

**Draft**

**Saint Mary Recovery Unit**

**Implementation Plan**

**for**

**Bull Trout Recovery Plan**

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Prepared by

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# Saint Mary Recovery Unit

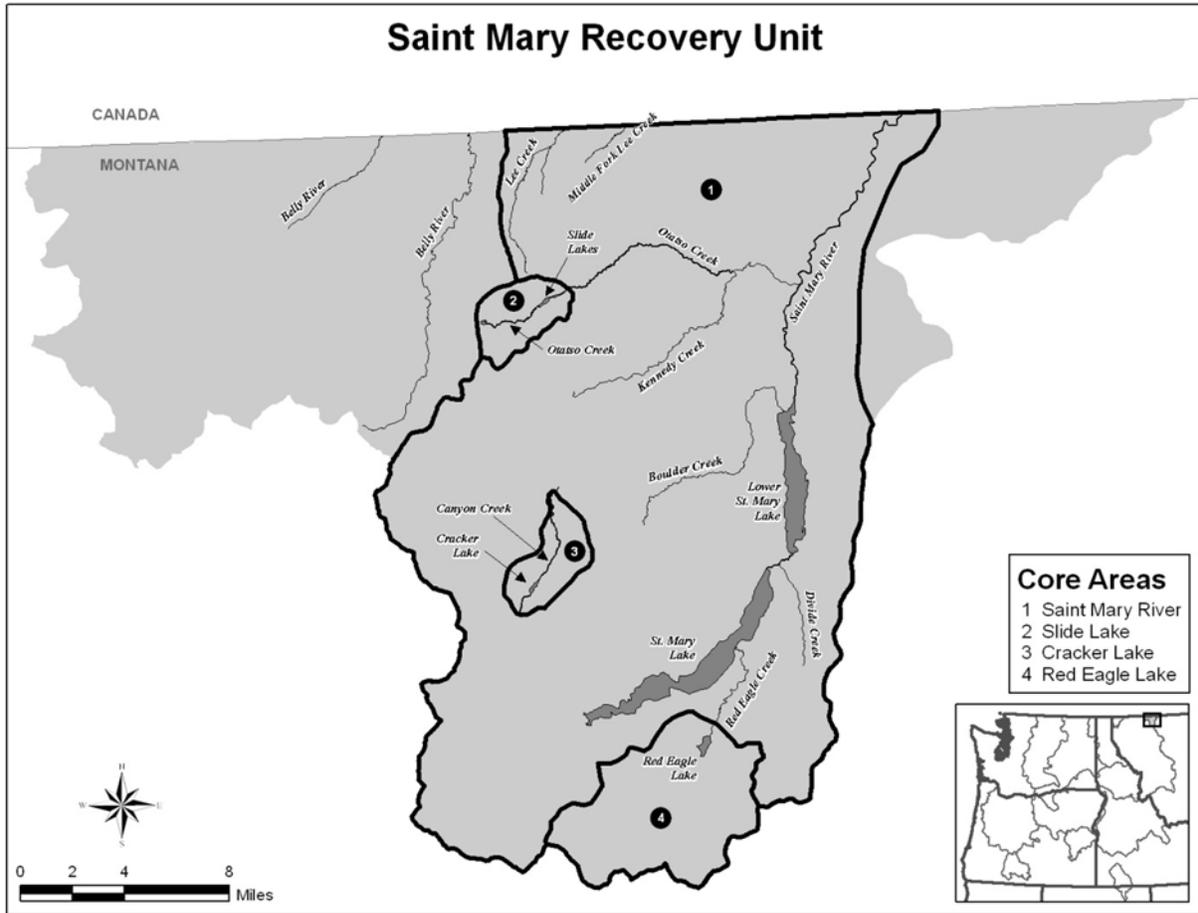
## Draft Recovery Unit Implementation Plan

### ***Introduction***

This draft recovery unit implementation plan (RUIP) describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the Saint Mary Recovery Unit, including estimates of time required and cost. This document supports and complements the Draft Revised Recovery Plan for the Coterminous U.S. Population of Bull Trout (USFWS 2014), which described recovery criteria and a general range-wide recovery strategy for the species, but deferred detailed discussion of species status and recovery actions within each of the six recovery units to RUIPs developed in coordination with State, Federal, Tribal, and other conservation partners. After we have received public comment on the draft RUIPs, we will incorporate changes as appropriate and release a final version in conjunction with the final recovery plan.

The Saint Mary Recovery Unit is located in northwest Montana east of the Continental Divide and includes the U.S. portions of the Saint Mary River basin, from its headwaters to the international boundary with Canada at the 49th parallel (Figure 1). The watershed and the bull trout population are linked to downstream aquatic resources in southern Alberta, Canada; the U.S. portion includes headwater spawning and rearing (SR) habitat in the tributaries and a portion of the foraging, migrating, and overwintering (FMO) habitat in the mainstem of the Saint Mary River and Saint Mary lakes (Mogen and Kaeding 2001).

