ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

BIOLOGICAL OPINION

for

Effects of Operation and Maintenance of the St. Mary Unit of the Milk River Project (2020-2025)

on

Bull Trout (*Salvelinus confluentus*)

Consultation Conducted by:

U.S. Fish and Wildlife Service
Montana Ecological Services Office
Kalispell, Montana

Action Agency:

Bureau of Reclamation
Montana Area Office
Billings, Montana

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A. INTRODUCTION

This biological opinion (BO) was prepared by the U.S. Fish and Wildlife Service (Service) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Section 7(b)(3)(A) of the Endangered Species Act (Act) requires that the Secretary of the Interior issue BOs on federal agency actions that may adversely affect listed species or critical habitat. BOs determine if the action proposed by the action agency is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat. Section 7(b)(3)(A) of the Act also requires the Secretary to suggest reasonable and prudent alternatives to any action that is found likely to result in jeopardy to a listed species or adverse modification of critical habitat, if any has been designated. If the Secretary determines no jeopardy, then regulations implementing the Act (50 C.F.R. § 402.14) further require the Director to specify "reasonable and prudent measures" and "terms and conditions" necessary or appropriate to minimize the impact of any "incidental take" resulting from the action(s). This BO addresses impacts to the federally threatened bull trout from the on-going operation and maintenance of the St. Mary Unit of the Milk River Project for the next five years (2020-2025) by the Bureau of Reclamation (Reclamation).

1. Conferencing and Consultation History

2000 through 2019: The Service and Reclamation have a long history of discussions regarding the effects of the project on bull trout in the St. Mary system since the time of their listing (1999). During these discussions the Service informed Reclamation that several of the threats identified during the listing effort pertain to the St. Mary Unit of the Milk River Project. These discussions also include results of research that has occurred since 1999, documenting impacts of water diversion activities on bull trout in the St. Mary system (e.g., entrainment, impaired fish passage, fish stranding, habitat loss), potential avenues to address these documented impacts, as well as early conferencing efforts to outline a consultation framework. Discussions over the past two decades include a multitude of meetings and correspondences; however, they are not individually listed here due to the volume of items that would need to be referenced. Individual records are available in the Service's project file.

November, 2019 – February, 2020: Following a letter from Reclamation to the Service on November 18, 2019, the Service and Reclamation engaged in early conferencing and informal consultation on the project. These early discussions pertained to accurately defining a "proposed action" and how to delineate an appropriate "action area" for consultation.

February – April, 2020: Reclamation sent several drafts of a biological assessment (BA) for effects of the project on bull trout to the Service for preliminary review. The Service provided comments back to Reclamation on all drafts.

Comments provided by the Service included the recommendation that the proposed action contain minimization measure designed at reducing the likelihood or impact of fish entrainment/stranding. In response, the Service and Reclamation met to discuss minimization measures that would reduce the effects of the proposed action on bull trout. Effects discussed

included the history of documented bull trout entrainment in the St. Mary Canal, the complete de-watering of Swiftcurrent Creek below Lake Sherburne Dam, and how to develop potential minimization measures using an adaptive management approach.

April 24, 2020: The Service received a request from Reclamation to initiate formal consultation on the effects of the project on bull trout. The request also indicated that Reclamation was seeking Service concurrence that the project may affect, but is not likely to adversely affect grizzly bears or Canada lynx. The request was accompanied by a final BA for effects of the project on bull trout, grizzly bear, and Canada lynx. Concurrence on the determinations for grizzly bears and Canada lynx is included in the cover letter for this biological opinion.

May – August, 2020: As part of the consultation process, the St. Mary Minimization Measures Team was convened. The Team includes a member of the Service's Ecological Services Office in Kalispell, Montana, as well as members from the Service's Fish and Wildlife Conservation Office in Bozeman, Montana. Reclamation is represented on the Team by members from the Montana Area Office in Billings, Montana. A representative from the Milk River Joint Board of Control was invited to attend and observe the Minimization Measures Team meetings. The Blackfeet Tribe was invited to attend the meetings, but the Team did not receive a response.

The Minimization Measures Team presented measures that could be implemented to reduce the effects of the project on bull trout to Reclamation managers and leadership. This meeting was also attended by managers from the Service's Montana Ecological Services Office and Fish and Wildlife Conservation Office. The measures presented to Reclamation leadership were aimed at reducing the likelihood of adult and juvenile bull trout entrainment in the St. Mary Canal, and measures that would attempt to return entrained bull trout to the St. Mary River. During this meeting the Service recommended that measures to reduce adult and juvenile entrainment, as well as measures to conduct in-canal fish salvage, be included as part of the proposed action.

August 20, 2020: Reclamation submitted a supplement to the BA that amended the proposed action. The supplement included additional minimization measures to reduce adult and juvenile bull trout entrainment into the St. Mary Canal as part of the proposed action. Reclamation also informed the Service the measures to conduct fish salvage efforts in the St. Mary Canal would also be included as part of the proposed action.

August 26, 2020: The Service provided a draft biological opinion to Reclamation for review. Reclamation provided feedback on the draft biological opinion on September 1, 2020.

B. DECRIPTION OF THE PROPOSED ACTION

1. Milk River Project – St. Mary Unit

The Milk River Project was conditionally approved on March 14, 1903 by the Secretary of the Interior under the Reclamation Act (1902 Public Law 57–161). The St. Mary Unit, as part of the overall Milk River Project, was authorized by Congress as an irrigation project in 1905. Between 1906 and 1924, Reclamation constructed several water-control and delivery structures in the St. Mary River basin as part of the St. Mary Unit. The Milk River is used as a conveyance so that the United States share of the St. Mary River can be utilized for irrigation in

the lower portion of the Milk River basin in northcentral Montana.

Currently, Reclamation regulates releases from Lake Sherburne Dam and withdrawals from the St. Mary River at the St. Mary Diversion Dam. The existing water right (40T-40955-00) is held by Reclamation and is for 850 cubic feet per second (cfs) for beneficial use by eight irrigation districts, individual users, and municipal use within the Milk River Project area.

Reclamation states that "the St. Mary Unit facilities have been in operation for over 100 years with only minor repairs and improvements." (BOR 2020). Further, Reclamation adds that "[t]he facilities are at the end of their expected service life and require replacement." (BOR 2020). Thus, Reclamation's proposed action is to continue operation and maintenance of the St. Mary Unit to allow continued diversions through the main Canal for use by the Project for the next five years (2020-2025) (BOR 2020). Reclamation states that "[f]ive years is a reasonable amount of time to further develop, plan, and identify funding strategies for new facilities." (BOR 2020). Nevertheless, we have analyzed the effects past the duration of this biological opinion to account for survival and recovery of the species.

2. Action Area

The St. Mary Unit of the Milk River Project lies within the Great Plains and Northern Rocky Mountain ecosystems in northwest Montana (Figure 1). With the exception of the Lake Sherburne Reservoir, which extends 6.4 miles (10 km) into Glacier National Park, the St. Mary Unit is located entirely within the boundaries of the Blackfeet Indian Reservation in Glacier County, Montana. Elevations in the project area range from 4,800-feet at the western end of Lake Sherburne Reservoir, to 4,400-feet at the northeastern-most extent of the St. Mary Canal, to 4,100-feet at the St. Mary and North Fork Milk rivers where they cross the international boundary.

Proposed operation and maintenance activities at the St. Mary Unit lie within the St. Mary River basin and includes Lake Sherburne Reservoir and Dam, Swiftcurrent Creek, Swiftcurrent Creek Dike, the northern most end of Lower St. Mary Lake, St. Mary Diversion Dam and Headworks, the St. Mary Canal, and the St. Mary River downstream to the international boundary with Canada (Figure 1). Within the St. Mary Unit, Lake Sherburne Reservoir, located in Glacier National Park (GNP), stores water behind Lake Sherburne Dam. Water released from the dam flows into Swiftcurrent Creek. The Swiftcurrent Creek Dike, located just downstream from the Swiftcurrent and Boulder Creek confluence, directs the collective flow into Lower St. Mary Lake near its outlet, which forms the St. Mary River. The river carries the water approximately 0.75-mile (~1 km) 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 it is allowed to pass the St. Mary Diversion Dam, continuing downstream to Canada.

For purposes of consultation under section 7 of the Act, the "action area" is defined by 50 CFR 402.02 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." This BO considers the action area for the proposed action (operation and maintenance of the St. Mary Unit of the Milk River Project) to include lower Canyon Creek and Lake Sherburne in Glacier National Park, Swiftcurrent Creek from below Sherburne Dam to Lower St. Mary Lake, Lower St. Mary Lake, the St. Mary River to the

Canadian border, and the St. Mary Canal (Figure 1). It should be noted that this action area encompasses an area larger than the project area, or areas immediately in the vicinity of existing infrastructure.

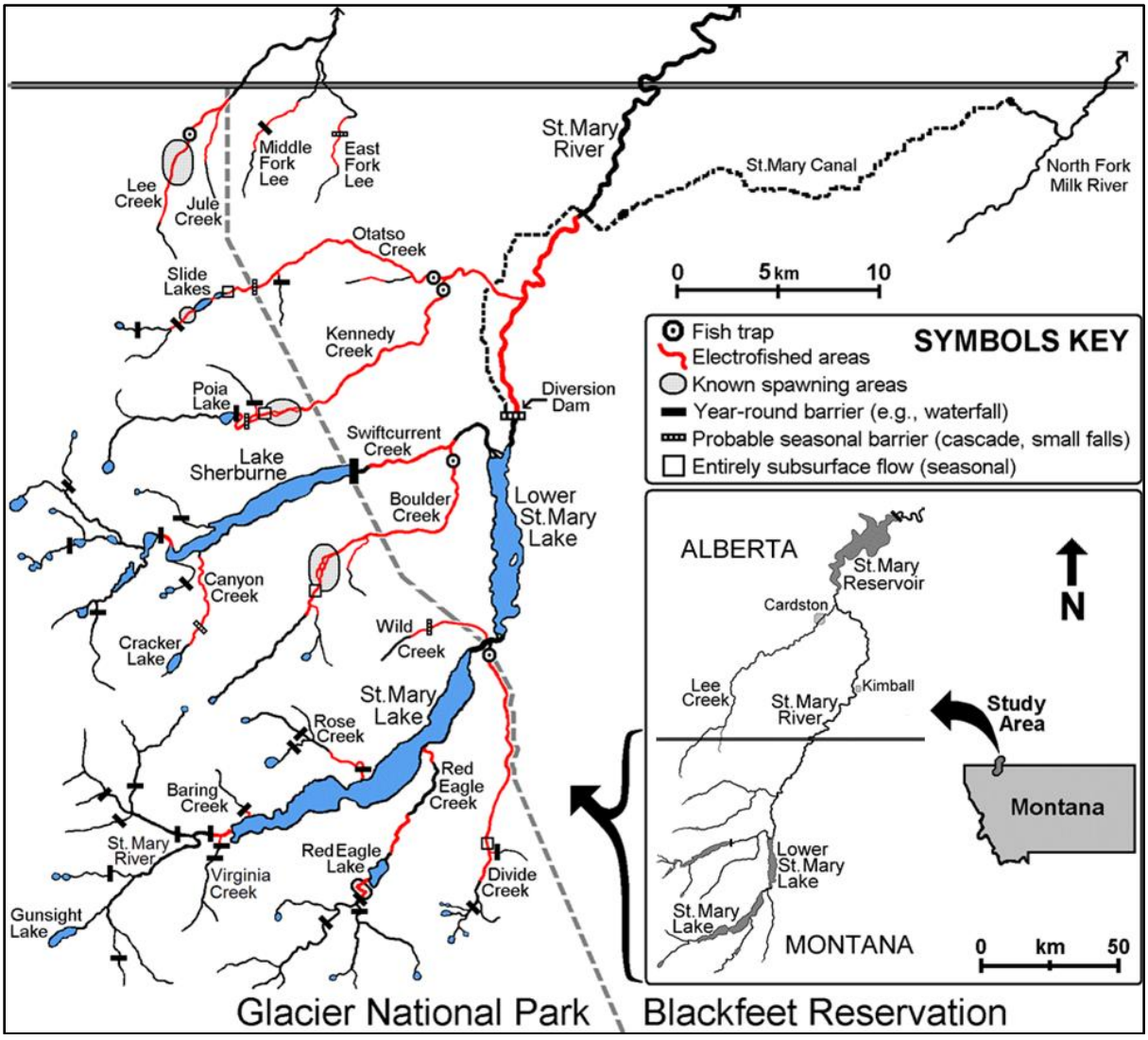

Figure 1. Overview of St. Mary River system (map from Mogen 2020)

Bull trout occur throughout the St. Mary drainage and its tributaries. Historically, bull trout could freely migrate throughout the St. Mary system. However, the Lake Sherburne Dam and the St. Mary Diversion Dam impede natural bull trout migration. The project also affects natural flow regimes, water quality (e.g., temperature, dissolved oxygen) and water quantity within an area far greater than the direct "footprint" of the dams and any supporting infrastructure. For these reasons, and because bull trout throughout the St. Mary system exhibit a migratory life history, this BO considers effect of the action to bull trout in the Saint Mary River and Cracker Lake bull trout core areas (Figure 2). The framework for analyzing effects of an action on bull trout is covered in further detail below (see *Section C*)

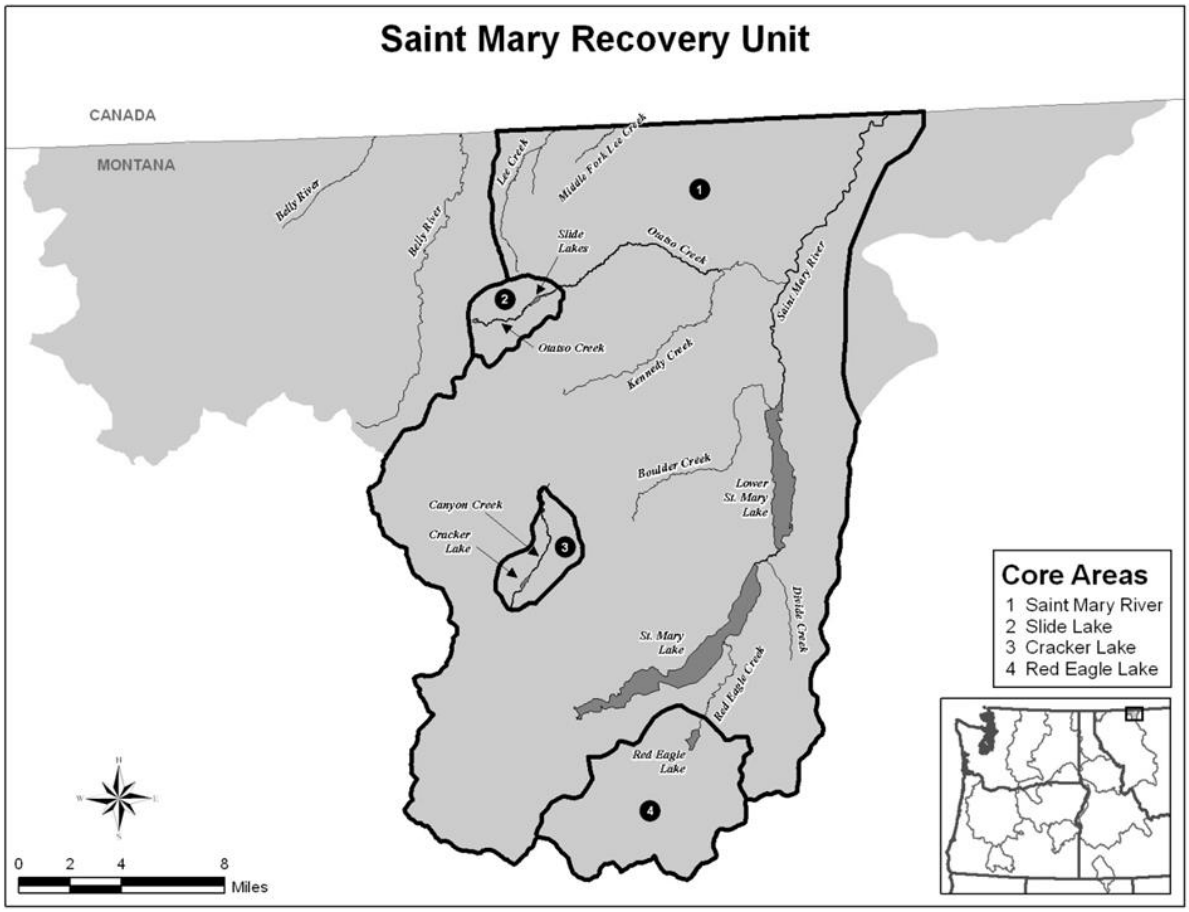

Figure 2. St. Mary Recovery Unit

3. Operation and Maintenance of the St. Mary Unit

The proposed action considered in this BO is the continued operation and maintenance of the St. Mary Unit of the Milk River Project from 2020 through 2025. The proposed action includes operation and maintenance of Lake Sherburne Dam and Reservoir, Swiftcurrent Creek Dike, St. Mary Diversion Dam and Headworks, and the St. Mary Canal and associated structures.

