Proposed

Species at Risk Act
Management Plan Series

Management Plan for the Mountain Sucker (*Catostomus platyrhynchus*), Pacific populations, in Canada

Mountain Sucker, Pacific populations

2018

Canada

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For copies of the management plan, or for additional information on species at risk, including Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the Species at Risk Public Registry.

Cover illustration: Illustration of adult Mountain Sucker, Pacific populations. Credit: Joseph R. Tomelleri.

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Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of Management Plans for species listed as Special Concern and are required to report on progress five years after the publication of the final document on the Species at Risk Public Registry.

The Minister of Fisheries and Oceans is the competent minister under SARA for the Mountain Sucker, Pacific populations, and has prepared this Management Plan, as per section 65 of SARA. To the extent possible, this Management Plan has been prepared in cooperation with environmental non-government organizations, species experts, and the Province of British Columbia as per section 66(1) of SARA.

As stated in the preamble to SARA, success in the conservation of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this plan and will not be achieved by Fisheries and Oceans Canada or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this plan for the benefit of the Mountain Sucker, Pacific populations, and Canadian society as a whole.

A SARA management plan includes measures for the conservation of the species to manage the species of special concern to prevent it from becoming threatened or endangered. The competent minister (Minister of Fisheries and Oceans) must prepare a management plan that includes measures for the conservation of the species that the minister considers appropriate. These measures for the conservation of the species set out to achieve the management objective identified in the management plan. Implementation of this Management Plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Acknowledgments

Fisheries and Oceans Canada (DFO) wishes to acknowledge the contributions of those who supported the development of the Management Plan for the Mountain Sucker, Pacific populations. This management plan was drafted by Patricia Woodruff and finalized by Ahdia Hassan (DFO), with input from Paul Grant (DFO) and Martin Nantel (DFO).

Executive Summary

The Mountain Sucker (*Catostomus platyrhynchus*), Pacific populations, was listed as Special Concern under the *Species at Risk Act* (SARA) in 2017. This Management Plan is considered one in 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) Status Report (2010).

The Mountain Sucker is found in the western mountainous regions and westernmost Great Plains of North America (COSEWIC 2010). In Canada, the Mountain Sucker is divided into three populations: the Saskatchewan – Nelson River populations; the Milk River populations; and the Pacific populations (COSEWIC 2010). The Mountain Sucker, Pacific populations, is found in the lower Fraser River and North Thompson River (Fraser River watershed), and the Similkameen River (Columbia River watershed).

The Mountain Sucker is a small, torpedo-shaped fish with fleshy bumps (papillae) on the lips (COSEWIC 2010; Scott and Crossman 1973). The Mountain Sucker feeds on plankton, small invertebrates and microscopic matter that it scrapes off rocks (COSEWIC 2010). In British Columbia, the Mountain Sucker, Pacific populations, is found in flowing water in both small, clear mountain streams and larger, turbid rivers. In the summer, Mountain Suckers tend to be found in deeper glides and pools (McPhail 2007). Section 3 describes characteristics and needs of the species.

There have been no quantitative studies on the abundance of Mountain Sucker, Pacific populations. In general, Mountain Suckers appear to be less abundant in the northern parts of their range, especially in British Columbia and Washington State (COSEWIC 2010). The Mountain Sucker, Pacific populations, has persisted in the same locales where it was first collected over 40 years ago, and remains abundant at these sites (COSEWIC 2010; McPhail 2007).

The main threats facing the species are described in Section 4 and include: water availability and use; physical destruction of habitat; impoundments and flow regulation; sedimentation; release of harmful substances; and aquatic invasive species.

The management objective (Section 5) for the Mountain Sucker, Pacific populations, is to maintain self-sustaining populations throughout their current distribution to ensure the population’s long-term viability in the wild.

A description of the broad strategies and measures for the conservation of the species that provide the best chance of achieving the management objective are included in Section 6. Broad strategies include monitoring and inventory, research, management and coordination, and stewardship and outreach. Measures for the conservation of the species aim to address knowledge gaps through monitoring and research, thereby strengthening the foundation for any future management actions.

Implementation of this Management Plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

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1. COSEWIC[1] Species Assessment Information

Date of Assessment: November 2010

Common Name: Mountain Sucker - Pacific populations

Scientific Name: *Catostomus platyrhynchus*

Status: Special Concern

Reason for Designation: This small freshwater fish has a patchy distribution within the North Thompson, lower Fraser and Similkameen river drainages in British Columbia. It has a small area of occupancy and number of locations within each of these areas. It is likely that habitat quality will continue to decline over about 40 percent of its Canadian range owing to increased water extraction in the Similkameen River drainage that climate change is expected to exacerbate.

Occurrence: British Columbia.

Status History: The species was considered a single unit and designated Not at Risk in April 1991. The species was split into three populations in November 2010. The "Pacific populations" unit was designated Special Concern in November 2010.

