacle orientation relative to the stream, facility operation, and other site-specific considerations. The model study examined hydraulics and operational performance of the following:

- Effectiveness of the dam structure for passing the maximum design flow rate of 10,000 cfs, while maintaining a stable riverbed downstream of the dam - not to exceed historical maximum upstream reservoir water surface elevations.
- Effectiveness of the sluice bays and gates for passing sediment and floating debris downstream.
- Maximum river flow rate that can pass through the sluice bay without inundating the headworks.
- Uniform approach velocity distributions along the fish screens, with approach velocities, perpendicular to the screen face, that are less than or equal to 0.80 ft/sec.
- Baffling techniques and/or other structures or modifications needed to achieve acceptable velocity distributions across the fish screen.
- Evaluation of the screening bay for eddies or recirculation zones where fish might hold.
- Rock ramp hydraulics to ensure the ability of fish to pass over the diversion dam.
- Low-flow channel for fish attraction and passage.
- Potential for fish to be entrained into the canal headworks as they exit the low-flow channel.

Potential for fish to be entrained into the canal headworks as they exit the low-flow channel. The model study was performed in close cooperation with the design engineers, with the primary objectives of verifying the hydraulic performance of the project features and assisting the designers with the layout of the dam, rock ramp, low flow channel, fish screen and other appurtenant structures.

Rating curves were developed for the dam structure with no diversion flow and with canal diversion flow rates of 600 and 850 ft^3/sec. Hydraulic conditions along the fish screen were evaluated to ensure the adequacy of the fish screen for the protection of juvenile bull trout, a threatened species. Approach velocities were set less than or equal to 0.8 ft/sec (NMFS 1997) using baffles located 0.75-ft behind the screen face set at 25% open area for screens 1-10, 20% open area for screens 11-20 and 17.5% open area for screens 21-30. Fish are bypassed back to the river through a bypass channel with a flow of approximately 40 ft^3/sec.

During non-irrigation season all flow is passed through the off-season sluice channel on river left. Up to 400 ft^3/sec can pass through the sluice channel without overtopping the entrance sill of the trash rack. Stop log slots are also available to provide sluicing of up to 750 ft^3/sec when the stop logs are installed. Velocities on the left side of the sluice channel (nearest the trashrack) are higher

than those on the right due to the curvature of the river upstream of the sluice, creating multiple passage routes for upstream migrating fish.

During diversions, approach velocities upstream of the trashrack remain below the 2 ft/sec design velocity. Gate operations were evaluated for diversion flow rates of 600 ft^3/sec and 850 ft^3/sec (640 ft^3/sec and 890 ft^3/sec through the headworks when the bypass is considered). It is recommended that at least four gates be operated at a time for the 600 ft^3/sec diversion and at least six gates open for the 850 ft^3/sec. In emergency situations a minimum of two gates can be used for a 600 ft^3/sec canal diversion and a minimum of three gates can be used for 850 ft^3/sec canal diversion, approach velocities along the fish screen with the minimum gates open will not be uniform.

Velocities and flow patterns down the rock ramp are in a range that should allow most species of fish to find a passage route over the diversion dam. The low flow channel of the rock ramp will be completely grouted and provide passage routes for all species up to about 125 ft^3/sec with a maximum velocity of 4.4 ft/sec. The rock ramp should allow successful passage up through 10,000 ft^3/sec where velocities can be as high as 19.2 ft/sec but vary across the entire rock ramp due to the roughness of the rock and slight irregularities in the ramp surface.

The rock ramp provides a more natural environment that spans the full width of river. Fish are not required to find a small concrete opening, but instead have full channel passage during normal and higher flows. During periods of low-flow, adequate depths, velocities, and refuge are ensured within the fully grouted Low-Flow Fishway that extends the full length of the ramp to the downstream thalweg of the river. Similarly, rather than a small opening at the exit and near the canal headworks, the full-channel width of the rock ramp should reduce the incidents of falling back and entrainment of ascending fish.

4. Proposed Federal Action

Reclamation, Montana Area Office, proposes to replace the St. Mary Diversion Dam and Canal Headworks with a low-head diversion dam and rock ramp with a low flow channel, a new headworks structure, an in-canal fish screen, and a fish bypass to return entrained fish to the river. The proposed action includes the modernization of facilities to include O&M control buildings, and appurtenant structures critical to project operations.

This EA includes an assessment of the effects that could reasonably be expected should Reclamation implement the Proposed Action. This EA identifies measures to help minimize potential environmental effects caused by the Proposed Action. Fieldwork and resource mapping conducted to evaluate conditions within the Proposed Action area are focused on the existing features and the proposed new features. The land included in the corridor where fieldwork and resource mapping occurred is referred to in this EA as the project area.

5. Purpose and Need

Under NEPA, an EA "shall briefly specify the underlying purpose and need to which the agency is responding" with the Proposed Action (40 CFR 1502.13). The St. Mary Unit facilities have been in operation for over 100 years with only minor repairs and improvements. The facilities are at the end of their expected service life and require replacement. Maintaining the key features of water infrastructure is increasingly costly over time due to the need for facility rehabilitation, replacement, and extraordinary maintenance. In addition, the only population of threatened bull trout on the east side of the Continental Divide can be found within the project area.

The purpose of the Proposed Action is to continue the viable and effective operation of the St. Mary Unit of the Project, to improve fish passage for bull trout and other native fish, and to prevent fish entrainment in the St. Mary Canal.

The proposed action is needed to:

- Replace aging infrastructure to ensure continued delivery of St. Mary Unit water to Milk River Project water users, as authorized.
- Provide passage for bull trout (*Salvelinus confluentus*) and other native fish species at the St. Mary Diversion Dam and prevent entrainment in the St. Mary Canal.

6. Alternatives

The NEPA §102(2)(E) directs Federal agencies to "study, develop, and describe appropriate alternatives to recommend courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." This EA evaluates alternatives developed as a part of a planning study consistent with the Department of the Interior Agency Specific Procedures for implementing the CEQ principles, Reclamation directives and standards, local agency guidance, applicable environmental laws, executive orders, and policies. This section describes all practical and reasonable alternatives developed to meet the purpose and need, as previously described.

6.1 No Action Alternative

The No Action Alternative serves as a baseline from which to measure benefits and impacts to the human environment that may occur because of the Proposed Action Alternative. The baseline refers to the existing condition, including past, present, and ongoing activities or actions in the project area. This includes the original construction of the St. Mary Diversion Dam that occurred in 1915 to present-day activities; either natural or anthropogenic.

Under the No Action Alternative (future without project), there would be no changes to the dam or headworks or how they are operated. There would be no construction of new facilities. The existing diversion dam would continue to provide irrigation water so long as it remains intact. Reclamation would continue to make repairs requiring continual high maintenance and expenses to the water users. The consequences of taking No Action could result in the failure of the existing

structures. Failure would result in the inability of the St. Mary Unit to operate under its intended purpose. With no St. Mary River water, a loss of storage capacity would occur in Fresno Reservoir and the Milk River basin could not support irrigation at the present level.

The No Action Alternative would not meet the requirements of ESA. Fish would continue to be entrained in the canal and limited upstream and downstream passage in the river would continue to affect bull trout and other native fish species. Reclamation would continue consultation with the Service for the ongoing effects of the St. Mary Unit on bull trout in the St. Mary River basin.

6.2 Proposed Action Alternative

Under the Proposed Action Alternative, the existing St. Mary Diversion Dam and Canal Headworks would be replaced with modern structures designed to maintain the authorized Project purposes, provide fish passage at the St. Mary Diversion Dam, and prevent fish entrainment in the St. Mary Canal. This Alternative would require a five-year construction period while maintaining canal operations during the construction process.

The main features of the project are a low head diversion dam (broad crested weir) and rock ramp for upstream fish passage, new headworks structure, canal fish screen, check structure downstream of the fish screen, fish bypass to return fish to the river, O&M control buildings, and auxiliary features. The following activities would facilitate the Proposed Action:

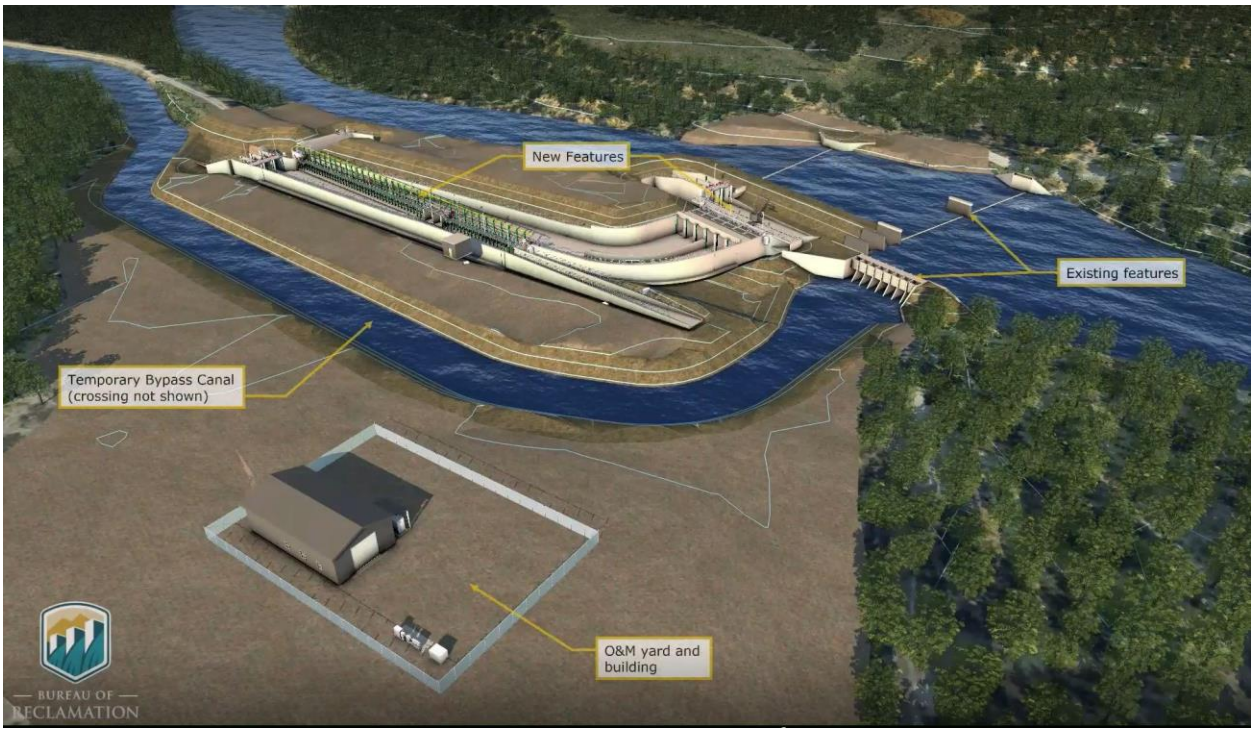
6.2.1 Temporary Construction Features

Cofferdam and Dewatering System: Construction of the St. Mary Diversion Dam replacement would require one cofferdam in the river channel and a dewatering system. The cofferdam and the dewatering systems are interdependent and rely on each other for success. The cofferdam design is undetermined but would likely consist of some combination of earthfill and geomembrane with armoring or sheet piles. The system would need to pump approximately 33 cfs (14,800 gallons per minute) to draw down the water for the concrete placements of the new headworks and diversion structures. Electrical power would be required for operation of unwatering systems on 24/7 timeframe. Construction sequencing assumes one cofferdam for major features. The dam, rock ramp, and retaining wall would be constructed during low flows in the "wet." Small super sack walls would be utilized as needed.

The cofferdam would be installed during year two of construction and is proposed to remain in the river for up to 16 months to allow for site preparation and construction of the canal and headworks structures.

Temporary bypass channel and crossing: A temporary bypass channel would be constructed adjacent to and west of the existing canal to allow for the continued delivery of water during the five-year construction period. The crossing would allow for access to construction areas. Features would be removed following construction.

Figure 3: Temporary Bypass Channel



Managing the River During Construction: One challenge of St. Mary Diversion Dam removal and replacement is that downstream water deliveries through the canal are mandatory during construction. In addition, the river would need to be manipulated within the existing channel by using an earthen cofferdam during the construction of the new headworks and associated features.

The following restrictions would be in place:

- Irrigation diversion must be maintained throughout construction, typically from April 15th to October 15th each year.
- The existing sluiceway would provide fish passage at the existing dam during the non-diversion period. Timing and duration of cofferdam placement would be limited to allow fish passage.
- For fish passage, minimum flow depths along the length of the in-river cofferdam shall be a minimum of six inches for flows of 150 cfs and higher.
- In-water activities include cofferdam construction, in-water excavation, and concrete placement in the wet, etc. cannot occur from December 31 to July 15.
    - The only exception would include maintenance/emergency repairs of the cofferdam (year 2 through 4).
- Any in-river cofferdam construction or other work that blocks flow through the existing sluiceway shall not remain in place longer than 16 months unless provisions are made for alternate fish passage.

- Alternate passage would include notching the existing diversion dam to allow fish passage during the non-irrigation season.

Staging Areas: Locations proposed for staging and stockpiling, borrow areas, and haul roads would be in areas with gentle slopes where erosion potential is slight. Use of the borrow areas would result in disturbance to topsoil and alluvial materials, both of which were previously disturbed during original construction of the dam.

Removal of the Existing Diversion Dam and Canal Headworks: All concrete and reinforcement on the existing structures would be demolished and removed up to 1.5 feet below final grade. Demolition would not occur on the dam or headworks until the new features are in place and ready for diversion.

Figure 4: Existing Features to be Removed

6.2.2 Permanent New Features

Concrete diversion dam rock ramp with low flow channel: The diversion dam would consist of a concrete broad-crested weir (low head dam) and rock ramp with large boulders and riprap placed on a slope from the top of the weir to the downstream natural grade to emulate the river. This would provide fish with a more-natural, channel-like connection to upstream habitats while minimizing channel scour and safely dissipating downstream energy. The low flow channel allows for energy dissipation and fish passage. This design provides passage to a wider variety of life stages and fish species.

The upper portion of the ramp surface would be grouted and designed to withstand and pass large flows with minimal structural damage. Large boulders (30-inch minus angular or rounded stone) would be placed to provide a roughened-channel design to offer bull trout and other fish full-river passage during high flows.

Velocities and flow patterns down the rock ramp are in a range that should allow most species of fish to find a passage route over the diversion dam. The low flow channel of the rock ramp would be completely grouted to provide passage routes for all species up to about 125 cfs with a maximum velocity of 4.4 ft/sec. The rock ramp would allow successful passage up through 10,000 cfs where velocities can be as high as 19.2 ft/sec but vary across the entire rock ramp due to the roughness of the rock and slight irregularities in the ramp surface.

The new rock ramp, diversion dam, and retaining wall would be constructed intermittently during low river flows without the use of a cofferdam and dewatering system. This construction would require access the river to allow a concrete pump truck, and other necessary equipment for installation of concrete. Barriers such as supersacks may be used to block flow in some areas during concrete placement and would also mobilize fine sediment.

Figure 5: Features of the New Construction

Sluiceway with radial gates: During the non-irrigation season all flow is passed through the off-season sluice channel on river left. The two identical 10-foot-wide by 14-foot-tall radial sluiceway gates would provide up to 400 cfs through the sluice channel without overtopping the entrance sill of the trash rack. Velocities on the left side of the sluice channel would be higher than those on the right due to the curvature of the river upstream of the sluice, making multiple passage routes for upstream migrating fish.