It should be noted that major maintenance actions within Lake Sherburne Reservoir are not included in this proposed action. These actions could include significant draw down or complete draining of the reservoir should major work need to be done on the Lake Sherburne Dam. In the past, these actions have typically been conducted every 10 to 15 years. The last time such actions occurred was 2018, when Lake Sherburne Reservoir was drawn down to remove sediment and debris. Reclamation did not consult with the Service on this action; however, Reclamation has indicated that if this type of activity is required during the five year time period covered by this consultation, a project-specific BA will be prepared and project-specific consultation will occur if necessary (BOR 2020).

Major components of the St. Mary Unit, as well as operation and maintenance of these components, are summarized below. A complete description of the activities included in the

proposed action can be found in the BA (BOR 2020):

Lake Sherburne Dam and Reservoir

Lake Sherburne Dam is a 107-foot tall dam (32 m) and impounds Swiftcurrent Creek as it flows out of Glacier National Park (Figure 1). The dam was constructed to store water for diversion to the Milk River. The resulting Lake Sherburne Reservoir is approximately 63 square miles, 6.4 miles long and 0.5 miles wide. Lake Sherburne Reservoir is used to store water during the non-irrigation season, and is the only water storage reservoir in the U.S. portion of the St. Mary River Basin.

The startup date for annual initial releases from Lake Sherburne Dam are based on St. Mary Canal diversion needs, flood control considerations, and needs associated with the Boundary Water Treaty (See BOR 2020 for additional information on the Boundary Water Treaty). Typical annual releases can start as early as March 1; however, there are no restrictions preventing releases earlier than March 1. Early releases maintain adequate storage space in Lake Sherburne Reservoir to control the snowmelt runoff and can also provide water for St. Mary Canal diversions or provide Canada with its entitled share of St. Mary River water (per the Boundary Water Treaty). Once releases from Lake Sherburne Reservoir are initiated for the season, the minimum release is approximately 25 cfs, which is the minimum gate opening of the river outlet works. Release changes are generally limited to no more than 150 cfs per day but can be greater if needed for such reasons as controlling the rate of fill of Lake Sherburne Reservoir.

Annual operation and maintenance activities associated with the Lake Sherburne Dam and Reservoir are briefly summarized below, a complete description is provided in the BA (BOR 2020):

Spring startup

1. Storm gates are chipped out of the ice and pulled.

2. The regulating gates are closed and then the guard gates are opened and hung.

3. One regulating gate is opened to minimum gate opening, followed by second gate a day or two later.

4. Following initial gate opening, operators drive the length of Swiftcurrent Creek to monitor ice conditions.

5. Once Swiftcurrent Creek is free of ice, releases are increased based on operational needs.

Fall shut down

1. Staging down of Lake Sherburne Dam to 25 cfs for a minimum of three days to allow for outmigration of fish.

2. The regulating gates are closed, followed by closing the guard gates, then the regulating gates are opened back up to allow seepage to bypass.

3. The storm gates are lowered to the water level in the conduit to prevent ice build-up in the conduit.

4. Fish Salvage in Swiftcurrent Creek below Lake Sherburne Dam to rescue stranded fish in the outlet structure and from isolated pools (discussed further in Section B.4 *Proposed Conservation Measures*).

5. The stilling basin downstream is cleaned out of gravels using a long reach excavator from the bank following fish salvage.

Maintenance

1. Riprap and concrete repairs of the upstream face of Lake Sherburne Dam.

2. Concrete repair of the spillway and outlet works at Lake Sherburne Dam.

Swiftcurrent Creek Dike

The Swiftcurrent Creek Dike is an earth and rock structure that is 13-feet (4m) high and 4,800-feet (1,463 m) long and is situated along the north side of Swiftcurrent Creek beginning 1.2 miles (2 km) downstream from the Swiftcurrent and Boulder Creek confluence (Figures 1 and 2). The Swiftcurrent Creek Dike was constructed in 1915 by Reclamation and diverts all flows from Swiftcurrent Creek and Boulder Creek into Lower St. Mary Lake (rather than the St. Mary River). Prior to construction of the Swiftcurrent Creek Dike, the combined flow of these two creeks historically created and flowed across a large alluvial fan (now occupied by the town of Babb, Highway 89, and other development) into the St. Mary River downstream of the present day location of the St. Mary Diversion Dam and canal headworks. The only activities being proposed that would be associated with the Swiftcurrent Creek Dike are annual inspections. It should be noted that unforeseen activities to repair future damage to the dike are not covered under this consultation. These actions would require an additional project-specific analysis, and separate consultation with the Service if they may affect listed species.

St. Mary Diversion Dam and Headworks

The St. Mary Diversion Dam and Headworks (Figures 3, 4 and 5) were constructed in 1915. The purpose of the St. Mary Diversion Dam is to divert water from the St. Mary River into the St. Mary Canal. The St. Mary Dam and Headworks are located on the St. Mary River 0.75 mile (~1 km) downstream from Lower St. Mary Lake. The dam consists of a 6-foot high (~2 m) concrete buttress weir. The eastern portion of the dam has a crest length of 190-feet (58 m). The western portion of the dam includes a six-bay, three-sluiceway segment with a total width of 56-feet (17 m).

Figure 3. St. Mary Diversion Dam during the non-irrigation season. Photo taken from St. Mary River upstream of diversion dam and headworks (BOR 2020).

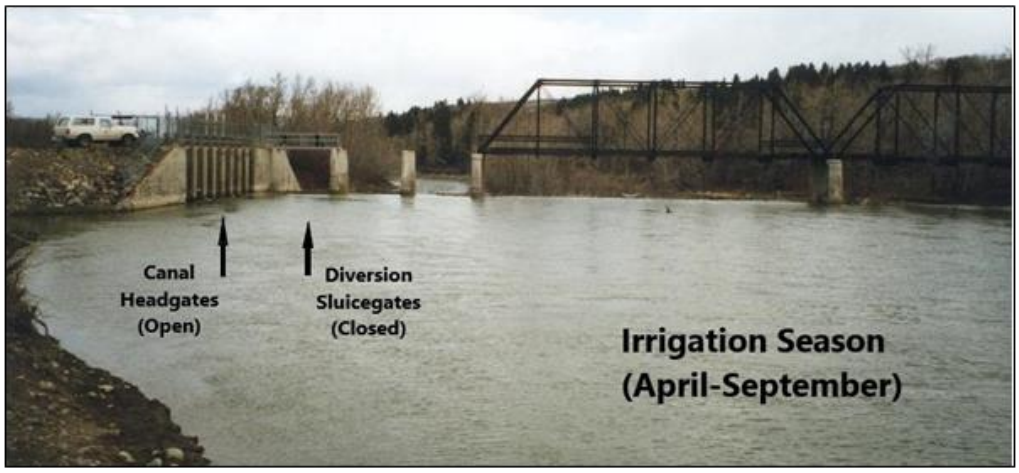

Figure 4. St. Mary Diversion Dam during the irrigation season. Photo taken from St. Mary River upstream of diversion dam and headworks (BOR 2020).

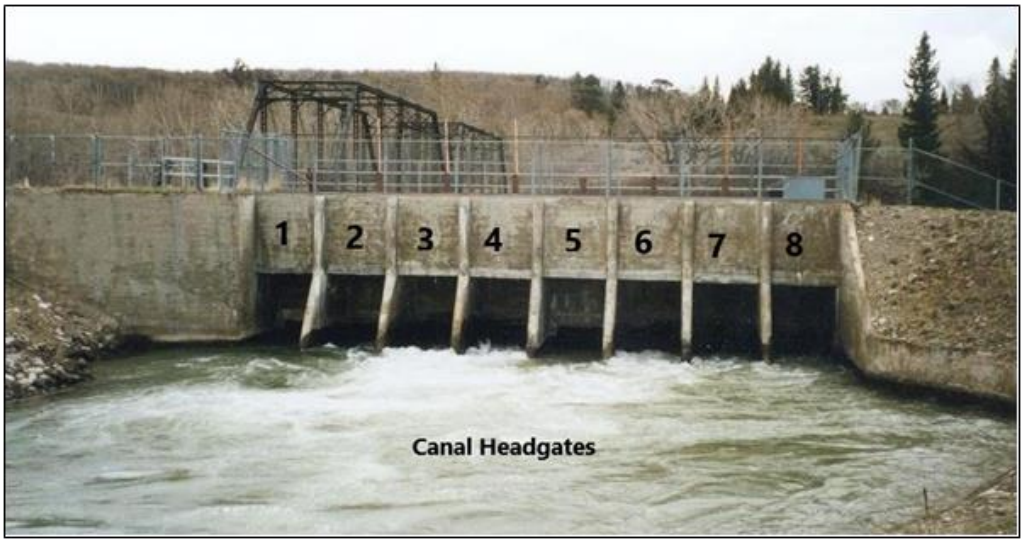

Figure 5. St. Mary Diversion Dam headgates during the irrigation season. Photo taken from St. Mary Canal just downstream of headworks (BOR 2020).

Operational dates and diversion rates will likely change each year in response to environmental conditions and annual water needs. However, the proposed action as indicated in the BA (BOR 2020) is to operate the St. Mary Diversion Dam and Headworks in a fashion that would allow Reclamation to divert its full water right (850 cfs) from March 1 through October 31 each year for the next five years. Below are the annual operation and maintenance activities associated with the St. Mary Diversion Dam and Headworks (BOR 2020):

Spring startup

1. Ice build-up around the water control structures on the diversion dam face (sluicegates) is removed from either atop the dam or within the river, depending on conditions.

2. Diversion Dam sluicegates are lowered, usually late February or early March.

3. Headworks gates are opened, and releases are slowly increased over the course of several days until water reaches the North Fork Milk River.

Fall shut down

1. Headworks are shut down slowly (over several days) to prevent canal damage.

2. Any large woody debris is removed from in front of the sluiceway gates and headworks with hooks from atop the dam or chainsaws in the river.

3. Sluiceway gates are opened.

Maintenance

1. Concrete repairs on the diversion dam.

2. Gate repairs at the headworks and on the sluiceway.

3. Concrete repairs of the headworks.

St. Mary Canal

Construction of the St. Mary Canal began in 1907 and was completed in 1915. The canal is approximately 29 miles long and was designed to convey 850 cfs (BOR's existing water right) of water from the St. Mary River to the Milk River. The canal begins at the diversion dam on the west side of St. Mary River and crosses the river through multiple siphons. The siphons are between 70-90 inches in diameter and between 1,400 and 3,600-feet in length. A series of five large concrete drop structures at the lower end (i.e., downstream-most extent) of the canal provide an elevation decrease of 214-feet (65 m) where the water is then discharged into the North Fork Milk River.

Typically, the canal is dry from November to March. As the irrigation season commences, flows are increased in March, and by mid-May flows through the canal reach a discharge rate of 600-650 cfs. Water diversion into the canal begins to decrease in September and by mid-October the canal is dewatered for the winter months. However, in some years water diversions may occur through the end of October to recharge other reservoirs in the Milk River Project (e.g., Fresno Reservoir).

Below are the annual operation and maintenance activities associated with the St. Mary Canal (BOR 2020):

Spring startup

1. Ice build-up around the sluicegates is removed via spud bar from either atop the dam or within the river, depending on conditions.

2. If heavy snow fall has occurred, trenching of the canal through the snow is required.

3. Cleanout of each C-10 gate (canal drains) is completed and each gate is closed.

4. Ice above the drop structures is cleaned out as needed.

5. Drain valves at St. Mary and Halls Coulee siphons are closed.

6. Headworks are opened and water is followed to the various structures, with equipment ready to remove ice buildups.

7. Conveyance of diverted water (600-650 cfs) through the St. Mary Canal.

Fall shut down

1. Drain valves at St. Mary and Halls Coulee siphons are opened.

2. C-10 gates (canal drains) are opened.

3. Canal is inspected for damage once water has drained out of the system.

4. Maintenance of the canal structures is completed as needed.

Maintenance

1. Vegetation control along the canal.

2. Landslide and embankment repairs along the canal.

3. Concrete repair of all siphons.

4. Repair of the steel siphons (including; welding repairs, expansion joint repairs, section replacement etc.).

5. Concrete repair or replacement of the drop structures.

4. Proposed Conservation Measures

Conservation measures are actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency or applicant and serve to minimize or compensate for, project effects on the species under review. The conservation measures presented below are part of the proposed action and will be implemented for the entire timeframe covered by this consultation (2020-2025):

Fall Ramp Down of Lake Sherburne Dam

Reclamation operates Lake Sherburne Dam in a manner that does not allow any water to pass though the dam during the fall/winter of each year. This is done in an effort to refill the Lake Sherburne Reservoir during the non-irrigation season. By eliminating flow through the dam, the project results in the complete de-watering of Swiftcurrent Creek below the dam (see further discussion in *Effects of the Action on Bull Trout Section F.3* below).

To reduce the likelihood of bull trout stranding in Swiftcurrent Creek below Lake Sherburne Dam after drawdown, Reclamation will ensure that annual fall shutdown operations encourage fish to migrate out of the section of Swiftcurrent Creek that is annually de-watered. This will be accomplished by a "stepped down" approach to gradually reduce flow through the dam each day (BOR 2020). Flows will be gradually stepped down until flow through the dam is 25 cfs. A minimum flow of 25 cfs will be maintained for at least three consecutive days before final shutdown occurs. The intent of this approach is to provide any fish below the dam with environmental cues that would trigger an individual fish to migrate further downstream to an area that is not annually de-watered.