The Saint Mary Recovery Unit is comprised of four core areas; only one (Saint Mary River) is a complex core area with five described local bull trout populations (Divide, Boulder, Kennedy, Otatso, and Lee Creeks). Roughly half of the linear extent of available FMO habitat in the mainstem Saint Mary system (between Saint Mary Falls and the Canadian border) is comprised of Saint Mary and Lower Saint Mary Lakes, with the rest in the Saint Mary River. The remaining three core areas (Slide Lakes, Cracker Lake, and Red Eagle Lake) are simple core areas. Slide Lakes and Cracker Lake occur upstream of seasonal or permanent barriers and are comprised of genetically isolated single local bull trout populations, wholly within Glacier National Park, Montana. In the case of Red Eagle Lake, physical isolation does not occur, but consistent with other lakes in the adjacent Columbia Headwaters Recovery Unit, there is likely some degree of spatial separation from downstream Saint Mary Lake. As noted, the extent of isolation has been identified as a research need.



**Figure F-1. Map of the Saint Mary Recovery Unit for Bull Trout.**

Bull trout in the Saint Mary River complex core area are documented to exhibit primarily the migratory fluvial<sup>1</sup> life history form (Mogen and Kaeding 2005a, 2005b), but there is doubtless some occupancy (though less well documented) of Saint Mary Lakes, suggesting a partly adfluvial<sup>2</sup> adaptation. Since lake trout and northern pike are both native to the Saint Mary River system (headwaters of the South Saskatchewan River drainage draining to Hudson Bay), the conventional wisdom is that these large piscivores historically outcompeted bull trout in the lacustrine environment (Donald and Alger 1993, Martinez et al. 2009), resulting in a primarily fluvial niche and existence for bull trout in this system. This is an untested hypothesis and additional research into this aspect is needed.

Bull trout populations in the simple core areas of the three headwater lake systems (Slide, Cracker, and Red Eagle Lakes) are, by definition, adfluvial; there are also resident<sup>3</sup> life history components in portions of the Saint Mary River system such as Lower Otatso Creek (Mogen and Kaeding 2005a), further exemplifying the overall life history diversity typical of bull trout.

Mogen and Kaeding (2001) reported that bull trout continue to inhabit nearly all suitable habitats accessible to them in the Saint Mary River basin in the United States. The possible exception is portions of Divide Creek, which appears to be intermittently occupied despite a lack of any migratory barriers, possibly due to low population size and erratic year class production.

It should be noted that bull trout are found in minor portions of two additional U.S. watersheds (Belly and Waterton rivers) that were once included in the Draft Recovery Plan (USFWS 2002) but are no longer considered core areas in the Revised Draft Recovery Plan (USFWS 2014) and are not addressed in this document. In Alberta, Canada, the Saint Mary River bull trout population is considered at “high risk,” while the Belly River is rated as “at risk” (ACA 2009). In the Belly River drainage, which enters the South Saskatchewan system downstream of the Saint Mary River in Alberta, some bull trout spawning is known to occur on either side of the international boundary. These waters are in the drainage immediately west of the Saint Mary River headwaters. However, the U.S. range of this population constitutes only a minor headwater migratory SR segment of an otherwise wholly Canadian population, extending less than one mile into backcountry waters of Glacier National Park. The Belly River population is otherwise totally dependent on management within Canadian jurisdiction, with no natural migratory connection to the Saint Mary, so it is not addressed further in this plan.

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<sup>1</sup> Fluvial: Life history pattern of spawning and rearing in tributary streams and migrating to larger rivers to mature.

<sup>2</sup> Adfluvial: Life history pattern of spawning and rearing in tributary streams and migrating to lakes or reservoirs to mature.

<sup>3</sup> Resident: Life history pattern of residing in tributary streams for the fish’s entire life without migrating.

The Waterton River basin also heads in the backcountry of Glacier National Park to the west of the Saint Mary River, including Waterton Lake, which spans the international border. In this drainage, natural fish barriers occur just upstream of Waterton Lake. Thus, U.S. headwaters are not reachable by migratory fish, the portion downstream of the barriers are not documented to be used for SR, and such bull trout occupancy as occurs appears to be only transitory in less than 1 mile of stream. As with Belly River, the land, water, and fishery management decisions for this population exist on the Canadian side of the boundary, so this population is also not addressed further in this plan.

In a meeting to discuss design of this RUIP, scientists from the U.S. Fish and Wildlife Service (Service), National Park Service (NPS), and Bureau of Reclamation (BOR) were asked to provide existing plans, conservation projects, and reports related to bull trout conservation within their areas. Over a dozen documents were reviewed to determine what recovery actions were underway, had been completed, or were needed in the future in the Saint Mary core area. Individual tasks from existing plans were classified by primary threat focus and compiled into a threats matrix in this RUIP. The intent was to identify those actions already being pursued and to highlight primary threats that may require additional planning and attention to address (Table 1).

Discussion at the meeting also highlighted actions identified in previous draft bull trout recovery plans and reviews that had been completed (Appendix) or that were no longer considered conservation priorities because of changes in core area management, new information from field surveys, or research results. Although we were unable to establish formal contact with the Blackfoot Tribe, we relied heavily on the 2010 Blackfoot Nation Bull Trout Management Plan, which was co-written by the Tribe and the Service and adopted by the Blackfoot Tribal Business Council in 2010. We also contacted the Bureau of Indian Affairs for a discussion of on-reservation grazing and timber management plans.