Headworks with slide gates and transition flume: The new canal headworks would include a six-gate intake. The headworks gates would be automated to provide required diversion flows depending on the river water surface elevation. The flume provides a downstream transition from the headworks to the fish screen structure and directs flows into the canal.

Figure 6: Fish Screen, Fish Return, and Check Structure

Fish screen, fish return, and check structure: Federal governance of fish screening criteria is dictated by the Endangered Species Act, Federal Power Act, and Fish and Wildlife Coordination Act. There is no universal set of fisheries criteria; these vary by species, life stage, region, and season. The following biological characteristics were evaluated when developing the fish screen design:

- Target species for fish passage or screening.
- Migratory timing and life history stage at migration.
- Physical limitations on fish passage (swimming speed, jumping ability).
- Environmental attractors and stressors (flow volumes, flow velocity, water temperature, seasonal timing).
- Behavioral characteristics that could affect fish passage (water temperature preferences and avoidances).

The 330-ft long (285-ft screened) flat plate fish screen system would be constructed within the canal prism and route fish entering the canal to a fish bypass and return them to the river. This bypass requires approximately 40 ft^3/s of flow to return fish to the river. Fish screen velocity criteria are as follows:

- The approach velocity must not exceed 0.80 ft/sec for active screens, which is the criteria for fry sized fish.
- The screen design must provide for nearly uniform flow distribution over the screen surface. Uniformity of approach velocity is defined as being achieved when no individual approach velocity measurement exceeds 110% of the criteria.
- Screens must have a sweeping velocity greater than the approach velocity.

The fish return structure is designed to return fish that enter the canal system back into the river to continue their function as part of the river ecosystem. The fish return would transition into an open channel that would tie into the St. Mary River where fish could exit downstream. The outfall is located and designed to minimize avian and aquatic predation in areas free of eddies, reverse flow, or known predator habitat. The overshot gate would act to provide a constant flow back to the river with a minimum depth of 18 inches for between 95% and 5% exceedances.

Table 1: River Flow

Season	95% Exceed. (Ave)	5% Exceed. (Ave)
Winter	50 cfs	250 cfs
Spring	1,000 cfs	2,500 cfs
Summer	1,500 cfs	4,000 cfs
Fall	150 cfs	1,000 cfs

The check structure would be located downstream of the fish screen to regulate water levels and canal flow and provide maximum water depth at the screens. The check structure would have a total of three radial gates, measuring 14 ft by 10ft.

O&M building and appurtenances: The O&M control building would house the diversion dam controls and monitoring system equipment.

- Monitoring system
- Radial gate actuators
- Fish return overshot gate actuator
- Sluiceway radial gate actuators
- Headworks structure slide gate actuator

7. Affected Environment and Environmental Consequences

This section describes the baseline conditions and potential impacts on resources that may be affected by the St. Mary Diversion Dam replacement project. The affected environment provides an overview of the existing communities, land, water, and biological resources in the project area, and the potential environmental consequences of the Proposed Action. Only those resource areas that would potentially be affected by the Proposed Action are discussed in detail.

The area of potential impacts (affected area) is resource-specific and is defined in each resource discussion. The boundary of the affected area for each resource extends to where effects can be reasonably and meaningfully measured. Each Alternative is comparatively evaluated against each environmental resource to describe potential impacts. Direct impacts would generally occur within the project area footprint; however, some impacts (indirect) may occur on a broader scale.

The St. Mary Unit lies within the crossroads of the Great Plains and Northern Rocky Mountain ecosystems in northwest Montana, on the east side of the Continental Divide and within the Blackfeet Reservation. This area provides a vast array of physical and biological features which include, but are not limited to hydrologic characteristics, soil types, geological features, vegetation types, species richness, and other features. The ecosystems here are valuable because of their location near headwaters, concentration, quality, and diversity.

7.1 Geology and Soils

The St. Mary Diversion Dam and headworks structures are founded on glacial-alluvial foundation materials. The project site is less than 10 miles from the base of the Rocky Mountain range, and about 20 miles from the high peaks of the continental divide. Mass wasting and depositional processes have reworked the landscape several times through geologic time. Soils are usually deep and well-developed with rock often absent from the soil. Soil texture ranges from sandy loam to clay loams. All overburden alluvial and glacial deposits at the site are associated with deposition by fluvial processes.

Glacial till and glacial outwash mantle the surface across the St. Mary River basin. Contributions from each drainage that flows off the surrounding mountains contain alluvial fan deposits. Terraces include lateral moraines on both sides of the floodplain and extend to Babb, Montana; about 1.5 miles to the northwest of the diversion structure.

7.1.1 Geology

Boulders are common to 3-feet in maximum dimension on the ground surface at the site. Cobbles are mostly hard and subangular to subrounded. Gravels are equally coarse to fine, hard to very hard, angular to subrounded, and contain about 10 to 15 percent elongated and flat shapes. Sand is represented equally by coarse, medium, and fine fractions that are hard, subangular to rounded rock fragments. The elongated and flat shapes are not as well represented in sand.

Two Medicine Formation (K_{tm})

Bedrock at the diversion dam is the Two Medicine Formation (Ktm) deposited between the western shoreline of the Late Cretaceous interior seaway and the eastward advancing margin of the Cordilleran Overthrust Belt. The Ktm (non-marine mudstone) is mostly deposited by rivers and deltas consisting of greenish-gray, fine-grained, hard sandstone, and/or siltstone containing clay with local nodular limestone. This sedimentary rock unit can be massive to cross-bedded (layering within a stratum and at an angle to the main bedding plane) and may contain some coal. Cementation is primarily calcium carbonate but may include silica.

Quaternary glacial-alluvial deposits (Q_{al})

Foundation materials at the St. Mary Diversion headworks structure are Quaternary glacial-alluvial deposits (Q_{al}). These materials are a heterogeneous mixture of gradations including a large percentage of cobbles and boulders by volume in the upper 20 to 30 feet of the foundation. The minus 3-inch diameter fraction, observed through the drilling process, is predominately either poorly graded gravel with sand and cobbles (GP) sc or poorly graded sand with gravel and cobbles (SM) gc or silty gravel with sand and cobbles (GM)sc. This same material observed at shallower depths up to 10 feet deep in the test pits is classified as cobbles and boulders with gravel and sand. A laboratory gradation of this material shows 5% boulders (greater than 12-inch diameter), 41% coarse cobbles (5- to 12-inch diameter), 31% fine cobbles (3- to 5-inch diameter), with 10.8% gravel, 7.3% sand and 4.9% fines. Unified Soils Classification System gradations in the project area are predominately (GM)sc, (GP)sc, (SP)gc, (SM)gc, and (SC)gc.

7.1.2 Soils

In general, most soils are a heterogeneous accumulation of mineral grains that are not cemented together. However, the term "soil" as used in engineering includes virtually every type of uncemented or partially-cemented inorganic and organic material in the ground. Only hard rock, which remains firm after exposure, is excluded. In the design and construction of foundations and earthwork, the physical and engineering properties of soils, such as density, permeability, shear strength, compressibility, and interaction with water, are of primary importance.

Table 2: Soil Types in the Project Area

Map Unit Symbol	Map Unit Name	Hydrologic Group	Description
BF	Babb-Hanson complex	B	Well drained, hilly, not prime farmland.
Bg	Bearmouth gravelly loam	B	Sandy loam, sandy subsoil variant, hilly, not prime farmland.
MZb	Mixed alluvial land	N/A	Well drained, not prime farmland
RS	Riverwash	N/A	Not prime farmland
TN	Tinsley	A	Excessively drained, not prime farmland

The soils associated with this ecological site are generally in Hydrologic Soil Groups A and B soils with similar runoff potential. The infiltration rates for these soils are normally rapid to very rapid. The runoff potential for this site is low, depending on slope and ground cover/health; however, soils are highly permeable (high porosity).

Group A—Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. This soil group typically has less than 10 percent clay and more than 90 percent sand or gravel and have gravel or sand textures.

Group B—Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. This soil group typically has between 10 percent and 20 percent clay and 50 percent to 90 percent sand and has loamy sand or sandy loam textures.

Prime farmland "has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management." None of the soils in the project area are classified as prime farmland.

Topsoil is used to cover an area so that vegetation can be established and maintained. The surface layer of most soils (upper 40 inches) is generally preferred for topsoil because of its content of organic matter. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth. Topsoil in the project area is rated as poor due to thickness of suitable material. These soils have a moderate to high potential for revegetation and productivity in the upper layers that decreases in the deeper layers due to high rock content and low ability to hold water and nutrients and are highly susceptible to weed invasion when disturbed.

Soil surfaces can be sources of particulate matter (PM) emissions when winds of sufficient speeds act upon the surface to cause erosion, suspension, and entrainment of soil particles or when the action of machinery on soils leads to PM generation. Both wind erosion and machinery action can lead to significant soil quality issues with the loss of valuable topsoil and deposition of soil in areas where it is not desired, including water bodies and streams. The degree to which soils erode and particles become airborne by wind or mechanical action is dependent on several factors, including the amount, type, and spatial distribution of surface cover, soil type, soil moisture, the amount of compaction versus looseness of the topsoil layer and the roughness of the soil.

7.1.3 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. The probability of a diversion dam failure is high due to the poor condition of the fixed weir concrete. Each year modifications and repairs are made to the facility to help reduce the risk of catastrophic failure of the structures. Failure would result in the deposition of accumulated sediment behind the dam and sluiceway into the St. Mary River.

7.1.4 Proposed Action Alternative

Under Proposed Action Alternative, the existing St. Mary Diversion Dam and Canal Headworks would be replaced with modern structures that would increase water diversion efficiency, allow fish passage at the St. Mary Diversion Dam, and prevent entrainment in the canal. This Alternative would require a five-year construction period.

As a result of construction and other disturbances, the soil profile can be altered from its natural state and the listed group assignments generally no longer apply, nor can any supposition based on the natural soil be made that would accurately describe the hydrologic properties of the disturbed soil.

Figure 7: Soil Excavation

Construction activities could result in short-term increased erosion and sedimentation from exposure of soils on areas cleared for temporary work sites. Site preparation activities would include tree removal and clearing and grubbing of mixed shrub vegetation. The use of heavy equipment for project activities would likely increase soil compaction and surface water runoff, increasing the potential for erosion. With the implementation of the minimization measures, effects to soil resources would be both short-term and minor in nature.

7.1.5 Minimization Measures

- Bare soil would be kept to the minimum required by designs. The extent of areas to be cleared, graded and recontoured would be minimized.
- Staging and stockpiling areas, borrow areas and haul roads would be in areas with gentle slopes where potential erosion would be low.
- Approved Best Management Practices (BMPs) to minimize impacts of sedimentation and runoff associated with construction activities from entering the river.
- Areas of ground disturbance would be identified in advance of construction and limited to only those areas necessary to complete project work. Bare soil would be kept to the minimum required by designs.
- Stormwater runoff origination on upslope areas would be diverted away from disturbed areas. Runoff on bare ground would be dispersed to reduce concentrated flows that might lead to erosion and sedimentation.

- All vehicular construction traffic would be confined to the designated access routes and staging areas.
- All temporary use roads would be returned to their pre-construction condition and revegetated after construction is completed.
- All disturbed areas would be restored to pre-existing conditions, with exception of the borrow areas which would be restored using typical restoration techniques. Restoration techniques include contouring and grading, planting erosion control grass species for revegetation using a Reclamation-approved seed mix.

7.2 Hydrological Resources

The St. Mary watershed is fed by Blackfoot and Jackson Glaciers of the Saint Mary Valley, Grinnell, and Swiftcurrent Glaciers in the Many Glacier Valley, permanent snowfields, annual snowpack, rainfall and precipitation. Headwater streams, alpine and subalpine lakes, and a complex network of glacial groundwater from both valleys feed streams feeding into the Saint Mary River, Upper Saint Mary Lake, Swiftcurrent Lake, Lake Sherburne Reservoir, and Lower St. Mary Lake.

The St. Mary River rises in GNP, flowing northeast through the Blackfeet Reservation in Montana to its confluence with Oldman River near Lethbridge, Alberta, a tributary of the South Saskatchewan River which ultimately dumps into Hudson Bay in northcentral Canada. Midway through its Montana course the river makes its way over the St. Mary Diversion Dam, where a portion of the water is seasonally (approximately April through September) diverted into the St. Mary Canal. Here, the diverted water travels 29-miles (~47 km) through the canal, siphons and drop structures and across the northern Great Plains before dumping into the North Fork Milk River.

The combination of mountain snowmelt, tributary inflows, and precipitation are the main sources of natural surface water flows in the St. Mary River. Flow in the St. Mary River varies in response to seasonal snowmelt and releases of stored water from Lake Sherburne. River flow increases rapidly from March through June then declines during late summer and fall. The characteristic seasonal hydrologic pattern typically starts with snowmelt runoff in March or April and usually peaks by June as follows:

- Spring is marked by rapid melting of snow on the plains and ice on frozen ground, usually in March or April as temperatures rise rapidly, accompanied by rainfall. This causes the spring ice break-up and increases in tributary streamflow. Annual maximum peak stages and flows usually occur during this time along tributary streams. This results in the characteristic spring thaw over a period of four to six weeks

- Summer and Fall are generally characterized by little rainfall, widely scattered local rainstorms, and occasional severe storms. Flow in the river decreases after the June rise, thereafter, decreasing to the low flows which prevail in winter.

- Winter is characterized by frozen streams, progressive accumulation of snow in the mountain areas, and intermittent snowfall and thaws in the plains area. The season usually ends with a "spotty" snowpack of relatively low water content and a considerable amount of water in ice

storage in the stream channels. Runoff during this period, which usually extends from late November into early March, is very low.