2. Species Status Information

Globally, the International Union for the Conservation of Nature (IUCN) ranks the Mountain Sucker as Least Concern, and NatureServe ranks the Mountain Sucker as G5 (globally secure; NatureServe 2017). Provincially, the Mountain Sucker, Pacific populations, is ranked as S2S3 (S2=imperiled, S3=special concern, vulnerable to extirpation or extinction; BC Conservation Data Centre 2017).

In 1991, COSEWIC assessed the Mountain Sucker as a single unit and designated it Not at Risk (Campbell 1991). The Mountain Sucker has since been recognized as three distinct Designatable Units (or populations) in Canada, and was reassessed in 2010: the Saskatchewan-Nelson River populations, designated Not at Risk; the Milk River populations, designated Threatened; and the Pacific populations, designated Special Concern (COSEWIC 2010). The Mountain Sucker, Pacific populations, was listed under Schedule 1 of the *Species at Risk Act* in 2017.

[1] COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

3. Species Information

3.1 Species Description

Suckers are cylindrical fishes with a short head and a mouth located on the ventral (stomach) side (Scott and Crossman 1973). The Mountain Sucker is a small, bottom-oriented fish that has fine scales, a distinctive mouth, with bumps (papillae) on the lips (McPhail 2007; COSEWIC 2010). The body is elongate and cylindrical, the snout is broad and heavy, the pectoral fins are long and virtually colourless, and the lower lip has the shape of a pair of wings (COSEWIC 2010). Mountain Suckers are dark green to grey or brown on their dorsal surface, with a dark green to black band along their sides (COSEWIC 2010). Breeding fish develop an orange to deep red lateral band, and males also develop tubercles (small “bumps”) on their entire body surface (COSEWIC 2010). Mountain Suckers typically range from 127 to 152 mm total length as adults, with a maximum recorded length of 232 mm (COSEWIC 2010).

Mountain Suckers feed primarily on algae that they scrape off rocks, or on algae, diatoms and larval insects that they ingest from the substrate (McPhail 2007; COSEWIC 2010). Female fish tend to be larger than males, and live to at least nine years; male fish generally live up to seven years (COSEWIC 2010). In British Columbia, most males are mature by age 4 and most females are mature by age 5 (McPhail 2007; COSEWIC 2010).

Additional details of life history and habitat requirements can be found in Needs of the Species (Section 3.3) and COSEWIC (2010).

3.2 Population and Distribution

The Mountain Sucker is found in waterbodies throughout the mountainous regions and westernmost Great Plains of North America. Its global range includes streams of the Great Basin in Utah, Nevada, and California; the North Fork Feather River, California; headwaters of the Green River in Utah, Colorado, and Wyoming; parts of the Columbia River drainage in Wyoming, Idaho, Washington, Oregon, and British Columbia; the Fraser River drainage, British Columbia; upper Saskatchewan River drainage, Alberta; Milk River drainage, Alberta, Montana, and Saskatchewan; upper Missouri River drainage, Montana, Wyoming and South Dakota; and the White River, Nebraska (COSEWIC 2010).

In Canada, the Mountain Sucker is divided into three designatable units: the Saskatchewan – Nelson River populations in Alberta and Saskatchewan; the Milk River populations in Alberta; and the Pacific populations in British Columbia (COSEWIC 2010). The Mountain Sucker, Pacific populations, has a broadly disjunct distribution among the lower Fraser River (Fraser River watershed), the North Thompson River (Fraser River watershed), and the Similkameen River (Columbia River watershed) (Figures 1–4). There is an unconfirmed record from near the confluence of the Salmo and Pend d’Oreille rivers (Columbia River watershed; Baxter et al. 2003).