Swiftcurrent Creek Dewatering Salvage

In addition to staging down flows through Lake Sherburne Dam, Reclamation will ensure an annual fish salvage is conducted to rescue stranded fish in the outlet structure of Lake Sherburne Dam and from isolated pools along the de-watered reach of Swiftcurrent Creek (BOR 2020). This effort has been conducted annually since 2003 in cooperation with the Service and the Blackfeet Nation. When staged-down flow occurs prior to fall shutdown, few bull trout are captured; typically, less than 10 bull trout are captured and moved into connected habitats each year (Table 1). However, in 2008 Reclamation did not stage-down flow prior to fall shutdown. The 2008 salvage effort captured 33 bull trout. This illustrates the importance of staging down flow (as described above).

A total of 73 bull trout have been saved since the Swiftcurrent Creek salvage efforts began in 2003. It remains uncertain as to what percentage of stranded bull trout are successfully captured and returned to connected habitats. Further, in some years (2004-2005, 2011, 2019) a salvage

was not possible because pools were already frozen over or weather prohibited sampling (USFWS-FWCO 2020c). Given the limitations of sampling, it is unlikely that all stranded bull trout are captured during any given year; however, the results presented in Table 1 show that Reclamation has been successful at saving bull trout by carrying out this salvage effort.

Table. 1 Results of Swiftcurrent Creek fish salvage since 2003.

Year	**2003**	**2006**	**2007**	**2008**	**2009**	**2010**	**2012**	**2014**	**2015**	**2016**	**TOTAL**
Date	Sept 18	Sept 27	Sept 10	Sept 15&17	Oct 5	Sept 27	Oct 22	Sept 27	Oct 21	Oct 21	
Bull Trout	9	5	2	**33**	8	9	1	9	0	0	**76**

St. Mary Minimization Measures Team

As part of the proposed action, Reclamation has committed to convening a multi-agency team to develop and implement conservation measures intended at reducing the effect of the project on bull trout (BOR 2020). The St. Mary Minimization Measures Team (Team) was convened in May 2020 and includes a member from the Service's Ecological Services Office in Kalispell, Montana, as well as members from the Service's Fish and Wildlife Conservation Office in Bozeman, Montana. Reclamation is represented on the Team by members from the Montana Area Office in Billings, Montana. A representative from the Milk River Joint Board was invited to attend and observe the Minimization Measures Team meetings. The Blackfeet Tribe was invited to attend the meetings, but the Team did not receive a response.

The Team met multiple times between May and August 2020. On August 12, 2020 the Team presented measures that could be implemented to reduce the effects of the project on bull trout to Reclamation managers and leadership. This meeting was also attended by managers from the Service's Montana Ecological Services Office and Fish and Wildlife Conservation Office. The measures presented to Reclamation leadership were aimed at reducing the likelihood of adult and juvenile bull trout entrainment in the St. Mary Canal, and measures that would attempt to return entrained bull trout to the St. Mary River. During this meeting the Service recommended that measures to reduce adult and juvenile entrainment, as well as measures to conduct in-canal fish salvage, be included as part of the proposed action.

On August 20, 2020, Reclamation informed the Service that it would be modifying the proposed action to include some of the minimization measures presented and recommended by the St. Mary Minimization Measures Team's final report and presentation (BOR 2020a). The inclusion of additional minimization measures followed a recommendation by the Service that the proposed action include measures designed at reducing the likelihood of adult bull trout entrainment during the late-fall diversion period (October 1-31), reducing the likelihood of juvenile bull trout entrainment during the entire diversion window (March 1 – October 31), and reducing the loss of bull trout that are entrained during the diversion period.

Additional minimization measures as included in Reclamation's August 20, 2020 letter amending the proposed action (BOR 2020a):

"The Team then presented these Minimization Measures to Reclamation and Service management for consideration on August 12. Following the meeting, Reclamation analyzed the measures and would like to modify the Proposed Action to include the following measures:

1. *Whenever Reclamation operates into October during the five-year consultation period, a fish screen will be installed on the St Mary Canal headgates in an effort to minimize/avoid entrainment of post-spawn adult bull trout. This installation will occur prior to October operations. This screen will have a maximum opening of approximately two inches, is intended as a temporary measure, and will not be designed to meet any of the screen hydraulics criteria set forth by the National Marine Fisheries Service Anadromous Salmonid Passage Facility Design.*

2. *Whenever Reclamation operates into October during the five-year consultation period, the top sluice board in one of the unused sluiceway bays will be removed. During these late fall operations, the natural flow is typically low with the majority of the flow in the river going into the headworks. By removing a sluice board, it provides an alternative path downstream past the headworks. This is particularly important during this late fall timeframe since the post-spawn bull trout will be leaving their spawning locations and migrating downstream to their winter habitat.*

3. *Given the uncertainties with using the Bio-Acoustic Fish Fence (BAFF) and the unknown installation and maintenance requirements of this system; Reclamation will scope out the various aspects of a Bio-Acoustic Fish Fence (BAFF) and explore research opportunities to potentially install individual components or a combination of components upstream of the headworks beginning in calendar years 2021 or 2022 of the five-year consultation period.*

4. *Reclamation will install a simple weir or block net across the canal in one or two locations upstream of Kennedy Creek Siphon just prior to fall shut-down of the canal during the five-year consultation period. This will minimize the possible exodus of entrained fish from the upper reaches of the canal during draw-down and better facilitate salvage efforts described in proposed measure No. 5.*

5. *In conjunction with proposed measure No. 4, Reclamation will work with the Service annually to perform in-canal salvage operations following the shut-down of the canal during the five-year consultation period. The salvage efforts will consist of electrofishing and netting from the headworks to the Kennedy Creek Siphon. This action can also be used as a monitoring tool to get some idea on how many bull trout have entered the canal with the aforementioned measures implemented."*

Reclamation has also committed to keeping the Team intact and active through the time frame covered in this consultation (2020 through 2025) (BOR 2020, 2020a). During this time, the Team will continue to investigate potential measures that could be implemented and monitor the effectiveness of already-implemented measures.

C. STATUS OF THE SPECIES – BULL TROUT

The bull trout was listed as a threatened species in the coterminous United States in 1999 (64 FR 58910-58933; USFWS 1999). Throughout its range, bull trout are threatened by the combined effects of habitat degradation, fragmentation, and alterations associated with dewatering, road construction and maintenance, mining, grazing, the blockage of migratory corridors by dams or other diversion structures, poor water quality, incidental angler harvest, entrainment, and introduced non-native species. Since the listing of bull trout, there has been very little change in the general distribution of bull trout in the coterminous United States, and we are not aware that any known, occupied bull trout core areas have been extirpated (USFWS 2015).

The 2015 recovery plan for bull trout identifies six proposed recovery units within the listed range of the species (USFWS 2015). Each of the recovery units are further organized into multiple bull trout core areas, which are mapped as non-overlapping watershed-based polygons, and each core area includes one or more local populations. Within the coterminous United States, we currently recognize 109 occupied core areas, which comprise 600 or more local populations of bull trout (USFWS 2015). Core areas are functionally similar to bull trout metapopulations, in that bull trout within a core area are much more likely to interact, both spatially and temporally, than are bull trout from separate core areas. The 2015 recovery plan defines core areas and being either simple core areas of complex core areas. Simple core areas typically have only one local population (or may be entirely resident), whereas a complex core area will have multiple local populations. The local populations in a complex core area will typically each utilize different spawning habitats, but all local populations will typically utilize the same foraging, migration and overwintering habitat (FMO).

The Service has also identified a number of marine or mainstem riverine habitat areas outside of bull trout core areas that provide FMO habitat that may be shared by bull trout originating from multiple core areas. These shared FMO areas support the viability of bull trout populations by contributing to successful overwintering survival and dispersal among core areas (USFWS 2015).

For a detailed account of bull trout biology, life history, threats, demography, and conservation needs, refer to Appendix A: Status of the Species - Bull Trout.

D. ANALYTICAL FRAMEWORK FOR BULL TROUT JEOPARDY ANALYSIS

In accordance with policy and regulation, the jeopardy analysis in this BO relies on four components: (1) the Status of the Species, which evaluates the bull trout's range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the bull trout in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the bull trout; (3) the Effects of the Action, which determines the direct and indirect

impacts of the proposed federal action and the effects of any interrelated or interdependent activities on the bull trout; and (4) Cumulative Effects, which evaluates the effects on bull trout of future non-federal activities reasonably certain to occur in the action area. In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed federal action in the context of the bull trout's current status, taken together with cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the bull trout in the wild.

Recovery Units (RU) for the bull trout were defined in the final Recovery Plan for the Coterminous United States Population of [the] Bull Trout (USFWS 2015). Pursuant to Service policy, when a proposed federal action impairs or precludes the capacity of a RU from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, the BO describes how the proposed action affects not only the capability of the RU, but the relationship of the RU to both the survival and recovery of the listed species as a whole.

The jeopardy analysis for the bull trout in this BO considers the relationship of the action area and affected core areas (discussed below under the Status of the Species section) to the RU and the relationship of the RU to both the survival and recovery of the bull trout as a whole as the context for evaluating the significance of the effects of the proposed federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Within the above context, the Service also considers how the effects of the proposed federal action and any cumulative effects impact bull trout local and core area populations in determining the aggregate effect to the RU(s). Generally, if the effects of a proposed federal action, taken together with cumulative effects, are likely to impair the viability of a core area population(s) such an effect is likely to impair the survival and recovery function assigned to a RU(s) and may represent jeopardy to the species (70 C.F.R. 56258).

The action area for this BO includes portions of the St. Mary Recovery Unit (see Figure 3 and Appendix A). The bull trout recovery plan considers a hierarchical order of demographic units ranging from local populations to the range of bull trout within the coterminous United States. This stepdown organization is important for implementing recovery, tracking consultation under section 7 of the Endangered Species Act, identifying and protecting critical habitat, and other aspects of planning and coordination. Core areas represent the closest approximation of a biologically functioning unit for bull trout, containing habitat that could supply all elements for the long-term security of bull trout and one or more local bull trout populations (USFWS 2015). Local populations are considered the smallest group of fish that are known to represent an interacting reproductive unit.

The proposed project will affect bull trout in local populations within the Saint Mary Recovery Unit (USFWS 2015c), specifically the five local populations within the Saint Mary River complex core area, and the one local population within the Cracker Lake core area. Table 2 shows the hierarchical units for bull trout in the action area.

Table 2. Hierarchy of analysis for bull trout.

Name	Hierarchical Relationship
Coterminous United States	Range of the species within the coterminous United States (i.e., the listed ESA entity)
Saint Mary Recovery Unit	One of 6 recovery units in the coterminous United States
Saint Mary River Complex Core Area, Cracker Lake Core Area	Two of four core areas within the Saint Mary Recovery Unit (including the only complex core area).
Boulder Creek, Divide Creek, Kennedy Creek, Lee Creek, Otatso Creek, Cracker Lake.	Six local populations within the Saint Mary River and Cracker Lake core areas.

E. ENVIRONMENTAL BASELINE

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Environmental baseline is defined as "…the past and present impacts of all Federal, State, or private actions and other human activities in an action area, the anticipated impacts of all proposed Federal projects in an action area that have already undergone formal or early Section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process." (50 CFR 402.02).

1. History of Bull Trout in the Action Area

The Saint Mary River flows northeasterly across the northwest corner of the Blackfeet Indian Reservation before crossing the international border. Bull trout apparently colonized the waters east of the Continental Divide via postglacial dispersal routes from refugia in the MacKenzie and Columbia River basins and elsewhere, soon after the Pleistocene glaciation (~12,000 years ago; Nelson and Paetz 1992; Haas and McPhail 2001).

The historic distribution of native fishes in the St. Mary River drainage was limited by the many natural, year-round barriers to fish movement. Waters that were upstream from such barriers and historically barren of fish included the entire upper Red Eagle, Swiftcurrent, Kennedy and Otatso Creek watersheds, and the headwaters of the St. Mary River itself. Among the fishes native to the drainage, bull trout, westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and mountain whitefish (*Prosopium williamsoni*) are believed to have occurred in all of the streams and lakes to which they had access, including the Slide Lakes, while lake trout (*Salvelinus namaycush*) inhabited only St. Mary and Lower St. Mary lakes (Brown 1971). Nowhere else in the contiguous United States are bull trout naturally sympatric with lake trout (Donald and Alger 1993). Also indigenous to the drainage are northern pike (*Esox lucius*), burbot (*Lota lota*), and lake whitefish (*Coregonus clupeaformis*), all of which inhabit the St. Mary lakes, and white sucker (*Catostomus commersoni*), longnose sucker (*Catostomus catostomus*), mountain sucker (*Catostomus platyrhynchus*), lake chub (*Couesius plumbeus*), trout-perch (*Percopsis omiscomaycus*), longnose dace (*Rhinichthys cataractae*), pearl dace (*Margariscus margarita*),

mottled sculpin (*Cottus bairdi*), and spoonhead sculpin (*Cottus ricei*), which inhabit many of the streams and lakes to which the fish had natural access (Brown 1971).

2. Past Reclamation Activities in the Action Area

Reclamation has a history of activity in the action area dating back to the early 1900's. In 1903, the Milk River Project was approved, and in 1905 Congress authorized the St. Mary Unit. Reclamation constructed several water-control and delivery structures at part of the St. Mary Unit. These structures are tied directly to this consultation, as the proposed action is the continued operation and maintenance of these structures for the next five years.

As part of the St. Mary Unit authorization, Reclamation constructed the Lake Sherburne Dam. Construction of the Lake Sherburne Dam permanently severed the connection between spawning habitat in Canyon Creek (and possibly upper Swiftcurrent Creek) and overwintering habitat in the St. Mary River and Lakes. Prior to the construction of Lake Sherburne Dam, migratory bull trout had access to upper Swiftcurrent Creek (the stream and the series of small lakes under the current reservoir up to the large waterfall at Many Glacier) and all of Canyon Creek. Migratory fish from the St. Mary River and Lower Lake spawned and reared in Canyon Creek (and possibly Swiftcurrent) as they do in the other tributaries of the drainage.

Canyon Creek still supports a primarily resident population of bull trout, although some individuals still exhibit a migratory life history by spending time in the reservoir. Since Lake Sherburne Dam is a complete barrier to upstream fish passage, the migratory component of the Canyon Creek population was likely eliminated over the years as the vast majority of important foraging and overwintering habitats were no longer accessible to individuals expressing a migratory life history. The effects of this fragmentation have been occurring since the construction of Lake Sherburne Dam, and will continue to occur as there are no plans to restore connectivity between spawning habitats upstream of the dam, and foraging and overwintering habitats below the dam.

3. Bull Trout Population Status and Trends in the Action Area

In February, 2020, a comprehensive assessment of the status of bull trout in the St. Mary system was completed by the U.S. Fish and Wildlife Service's Fish and Wildlife Conservation Office (Mogen 2020). This assessment represents the most up-to-date information on bull trout population status and trends in the action area, and is largely cited below:

Bull trout have been extensively studied in the action area (as well as entire St. Mary drainage) since their listing in 1998 (Mogen and Kaeding 2003, 2005a and 2005b; Mogen et al. 2011; DeHaan et al. 2011; Mogen 2012). These studies have determined key characteristics of bull trout populations in the St. Mary River drainage in Montana, including locations of spawning areas, relative sizes, trends and genomes of spawning stocks, and the extent that bull trout move among tributaries; identified factors that may unduly limit the populations; and recommended management actions to eliminate or ameliorate the effects of those factors. The summaries presented below were first presented in the February, 2020 status assessment (Mogen 2020).