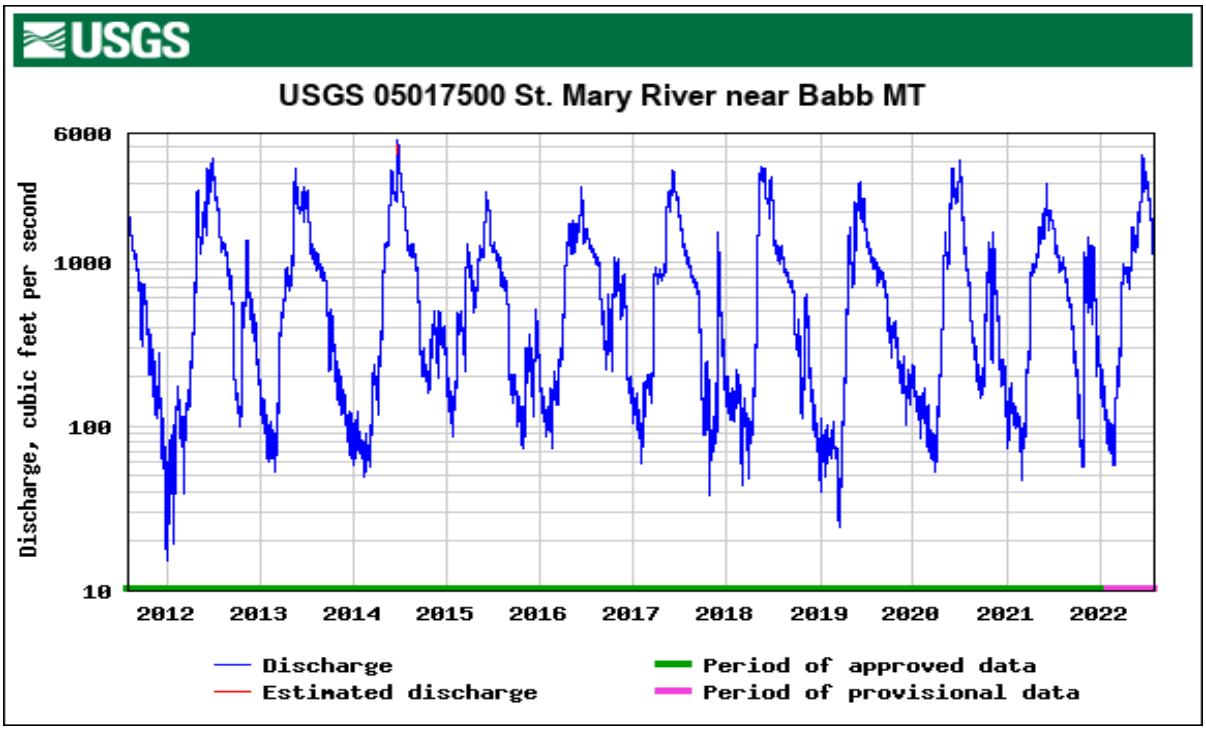
7.2.1 Waters of the United States

The term waters of the United States (WOTUS 40 CFR 230.3) include all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce. Activities in waters of the United States potentially regulated under Section 404 include the discharge of dredged and/or fill material for construction of water resource projects such as dams and levees and the potential release of bottom sediment.

7.2.2 The St. Mary River

The St. Mary River is within Hydrologic Unit 09040001. The source of water is predominately derived from melting snow and seasonal precipitation events. The river has a constant and dependable flow during the summer irrigation period because of its source in the high elevations of GNP. Midway through its Montana course, the river makes its way over the St. Mary Diversion Dam, where a portion of the water is seasonally (approximately April through September) diverted into the St. Mary Canal. Winter flows are sustained by a ground-water base flow.

Figure 8: St. Mary River Annual Flow 2012-2022



Water supply across Montana is controlled by the variability in seasonal temperature and precipitation. While the water demand continues to grow, water availability varies from year to year and often changes dramatically within a given year. As a result, managing supply and demand imbalance is a constant feature of water management in Montana. Impoundment of water for

irrigation changes the natural hydrograph, as depicted, by regulating the amount of water that is stored and discharged during regular intervals (irrigation season). See Figure 6.

The amount of water transferred from the St. Mary to the Milk River Basin is dependent on water supply in each basin, as well as weather, maintenance issues, and the Boundary Water Treaty of 1909 between the United States and Canada. The 1921 Order of the International Joint Commission established the division of flows between Canada and the U.S. for the St. Mary and Milk Rivers.

The natural flow of the Milk River is greatly impacted by seasonal changes in temperature and precipitation, and without the input of water from the St. Mary River certain stretches would become dry during the hot summer months. The lands drained by the two rivers are known collectively as the St. Mary and Milk Rivers (SMMR) watershed, or 'basin.'

As a stream or river flows downslope, it transports sediment and dissolved matter (Skinner and Porter 2000). A stream has a natural amount of sediment that is transported through the system that varies throughout the year in response to natural hydrological changes. The amount of sediment that a stream can transport annually is based on numerous factors, including precipitation, surface water transport, streamflow, topography, geology, erosion, riparian vegetation, stream geomorphologic characteristic, and human disturbance. Therefore, different watersheds have different levels or concentrations of turbidity and suspended sediment. A glaciated stream will naturally have higher sediment levels than a spring fed stream.

7.2.3 Water Quality

Under the Clean Water Act (33 U.S.C. §§1251-1387, CWA as amended), all surface waters are designated with specific beneficial uses. In Montana, beneficial use is defined as the use of water for the benefit of the appropriator, other persons, or the public, including but not limited to agricultural (stock water), domestic, fish and wildlife, industrial, irrigation, mining, municipal, power, and recreational uses (MCA 85-2-102).

The Environmental Protection Agency (EPA) has primary authority over the regulation of water quality on the Blackfeet Reservation. Under Section 106 of the CWA, the EPA provides technical assistance and funding to assist tribes with preserving water resources on their lands. Surface water quality data is collected under a quality assurance project plan developed by the Tribe each year and approved by the EPA. The CWA and its regulations grant the EPA authority for tribal implementation of water quality standards (WQS) through its oversight or implementation of the national pollution elimination system (NPDES) and 303(d)/total maximum daily load (TMDL) programs.

The Tribe monitors the St. Mary River at two locations within the project area:

- 100 feet downstream of the US Highway 89 bridge.
- 100 feet downstream of the St. Mary Diversion Dam.

The segments are monitored for physical and chemical parameters that provide suitable conditions that support designated and potential uses. Monitoring parameters include ammonia, arsenic, dissolved oxygen, Escherichia coli, pH, phosphorous, temperature, specific conductance, nitrogen, dissolved solids, suspended solids, and turbidity. Beneficial uses for the St. Mary River include

migration habitat for aquatic organisms; and spawning and breeding habitat for fish and wildlife. The water quality conditions in the St. Mary River at the two monitoring locations currently meet all designated water quality standards (Blackfeet Environmental 2022).

7.2.4 Ground Water

Ten drill holes and two test pits were installed at the project site to better define foundation physical properties and obtain groundwater data related to dewatering for construction activities. Most of the explorations recorded groundwater within about one foot of surface water observed in the St. Mary River or within the St. Mary Diversion Canal. The groundwater levels in observation wells adjacent to the St. Mary River and the St. Mary Canal are reflective of the water level at each of these features. When comparing depth to groundwater and elevation difference in the observation wells, it is apparent that the groundwater is very linear across the site (Reclamation 2017).

Aquifer testing at St. Mary Diversion Dam was performed to obtain site specific information regarding the hydrogeologic material properties of the Quaternary Glacial-Alluvium Deposits (Qal) for use in designing a dewatering system. The test occurred on the left bank of the canal, when looking downstream, and monitored in ten observation wells on both the right and left of the canal.

A pump out test was performed at the diversion dam from May 3-5, 2022. The analysis of the data collected from the pump out test was performed using Advanced Aquifer Test Analysis Software (AQTESOLV). Water quality measurements were performed on the discharged water throughout the pump out tests and were taken using only the nephelometer to measure turbidity. The turbidity testing performed during the first pump out test showed very little turbidity within the effluent water. A total of 16 turbidity measurements were taken over the course of the test with values ranging from 0.02 to 0.03 nephelometric turbidity unit (NTU). Overall, there was very little turbidity within the effluent water during the pump out test.

7.2.5 St. Mary Canal

The Project supplies water to irrigation districts, individual irrigators, and communities under contracts with Reclamation, subject to the availability of water. Water right 40T-40955-00 is held by Reclamation for 850 cfs for beneficial use by irrigation districts, individual users, and municipal use within the Milk River Project area.

The startup date for initial releases from Lake Sherburne Dam/Reservoir is based on St. Mary Canal diversion needs, flood control considerations, and BWT accounting. Typical annual releases can start as early as March 1; however, there are no restrictions preventing releases earlier than March 1. The early releases maintain adequate storage space in Lake Sherburne Reservoir to control the snowmelt runoff and provide water for St. Mary Canal diversions or provide Canada with its entitled share of St. Mary River water.

At the end of the irrigation season or once storage levels in Lake Sherburne Reservoir are low or St. Mary Canal diversions are shut off for the season, releases from the reservoir begin to shut down and are eventually shut off unless additional water is needed based on the BWT. Releases for Lake Sherburne Dam are gradually reduced before being shut off for the fall and winter. This fall closure

procedure usually begins in September depending on hydrologic conditions, but full gate closure can occur as late as Oct. 31.

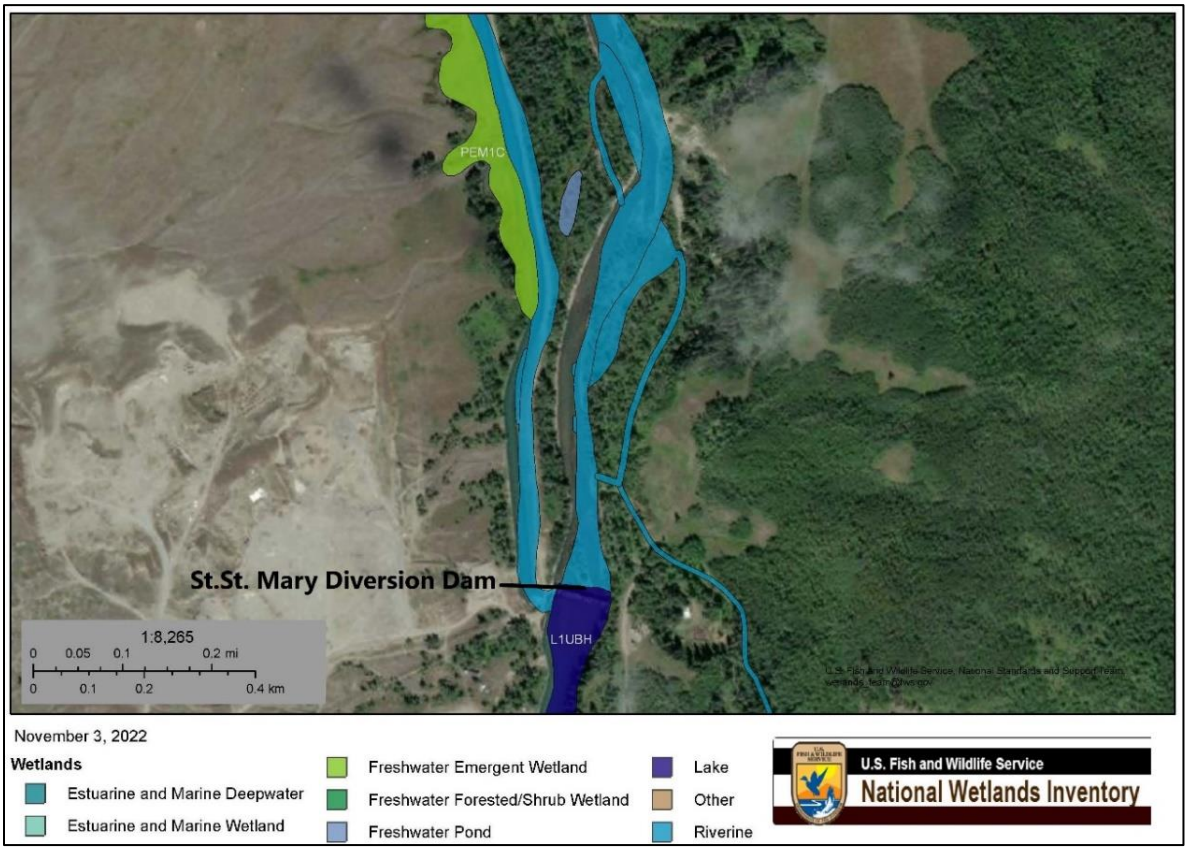
7.2.6 Floodplains

A floodplain is comprised of the floodway and the floodway fringe. The floodway is defined as the channel of a river or other watercourse and the adjacent land areas (floodplain) reserved to discharge the 1- percent-annual-chance flood without cumulatively increasing the water surface elevation by more than the designed height (usually 1-foot). The project area is in an unincorporated area of Glacier County, MT (FIRM panel 300151 0006 A) where floodplains are not mapped.

7.2.7 Riparian Areas

Riparian areas are defined as ecotones that occur along watercourses or water bodies. They are distinctly different from the surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil. These areas include separate landscape elements which are connected by hydrology, soils are formed and maintained by fluvial processes; they exist in a continuum along stream reaches in the watershed; and they connect with adjacent landscapes. Riparian ecotones occupy the transitional area between the terrestrial and aquatic ecosystems.

Figure 9: Mapped Wetland Riparian Areas



- L1UBH - Permanently flooded, deep-water habitat greater than 20 acres in size.
- PEM1C - Seasonally flooded wetlands dominated by persistent herbaceous vegetation.
- Riverine - River, riverbank, or riparian.

Riparian areas include floodplains and wetlands and are protected under the following Orders:

- Executive Order 11988 (Floodplain Management) provides Federal guidance for activities within the floodplains of inland and coastal waters.
- Executive Order 11990 (Protection of Wetlands) requires the avoidance, to the extent possible, of long- and short-term adverse impacts associated with the destruction, modification, or other disturbance of wetland habitats.

7.2.8 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. The existing diversion dam would continue to provide irrigation water so long as it remains intact. Reclamation would continue to make temporary repairs requiring continual high maintenance and expenses to the water users. This alternative would not meet the requirements of ESA, as fish would continue to be entrained in the canal, and upstream and downstream passages in the river would continue to affect bull trout and other native fish species.

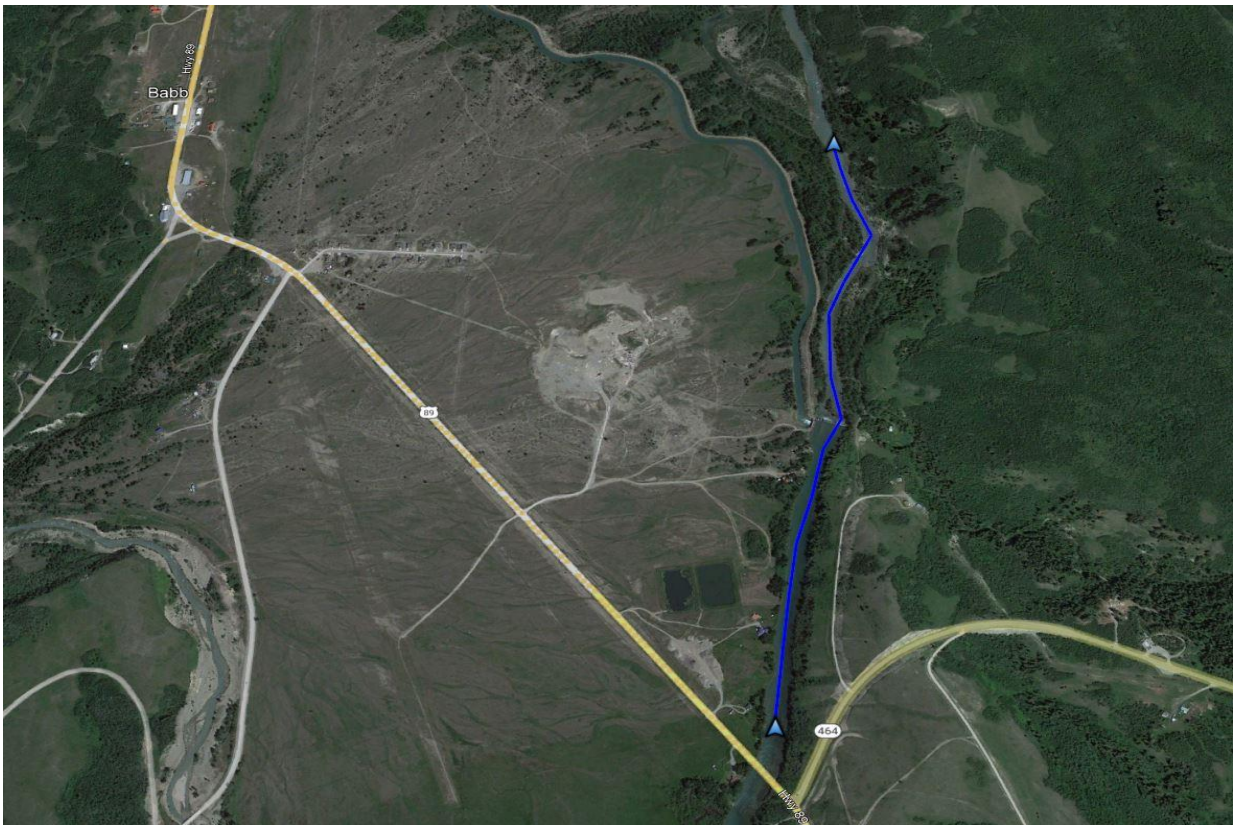
The consequences of taking no action could result in the failure of the existing structures. Failure of the structure would release sediment and debris into the river affecting water quality in the short-term. The structure of riparian areas would be altered by the release of water and sediment, and temporary inundation of these areas. Flows would remain in the natural channel of the St. Mary River causing minor, localized environmental damage.

