

Recovery Strategy for the

Mountain Sucker

(Catostomus platyrhynchus)

Milk River populations



2026

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Preface

Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of a recovery strategy for species listed as extirpated, endangered, or threatened and are required to report on progress 5 years after the publication of the final document on the [Species at Risk Public Registry](#), and every subsequent 5 years, until the recovery strategy is no longer required under SARA, or the species' recovery is no longer feasible.

The Minister of Fisheries and the Minister of the Environment, Climate Change and Nature as the Minister responsible for the Parks Canada Agency are the competent ministers under SARA for the Mountain Sucker, Milk River populations and have prepared this recovery strategy, as per section 37 of SARA. In preparing this recovery strategy, the competent ministers have considered, as per section 38 of SARA, the commitment of the Government of Canada to conserving biological diversity and to the principle that, if there are threats of serious or irreversible damage to the listed species, cost-effective measures to prevent the reduction or loss of the species should not be postponed for a lack of full scientific certainty. To the extent possible, this recovery strategy has been prepared in cooperation with the Provinces of Alberta and Saskatchewan, as per subsection 39(1) of SARA.

As stated in the preamble to SARA, success in the recovery of this species depends on the commitment and cooperation of many different groups that will be involved in implementing the measures set out in this recovery strategy and will not be achieved by Fisheries and Oceans Canada (DFO), Parks Canada (PC), or any other jurisdiction, alone. The cost of conserving species at risk is shared amongst different constituencies. All Canadians are invited to join in supporting and implementing this recovery strategy for the benefit of the Mountain Sucker and Canadian society as a whole.

This recovery strategy will be followed by 1 or more action plans that will provide information on recovery measures to be taken by DFO, PC, First Nations and Métis, and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this recovery strategy is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Acknowledgments

To the extent possible, this recovery strategy has been prepared with input from the Mountain Sucker Recovery Team. DFO would like to express its appreciation to all First Nations and Métis, individuals, and organizations who have contributed to the recovery of the Mountain Sucker, Milk River populations.

Executive summary

At the time of publication, the species is listed on Schedule 1 of the *Species At Risk Act* (SARA) as the Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations. However, it is currently referred to as the Plains Sucker (*Pantosteus jordani*), Missouri population by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2022b). For consistency with SARA, this document will refer to the species using the name that appears on Schedule 1. This “Recovery Strategy for the Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations, in Canada” is part of a series of documents for this species that are linked and should be taken into consideration together; including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), wildlife species assessment (COSEWIC 2022a), and status report (COSEWIC 2010), a recovery potential assessment (RPA) (DFO 2013b), and 1 or more action plan(s) (to come). Recovery of the Mountain Sucker, Milk River populations has been determined to be biologically and technically feasible.

In the 2010 COSEWIC assessment, the Mountain Sucker was originally assessed with 3 Designatable Units (DUs) in Canada: 1) the Saskatchewan - Nelson River populations; 2) the Milk River populations; and 3) the Pacific populations. The assessment suggested that more research was necessary because taxonomic examination of the species using molecular data might result in multiple separate taxa across the Continental Divide. Unmack et al. (2014) concluded that the fish known as “mountain suckers” actually consisted of 11 different species overall, with significant genetic divergence within allopatric sibling lineages. In the most current COSEWIC assessment (2022b), the species formally assessed as Mountain Sucker was split into 2 allopatric species: the Cordilleran Sucker (*Pantosteus bondi*) in British Columbia (Bangs et al. 2018) and the Plains Sucker in Alberta and Saskatchewan. There are 2 DUs of Plains Sucker in Canada: 1) the Saskatchewan – Nelson River population, and 2) Missouri population. The latter of these (Plains Sucker, Missouri population) corresponds with this document and the nomenclature of Mountain Sucker, Milk River populations as per Schedule 1 of SARA.

Based primarily on geographic factors, the Mountain Sucker, Milk River populations, is found in 3 watersheds: 1) the North Milk and Milk River watershed within southern Alberta; 2) the Battle Creek watershed in Saskatchewan, and 3) Frenchman River watershed in Saskatchewan. The Mountain Sucker within these watersheds are now separated by watershed divides and human-made barriers, resulting in limited rescue potential between watersheds. The Milk River, Frenchman River, and Battle Creek are all part of the Missouri drainage and, historically, movement of Mountain Sucker between the watersheds would have been possible. Upstream fish movement is restricted by the Fresno Reservoir on the Milk River; the Frenchman Reservoir on the Frenchman River on Newton Lake, Montana; Huff Lake; and the Eastend Reservoir on the Frenchman River in Saskatchewan. Therefore, the Milk River populations consist of 3 disjunct populations.

The Mountain Sucker is a small (usually less than 250 mm fork length as an adult), bottom-dwelling fish, native to the westernmost Great Plains of North America. The Mountain Sucker has a broad and heavy snout, small eyes, sub-terminal mouth, no teeth, and characteristic “fleshy bumps” (papillae) on the lips. The mouth of the Mountain Sucker has a shallow cleft between the lower lips and a notch at each corner. The body is elongated, cylindrical, and somewhat compressed. The Mountain Sucker is a highly specialized feeder whose diet consists primarily of plankton and microscopic organic matter scraped off rocks. It is an important part of the food chain, forming the link between primary producers and higher-level consumers.

The main threats facing the Mountain Sucker, Milk River populations, are described in section 4 and include climate change and severe weather, followed by dams and water management or use. Agricultural and forestry effluents, invasive species and diseases, roads, and railroads have been identified as low-level threats. In addition, the Mountain Sucker has a small area of occupancy which may make it particularly susceptible to any changes in habitat.

The population and distribution objectives (section 6) for the Mountain Sucker, Milk River populations, are:

- population objective: to ensure that the Milk River populations of the Mountain Sucker are self-sustaining.
 - sub-objective: to ensure that populations within the Milk River drainage are stable
 - sub-objective: to ensure that populations in the Battle Creek and Frenchman River drainages are increasing
- distribution objective: to ensure the survival of populations within current waterbodies, and protect and/or improve habitat conditions

A description of the broad strategies to be taken to address threats to the species' survival and recovery, as well as research and management approaches needed to meet the population and distribution objectives, are included in section 7. These strategies will help to inform the development of specific recovery measures in 1 or more action plans.

For the Mountain Sucker, Milk River populations, critical habitat is identified to the extent possible, using the best available information, and provides the functions, features, and attributes necessary to support the species' lifecycle processes. This recovery strategy identifies critical habitat for the Mountain Sucker, Milk River populations, as cool (less than 25°C), moderate gradient streams within the Missouri drainage in Canada. This critical habitat includes North Milk and Milk rivers in southern Alberta; tributaries of the Frenchman River, including Belanger, Sucker, Davis, Fairwell, Caton, and Conglomerate creeks; and upper Battle Creek, as well as its tributary, Nine Mile Creek (section 8). It is anticipated that the protection of the species' critical habitat will be accomplished through a SARA critical habitat order made under subsections 58(4) and 58(5), which will invoke the prohibition in subsection 58(1).

A proposed action plan will be completed within 5 years of posting the final recovery strategy.

Recovery feasibility summary

The recovery of the Mountain Sucker, Milk River populations, is believed to be biologically and technically feasible.

1. Are individuals of the wildlife species that are capable of reproduction available now or in the foreseeable future to sustain the population or improve its abundance?

Yes. The Mountain Sucker continues to reproduce in all areas in which they are currently found and there is no evidence of any impediments which might limit or reduce reproductive success. Currently, the Mountain Sucker in the North Milk and Milk rivers are at no risk of imminent extirpation. Less certainty exists for the Mountain Sucker in Battle Creek and Frenchman River.

2. Is sufficient suitable habitat available to support the species or could it be made available through habitat management or restoration?

Yes. The occurrence of several viable populations over the course of many years suggests that the quantity of habitat is not a limiting factor; however, quality of habitat, specifically declines in water quality, may be a limiting factor. Habitat within portions of the North Milk and Milk rivers in Alberta is protected as critical habitat by SARA for the Rocky Mountain Sculpin (*Cottus sp.*) and the Western Silvery Minnow (*Hybognathus argyritis*). Activities to recover, protect, or restore habitat for the Rocky Mountain Sculpin and the Western Silvery Minnow will benefit the Mountain Sucker habitat, without any additional activities being required. Habitat in the Saskatchewan portion of the Mountain Sucker range may require specific protection measures, but this habitat needs to be better defined to help determine exactly where it occurs and how much it can be improved, if any improvement is required. This recovery strategy includes an identification of critical habitat. The “Action Plan for Multiple Species at Risk in Southwestern Saskatchewan: South of the Divide” (Environment and Climate Change Canada 2017) includes protection for riparian areas which should benefit the Mountain Sucker. Due to limited survey information, an incomplete understanding of the distribution exists; current thought is that habitat may be limited only seasonally or only in some years in Saskatchewan streams. However, the Mountain Sucker is likely adapted to periods of drought, and it is possible that it can survive through periods of poor conditions.

3. Can significant threats to the species or its habitat be avoided or mitigated?

Yes. Standard mitigation measures should be adequate to mitigate the main human-caused threats affecting the Mountain Sucker, at least in the Milk River watershed. Because habitat and distribution are less well known for populations in Saskatchewan, it is somewhat unclear at this stage what exactly may need to be avoided or mitigated. Natural threats will be more difficult to control, but it appears that Mountain Sucker has evolved to survive in challenging habitats.

4. Do recovery techniques exist to achieve the population and distribution objectives, or can they be developed within a reasonable timeframe?

Yes. Recovery techniques are already being used to successfully protect other SARA-listed species facing similar habitat challenges in the Milk River drainage. Many of these same techniques could be applied to Saskatchewan streams.

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1 Introduction

At the time of publication, the species is listed on Schedule 1 of the *Species At Risk Act* (SARA) as the Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations. It is currently referred to as the Plains Sucker, Missouri population, by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2022b). This document will reference information and data for both the Plains Sucker and the Mountain Sucker, where appropriate. This “Recovery Strategy for the Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations, in Canada” is part of a series of documents for this species that are linked and should be taken into consideration together, including the COSEWIC assessment and status report on the Plains Sucker (*Pantosteus Jordani*), Saskatchewan-Nelson River population, Missouri population, and the Cordilleran Sucker (*Pantosteus bondi*), in Canada (COSEWIC 2010), and the Recovery potential assessment of Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations (DU2) (DFO 2013b).

A recovery strategy is a planning document that identifies what needs to be done to arrest or reverse the decline of a species. It sets objectives and identifies the main areas of activities to be undertaken. Detailed planning is done at the subsequent action plan stage.

The recovery potential assessment (RPA) is a process undertaken by Fisheries and Oceans Canada (DFO) Science to provide the information and scientific advice required to implement SARA, relying on the best available scientific information, data analyses and modeling, and expert opinions. The outcome of this process informs many sections of the recovery strategy.

2 COSEWIC species assessment information

When the species was assessed by COSEWIC in 2010, the species common and scientific name used in the species status report was Mountain Sucker (*Catostomus platyrhynchus*). In 2022, the species was assessed as the Plains Sucker. For consistency with SARA, this document refers to the species using the name that appears on Schedule 1 (Mountain Sucker, Milk River population).

Initial date of assessment: November 2010

Species’ common name: Mountain Sucker – Milk River populations

Scientific name: *Catostomus platyrhynchus*

Status: Threatened

Reasons for designation: This small freshwater fish is limited to the Milk River basin of southern Alberta and Saskatchewan. It has a small area of occupancy and number of locations (8) that make it particularly susceptible to habitat loss and degradation from altered flow regimes and drought that climate change is expected to exacerbate.

Canadian occurrence: Alberta

Initial date of assessment: April 2017

Updated date of assessment: December 2022

Species' common name: Plains Sucker (Missouri population)

Scientific name: *Pantosteus jordani*

Status: Threatened

Reasons for designation: This population of small freshwater fish is found in the southern portion of a broader distribution of this species across prairie Canada. In Canada, its range is limited to 2 locations in the Milk River drainage of southern Alberta and Saskatchewan, where its distribution is restricted and has declined in recent years. Actual population size and trend are unknown. Habitat in this river drainage is undergoing continued decline in quality, related to declines in water quality and quantity as a result of water-use management and climate change.