Electrofishing Surveys

Tributary electrofishing surveys indicate that bull trout are widely distributed and often

abundant in St. Mary River tributaries (Mogen 2012). Moreover, the species remained in all of the waters that it historically inhabited in the drainage in Montana. The occurrence of age-0 bull trout indicated recent spawning and reproduction in each creek in which the species was commonly found and annual reproduction was indicated by multiple age-classes of young fish. The occurrence of redds revealed bull trout spawning areas in Boulder, Kennedy, and Lee creeks, as well as above the Slide Lakes in upper Otatso Creek. Recaptures of tagged fish revealed bull trout movements among most creeks, as well as both upstream and downstream movements over the St. Mary Diversion Dam, the rockslide that forms the Slide Lakes, and the lower fall on Otatso Creek (Park Line Falls). Although both migratory and non-migratory bull trout remained in the St. Mary River drainage, migratory fish were most obvious because they were caught in traps or moved between creeks (Mogen and Kaeding 2003 and 2005a). Resident (i.e., non-migratory) bull trout also occurred in several creeks but were less conspicuous than migratory fish.

Fish Trap Surveys

Fish trapping was conducted annually (1997-2000) between about late August and mid-October near the mouths of Boulder, Kennedy, and Otatso creeks (1997-2000), Divide Creek (1997 and 1998), and on Lee Creek at the highway crossing (1999 and 2000) (Mogen and Kaeding 2003). Traps (holding box and attached weirs) were designed to capture downstream-moving fish and were primarily intended to catch post-spawning bull trout as they departed tributaries. In most instances, annual trapping ended after no adult bull trout had been caught for several days; typically by mid-October, suggesting most migratory fish had spawned by early October. Although post-spawning adult bull trout (i.e., greater than 300 mm TL) were often caught soon after traps were installed each year, the majority of adult captures occurred after mid-September (Figure 6).

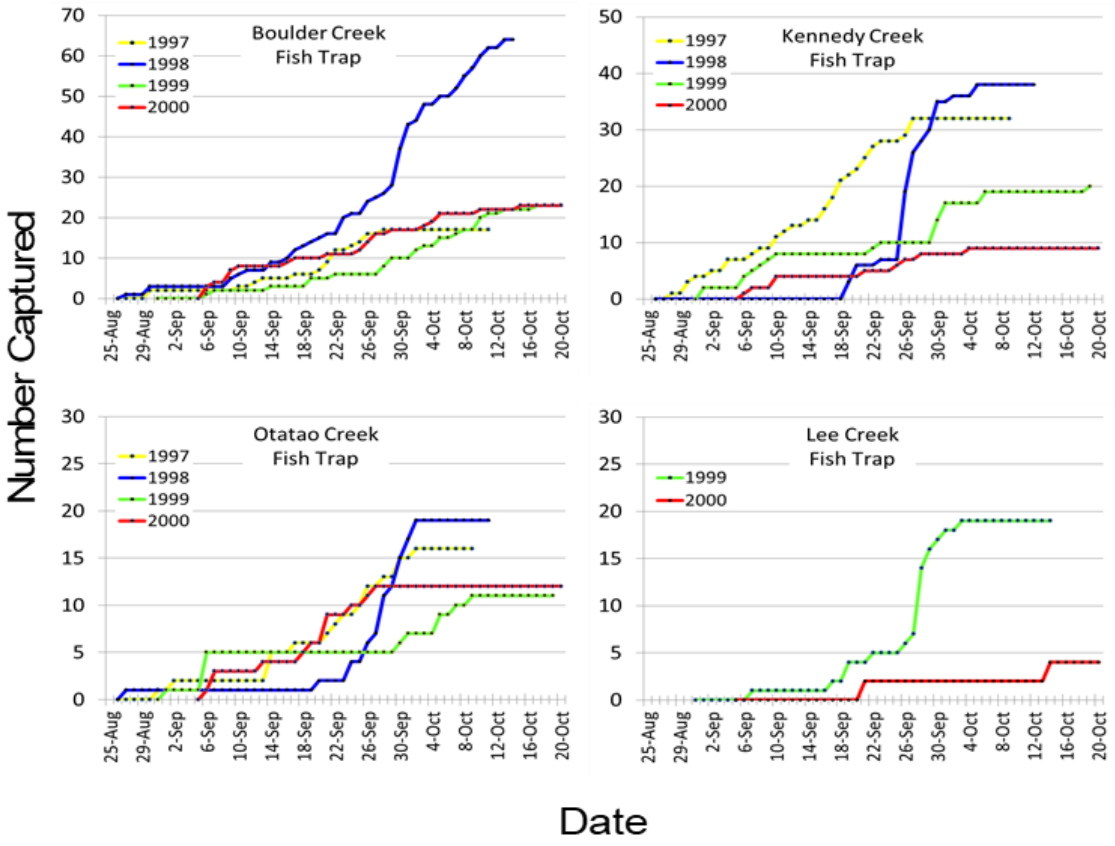

Figure 6. Cumulative catches of adult bull trout (greater than 300 mm TL) from fish traps, St. Mary River drainage, Montana, August-October, 1997-2000. Figure and data from Mogen 2020

Bull trout were captured in all traps in all years, except in Divide Creek in 1998. Average size of the 16 samples was 155 fish (range, 21 to 333); average number of bull trout in samples was 39 (range, 0 to 88). Collectively, 85% of the other fishes in samples were Mountain Whitefish (dominated samples in all years) and 15% were cutthroat × rainbow intergrades. Only four brook trout (*Salvelinus fontinalis*) were caught in traps (3 in Boulder and 1 in Divide). Total annual captures of bull trout and other fishes in Boulder, Kennedy, and Otatso Creek traps varied among years (Table 1). Annually, the Otatso Creek trap yielded the largest overall catch, which consisted mainly of mountain whitefish; however, most adult bull trout (greater than 300 mm total length (TL)) were caught in the Kennedy trap in 1997 (48% of bull trout caught that year) and in the Boulder trap in 1998 (53%), 1999 (32%) and 2000 (48%). Most bull trout less than 300 mm TL were caught in the Boulder trap in 1997 and 1998 and in Lee Creek trap in 1999 and 2000. Altogether, 99 bull trout (156-720 mm TL) were caught in traps in 1997, 167 (160-690 mm TL) in 1998, 194 (137-695 mm TL) in 1999, and166 (130-763 mm TL) in 2000. Total lengths of all bull trout (n = 626) caught in traps averaged 332 mm (range, 130-763 mm).

Bull Trout Tagging Efforts

An on-going, long-term effort to assess the degree of bull trout movement among the various St. Mary tributaries has been going on since the late 1990s (Mogen 2020). These efforts use passive integrated transponder tags (PIT tags) injected into the dorsal musculature (directly below and parallel to the dorsal fin) of most bull trout greater than 200 mm. In 2015, the minimum tagging size was reduced to 100 mm in an effort to bolster the number of young fish carrying tags. This study utilizes PIT-detection stations that continually scan for PIT-tagged

fish as they pass a fixed location. Stations are currently operating near the mouths of Boulder and Divide creeks, two primary migratory bull trout spawning streams that are located upstream from the St. Mary Diversion and its associated threats (passage and entrainment). Stations are also established in Swiftcurrent Creek below Sherburne Dam and the St. Mary Canal to help better understand these threats as well as the effects of seasonal dewatering in Swiftcurrent and the canal.

As of 2019, 4,673 bull trout received tags (3,776 bull trout greater than 200 mm TL), of which 4,451 (95%) had been caught by electrofishing and 222 (5%) in traps. On the basis of captured fish that already had excised adipose fins (i.e., a secondary mark applied at time of tagging), 855 of the tagged bull trout (840 bull trout greater than 200 mm TL and 15 bull trout less than 200 mm TL) were recaptured (23.7% and 2.9%, respectively) in subsequent years and tags were retained in 820 (96.0%) of those fish. Of the 1,169 total recaptures of those 855 fish, most (88%) recapture events occurred in the creek where the fish had been originally tagged, although there were 141 instances of bull trout movements between creeks. Such movements occurred among all bull trout inhabited streams except Lee, Canyon, Rose and Red Eagle creeks (Red Eagle was only surveyed once, 2009).

An adult bull trout tagged in 1998 in Kennedy Creek and recaptured in Boulder Creek in two subsequent years (2000 and 2002) was also recaptured in 2002 in a net deployed on the headworks of the St. Mary Canal as part of a study to estimate the extent of fish entrainment at the St. Mary Diversion (Mogen et al. 2011). That fish, released into the St. Mary River downstream from the diversion dam, was recaptured the following year (2003) in Boulder Creek. An adult bull trout tagged in 1999 in Boulder Creek and then recaptured there in two subsequent years (2000 and 2003) was later recaptured from isolated pools in lower Swiftcurrent Creek after flows from Sherburne Dam had been turned off for the season during fish-salvage efforts in the fall of 2003 and 2004. That fish was released into the St. Mary River both years. A juvenile (205 mm TL) bull trout tagged in 2003 in Divide Creek was recaptured as an adult presumably on its spawning run in Boulder Creek in 2005, 2006 and 2007. Many (28) bull trout, originally tagged in middle Otatso, moved downstream over the Park Line falls and were recaptured in subsequent years in lower Otatso (24) and Kennedy (4) creeks, while eight bull trout moved upstream over the Park Line Falls from downstream habitats in Lower Otatso (6) and Kennedy (2) creeks. In addition, 14 middle Otatso fish also moved upstream through the rockslide forming Slide Lakes and were subsequently recaptured in the creek above the lakes. Similarly, 20 adult bull trout moved down through the rockslide from Slide Lakes and were later recaptured in the middle Otatso Creek reach. Movement through the rockslide is only permitted during periods of seasonal high flow.

Between 1998 and 2003, 42 adult bull trout (434-763 mm TL) captured in tributaries at the traps or while electrofishing were surgically implanted with radio transmitters and tracked to determine bull trout spawning and wintering areas and the large-scale, seasonal movements between those habitats within the St. Mary drainage in Montana and Alberta (Mogen and Kaeding 2003 and 2005b). Forty (95%) of the 42 radiotagged bull trout were contacted one or more times after their release, and 11 (26%) were subsequently recaptured by electrofishing or in traps (Figure 7). Because the focus was primarily aimed at determining the broad relations between spawning and wintering habitats used by radiotagged fish, active searches occurred mainly during those disparate periods of habitat use. Active searches conducted from the

ground and aircraft during winter (December) and early spring (April) found 22 individual tagged fish distributed in the St. Mary River between the mouth of Lee Creek (Alberta) and Lower St. Mary Lake (Montana) (Figure 7). Many of these were located in multiple winters and at different locations. During this period, 17 were found wintering in the river in Alberta (5 Boulder, 9 Kennedy, 2 Otatso, and 1 Lee Creek fish) and at least 19 in Montana (8 Boulder, 6 Kennedy, 5 Otatso fish). Four Boulder fish wintered in Lower St. Mary Lake and seven Boulder fish wintered (stranded in isolated pools) in Swiftcurrent Creek, just downstream from Sherburne Dam. Only five radiotagged fish (4 in Kennedy and 1 in Boulder) were found in creeks during winter. Maximum stream distance between contact locations for individual fish (median, 25.5 km; range, 1-91 km) was not associated with fish length or weight when tagged.

Automated, radio receivers that were operated at three locations (the St. Mary Diversion Dam, the international boundary, and a location nearly half-way between the two) adjacent to the river recorded 21 individual radiotagged bull trout between January 1999 and December 2002. These data showed the pre-spawning and post-spawning movements of tagged bull trout occurred during May-July and September-November, respectively (Figure 7). Although many fish with which radio contact was made in successive winters were often found in the same river reaches between years, some used completely different winter habitats in different years. For example, two bull trout (both Boulder fish) wintered in Lower St. Mary Lake in one year and downstream in the river in another. Several Boulder fish were stranded and forced to winter in Swiftcurrent Creek below Sherburne Dam after shut-down in October but were found wintering in other downstream locations (river or lake) in different years. One, in particular, was located in the outlet works of Sherburne Dam the first winter, then 85 km downstream in the river (Alberta) the next winter, and then back in the outlet of the dam the final winter.

In summary, the study documented bull trout usage of the mainstem St. Mary River from Lower St. Mary Lake to St. Mary Reservoir in Canada (Figure 7). Additionally, the study documented adults moving among spawning tributaries (Figure 7). These results illustrate the highly migratory nature of bull trout in the St. Mary River core area. These results are important during this consultation as it indicates that bull trout from local populations below the St. Mary Diversion Dam (e.g., Kennedy and Otatso Creeks) can still be affected by the proposed action.

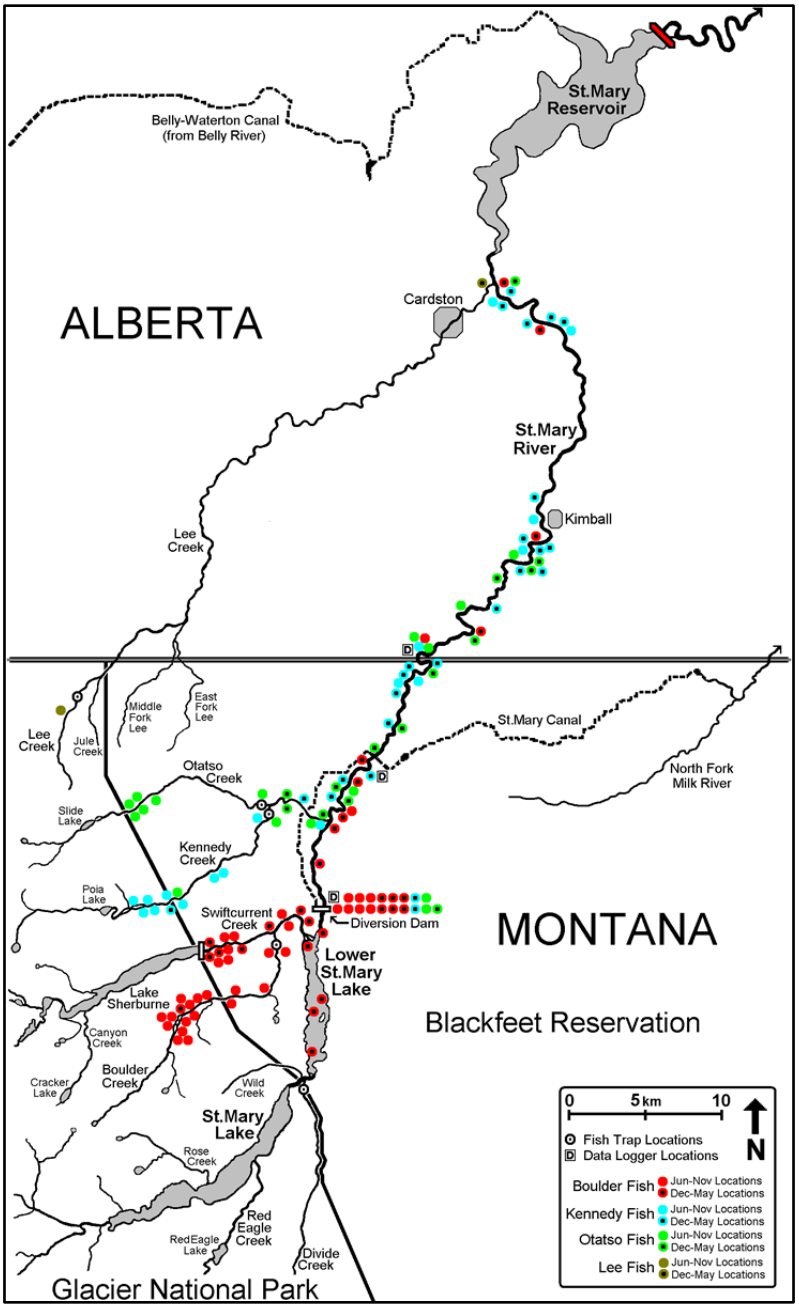

Figure 7. Locations of radiotagged bull trout, St. Mary River drainage, U.S. and Canada, 1999-2002. Figure and location data from Mogen 2020.