7.2.9 Proposed Action Alternative

Under Proposed Action Alternative, the existing St. Mary Diversion Dam and Canal Headworks would be replaced with modern structures that would increase water diversion efficiency and allow fish passage at the St. Mary Diversion Dam. This Alternative would require a five-year construction period.

Actions related to hydrological resources includes new construction and removal of existing features. Cofferdam installation and removal, and placement of rock could release sediment into the water. Increases in sedimentation and turbidity could cause a temporary effect on hydrological resources. It is anticipated that short-term impacts to the St. Mary River could extend up to .5 miles (800 meters) upstream and downstream of the construction zone. Sediment would primarily be mobilized during installation and removal of the cofferdam, supersacks, and removal of the existing features.

Figure 10: Area of Potential Sediment Impacts to the St. Mary River



Sediment within a stream can be classified into several categories, including turbidity, suspended sediment, bedload, deposited sediment, and wash load (Bash et al. 2001)). Sediment category definitions include:

- Turbidity - Optical property of water which results from the suspended and dissolved materials in the water. This causes light to be scattered rather than transmitted in straight lines. Turbidity is measured in NTUs.
- Suspended sediment - Represents the actual measure of mineral and organic particles transported in the water column. Suspended sediment is measured in mg/L and is an important measure of erosion, and is linked to the transport of nutrients, metals, and industrial and agricultural chemicals through a river system.
- Bedload - Consists of larger particles on the stream bottom that move by sliding, rolling, or saltating along the substrate surface. Bedload is measured in tons/day, or tons/year.
- Deposited sediment - The intermediate sized sediment particles that settle out of the water column in slower moving water. Based on water velocity and turbulence, these intermediate size particles may be suspended sediment or bedload.
- Wash load - Finest particles in the suspended load that are continuously maintained in suspension by the flow turbulence; therefore, significant quantities are not deposited in the bed.

Construction activities such as vegetation clearing, topsoil stripping, excavation from borrow areas, and construction of temporary haul routes could result in the introduction of sediment and pollutants into stormwater runoff. There may be short-term impacts to water quality during and after placement of the cofferdam, placement of concrete structures, and removal of the existing diversion dam and canal headworks. Turbidity may increase both during and for a short time after each activity; however, turbidity is not expected to be greater than average high flow events.

An extensive dewatering/unwatering system would be required to remove groundwater from the site before construction commences and throughout the construction period. This is a vital step in construction areas with high water tables, inadequate slopes for water run-off, or excavations and trenches where water can accumulate. Unwatering means to draw off or remove water from a location**.** On the other hand, dewatering is the removal of ground water from open spaces or pores in soil or rocks. Adequate removal and control of groundwater is critical to the following:

- Loss of dewatering and/or unwatering capability could result in substantial delays in completing the work due to unstable slopes, difficult excavation conditions, and/or heaving foundation, concrete, and placed materials.
- Total loss of unwatering and dewatering capacity could result in flooding the work area.

Conditions which may influence the unwatering systems as well as the initial drawdown period may include:

- Frequency and rate of precipitation at the site.
- Subsurface conditions including natural layering, thickness, permeability, and storativity of materials.
- Initial groundwater levels.
- Flows in St. Mary River and St. Mary Canal.
- Efficiency of unwatering systems, sumps, collectors, and discharge systems.
- Leakage from the bypass canal, soil plugs, or cofferdam.

Not all water may be removed from highly permeable layers by dewatering systems. Unwatering in conjunction with dewatering would be required to remove groundwater from permeable layers and would necessitate the use of open pumping techniques. Water collected during dewatering would be discharged into the St. Mary River during the off-season shutdown of the canal (October – March). During canal operation (April-September) water may be discharged into the irrigation canal.

The risk of impact from sedimentation increases during construction because construction activities create exposed soils, subject to erosion and transport to nearby streams. Stormwater discharge during construction would require a National Pollutant Discharge Elimination System (NPDES) permit and associated stormwater pollution prevention plan (SWPPP) as required under section 402 of the Clean Water Act (CWA), and requirements of Blackfeet Ordinance 117 aquatic resource protection. Monitoring results would be reported to the appropriate jurisdictional agencies during the construction period.

All discharged water would meet applicable numeric and water quality standards, as stipulated within the permits listed below.

Prior to construction Reclamation would obtain and implement the following permits:

- Blackfeet Ordinance 117 Permit
- Section 401 of the CWA-Water Quality Certification
- Section 404 of the CWA – Permitting discharges of dredge or fill material.

The planned action would replace the diversion dam and headworks and allow continued use for agricultural and irrigation purposes. There would be no induced development of the floodplain because of the proposed action. The proposed action is consistent with Executive Order 11988.

Impacts of construction activities on water quality in the St. Mary River would be minor and short-term. Implementation of the proposed minimization measures would provide insurance that the project does not contribute to sources of contamination in the St. Mary River at the construction area and upstream and downstream of the dam.

7.2.10 Minimization Measures

- Standard construction BMPs such as straw wattles, silt fence, straw bales, sediment basins, earthen berms, erosion control blankets, surface roughening, seeding, and preserving natural vegetation would be used to prevent potential pollution sources from entering the St. Mary River.

- Storm water runoff originating on upslope areas would be diverted away from disturbed areas. Runoff on bare ground would be dispersed to reduce concentrated flows that might deliver fine sediment to water sources.

- Existing vegetation would be preserved where feasible.

- Excavated or other construction materials would not be stockpiled or deposited near or on-stream banks or reservoir shorelines where they could be washed away by high water or storm runoff.

- Wastewater from general construction activities would be prevented from entering flowing or dry watercourses without the use of approved turbidity control methods, if needed.

- The disposal of waste material (debris, excavated material or other construction related materials) within any water of the US or drainage way would be minimized to the extent possible.
- All fueling, servicing operations, and fuel storage would be conducted at least 100 feet away from all water bodies.

7.3 Climate, Climate Change, and Hydroclimate

Public Law 111-11, Title IX, Subtitle F (SECURE Water Act), Section (§) 9503 authorizes Reclamation to assess climate change risks for water and environmental resources in major river

basins. According to the West-Wide Climate Risk Assessments (Reclamation, 2021), future hydrologic impacts are consistent with the mean changes in temperature and precipitation derived from projections, characterized across the western United States, as follows:

- Temperature increases have resulted in decreased snowpack, changes in the timing and volume of spring runoff, and an increase in peak flows for some western US basins. The impacts to snowpack and runoff affect the timing and availability of water resources.
- Warming is expected to continue, causing further impacts to supply, and increased agricultural water demands.
- Precipitation patterns are expected to change, interacting with warming to cause longer-term and more frequent droughts and larger and more frequent floods, varying by basin.
- Projected increasing precipitation in the northern tier of the western US could counteract warming-related decreases in warm-season runoff.

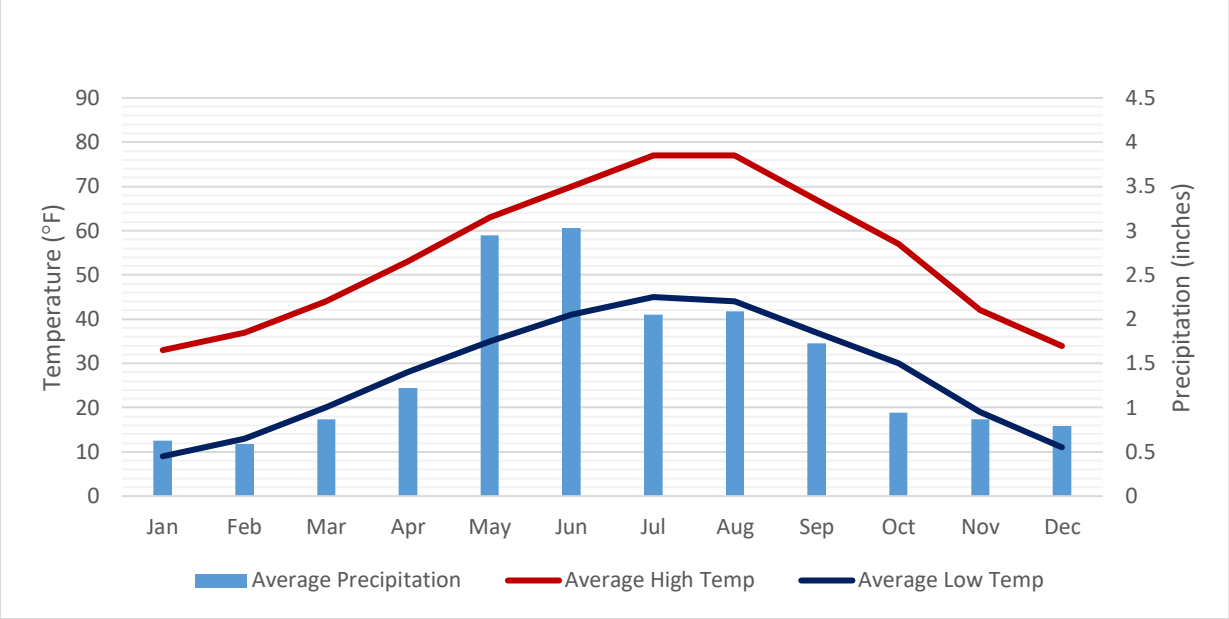
The western US faces serious water challenges related to climate variability and competing demands. Adequate and safe water supplies are fundamental to health, economy, security, and environmental well-being. Drought, changing hydrology, and increasing climate variability intensify water shortages, contribute to impaired water quality, and deplete groundwater resources. The decrease in snowpack and earlier spring runoff makes climate resilience an important area of focus for Reclamation.

7.3.1 Climate

Climate is determined by the long-term pattern of temperature and precipitation averages and extremes at a location. Climate descriptions can refer to areas that are local, regional, or global in extent. Climate can be described for different time intervals, such as decades, years, seasons, months, or specific dates of the year. In contrast, climate change is a significant and persistent change in an area's average climate conditions or their extremes. Seasonal variations and multi-year cycles that produce warm, cool, wet, or dry periods across different regions are a natural part of climate variability. They do not represent climate change.

Montana's unique geography means climate varies across the state, as it does across the nation. The project area is located within the region generally classified as a dry continental or steppe with four well-defined seasons, although long cold winters and moist springs are the norm. The historic climate is typical of the northern Great Plains, with wide variations in temperature from season to season. Annual average precipitation is 15 inches with greater precipitation in the higher elevations of the Rocky Mountains. The weather can be quite changeable with large day-to-day temperature variations, particularly from fall to spring. Days with severe winter cold and summer heat are typical. High winds are common. In the northern Great Plains, the timing and quantity of both precipitation and runoff have important consequences for water supplies, agricultural activities, and energy production.

Figure 11: Average Climate Conditions in the Project Area



7.3.2 Climate Change

Climate change implies a significant change having important economic, environmental, and social effects in a climatic condition such as temperature or precipitation. Climate change is generally attributed directly or indirectly to human activity that alters the composition of the global atmosphere, additive to natural climate variability observed over comparable time periods.

Burning of fossil fuels is considered a major contributor to perceived global climate change. Carbon dioxide (CO^2), which is produced when fossil fuels are burned, is a greenhouse gas (GHG) that effectively traps heat in the lower atmosphere. Some CO^2 is liberated naturally, but this may be augmented greatly through human activities. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to Reclamation's water resources and project operations.

A study on climate change specific to the St. Mary River System in Montana (Reclamation TSC 2010) suggests that climate projections over the study area are likely to follow a warming trend in the future. The results indicate an earlier runoff regime in most of the sub-basins of the St. Mary River basin. The predicted mean monthly flows generally indicate the potential for increased flows from January through May and decreased flows from June through December. Similar results (MT DNRC 2015) show an overall decline in snowpack in western North America and an increased percentage of precipitation falling as rain. This could lead to earlier and lower levels of runoff for the St. Mary River since the majority of runoff in the basin is a result of snowmelt. However, increased spring precipitation observed in recent years has tended to maintain overall annual discharges. Overall, climate projections suggest that the number of heavy precipitation events (events with greater than 1-inch per day of rainfall) is projected to increase. Moving forward, the

magnitude of year-to-year variability overshadows the small projected average decrease in streamflow (Conant et al. 2018).

Climate change is another stressor in hydrological water balance. The feedback between rising temperatures and hydrological process affects precipitation patterns and the frequency of extreme weather events. Globally, temperatures are rising, and temperature and precipitation extremes are becoming more common. Looking solely at global or national averages does not give an accurate picture of climate change impacts in north-central Montana. Impacts in this area may be greater than national averages would suggest, because the rate and magnitude of climate warming in Montana has been greater. For example, the average annual temperature in Montana increased 2.7°F between 1950 and 2015, much higher than the average warming the US has experienced over an even longer period.

7.3.3 Hydroclimate

Hydroclimate is the scientific field that brings together hydrology and climate, including the impacts that water and its processes have on Earth's climate. The hydrological cycle plays a vital role in Earth's ecosystem as well as the weather. The hydrological cycle involves processes where liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to Earth in the form of rain and snow. The hydrological cycle involves factors such as water storage through snow, ground, and vegetation. Hydroclimate phenomena such as drought, flooding, and precipitation can have societal impacts such as crop damage and loss of life.

The historic climate of the region is typical of the Northern Great Plains, with wide variations in temperature from season to season. Summers are cooler and wetter in the higher elevations of the western part of the region near GNP where snow is reported in every month of the year. In this region, the timing and quantity of both precipitation and runoff have important consequences for water supplies, agricultural activities, and energy production. Overall, climate projections suggest that the number of heavy precipitation events (events with greater than 1-inch per day of rainfall) is projected to increase. Moving forward, the magnitude of year-to-year variability overshadows the small projected average decrease in streamflow (Conant et al. 2018).

7.3.4 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. The local climate would continue to fluctuate over time. Without the construction project; there would be no change in current trends of greenhouse gas emission in the project area. Consequences of taking no action could result in failure of the existing structures. Failure would result in the inability of the St. Mary Unit to operate under its intended purpose. In addition, failure would result in decreased water storage in the face of growing water demands and climate variability.

7.3.5 Proposed Action Alternative

For this climate change analysis two indicators are used to measure potential effects:

1. What effects climate change may have upon the Proposed Action.
2. Whether Reclamation's Proposed Action would contribute to climate change.