### ***Current Status of Bull Trout in the Saint Mary Recovery Unit***

Current status of bull trout in the Saint Mary River core area (U.S.) is considered strong (Mogen 2013). Migratory bull trout redd counts are conducted annually in the two major SR streams, Boulder and Kennedy creeks. Boulder Creek redd counts have ranged from 33 to 66 in the past decade, with the last 4 counts all 53 or higher. Kennedy Creek redd counts are less robust, ranging from 5 to 25 over the last decade, with a 2014 count of 20.

Generally, the demographic status of the Saint Mary River core area is believed to be good, with the exception of the Divide Creek local population. In this local population, there is evidence that a combination of ongoing habitat manipulation (Smillie and Ellerbroek 1991,

USDOI 1992) resulting in occasional historical passage issues, combined with low and erratic recruitment (DeHaan et al. 2011) has caused concern for the continuing existence of the local population.

While less is known about the demographic status of the three simple cores where redd counts are not conducted, all three appear to be self-sustaining and fluctuating within known historical population demographic bounds. Of the three simple core areas, demographic status in Slide Lakes and Cracker Lake appear to be functioning appropriately, but the demographic status in Red Eagle Lake is less well documented and believed to be less robust.

### ***Factors Affecting Bull Trout in the Saint Mary Recovery Unit***

A comprehensive summary of factors affecting bull trout at the core area level within the Saint Mary Recovery Unit can be found in the Service's Core Area Status Assessment Template (USFWS 2008).

The current design and management of the Saint Mary Diversion for the Milk River Project is the primary factor affecting bull trout in the Saint Mary Recovery Unit (Mogen and Kaeding 2005b, Mogen et al. 2011). The Saint Mary Diversion is operated by BOR and recovery actions identified as necessary to conserve bull trout include: (1) constructing a screen at the Saint Mary Diversion to eliminate entrainment of up to 600 bull trout per year (Mogen et al. 2011); (2) development of fish passage facilities to facilitate upstream migration, especially to access Boulder Creek, the single most abundant local population; and (3) securing adequate instream flow for bull trout in Swiftcurrent Creek, downstream of Sherburne Dam and in the Saint Mary River during irrigation season in order to prevent dewatering and provide suitable bull trout habitat. These measures should be accomplished in coordination with full implementation of the Blackfoot Bull Trout Management Plan (Skunk Cap et al. 2010) and consistent with needs of downstream water right holders.

Effects of nonnative fish on bull trout in the Saint Mary Recovery Unit are relatively minor. Lake trout and northern pike are native to these watersheds and historically coexisted with bull trout, although as noted above the resulting interaction probably minimized the existence of the adfluvial life history form of bull trout in Saint Mary lakes. Brook trout have been introduced in areas where bull trout occur, but to date no hybridization has been detected and brook trout are not currently considered to be a factor negatively affecting bull trout conservation in the Saint Mary Recovery Unit. Walleye have existed since the 1980's downstream in Saint Mary Reservoir (Alberta, Canada) and are occasionally caught by fishermen in the lower Saint Mary River around Cardston, Alberta, indicating some upstream migratory movement. Several walleye were also captured in the fall of 2014 by BOR, during shut-down from the lower-most drop pool on the Saint Mary Canal where it enters the North

Fork Milk River. At this time it is considered unlikely that walleye could pass upstream from there, through a large siphon, into the Saint Mary River. Walleye currently inhabit several additional waters on the Blackfeet Reservation, namely Four Horns Reservoir, Mission Lake (stocked with Saugeye), Milk River and the lower headwaters of the Marias River (Two Medicine River and Cut Bank Creek). Walleye represent a potential threat to the Saint Mary Recovery Unit due to habitat overlap with migratory bull trout in the Alberta portion of the watershed and the potential for illegal transplant. However, this recovery plan is limited to addressing threats currently occurring within the U.S. portion of the drainage. Should walleye continue to move upstream or be documented elsewhere in U.S. portions of the drainage, this potential threat may need to be re-evaluated.

Climate change and its potential effects on bull trout are a consideration across the range. In the Saint Mary Recovery Unit we have not yet completed an adequate assessment of the potential impacts of changing climate. The three simple core areas centered on high elevation lakes (FMO) are fed by small cold streams providing SR habitat. Similar to those on the west side of Glacier National Park (USFWS 2015), these simple core areas are unlikely to be meaningfully affected by climate change in the foreseeable future. The lakes themselves provide cold water refugia and a measure of resiliency from minor temperature effects. Concerns about climate change may be more relevant for portions of the Saint Mary River core area. The natural thermal regime in Swiftcurrent Creek and the Saint Mary River has been altered by Sherburne Dam. Irrigation discharge from Sherburne Reservoir is likely much warmer than natural conditions, especially in late summer, and additional temperature increases could have negative effects for bull trout in Swiftcurrent Creek and the Saint Mary River. Operational changes may or may not be able to mitigate such impacts. These issues require further examination.