Canadian occurrence: Alberta, Saskatchewan

Status history: The Mountain Sucker (*Catostomus platyrhynchus*) was originally assessed by COSEWIC as a single unit and designated Not at Risk in April 1991. Split into three populations in November 2010: "Milk River populations" unit (Threatened), "Pacific populations" unit (Special Concern), and "Saskatchewan - Nelson River populations" unit (Not at Risk). In December 2022, the species formerly considered Mountain Sucker was split into two separate species, Plains Sucker (*Pantosteus jordani*) (2 populations) and Cordilleran Sucker (*Pantosteus bondi*). The original 2010 "Milk River populations" unit of Mountain Sucker is now known as Plains Sucker, Missouri population, and was designated

3 Species status information

Table 1. Summary of existing protection or other status designations for the Mountain Sucker, Milk River populations.

Jurisdiction	Authority/organization	Year(s) assessed and/or listed	Status/description	Designation level
Canada	Species at Risk Act (SARA)	2017	Threatened	Population
Globally	NatureServe	2016	Secure (G5)	Species
Canada	NatureServe	2020	Secure (N5)	Species
Province	Government of Saskatchewan	2020	Vulnerable (S3)	Population
Province	Government of Alberta	2020	Secure (S5)	Population
United States	NatureServe	1996	Secure (N5)	Species

Jurisdiction	Authority/organization	Year(s) assessed and/or listed	Status/description	Designation level
United States	NatureServe	1996	Montana - secure (S5), Nebraska – presumed extirpated (SX), South Dakota- vulnerable (S3), Wyoming- secure (S5)	Population
Globally	IUCN Red List	2013	Least concern	Species

Upon listing as a threatened species, the Mountain Sucker, Milk River populations, became protected wherever it is found by section 32 of SARA:

“No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species.” [section 32(1)]

“No person shall possess, collect, buy, sell or trade an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species, or any part or derivative of such an individual.” [section 32(2)]

Under section 73 of SARA, the competent minister may enter into an agreement or issue a permit authorizing a person to engage in an activity affecting a listed wildlife species, any part of its critical habitat, or its residences.

The *Fisheries Act* also provides for the protection of fish. The *Fisheries Act* provides a framework for (a) the proper management and control of fisheries; and (b) the conservation and protection of fish and fish habitat.

4 Species information

4.1 Species description

The Mountain Sucker is a small, benthic species that belongs to the family of suckers that is found only on the east slope of the Rocky Mountains and Great Plains of North America. The Mountain Sucker morphology and biology will be described using information from studies on *P. jordani*, but in cases where information is limited, data on *P. bondi* and *Catostomus platyrhynchus* will be used.

The Mountain Sucker has a sub-terminal mouth, no teeth, and fleshy lips (a trait characteristic of suckers). The mouth of the Mountain Sucker has a shallow cleft between the lower lips and a notch at each corner. It has a broad, heavy snout and small eyes. The body is elongated, cylindrical, and somewhat compressed (figure 1). It is a small fish, with the longest length on record being an Alberta specimen that measured 232 mm total length (COSEWIC 2022b). The dorsal colouring is typically dark green to grey or brown, while the belly is pale yellow to white. There is also a dark green to black lateral band and/or 5 dorsal blotches of fine black pigment on the sides. During the spawning season, spawning fish develop an orange to red lateral band, which is most prominent in males. In addition, males and females develop “bumps”

(tubercles) on their fins during the spawning season; however, they are far fewer in number and smaller on females.

The Mountain Sucker is of low economic importance and has never been an important human food or sport fish. In the United States, it is often used as bait fish where abundant; and has been used as food for fur-bearing mammals (Scott and Crossman 1998). Both small and large Mountain Suckers may be preyed upon by many species, including birds, mammals, and other fishes.

Ecological role

The Mountain Sucker is a highly specialized feeder whose diet consists primarily of plankton and microscopic organic matter that is scraped off rocks using the horny edges of its jaws. Only a small proportion of its diet consists of aquatic invertebrates, which are mainly consumed by juveniles (Smith 1966). The Mountain Sucker is an important part of the food chain, forming the link between primary producers and higher-level consumers.



Figure 1. The Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations (photo courtesy of D. Watkinson, Fisheries and Oceans Canada).

4.2 Population abundance and distribution

The Mountain Sucker is found only in North America. Its range is confined primarily to cool water, usually upland, at headwater regions in western North America, although it does extend east into the Cypress Hills in Saskatchewan and the Black Hills in South Dakota. The Mountain Sucker occurs in Alberta and Saskatchewan in Canada, and in Montana, North Dakota, South Dakota, and Wyoming in the United States; however, it is presumed extirpated in Nebraska (NatureServe 2022). It is endemic to the Missouri and South Saskatchewan river watersheds and has probably occupied these systems since at least the last period of glaciation.

Population size and trend information for the Mountain Sucker is limited mainly to presence and absence data, particularly in Canada. Although locally abundant in some areas, the Mountain Sucker is not abundant in most Canadian waters where they are at the northern extent of their range. It is estimated that over 50% of the Canadian range, but less than 10% of its North American range, is in Alberta.

The Mountain Sucker, Milk River populations, occurs in 10 named waterbodies in 3 watersheds within the Milk River drainage: 1) North Milk and Milk rivers, Milk River watershed (figure 2), 2) Belanger, Sucker, Caton, and Conglomerate creeks (tributaries to the upper Frenchman River), Frenchman River watershed (figure 3), and 3) Nine Mile Creek and upper Battle Creek,

Battle Creek watershed (figure 3) (COSEWIC 2022b). A study by the Saskatchewan Water Security Agency (Pollock et al. 2017) confirmed the continued presence of the Mountain Sucker in the Battle Creek and Frenchman River watersheds. A survey in 2017 also found the species in Davis, Fairwell, and Sucker Creeks (MacNaughton et al. 2019).

The Mountain Sucker in the Milk River (figure 2), the Frenchman River and Battle Creek (figure 3) are separated by unsuitable habitats in their lower reaches. In addition, upstream fish movement is completely limited in the Fresno Reservoir on the Milk River, Frenchman Reservoir on the Frenchman River in Montana, Newton Lake, Huff Lake, and the Eastend Reservoir on the Frenchman River in Saskatchewan. There is no possibility of natural rescue/recolonization from populations in adjacent watersheds should any of these populations disappear. While there is an intermittent canal draining into Cypress Lake, which occasionally connects the Frenchman River and Battle Creek, the potential for rescue between these areas is unlikely, given that the species occupies limited habitat in small, well separated headwater areas. Based on its distribution, the Mountain Sucker occupies areas with different habitat types and, therefore, may be vulnerable to different threats within the Missouri drainage.

The Milk River receives water augmentation from the St. Mary Diversion into the North Milk River, typically from March to April and September to October (DFO 2013b). Battle Creek typically experiences low flow, while the Frenchman River typically has low or no flow in late summer (Saskatchewan Watershed Authority 2004).

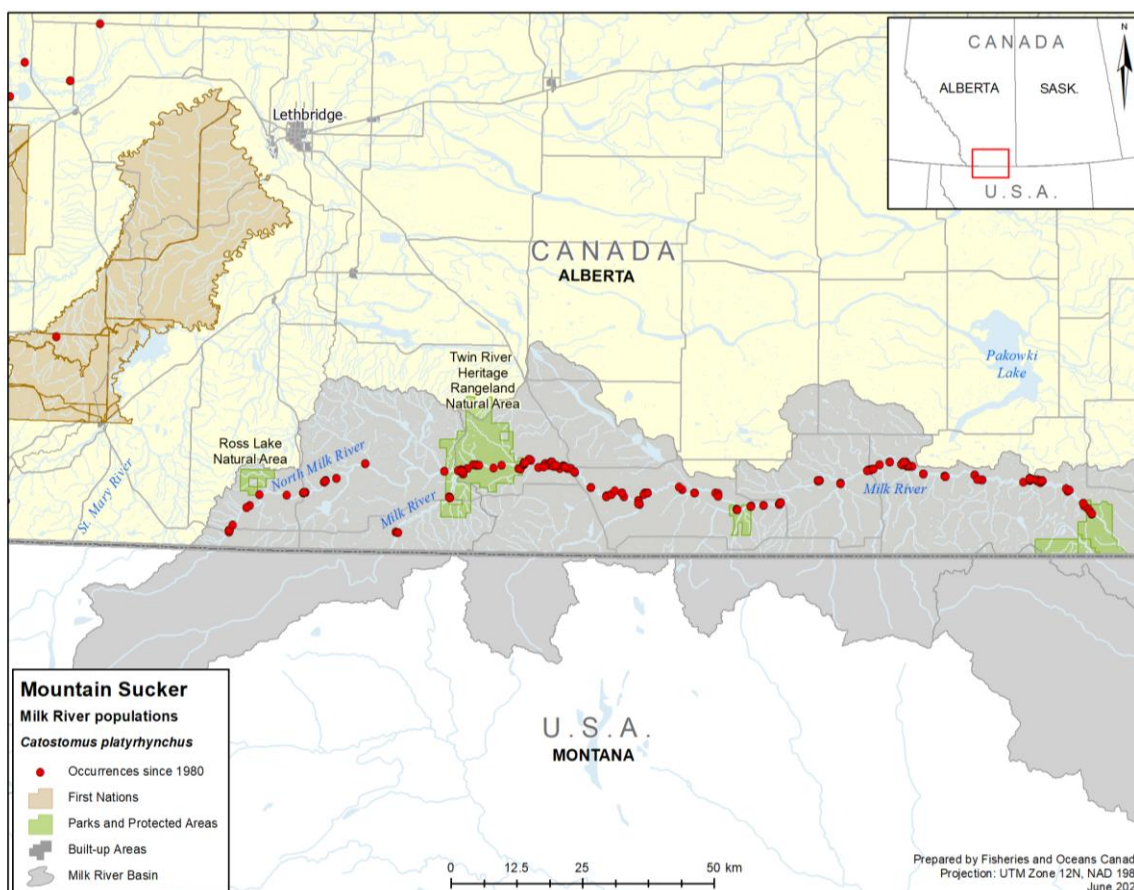


Figure 2. Distribution of the Mountain Sucker, Milk River populations, in the Milk River Basin in Alberta as indicated by red dots (occurrences since 1980).

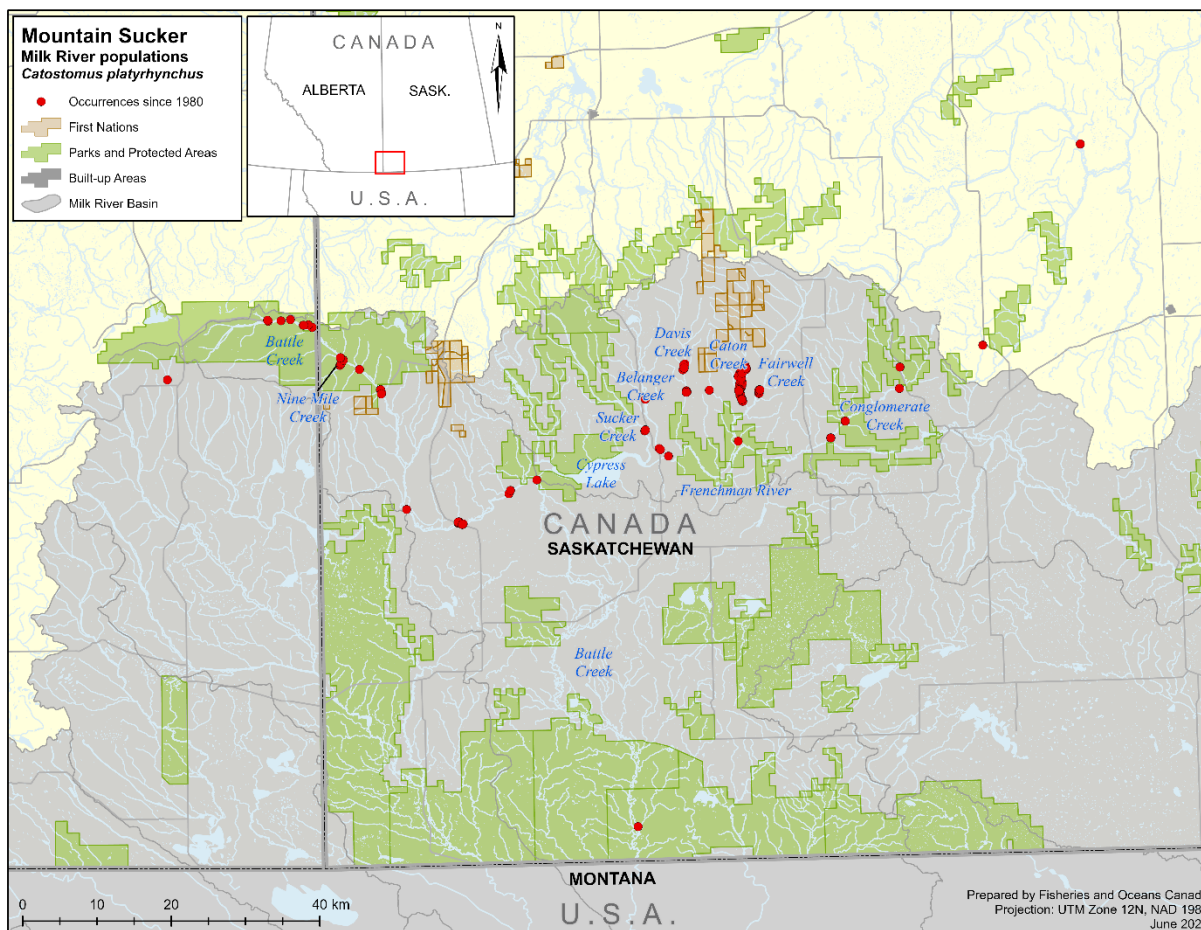


Figure 3. Distribution of the Mountain Sucker, Milk River populations, in the Milk River Basin in Saskatchewan as indicated by red dots (occurrences since 1980).