Redd Counts

In addition to long term fish tagging efforts, a long term effort has been conducted since the 1990s to monitor bull trout redd counts in the St. Mary drainage. This effort is still on-going at the time of writing. Principle bull trout spawning areas were located in Boulder and Kennedy creeks in 1997, where annual late-October redd counts have been conducted since (Figure 8). Over the 23 years of counts, redd abundance has averaged 40.2 (range 12-66) in Boulder and 15.1 (range 0-37) in Kennedy. Due to inclement weather, surveys were not conducted in Kennedy Creek in 1999, 2016 and 2019 and in Boulder Creek in 2005, 2016 and 2019.

Beginning in 2011, Glacier National Park fisheries personnel conducted annual October bull trout redd counts in Lee Creek upstream from the highway bridge. Based on those counts, redd numbers have averaged 14.0 (range 5-31; Figure 8) over the eight years of record (2011-2018; unpublished data, NPS). Lee Creek was not surveyed in 2019.

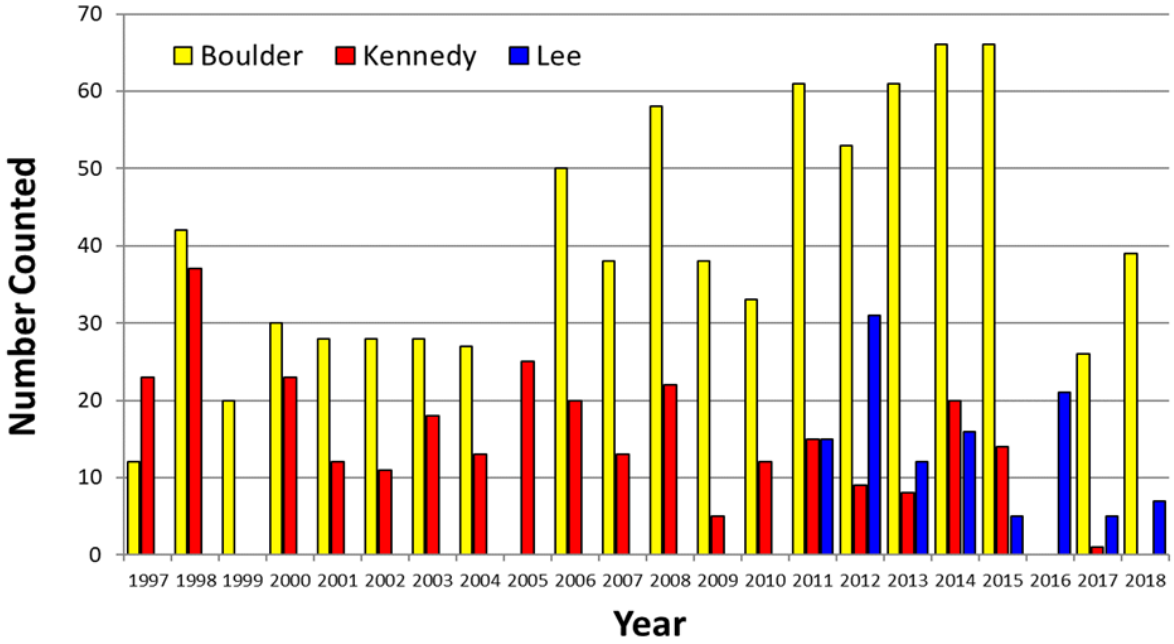

Figure 8. Total redds counted during annual redd surveys in Boulder and Kennedy creeks, St. Mary River drainage, Montana, 1997-2018. Also shown are Lee Creek counts reported by the National Park Service for the years 2011-2018.

Spawning areas were 2.5 km long in Boulder and 1.5 km long in Kennedy and occurred in areas of probable groundwater upwelling, just downstream from the regions of entirely subsurface flow. Redds were often associated with nearby undercut banks, root wads, debris jams, or beaver dams and were constructed in substrates that appeared to range from fine gravel (~10-mm diameter) to small cobble (less than 150-mm diameter). Although seemingly comparable substrates occurred downstream from both spawning areas, as well as at various locations in Divide Creek, no redds were found in those areas. Bull trout were occasionally observed spawning in upper Otatso Creek (upstream from Slide Lakes) during electrofishing in late-August, but no formal surveys have been conducted there.

4. Genetic Analysis of Bull Trout in the Action Area

Based on bull trout genetic samples collected during the 1997-2009 trapping and electrofishing surveys previously described, several studies documented significant levels of genetic variation among tributary populations in the St. Mary River system and suggested the presence of multiple local spawning populations (Spruell et al. 2003; Spruell and Nerass 2003; Ardren et al. 2011). These studies also found that bull trout populations in the St. Mary River system were highly differentiated from populations in the Flathead River system, the closest populations on the west side of the Continental Divide.

A more recent study by DeHaan et al. (2011), in collaboration with Mogen and Kaeding, examined patterns of genetic variation within and among nine putative bull trout populations in

the St. Mary drainage and how the levels of genetic variation have been influenced by both historical and contemporary factors (barriers). They found significant levels of genetic variation among all populations (overall FST = 0.271) which was substantially greater than has been observed in other river systems across similar spatial scales. Analysis suggested three main population groups: one consisting of populations found below barriers with connectivity among them (Divide, Boulder, Kennedy, Lee, and Red Eagle creeks), one with populations above a natural waterfall barrier in Otatso Creek (middle Otatso Creek and Slide Lakes), and one population isolated above Sherburne Dam (Canyon Creek and Cracker Lake). Although there were no significant reductions in levels of genetic variation within populations above presumed barriers, results of their study did suggest that genetic variation within individual populations was lower than observed in other populations west of the Continental Divide, including populations from the Kootenai and Clark Fork River systems, presumably due to historic patterns of re-colonization following recent glaciation.

DeHann et al. (2011) also used genetic assignment techniques to determine the most likely population of origin for a number of the adult bull trout captured in the fish traps (Mogen and Kaeding 2003) or while electrofishing (Mogen 2012) in areas known to be devoid of spawning habitat (i.e., St. Mary River, lower Swiftcurrent Creek and lower Otatso Creek). Assignment showed similar movements to the PIT tagging/recapture studies previously described and supported the assertion that migratory adult bull trout utilize habitats throughout the St. Mary River system during non-spawning periods.

In summary, genetic analysis of the St. Mary bull trout has shown that although bull trout regularly move throughout the St. Mary system and among the different spawning tributaries, the significant levels of genetic variation among all spawning populations suggest that fidelity to natal spawning areas is high, gene flow among tributary populations is low, and that each tributary contains a genetically distinct local spawning population.

F. EFFECTS OF THE ACTION ON BULL TROUT

Under section 7(a)(2) of the Act, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 C.F.R. § 402.02). The effects discussed below are the result of implementing the proposed action.

The 2015 Final Bull Trout Recovery Plan considers the St. Mary Unit of the Milk River Project as “the primary factor affecting bull trout in the Saint Mary Recovery Unit” (USFWS 2015, 2015c). The St. Mary Recovery Unit Implementation Plan further breaks down the various pathways by which the St. Mary Unit of the Milk River Project is acting as the primary demographic and habitat threats to bull trout recovery in the St. Mary Recovery Unit (USFWS 2015c). Components of the Project have ongoing adverse effects to bull trout in the St. Mary Recovery Unit. Adverse effects range from sub-lethal effects due to habitat alteration and artificial flow regimes, to direct mortality of individual bull trout. These effects are presented below:

1. Bull Trout Entrainment in the St. Mary Canal

Water diversion from the St. Mary River into the St. Mary Canal is described in detail above (see Section B.3). Diversion of water typically begins in March and lasts through September for irrigation purposes. In some years, diversion may continue through the end of October to recharge other storage reservoirs in the Milk River Project system.

There are currently no fish screens or other structures that would prevent entrainment of bull trout, or any species of fish, into the St. Mary Canal when water is being diverted from the St. Mary River. Entrainment of fish in the canal has been well documented, and had been considered an impact of the St. Mary Unit on aquatic species for decades (Wagner and Fitzgerald 1995). Since bull trout were listed as a threatened species in 1998, reports to Reclamation have highlighted the effects of the Milk River Project on bull trout in the St. Mary Drainage (Mogen and Keading 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007). Many of these reports also recommended measures to prevent continued entrainment of bull trout into the St. Mary Canal (Mogen and Keading 2004, 2005, 2006, 2007). Entrainment of bull trout into the St. Mary Canal results in a direct loss of individual bull trout to the St. Mary River core area since entrained fish are either moved to a different basin (Missouri River Basin), or die once in the canal.

In response to known fish entrainment into the St. Mary Canal at the St. Mary Diversion Dam, Reclamation funded a study that investigated entrainment of bull trout and other native species during the 2002 to 2006 water diversion periods (Mogen et al. 2011). The results of the study are summarized below.

Entrainment netting at the St. Mary Canal headworks collected 9,980 fish in 2,421 hours of sampling over a five-year period (2002-2006; Mogen et al. 2011). With the exception of Kokanee salmon, all species of fish inhabiting the St. Mary River drainage were represented in the catch including 207 bull trout. The majority of captured bull trout were juveniles (104-228 mm), but three were sub-adults (357-393 mm) and two were adults (465 and 554 mm). Overall catch rates associated with the netting varied markedly during the course of the annual diversion periods with the highest rates of entrainment occurring mid- to late-summer (Jul-Aug) after annual runoff subsided (Figures 12 and 13). Combined netting catch rates of all fish averaged greater than five fish per hour during the months of July and August and exceeded 20 or more fish per hour in 2003, whereas mean rates rarely exceeded one fish per hour for the months of March-June during the entire study. Bull trout entrainment showed nearly the opposite trend with greater rates occurring in the spring (April-May) with increasing river temperatures and discharge prior to peak runoff (Mogen et al. 2011). During this period, netting catch rates for bull trout averaged about 0.21 bull trout per hour (118 bull trout caught in 560 hours of netting) compared to around 0.05 bull trout per hour for the remainder of the irrigation season (89 bull trout in 1,861 hours of netting). The greatest single entrainment event recorded for bull trout during the study occurred from May 6-18, 2005, when 48 juvenile bull trout were captured over a 56 hour period; a netting catch rate of nearly one bull trout per hour (Mogen et al. 2011). The timing of this pulse seemed to coincide with a high precipitation event in the upper Swiftcurrent/Boulder drainage (Ibid.).

The 207 bull trout captured during the entrainment study only represents a small portion of the bull trout likely entrained because the study was not able to fully sample all water being

diverted into the St. Mary Canal (Mogen et al. 2011). Nets on the canal headworks were not able to be deployed for the entire irrigation season due to the logistical challenges of checking and operating nets 24 hours per day for an entire irrigation season. Nets were deployed for a total of 2,421 hours over the five diversion seasons sampled during the study. The total number of hours of diversion in five diversion seasons is approximately 21,900 hours, meaning that nets were only deployed for 11 percent of the time water was being diverted into the St. Mary Canal. Additionally, four of the seven functioning headgates were equipped with nets, meaning that when all seven gates were open and diverting water (majority of the study period), only 67 percent of the diverted water was being sampled. As a result, the report had to extrapolate the catch data in order to estimate total annual loss of fish to entrainment in the unscreened St. Mary Canal. The final estimates ranged from roughly 22,570 to 31,670 individuals (all species combined) or about 124 to 174 fish per day during the irrigation season, and total bull trout losses ranged from approximately 471 to 661 individuals per year or around 2.6 to 3.6 bull trout per day (Mogen et al. 2011).

The bull trout entrainment study (Mogen et al. 2011) also concluded that the design of the St. Mary Diversion Dam and Canal is likely creating a scenario that maximizes the probability of entrainment of a down-stream migrating, juvenile bull trout. Below is an excerpt from Mogen et al. (2011) that details how physical parameters and effects to water quality are influencing bull trout entrainment:

"The actual design of the diversion itself, including the locations of the canal headgates and dam sluice gates, certainly influences the diversity, size and number of fish being entrained in the canal. The headgates and sluice gates are both situated at the west side of the diversion dam. Their locations, in conjunction with a retaining wall running perpendicular to the dam, maintain a deep pool directly in front of the gates, the deepest habitat in the immediate area (Fig. 2). The channeling of the river through the headgates during the irrigation season and through the sluice gates during the non-irrigation period creates a consistent and unnaturally strong draw on that side of the river. As a result of nearly 100 years of project operation the current has maintained a deep channel, or thalweg, along the western bank of the river which continues upstream from the diversion. This channel leads directly to the unscreened canal and provides a preferred corridor for bottom-oriented fishes, even during the irrigation season when the sluice gates are lowered and the entire streambed is inundated. Swiftcurrent Creek also enters from the west, only a short (1.5 km) distance upstream from the diversion. Swiftcurrent Creek and especially its largest tributary, Boulder Creek, provide important spawning and juvenile rearing habitat for numerous fish species inhabiting the lake and river (Mogen and Kaeding 2005a and 2005b). Post-spawning adults and juvenile emigrants moving downstream to the St. Mary River from Swiftcurrent Creek must pass by the diversion making them vulnerable to entrainment.

Larval fish and small juveniles are often passively carried along by the current, especially during periods of high flow (Zelazny 2010). With the heavy runoff typical of the St. Mary drainage followed by unseasonably high flows (650 cfs) maintained for irrigation throughout the summer in Swiftcurrent Creek itself, it would appear that small fish are particularly at high risk. Stream margins and their associated decreased water velocities, overhead cover and flooded vegetation provide important security for

these fish. As the fish move downstream they tend to use the margins as corridors for migration which makes them especially vulnerable to entrainment in downstream diversions located along those margins (Hiebert et al. 2000 and Sechrist and Zehfuss 2010). Also, Swiftcurrent's flows are typically cooler and often more turbid than the warmer clear surface water of the lower lake. Mixing of flows from the two systems rarely occurs in the short distance between the confluence and the diversion, and during periods of high turbidity a distinct seam is often visible between the two. Trout tend to prefer the coolest and most substantial flow (Zelazny 2010), which in this case is the same flow being diverted into the canal. Turbidity also provides security to fish, especially when they've become accustomed to it throughout their migration. It is unlikely that a downstream moving fish would stray significantly from the security of the stream margin and turbid water provided by the western bank of the river in favor of the warmer clear water of the eastern bank or the lake itself. This survival behavior, however, increases the likelihood of entrainment, as the unscreened canal headgates lie only a short distance downstream along the western bank."

Results of that study conducted by Mogen et al. (2011) support the Service's assertion in the original listing document (USFWS 1999) that bull trout and other native fishes are entrained in the unscreened St. Mary Canal. Once entrained, fish either reside in the St. Mary canal during the irrigation season or are transferred to the North Fork of the Milk River. Fish that remain in the canal may survive for a while in one of the many pools that exist along its length, but it is likely that most perish once the canal is dewatered at the end of the diversion period due to poor water quality (anoxic conditions) or winter freeze. Because of the high velocities through the canal headgates during operation and the closed position of the gates during the non-irrigation season, the headgates act as a barrier, preventing entrained fish from returning to the St. Mary River.