**Table F-1. Primary Threats in the Saint Mary Recovery Unit, listed by major category (Habitat-Based, Demographic, and Nonnative Species) with subheadings. All threats listed are considered “primary”, without rank.**

Core Area	Number of Local Populations	PRIMARY THREATS <sup>1</sup>		
		<i>Habitat</i>	<i>Demographic</i>	<i>Nonnatives</i>
Saint Mary River	5	<p><b>Upland/ Riparian Land Management (1.1)</b> Trespass <u>livestock grazing</u> along lower reaches of SR tributaries (primarily Kennedy, Otatso, and Lee Creeks) causes riparian and instream degradation, leading to loss of large woody debris, potential pool reduction, and sedimentation. Redd trampling has been documented in Kennedy Creek and possibly also occurs in other SR tributaries.</p> <p>Periodic dredging and diking of the stream channel to reduce bedload along lower Divide Creek, associated with maintenance of <u>residential development</u> in Saint Mary and the NPS compound, along with historical rerouting of the lower channel, perpetually aggravates unstable alluvial deposits contributing to dewatering and potential blockage of upstream fish passage.</p> <p><b>Instream Impacts (1.2)</b> Ongoing management of <u>roads and transportation corridors</u> (Saint Mary River, Swiftcurrent Creek, and Divide Creek) impacts FMO habitat by contributing to destabilized stream channel.</p>	<p><b>Connectivity Impairment (2.1)</b> <u>Entrainment</u> of an estimated 470 juvenile bull trout (and a few subadults and adults) occurs annually at the unscreened Saint Mary Diversion, representing by far the most significant primary threat.</p> <p><u>Upstream passage</u> of prespawning adult bull trout is partially blocked (some fish can jump the diversion under certain conditions) during irrigation season, disproportionately impacting Boulder and Divide Creek local populations. Passage improvement is necessary to fully remediate effects of fragmentation and to enhance persistence of bull trout in isolated local populations.</p> <p><b>Small Population Size (2.3)</b> <u>Small population size</u> and fragmentation limits annual recruitment and genetic diversity in key SR tributaries in the lower drainage (e.g., Divide Creek).</p>	<p><b>Nonnative Fishes (3.1)</b> Prevalence of <u>brook trout</u> is high in the Kennedy Creek watershed, but hybrids are rarely documented. Competition appears to be the major threat.</p>

		<p><b>Water Quality (1.3)</b>  <u>Dewatering</u> of the Saint Mary River mainstem (inter-basin transfer to the Milk River) reduces quality and quantity of FMO habitat and contributes to warmer summer water temperatures downstream of Saint Mary Diversion.</p> <p>Complete seasonal <u>dewatering</u> of Swiftcurrent Creek in winter (nonirrigation season) strands fish (up to 10 bull trout typically salvaged annually, but not all are captured) and reduces availability of FMO habitat, especially for subadult and adult bull trout in winter.</p> <p>Sherburne Reservoir discharges into Swiftcurrent Creek channel for conveyance downstream to Saint Mary Diversion, negatively affecting the <u>thermal regime</u> (warmer summer water temperature) in Swiftcurrent Creek as well as potentially downstream in the Saint Mary River.</p>		
<b>Red Eagle Lake</b>	<b>1</b>	None	None	None
<b>Cracker Lake</b>	<b>1</b>	None	None	None
<b>Slide Lakes</b>	<b>1</b>	None	None	None

<sup>1</sup> **Primary Threat:** *Factors known or likely (i.e., non-speculative) to negatively impact bull trout populations at the core area level, and accordingly require management actions to assure bull trout persistence to a degree necessary that bull trout will not be at risk of extirpation within that core area in the foreseeable future (50 years).*

## ***Ongoing Saint Mary Recovery Unit Conservation Measures***

The primary issue precluding bull trout recovery and eventual delisting in the Saint Mary Recovery Unit relates to impact of water diversions, specifically the BOR Milk River Project. This includes dewatering of Swiftcurrent Creek and the Saint Mary River channel, entrainment of bull trout at the Saint Mary Diversion Dam, and at least seasonal migration barriers to upstream bull trout movement at the diversion. We are currently engaged with BOR in consultation under section 7 of the Endangered Species Act to facilitate rehabilitation and necessary corrective actions at the Saint Mary Diversion Dam.

The Blackfeet Nation Bull Trout Management Plan was adopted in 2010 (Skunk Cap et al. 2010). This document, adopted by the Blackfeet Tribal Business Council, certifies that the Blackfeet Tribe, in cooperation with Federal, State, and local government agencies, will work to complete the recovery measures outlined in the 2002 Draft Recovery Plan (USFWS 2002), within such funding constraints as resources are made available to the Tribe. The Tribe has the necessary regulatory authority and ordinances in place to protect and conserve bull trout and their habitat.

## ***Research, Monitoring, and Evaluation***

There are generally a suite of concerns associated with the dominant primary threat of the Saint Mary Diversion, due to the lack of passage and instream flow as well as entrainment. If those issues are resolved, as expected over the next few years, then future research needs will likely focus on the potential impacts of climate change, the interaction between bull trout and native lake trout and northern pike in the FMO habitat of the Saint Mary lakes, and any future habitat issues that arise. Some of these factors could rise to the level of primary threat in the foreseeable future if they increase in magnitude or intensity, or are better documented or understood. Existing monitoring (primarily redd counts) could be expanded, particularly to account for the simple core areas, but are largely adequate to assess recovery criteria.