4.3 Needs of the species

Habitat requirements

The habitat requirements for the Mountain Sucker in Canada needs more research, although collection records indicate that habitat characteristics may be similar to those reported in northern parts of the species' range in the United States. There is a description of general habitat for where the Mountain Sucker has been collected in terms of velocity, oxygen, substrate, and gradient requirements from the Milk River in Alberta, and Battle and Frenchman systems in Saskatchewan (Pollock et al. 2017, unpublished data).

The Mountain Sucker appears to be tolerant of a variety of water conditions that vary from turbid to clear, with Secchi disk measurements ranging from 0.14 m to greater than 2 m (DFO 2013b). It is found exclusively in lotic environments. Daytime water temperature at collection sites in Alberta and Saskatchewan have been recorded as high as 24.5°C (MacLeod, 2019 – 2020 unpublished data). Smith (1966, regarding a collection by R.M. Bailey) reported Alberta and Saskatchewan collections made in 0.1 to 1.4 m of water (mean = 0.49 m) and velocities of 0 to 1.98 m/s (mean = 0.66 m/s), and elsewhere in up to 2.4 of water. Substrates in Alberta and Saskatchewan have ranged from silt to boulder, with most collection sites dominated by gravel (43%) and cobble (32%). More recent collections in Saskatchewan were recorded in

streams ranging from 10 to 20 m in width with depths less than 1 m, velocities from 0.2 to 0.5 m/s, and substrates ranging from mud to boulders, with cobble being the most common (Watkinson unpublished data 2003, 2004 as reported in MacNaughton et al. 2019). The highest abundance for the Mountain Sucker in the Cypress Hills region was associated with the largest substrate size, low embeddedness, and no cattle use (Pollock et al. 2017). In Saskatchewan, the Mountain Sucker was captured in areas of Caton Creek with dense vegetation (Sereda, pers. comm. 2019).

Riparian vegetation plays a crucial role in preserving the essential in-stream features needed to support the spawning, nursery, cover, and feeding requirements of the Mountain Sucker. The overall health and integrity of riparian habitat is vital for sustaining the riffle features, as well as for filtering surface run-off carrying fine sediments and nutrients. Furthermore, this vegetation provides vital attributes like bank stability, shading, coarse sediments, and cover, all of which are indispensable for ensuring the long-term survival of the Mountain Sucker.

The Mountain Sucker distribution in the Black Hills of South Dakota appears to be correlated with the following permanent streams more so than intermittent ones: within second order and higher streams as opposed to first order streams, with a fairly steep stream slope; and higher elevations (Dauwalter and Rahel 2008). Cool water temperatures, permanent streams, and higher gradients all suggest the presence of higher oxygen levels, which may also be part of the preferred habitat. Food availability does not appear to be a limiting factor in most of the Mountain Sucker habitats.

Reproduction and growth

Spawning is reported to occur in late spring or early summer (May to July) when water temperature is above 10.5°C (average range 10.5 to 18.8°C [Scott and Crossman 1998]). Spawning usually takes place in riffle areas adjacent to pools in streams of swift to moderate flow velocity. The Mountain Sucker does not build a nest, instead the species scatters eggs over the substrate. Fish return to deeper pools after spawning. The incubation period has not been recorded, but probably ranges between 8 to 14 days, as has been reported for other sucker species (Stewart 1926; Geen et al. 1966).

In a study in Montana (Hauser 1969), the Mountain Sucker was observed spawning in areas of moderate velocity (0.5 m/s) adjacent to pools with bank cover at depths of 1 to 1.5 m. Substrate composition of occupied habitats varied greatly, with cobble being the most common. Fish were often observed near the transitions between pools and runs, and riffle habitats were rarely used, except for spawning.

Fecundity may vary between watersheds and is related to fish length and age, with older and larger fish bearing more eggs. (COSEWIC 2010; Cannings and Ptolemy 1998). Hickling and Rutenburg (1936) demonstrated that in haddock of the North Sea and herring of the southern North Sea there was a marked difference in size between mature and recruitment eggs. Smaller mature and recruitment eggs indicated a short and definite spawning season. Small recruitment eggs (those not ready for the spawning season) may also be found in the Mountain Sucker ovaries (COSEWIC 2010), indicating a short and definite spawning season.

The Mountain Sucker females are larger than males and may reach 9 years of age, while males will live to about 7 years (Hauser 1969). Most fish seem to reach maturity by age 2, although this depends on location (Hauser 1969; McPhail 2007; Wydoski and Wydoski 2002). Multi-year spawning, longevity, and high fecundity may allow populations to persist through successive poor spawning years and fluctuating environments (COSEWIC 2010). Growth is

fastest in the first year and gradually decreases but remains relatively constant after 3 years of age (COSEWIC 2010).

For other *Pantosteus* species, young fish (20 to 35 mm) seem to prefer areas with moderate current at depths of 15 to 40 cm and are usually found close to an obstruction such as a large rock or submerged log (COSEWIC 2010). Fingerlings (35 to 135 mm) seem to prefer intermittent side channels with very little discharge, and abundant aquatic vegetation at depths of 15 to 50 cm, but were also found in deeper pools (Smith 1966). Larger fish were found at the margins of runs, retreating to deeper water if disturbed (Wydoski and Wydoski 2002).

5 Threats

5.1 Threat assessment

This recovery strategy presents threats facing the Mountain Sucker, Milk River populations, based on a threats assessment conducted on the Plains Sucker in an updated COSEWIC status report (COSEWIC 2022b), which provides a more accurate and updated assessment of the threats, in comparison to the recovery potential assessment (RPA) (DFO 2013b). The specific assessment categories and associated rankings used in tables 2 and 3 have been adapted from the RPA for Mountain Sucker (DFO 2013b). In appendix A, assessment category definitions are provided in the table's footnotes.

There are 2 overarching types of threats potentially affecting the Mountain Sucker, Milk River populations: natural processes and human-caused threats. Natural processes threatening fishes, primarily via drought and the subsequent creation of low oxygen (hypoxic) waters, can have a large impact on the survival of the Mountain Sucker. Many human activities (for example, those contributing to climate change, agricultural activities), can exacerbate drought conditions or compound their effects, resulting in even lower water flows and more hypoxic waters. Activities carried out by humans may either directly or indirectly threaten the survival of the Mountain Sucker, and natural processes, in part, may ultimately dictate the threat level of how threatening some of these activities are.

Besides the small area of occupancy in which the Mountain Sucker is found within the Missouri National Freshwater Biogeographic Zone (NFBZ), COSEWIC (2022) considered climate change and severe weather as the main threat to the persistence of the Mountain Sucker in the Milk River watershed, followed by dams and water management or use (table 2). The Western Silvery Minnow (*Hybognathus argyritus*), and the Rocky Mountain Sculpin, Eastslope populations—are listed under SARA and occur in the Milk River system in Alberta.

The RPA that was previously conducted for the Mountain Sucker, Milk River populations, (DFO 2013b) evaluated the same list of threats that were presented in the recovery strategies for Western Silvery Minnow (Milk River Fish Species at Risk Recovery Team 2007) and Rocky Mountain Sculpin, Eastslope populations (Fisheries and Oceans Canada 2012).

In addition to the higher-level threats noted above, the assessment also identified agricultural and forestry effluents, invasive species and diseases, and roads and railroads as low-level threats (table 2). Several other threats were evaluated and determined to be negligible (COSEWIC 2022b) that were not included in the assessment, as negligible threats are categorized as having a less than 1% impact on the population, and therefore fall below DFO's low threat impact (low having a 1 to 10% change in a population); however, a description of these threats is provided in section 4.2.

Threats facing the Mountain Sucker, Milk River populations, are multifaceted, likely cumulative, and involve the degradation and elimination of habitat or habitat quality over the medium to long term. The influence of these anthropogenic factors will be affected by the degree of range fragmentation that characterizes the species' natural distribution. It is important to note that one threat may directly affect the severity of another and that many of these threats may fluctuate in severity depending on the time of year during which they occur. As it is difficult to quantify these interactions, each threat is addressed independently.

To assess the status of threats regarding the Mountain Sucker, each threat was scored in terms of its threat likelihood and threat impact (appendix A), and the overall effect on the species in terms of its spatial extent and temporal extent (table 3). Threat likelihood and threat impact were rated for the Milk River populations as a whole using expert opinion due to a general lack of studies. The level of certainty associated with each rating can be identified based on cause-effect studies, correlation studies, or expert opinion. Ultimately, only expert opinion was used to determine the level of certainty which was ranked as medium, suggesting that there is some evidence linking the threat to population decline or jeopardy to survival or recovery. The threat likelihood and threat impact ratings for the Mountain Sucker, Milk River populations, were subsequently combined, resulting in the final threat level for each threat (table 2). A range of threat impacts or resulting threat levels reflect uncertainty in the expected population declines. All threat assessment categories and definitions are described in appendix A.

Table 2. Threat level for the Mountain Sucker, Milk River populations, resulting from an analysis of the threat likelihood and threat impact (based on threats assessment in COSEWIC 2022b).

Threat	Threat level
Climate change and severe weather	High to medium
Dams and water management/use	Medium to low
Agricultural and forestry effluents	Low
Invasive non-native/alien species	Low
Roads and railroads	Low

Table 3. Spatial and temporal extents of threats on the Mountain Sucker, Milk River populations.

Threat	Spatial extent	Temporal extent
Climate change and severe weather	Widespread	Chronic
Dams and water management/use	Widespread	Chronic
Agricultural and forestry effluents	Widespread	Recurrent
Invasive non-native/alien species	Widespread	Chronic
Roads and railroads	Local	Chronic

5.2 Description of threats

Climate change and severe weather

The range of the Mountain Sucker, Milk River populations, is almost completely within the Palliser Triangle ecozone, a geographical area with semi-arid grasslands that stretches across southern Alberta and Saskatchewan and is naturally characterized by little annual precipitation, high moisture loss due to winter Chinook winds, frequent summer heat waves, and limited suitability for agriculture (Marchildon et al. 2007).

Natural low-flow conditions can result in low oxygen levels during drought and heatwaves in later summer and fall, or during low-flow periods in the winter. Low-flow conditions can also result in the loss of riffle habitat, elevated water temperatures (summer or fall), increased risk of freezing (winter), reduction in habitat connectivity, reduced dilution potential, degraded water quality (waste discharge), and increased vulnerability to terrestrial and aquatic predators.

These naturally extreme weather conditions can be exacerbated by climate change, as well as by other threats that contribute to low flows (see below). Climate change can impact water availability, temperature, and a range of other ecosystem processes (Schindler 2001) and therefore affect the availability and quality of the Mountain Sucker habitat. Based on the threat assessment conducted for COSEWIC (2022), climate change and severe weather was assigned a threat likelihood of known and a threat impact of medium to high, the highest impact of all threats facing the Mountain Sucker, Milk River populations (appendix A). Much uncertainty exists regarding this threat, and therefore, the threat level ranges from medium to high (table 2). Climate change and severe weather is thought to be widespread and chronic (table 3).

Much of the distribution of Mountain Sucker has experienced warming of 1 to 4°C, most of which has occurred since the 1970s (Schindler and Donahue 2006) and most climate models predict further warming of 1 to 2°C (CCIS 2007). Mountain Sucker is primarily constrained to cool water environments and has been found in sites with daytime water temperatures ranging from 10 to 28°C (Reed 1959). As such, warming stream temperatures are likely to negatively affect the extent and quality of habitat of the Mountain Sucker.