The bull trout entrainment study by Mogen et al. (2011) confirmed that the unscreened St. Mary Canal is annually entraining bull trout, as well as all other species of fish native to the St. Mary River system. The study also indicated that entrainment of bull trout is not constant throughout the irrigation season (i.e., more bull trout entrained in the spring), or constant throughout an individual day (i.e., more bull trout entrained at night). A recent re-analysis of the bull trout entrainment data collected by Mogen et al. (2011) was conducted in June, 2020 by Kaeding and Mogen (2020). This analysis was done in an effort to calculate annual bull trout entrainment based on the understanding that entrainment rates do not remain constant throughout the irrigation season. This analysis concluded that the St. Mary Canal is entraining between 140 and 274 bull trout each year (95 percent confidence intervals), with a mean estimate of 202 bull trout entrained annually under the current operating schedule of the St. Mary Unit. The study also concluded that without a screen, a 90 percent reduction in bull trout entrainment could be achieved if there were no water diversions in April or May, and an 80 percent reduction could be achieved if water was only diverted during daylight hours (Kaeding and Mogen 2020).

In addition to the well-documented entrainment of juvenile and sub-adult bull trout in the St. Mary Canal, late-fall (October) diversion is likely creating a scenario that presents a risk of entrainment of post-spawn, outmigrating adults. As described above, during some diversion seasons, Reclamation may continue to divert water from the St. Mary River through the month of October to recharge other reservoirs in the Milk River Project system. During these years,

diversion would occur during a time when flows in the St. Mary River are low, meaning the majority of flow would be entering the canal. Additionally, any flow remaining in the river would be spilling over the diversion dam wall in a relatively thin sheet of water. Mogen and Kaeding (2005b) conducted a study using radiotagged, adult bull trout to assess seasonal movements within the St. Mary River drainage. Their results indicated that post-spawn adult bull trout typically moved out of their spawning tributaries and back to overwintering habitat in October and November, with the majority of post-spawn contacts occurring in October. This means that when an adult bull trout is moving downstream and encounters the diversion dam, there will be a scenario that encourages that individual to purposely enter the St. Mary Canal. Loss of spawning-age adults is highly impactful to the St. Mary Recovery Unit since these individuals have already survived the life stages with higher mortality rates (i.e., fry, juvenile), and are actively contributing to the population.

On August 20, 2020, Reclamation informed the Service that is would be implementing five minimization measures as part of the proposed action that are aimed at reducing the impact of bull trout entrainment into the St. Mary Canal (see *Section B.4* above and BOR 2020b). The measures include an effort to reduce the likelihood of adult bull trout entrainment during late-fall diversion (October 1-31) by installing an adult fish exclusion screen on the St. Mary Canal Headgates. In addition, Reclamation also committed to continue to investigate the efficacy of a bioacoustic fish barrier that could reduce the extent of bull trout entrainment during the entire diversion window (March 1 – October 31). An annual salvage effort will also be conducted after the canal is shut down for the season. Fish captured in the St. Mary Canal will be returned to the St. Mary River. The Service anticipates that these measures will reduce the overall impact of the project on bull trout by reducing the likelihood of adult entrainment, and returning entrained fish back to their native system (St. Mary River core area). However, these measures will not reduce the extent or effect of juvenile bull trout entrainment year-round since there is no firm commitment to implement a measure to prevent fish entrainment during the entirety of the diversion period (March 1 – October 31). Therefore, the Service expects that the entrainment of juvenile bull trout will continue until a permanent solution to avoid fish entrainment can be installed on the St. Mary Canal (e.g., fish screen/bypass structure).

The Service concludes that the St. Mary Canal has been adversely affecting bull trout in the St. Mary Recovery Unit since it was constructed and began operations. We anticipate that late-fall entrainment of some adult bull trout will be avoided due to installation of an adult fish exclusion screen. However, entrainment of bull trout during the remainder of the diversion window (March 1 – September 30) will continue as Reclamation has not committed to any measures to keep bull trout out of the St. Mary Canal during that time. The in-canal salvage efforts being proposed will reduce the impact of entrainment on the St. Mary River core area by safely returning some entrained bull trout to the St. Mary River, but we do not anticipate that this effort will capture all entrained bull trout. Further, some loss is likely to occur due to the stresses imparted during a salvage effort. Thus, the Service concludes that the St. Mary canal will continue to adversely affect bull trout.

2. Blocked Fish Passage at the St. Mary Diversion Dam

The St. Mary Diversion Dam presents a substantial barrier to volitional fish movement in the St. Mary River. When the sluicegates on the diversion dam are closed (February to October), the St. Mary Diversion Dam serves as a barrier to upstream moving fish. Mogen and Kaeding

(2005) found that the majority of radiotagged, adult bull trout tagged and released upstream of the Diversion Dam moved downstream past the diversion dam, but were then unable to migrate upstream past the diversion dam when trying to reach spawning habitat. In that study, the authors concluded that "Nevertheless, our data also suggested that the upstream movements of some bull trout were impeded by the dam, particularly during pre-spawning movements when the dam was closed for the irrigation season." (Mogen and Kaeding 2005b).

During periods when water from the St. Mary River is not being diverted into the St. Mary Canal, sluicegates on the diversion dam face are opened to allow flow. While this provides some measure of passage relative to the complete barrier presented during the diversion periods, flow through the sluicegates can act as a velocity barrier to fish seeking to move upstream of the diversion dam, particularly juveniles or sub-adults.

When bull trout were listed under the Act as a threatened species, the Service identified the St. Mary Diversion Dam as a substantial fish barrier (USFWS 1999). Since the time of listing, reports to Reclamation have highlighted the effects of the Milk River Project on bull trout in the St. Mary Drainage (Mogen and Keading 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007). Many of these reports also recommended measures to facilitate year-round, un-impeded fish passage past the St. Mary Diversion Dam (Mogen and Keading 2004, 2005, 2006, 2007). More recently, the final Bull Trout Recovery Plan identified connectivity impairment due to blocked upstream passage as a primary threat to the recovery of bull trout in the St. Mary Recovery Unit (USFWS 2015c).

The Service concludes that the St. Mary Diversion Dam has been adversely affecting bull trout in the St. Mary Recovery Unit since it was constructed. These adverse effects are due to physical harm that occurs to individuals when attempting to move upstream of the dam (e.g., hitting the dam face), and preventing individual bull trout from spawning. We anticipate that the St. Mary Diversion Dam will continue to adversely affect bull trout by impairing fish passage until an effective solution to allow un-impeded fish passage past the diversion dam can be achieved.

3. Lake Sherburne Dam: Habitat Fragmentation and De-watering of Swiftcurrent Creek

Lake Sherburne Dam permanently severed the connection between spawning habitat in Canyon Creek (and possibly upper Swiftcurrent Creek) and overwintering habitat in the St. Mary River and Lakes. This effect was discussed in the Environmental Baseline section of this BO since Reclamation does not retain authority to remove this dam. In addition to the effects of the dam itself, the operation of the dam also effects bull trout. Since this operation is part of the proposed action considered in this consultation, these effects are discussed further.

Annual operation of Lake Sherburne Dam and Reservoir also results in the annual de-watering of Swiftcurrent Creek. Operations are described above (see Section B.3) and in the BA (BOR 2020). Toward the end of the irrigation season (August-September) discharge from Lake Sherburne Dam begins to ramp down (See BA Fig. 5, BOR 2020). Eventually discharge from Lake Sherburne Dam ceases completely to allow the reservoir to refill for the next irrigation season (See BA Fig. 5, BOR 2020). When flow through Lake Sherburne Dam is shut down each fall, Swiftcurrent Creek is completely de-watered from just below the dam to the

confluence with Boulder Creek (Figure 9). Additionally, this shutdown also de-waters Swiftcurrent Creek from the Boulder Creek confluence downstream to Lower St. Mary Lake, but this section does not go completely dry due to additional inflow from Boulder Creek (Figure 9). Annual de-watering of Swiftcurrent Creek is adversely affecting bull trout in the St. Mary River core area by eliminating overwintering habitat for bull trout. We conclude that this adverse effect has been occurring since the current water management regime through Lake Sherburne Dam began (i.e., no flow during fall and winter months), and that this will continue to adversely affect bull trout unless alternative management of Lake Sherburne Dam and Reservoir can achieve adequate flow in the stretch of Swiftcurrent Creek to maintain habitat year-round.

In addition to eliminating overwintering habitat, de-watering of Swiftcurrent Creek results in the stranding of fish that were unable to move to connected habitats downstream prior to complete drawdown. In general, post-spawn adults and emigrating juveniles exit Boulder Creek throughout the fall, including September when Swiftcurrent Creek is running bank-full (greater than 650 cfs). Once reaching the high flows of Swiftcurrent Creek (which are greater than base flow in the St. Mary River at that time), those fish likely move up Swiftcurrent Creek in an effort to seek out the deep pool habitat for the winter (USFWS-FWCO pers. comm. 2020a). When flows through Lake Sherburne Dam cease, the drop in water surface elevation leaves fish stranded in isolated pools below the dam and upstream from the Boulder Creek confluence. It is unlikely that fish stranded in the de-watered stretch of Swiftcurrent Creek would be able to survive the winter. The pools that remain are typically shallow enough that they will freeze solid in the winter. Pools that do not freeze solid likely turn to an anoxic condition since the remaining fish continue to consume oxygen and no fresh, oxygenated water is delivered and results in fish mortality. Stranding in these pools also leaves fish extremely vulnerable to predation.

Mogen and Kaeding (2005) conducted a radio telemetry study designed to assess basin-wide, seasonal movement patterns of adult bull trout. Their study radiotagged dozens of adult bull trout from tributaries throughout the St. Mary drainage. This included seven adult bull trout from Boulder Creek that attempted to overwinter in the de-watered section of Swiftcurrent Creek. Two bull trout were able to survive by wintering inside the dam itself or in the deep outlet pool just below the dam, and three were able to move downstream in time to avoid stranding. The other two died in isolated pools that froze solid in the subsequent winter: "*The 2 bull trout died in Swiftcurrent Creek while stranded in shallow (less than 1 m), ice-covered pools that remained after Sherburne Dam had been closed for the year*." (Mogen and Kaeding 2005b).

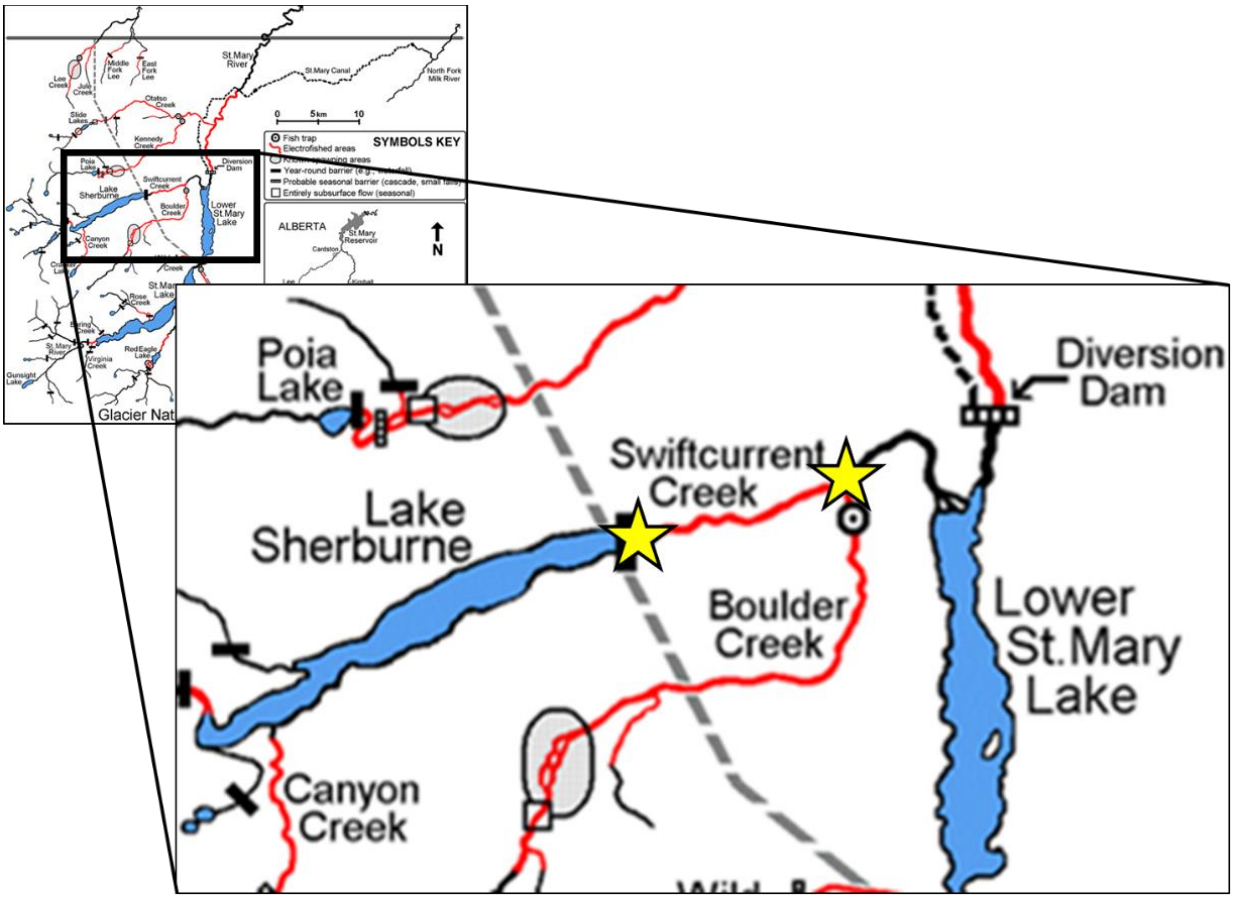

Figure 9. Stretch of Swiftcurrent Creek that annually goes dry due to lack of in-stream flow below Lake Sherburne Dam. Yellow stars denote upstream and downstream boundaries of section that is completely de-watered.

Figures 10 and 11 below represent the condition of Swiftcurrent Creek each fall following the shutdown of flow through Lake Sherburne Dam. These figures were taken from a 2009 U.S. Geological Survey report investigating the relationship between potential streamflow in the de-watered section of Swiftcurrent Creek, and bull trout passage (Auble et al. 2009). The report defined a minimum passage window criterion of an area of the stream at least 15 cm deep and 45 cm wide. Using this minimum criterion, Auble et al. (2009) found that minimal flow through Lake Sherburne Dam (1.2 cubic feet per second) would still result in severe limitations to bull trout passage. The report also states that "*substantially better but still substantially limited passage*" would be achieved at a flow of 12.7 cfs, and that "*generally good passage*" would be achieved at flows of 24 cfs. Thus, the conclusions of Auble et al. (2009) indicate that adequate habitat connectivity is lost when flows are below 24 cfs. Without adequate habitat connectivity, bull trout in this stretch of Swiftcurrent Creek could become stranded in isolated pools, eventually resulting in mortality.

Figure 10. Swiftcurrent Creek below Lake Sherburne Dam during de-watering period. Photo taken from a 2009 USGS report (Auble et al. 2009).

Figure 11. Swiftcurrent Creek below Lake Sherburne Dam during de-watering period. Photo taken from a 2009 USGS report (Auble et al. 2009).