## ***Recovery Measures Narrative***

A list of individual recovery actions identified within the Saint Mary Recovery Unit follows (Table F-2). For each recovery action a title is underlined and carried forward (sometimes in abbreviated format) to the implementation schedule, where details of priority, partners, and costs are added. Each recovery action is accompanied below by a brief narrative with appropriate details of methods, rationale, scope, and implementation considerations.

It is our belief that the most effective way to implement bull trout recovery is a bottom-up approach that supports existing recovery efforts that partners have already agreed to and are implementing, rather than a prescriptive top-down approach that provides unsupported mandates for actions that are unlikely to occur. For that reason, the majority of recovery actions in this RUIP were taken directly from existing land, water, and natural resource planning documents, most of which were developed through collaborative processes involving interagency forums. These plans have nearly all been developed since bull trout were listed under the Endangered Species Act, and many have already contributed measurably to focusing mitigation programs and agency activities on priorities for bull trout recovery (see Appendix I).

In most cases, recovery action wording is taken directly from the source document(s), or closely paraphrased, with some editing for purposes of updating, brevity, and clarity. Recovery actions that are not sourced were generally new additions to this RUIP to cover identified gaps (i.e., primary threats with no identifiable actions found in existing literature). Recovery tasks that address primary threats are bolded.

Primary sources for most of the referenced recovery tasks in the Saint Mary Recovery Unit were the 2002 Draft Recovery Plan (USFWS 2002) and the Blackfoot Nation Bull Trout Management Plan (Skunk Cap et al. 2010).

## **1. Actions to Address Habitat Threats**

### **1.1 Upland/Riparian Land Management**

**1.1.1 Implement Divide Creek restoration actions.** Watershed analysis of channel instability in lower Divide Creek, related to Glacier National Park and private developments, was completed in 1992. Recommended solutions to chronic road and sediment delivery problems in and around Saint Mary must be implemented to restore aquatic function. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.1.2; Blackfoot Nation Bull Trout Management Plan 2010)

**1.1.2 Improve grazing practices.** Reduce negative effects of grazing with improved grazing management or riparian fencing where investigation indicates actions are likely to benefit bull trout and other native fish. Priority watersheds include Middle Fork and East Fork Lee Creek, Kennedy Creek (outside Glacier National Park; livestock trespass inside the Park needs to be controlled), and lower Otatso Creek. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.3.3; Blackfoot Nation Bull Trout Management Plan 2010)

**1.1.3 Develop Aquatic Conservation Strategy and follow Best Management Practices (BMPs) for timber activities.** Per the 2008 BIA Biological Opinion on the Effects of the Draft Blackfoot Forest Management Plan on Bull Trout on the Blackfoot Indian Reservation: In the event that BIA conducts timber sales that result in timber harvest or ground disturbing activities within the Lee, Otatso, Boulder, Swiftcurrent, Kennedy, or Divide Creek drainages and all such activities are 300 feet or more from those streams and their fish-bearing tributaries, BIA must follow standard Forestry BMPs. In the absence of an approved Aquatic Conservation Strategy, the BIA must reasonably demonstrate through cumulative watershed effects analysis that those activities will not adversely affect bull trout. (New Task)

## **1.2 Instream Impacts**

**1.2.1 Minimize potential stream channel degradation.** Ensure that negative effects to bull trout of ongoing flood control activities (e.g., dredging, channel clearing on lower Divide and Swiftcurrent creeks) are minimized or eliminated. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.3.6; Blackfoot Nation Bull Trout Management Plan 2010)

**1.2.2 Evaluate the proposal to reroute lower Swiftcurrent Creek** to its original confluence with the Saint Mary River (rather than Lower Saint Mary Lake). As currently conceived, this project represents a potential threat to the Boulder Creek local population, which may have adapted to a more adfluvial orientation. If implementation occurs, ensure that connectivity issues for bull trout in and out of Boulder Creek drainage are satisfactorily addressed. (New Task)

## **1.3 Water Quality**

**1.3.1 Improve instream flows.** Restore connectivity, opportunities for migration, and improve habitat by securing or improving instream flows. Priority streams include lower Swiftcurrent Creek and the Saint Mary River. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.2.4; Blackfoot Nation Bull Trout Management Plan 2010)

**1.3.2 Optimize outflow patterns from Sherburne Dam.** Continue ongoing discussions and implement a program to integrate reservoir operations with the demands for downstream flow releases in a fashion that restores a more naturally shaped dam discharge pattern (both seasonally and daily), and accommodates sufficient instream flows for threatened bull trout and

other native species. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.4.1; Blackfeet Nation Bull Trout Management Plan 2010)