Climate models also predict slight increases in precipitation by the end of the 21st century, but these forecasted increases are much lower than the predicted increase of 55% in evapotranspiration due to rising temperatures. As a result, the southern prairies are likely to be much drier (Schindler and Donahue 2006), which may be further exacerbated by reduced snowmelt captured in reservoirs. As such, it may become increasingly difficult to maintain current summer flow regimes and fish habitat in many locations without augmentation, which is currently only possible in the Milk River. Annual flows in major drainages of the southwestern prairies have shown modest declines during the 20th century on an annual basis (Déry and Wood 2005; Rood et al. 2005); however, Schindler and Donahue (2006) demonstrated that current summer flows, when agricultural and urban use is at a maximum, are 20 to 84% lower than they were in the early 20th century. Droughts are frequent in the Missouri drainage. During extreme drought conditions, the surface flow of the Milk River east of the Aden Bridge and upstream of the confluence with the North Milk River may be virtually eliminated in the fall and winter, while the lower river can be reduced to a series of standing pools (WSC 2011; RL&L Environmental Services Ltd. 2002).

In Saskatchewan, the water supply in Davis Creek and the Frenchman River may not be constant, while Battle and Caton creeks almost always have flow and may be less impacted by

changes in weather. Overwintering habitat is most likely to be threatened by droughts. The combination of drought (natural or climate change-driven) and human-caused stresses due to water removal could compound the severity of drought significantly. However, a post-drought survey conducted in 2002 found the Mountain Sucker in the Milk River, which suggests that it may be able to find refuge in the river during droughts. In fact, the presence of the Mountain Sucker in Battle Creek and the Frenchman River tributaries after multi-year droughts further demonstrates its resilience. Lethal thresholds to such conditions and at different developmental stages have, however, not been determined yet for the species.

The Mountain Sucker is often associated with cool water environments, suggesting it may have high oxygen requirements. However, it also appears that it tolerates fluctuations in dissolved oxygen levels based on recent collections in Alberta and Saskatchewan from ephemeral streams, where it has been found in very low flow conditions, including isolated pools and dugouts (DFO 2013b). It is unknown if fluctuations in dissolved oxygen cause stress to the fish or if the effect varies depending on life stage. A water quality study (Noton 1980) concluded that the most important water quality parameter potentially not meeting fish needs in the Milk River was dissolved oxygen, where concentrations under ice in the lower reach of the river were as low as 1.6 mg/L in January.

Dams and water management/use

The Mountain Sucker is only found in flowing waters throughout its range (Nelson and Paetz 1992; Holton and Johnson 2003). Changes to the Mountain Sucker habitat that fall under this threat may occur as a result of diversions, new or existing licensed dams, unlicensed dams or weirs (for example, those operated by farmers for irrigation or cattle watering), and ground or surface water extraction used for irrigation and non-irrigation purposes. The threat likelihood for dams and water management or use in the distribution of the Mountain Sucker, Milk River populations, is known, and the threat impact was assigned a range between low to medium, resulting in an overall threat level of medium to low (table 2). The assessment of a range from medium to low reflects a certain amount of uncertainty around the population decline that could occur as a result (COSEWIC 2022b). The overall effect of this threat on the Mountain Sucker is estimated to be widespread and chronic (table 3).

The St. Mary Diversion, built in Montana in 1917, has greatly modified the natural hydrograph and ecological regime of the North Milk River and the Milk River downstream of its confluence with the North Milk River. The canal diverts water from the St. Mary River to the North Milk River for irrigation purposes from April to September each year, increasing the water volume in the North Milk River and the Milk River proper and reducing the effects of drought in the summer. Before the canal's construction, the Milk River was probably a typical small prairie stream, possibly intermittent in times of drought, and generally less turbid. The even-flowing waters now observed in the lower Milk River in Alberta were probably mainly restricted to downstream of the international border. The result has been the creation of a more turbid, higher-flow river in the North Milk and Milk rivers, resulting in increased erosion and sedimentation (Willock 1969). Increased flows from the diversion may have increased the amount of suitable summer habitat for the Mountain Sucker (Willock 1969); however, the net effect of this change on the population is unknown. Increased water velocities due to flow augmentation might, for example, affect the species' reproductive success negatively by increasing larval drift downstream into unsuitable habitats.

Existing or new dams and reservoirs reduce available habitat for the species and limit connectivity in the drainage. Dams, impoundments, and resulting flow management alter habitat

types, flow regimes, sediment loads, microbiota, and water temperatures and may also increase the risk of species introductions. Impoundments often reduce turbidity, which leads to the replacement of fine substrates typical of large plains streams by gravel, cobble, and boulder. Impounded systems are less subjected to fluctuations in temperature and flow, are less productive, and include less substrate movement (Quist et al. 2004, Maitland et al. 2016).

Dams and resulting changes to habitat and river function may affect cues for spawning and egg survival (R.L. & L. 2002; McPhail 2001; Golder Associates Ltd. 2005), may increase mortality associated with entrainment, stranding of eggs and free-swimming life stages, and may result in indirect effects on fishes via altered aquatic communities. Low flow conditions below a dam could increase the potential for local extirpation of some species, and the barrier posed by the dam might eliminate re-colonization by the upstream population. The downstream effects of impoundments on the Mountain Sucker habitat would depend, in part, on how and when water releases are managed. For example, the potential benefits of winter flow augmentation on the Mountain Sucker are unknown, though they could be beneficial. The feasibility of developing a dam on the Milk River upstream of the Town of Milk River has been investigated (DFO 2013b) and continues to elicit periodic interest to help improve the security of the water supply for existing withdrawals and provide water for the irrigation of additional acres. Currently, Battle Creek is diverted into Cypress Lake annually during spring freshet. Battle Creek (within Canada) is impounded by 3 weirs (Wilson's, Richardson, and McKinnon), which impede upstream fish movement and impact downstream flows (Sereda, pers. comm. 2019). Above Cypress Lake, a few weirs on Battle Creek are used for irrigation by drawing water in spring for pivot installations. The Frenchman River has at least 3 primary reservoirs created by dams that alter downstream flow. Some farmers in the Saskatchewan portion of the Missouri drainage have been operating small dams/weirs for irrigation and cattle watering purposes independently of the Water Security Agency and/or Prairie Farm Rehabilitation Administration. Such operations may not give due consideration to overall instream flow needs to support aquatic biota.

The greatest changes to habitat in the Milk River have been associated with irrigation needs. Water withdrawal for irrigation for farming and ranching is the fourth largest consumptive use of water in Canada and over 70% of those irrigation withdrawals occur in southern Alberta and Saskatchewan (COSEWIC 2008; COSEWIC 2017), with total water withdrawals increasing over time with agricultural demands (COSEWIC 2010). While water extraction for irrigation could seriously reduce the habitat available for the Mountain Sucker, the impact of this threat is thought to be less in the Milk River in Alberta, where only a small portion of the available flow is withdrawn, and where withdrawals are regulated and only occur while flows are augmented. In southern Saskatchewan watersheds, irrigation is the largest use of surface water (Halliday and Associates 2009). Although Battle Creek, Davis Creek, and the Frenchman River are known to support water withdrawals for irrigation, there is a moratorium on new water licenses in the watershed (Pollock et al. 2016). In Saskatchewan, water use has been stable in the Missouri drainage for several decades.

Non-irrigation water extraction can threaten the Mountain Sucker habitat, particularly during periods of reduced flow in winter. In Alberta, Temporary Diversion Licenses for non-irrigation purposes (for example, oil and gas) are issued throughout the year, though rarely during critically low-flow periods, and may be revoked to mitigate impacts of reduced flow on fish habitat during critically low flows (Alberta Rocky Mountain Sculpin Recovery Team 2013). In Saskatchewan, Temporary Water Rights Licences are issued for non-irrigation surface water extraction for 2 to 4 weeks at a time, allowing the Province of Saskatchewan to deny a licence in response to drought conditions. Non-irrigation surface water extraction is known to occur in

Battle Creek and is likely to occur in the Frenchman River. Extraction of non-potable water from deep aquifers by the oil and gas industry may result in an increased loss of surface water.

Loss of surface water to groundwater is known to occur naturally in the Milk River basin. Reduction in the surface flow is known to occur naturally along an 11 km section of the Milk River from Black Coulee to the Highway 880 crossing in southern Alberta (Grove 1985). The Mountain Sucker may be particularly susceptible to impacts relating to groundwater extraction and surface flow, especially during the winter or other low flow periods. The impact of the threat of groundwater extraction on the Mountain Sucker in Saskatchewan is currently being studied (Sereda, pers. comm 2019).

Agriculture and forestry effluents

Agricultural run-off can carry pollutants, sediment, and nutrient inputs that could negatively affect the Mountain Sucker habitat (Boguski and Watkinson 2013). Agriculture is present in all the Mountain Sucker inhabited watersheds in the Missouri drainage. However, the rough terrain along the Milk River valley limits crops from being grown in much of the valley bottom, and the growing season coincides with flow augmentation from the St. Mary Diversion, diluting any inputs of nutrients. Water quality in the Milk River main stem changes seasonally in response to flow augmentation in the spring and summer, leading to decreases in total dissolved solids, conductivity, and salinity (Fisheries and Oceans Canada 2017).

The Saskatchewan portion of the Mountain Sucker, Milk River populations, distribution contains native grassland and cropland (Environment and Climate Change Canada 2017). The majority of agricultural lands are rangeland where there is limited use of fertilizers and pesticides, but crop production also occurs. The headwaters of Battle Creek are located in the Cypress Hills interprovincial park. Some areas within the park allow livestock grazing during summer and fall periods. Nutrient loading in the lower reaches of Battle Creek is presumed to be influenced by cattle grazing, since commercial fertilizers are not applied within the park (Scrimgeour and Kendell 2002). Where the Mountain Sucker occurs in the Frenchman River watershed, most of the land use is strictly rangeland or hayland (Environment and Climate Change Canada 2017). Some land in this area is provincial and federal pasture. No logging occurs within the distribution of the Mountain Sucker, Missouri population; however, wood harvesting to support Mountain Pine Beetle (*Dendroctonus ponderosae*) suppression has occurred in the Cypress Hills interprovincial park which may result in increased stream sedimentation. Direct impacts of agriculture effluents have not been investigated for this species. As such, the threat likelihood of agriculture and forestry effluents is not known. The impact of the threat on the Mountain Sucker, Milk River populations, was therefore scored low, as there is an estimated decline of only 1 to 10% of the population in the event the impact occurs (appendix A). These scores were combined for an overall threat level of low (table 2) with the effect thought to be widespread and recurrent (table 3).

Invasive non-native/alien species

Invasive non-native/alien species can threaten fish populations through various mechanisms, including predation, competition for resources, hybridization, the introduction of exotic diseases and parasites, and habitat degradation. The specific effect of invasive non-native/alien species may have on the Mountain Sucker, Missouri population, will depend on the type and number of species introduced. The introductions of piscivorous fish such as Walleye (*Sander vitreus*), Northern Pike (*Esox lucius*), Yellow Perch (*Perca flavescens*) and various trout species could negatively impact the Mountain Sucker abundance via predation (COSEWIC 2022b). The overall threat likelihood of invasive non-native/alien species and diseases in the Mountain

Sucker, Milk River populations is known and the threat impact was assigned an overall score of low (appendix A), since the resulting population decline was estimated to be 1 to 10% (COSEWIC 2022b); the resulting threat level was determined to be low (table 2). The overall effect of this threat is widespread and chronic (table 3).

The Milk River and its tributaries have not been stocked for more than a decade and unauthorized introductions have not been documented in these watersheds. To date, only Yellow Perch, Walleye, Spottail Shiner (*Notropis hudsonius*) and Trout-perch (*Percopsis omiscomaycus*) have been observed in the lower Milk River in Canada where the Mountain Sucker occurs (COSEWIC 2022b). However, other introduced species occur in the Milk River below the international border and north of the Fresno Reservoir in Montana. These species include Rainbow Trout (*Oncorhynchus mykiss*), Northern Pike Black Crappie (*Pomoxis nigromaculatus*), Lake Whitefish (*Coregonus clupeaformis*), and Spottail Shiner. Any of these could be in the Canadian portion of the Milk River, just not detected yet, as there are no migration barriers upstream of the Fresno Reservoir. The unidirectional movement of fish passing over the St. Mary Diversion may have facilitated non-native species movement from the Saskatchewan River watershed into the Milk River, although it is only Bull Trout (*Salvelinus confluentus*) and Spottail Shiner that may have been introduced into waterbodies via this connection (Fisheries and Oceans Canada 2012). Many species of minnows and suckers used as baitfish have been introduced into new waters when bait buckets are dumped. Whether such introductions have occurred in the Missouri drainage is unknown, and may contribute to declines in the abundance of the Mountain Sucker.