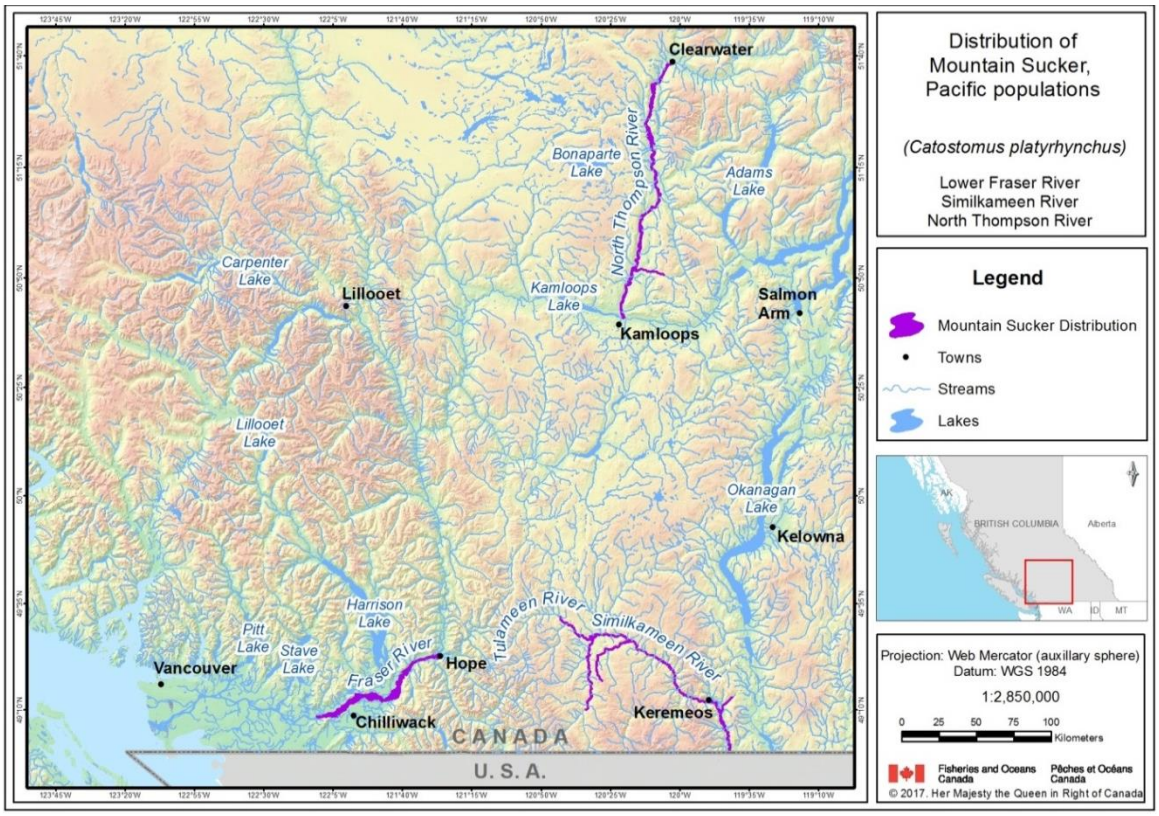

Figure 1: Distribution of Mountain Sucker, Pacific populations.

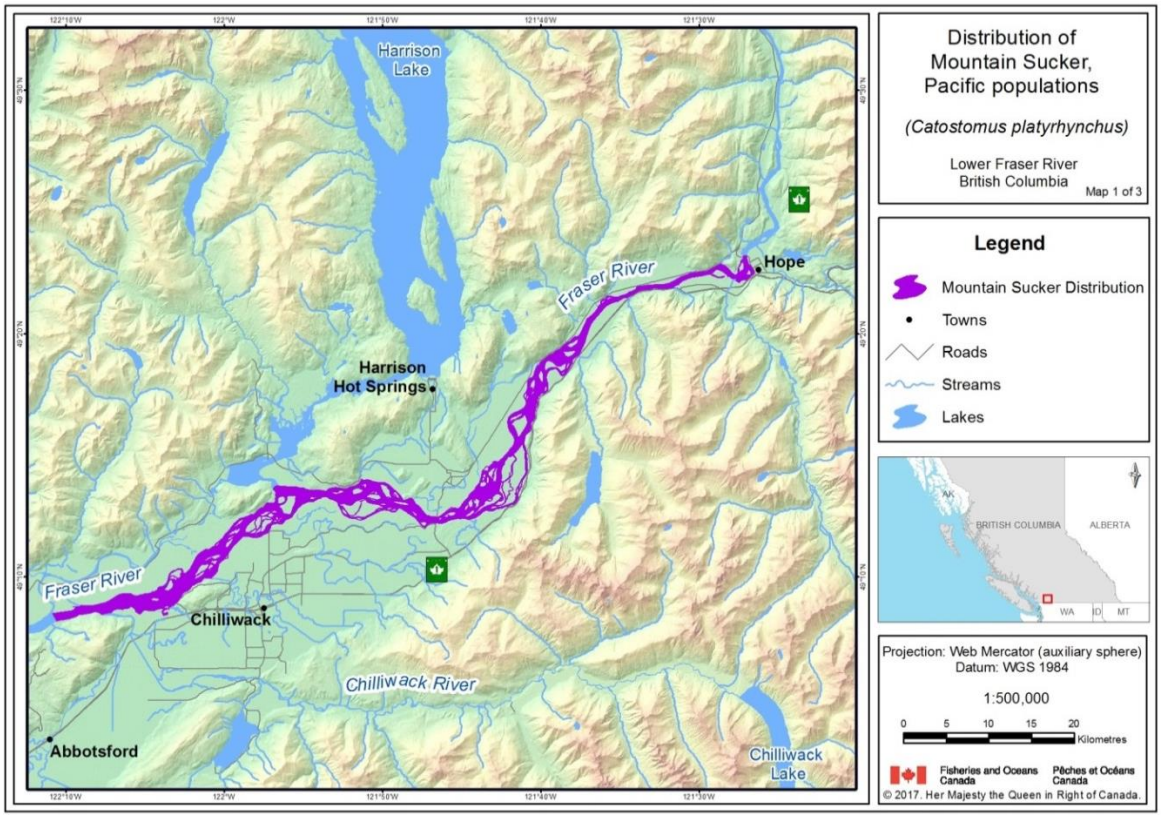

Figure 2: Distribution of Mountain Sucker, Pacific populations, in the lower Fraser River.