## **2. Actions to Address Demographic Threats**

### **2.1 Connectivity Impairment**

- 2.1.1 Eliminate entrainment in diversions.** Continue efforts to eliminate loss of fish through entrainment in diversions; in part by incorporating screens on the Saint Mary Diversion in Montana (evaluation in progress). (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.2.1; Blackfeet Nation Bull Trout Management Plan 2010)
- 2.1.2 Provide fish passage around diversions.** Install effective fish passage around the Saint Mary Diversion. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.2.2; Blackfeet Nation Bull Trout Management Plan 2010)
- 2.1.3 Eliminate culvert barriers.** Monitor road crossings for blockages to upstream passage, and replace any existing culverts or manmade blockages that may impede fish passage as necessary, taking into consideration risks versus benefits to reconnection. One site currently identified on Middle Fork Lee Creek. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.2.3; Blackfeet Nation Bull Trout Management Plan 2010)
- 2.1.4 Establish and restore natural thermal regime.** Attempt to determine natural thermal conditions in lower Swiftcurrent Creek and, to the extent possible, restore those conditions so that the normal biological migratory and growth response of bull trout is enhanced in the creek and the Saint Mary River downstream. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.4.2; Blackfeet Nation Bull Trout Management Plan 2010)

### **2.2 Fisheries Management**

- 2.2.1 Evaluate enforcement of angling regulations.** Ensure compliance with angling regulations and scientific collection policies. Target bull trout spawning and staging areas for enforcement, especially in the Saint Mary River near the diversion. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 3.2.2; Blackfeet Nation Bull Trout Management Plan 2010)

## 2.3 Small Population Size

- 2.3.1 Continue and expand annual redd counts** in index reaches. Annual redd counts ongoing since 1997 should be continued in Boulder and Kennedy creeks. The NPS should continue annual bull trout redd counts begun in Lee Creek in 2011 and explore the potential for periodic redd counts in Red Eagle and Slide Lakes core areas. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 5.1.1; Blackfoot Nation Bull Trout Management Plan 2010)

## 3. Actions to Address Nonnative Fishes

### 3.1 Nonnative Fishes

- 3.1.1 Discourage nonnative fish introductions** into waters with a surface water connection to bull trout core areas. Implement a public educational effort about the problems and consequences associated with unauthorized fish introductions. Establish dialogue with Blackfoot Fish and Game staff as well as fish managers in Alberta regarding stocking of nonnative fish species into connected surface waters. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 2.3.1; Blackfoot Nation Bull Trout Management Plan 2010)
- 3.1.2 Evaluate experimental removal of established brook trout** populations. Evaluate opportunities for removal of brook trout from selected streams and lakes. Priority watersheds include Kennedy and Red Eagle Creeks. Evaluate other waters for brook trout removal which may act as potential sources of dispersal to bull trout waters (e.g. Lost Lake in Glacier National Park). (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 2.4.1)

## 4. Research, Monitoring, and Evaluation

### 4.1 Habitat

- 4.1.1 Conduct watershed assessments.** Identify site-specific threats (problem assessment) that may be limiting bull trout in watersheds not already evaluated. Examples include Divide Creek and forks of Lee Creek. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 1.3.1)
- 4.1.2 Evaluate temperature as a limiting factor.** Evaluate the potential role of seasonally elevated water temperatures as a limiting factor to juvenile bull trout rearing and/or adult migration in Swiftcurrent Creek, the Saint Mary

River downstream from the Swiftcurrent Creek confluence, and the Saint Mary River downstream from Saint Mary Diversion. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 5.2.4)

- 4.1.3 Model the potential impacts of climate change and, if necessary, develop and implement mitigation strategies. (New Task)
- 4.1.4 Mitigate impacts of oil and gas exploration. Based in part on past experience in the Belly and Waterton river watersheds of Alberta, Canada, develop best management practices to mitigate cumulative impacts of oil and gas exploration. These include, but are not limited to direct impacts on habitat and consequences to water quality and quantity, as well as associated human impacts from opening up access for other types of development and increased angler use. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 5.3.2; Blackfeet Nation Bull Trout Management Plan 2010)

#### 4.2 Demographic

- 4.2.1 Evaluate distribution, abundance, and habitat use by bull trout occupying the Saint Mary lakes. A research need is to develop information about the relatively unknown status, distribution, abundance and habitat preference of bull trout that occupy the large valley lakes in the basin; particularly since these fish are the only population in the United States known to have coexisted with native lake trout and northern pike. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 5.5.5)
- 4.2.2 Determine connectivity status and movement patterns of bull trout in lower Red Eagle Creek. Bull trout that occur in this watershed may have an adfluvial life history tied to Saint Mary Lake, but there is currently a lack of evidence to establish this as a local population of the Saint Mary.

#### 4.3 Nonnatives

- 4.3.1 Develop bull trout education program. Develop and present public information programs with broad emphasis on bull trout ecology and life history requirements and more specific focus on regionally or locally important recovery issues. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 2.3.2; Blackfeet Nation Bull Trout Management Plan 2010)
- 4.3.2 Evaluate species interaction with native lake trout and northern pike. Examine the species interaction and/or habitat partitioning that has allowed bull trout to persist in the Saint Mary watershed alongside native

populations of lake trout and northern pike, with possible implications to other areas where these other species have been introduced. (Source: USFWS (2002) - Draft Bull Trout Recovery Plan, task 5.2.6)

## ***Implementation Schedule***

The following Implementation Schedule, specific to the Saint Mary Recovery Unit, includes the following components:

- Core Area: Designated core area(s) where the recovery action should be targeted.
- Threat Factor: Listing factor (A through E) or threat category addressed by the action.
- Recovery Action Priority: Assigned # 1, 2, 3, or CR based on the following definitions;

*Priority 1* – An action that must be taken to prevent extinction or prevent the species from declining irreversibly in the foreseeable future;

*Priority 2* – An action that must be taken to prevent a significant decline in species population or habitat quality; and

*Priority 3* - All other actions necessary to meet the recovery objectives.