The Val Marie Reservoir on the Frenchman River in Saskatchewan restricts all upstream migrants from Montana. However, species such as Northern Pike, Walleye, and Yellow Perch have already been introduced in the Eastend Reservoir, as well as Cypress Lake, the headwaters of the Frenchman River, and hence occupy most of the Frenchman River. Common Carp (*Cyprinus carpio*) are also abundant below the Eastend Reservoir in the Frenchman River (Sereda, pers. comm 2019). Additionally, many southwest Saskatchewan streams have been managed for sport fisheries since the early 1920s (Snook 2004). Rainbow Trout, Brown Trout (*Salmo trutta*) and Brook Trout (*Salvelinus fontinalis*) have been stocked in Battle Creek's upper reaches since 1924, and they have commonly been recorded along the Alberta-Saskatchewan border. Non-native Brown Trout were originally stocked in Belanger and Conglomerate creeks (Frenchman River) in 1924, and Brook Trout were subsequently stocked in these creeks in 1933 and 1952, respectively. Fairwell Creek is stocked with Brown Trout and is assumed to be affecting the Mountain Suckers populations in this creek. Boiler Creek was first stocked with Brook Trout in 1971.

Natural recruitment has been noted in many of the stocked waterbodies; however, it has also been noted that fishing pressure is increasing. The presence of salmonids has been suggested to account for the absence of the Mountain Sucker in some Saskatchewan streams (McCulloch et al. 1994). Species, such as Northern Pike in Battle Creek, may also contribute to declines in the abundance of the Mountain Sucker. Although Prussian Carp (*Carassius gibelio*) has not been observed in the Milk River system yet, it might pose a threat to Mountain Suckers by competing with native species for food and spreading diseases if they were transported from neighboring waterbodies through reservoirs or irrigation canals. The relative impact of different species on the Mountain Sucker, including the degree to which it is a prey species, has not been assessed (Belica and Nibbelink 2006). However, Decker and Erman (1992) and Dauwalter and Rahel (2008) found that a higher density of large non-native Brown Trout had a negative effect on the Mountain Sucker occurrence, suggesting that management of recreational trout fisheries needs to be balanced with the Mountain Sucker conservation.

Didymosphenia geminata, a diatom responsible for algal blooms in the clear, nutrient-free headwaters of various Alberta rivers is an emerging threat to fish habitat (Kirkwood et al. 2007). However, it is arguable whether or not the appearance of these blooms is due to human-induced introductions, or the alteration of river conditions that promote the proliferation of naturally occurring, sparse populations (Taylor and Bothwell 2014; Bergey and Spaulding 2015). While the environmental conditions that promote bloom events are not well understood, flow regulation by dams may contribute to the stable flows preferred by *D. geminata*. If these algal blooms occur in river habitat occupied by the Mountain Sucker, they may alter the cover, food, and spawning habitats preferred by these fish and may displace them from these habitats. The occurrence of these algal blooms in the Milk River is known; however, their impact on the Mountain Sucker remains unknown. The Battle Creek and the Frenchman River watersheds are currently unaffected by *D. geminata*. Additional introduced species of riparian vegetation (for example, Russian Olive (*Elaeagnus angustifolia*) and Salt Cedar (*Tamarix*)), considered noxious weeds in southern Alberta, could have impacts on the Milk River system, although the level of threat impact is unknown for these species. The parasitology of the Mountain Sucker has not been adequately studied to provide an understanding of potential parasites for the species (COSEWIC 2010). However, trematodes (*Posthodiplostomum minimum* and *Diplostomum spathaceum*) have been known to infect closely related suckers (COSEWIC 2010).

Roads and railroads

Road crossings can act as barriers to fish passage, fragment habitat, reduce population resilience to environmental disturbance, and increase risks of local extinction (Diebel et al. 2015). There is a hanging culvert along Davis Creek, near the confluence of the Frenchman River, that is fragmenting the habitat, limiting the recovery of the Mountain Sucker; however, it is also acting as a barrier to predatory fish (COSEWIC 2022b). Construction or maintenance projects on road crossings or grade-control of stream banks (Forman and Alexander 1998; Maitland et al. 2016) can also lead to habitat destruction. In the Mountain Sucker, Milk River populations, however, road development is limited since the watersheds are dominated by agriculture. The effects of roads and road crossings have not been investigated for the Mountain Sucker. This threat was assigned a threat likelihood of remote because of low road density, and a threat impact of low to medium based on an estimated decline in the population of 1 to 10% if the threat were to occur (appendix A). These threats were combined to a threat level of low (table 2), with an overall spatial extent of local and a temporal extent of chronic (table 3).

Negligible threats

Livestock farming and ranching occurs throughout the Mountain Sucker, Milk River populations; however, the impacts are likely negligible, as most ranchers and land managers utilize sustainable practices that prevent over-grazing (Environment and Climate Change Canada 2017). Local areas may be subject to heavy grazing if livestock are concentrated in an area over a series of years during calving, winter feeding, water sources, and salt blocks (Environment and Climate Change Canada 2017).

Energy production and mining were assessed as a negligible threat, as there is limited gas and oil extraction in the distribution of the Plains Sucker, Missouri population (COSEWIC 2022b). However, increased helium production in the area could have an impact on the species in the form of helium exploration, helium wells, and new roads associated with these activities. The largest helium purification facility in Canada is located near Battle Creek.

Service and utility lines are present, but are assessed as a negligible threat, as they are limited in the distribution of the Mountain Sucker, Milk River populations.

The fishing and harvesting of aquatic resources in the distribution of the Mountain Sucker, Milk River populations, occur; however, it has been assessed as negligible. In headwater streams in Saskatchewan, fly fishing occurs, mainly targeting salmonids. Fishing in the Milk River system generally targets Northern Pike and Sauger (*Sander canadensis*) (COSEWIC 2022b).

Recreational activities, such as off-road and all-terrain vehicle use around streams, likely occur to a limited extent. Impacts to the aquatic habitat are assumed to be negligible.

Although work and other activities such as scientific research for other SARA-listed species or environmental assessments by consultants does occur, it is not expected to impact the population, given the limited spatial and temporal scope of the research and the requirement of government permits to conduct the work.

Other ecosystem modifications, such as the loss of riparian vegetation, can lead to increased stream temperatures (loss of shading), erosion, and sedimentation in the stream (COSEWIC 2022b). Currently, this threat is thought to be limited in scope for the entire Mountain Sucker, Milk River populations, and negligible.

Domestic and urban wastewater includes sediment and pollution from roads. Road development is limited within the distribution of the Mountain Sucker, Milk River populations, resulting in a negligible threat level.

6 Population and distribution objectives

Population and distribution objectives establish, to the extent possible, the number of individuals and/or populations, and their geographic distribution that is necessary for the recovery of the species. Considering that the Mountain Suckers designation as threatened is based on its limited presence in just 2 locations within the Missouri drainage, and the lack of comprehensive population trend data, the long-term population and distribution objectives for the Mountain Sucker, Milk River populations are:

- population objective: to ensure that the Milk River populations of the Mountain Sucker are self-sustaining
 - sub-objective: to ensure that populations within the Milk River drainage are stable
 - sub-objective: to ensure that populations in the Battle Creek and Frenchman River drainages are increasing
- distribution objective: to ensure the survival of populations within current waterbodies, protect and/or improve habitat conditions

The population and distribution objectives take into consideration the lack of quantitative information about the species. The RPA (DFO 2013a), estimated that the Mountain Sucker, Milk River populations, as a whole is in decline; however, the minimum viable population (MVP) that was calculated, applied separately to the Mountain Sucker in each of the 3 isolated locations (Milk River, Battle Creek and Frenchman River). Modeling suggests that the Mountain Sucker in the Milk River is not in imminent danger of extirpation; the population is likely larger than the calculated MVP of 6,400 adults, and has more than the minimum suitable habitat. However, modelling suggests that the Mountain Sucker populations in Battle Creek and the Frenchman River are at risk of extirpation, even though it is likely that they have never naturally reached the population densities required to meet the MVP target. It is important to note that there was insufficient data to estimate abundance of the Mountain Sucker, Milk River populations, and that

expert opinion was used to come to a consensus for the population status within each isolated location (Young and Koops 2013).

7 Broad strategies and general approaches to meet objectives

7.1 Actions already completed or currently underway

A 2014 molecular study of the Mountain Sucker identified deep genetic divergences among allopatric sister lineages, and recommendations were made to split the species into 2 separate species (Unmack et al. 2014). Although none of the samples used to distinguish species in the Unmack et al. (2014) study originated from the Canadian portion of the distribution, what was formerly considered the Mountain Sucker is now considered to be the Plains Sucker in Alberta and Saskatchewan, and the Cordilleran Sucker in British Columbia (Bangs et al. 2018). Given the results from USA drainages and the locations of the samples that were used, inference can be safely applied to the Canadian drainages.

MacNaughton et al. (2019) created a standardized field sampling method for monitoring the distribution of the Mountain Sucker populations in Canada, including a survey design that can be used to determine whether population and distribution objectives are being met in the Missouri drainage. This sampling method outlines the type of gear that should be used, timing, sampling effort, and sites to monitor for Mountain Sucker occurrence and relative abundance.

In 2020, sampling was conducted that followed the standardized field sampling methods described above. That year, the Milk River experienced natural summer flows after a diversion structure in Montana failed. The Mountain Sucker was found at 5 upstream access points, in areas that had cooler water temperatures and higher percentages of gravel and cobble substrates, which supports the type of preferred habitat described in section 3 (Needs of the species).

In 2022, a case study was conducted for the Mountain Sucker using a Cumulative Effects Model for Prioritizing Recovery Actions (CEMPRA) to generate questions and/or hypotheses about the major threats to which the species or population is exposed (Jarvis 2022, unpublished data). A tool like this can be used for data-deficient species to ask general questions or to fill gaps in knowledge that can help generate recovery measures. The results of the model indicated that the output is limited by data deficiency. However, several knowledge gaps were identified, which suggests that further investigation and research is warranted to determine causal-effect pathways, and to identify response threats and stressor variables.

The “Action Plan for the Milk River and St. Mary Drainage Basins in Canada” (Fisheries and Oceans Canada 2018) and the “Action Plan for Multiple Species at Risk in Southwestern Saskatchewan: South of the Divide” (Environment and Climate Change Canada 2017) both address recovery measures such as mitigations, management and regulation changes, and habitat monitoring targeted for other species, that may benefit the Mountain Sucker, either directly or indirectly. The “Action Plan for the Milk River and St. Mary River Drainage Basin in Canada” particularly addresses most, if not all, of the issues faced by Mountain Sucker and other fish species in that watershed in Alberta.

Additionally, the “Recovery Strategy for the Rocky Mountain Sculpin, Eastslope populations” (Fisheries and Oceans Canada 2012) and the “Recovery Strategy for the Western Silvery Minnow” (Milk River Fish Species at Risk Recovery Team 2007) both identify critical habitat that

overlaps with the distribution of the Mountain Sucker in the Milk River. Protection of these species' critical habitat under a SARA critical habitat order offer some level of protection for the Mountain Sucker habitat in those overlapping areas.

7.2 Strategic direction for recovery

A description of the broad strategies to address identified threats or concerns and of the research and management approaches needed to meet population and distribution objectives is presented in table 4. These strategies and approaches will help to inform the development of specific recovery measures in 1 or more action plans.

Priority reflects the degree to which the approach is expected to contribute directly to the recovery of the species or is an essential precursor to an approach that contributes to the recovery of the species, measured in:

- high (direct) approaches that are considered likely to have a direct influence on the recovery of the species
- medium approaches that are important but considered to have a less direct influence on the recovery of the species
- low (indirect) approaches that are still considered important contributions to the knowledge base about the species and mitigation of threats, but are less direct in terms of population recovery

Timing of influence reflects the immediacy of influence that the approach is anticipated to have on the species' recovery, measured in:

- immediate approaches that are considered to have an immediate influence of the recovery of the species
- medium approaches that are important but considered to have a less immediate influence of the recovery of the species
- future approaches that are still considered important precursors to the recovery of the species, but further in the future

Table 4. Recovery planning table for the Mountain Sucker, Milk River populations.