Since the time of listing, reports to Reclamation have highlighted the effects of the Milk River Project on bull trout in the St. Mary Drainage, specifically the acute reduction in flow below Lake Sherburne Dam following annual irrigation seasons (Mogen and Keading 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007). Many of these reports also recommended measures to ensure adequate winter habitat and in-stream flow in Swiftcurrent Creek below Lake Sherburne Dam (Mogen and Keading 2004, 2005, 2006, 2007). More recently, the final Bull Trout Recovery Plan identified the complete de-watering of Swiftcurrent Creek as a primary threat to the recovery of bull trout in the St. Mary Recovery Unit due to direct mortality and loss of available foraging, migrating and overwintering habitat (USFWS 2015c).

The Service concludes that the operation of the Lake Sherburne Dam has been adversely affecting bull trout in the St. Mary Recovery Unit since the current management regime began (i.e., no flow during fall and winter months). We anticipate fall salvage efforts being proposed will reduce the effect of the dam on the St. Mary River core area by safely returning some stranded bull trout to connected habitats, but we do not anticipate that this effort will be able to capture all stranded bull trout. Further, some loss is likely to occur due to the stresses imparted during a salvage effort. Thus, the Service concludes that the operations of the Lake Sherburne Dam will continue to adversely affect bull trout.

4. Habitat Effects From Lake Sherburne Dam and Reservoir

The complete fragmentation of a historically migratory bull trout population by Lake Sherburne Dam is discussed above. That fragmentation has manifested in a remnant population of bull trout in Canyon Creek. Canyon Creek bull trout largely exhibit a resident life history (i.e., remain in spawning/rearing stream for entire life cycle); however, some bull trout still exhibit a migratory life history and overwinter in Lake Sherburne Reservoir.

Canyon Creek provides spawning and juvenile rearing habitats for resident bull trout, as well as the migratory bull trout that reside downstream in Sherburne Reservoir. Annual operation of Lake Sherburne Dam and Reservoir described above (see Section B.3) and in the BA (BOR 2020). Operation of Lake Sherburne Dam is likely producing conditions at the inlet of Canyon Creek that prohibit or impede both upstream and downstream passage of bull trout between Lake Sherburne Reservoir and Canyon Creek (USFWS-FWCO pers. comm. 2020a, 2020b) At its mouth, Canyon Creek flows across a large, deep-sediment delta consisting of extensive stream bifurcation (braiding) and subsurface flow, often with no overland flow connections between the stream and reservoir pool during the later stages of draw-down. Historically, flows through this stretch likely produced unconnected surface flow. However, the creation of the reservoir had led to annual deposition of sediment that likely would have been flushed through the system prior to the presence of the reservoir and dam. Depending on Canyon Creek flow, reservoir levels and conditions on the delta, this seasonal disconnect between the stream and reservoir likely causes impaired bull trout migrations, and may also result in bull trout entrapment in the lower reaches of Canyon Creek that lose surface water connectivity. Stream surveys in Canyon Creek occasionally find large, migratory bull trout, there are likely bull trout that overwinter in Lake Sherburne Reservoir, moved up Canyon Creek to spawn, but were unable to return the reservoir (USFWS-FWCO pers. comm. 2020b). Conditions at the mouth of Canyon Creek were documented by the Service in the fall of 2011 (see Figures 12 and 13 below). These figures capture the extent of sediment deposition and the extensive stream bifurcation that can occur in the lower stretch of Canyon Creek.

Figure 12. Illustration of sedimentation of stream bifurcation at the Canyon Creek delta, view upstream from mouth of Canyon Creek at Lake Sherburne Reservoir. Photo taken in fall 2011 (USFWS files).

Figure 13. Illustration of sedimentation and stream bifurcation at the Canyon Creek delta, view downstream from lower stretch of Canyon Creek at Lake Sherburne Reservoir. Photo taken in fall 2011 (USFWS files).

The Service concludes that operations of the Lake Sherburne Dam and Reservoir have been adversely affecting bull trout in the St. Mary Recovery Unit since the dam was constructed due to habitat loss and impaired connectivity between Canyon Creek, Lake Sherburne and the St. Mary River. We anticipate that adverse effects to bull trout will continue for the life of this consultation (5 years) as there no plans to implement a change in operations of Lake Sherburne Dam.

5. Permanent Flow Reductions in the St. Mary River

Operations of the St. Mary Unit are summarized above (see Section B.3 above) and are presented in detail in the BA (BOR 2020). The storage of water in Lake Sherburne Reservoir and the annual diversion of up to 850 cfs of water from the St. Mary River drainage permanently impact water quality (e.g., temperature, dissolved oxygen) and available habitat in the portion of the St. Mary River downstream of the diversion dam.

The majority of inflow into Lake Sherburne Reservoir is provided by Swiftcurrent and Canyon Creeks. This water is collected in the reservoir as the Lake Sherburne Dam outlet remains closed during the non-diversion period (typically October through March). In-flow into Lake Sherburne Reservoir from Swiftcurrent Creek during October through March averaged approximately 20-60 cfs from 1957-2007 (Auble et al. 2009). Historically, this flow would continue downstream into Swiftcurrent Creek and the St. Mary River, providing additional habitat during a period when the river is already at its annual base level (typically less than 70 cfs during the winter months; USFWS-FWCO pers. comm. 2020b). Annual operation of Lake Sherburne Dam (i.e., no out flow during non-diversion period) prevents this water from moving downstream. Thus, altering water quality (e.g., temperature, dissolved oxygen) and reducing available habitat to bull trout in the St. Mary River.

Additionally, under the proposed action Reclamation would divert up to 850 cfs of flow from the St. Mary River drainage from roughly March 1 through October 31 each year. Historically, this flow would remain in the system and continue to maintain natural hydrological conditions (e.g., temperature, velocity, dissolved oxygen), as well as provide habitat in the portion of the St. Mary River downstream of the diversion dam. As presented above, the diverted water eventually ends up in the Milk River, which is part of the Missouri River basin. Thus, this water is permanently removed from the St. Mary drainage each year.

Since the time of listing, reports to Reclamation have highlighted the effects of the Milk River Project on bull trout in the St. Mary Drainage from the permanent loss of flow in the St. Mary River (Mogen and Keading 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007). Many of these reports also recommended an assessment of the effects of water diversion into the St. Mary Canal on bull trout habitat in the St. Mary River downstream of the diversion dam (Mogen and Keading 2004, 2005, 2006, 2007). These recommendations came in light of radio telemetry data showing that adult bull trout inhabit the St. Mary River below the diversion dam during the non-spawning season (Mogen and Kaeding 2003).

More recently, the final Bull Trout Recovery Plan identifies de-watering of the St. Mary River (inter-basin transfer to the Milk River) as a primary threat to the recovery of bull trout in the St. Mary Recovery Unit. The recovery plan considers this a primary threat since water diversion reduces quality and quantity of feeding and overwintering habitat, and contributes to warmer

temperatures in the St. Mary River downstream of the diversion dam.

The Service concludes that reduced outflow through Lake Sherburne Dam and diversion of water from the St. Mary River drainage has been adversely affecting bull trout in the St. Mary Recovery Unit since these structures began operating. We anticipate that the project will continue to adversely affect bull trout in this manner for the duration of the consultation timeframe (five years).

6. Proposed Conservation Measures

The Service anticipates and acknowledges that incidental take of bull trout will occur on an annual basis related to implementation of the proposed conservation measures. The conservation measures are proposed in an effort to minimize incidental take of bull trout, and to otherwise minimize the adverse impacts to the native fishery resources caused by the proposed action. Successful implementation of the measures will result in adverse effects to bull trout; however, these adverse effects are required in order for the conservation measures to provide their intended benefits, which are anticipated to outweigh the adverse effects. Examples of actions that will be undertaken as part of a conservation measure, but will adversely affect bull trout include but are not limited to: trapping, electrofishing, netting, surgical implanting of transmitters, and transport via fish tanks. Examples of adverse effects that could result from these actions include: injury or death due capture technique (e.g., electrocution), predation following release of captured fish, or complications (e.g., infections) following capture sampling.

J. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

For the purpose of this consultation, cumulative effects are primarily the effects attributable to state and private landowners. It is likely that ongoing and reasonably foreseeable actions on private lands within the action area include timber harvest, road building, subdivision, home site and septic system development, road construction and maintenance, riparian disturbance, streambank armoring, and water withdrawals. Effects to fish habitat, including bull trout habitat, resulting from these practices include reduced channel stability, decreased habitat complexity, increased nutrient inputs, increased sedimentation, increased stream temperature, and reduced base flows. These effects reduce foraging habitat for adult bull trout, and hiding habitat for juvenile and sub-adult bull trout. Additionally, effects to water quality parameters (e.g., temperature, nutrients, suspended solids) can impart physiological stress on fish, as well as result in reduced survival and hatching of eggs. Although all of these activities are likely to occur, the amount and intensity on private land would not change the scope or magnitude of effects anticipated from this proposal.

Angler harvest and poaching has been identified as one reason for bull trout decline (USFWS

2015b). It is likely that recreational fishing, especially in known spawning streams in the fall, will increase as the human population in western Montana increases. Misidentification of bull trout has been a concern because of the similarity of appearance with brook trout. Although harvest of bull trout in the majority of the action area is illegal, incidental catch likely occurs. The fate of released bull trout is unknown, but some level of hooking mortality is likely due to the associated injuries and the stress of handling fish (Long 1997). Unintentional and illegal harvest could have a direct effect on the bull trout in the action area. The extent of the effect is dependent on the amount of increased recreational fishing pressure, which is a function of the increased number of people fishing each season. Illegal poaching is difficult to quantify, but generally increases in likelihood as the human population in the vicinity grows (Ross 1997). This may increase as the human population grows, but we anticipate that closed roads and limited public access will keep this low.

Global climate change and the related warming of our climate have been well documented. Evidence of global climate change/warming includes widespread increases in average air and ocean temperatures, accelerated melting of glaciers, and rising sea level. Given the increasing certainty that climate change is occurring and is accelerating (IPCC 2007; Battin et al. 2007), we can no longer assume that climate conditions in the future will resemble those in the past. The causes and effects of climate change transcend the action area. However, potential increases in water temperature – locally and within the range of bull trout - due to climate change, and the impact these factors have on habitat, provide more favorable conditions for non-native fish – and all affect bull trout (USFWS 2015, 2015c). Additionally, based on the history of the proposed action and the water needs of the growing human population in the Western United States, it is reasonable to assume that diversion of water will continue into the future.

The cumulative effects within the action area are reflected in bull trout population numbers and life history forms and the habitat conditions described herein. All core areas are at risk of the continued increase of non-native fish species and fisheries management; and concern for the viability and effects to bull trout populations are well documented (USFWS 2015). Activities occurring on private lands at the same time that the proposed federal activities may exert cumulative adverse effects on bull trout. However, some non-federal activities will likely improve conditions for bull trout over the long-term and will work in conjunction with federal actions toward recovery of bull trout in some instances.

K. CONCLUSIONS

1. Jeopardy Determination

Jeopardy determinations for bull trout are made at the scale of the listed entity, which is the coterminous United States population (64 FR 58910). This follows the April 20, 2006, analytical framework guidance described in the Service's memorandum to Ecological Services Project Leaders in Idaho, Oregon and Washington from the Assistant Regional Director – Ecological Services, Region 1 (USFWS 2006). The guidance indicates that a biological opinion should concisely discuss all the effects and take into account how those effects are likely to influence the survival and recovery functions of the affected [then] interim recovery unit(s),

which should be the basis for determining if the proposed action is "likely to appreciably reduce both survival and recovery of the coterminous United States population of bull trout in the wild."

As detailed earlier in this BO (see Section D), the approach to the jeopardy analysis in relation to the proposed action follows a hierarchical relationship between units of analysis (i.e., geographical subdivisions) that characterize effects at the lowest unit or scale of analysis (the local population) toward the highest unit or scale of analysis (the Coterminous United States). The hierarchical relationship between units of analysis (local population, core areas) is used to determine whether the proposed action is likely to jeopardize the survival and recovery of bull trout. As mentioned previously, if the adverse effects of the proposed action do not rise to the level where it appreciably reduces both survival and recovery of the species at a lower scale, (such as the local population or core area) then the proposed action could not jeopardize bull trout in the coterminous United States (i.e., range wide). Therefore, the determination is appropriately a no-jeopardy finding. However, if a proposed action causes adverse effects that are determined to appreciably reduce both survival and recovery of the species at a lower scale of analysis (i.e., local population or core area), then further analysis is warranted at the next higher scale.

After reviewing the current status of bull trout, the environmental baseline for the action area, the effects of the proposed project, and cumulative effects, it is the Service's biological opinion that the continued operation of the St. Mary Unit of the Milk River Project is not likely to jeopardize the continued existence of bull trout. As mentioned above, stressors such as climate change will continue into the future and were evaluated as part of cumulative effects. Our jeopardy conclusion is based on the magnitude of the project effects in relation to the affected bull trout core area, aggregated to the geographic region, then to the recovery unit, and finally to the range-wide population in the United States. Our rationale for this no-jeopardy conclusion are based on the following:

- Minimization measures (as described in the proposed action) are likely to be effective in reducing the extent and effect of incidental take resulting from the proposed action.

- Minimization measures designed to reduce entrain of adult bull trout in the St. Mary Canal will be installed and functional prior to any water diversion at the St. Mary Diversion Dam.

- Implementation of the proposed action is anticipated to have adverse effects to bull trout in the St. Mary River and Cracker Lake core areas. However, with the implementation of minimization measure, we conclude that the proposed action will not jeopardize the survival of bull trout in the St. Mary River or Cracker Lake core areas.

- We do not anticipate the proposed action to affect the remaining two core areas in the St. Mary Recovery Unit.

- As implementation of the proposed action is not likely to reduce the likelihood of survival of the St. Mary Recovery Unit, it is unlikely to jeopardize the survival of bull

trout in the coterminous United States.

Implementing regulations for section 7 (50 CFR 402) defines "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." Our conclusion is based on, but not limited to, the information in our files and cited throughout, information gathered during the early conferencing and consultation processes, the 2020 BA (BOR 2020), and information exchanged between the Service and Reclamation.

L. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the "take" of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are not discretionary and must be undertaken by Reclamation for the exemption in section 7(o)(2) to apply. In the event that actions are not directly conducted by Reclamation, Reclamation is responsible for ensuring that the measures described below become binding conditions of any contract, license, or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. Further, the exemptions allowed under this incidental take statement are only applicable to the five-year time period considered in the proposed action (2020-2025). As such, any take that occurs as a result of operation and maintenance of the St. Mary Unit beyond 2025 is not exempted.

Reclamation has a continuing duty to regulate and oversee the activity covered by this Incidental Take Statement. If Reclamation fails to assume and implement the terms and conditions of the Incidental Take Statement, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, Reclamation must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement [50 CFR 402.14(i)(3)].

1. Amount of Extent of Take Anticipated

The Service expects that continued operation of the St. Mary Unit of the Milk River Project for the next five years will result in incidental take of bull trout in the form of harm, harassment, and mortality. Incidental take of bull trout will be directly related to the loss of individual bull trout due to entrainment in the St. Mary Canal, and the lack of effective fish passage at the St. Mary Diversion Dam. Incidental take of bull trout will also be directly related to the continued degradation of aquatic habitat throughout the St. Mary River core area caused by the continued presence and operation of the Lake Sherburne and St. Mary Diversion Dams. These effects have been described in Section F. *Effects of the Action on Bull Trout*.