Over time, climate change could affect the supply of water available in the St. Mary River Basin. Changes in precipitation, temperature, and wind patterns could increase evapotranspiration from crops and increase demand for irrigation. A changing climate could increase moisture deficit, or decrease it, depending on the relative change in temperatures and precipitation. Demand for irrigation depends on the crop grown, as well as the prevailing climate.

Deteriorating water infrastructure compounds the climate risk faced by Project water users. Extreme precipitation events are projected to increase in a warming climate and may lead to more severe floods and greater risk of infrastructure failure in some areas. The Proposed Action Alternative would replace deteriorating structures at the St. Mary Unit, allowing this facility to better respond to future climate change by increased efficiency.

Under the Proposed Action construction activities, such as operation of heavy machinery: would result in short-term emissions of GHGs. CO^2 is the main GHG of concern since the proposed dam raise would utilize on-road and off-road vehicles with combustible engines that produce CO^2 as emissions. While this alternative would result in GHG emissions, these emissions would not measurably impact the local climate. GHG associated with construction equipment would be minimal and temporary during the five-year construction period. With the implementation of minimization measures, there would be no measurable emission-related impacts on the climate, climate change, or the hydroclimate.

7.3.6 Minimization Measures

- To minimize potential GHG emissions, only equipment and vehicles that meet state and federal emissions guidelines would be used during construction activities.
- If equipment or vehicles show signs of excessive emissions, they would not be operated until corrective measures are taken to reduce emissions.

7.4 Socioeconomics

Much of the local economic area surrounding the St. Mary Diversion facilities as well as the counties included in the Milk River Project-irrigated lands fit the definition of areas with significant underemployed resources. Extremely high unemployment rates within the four Indian reservations proximate to the area along with the four counties served by the Project indicate significant underemployment of labor. Additionally, the loss of population in recent years within the Milk River drainage area indicates the underemployment of other resources.

The socioeconomic study area includes counties that have social and economic links to the region that would be directly impacted by the Project. The study area includes Glacier, Hill, Blaine, Phillips, and Valley Counties in Montana. This section includes the socioeconomic characteristics of the counties within the study area and provides context for the information by comparing to statewide totals.

7.4.1 Environmental Justice

Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 128980) was issued in 1994. The Environmental Justice EO requires agencies to identify and address disproportionately high or adverse human health and environmental effects on minority and low-income populations. Under this EO Federal agencies are required to analyze the environmental effects of Federal actions, including human health, economic and social effects, on minority and low-income communities.

Environmental justice is the fair treatment of people of all races, income, and cultures with respect to the development, implementation and enforcement of environmental laws, regulations, and policies, as well as their meaningful involvement in the decision-making processes of the government.

The study area for the environmental justice evaluation is the same as that of the socioeconomic economic conditions. The purpose of the environmental justice evaluation is to identify and characterize any populations in the study area with a potential for disproportionately high and adverse human health or environmental effects. Federal actions must mitigate any disproportionate negative impacts on environmental justice populations.

7.4.2 Tribal Employment Rights Ordinance

Tribal Employment Rights Ordinance (TERO) programs use a variety of legal tools to ensure that Indian/Native people receive their rightful share of employment and other economic opportunities both on and near reservations. Indian Tribes, as sovereigns have the sovereign authority to regulate and control the employment practices of all employers conducting business on their reservations. This power enables Tribal Government to require that all contractors operating within their jurisdiction provide Indian preference in employment, contracting and subcontracting.

The Blackfeet Tribal Employment Rights Ordinance and Safety Act of 2010 – Section 3-201: Indian Preference in Contracting, states that "All entities awarding contracts or subcontracts for supplies, services, labor, and materials where the majority of the work on the contract or subcontract would occur within the jurisdiction of the Blackfeet Tribe shall give preference in contracting and subcontracting to qualified Blackfeet firms that are certified by the Blackfeet Tribal Employment Rights Office.

7.4.3 Economic Status

The project is located approximately one mile from Babb, MT, a small unincorporated farming, and ranching community within the Blackfeet Reservation, in Glacier County, MT. The Blackfeet Reservation has an estimated population of 9,900 (US Census Bureau 2022) and covers 2,372 square miles. The median household income is $34,731. Glacier County, Montana is a sparsely populated county with relatively low-income levels in comparison to the rest of Montana.

Table 3: Economic Status

Location	Population	Median Household Income	Per Capita Income	% Below Poverty
Blackfeet Reservation	9,900	$34,731	$15,035	37%
Glacier County	13,778	$37,645	$18,440	24.3%
State of Montana	1,085,407	$63,249	$36,020	14.4%
United States	331,893,745	$67,521	$35,384	11.4%

U.S. Census Bureau QuickFacts

The St. Mary Diversion facilities and Project irrigated lands are located between the bookends of the Blackfeet Reservation (on which the diversion facilities are located) and the Fort Peck Reservation (the eastern limits of the Milk River). The Fort Belknap Irrigation District has senior water rights on the Milk River for 125 cfs of the natural flow and 1/7 of stored water in Fresno Reservoir. The Rocky Boys Reservation receives no irrigation project water.

Low-income populations are identified by several socioeconomic characteristics. As categorized by the 2020 Census, specific characteristics include income (median family and per capita), percentage of the population below poverty. The total population for the State of Montana was 1,085,407 in 2020. The 2020 median household income for Montana was $63,249, with an overall poverty rate of 14.4%. In comparison the Blackfeet Reservation median income was $34,731 with 37% of the population below poverty, compared to 14.4% statewide and 11.4% nationwide. Because of its isolated location, residents of the reservation have suffered high unemployment.

7.4.4 Milk River Project Ability-to-Pay

The Milk River contractors evaluated for ability-to-pay (ATP) includes eight irrigation districts that receive Project water deliveries for commercial agricultural purposes and three cities that receive MRP water deliveries for M&I purposes. The 2022 ATP study period of analysis includes fiscal years 2022 through 2026. All results are estimated at a 2020 price level.

The steps necessary to complete an ATP study include:

1. Completing a farm-level payment capacity analysis.
2. Aggregating the farm-level payment capacity results to district-level payment capacity (Payment Capacity Income); and
3. Analysis of district-level financial reports such as the profit and loss statement and balance sheet for district expenses and/or other income sources.

The four-county area receiving Project irrigation water (Table5) indicates that Hill, Blaine, and Phillips Counties are below the poverty rate for the state and nation, while Phillips County is just below the state average and slightly above the national poverty average.

Table 4: Project Irrigated Economic Status per County

County	Population	Median Household Income	Per Capita Income	% Below Poverty
Hill	16,179	$45,361	$23,922	18.9%
Blaine	6,980	$41,279	$20,586	20.9%
Phillips	4,192	$46,686	$26,825	14.9%
Valley	7,537	$51,087	$28,440	13.4%

U.S. Census Bureau QuickFacts

The entities that irrigate commercial agricultural lands with Project delivered water can be classified into the following general categories:

- Irrigation districts
- District pumpers
- River pumpers
- Private lands irrigators
- Indian reservations

7.4.5 Irrigation Water Supply

Delivery of water for agricultural irrigation is a major purpose of the St. Mary Diversion Dam. In addition, irrigation generally increases the productivity rating of the land. The type of soil becomes less important to production as the amount, quality, and consistency of irrigation increases. For example, irrigated hay land typically produces two to three cuttings annually, while non-irrigated hay land generally receives only one cutting per year. In Montana, irrigated land must be valued at or above the value it would have if it wasn't irrigated (15- 7-201, MCA).

Much of the local economic area surrounding the St. Mary Diversion facilities as well as the counties included in the Project irrigation districts fit the definition of areas with underemployed resources. High unemployment rates within the four Indian reservations proximate to the area indicate underemployment of labor. Additionally, the loss of population in recent years within the Milk River Drainage indicates the underemployment of other resources.

The largest current use of Milk River Project water flows is for irrigation of the approximately 140,400 acres receiving some project water. The use of irrigation along the Milk River results in significantly higher crop yields in comparison with dryland yields for the same crops in the area. The increased production associated with irrigated acreage compared to comparable dryland cropland translates into higher gross revenue for crops produced. While there are increased costs associated with irrigated agricultural production, the benefits of increased production outweigh the incremental costs of irrigation.

7.4.6 Municipal Water Use Benefits

The towns of Havre, Chinook, Harlem, and Fort Belknap, and the Hill County Water District draw water from the Milk River for their municipal, residential, and industrial supply (MR&I). In the absence of the contracted St. Mary flows these water users would need to find alternative sources for water.

Diverted St. Mary water provides a source of high-quality water for the Milk River system. The loss of the St. Mary water would result in less dilution of pollutants and would result in a decrease in water quality within the river. The Milk River, including Fresno Reservoir, downstream to the Missouri River has been assessed as having one or more beneficial uses impaired or threatened by human activity. These waters are on the Montana 303(d) list of impaired streams. Loss of St. Mary dilution flows would further impair these waters.

7.4.7 Recreation Benefits

In many cases social effects are less quantifiable but can be described in terms of quality of life, which could include the quantity and quality of available resources or the health of regional industries, including energy, agriculture, and recreation opportunities. Outdoor recreation is a component of most lifestyles in the study area. Prominent recreation opportunities and key issues in the study area include fishing, camping, boating, hiking/walking, hunting, birdwatching, and wildlife viewing. Recreationists represent diverse groups of people and changes to recreation opportunities can affect individuals differently based on need and preference.

7.4.8 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. Consequences of taking no action could result in failure of the existing structures. Failure would result in the inability of the St. Mary Unit to operate under its intended purpose.

With increasing age of the facilities, comes the increased frequency and risk of failure. Potential failures range from minor to catastrophic. Minor failures may last a few days while a catastrophic failure may span multiple irrigation seasons. Catastrophic failure could result in an economic disaster for north-central Montana from the loss of St. Mary River water.

The damage severity of a failure can be intensified by additional factors that may affect the economic impact. The repair costs of a failure represent a portion of the financial impact that would be borne by the irrigators. Costs increase with respect to the complexity and emergency effort required. Repair costs may be intensified by environmental damage, private property mitigation, and/or legal expenses.

The timing of failure during the irrigation season directly impacts severity. For example, a late–season failure, unless catastrophic, could be repaired with little or no impact on the current growing season. A failure during June or July when demand for diverted water is typically high would have a greater impact. Failure during periods of high-water demand would increase impact severity. Variables that affect demand include soil-moisture, precipitation, temperature, and wind. An ill-timed failure (drought conditions) would represent a level of high severity. Conversely, the severity is reduced if a failure occurs during a period when precipitation can sustain crop water requirements.

An extended period of lost diversion water would have direct economic impacts on the entire Milk River Basin. Immediate impacts would affect agricultural producers through reduced crop production. If a failure results in the disruption of water service, economic impacts could extend to local businesses, communities, and distributers that serve north-central Montana, and possibly the local tax base. The delayed and potentially more severe economic impact to producers would result from the costs of repairs and environmental mitigation.

7.4.9 Proposed Action Alternative

Water diverted from the St. Mary River to the Milk River Basin through the St. Mary Diversion facilities is essential to the economy of Montana's Hi-line region and the State of Montana. The largest current use of Project water is for irrigation of approximately 140,400 acres. Irrigation along the Milk River results in higher crop yields in comparison to dryland yields for the same crops produced in the area. Other benefits associated with the diverted water are considered "ecosystem values." Although difficult to quantify, benefits include the importance of diverted water to threatened or endangered species such as piping plover at Bowdoin NWR and the pallid sturgeon in the Milk and Missouri Rivers. Milk River flows aid in creating and maintaining a unique and extensive cottonwood riparian zone, irrigated farmlands, and the wildlife habitat associated with these areas.

Replacement of the St. Mary facilities would have a short-term positive economic impact on the Blackfeet Reservation and Glacier County through local purchasing and spending. Construction of the project would result in an increase in agricultural production compared to continued deterioration and/or failure of the system. Rebuilding the facilities would have a long-term positive impact on the counties primarily impacted by the diverted flows. The four counties of Hill, Blaine, Phillips, and Valley and the Fort Belknap Reservation comprise the area most directly affected by flow augmentation. It is anticipated that rehabilitating the diversion facilities would lead to improvements in agricultural production.

No adverse natural resource or socioeconomic impacts adversely affecting minority and low-income populations have been identified; therefore, there would be no environmental justice impacts.

7.5 Lands and Vegetation

The project area is specifically designated to the operation and maintenance of the St. Mary Diversion Dam and Headworks. The general area can be characterized as northern Rocky Mountain lower montane riparian woodland and shrubland; a mix between short-grass prairies, shrublands and mixed-coniferous forests, this system is dependent on a natural hydrologic regime, typically found along rivers and streambanks with black cottonwood being the key indicator species. Grizzly bears are commonly associated with this system.

This system is a seasonally flooded found at montane to subalpine elevations of the Rocky Mountains. It occurs as bands of shrub vegetation lining streambanks and alluvial terraces in narrow to wide, low-gradient valley bottoms and floodplains with sinuous stream channels. Flooding creates and destroys sites for the establishment of vegetation through the transport and accumulation of coarse sediment. Sediment accumulating in this system can form gravel bars at or near the surface of the river, creating bands of mixed vegetation that occupy different stages of succession. Ground water seepage from snowmelt may create shallow water tables or seeps that vegetation depends on for a portion of the growing season.

Overstory vegetation consists of scattered black cottonwood, Engelman spruce, Douglas fir, limber pine, and paper birch. The understory in this system is composed of woods rose, snowberry, and juniper along the stream banks and on gravel bars are a mix of willow and red-osier dogwood which

contribute to structural diversity. This system contributes to animal and plant diversity, and often contains important cultural food plant species, such as serviceberry and chokecherry. The herbaceous understory includes native forbs such as yarrow, Canada goldenrod, and American licorice. Native grasses include wheatgrass species. The project area is largely infested with spotted knapweed.

Aerial photos and site visits were reviewed to assess current land use, property ownership, and vegetation types. Restoration strategies are dependent on the level and type of disturbance event. Highly impacted sites and areas of potential soil erosion may require soil stabilization and, in some cases, reseeding or replanting. All land areas proposed for use during construction have been previously disturbed and are largely unvegetated except for the St. Mary River and canal corridors.

Per the Act of Congress, approved August 28, 1937, 50 Stat. 864, the Bureau of Reclamation letter dated July 1943, and the Bureau of Reclamation letter dated September 1946, Reclamation intends to exercise reserved rights to construct the St. Mary Diversion Dam Replacement Project using the relinquished lands around the dam site.

7.5.1 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. The consequences of taking No Action could result in failure of the existing structures. In the event of structure failure, turbidity, siltation, debris flow, and destruction of vegetation could occur. With potential flooding, water is known to function as a "transport habitat" for the dispersal of plant materials. Flood flows act to transport seeds and plant parts from existing infestations into previously weed-free areas. Spotted knapweed and other invasive plants and seeds would be dispersed to downstream areas.

Existing cropland would no longer have access to Project water. Likely, some farm operations would no longer produce crops; previously broken ground would be subject to weed infestations. In addition, noxious weeds are not often tolerated or sought out by domestic animals or wildlife. Structure failure would result in short-term consequences to lands and vegetation in the immediate area while producing wide-ranging long-term effects over areas that are reliant on Project water for crops and forage.