General description of research or management approaches	Broad strategy	Priority	Timing of influence	Threat or concern addressed
1. Clarify life history	Research	High	Immediate	Concern addressed: insufficient data Limited information about life history, population dynamics, and population structure of the Mountain Sucker in Canada
2. Determine distribution and abundance	Research	High	Immediate	Concern addressed: insufficient data

General description of research or management approaches	Broad strategy	Priority	Timing of influence	Threat or concern addressed
				Data lacking on total distribution, especially in Saskatchewan
3. Describe habitat	Research	High	Immediate	Concern addressed: insufficient data Data limited on habitat use by life stage, suitable habitat in areas adjacent to distribution, extent of migration, and required width of riparian vegetation.
4. Develop population models	Research	Medium	Medium	Concern addressed: insufficient data Insufficient data to refine population viability estimates, especially for Saskatchewan populations
5. Identify main limiting factors as they relate to threats	Research	Medium	Medium	Threat(s) addressed: all Identification of which threats are affecting populations in each watershed as they relate to limiting factors
6. Gather and integrate Indigenous knowledge	Research	Medium	Medium	Threat(s) addressed: all Not considering Indigenous knowledge can lead to important gaps in recovering the species
7. Monitor population	Monitoring	High	Immediate	Concern addressed: insufficient data Lack of data on whether population is stable or declining
8. Monitor habitat	Monitoring	High	Immediate	Concern addressed: insufficient data Lack of sufficient habitat data
9. Employ water management and conservation	Management and regulation	High	Immediate	Threat(s) addressed: Dams and water management/use Water extraction or water degradation could reduce the quantity and quality of habitat available

General description of research or management approaches	Broad strategy	Priority	Timing of influence	Threat or concern addressed
10. Develop impact mitigations	Management and regulation	High	Immediate	Threat(s) addressed: all except climate change and severe weather Projects occurring within critical habitat for the Mountain Sucker, can have negative environmental effects if not mitigated
11. Rationalize sportfish stocking program ¹	Management and regulation	Medium	Medium	Threat(s) addressed: invasive non-native/alien species and diseases Stocking of competitive or predacious sportfish species can negatively impact the Mountain Sucker population
12. Foster international cooperation	Management and regulation	Medium	Medium	Threat(s) addressed: Dams and water management/use Unscheduled flow interruptions in the Milk River during flow augmentation can lead to fish stranding and negative impacts on sensitive life stages
13. Employ data conservation	Management and regulation	Medium	Medium	Concern addressed: insufficient data Lack of appropriately preserved and/or archived samples and information can result in loss of information over the long term
14. Prevent invasive non-native/alien species introductions	Management and regulation	Medium	Medium	Threat(s) addressed: invasive non-native/alien species The use of live baitfish (baitfish bucket dumping) can lead to declines in the abundance of the Mountain Sucker
15. Ensure compliance and enforcement	Management and regulation	Medium	Medium	Threat(s) addressed: all except climate change and severe weather

¹ Stocking program rationalization: the rationale and decisions made regarding species to be stocked in drainages.

General description of research or management approaches	Broad strategy	Priority	Timing of influence	Threat or concern addressed
				Noncompliance with the SARA and lack of enforcement can result in degraded habitat and negatively impact the population of the Mountain Sucker
16. Improve awareness of the species and recovery strategy	Stewardship and outreach	Medium	Medium	Concern addressed: Insufficient awareness and/or support to recovery the species and implement recovery measures Insufficient awareness could lead to unintentional destruction of critical habitat and/or harm to the species
17. Encourage participation in stewardship programs	Stewardship and outreach	High	Immediate	Threat(s) addressed: all Lack of participation in stewardship program could result in missed opportunities to restore habitat and/or recover the species
18. Discourage species introductions	Stewardship and outreach	Medium	Medium	Threat(s) addressed: invasive non-native/alien species and diseases Intentional and unintentional non-native species introductions can lead to increased predation, competition for resources, hybridization, introduction of toxic diseases and parasites and degradation of habitat

7.3 Descriptions of approaches in the recovery planning table

Strategies proposed to address the identified threats, and to guide appropriate research and management activities to meet the recovery objectives, are discussed under the approaches of research, monitoring, management and regulatory actions, stewardship, and outreach. Indigenous communities, provincial and federal organizations, local stakeholders, and conservation groups can be key partners in implementing the approaches listed below.

Each strategy has been designed to address information deficiencies that might otherwise inhibit species recovery, assess, mitigate, or eliminate specific threats to the species; or contribute to the species' conservation in general. These strategies are summarized by approach in table 4.

Research

Scientific and Indigenous knowledge should form the basis of any recovery efforts for the Mountain Sucker. Currently, some information on the Mountain Sucker in Canada is speculative and relies on limited and often inferred information from populations in the United States. Information gaps exist regarding Indigenous knowledge, basic life history, population structure, abundance, distribution, and habitat requirements and threats; hence, these gaps need to be addressed to refine the recovery strategy and to ensure that the species is adequately protected. To address these information gaps, the following strategies are recommended:

Clarify life history: Studies are required to understand and document life history, population dynamics, and population structure. While much of the current knowledge of the species comes from studies in the United States, even that information is relatively sparse and may not be completely applicable to the various habitats the species occupies in the Missouri drainage. To assist the management and recovery of the species in Canada, a sound understanding of all aspects and stages of the Mountain Sucker life history is required.

Determine distribution and abundance: There are information gaps on distribution, especially for the Saskatchewan populations, due to a lack of targeted sampling. Further information on the distribution and abundance of the species will assist in determining if maintenance or recovery activities are effective. Furthermore, without having distribution information for all areas, it would be difficult to make sound decisions regarding actions that might be unpopular with some stakeholders if implemented without distribution data for all areas.

Describe habitat: Further research is required to refine the boundaries of currently identified critical habitat and/or refine the understanding of the function, features, and attributes necessary to support achieving the species' population and distribution objectives. Refinements may be made to critical habitat as new information on habitat use by life stage and the extent of movement of the species is acquired, especially with regards to spawning and overwintering. Identification and inventory of habitat outside of the known distribution would help identify areas with habitat similar to that in the range of the species, and may explain what has changed at sites where the species was captured historically, but where it no longer appears to be extant. Further, a quantitative understanding of the width of riparian vegetation needed to support the functions and features of riparian critical habitat may help ensure adequate protection.

Develop population models: Once abundance estimates are available and population structure is understood in each watershed, studies to refine population viability estimates will be required. These studies are especially important for Saskatchewan populations where currently not enough information is available to develop reliable models (DFO 2013a). Population modelling will also help to confirm whether or not there is sufficient habitat available to maintain the population.

Identify main limiting factors as they relate to threats: Studies to better understand the natural limiting factors for the Mountain Sucker as they relate to threats, especially those ranked as medium to high, are required. The means to mitigate these threats can then be developed and implemented. It should also be determined if the Mountain Sucker is absent from historic areas of capture due to habitat changes or other stressors.

Gather and integrate Indigenous knowledge: Indigenous knowledge on the relationships among humans, wildlife, spirituality, environmental conditions, and land forms in a defined locality and, frequently, over lengthy time periods should be considered in order to facilitate recovery of the Mountain Sucker, Milk River populations. Combining Indigenous knowledge and scientific research will benefit the species by bringing another perspective into the recovery needs of the species. Permission to use Indigenous knowledge will be obtained before use in any recovery planning document.

Monitoring

Once baseline information has been collected, regular monitoring is necessary to determine changes in biological traits such as distribution and abundance of populations, as well as to monitor and describe the traits, availability, and permanency of critical habitats (MacNaughton et al. 2019). Furthermore, the general physical and biological parameters of rivers and streams should be monitored regularly to track water quality and quantity (MacNaughton et al. 2019). The following strategies are recommended to address monitoring needs:

Monitor population: Develop an appropriate monitoring protocol to track relative abundance, distribution, and habitat use for the Mountain Sucker. This development should include the establishment of surrogate measures of biological traits of the various populations in different waterbodies, such as the abundance of size classes. Representative sites should be identified that can be sampled regularly to document changes in the Mountain Sucker population dynamics.

Monitor habitat: Routinely monitor physical environmental parameters, including flow, flow conditions, turbidity, water temperature, dissolved oxygen, nutrient loading, and salinity. Similar to population monitoring, the establishment of several representative sites that can be sampled on a rapid, regular basis, is recommended.

Management and regulation

Some management and regulatory actions may ultimately be necessary to protect the Mountain Sucker and its habitat. Such actions will assist in reducing or eliminating identified threats. This recovery strategy focuses on maintaining and/or increasing existing populations and protecting critical habitats. Recommended strategies include:

Water management and conservation: Reduce the effects of water extraction or degradation on the Mountain Sucker, where possible, through appropriate water use management and conservation measures already in place. Encourage new ways to reduce water use or degradation. Encourage the use of any feasible measures which are working in other areas, but not adopted yet in the Missouri drainage.

Development of impact mitigation: Consider the potential environmental effects on the species as early as practical in the planning stages, in the development of any project proposals within critical habitat for the Mountain Sucker, and focus on the elimination or mitigation of any potential adverse impacts on the species. Early recognition of the need for mitigation and the incorporation of appropriate measures within the project design will help to expedite project reviews and assessments.

Sportfish stocking program rationalization: Re-evaluate stocking of sportfish species in areas where they can impact the Mountain Sucker populations. While many Saskatchewan areas have already been stocked, thought should be given in the future

to stocking only areas downstream of dams, which will prevent upstream movement by introduced species into areas with known populations of the Mountain Sucker. Ensure that any planned fish stocking in United States waters will not contribute to introductions into Canada.

International cooperation: Work with United States agencies to avoid unscheduled flow interruptions in the Milk River during flow augmentation, to prevent possible fish stranding and deleterious effects on sensitive life history stages.

Data conservation: Appropriately preserve and/or archive all samples and information (current and future) on specimens and capture locations within known repositories, so that information can be readily and easily retrieved, to provide continuity and future reference.

Prevent invasive species introductions: Reduce the potential for species introductions by anglers, by banning the use of live baitfish in the Milk River. Baitfish use has already been banned in the Frenchman River and Battle Creek.

Compliance and enforcement: Create and implement a compliance and enforcement plan to conduct strategic compliance inspections to mitigate threats.

Stewardship and outreach

Stewardship and outreach is essential to gain acceptance of, and compliance with, the overall recovery strategy. Support can be gained through increased awareness of the Mountain Sucker and involvement in stewardship programs. The following strategies are recommended:

Improve awareness of the species and recovery strategy: Develop and distribute information describing the species and its needs, and promote recovery measures described in the recovery strategy. Outreach programs should focus on First Nations and Métis, local stakeholders, and conservation groups. These programs should also emphasize beneficial impacts on other species and the environment by protecting the Mountain Sucker and its habitat.

Encourage participation in stewardship programs: Work closely with First Nations and Métis and local stakeholders to promote conservation involvement in stewardship initiatives. Promote federal grant and contribution programs that are available which provide funding for projects that contribute directly to recovery of species at risk. Recognize those who have made an effort to protect or restore habitat populated by the Mountain Sucker or otherwise have contributed to the conservation of the species.

Discourage species introductions: Support and increase education programs that heighten awareness of this issue, to prevent species introductions – intentional or otherwise. This type of program could be directed towards anglers and landowners who may wish to introduce species into waters supporting the Mountain Sucker.

8 Critical habitat

8.1 Identification of the species' critical habitat

8.1.1 General description of the species' critical habitat

Critical habitat is defined in SARA as "...the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species." [subsection 2(1)]

Also, SARA defines habitat for aquatic species as "... spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced." [subsection 2(1)]

For the Mountain Sucker, Milk River populations, critical habitat is identified to the extent possible, using the best available information. Adequate information was available to identify the biophysical functions, features and attributes necessary to support the species' life-cycle processes throughout its known distribution. The identified areas may be revised if new or additional information supports the inclusion or refinement of areas beyond those currently identified.

This recovery strategy identifies critical habitat for the Mountain Sucker, Milk River populations, as cool (less than 25°C), moderate gradient streams within the Missouri drainage in Canada; more specifically, the North Milk and Milk rivers in southern Alberta; tributaries of the Frenchman River in Saskatchewan, including Belanger, Sucker, Davis, Fairwell, Lonepine, Caton, and Conglomerate creeks; and upper Battle Creek in Alberta and Saskatchewan, as well as its tributary, Nine Mile Creek in Saskatchewan (table 5).