The amount of take that may result from implementation of the proposed action is difficult to quantify for the following reasons:

- The low likelihood of finding an injured or dead individual bull trout. This is due to bull

trout's primarily nocturnal activity patterns, tendency to hide in or near the substrate, and the small body size, cryptic coloration, and behavior of juvenile and sub-adult bull trout.

- The effects of the St. Mary Unit on bull trout (e.g., blocked migration, downstream entrainment, stranding events) are difficult to detect. It is not possible to determine the exact number of upstream-migrating adults that are blocked by the dams, or that may be injured by jumping into the dams in an effort to migrate upstream. It is also not possible to determine the exact number of adults or juveniles that are entrained in the canal, or that are injured going over top of the dams during downstream migration.

- Aquatic habitat modifications are difficult to ascribe to one particular activity because the proposed action includes multiple sources of habitat degradation (e.g., Lake Sherburne Dam, St. Mary Diversion Dam).

- Detection of dead or impaired bull trout from these activities is unlikely. Losses may also be masked by seasonal runoff and removal by predators or scavengers.

For these reasons, the Service has determined the actual amount or extent of incidental take is difficult to determine.

The use of surrogates to express the amount or extent of incidental take is appropriate and consistent with Federal court decisions addressing the issue of surrogates as reinitiation triggers in incidental take statements (80 FR 26834, May 11, 2015). Surrogate measures of take are especially useful in cases where the biology of the listed species or the nature of the proposed action make it impractical to detect or monitor take-related impacts to individual animals. In 2015, the Service and the National Marine Fisheries Service jointly concluded "Over the last 25 years of developing incidental take statements, the Services have found that, in many cases, the biology of the listed species or the nature of the proposed action makes it impractical to detect or monitor take of individuals of the listed species. In those situations, evaluating impacts to a surrogate such as habitat, ecological conditions, or similar affected species may be the most reasonable and meaningful measure of assessing take of listed species."(80 FR 26834, May 11, 2015).

In this instance, a monitoring program capable of determining the precise number of bull trout entrained in the St. Mary Canal would be impossible or impractical to implement. Such a program would require monitoring the entrance of the St. Mary Canal for 24 hours per day for eight months each year. The monitoring program would need to be able to determine the entrainment of all bull trout life stages, which would include ensuring the detection of fry. Determining the actual amount of take would also require monitoring of the St. Mary Diversion Dam for 24 hours per day for the duration of time covered by this consultation (five years) to determine when fish passage in impaired, and how many fish were unable to pass the dam or injured in the process of passing the dam. This effort would also need to be able to document any mortality that could occur as a result of passing the dam, or attempting to pass the dam. Mortality caused by passing, or attempting to pass the St. Mary Diversion Dam could occur days or weeks after passing, or an attempted passing. As a result, each fish that passed, or attempted to pass, the dam would need to be followed and monitored to ensure survival. For these reasons, we have determined that the monitoring effort needed to determine the actual amount of take is

not possible. Therefore, in this incidental take statement we use surrogates as measures of incidental take, and as triggers for reinitiation of consultation.

In this BO we use the extent of water loss (via diversion) from the St. Mary River drainage, the duration of seasonal habitat loss below Lake Sherburne Dam, and the duration of the proposed action (2020 through 2025) as surrogates for incidental take and triggers for reinitiation of consultation. We conclude that quantifying actual incidental take is not feasible (described above) and that these surrogates will determine whether the impacts are consistent with the analysis in this biological opinion, and will ensure that reinitiation of formal consultation will be triggered in the extent of the incidental taking specified in this incidental take statement is exceeded. These surrogates are discussed below:

- The proposed action would annually divert a maximum of 850 cubic feet/second of water from the St. Mary River from March 1 to October 31. This annual diversion results in bull trout entrainment (see discussion in *Section F.1* above), but the number of bull trout entrained in any given year is likely to vary. Additionally, it would be impossible to determine the precise number of bull trout that are entrained in any one diversion period. The diversion of 850 cubic feet/second of water from the St. Mary River also results in habitat reduction and degradation in the St. Mary River downstream of the St. Mary Diversion Dam (see discussion in *Section F.5* above). Thus, the amount of water diverted from the St. Mary River is the first surrogate measure of incidental take. If more than 850 cubic feet/second of water is diverted from the St. Mary River, incidental take will be exceeded and reinitiation of consultation will be required. If diversion of water from the St. Mary River occurs outside of the March 1 – October 31 time window, incidental take will be exceeded and reinitiation of consultation will be required.

- The proposed action results in annual de-watering of Swiftcurrent Creek from just below Lake Sherburne Dam to the confluence with Boulder Creek, resulting in habitat loss and degradation, as well as potential for direct mortality through fish strandings (see discussion in *Section F.3* above). Flow through Lake Sherburne Dam typically begins to ramp down in October, and is fully shut down by November. Releases generally begin again the following spring by May 1. Thus, the amount of time Swiftcurrent Creek remains de-watered as a result of no flow through Lake Sherburne Dam is the second surrogate of take. If Swiftcurrent Creek below the Lake Sherburne Dam is de-watered prior to October 1, or after May 1 during any given year, incidental take will be exceeded and reinitiation of consultation will be required. Additionally, the action includes the staged shutdown of Lake Sherburne Dam in the fall, including maintaining a discharge into Swiftcurrent Creek of 25 cubic feet/second for at least three consecutive days immediately prior to complete shutdown. If a staged shutdown of Lake Sherburne Dam does not occur, incidental take will be exceeded and reinitiation of consultation will be required. If the fall shutdown of Lake Sherburne Dam does not include at least three consecutive days of 25 cubic feet/second directly prior to complete shutdown, incidental take will be exceeded and reinitiation of consultation will be required.

2. Effect of Take

Through the analysis in this BO, the Service has determined that this level of incidental take is not likely to jeopardize the continued existence of the coterminous United Stated

population of bull trout.

3. Reasonable and Prudent Measures

Biological opinions provide "reasonable and prudent measures" that are expected to reduce the amount of incidental take. Reasonable and prudent measures refer to those actions the Director believes are necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take resulting from proposed actions [50 CFR §402.02]. Reasonable and prudent measures are nondiscretionary and must be implemented by the action agency in order for the exemption in section 7(o)(2) to apply.

The Service concludes that the following reasonable and prudent measures (RPM) are necessary and appropriate to minimize the take of bull trout caused by the proposed action:

RPM # 1: Implement measures that reduce the direct loss of bull trout due to entrainment and mortality in the St. Mary Canal.

RPM # 2: Implement measures that reduce the likelihood of bull trout stranding and mortality in Swiftcurrent Creek.

RPM # 3: Continue assessing, developing and implementing measured designed to reduce the direct loss of bull trout associated with operation of the St. Mary Unit of the Milk River Project.

4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must ensure compliance with the following terms and conditions. These terms and conditions implement the reasonable and prudent measure described above; they are non-discretionary:

To fulfill RPM #1, the following terms and conditions shall be implemented:

1. To reduce the likelihood of adult bull trout entrainment in the fall, Reclamation shall ensure that an adult fish screen is installed and properly functioning during any water diverting activities that occur from October 1 – October 31. This screen shall be implemented as proposed in the supplement to the BA (BOR 2020a; Measure #1 and Measure #2).

2. To reduce the likelihood of bull trout entrainment in the St. Mary Canal, Reclamation shall continue to develop a measure utilizing a bio-acoustic fish barrier as described in the supplement to the BA (BOR 2020a; Measure #3) prior to the 2021 diversion period (March 1, 2021). This measure shall be further explored through continued implementation of the St. Mary Minimization Measures Team as indicated in the supplement to the BA.

3. Reclamation shall coordinate with the Service and the Blackfeet Nation to conduct an in-canal salvage of the St. Mary Canal following each of the diversion periods for the life of this consultation (2020-2025). The in-canal

salvage shall be conducted as proposed in the supplement to the BA (BOR 2020a; Measure #4 and Measure #5).

To fulfill RPM #2, the following terms and condition shall be implemented:

4. To reduce the likelihood of bull trout stranding and mortality in Swiftcurrent Creek, Reclamation shall ensure that annual fall closure of the Lake Sherburne Dam is done is a "staged down" manner as described in the BA (BOR 2020, pgs. 7-8).

5. To reduce the likelihood of bull trout stranding and mortality in Swiftcurrent Creek, Reclamation shall ensure that a minimum flow of 25 cubic feet/second is maintained through Lake Sherburne Dam for a minimum of three consecutive days immediately prior to complete fall shutdown.

6. Reclamation shall work with the Service to conduct an annual fish salvage of Swiftcurrent Creek from just below Lake Sherburne Dam to the confluence of Boulder Creek. This salvage effort shall be conducted after each fall shutdown of Lake Sherburne Dam, and shall be conducted in a timely manner that reduces the likelihood of mortality due to severe habitat degradation (e.g., high water temperature, low dissolved oxygen, frozen conditions), or predation.

To fulfill RPM #3, the following terms and condition shall be implemented:

7. Reclamation shall continue to convene the St. Mary Minimization Measures Team throughout the five year period covered by this consultation (2020-2025) as described in the supplement to the BA (BOR 2020a; Measure #6).

8. The St. Mary Minimization Measures Team shall operate using an adaptive management approach, in a manner that places priority on developing and implementing measures designed to reduce the effect and extent of incidental take of bull trout. The Team shall also continue to assess already-implemented measures to evaluate their effectiveness and determine if those measures should be continued.

9. Should the St. Mary Minimization Measures Team determine additional measures would be feasible and effective, and the Service agrees, these measures shall be considered for implementation by Reclamation. If Reclamation does not implement the recommended measures, documentation of the rationale must be included in the annual report (see reporting requirements below). In the event that additional measures are recommended and implemented, the Team shall evaluate their effectiveness and determine if those measures should be continued.

5. Notification, Reporting and Coordination Requirements

In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [(50 CFR 402.14 (i)(3)].

To demonstrate that the proposed action is adequately reducing the potential for, and minimizing the effect of any, incidental take that may result, and that the assumptions made in this consultation are valid, Reclamation shall annually complete a report with the information listed below and submit it to the Service's Montana Ecological Services Office by March 1 of each year for the preceding calendar year. The report shall include, but not be limited to:

1. A summary of water diversion from the St. Mary River including verification that the appropriate diversion time window was met (i.e., March 1 – October 31).

2. A description of implemented minimization measures intended to reduce the likelihood of bull trout entrainment into the St. Mary Canal (as required in terms and conditions #1 and #2).

3. A summary of the in-canal salvage effort (as required by term and condition #3) including dates of the salvage, methods used, the number of bull trout captured, and the final disposition of fish captured (e.g., mortality, release location, release condition). If possible, the report should also include the length and weight of all bull trout captured.

4. A summary of fall shutdown procedures at Lake Sherburne Dam, including verification that a "staged down" approach was adhered to (as required by term and condition #4), and a minimum flow of 25 cubic feet/second was maintained for at least three consecutive days immediately prior to full shutdown (as required by term and condition #5).

5. A summary of the Swiftcurrent Creek salvage effort (as required by term and condition #6) including dates of the salvage, methods used, the number of bull trout captured, and the final disposition of fish captured (e.g., mortality, release location, release condition). If possible, the report should also include the length and weight of all bull trout captured.

6. Status of the St. Mary Minimization Measures Team. This update shall include a summary of the year's activity, any minimization measures the Team investigated, any minimization measures the Team recommended for implementation, and any measures the Team recommended should no longer be implemented.

Any sick, injured, or dead bull trout that are observed while implementing the proposed action must be reported to the Service's Montana Ecological Services Office within 24 hours. This requirement does not include any bull trout captured as part of the St. Mary Canal or Swiftcurrent Creek salvage efforts.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary recommendations that: (1) identify discretionary measures a Federal agency can take to minimize or avoid the adverse effects of a proposed action on listed or proposed species, or designated or proposed critical habitat, (2) identify studies, monitoring, or research to develop new information on listed or proposed species, or designated or proposed critical habitat, and, (3) include suggestions on how an action agency can assist species conservation as part of their action and in furtherance of their authorities under section 7(a)(1) of the Act. The Service provides the following recommendations:

1. The April 24, 2020 letter requesting initiation of formal consultation indicates that funding strategies for new facilities will be pursued during the five year period covered in this consultation. The Service recommends that new facilities include permanent measures to reduce the on-going negative effects of the St. Mary Unit of the Milk River Project on bull trout in the St. Mary River basin.

2. The Service recommends that Reclamation continue to pursue permanent alternatives that would effectively eliminate entrainment and mortality of all age classes of bull trout in the St. Mary Canal. Measures designed to eliminate fish entrainment in water diversion canals are well documented within the range of bull trout, as well as throughout the United States (including as part of many Reclamation projects). These measures often includes a fish screen and bypass structure designed to safely prevent entrainment of all age classes of fish (including migratory salmonids).

3. The Service recommends that Reclamation continue to pursue permanent alternatives that would provide safe, timely and effective upstream and downstream passage of all age classes of bull trout at the St. Mary Diversion Dam. Measures designed to provide safe, timely and effective upstream and downstream fish passage are well documented within the range of bull trout, as well as throughout the United States (including as part of many Reclamation projects). These measures often include fish ladders, fish transport facilities, or naturalized diversion dam designs (i.e., rock ramp designs) that prevent impaired migration and fragmented habitat for all age classes of fish (including migratory salmonids).

4. The Service recommends that Reclamation pursue alternative operational procedures that would avoid complete de-watering of Swiftcurrent Creek below the Lake Sherburne Dam. The Service also recommends that year-round in-stream flow in Swiftcurrent Creek below Lake Sherburne Dam should be maintained at a level that would provide sufficient habitat connectivity for bull trout year-round. The Service understands that this recommendation would need to be pursued while also considering all commitments and confines associated

with existing treaties and agreements that Reclamation is engaged in.

5. The Service recommends that Reclamation pursue alternative operational procedures that would avoid habitat fragmentation and impaired bull trout migration at the mouth of Canyon Creek in Lake Sherburne Reservoir. The Service understands that this recommendation would need to be pursued while also considering all commitments and confines associated with existing treaties and agreements that Reclamation is engaged in.

6. The Service recommends that Reclamation continue to work with the Blackfeet Nation and the National Park Service (Glacier National Park) to identify and address concerns regarding the continued impacts of the St. Mary Unit on bull trout and other native fish species.

REINITIATION NOTICE

This concludes formal consultation with Reclamation regarding the effects of continued operation and maintenance of the St. Mary Unit of the Milk River Project (as proposed) for 2020 through 2025 bull trout. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

(1) the amount or extent of incidental take is exceeded;

(2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion;

(3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or

(4) a new species is listed or critical habitat designated that may be affected by the action.

The Service retains the discretion to determine whether the conditions listed in (1) through (4) have been met and reinitiation of formal consultation in required.

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PERSONAL COMMUNICATIONS

USFWS-FWCO 2020a – Telephone conversation with USFWS Fish and Wildlife Conservation Office fisheries biologist (Jim Mogen) on April 7, 2020.

USFWS-FWCO 2020b – Email exchange with USFWS Fish and Wildlife Conservation Office fisheries biologist (Jim Mogen) on July 15, 2020.

USFWS-FWCO 2020c – Telephone conversation with USFWS Fish and Wildlife Conservation Office fisheries biologist (Jim Mogen) on September 2, 2020.