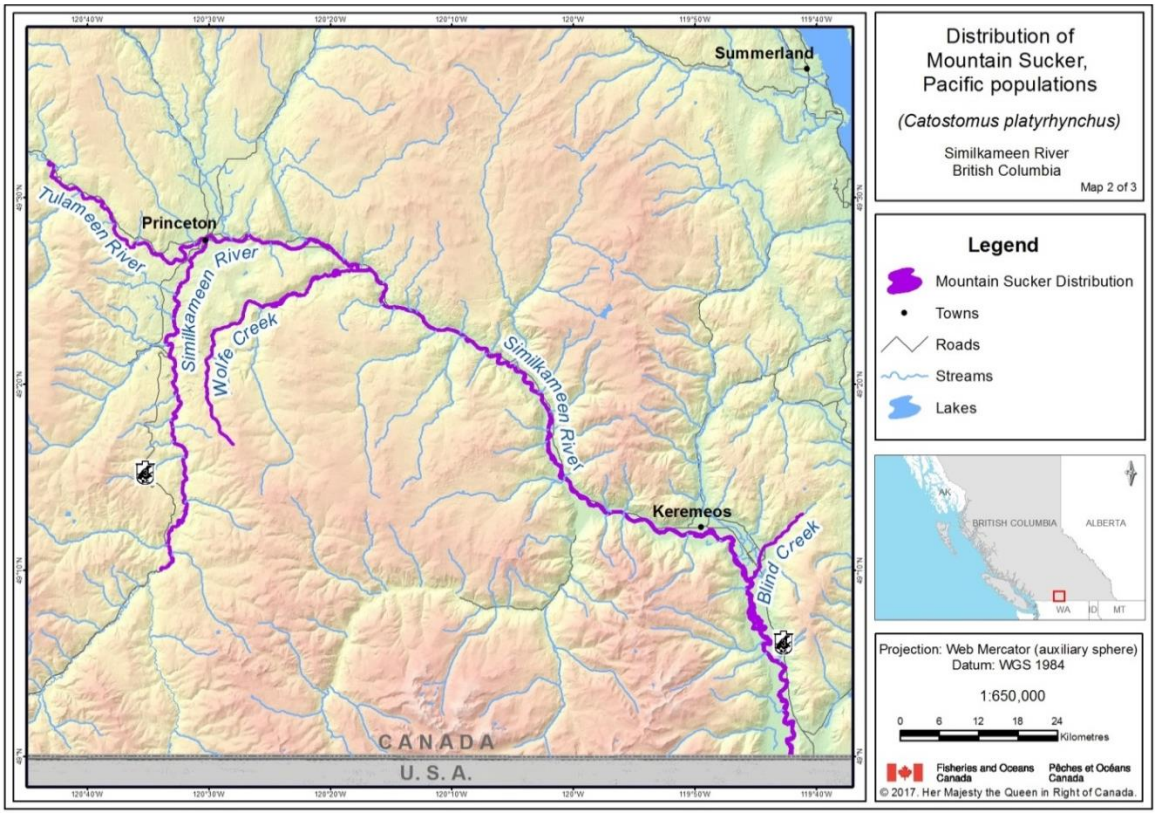

Figure 3: Distribution of the Mountain Sucker, Pacific populations, in the Similkameen River.