8.1.2 Information and methods used to identify critical habitat

The critical habitat was identified for the Mountain Sucker, Milk River populations, using the best information available. The critical habitat is not comprised of all areas within the identified boundaries, but only those areas within the identified geographical boundaries where the described biophysical feature and function they support occur, as described in table 6. This approach for identifying critical habitat requires the use of essential features and attributes for each life function of the species to identify patches of critical habitat within the identified geographical boundaries, which is defined by the distribution of the species. Life stage habitat information was summarized in chart form using available data and studies referenced in section 3.3 (Needs of the species). Where habitat information was available, it was used to inform the identification of critical habitat.

Within all identified stream segments, aquatic features of critical habitat for the Mountain Sucker include cool (less than 25°C), moderate gradient streams, within the entire bankfull² channel

² Bankfull channel width is the width of the stream or river at bankfull discharge, which is the flow at which water begins to leave the channel and move into the floodplain.

width. Other features of critical habitat include the riparian vegetation within the bankfull channel width.

8.1.3 Identification of critical habitat

Geographic information

For the Mountain Sucker, critical habitat is identified within 3 main locations within the Milk River drainage in Alberta and Saskatchewan (table 5) including:

- area 1: the North Milk and Milk rivers in southern Alberta (figures 4 and 5)
- area 2: Battle Creek and its tributary, Nine Mile Creek (figure 6)
- area 3: creeks in the Frenchman River drainage (although not the mainstem of the river itself): Belanger, Sucker, Davis, Fairwell, Lonepine, Caton, and Conglomerate creeks (figure 7)

The critical habitat is not composed of the entire area within the identified boundaries but only those areas within the identified geographical boundaries where the described biophysical feature and the function it supports occur, as described in table 6. The geographic coordinates for the areas within which critical habitat is found for the Mountain Sucker are indicated in table 5 and illustrated on figures 4, 5, 6, and 7.

Table 5. Locations in Alberta and Saskatchewan identified as critical habitat for the Mountain Sucker, Milk River populations.

Waterbody	Latitude (decimal degrees)	Longitude (decimal degrees)	Map figures	Critical habitat point number
North Milk River	48.99860	-112.99809	Figure 4	P1
Milk River	48.99872	-112.55588	Figure 4	P1
Milk River	49.00053	-110.53109	Figure 5	P2
Battle Creek	49.66095	-110.09426	Figure 6	P1
Battle Creek	49.00039	-109.41720	Figure 6	P2
Nine Mile Creek	49.60087	-109.96455	Figure 6	P1
Conglomerate Creek	49.60255	-108.93333	Figure 7	P1
Fairwell Creek	49.60874	-109.14510	Figure 7	P1
Caton Creek	49.60223	-109.20718	Figure 7	P1
Davis Creek	49.61919	-109.31968	Figure 7	P1
Belanger Creek	49.57158	-109.39205	Figure 7	P1
Lonepine Creek	49.55452	-109.39623	Figure 7	P1
Sucker Creek	49.54394	-109.42912	Figure 7	P1

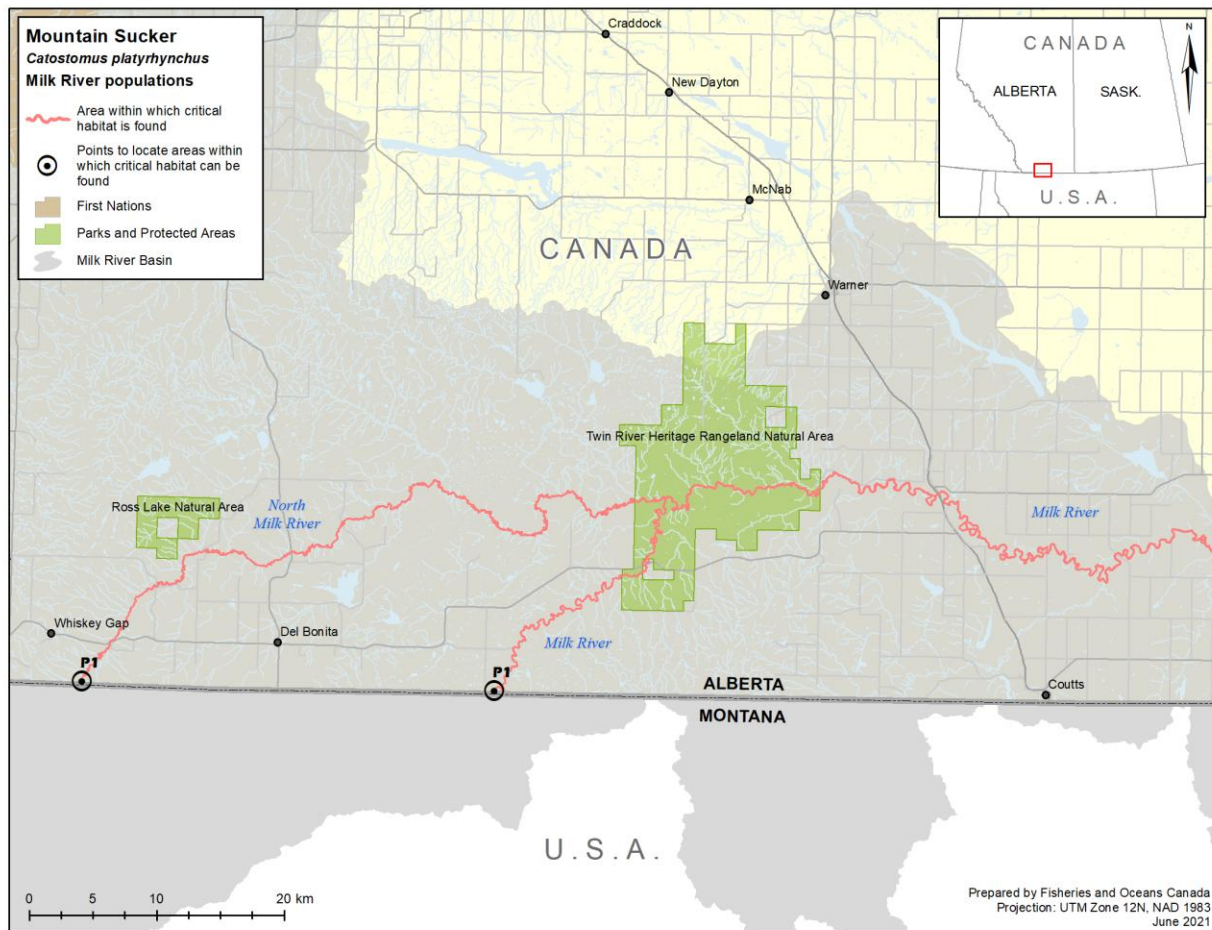


Figure 4. Areas within which the Mountain Sucker, Milk River populations, critical habitat is found in the Milk and North Milk rivers, Alberta.

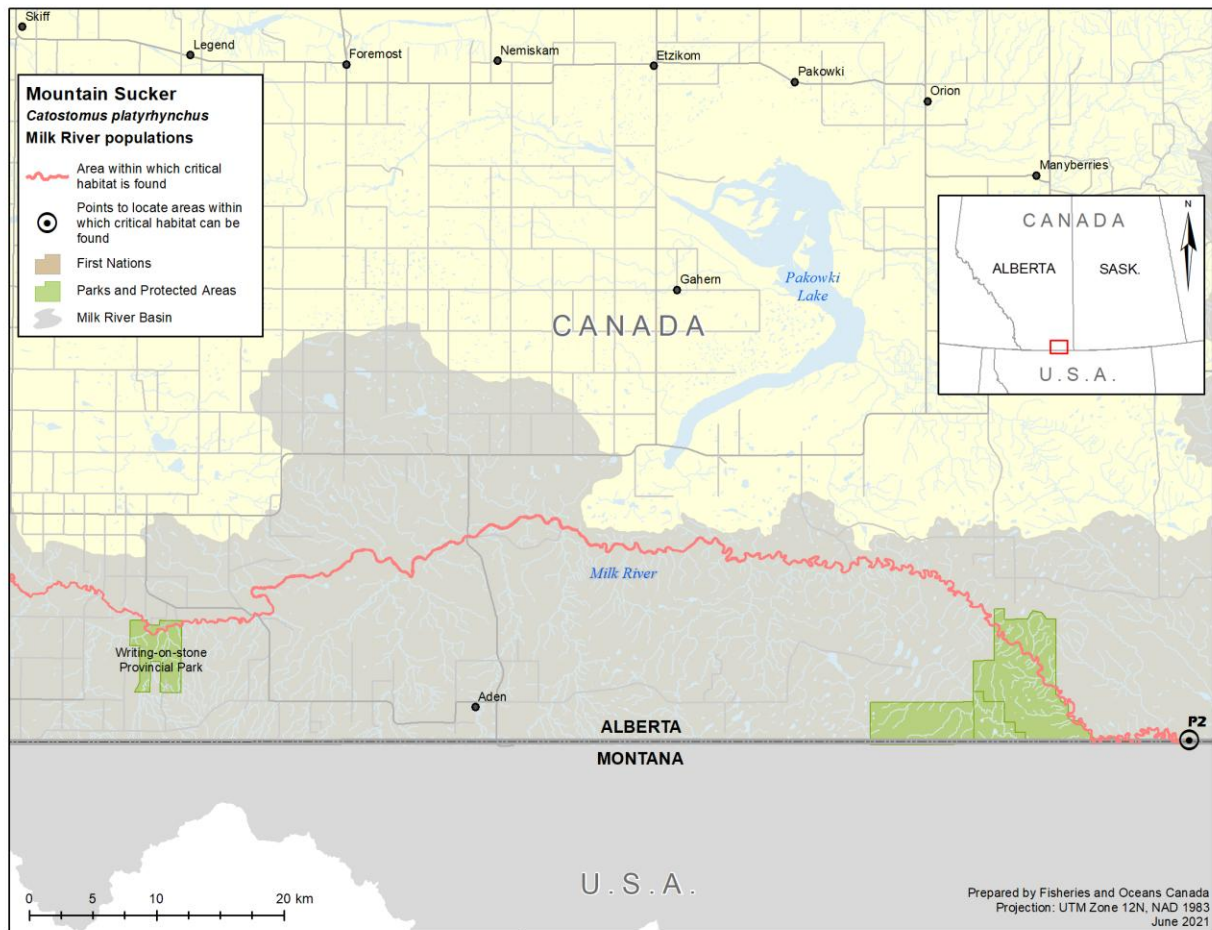


Figure 5. Areas within which the Mountain Sucker, Milk River populations, critical habitat is found in the Milk River, Alberta.



Figure 6. Areas within which the Mountain Sucker, Milk River populations, critical habitat is found in the Battle Creek (Alberta and Saskatchewan) and Nine Mile Creek (Saskatchewan).