*Priority CR* - We also list additional conservation recommendations (denoted by “CR”). These actions are considered beneficial for bull trout conservation and merit implementation, but are not considered necessary to meet recovery objectives within a core area and so are not classified as Priority 1, 2, or 3. Conservation recommendations are not included in recovery cost estimates.

We evaluate recovery action priorities relative to the core area(s) where the action is targeted. Recovery action priorities may reflect both the severity of the threat and the expected effectiveness of the action in addressing it. Some research, monitoring and evaluation (RM&E) actions necessary for recovery are also deemed critical for developing information for planning, implementing, monitoring, and evaluating effectiveness of recovery actions addressing management of primary threats. Depending on the level of importance of this information, these RM&E actions may be classified as Priority 2 or 3.

Additional components of the implementation schedule include:

- Recovery Action Description: Brief descriptive title of recovery action (consistent with the Recovery Measures Narrative that precedes this section).
- Recovery Action Duration: Indicates the number of years estimated to complete the action, or other codes defined as follows: Actions that are expected to last for the life of this plan (25 years) are so designated.

- **Responsible Parties:** Agencies and others with responsibility or authority to implement proposed recovery actions, typically with the primary lead for implementation listed first and others in no particular order.
- **Estimated Costs:** Estimated costs (x \$1,000) are assigned to each recovery action identified in the Implementation Schedule, both for the first 5 years after release of the recovery plan and for the total estimated cost of recovery (based on time to recovery, for Continual or Ongoing actions).
- **Time to Recovery:** Estimated time before this recovery unit could meet recovery criteria, if recovery actions are successfully implemented.

The following acronyms are used to identify responsible or participating parties throughout the implementation schedule:

BFN	Blackfeet Nation
BIA	Bureau of Indian Affairs
Glacier Co.	Glacier County, Montana
NPS	National Park Service, Glacier National Park
BOR	U.S. Bureau of Reclamation
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

**Table F-2. Saint Mary Recovery Unit Implementation Schedule**

Core Area	Threat Factor	Recovery Action Priority	Recovery Action Number	Recovery Action Description	Action Duration	Responsible Parties	Estimated Costs (x \$1,000)					
							Total Cost	FY 15	FY 16	FY 17	FY 18	FY 19
Saint Mary River	A	1	1.1.1	Implement Divide Creek restoration actions	25	NPS, BFN, BIA, Glacier Co., USDOT, USFWS	20,000	1,000	1,000	5,000	5,000	2,000
Saint Mary River	A	2	1.1.2	Improve grazing practices	25	BFN, BIA, USFWS	*					
Saint Mary River	A	2	1.1.3	Develop Aquatic Conservation Strategy and follow BMPs for timber activities	5	BFN, BIA, USFWS	*					
Saint Mary River	A	2	1.2.1	Minimize potential stream channel degradation	25	USDOT, USFWS, BFN, BIA, NPS, Glacier Co., BOR,	*					
Saint Mary River	A	2	1.2.2	Evaluate the proposal to reroute lower Swiftcurrent Creek	5	BFN, BOR, USDOT, BIA, NPS, Glacier Co., USFWS	5,000	500	500	2,000	1,000	1,000
Saint Mary River	A, D	1	1.3.1	Improve instream flows	25	BOR, BFN, USFWS, USGS	2,000	250	500	500	500	250
Saint Mary River	A, D	2	1.3.2	Optimize outflow patterns from Sherburne Dam	5	BOR, USFWS, NPS, BFN	*					
Saint Mary River	A, D	1	2.1.1	Eliminate entrainment in diversions	5	BOR, USFWS, BFN	9,000	1,000	5,000	2,000	500	500
Saint Mary River	A, D	1	2.1.2	Provide fish passage around diversions	3	BOR, USFWS, BFN	1,000	250	500	250		
Saint Mary River	A	2	2.1.3	Eliminate culvert barriers	10	BFN, BIA, Glacier Co., USDOT, USFWS	500	50	50	50	50	50

Core Area	Threat Factor	Recovery Action Priority	Recovery Action Number	Recovery Action Description	Action Duration	Responsible Parties	Estimated Costs (x \$1,000)					
							Total Cost	FY 15	FY 16	FY 17	FY 18	FY 19
Saint Mary River	A, D	2	2.1.4	Establish and restore natural thermal regime	25	BOR, BFN, BIA, NPS, USFWS	*					
Saint Mary River	B	3	2.2.1	Evaluate enforcement of angling regulations	5	BFN, NPS, USFWS	*					
Saint Mary River, Red Eagle Lake, Slide Lakes	A, E	2	2.3.1	Continue and expand annual redd counts	25	BFN, NPS, USFWS	250	10	10	10	10	10
Saint Mary River	A, E	2	4.1.2	Evaluate temperature as a limiting factor	2	USFWS, USGS, BFN, NPS, BOR	250	50	200			
Saint Mary River	A, E	2	4.1.3	Model the potential impacts of climate change	5	USGS, NPS, USFWS	240	10	10	200	10	10
Estimated total cost of recovery actions within this recovery unit: \$38,240,000 (over 25 years, minimum estimate)												
Time to Recovery (estimated time required to meet recovery criteria within this recovery unit): <b>25 years</b>												