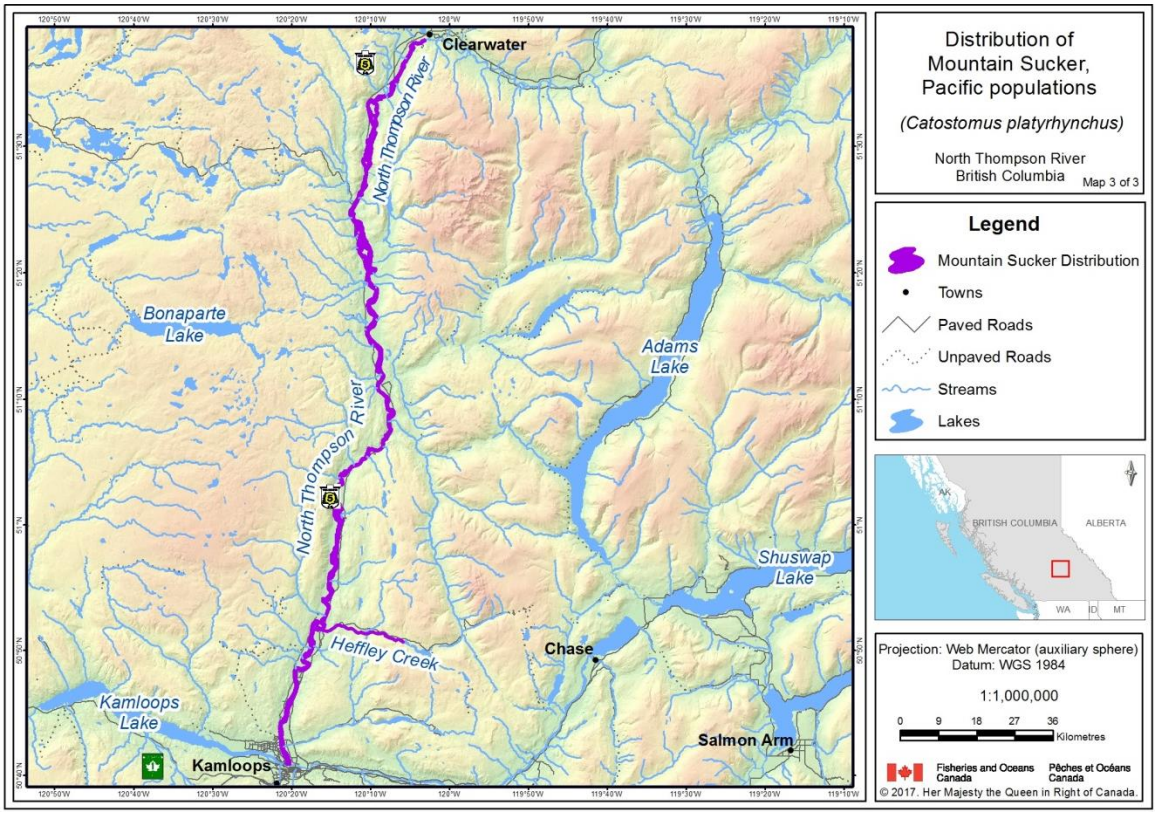

Figure 4: Distribution of the Mountain Sucker, Pacific populations, in the North Thompson River.

McPhail (2007) indicated that the Mountain Sucker, Pacific populations, was abundant in three local areas: the gravel deposition area in the lower Fraser River; the North Thompson River from Heffley Creek to Clearwater, British Columbia; and the Similkameen River from the U.S. border to Princeton, British Columbia (COSEWIC 2010). Rosenfeld (1996) failed to find Mountain Sucker in the Similkameen River, suggesting that there is either a decline or an extremely patchy distribution (McPhail 2007); however, a 2009 study in the Similkameen River found nine Mountain Sucker samples over a two day period (Taylor 2009, unpubl. data).

There has been no quantitative study looking at abundance of the Mountain Sucker, Pacific populations, and therefore there are no abundance estimates or trends available. The Mountain Sucker, Pacific populations, has persisted in the same locales where it was first collected over 40 years ago, and remains abundant in those sites (McPhail 2007; COSEWIC 2010).

3.3 Needs of the Mountain Sucker, Pacific populations

The Mountain Sucker, Pacific populations, is generally associated with cool waters, swift currents and rocky substrates (COSEWIC 2010). In British Columbia, Mountain Suckers are found in flowing water, in both small clear mountain streams and larger, turbid rivers. In the Fraser River, adults are found in channels amongst the gravel bars; most of the side-channels go dry in the summer (McPhail 2007). Juveniles are also associated with gravel bars in the Fraser River, and in small tributary streams off the North Thompson and Similkameen Rivers (McPhail 2007). Young of the year are found in embayments, side-channels and the mouths of tributary streams (McPhail 2007); within the lower Fraser River, young of the year were associated with shallow, low velocity sites with gravel substrate (Rempel et al. 2012).

There is little information available on the dispersal and migration patterns of the Mountain Sucker, Pacific populations, in Canada. In the summer, Mountain Suckers tend to be found in deeper glides and pools (McPhail 2007). Hauser (1969) studied Mountain Suckers in Montana and determined that in the late winter and spring, they moved from deep pools to streams adjacent to the pools with a moderate current.

Across their North American range, Mountain Suckers spawn in late spring to early summer, when water temperatures reach about 10^{o}C; it is believed that Mountain Suckers present in the lower Fraser River spawn in early June (Scott and Crossman 1973; McPhail 2007). Fish in the Fraser River are thought to spawn in the side-channels between Chilliwack and Laidlaw; not enough is known about Mountain Suckers in the North Thompson or Similkameen rivers to determine where they might spawn (McPhail 2007; COSEWIC 2010). In Montana, Mountain Suckers spawn in riffles adjacent to pools of swift, mountain streams (Scott and Crossman 1983). Mountain Sucker eggs are scattered over the substrate, no nests are built (COSEWIC 2010).

The Mountain Sucker feeds on plankton, small invertebrates and microscopic matter that it scrapes off rocks (COSEWIC 2010) and will also ingest food items such as green algae, diatoms and larval insects, directly off the substrate (McPhail 2007). Mountain Suckers in the lower Fraser River were found to be primarily herbivores; gut contents of 30 Mountain Suckers were examined and found to consist almost entirely of algae and plant materials (Rempel 2004).