7.5.2 Proposed Action Alternative

The Proposed Action Alternative would remove soil and vegetation from the project area and contractor-use areas. There is little to no topsoil at the project site due to local geology, and prior construction and disturbance. The overall construction use area would be approximately 55acres (including the river) and would require 15 acres of clearing and grubbing of vegetation (grass, forbs, shrubs, and trees). This would require the removal and replacement of about 2 acres of trees and shrubs.

Land use in the project area would not change because of the Proposed Action. A relatively small portion of the construction area would be permanently impacted by construction of the project features and would be precluded from establishment of vegetation following construction. Surrounding impact areas would provide an opportunity for reestablishment of native vegetation.

This would minimize erosion and establishment of invasive species and would reestablish habitat for plants and wildlife. Short-term impacts include the removal of soil and vegetation, construction equipment, and vehicle traffic use.

7.5.3 Minimization Measures

- The limits (boundaries) for vegetation clearing and construction would be identified by staking, flagging, and fencing to ensure that there is no additional impact from construction activities beyond the work zone.
- Plant material shall be native to the growing conditions of the project.
- Preserve natural landscape and preserve and protect existing vegetation not required or otherwise authorized to be removed.
- All off-road equipment and vehicles used for project implementation would be required to be weed-free.
- Reclamation requires that all earth-moving equipment, gravel, road base, fill, or other materials be noxious weed-free.
- Certified weed-free straw or hay would be used for mulch.
- Certified weed-free seed sources would be used for all post-construction rehabilitation activities. All activities that require seeding or planting would use a mixture of native or adapted seeds and plants.
- Post-construction monitoring and treatment of noxious or invasive weeds on Reclamation-owned lands.

7.6 General Wildlife

The wide variety of wildlife species found within the area is attributable to its location in a transition zone between the Northern Great Plains and the Rocky Mountains. The diverse habitats associated with these zones range from mountain and forested areas to prairie grasslands

7.6.1 Bald and Golden Eagles

Bald and Golden Eagle Protection Act (16 USC §668-668c), enacted in 1940, and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs. Any activity that disrupts breeding, feeding, sheltering, and roosting behavior and causes, or is likely to cause, nest abandonment or reduced productivity, is considered disturbance and is a violation of the BGEPA and state regulations.

The St. Mary River riparian corridor provides potential nesting habitat for bald and golden eagles and other raptor species. Eagles are sensitive to human disturbance during the breeding and nesting periods (Feb – May). Preferred habitat can be found near open water where fish are available, where waterfowl congregate, and near concentrated food sources such as predator or road kills. Roosting

habitat is associated with large trees, while foraging habitat typically consists of lake inlets and outlets, stream and river corridors, wetlands, and meadows.

7.6.2 Birds

The Migratory Bird Treaty Act of 1918 (MBTA, 16 U.S.C. 703 et seq.) was enacted to conserve certain species of migratory birds and gives the Secretary of the Interior the authority to regulate the harvest of these birds. In addition, EO 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds* obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures to improve bird populations. This Order provides for the protection of both migratory birds and migratory bird habitat.

Because of the ecological diversity in the area, a wide variety of bird species can be found including game birds, raptors, owls, shorebirds, woodpeckers, and songbirds. Some Montana species of concern include veery, evening grosbeak, common loon, golden eagle, bald eagle, great blue heron, and tern (var.).

7.6.3 Mammals

Big game species found in the area include elk, black bear, antelope, whitetail deer, mule deer, and moose. Many of these species use riparian areas for movement or migration corridors. Predators, which may be found in the area, include the gray wolf, coyotes, mountain lion, grizzly and black bear, red fox, badgers, bobcats, American marten, fisher, several species of weasel, and Canadian lynx. Many small mammals can be found, including the snowshoe hare, white-tailed jackrabbit, mountain cottontail, yellow-bellied marmot, striped skunk, a variety of ground squirrels, mice, voles, and shrews.

7.6.4 Aquatic Species

Fish species found in the St. Mary River include long-nosed dace, mottled sculpin, burbot (ling), long-nosed sucker, mountain whitefish, trout perch, cutthroat x rainbow trout hybrids, and brook trout.

Different fish species and their various life-stages move in different ways for different reasons and at different times of year, and those movements may be upstream, downstream or both. For example, many adult salmonids undergo a very distinct flow-, temperature- and sex-driven spawning migration and typically ascend fluvial systems by utilizing the lower velocity corridors along stream margins and taking advantage of the various resting and staging areas provided by bank structure. Conversely, out-migrating juveniles generally exhibit a broader period of emigration and often move downstream more passively in the faster flowing thalweg rather than along the margins. In general, juveniles and smaller fish do not swim as strongly as larger fish or healthy adults of the same species. Since the timing and frequency of fish movement vary among species and watershed, knowledge of the specific behaviors of the target species is vital to the development and operation of a successful passage structure.

Relatively little is known about the demography and life history of most Montana amphibian and reptile species, because most have only been studied in detail at specific locations. The unique blend

of water and gravel benches in the river valleys provide great habitat for both reptiles and amphibians. Common amphibians such as western toad and northern leopard frog and reptiles such as the common garter snake are likely to occur in the project area.

7.6.5 No Action Alternative

Under the No Action Alternative, irrigation water would not be diverted from the St. Mary River to the North Fork Milk River. Wildlife in the St Mary River basin would generally remain the same. In the event of dam failure, wildlife may be temporarily displaced; however, this alternative would not meet the requirements of the ESA as fish would continue to be entrained in the canal and upstream and downstream passages in the river would continue to affect bull trout and other native fish species.

7.6.6 Proposed Action Alternative

Under the Proposed Action, construction noise and activities would temporarily displace terrestrial wildlife in the project area. Displaced wildlife would likely find suitable habitats in surrounding areas where similar vegetation is present. Temporary, minor loss of habitat would occur where vegetation is removed during construction activities.

Bald and golden eagles are known to occur in the general area; however, it is uncertain if they nest within the project area. Minimization measures would be in place for the protection of all avian species (see below).

Species such as small mammals and nesting ground birds are expected to return to reclaimed areas after construction. Amphibians and reptiles could be lost in the construction zone of the project area since equipment would be working in the riparian zone. Larger animals such as deer are expected to avoid construction areas. Temporary, minor loss of habitat would occur where vegetation is removed during construction activities. These impacts would be short-term and temporary in nature, and overall unlikely to have a noticeable impact.

Individuals or their preferred habitats, if occurring near the Proposed Action site could be exposed to the direct effects described above. The project area does not provide large enough tracts of suitable habitat to support the general wildlife species that may occasionally visit the area. In addition, the relatively small area of impact would not cause a notable decrease in available habitat. The range, magnitude, and duration of the construction activities would be short-term. Essentially, upon completion of the project, the area would be returned to prior conditions but with improved features. Following the construction and replacement of the St. Mary Diversion Dam and associated structures, O&M of the St. Mary Unit would continue as in the past.

7.6.7 Minimization Measures

- A nest inventory shall be completed outside of the eagle nesting period (Feb-August) prior to construction. If a nest is found, Reclamation would work with the Service to determine appropriate protection measures.

7.7 Endangered Species Act

The Endangered Species Act (ESA) sets out a comprehensive program for the protection of threatened and endangered species and their habitats. Section 7 (a)(2) of the ESA requires Federal agencies to consult with the Service on any Federal action that may affect listed species (50 CFR § 402.12; 16 USC § 1536 (a)(2)).

The official species list for the proposed St. Mary Diversion Dam Replacement Project was generated through the Service's Information for Planning and Consultation (IPaC) on January 20, 2023. This list is provided pursuant to Section 7 of the Endangered Species Act and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." Three listed "Threatened" species; bull trout, grizzly bear, and Canada lynx could occur within the project area.

Table 5: Endangered Species Act Effects Determination

Common Name	Scientific Name	Determination of Effects
Bull Trout	*Salvelinus confluentis*	Likely to adversely affect
Bull Trout	Critical Habitat	No effect – no designated critical habitat
Grizzly Bear	*Ursus arctos horribilis*	Not likely to adversely affect
Canada Lynx	*Lynx canadensis*	No effect
Canada Lynx	Critical Habitat	No effect – no designated critical habitat

Reclamation has prepared a Biological Assessment (BA) to analyze the potential effects of the St. Mary Diversion Dam Replacement Project on bull trout (*Salvelinus confluentus*), grizzly bear (*Ursus arctos horribilis*), and Canada lynx (*Lynx canadensis*). The BA, in its entirety is included as Appendix A of this document. Below is a summary of each species, habitat requirements, and distribution within the study area.

7.7.1 Bull Trout

Bull trout (*Salvelinus confluentus*) in the coterminous United States were listed as a threatened species on November 1, 1999 (64 FR 58910). The final determination was based on the combined effects of habitat degradation, fragmentation, and alterations associated with dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (the process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduction of non-native species.

In reaching its decision to list the St. Mary Bull Trout, the Service stated that the St. Mary River diversion dam is a substantial barrier to the movement of fish. However, results from both radio telemetry and conventional tag-recapture techniques (Mogen and Kaeding 2003 and 2005b) show upstream and downstream movements of bull trout past the dam. The upstream passage of bull trout appears to be impeded by the dam, particularly during pre-spawning movements when the dam is closed for the irrigation season.

The only known US bull trout population east of the Continental Divide in Montana is found in the upper St. Mary River Basin. The Service identified the following areas where Reclamation facilities are threats to bull trout:

1. Lack of winter flows in Swiftcurrent Creek below Lake Sherburne Dam and winter flow reductions in the lower Mary River.
2. Passage at the St. Mary Diversion Dam.
3. Entrainment into the St. Mary Canal.

The final rule for bull trout critical habitat was published in the Federal Register in October 2004. The only designated critical habitat in MT was in the St. Mary River drainage. The Blackfeet Tribe opposed the critical habitat designation. The final critical habitat rule was remanded by the Service and a revised final rule was re-published in the Federal Register in October 2010 (75 FR 200, 2010). All Tribal lands on the Blackfeet Reservation are excluded.

7.7.2 Grizzly Bear

The grizzly bear (*Ursus arctos horribilis*) was listed as a threatened species in 1975 (40 FR 31736) in the conterminous 48 States. A Recovery Plan was approved in 1982 and identified five ecosystems with known populations. They are the Northern Continental Divide, Greater Yellowstone, Cabinet /Yaak in Montana, and the Selkirk (Idaho and Washington), and Northern Cascades (Washington). The Bitterroot in Idaho represents a sixth possible population.

At the time the grizzly bear was listed (1975) the Service identified habitat destruction, modification, and range curtailment as major contributing factors leading to the listing as a threatened species. Causes were listed as increased trail and road construction, recreational use, livestock grazing, human caused mortality, and lack of population/genetic analysis. Since 1975, habitat protection measures have focused primarily on providing secure habitat for bears to minimize the opportunity for human caused mortality. Implementation of management efforts across Federal, State, and Tribal lands were developed to aid in recovery and conservation and reduce threats to bears.

Action Area

The Action Area lies within the Northern Continental Divide Ecosystem (NCDE) Primary Conservation Area (PCA) grizzly bear recovery zone, Zone 1, Blackfeet Reservation Bear Management Unit (BMU). The NCDE is the large ecological system containing and surrounding GNP. This is the largest grizzly bear population found in the lower 48 states and is connected to Canada. The NCDE specific Grizzly Bear Recovery Plan was most recently updated in 2018 (Supplement: Habitat-based Recovery Criteria for the Northern Continental Divide Ecosystem). Critical Habitat has not been designated, instead, the Interagency Grizzly Bear Committee (IGBC) issued habitat management guidelines within all occupied grizzly bear habitat (USFWS 2011). Grizzly bears historically occurred throughout the area but were less common in prairie habitats (USFWS 2021). Since the 1975 listing of grizzly bears as threatened, the NCDE population has more than doubled in size and range (USFWS 2021). The carrying capacity of this ecosystem is unknown. The Action Area consists of low to moderately suitable habitat for grizzly bear (MTNHP 2023).

7.7.3 Canada Lynx

The Canada lynx was listed as a threatened species March 24, 2000 (65 FR 16052) for the contiguous US Distinct Population Segment (DPS). The Service concluded that the population was threatened by human alteration of forests, low numbers caused by past overexploitation, expansion of the range of competitors and elevated levels of human access into lynx habitat. Critical habitat for the species was designated in 2006 and revised in 2014. The 2014 Final Rule (79 FR 177) excluded all Tribal lands on the Blackfeet Reservation from critical habitat designation. However, adjacent lands within GNP are included as critical habitat for the Canada lynx.

Action Area

The Action Area, for purposes of analyzing effects to lynx, located on the east side of the Continental Divide consists of rugged mountain topography shaped by glaciation; the mountains abruptly transition to short-grass prairie and savanna habitats. The project footprint for the St. Mary Diversion Dam Replacement Project lacks the high-elevation mesic coniferous boreal, subboreal, and montane forest habitat typically preferred by lynx in Montana. The nearest suitable habitat is in the higher elevation mountainous areas surrounding the valley bottom.

Effects Determination – Canada Lynx

The St. Mary Diversion Dam Replacement Project would have ***No Effect*** on Canada lynx.

Rationale:

- There is no anticipated harm of Canada lynx caused by the Proposed Action within the footprint of the St. Mary Diversion Dam and Headworks.
- Direct, indirect, and cumulative effects of the Proposed Action would be discountable.
- The Proposed Action would not result in changes to ecological systems resulting in altered predator/prey relationship.
- There are no documented lynx occurrence records in the Action Area.
- The Proposed Action would not increase the project footprint or human presence in the Action Area.

7.7.4 No Action Alternative

Under the No Action Alternative, bull trout and other native fish species would continue to be entrained in the canal, and passage over the diversion dam would continue to be limited for bull trout and other native fishes. Grizzly bears would continue to expand beyond their historic range, potentially utilizing the proposed project area. There would be no change to Canada lynx, as there is not suitable habitat in the action area. The No Action Alternative would not meet the requirements of ESA for the protection of bull trout.

7.7.5 Proposed Action Alternative

Bull Trout

Bull trout in the Action Area could be found anywhere in the St Mary complex core area. Since bull trout are a migratory fish species, it is known that movement occurs throughout the St. Mary Recovery Unit. The proposed actions have the potential to affect fish that are moving through the system concurrently with dam construction and removal activities.

Although the proposed construction activities would be contained within an area of existing development and human presence, the level of noise disturbance associated with construction activities would be elevated in comparison to the existing impacts. The proposed action includes permitting construction in and near the water.

Such construction can mobilize sediments and temporarily increase local turbidity levels in the action area. The proposed action includes measures to decrease the likelihood and extent of any such effect on bull trout. These measures are identified in the proposed action (St. Mary Diversion Dam Replacement Project EA) and include best management practices (BMPs), as well as minimization measures, and conservation measures addressing construction-related activities.

Quantifying turbidity levels and their effect on fish species is complicated by several factors. First, turbidity from an activity will typically decrease as distance from the activity increases. How quickly turbidity levels attenuate is dependent upon the quantity of materials in suspension (i.e., mass or volume), the particle size of suspended sediments, the amount and velocity of ambient water

(dilution factor), and the physical/chemical properties of the sediments. Second, the impact of turbidity on fish is not only related to the turbidity levels, but also the particle size of the suspended sediments.