### Conservation Recommendations for the Saint Mary Recovery Unit

Core Area	Threat Factor	Recovery Action Priority	Recovery Action Number	Recovery Action Description	Action Duration	Responsible Parties	Estimated Costs (x \$1,000)					
							Total Cost	FY 15	FY 16	FY 17	FY 18	FY 19
Saint Mary River	E	CR	3.1.1	Discourage nonnative fish introductions	25	BFN, NPS, USFWS	**					
Saint Mary River	E	CR	3.1.2	Evaluate experimental removal of established brook trout in Kennedy Creek	5	NPS, USFWS	**					
Red Eagle	E	CR	3.1.2	Evaluate experimental removal of established brook trout in Red Eagle Creek	5	NPS, USFWS	**					
Saint Mary River	A	CR	4.1.1	Conduct watershed problem assessments	10	BIA, BFN, NPS, USFWS	**					
Saint Mary River	A	CR	4.1.4	Mitigate impacts of oil and gas exploration	25	BFN, BIA, Glacier Co., USFWS	**					
Saint Mary River	E	CR	4.2.1	Evaluate distribution, abundance, and habitat use by bull trout occupying the Saint Mary lakes	10	BFN, NPS,USFWS, USGS	**					
Red Eagle	E	CR	4.2.2	Determine connectivity status and movement patterns of bull trout in lower Red Eagle Creek	10	BFN, NPS,USFWS, USGS	**					
Saint Mary River	E	CR	4.3.1	Develop bull trout education program	10	BFN, NPS, USFWS	**					
Saint Mary River	E	CR	4.3.2	Evaluate species interaction with native lake trout and northern pike	10	NPS, USDOT, USFWS, USGS	**					

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## **Appendix I. Completed Recovery Actions**

*Partial list of recovery tasks, per the 2002 Draft Bull Trout Recovery Plan, determined to be fully accomplished in the Saint Mary River core areas by the end of 2014.*

3.2.4 Solicit information from commercial fishermen. Develop a reporting system to collect information on bull trout caught and killed or released by commercial fishermen on Saint Mary Lake. Take corrective action if warranted.

3.4.2 Increase harvest of competing species. Adjust regulations in bull trout waters to encourage angler harvest of nonnative brook trout and other nonnative species. Examine potential to increase harvest of competing native species (lake trout, northern pike), in a manner that is compatible with bull trout persistence.

4.1.1 Conduct genetic inventory. Continue coordinated genetic inventory throughout recovery unit to contribute to establishing a program to understand the genetic baseline and monitor genetic changes throughout the range of bull trout.

5.2.1 Delineate important migratory habitat. Further determine movement and seasonality of use of different habitat types by adult and subadult migratory bull trout with emphasis on the mainstem Saint Mary and Belly rivers (especially United States portions) and Lee Creek in Alberta.

5.2.2 Evaluate effects of entrainment losses on population status. Collect additional information on the population dynamics of Saint Mary River and Belly River bull trout local populations, related to assessing the impact of losses downstream into and over the Saint Mary Canal and United Irrigation District, Mountain View Irrigation District and Belly to Saint Mary canal diversions. A 2-year study of entrainment losses in Saint Mary Canal is beginning in 2002.

5.2.5 Identify suitable unoccupied habitat. Identify suitable unoccupied habitat, if any. Within five years complete a comprehensive list of all known passage barriers blocking access to suitable habitat by upstream migrating bull trout in the United States and Canada.

5.4.1 Conduct wild fish health survey. Conduct the National Wild Fish Health Survey throughout headwaters of the Saint Mary and Belly drainages to assess current status of fish pathogens, given the widespread legacy of past fish stocking and transplanting practices.

5.5.2 Finalize list of local populations and prioritize key watersheds for restoration actions. Complete status and distribution surveys to a level sufficient to be used in refining site-specific lists of recovery tasks.

5.5.3 Map spawning habitat. Develop a comprehensive map of primary bull trout tributary spawning reaches for purposes of focusing habitat protection, law enforcement, and recovery efforts.

5.5.4 Evaluate resident populations. Evaluate hypothesis that some local populations may convert from migratory to “resident” status, due to the loss of functional connectivity. Assess fragmentation and isolation concerns as a result. Middle Otatso Creek and Lee Creek may provide one opportunity, although the migratory population in Lee Creek may be stronger than has currently been documented.

7.3.1 Periodically review progress towards recovery goals and assess recovery task priorities. Annually review progress toward population and adult abundance criteria and recommend changes, as needed, to the Saint Mary - Belly River Recovery Unit Chapter. In addition, review tasks, task priorities, completed tasks, budget, time-frames, particular successes, and feasibility within the Saint Mary - Belly River Recovery Unit.