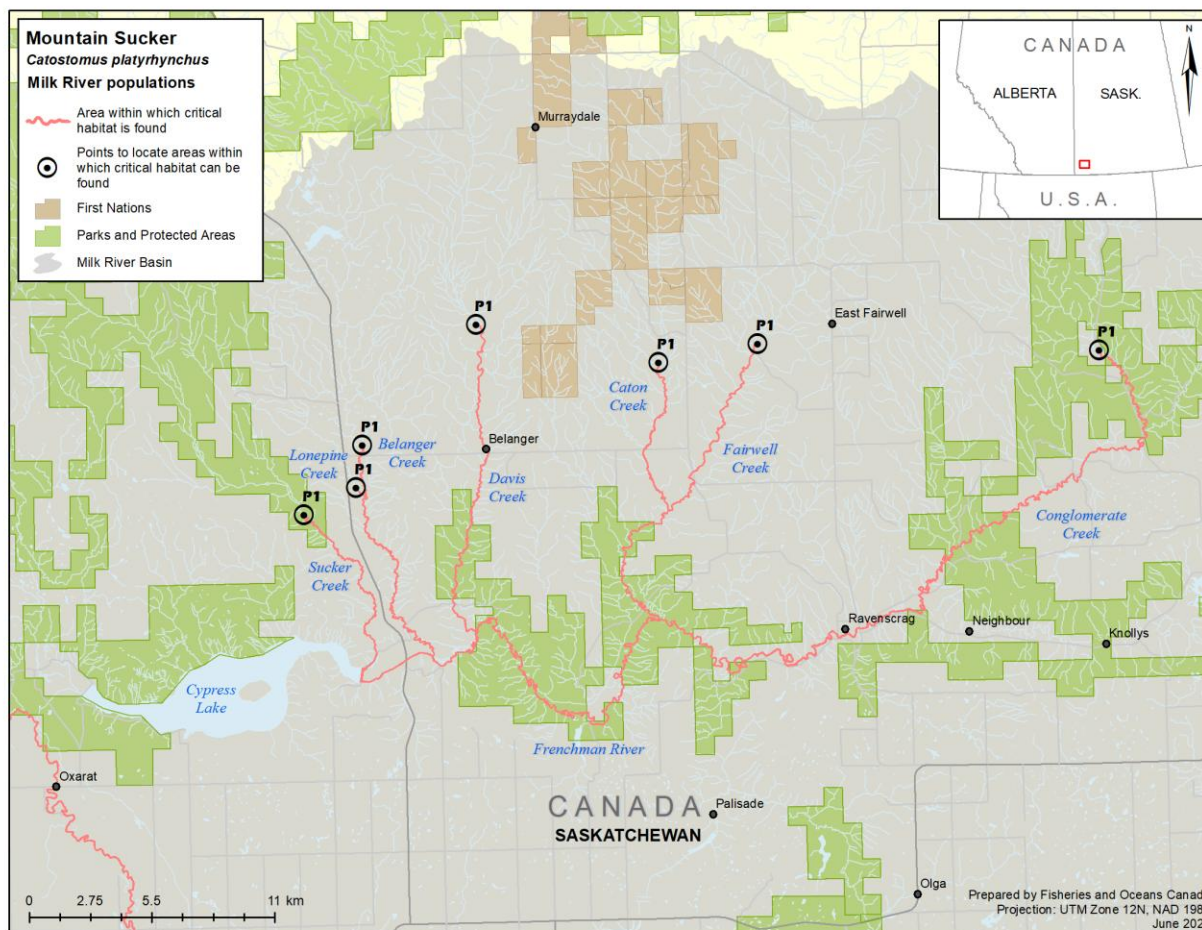


Figure 7. Areas within which the Mountain Sucker, Milk River populations, critical habitat is found in the Frenchman River, Sucker, Lonepine, Belanger, Davis, Caton, Fairwell, and Conglomerate creeks, Saskatchewan.

Biophysical functions, features, and attributes

Table 6 summarizes the best available knowledge of the functions, features, and attributes for each life stage of the Mountain Sucker (refer to section 3.3 “Needs of the species” for full references). Note that not all attributes in table 6 must be present for a feature to be identified as critical habitat. If the features as described in table 6 are present and capable of supporting the associated function(s), the feature is considered critical habitat for the species, even though some of the associated attributes might be outside of the range indicated in the table.

Table 6. General summary of the biophysical functions, features, attributes, of critical habitat necessary for the recovery of the Mountain Sucker, Milk River populations.

Life stage	Function ³	Features ⁴	Attributes ⁵
Adult (spawning)	• Spawning	• Riffles	• Water depths of 0.1 to 0.3 m • Water velocities of 0.06 to 0.20 m s⁻¹
Eggs to exogenous feeding (young-of-the-year [YOY])	• Nursery • Cover • Feeding	• Obstacle (rocks, submerged logs) • Embayments and side-channels associated with mid-channel gravel bars • Refugia during times of drought	• Water depths of < 40 cm • Stable stream banks • Overhanging bank vegetation, shrubs, grasses, forbs
Juvenile	• Feeding • Cover	• Rocks, submerged logs, embayments • Refugia during times of drought	• Water depths (<1 m) • Water velocity (<0.5 m s⁻¹) • Water temperature <25°C • Stable stream banks • Overhanging bank vegetation, shrubs, grasses, forbs
Adult	• Feeding • Cover	• Small, cool rivers and streams • Refugia during times of drought	• Water temperature <25°C • Gravel and cobble substrate • Water depth >0.1 • Water velocities of 0.0 to 2.0 m s⁻¹ • Stable stream banks • Overhanging bank vegetation, shrubs, grasses, forbs
All life stages	• Spawning • Nursery • Cover • Feeding	• Riparian vegetation	• Overhanging vegetation, including but not limited to grasses, forbs, shrubs, trees within the bankfull channel width

³ Function: functions are life-cycle processes of the listed species taking place in critical habitat (for example, spawning, nursery, rearing, feeding and migration).

⁴ Feature: features are the essential structural component that provides the requisite function(s) to meet the species' needs. Features may change over time and usually consist of more than one part, or attribute. A change or disruption to the feature or any of its attributes may affect the function and its ability to meet the biological needs of the species.

⁵ Attribute: attributes are measurable properties or characteristics of a feature. Attributes describe how the identified features support the identified functions necessary for the species' life processes.

Summary of critical habitat relative to population and distribution objectives

The biophysical functions, features, and attributes described in table 6 are the areas that the Minister of Fisheries and the Minister of the Environment, Climate Change and Nature as the Minister responsible for the Parks Canada Agency considers necessary to achieve the species' population and distribution objectives required for the recovery of the Mountain Sucker.

8.2 Activities likely to result in the destruction of critical habitat

The following examples of activities likely to result in the destruction⁶ of critical habitat (table 7) are based on known human activities that are likely to occur in, and around, critical habitat and would result in the destruction of critical habitat, if unmitigated. The list of activities is neither exhaustive nor exclusive and its development has been guided by the threats described in section 4. The absence of a specific human activity from this table does not preclude or restrict the Department's ability to regulate that activity under SARA. Furthermore, the inclusion of an activity does not result in its automatic prohibition and does not mean that the activity will inevitably result in destruction of critical habitat. Every proposed activity must be assessed on a case-by-case basis, and site-specific mitigation will be applied where it is reliable and available. Where information is available, thresholds and limits have been developed for critical habitat attributes to better inform management and regulatory decision-making. However, in many cases, knowledge of a species and its critical habitat's thresholds of tolerance to disturbance from human activities is lacking and must be acquired.

Table 7. Examples of activities likely to result in the destruction of critical habitat for the Mountain Sucker's, Milk River populations, critical habitat.

Threat	Activity	Effect/pathway	Function affected	Feature affected	Attribute affected
Dams and water management/ use	Diversion of flow	Reduction in available habitat	• Spawning • Feeding • Cover	• Flowing water	• Depth • Velocity • Temperature
Dams and water management/ use	Dam construction and operation	Reduction in available habitat	• Spawning • Feeding • Cover	• Flowing water	• Depth • Velocity • Temperature • Stable stream bank
Dams and water management/ use	Surface water extraction	Reduction in available habitat	• Spawning • Feeding • Cover	• Flowing water	• Depth • Velocity • Temperature
Agriculture and forestry effluents Livestock farming and ranching	Livestock use of floodplain	Reduction in available habitat	• Feeding • Cover	• Riparian vegetation	• Temperature • Stable stream bank

⁶ Destruction occurs when there is a temporary or permanent loss of a function of critical habitat at a time when it is required by the species.

Threat	Activity	Effect/pathway	Function affected	Feature affected	Attribute affected
Ecosystem modifications	Removal of riparian vegetation	Reduction in available habitat	• Feeding • Cover	• Riparian vegetation	• Temperature • Stable stream bank

8.3 Measures to protect critical habitat

Under SARA, critical habitat must be legally protected within 180 days of being identified in a final recovery strategy or action plan that is included in the [Species at Risk Public Registry](#).

Once the final recovery strategy is included in the Species at Risk Public Registry, it is anticipated that the critical habitat for the Mountain Sucker, Milk River populations, will be protected through a SARA critical habitat order made under subsections 58(4) and 58(5).

9 Measuring progress

The performance indicators presented below provide a way to define and measure progress towards achieving the population and distribution objectives. A successful recovery program will achieve the overall aim of recovering populations to a state where they are stable or increasing and are demonstrably secure, with low risk from known threats. Progress towards meeting these objectives will be reported in the report on the progress of recovery strategy implementation, 5 years after the publication of the final document on the [Species at Risk Public Registry](#), and every subsequent 5 years.

Performance indicators:

1. the continued presence of the Mountain Sucker, Milk River populations, within its current distribution by 2031
2. a stable and self-sustaining population of the Mountain Sucker, in the Milk River drainage
3. a stable and/or increasing population of the Mountain Sucker in the Battle Creek and Frenchman River drainages

10 Statement on action plans

The federal government's approach to recovery planning is a two-part approach, the first part being the recovery strategy and the second part being the action plan. An action plan contains specific recovery measures or activities required to meet the objectives outlined in the recovery strategy.

An action plan for the Mountain Sucker, Milk River populations, will be completed within 5 years of posting the final recovery strategy. Recovery measures for Mountain Sucker may also be incorporated into existing plans such as the Milk River and St. Mary River Drainage Basins Action Plan (Fisheries and Oceans Canada 2018) and/or the Southwestern Saskatchewan Multi-species Action Plan (Environment and Climate Change Canada 2017).

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Appendix A: Threat assessment categories

Threat	Threat likelihood	Threat impact
Climate change and severe weather	Known	Medium to high
Dams and water management/use	Known	Low to medium
Agricultural and forestry effluents	Known	Low
Invasive non-native/alien species and diseases	Known	Low
Roads and railroads	Remote	Low to medium

Threat likelihood	Definition
Known or very likely to occur	This threat has been recorded to occur 91 to 100%.
Likely to occur	There is 51 to 90% chance that this threat is, or will be, occurring.
Unlikely	There is 11 to 50% chance that this threat is, or will be, occurring
Remote	There is 1 to 10% or less chance that this threat is, or will be, occurring.
Unknown	There are no data or prior knowledge of this threat occurring now or in the future.

Threat impact	Definition
Extreme	Severe population decline (71 to 100%) with the potential for extirpation.
High	Substantial loss of population (31 to 70%) or threat would jeopardize the survival or recovery of the population.
Medium	Moderate loss of population (11 to 30%) or threat is likely to jeopardize the survival or recovery of the population.
Low	Little change in population (1 to 10%) or threat is unlikely to jeopardize the survival or recovery of the population.
Unknown	No prior knowledge, literature, or data to guide the assessment of threat severity on population.

Level of certainty	Definition
Very high	Very strong evidence that threat is occurring and the magnitude of the impact to the population can be quantified.
High	Substantial evidence of a causal link between threat and population decline or jeopardy to survival or recovery.
Medium	There is some evidence linking the threat to population decline or jeopardy to survival or recovery.
Low	There is a theoretical link with limited evidence that threat is leading to a population decline or jeopardy to survival or recovery.
Very low	There is a plausible link with no evidence that the threat is leading to a population decline or jeopardy to survival or recovery.

Temporal extent	Definition
Ephemeral	The threat occurs once.
Recurrent	The threat occurs periodically, or repeatedly.
Chronic	The threat occurs without interruption.

Spatial extent	Definition
Widespread	71 to 100% of the population is affected by the threat.
Broad	31 to 70% of the population is affected by the threat.
Narrow	11 to 30% of the population is affected by the threat.
Local	1 to 10% of the population is affected by the threat.

Appendix B: Record of cooperation and consultation

Recovery strategies are to be prepared in cooperation and consultation with other jurisdictions, Indigenous Peoples, organizations, affected parties, and others as outlined in SARA Section 39. DFO has utilized a process of meetings and written requests to seek input to the development of this recovery strategy. Information on participation is included below.

Table 9. List of other jurisdictions, organizations, and stakeholder groups from which DFO received input for the development of the recovery strategy for the Mountain Sucker, Milk River populations.

Affiliation	Name
Fisheries and Oceans Canada	Eva Enders
Fisheries and Oceans Canada	Ashley Gillespie
Fisheries and Oceans Canada	Christine Lacho
Fisheries and Oceans Canada	Elizabeth Patreau
Fisheries and Oceans Canada	Melanie Toyne
Fisheries and Oceans Canada	Doug Watkinson
Government of Saskatchewan – Ministry of Environment	Ron Hlasny
Government of Saskatchewan – Ministry of Environment	Matt Tyree
Saskatchewan Fly Fishing Federation	Kyle Chow
Trout Unlimited Canada	Lesley Peterson
University of Alberta	Mark Poesch
University of Alberta	M. Macleod
Water Security Agency	Jeff Sereda

In addition, DFO sought input from First Nations and Métis in Alberta and Saskatchewan during the development of the recovery strategy.

Additional Indigenous Peoples, stakeholder, and public input were sought through the publication of the proposed document on the [Species At Risk Public Registry](#) for a 60-day public comment period held from December 15 2025 to February 13 2026. All feedback received was considered in the finalization of the recovery strategy. Suggestions and concerns related to the implementation of recovery measures for the Mountain Sucker, Milk River populations, will be considered in the action plan that will be developed