The river would need to be manipulated within the existing channel by using an earthen cofferdam during the construction of the new headworks and associated features. The coffer dam would be used to isolate the in-river work zones, diverting river flows from one side of the main channel to the other and increasing water depths and velocities in the river channel. Timing and duration of the cofferdam would be limited to (window) allow fish passage. In addition, the cofferdam could reduce the width of the river by up to 50% of existing width and alter velocities accordingly. To allow fish passage, minimum flow depths along the length of the cofferdam shall be a minimum of six inches for flows of 150 cfs and higher.

Construction activities (vegetation clearing, topsoil stripping, excavation from borrow areas, construction of temporary haul routes) could result in the introduction of pollutants and sediment into stormwater runoff. Dewatering system installation, operation, and removal may also cause a slight increase in turbidity in the river. There may be short-term impacts on water quality in the St. Mary River during and after the removal of the existing diversion dam and canal headworks. Turbidity may increase both during and for a short time after the removal, but this is anticipated to be well within the range of normal hydrological changes (i.e., spring runoff, storm events). It is expected that turbidity arising from the implementation of the proposed diversion dam replacement would be short-lived and cause only minor, short-term increases in turbidity. However, this would also be a short-term impact to bull trout in the area.

If necessary, sheet piles would be installed within the river channel to stability for installation of the cofferdam (to be determined by the selected contractor). Elevated underwater noise levels (percussive damage) from sheet pile driving may disturb fish species in the immediate area. Fishes may respond to the first few strikes of an impact hammer with a "startle" response. After initial strikes, the startle response wanes and the fishes may remain within the field of potentially harmful sound (NMFS 2002, p. 32).

The proposed concrete diversion dam rock ramp with low flow channel would provide fish with a more-natural, channel-like connection to upstream habitats. This design would provide full-river passage to a wider variety of life stages and fish species during high flows, providing both upstream and downstream passage and promote connectivity between habitat types and subpopulations. Passage improvement at the St. Mary Diversion Dam would remediate effects of fragmentation and enhance persistence of bull trout in isolated local populations.

The proposed action would potentially limit upstream passage of bull trout during the construction period for up to three years while the diversion dam is being replaced. The loss of upstream passage by a few individuals during the construction period would be additive to the existing passage limitations. Once completed the diversion dam and rock ramp is likely to substantially improve the likelihood that adult bull trout could migrate upstream and spawn versus the existing condition. Following construction bull trout and other native fish species would be allowed greater access to habitats, both upstream and downstream of the diversion dam. Overall, the construction of the proposed action is likely to affect bull trout from noise levels during installation of coffer dams and

blocking the existing high-flow side that could prevent adult bull trout passage during the five year construction period.

Until the new weir is constructed, the existing weir would remain in place so that water can continue to be diverted into the temporary bypass canal. The existing weir would continue to be an upstream impediment to bull trout over the short-term, as will the likely increased velocities resulting from the coffer dam during construction. It is anticipated that this short-term effect would perpetuate the adverse effects that have existed over the past 100 years at the St. Mary Diversion Dam. However, this would be for the five year construction period.

Collectively, the proposed features would allow bull trout passage for all age classes, both upstream and downstream of the diversion dam. The fish bypass would function to return fish to the river and limit entrainment in the canal. The proposed St. Mary Diversion Dam would be beneficial to bull trout and other native fish species that occupy the St. Mary River drainage.

Action Area

The Action Area for bull trout includes St. Mary Diversion Dam and Headworks, and upstream approximately 1 mile (1.6 km) of the St. Mary River to State Highway 464 and downstream approximately 1 mile (1.6 km) within the St. Mary River and Canal. The Action Area occurs within the St. Mary River Complex Core Area.

Conservation Measures

Reclamation is committed to minimizing the impact and extent of incidental take of bull trout resulting from the proposed action. Conservation measures used to minimize or eliminate short-term, adverse construction-related noise and human impacts are described below:

- Keep in-water work within the river channel to the minimum amount necessary. This includes, but is not limited to, construction and removal of any temporary support structures that may be necessary.
- In-water activities include cofferdam construction, in-water excavation, and concrete placement in the wet, etc. cannot occur from December 31 to July 15 of each year.
- The only exception would include maintenance/emergency repairs of the cofferdam.
- For fish passage, minimum flow depths along the length of the in-river cofferdam shall be a minimum of six inches for flows of 150 cfs and higher.
- Any in-river cofferdam construction or other work that blocks flow through the existing sluiceway shall not remain in place longer than 16 months unless provisions are made for alternate fish passage.
- Alternate passage would include notching the existing diversion dam to allow fish passage.
- Equipment may not remain in the river outside of work hours, or overnight.
- Work shall be limited to Monday to Saturday with 10-hour workdays except for the removal and control of water activities.

- Reclamation will have a monitoring plan in place preconstruction, during construction, and post-construction for monitoring of bull trout. This will be coordinated with the Blackfeet Nation Fish and Wildlife.
- Monitor all dewatering activities visually to ensure bull trout are not trapped. In the unlikely event a live bull trout is found within a dewatering area, immediately return it to the river.

Effects Determination

The St. Mary Diversion Dam Replacement Project **May Affect, Likely to Adversely Affect** bull trout (Appendix A-Biological Assessment)

No federally designated bull trout critical habitat exists within the Action Area; therefore, a determination of **No Effect** has been made for designated bull trout critical habitat.

Rationale:

- The proposed actions have the potential to affect fish that are moving through the system concurrently with dam construction and removal activities since migratory bull trout are known to use the St. Mary River as a migratory corridor.
- In-river construction has the potential to trap, injure, or kill bull trout, and has the potential to create a temporary disturbance barrier that prevents fish from passing upstream or downstream to preferred habitats.
- The proposed action will result in short-term degradation of water quality in bull trout waters during the five year construction period: however, measures to minimize sediment inputs to the river, and the low probability of bull trout occurrence, impacts from potential elevated sediment levels associated with construction are minimal.
- The effects of this fish passage improvement project will not alter the hydrologic condition in the St. Mary River but would affect instream habitat conditions during construction. A small amount of vegetation will be removed along the river corridor (grass, forbs, shrubs, and trees), potentially reducing shoreline and channel complexity, increasing the water temperature, and reduce substrate quality. The migratory corridor would be temporarily affected while construction activities occur.

Grizzly Bear

Upon emergence from the den, bears move considerable distances from high, snow-covered elevations to lower elevations to reach palatable, emerging vegetation on avalanche chutes, or to feed on winter-killed or weakened ungulates on foothill winter ranges. This type of movement often occurs on the Rocky Mountain front region of Montana. Such movement of bears to lower elevations often takes them near areas of human habitation and may increase the incidence of human/bear conflicts. It is likely that bears would emerge and move to lower elevations as operations start at the St. Mary Unit each spring.

The likely period that bears would be disturbed by construction activities would be March through November. Grizzly bears are known to seasonally use the riparian corridor associated with both the St. Mary Canal and the St. Mary River.

Direct effects of the St. Mary Diversion Dam Replacement Project would include disturbance to any bears that may be in the vicinity during construction activities, and avoidance of those areas. It is assumed that sights and sounds, including vehicles, equipment, and personnel would be perceptible to bears that may be within the action area, causing them to leave. Avoidance would be reasonably certain to occur during site preparation and construction activities.

Indirect effects of the proposed project include the overlap of human/grizzly bear habitat. Grizzly bears generally avoid humans; the occupied habitat of the two species has relatively little overlap at the landscape scale; however, humans travel, recreate, introduce non-native species, develop, and harvest resources in grizzly bear habitat.

To minimize impacts to wooded riparian habitat the diversion dam and headworks be constructed within the existing project footprint to the greatest extent possible. The overall construction use area would be approximately 55 acres (including the river) and would require 15 acres of clearing and grubbing of vegetation (grass, forbs, shrubs, and trees). This will require the removal and replacement of about two acres of trees and shrubs.

Although noise impacts associated with construction may result in temporary displacement of individuals, the frequency and regularity of activities during the five year construction period would likely result in avoidance of the area. The effects of construction noise and disturbance to grizzly bears are described in more detail above in the effects analysis. Construction activities would not have impacts to denning habitats or behaviors due to the project location.

It is known that anthropogenic food, garbage, and other attractants associated with resource management activities increase the risk of grizzly bear mortality. Reclamation is bear aware and would follow mandatory food storage requirements.

Construction-related noise and increased human presence on the landscape is a direct, but short-term, impact of construction. During construction, the presence of large earthmoving equipment as well as construction crews will likely deter wildlife, including grizzly bears from using potential habitat within the action area. Grizzly bears generally avoid human interaction under most circumstances. Any bears using the St. Mary River riparian corridor during construction would likely be displaced temporarily by construction activities and leave the action area.

Conservation Measures

Terms of the construction contract include implementation of the following conservation measures to minimize or eliminate short-term, adverse construction-related noise and human impacts to grizzly bears, as described below:

- If grizzly bears are present in or near the construction zone, all work would stop until the bears leave the area.
- Store all food, food related items, petroleum products, antifreeze, garbage, and personal hygiene items inside a closed, hard-sided vehicle or commercially manufactured bear resistant containers. Attractant storage rules will be implemented on Federal and Tribal lands.

- Bear-resistant containers must meet the most current Interagency Grizzly Bear Committee (IGBC) Certified Bear-Resistant Products list.
- During nighttime hours, all attractants, including human, pet, and garbage shall be stored in a bear-resistant manner unless it is in immediate control, being prepared for eating, being eaten, being transported, or being prepared for storage.
- Promptly clean up any project-related spills, litter, garbage, and debris.
- It is known that anthropogenic food, garbage, and other attractants associated with resource management activities increase the risk of grizzly bear mortality. To ensure there are no adverse effects to grizzly bears all Reclamation staff and contractors would be required to comply with the Blackfeet Nation, Fish and Wildlife Code Chapter 3, Section 17. The Blackfeet Nation implements and monitors compliance with attractant storage regulations in areas normally occupied by grizzly bears. This includes nearly all public reservation lands in the PCA and most public reservation lands in Zone 1. All residents and visitors in "normally occupied" grizzly bear habitat are required to store attractants in a bear-resistant manner. Purchasers, all employees, contractors, and subcontractors must store trash in bear-resistant containers, remove trash daily, and refrain from feeding wildlife. Regulations are enforceable by Tribal wardens and Tribal police.

Effects Determination -Grizzly Bear

The St. Mary Diversion Dam Replacement Project is **Not Likely to Adversely Affect** the grizzly bear.

Rationale:

- Vegetation control/removal would be limited to within the footprint of the St. Mary Unit. There would be no change to the ecological system that would result in long-term habitat alteration.
- Associated construction activities would be located within the NCDE, PCA, Zone 1, Blackfeet Reservation BMU for grizzly bears. It is likely that a bear could be found within this area but would relocate due to human activity.
- Noise and disturbance associated with construction activities have the potential to extend outward up to one mile from the project footprint. It is likely that grizzly bears in the area would perceive the noise and likely leave the area.
- No new permanent roads would be constructed within the footprint of the St. Mary Unit.
- Direct, indirect, and cumulative effects of proposed actions would be discountable.
- Conservation Measures (above) will be implemented to avoid potential conflicts due attractant storage.

Canada Lynx

Canada lynx are known to occur in high elevation habitats that consist of lodgepole pine, subalpine fir, Engelmann spruce, and aspen habitat types that are subject to cold, snowy winters and support a prey base of snowshoe hares. The size of the lynx home range varies by gender, abundance of prey, season, and the population density.

There is not adequate habitat available in the construction area and it is highly unlikely that Canada lynx would be present in the vicinity of construction activities. Construction activities are not expected to have any effect on Canada lynx.

Canada lynx are known to occur in high elevation habitats that consist of lodgepole pine, subalpine fir, Engelmann spruce, and aspen habitat types that are subject to cold, snowy winters and support a prey base of snowshoe hares. The size of the lynx home range varies by gender, abundance of prey, season, and the population density.

There is not adequate habitat available in the construction area and it is highly unlikely that Canada lynx would be present in the vicinity of construction activities. Construction activities are not expected to have any effect on Canada lynx.

Effects Determination – Canada Lynx

The St. Mary Diversion Dam Replacement Project would have ***No Effect*** on Canada lynx.

Rationale:

- There is no anticipated harm of Canada lynx caused by the Proposed Action within the footprint of the St. Mary Diversion Dam and Headworks.
- Direct, indirect, and cumulative effects of the Proposed Action would be discountable.
- The Proposed Action would not result in changes to ecological systems resulting in altered predator/prey relationship.
- There are no documented lynx occurrence records in the Action Area.
- The Proposed Action would not increase the project footprint or human presence in the Action Area.

7.8 Air Quality and Noise

7.8.1 Air Quality

The Clean Air Act (CAA - 42 USC §7401 et seq.), as amended, requires the Environmental Protection Agency (EPA) to establish air quality standards for pollutants considered harmful to public health and the environment by setting limits on emission levels of various types of air pollutants. Air pollution impacts are limited by local, state, tribal, and federal air quality regulations,

standards, and implementation plans established under the CAA. GNP is designated as a mandatory Class I area under section 162(a) of the CAA.

Section 301 (d) of the 1990 Clean Air Act Amendments provides federally recognized tribal governments the authority to implement Clean Air Act programs for their reservations and other land for which they can demonstrate jurisdiction. The Tribal Authority Rule (TAR – 1998) further delineates the authority of tribes to implement air quality programs under the Act.

Criteria pollutants tracked under EPA's National Ambient Air Quality Standards (NAAQS) include SO2 (sulfur dioxide), PM (particulate matter), NO2 (nitrogen dioxide), O3 (ozone), Pb (lead), and CO (carbon monoxide). Air quality in the project area is consistent with typical background levels for this area. According to EPA's AirData interactive map, there are no monitoring stations for the six criteria pollutants within the project area (EPA, 2021).

The principal sources of Montana's Greenhouse Gas (GHG) emissions are electricity use (excluding electricity exports) and agriculture, each accounting for about 27% of Montana's gross GHG emissions (CCS 2007). The next largest contributor to emissions is the transportation sector. According to the Montana GHG Inventory and Reference Case Projections (1990-2020), Montana's gross GHG emissions are rising at about the same rate as the nation.

The nearest air quality monitoring station is in Cut Bank, Montana. The project area has minor sources of air pollution that include vehicular traffic, home heating, agriculture, dust storms, and wildland fires. On occasion, exposed areas with erodible soils, such as roads, and plowed fields can produce dust pollution. Air quality is considered good in the area; however, visibility is occasionally marred by airborne particulate matter that includes smoke from natural and manmade fires and dust from unpaved roads.

7.8.2 Noise

The Noise Control Act of 1972 (PL 92-574) created a national policy to promote an environment free from noise that jeopardizes human health and welfare. While primary responsibility for control of noise rests with state and local governments, Federal action is essential to deal with major noise sources. The EPA developed environmental noise criteria to be used as a guideline when no other local, county, or state standard has been established.

Existing sound levels can serve as a baseline from which to measure potential disturbance caused by project activities. Baseline sound is characterized as either background or ambient sound and levels can vary greatly, depending on site-specific factors. Sound levels are influenced by the distance and the path traveled between the source of the sound and receptor. There is a natural reduction of sound levels with increasing distance between the source and the receptor. Natural factors such as topography, vegetation, and temperature can affect the rate of noise attenuation by disrupting or deflecting the sound wave. A hard site exists where noise travels away from the source over a generally flat, hard surface such as water, concrete, or hard-packed soil. When ground cover or normal unpacked earth is present between the source and receptor, the ground becomes absorptive to noise energy and is called a soft site.