4. Threats

4.1 Threat Assessment

An assessment of threats to the Mountain Sucker, Pacific populations, was undertaken (Table 1). Background information on the threats can be found in the COSEWIC (2010) status report. For more details on the threat assessment process, refer to the Guidance on Assessing Threats, Ecological Risk and Ecological Impacts for Species at Risk (DFO 2014).

Table 1. Threat Assessment Table

Threat	Level of Concern[2]	Extent[3]	Occurrence[4]	Frequency[5]	Severity[6]	Causal Certainty[7]
Water availability and use	High	Localized (Similkameen River)	Current	Seasonal	Unknown	Medium
Aquatic invasive species	Medium	Widespread	Current/ Anticipated	Continuous	Unknown	Medium
Physical destruction of habitat	Medium	Localized (Fraser River)	Current	Continuous	Unknown	Low
Impoundments and flow regulation	Low	Localized (Similkameen River)	Anticipated	Unknown	Unknown	Low
Sedimentation	Low	Widespread	Current	Recurrent	Unknown	Low
Release of harmful substances	Low	Widespread	Current/ Anticipated	Continuous	Unknown	Low

4.2 Description of Threats

Water availability and use

A significant threat to riffle-habitat specialists like the Mountain Sucker, Pacific populations, is water diversion during low flow months. Impacts may be particularly severe in areas where drought-like conditions are common such as the Similkameen River which has hot, dry summers with low-flow conditions in streams. Within this region there have been increases in water withdrawals for agricultural, urban, and industrial requirements, which may be exacerbated by climate change (COSEWIC 2010).

[2] Level of Concern: signifies that managing the threat is of (high, medium or low) concern for the conservation of the species, consistent with the management objective. This criterion considers the assessment of all the information in the table.
[3] Extent: proportion of the species affected by the threat.
[4] Occurrence: timing of occurrence of the threat and describes whether a threat is historical, current, and/or anticipated.
[5] Frequency: temporal extent of the threat (one-time, seasonal, recurrent, continuous or unknown).
[6] Severity: magnitude of impact caused by the threat and level to which it affects species conservation.
[7] Causal certainty: strength of evidence linking the threat to the conservation of the species.

In the summer, low-flow conditions may lead to the loss of necessary riffle habitat, as well as higher water temperatures, degraded water quality, reduced dissolved oxygen levels, and increased vulnerability to predators (COSEWIC 2010). In the winter, the risk of freezing and low dissolved oxygen levels increases in low-flow conditions (COSEWIC 2010). The effects of prolonged droughts have likely influenced the distribution of Mountain Sucker in the Black Hills, South Dakota; populations declined, and Mountain Sucker appeared to have been extirpated in 14 sample reaches and two streams (Schultz and Bertrand 2012).

Aquatic invasive species

Aquatic invasive species have been introduced throughout southern British Columbia, including in watersheds where the Mountain Sucker, Pacific populations, is present. Off-channel areas of the lower Fraser River contain numerous aquatic invasive species, including Brown Bullhead (*Ameiurus nebulosis*), Bullfrogs (*Rana catesbeiana*), Largemouth Bass (*Micropterus salmoides*), and Smallmouth Bass (*M. dolomieu*) (COSEWIC 2010). The Similkameen River system contains non-native Brown Trout (*Samo trutta*; McPhail and Carveth 1993). Increased predation and competition are likely to occur in the presence of non-native species (COSEWIC 2010). Brown Trout, which are known piscivores, were introduced into streams of the Black Hills, South Dakota, and had a negative influence on the occurrence of Mountain Suckers (Dauwalter and Rahel 2008).

Physical Destruction of Habitat

Large portions of the Fraser River watershed have been channelized for agricultural drainage and flood control purposes (COSEWIC 2010). Riffle and pool habitats, such as those used by Mountain Suckers, tend to be targeted for removal or alteration in drainage maintenance projects (COSEWIC 2010). Such work may also eliminate the shallow marginal pools preferred by young-of-the-year (COSEWIC 2010). More than 70 percent of wetland areas in the Fraser Valley have been drained or altered, and at least 15 percent of the streams have been paved over. However, the extent to which Mountain Suckers rely on wetland areas and streams in the Fraser Valley is unknown (Boyle et al. 1997; DFO 1998; COSEWIC 2010).

Gravel mining in the lower Fraser River could result in either direct mortality or reduced habitat availability for Mountain Sucker, Pacific populations, whose distribution includes gravel bars in the lower Fraser River (COSEWIC 2010).

Impoundments and flow regulation

The Columbia River basin has a long history of major hydroelectric development projects (COSEWIC 2010). Dam construction results in fragmentation of habitat and alteration of habitat connectivity, water temperature, flow, and water quality (COSEWIC 2010). Changes to flows and temperature can affect fish by altering breeding behaviour, spawning and survival of eggs, as well as increasing mortality due to entrainment and stranding (RL&L Environmental Services Ltd. 1995; McPhail 2001; Golder Associated Ltd. 2005).

At the time of the 2010 COSEWIC assessment, two hydro-electric facilities were proposed[8] by the Okanogan County Public Utility District for the Similkameen River, both immediately south of the international border (COSEWIC 2010). These proposals included: 1) the reinstatement of

[8] Since the COSEWIC (2010) report, FortisBC proposed a hydroelectric facility on the Similkameen River near Princeton, British Columbia; however, as of 2014 it was no longer under consideration.

Enloe Dam, which has since been approved; and 2) a proposal for the development of a dam approximately 2.5 km upstream of Enloe Dam (Shanker's Bend Hydroelectric Project), which has since been voluntarily surrendered (T. White, pers. comm. 2017). Reinstating power generation at Enloe Dam is expected to have minimal impacts on Mountain Sucker as it would be a run-of-the-river facility and would not alter the pre-existing conditions at the dam site (COSEWIC 2010).

Sedimentation

Sedimentation occurs in all three watersheds, and could affect spawning, reproduction and feeding (COSEWIC 2010). Excessive sedimentation leads to an increase in the fine and very fine solid matter particles in a water body and can be caused by anthropogenic activities, including forest harvesting, road building, dredging and placer mining (Birtwell 1999). Sedimentation can affect the flow resistance in the river channel, the stability of the bed, and the amount of available aquatic habitat types, as well as water clarity and turbidity (Mebane 2001; Birtwell 1999). The impact of increased sedimentation on the Mountain Sucker, Pacific populations, is unknown; however, impacts to other freshwater fish species include mortality, reduced growth rates, or reduced resistance to disease; other effects include the abnormal development of eggs and larvae, alteration of movements and migrations, and a reduction in the abundance of prey (Bergstedt and Bergerson 1997).

Release of harmful substances

The restricted distribution of the Mountain Sucker, Pacific populations, means that these fish are vulnerable to localized stochastic events. Major rail lines run adjacent to areas of local concentrations of Mountain Sucker (i.e., lower Fraser and North Thompson rivers), and any spills of harmful substances may result in significant fish kills (COSEWIC 2010). Further, within the lower Fraser River, harmful substances may enter the river through tributaries from a variety of sources (e.g., urban storm runoff, contaminated groundwater, direct industrial discharges, wastewater treatment plant effluents, aerial deposition, and accidental spills; COSEWIC 2010).

There is a long history of mining for gold, platinum and copper in the immediate vicinity of the mainstem Similkameen River, primarily near Hedley, British Columbia; some limited mining still continues in the Similkameen Valley (Rae 2005). Monitoring data from 1979-1997 found that several metals exceed guidelines for aquatic life; however, high concentrations of these metals were measured when turbidity, or suspended material, was also high (Rae 2005). The metals are most likely bound to the suspended materials, which mean they would not be biologically active (Rae 2005).

5. Management Objectives

Management objectives are ideally stated as quantitative targets (e.g., for population abundance or habitat quantity and quality). Insufficient information is available about current population abundance to develop scientifically defensible quantitative targets for the Mountain Sucker, Pacific populations. Therefore, the management objective for Mountain Sucker, Pacific populations, is to maintain self-sustaining populations throughout their current distribution to ensure the species' long-term viability in the wild.

6. Broad Strategies and Measures for the Conservation of the Species

6.1 Actions Already Completed or Currently Underway

In 2010, the Similkameen Valley Planning Society published a valley-wide sustainability strategy, which included a goal to develop a water management plan for the Similkameen Valley (Glorioso, Moss & Associates 2010). The management plan would determine actual water use, and incorporate in-stream flow needs for fish, including the Mountain Sucker, Pacific populations (Summit Environmental Consultants 2011). To date, a scoping study for the watershed management plan has been completed (Summit Environmental Consultants 2011).

6.2 Broad Strategies

The following broad strategies support the management objective outlined in Section 5. Broad strategies and measures for the conservation of the species are summarized and prioritized in Tables 2-4:

1. Inventory and Monitoring
2. Research
3. Management and Coordination
4. Stewardship and Outreach

6.3 Measures for the Conservation of the Species

Success in the conservation of this species is dependent on the actions of many different jurisdictions; it requires the commitment and cooperation of the constituencies that will be involved in implementing the directions and measures set out in this Management Plan.

The measures set out in this Management Plan provide the best chance of achieving the management objective for the Mountain Sucker, Pacific populations, to guide not only activities to be undertaken by Fisheries and Oceans Canada, but those for which other jurisdictions, organizations and individuals may have a role to play. As new information becomes available, these measures and the priority of these measures may change. Fisheries and Oceans Canada strongly encourages all Canadians to participate in the conservation of the Mountain Sucker, Pacific populations, by undertaking the measures for the conservation of the species outlined in this Management Plan.

Table 2 identifies the measures for the conservation of the species to be undertaken by Fisheries and Oceans Canada to manage the conservation of the Mountain Sucker, Pacific populations.