The St. Mary Diversion Dam is within the boundaries of the Blackfeet Reservation and within the St. Mary River. The nearest noise-sensitive receptors are the community of Babb, including the Babb elementary school, and scattered residences within one mile. This environment can best be described as a rural area with minor background noise coming from sources such as transportation in the area, agricultural work, and O&M at the dam. The project area is composed of both hard and soft site types.

The most common metrics for evaluating community noise are as follows:

- Leq: The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, logarithmically averaged over a specified monitoring period
- LDN: The day-night average sound level, representing a 24-hour A-weighted sound level average from midnight to midnight, with sound levels from 10 p.m. to 7 a.m. having an added 10 dB weighting.

The Project is in a rural, sparsely populated area in northcentral Montana. The existing ambient noise environment in the immediate vicinity is mainly made up of natural sounds and vehicle noise associated with US Highway 89 and small community roadway segments near the St. Mary River. Relevant noise limits have not been established by the Blackfeet Tribe. There are no documented noise studies of measured ambient noise levels at or near the project area. Research shows that typical ambient noise levels for rural areas range from 35 to 40 dBA Leq during the day and 30 to 35 dBA Leq at night (EPA 1978).

There are no federal, state, or local noise regulations or offsite noise-sensitive receptors that would be affected by the proposed project. Table 7 summarizes the maximum recommended noise level for specific land use areas.

Table 6: Noise Levels for Public Health and Welfare

Effect	Max Noise Level	Land Use Area
Hearing Loss	$L_{eq}(24) =< 70$ dB	All Areas
Outdoor activity interference and annoyance	LDN =< 55 dB	Outdoors in residential areas and farms where people spend time and where solitude is a basis for use.
	$L_{eq}(24) =< 55$ dB	Outdoor areas such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	N =< 45 dB	Indoor residential areas.
	$L_{eq}(24) =< 45$ dB	Indoor areas such as schools, etc.

Source: EPA 1974

An L_{DN} of 45 dBA indoors and 55 dBA outdoors for residential areas in a rural setting is identified as the maximum allowable noise level with no effect on public health and welfare (defined as interference with speech or other activities). These levels would protect most of the population against annoyance under most conditions.

Several pieces of equipment would be operating concurrently within the construction zone and vary day to day throughout the construction period. Although noise from multiple sources within the same location is louder than a single source, the decibel is measured on a logarithmic scale thus noise levels cannot be added by simple addition. Two noises of equal level (± 1dB) combine to raise the noise level by 3 dB. However, if two noises differ by more than 10 dB, there is no combined increase in the noise level; the higher output covers any other noise. Thus, the noise levels outside the construction zone would continue to decrease with distance.

Table 7: -Estimated Construction Equipment Noise Levels (dBA) and Distances

	Equipment	25 feet	50 feet	100 feet	200 feet
Internal combustion engines	Compactors (Rollers)	80	74	68	62
	Front end loader	85	79	73	67
	Grader	91	85	79	73
	Scraper	94	88	82	76
	Trucks	97	91	85	79
	Concrete pumps	82	76	70	64
	Concrete mixer	91	85	79	73
	Pumps	82	76	70	64
	Generators	82	76	70	64
	Compressors	87	81	75	69
Impact	Pneumatic wrenches	91	85	79	73
	Jack hammers and rock drills	94	88	82	76
Other	Vibratory equipment	82	76	70	64
	Saws	84	78	72	66

https://blog.ansi.org/2018/10/how-loud-is-construction-site-noise/#gref

7.8.3 No Action Alternative

Under the No Action Alternative impacts to air quality and noise would remain consistent with the current conditions. The project area has minor sources of air pollution and sound disturbance from transportation and agricultural activities. There would be no increase of criteria air pollutant emissions or increased noise from taking no action.

7.8.4 Proposed Action Alternative

Under the Proposed Action air quality affects are primarily centered on particulate matter generation from emissions to the air from heavy equipment operation during construction. Construction activities often take place outside where they can be affected by weather, topography, atmosphere, and landscaping. Typical construction noise and emissions from heavy earth moving equipment are likely to vary in intensity throughout a workday, depending on the timing and intensity of construction, as well as wind speed and direction. Noise and emissions from heavy equipment such as excavators, dozers, site grading equipment, large hauling trucks, concrete trucks, general construction vehicles, etc., would increase during the five-year construction period.

The proposed project would result in the temporary emissions of fugitive dust and combustion and noise pollutants during the following construction activities:

- On-site earthwork (cut/fill, excavation, compacting, and stockpiling).
- On-site construction equipment engine emissions.
- Off-site haul truck engine emission.
- On-site and off-site haul truck fugitive dust emissions for paved and unpaved road travel.
- On-site materials processing.

During construction, the Proposed Action would have the potential to increase noise in the area due to construction equipment and workers in the area. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and the nearest receiver.

There are three residences located with .05 miles from the construction site. In addition, the town of Babb, MT is located approximately 1 mile from the project site and the Babb Elementary School is approximately 1.5 mile from the site. These areas would be subject to minor interruptions caused from emissions (nearby residences) and construction noises, which would dissipate with distance from the project site.

There would be minimal impacts during construction from particulate matter generation and noise from construction activities. The engines and motors associated with the equipment would temporarily elevate noise levels in the construction zone. Overall noise levels are expected to increase for the duration of the project, which may impact the enjoyment of quiet spaces. Disturbances to air quality and noise are anticipated to be short-term, for the duration of the

construction period. Once construction activities are completed, the project area would return to preexisting levels of air quality and noise production.

7.8.5 Minimization Measures

- During construction, water trucks would be used for dust abatement when needed.
- All construction-related ground-disturbing activities would be limited to the smallest possible construction footprint to minimize particulate generation.
- Provide means for eliminating atmospheric discharges of dust during mixing, handling, and storing of cement, and concrete aggregate.
- Use reasonably available methods and devices to prevent, control, and minimize emissions or discharges of air contaminants.

7.9 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (PL 89-665; 80 Stat. 915; 16 USC 470) mandates that Reclamation considers the potential effects of a proposed Federal undertaking on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings.

Historic properties (36 CFR § 800.16 (l)(1)) are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Cultural items include Native American historical items such as funerary objects, sacred objects, objects of cultural patrimony, or human remains for which protection is prescribed under the Native American Graves Protection and Repatriation Act (NAGPRA) - Public Law 101-601; 104 Stat. 3042, Section 3(d); and 43 CFR Part 10.4.

7.9.1 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. No historic properties would be affected as there would be no ground disturbing activities or dam removal and the current land use would remain unchanged. No ground-breaking or excavation activities would occur and there would be no effect on cultural resources. Consequences of taking No Action could result in failure of the existing structures. If failure occurs there would be an adverse effect to a site (24GL0155) eligible for inclusion in the NRHP.

7.9.2 Proposed Action Alternative

In compliance with section 106, Reclamation consulted with the Blackfeet Nation Tribal Historic Preservation Office (THPO). Reclamation, in consultation with the THPO, determined an adverse effect due to the proposed removal and replacement of the St. Mary Diversion Dam, part of site 24GL0155, a site eligible for inclusion in the NRHP. Reclamation and the THPO, in consultation with the ACHP, will develop a Memorandum of Agreement (MOA) to mitigate the adverse effect

7.9.3 Minimization Measures

- Should any cultural resources be found during construction, work would be halted, and Reclamation and the appropriate agencies would be contacted.
- If a site is located, Reclamation and the THPO shall record any site features and artifacts in place.
- Reclamation and the THPO may conduct shovel testing and/or test excavation if allowed by the allotment owners.
- If avoidance of a site is not possible to complete the undertaking, Reclamation and the THPO shall determine the mitigation of the site pursuant to 36 C.F.R. part 800.
- Any artifacts located on the allotment are owned by the allottees. Any artifacts recovered by testing during inventory or monitoring during the undertaking construction shall be returned to the allottees.
- A Blackfeet Tribal monitor would be onsite during construction of the proposed project.

7.10: Indian Trust Assets

Indian Trust Assets (ITAs) are "legal interests in property or resources held in trust by the United States for Indian tribes or individual Indians" (Indian Trust Policy issued July 2, 1993). The Secretary of the Interior is the trustee for the United States on behalf of Indian tribes. Assets can be real property, physical assets, or intangible property rights. Examples include lands, minerals, water rights, gathering rights, hunting, and fishing rights, rights to other natural resources and forest products, money, or claims. They need not be owned outright, but can include other types of property interest, such as a lease or a right to use something. Some treaties express a priority right for a resource; others express a proportional or in common right. ITAs cannot be sold, leased, or otherwise alienated without federal or tribal approval.

The St. Mary Diversion facilities Project lands are located between the Blackfeet Reservation and the Fort Peck Reservation. Between these two reservations is the Fort Belknap Reservation, which borders the Milk River and receives irrigation water from the river.

The Blackfeet Reservation includes approximately 1.5 million acres of land. The largest percentage of this land is held in trust by the Bureau of Indian Affairs (BIA). The Blackfeet Nation is an

important stakeholder because the entire St. Mary diversion and conveyance system lies within the boundaries of the Blackfeet Reservation. Reclamation reserves the right on these lands to access, operate, maintain, and replace as necessary to meet the contractual water delivery needs (PL 50-864).

7.10.1 No Action Alternative

Consequences of taking No Action could result in failure of the existing structures. Failure would result in the inability of the St. Mary Unit to operate under its intended purpose: The existing structures would continue to deteriorate, causing eventual failure and potentially causing damage to ITA properties.

7.10.2 Proposed Action Alternative

The Proposed Action does not involve the acquisition of water rights or change of use for the St. Mary Diversion Dam and Canal Headworks. Reclamation would continue to operate the dam and headworks to meet water supply and delivery requirements during and after construction of the Proposed Action Alternative.

During construction Reclamation would need to use and access lands along both sides of the St. Mary River. Per the Act of Congress, approved August 28, 1937, 50 Stat. 864, the Bureau of Reclamation letter dated July 1943, and the Bureau of Reclamation letter dated September 1946 Reclamation intends to exercise reserved rights to construct the St. Mary Diversion Dam Replacement Project using the relinquished lands around the dam site.

During construction, the Blackfeet Tribe, in cooperation with Reclamation, would provide monitoring services for cultural resources within the project area.

8. Cumulative Impacts

Cumulative effects are the impact on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7). As required by NEPA, Reclamation has prepared this assessment in consideration of cumulative impacts related to the alternatives considered in the EA.

Reclamation has examined the potential for significant environmental effects to geology and soils, hydrological resources, climate change, socioeconomics, air quality and noise, cultural resources, Indian trust assets, lands and vegetation, and wildlife. Federal, State, and Tribal regulations designed to protect fish and wildlife resources, important habitats and sensitive areas, cultural resources, human health and safety, and the public interest provide the legal basis for the evaluations. Cumulative impacts may influence minimization measures and mitigation considered for the proposed action. Reclamation's consideration of mitigation would not extend to mitigating impacts of non-Reclamation actions.

The St. Mary Unit was built between 1906 and 1924 and included construction of several water-control and delivery structures in the St. Mary River basin. Cumulatively, these past actions and associated activities have altered the landscape within the project area. The effects of past and ongoing actions are accounted for in the baseline (existing condition) and reflects any relevant impacts of the past actions.

Cumulative impacts were determined by combining the effects of the proposed actions with other actions (past, present, and reasonably foreseeable) in proximity to the proposed action area. Actions such as recreational activities, state and county road maintenance, utility corridor maintenance, grazing and timber removal on tribal lands are expected to continue. When the overall effects of the proposed action are combined with these foreseeable future actions, there would be no cumulative adverse effect on Grizzly bear or Canada lynx.

Present ongoing actions include routine operation and maintenance of the St. Mary Unit facilities, annual bull trout monitoring and salvage activities, CWA monitoring activities performed by the Blackfeet Environmental Office, maintenance, and data collection for hydrological monitoring stations by the USGS, and noxious and invasive weed treatment along the canal.

Reasonably foreseeable actions include activities that may occur within the next five years. These activities would likely occur regardless of which alternative is selected for implementation. Those foreseeable actions in or near the project area would potentially contribute to cumulative effects when analyzed in conjunction with the Proposed Action. These actions may include:

Blackfeet Water Rights Settlement Act

The Blackfeet Water Rights Settlement Act (Water Infrastructure Improvements for the Nation Act, Title III, Subtitle G. PL 114-322, as amended *by* PL 115-270, Title IV, Subtitle C, § 4311, 132 Stat. 3765, 3891-92 (2018) authorizes, ratifies, and confirms the water rights compact between the Blackfeet Nation and the US. The Settlement Act authorizes Reclamation to plan, design, and construct facilities to supply domestic water and support irrigation—including developing new water infrastructure on the Blackfeet Reservation. This includes the Blackfeet Regional Water System, which would serve an estimated 25,000 reservation residents in the communities of Browning, Heart Butte, Babb, East Glacier, and Blackfoot, as well as rural farms and ranches.

St. Mary Canal Rehabilitation Project

The remaining downstream features of the St. Mary Unit include the 29-mile (47 km) St. Mary Canal. The unlined canal was designed to convey 850 cfs (24 m3) at a flow depth of 9-feet (2.75 m). The canal begins at the diversion dam on the west side of St. Mary River and crosses the river 9.5-miles (15 km) downstream through a two-barrel steel-plate siphon. Eight miles down the canal is another siphon that conveys water across Hall's Coulee. A series of five large concrete drops at the lower end of the canal provide an elevation decrease of 214-feet (65 m) where the water is then discharged into the North Fork Milk River. Most of the structures have exceeded their design life and need major repairs or replacement

8.1 No Action Alternative

Under the No Action Alternative, there would be no changes to the dam or headworks or how they are operated. The existing structures would continue to deteriorate, causing eventual failure. Failure would result in the inability of the St. Mary Unit to operate under its intended purpose. Potential failures range from minor to catastrophic, potentially affecting the entire Milk River Project, water users, and natural resources in the area.

8.2 Proposed Action

Under the Proposed Action Alternative, temporary direct impacts would include increased traffic, noise, dust, and vehicle emissions. Land disturbing impacts associated with removal of the existing features could cause erosion and sedimentation. BMPs would be employed to reduce the sort-term impacts. Construction noises may temporarily displace wildlife in the area, but they would return to favorable conditions upon completion of construction activities. The Proposed Action would provide long-term improvements for water delivery. The fish bypass would reduce entrainment in the canal, while the rock ramp would allow for fish passage both upstream and downstream of the diversion dam during the irrigation season. The minor, short-term impacts would be offset by the long-term benefits of the Proposed Action.

The collective impacts of past, present, and reasonably foreseeable future actions are likely to be similar to the impacts of the Proposed Action and primarily result from construction activities. The temporary nature of construction, as well as the incorporation of standard BMPs, regulatory compliance, and environmental commitments, and minimization measures into the Proposed Action would ensure that adverse impacts are lessened to the extent possible.

9. Consultation and Coordination

Consultation and Coordination with Indian Tribal Governments (EO 13175, November 6, 2000) requires federal agencies to consult with Indian tribal governments when considering actions that could impact tribal communities.

All Federal agencies are charged under Section 7 of ESA with ensuring, in consultation with the Fish and Wildlife Service, that their actions are not likely to jeopardize listed species or adversely modify their critical habitat, and with carrying out actions to improve the status of endangered and threatened species.

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