Table 3 identifies the measures for the conservation of the species to be undertaken collaboratively between Fisheries and Oceans Canada and its partners, other agencies, organizations or individuals. Implementation of these measures will be dependent on a collaborative approach, in which Fisheries and Oceans Canada is a partner in conservation efforts, but cannot implement the measures for the conservation of the species alone. As all Canadians are invited to join in supporting and implementing this Management Plan, Table 4 identifies the remaining measures for the conservation of the species that represent

responsibilities and/or opportunities for other jurisdictions, organizations or individuals to lead for the conservation of the species. If your organization is interested in participating in one of these measures, please contact the Species at Risk Pacific office at sara@pac.dfo-mpo.gc.ca.

Federal funding programs for species at risk that may provide opportunities to obtain funding to carry out some of the outlined activities include the Habitat Stewardship Program for Species at Risk, the Aboriginal Fund for Species at Risk Program, and the Interdepartmental Recovery Fund.

The measures for the conservation of the species included in this Management Plan that are to be implemented by Fisheries and Oceans Canada will be subject to the availability of funding and other required resources. As indicated in the tables below, partnerships with specific organizations will provide expertise and capacity to carry out some of the listed measures. However, the identification of partners is intended to be advice to other jurisdictions and organizations and carrying out these actions will be subject to each group's priorities and budgetary constraints.

Table 2. Measures for the conservation of the species to be undertaken by Fisheries and Oceans Canada

#	Measures for the Conservation of the Species	Priority[9]	Threats addressed	Timeline[10]
Broad Strategy 1: Inventory and Monitoring				
1	Develop a sufficiently robust monitoring plan to provide a clear indication of the progress towards the management objective. Monitoring efforts may include: • Long-term abundance monitoring at index sites throughout the species' range; • Quantitative population estimates, including variability, at index sites.	Medium	All	Short-term

[9] Priority" reflects the degree to which the measure contributes directly to the conservation of the species or is an essential precursor to a measure that contributes to the conservation of the species:

- "High" priority measures are considered likely to have an immediate and/or direct influence on the conservation of the species.
- "Medium" priority measures are important but considered to have an indirect or less immediate influence on the conservation of the species.
- "Low" priority measures are considered important contributions to the knowledge base about the species and mitigation of threats.

[10] Short-term = 2018-2022, medium-term = 2023-2027, long-term = beyond 2027.

Table 3. Measures for the conservation of the species to be undertaken collaboratively between Fisheries and Oceans Canada and its partners

#	Measures for the Conservation of the Species	Priority[11]	Threats addressed	Timeline[12]	Partners
Broad Strategy 1: Inventory and monitoring					
2	Implement the long-term population monitoring plan for the Mountain Sucker, Pacific populations.	Medium	All	Medium-term	Academia, provincial government
Broad Strategy 2: Research					
3	Address information gaps on species needs, including: • Study life history (e.g., age at spawning, fecundity, timing of spawning) and life history requirements (e.g., spawning behavior and susceptibility of early life stages to water level, flow, temperature and sedimentation changes); • Conduct a quantitative habitat survey, including the identification of spawning habitats in the North Thompson and Similkameen Rivers.	Medium	All	Medium-term	Academia, provincial government
4	Increase the understanding of threats to the Mountain Sucker, Pacific populations (e.g., mean annual discharge required at various times of the year to support different life stages, predation by and competition with aquatic invasive species).	Medium	All	Medium-term	Academia, provincial government

[11] Refer to Footnote 9.
[12] Refer to Footnote 10.

Table 4. Measures for the conservation of the species that represent responsibilities and/or opportunities for other jurisdictions, organizations or individuals to lead

#	Measures for the Conservation of the Species	Priority[13]	Threats addressed	Potential Jurisdiction of Organization
Broad Strategy 3: Management and Coordination				
5	Share information about Mountain Sucker, Pacific populations, and encourage land owners, industry and relevant levels of government to consider the species and its threats in development, implementation and updating of land use plans and water licenses, official community plans, by-laws and management guidelines.	Low	All	Stewardship groups, industry, local and provincial governments
Broad Strategy 4: Stewardship and Outreach				
6	Incorporate the Mountain Sucker, Pacific populations, information into existing stewardship programs.	Low	All	Stewardship groups, industry, local and provincial governments
7	Develop and distribute educational outreach materials for the general public, industry and landowners to foster awareness of the Mountain Sucker, Pacific populations. Outreach materials could include school programs, brochures, web-based materials, and signage to place at targeted locations.	Low	All	Stewardship groups, industry, local and provincial governments

[13] Refer to Footnote 9.

7. Measuring Progress

The performance indicators presented below provide a way to define and measure progress toward achieving the management objective:

1. Observe a stable or positive population abundance.
2. Observe a preservation or expansion of distribution, taking into account natural variation.

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Appendix A: Effects on the Environment and Other Species

In accordance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals (2010), SARA recovery planning documents incorporate strategic environmental assessment (SEA) considerations throughout the document. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or achievement of any of the Federal Sustainable Development Strategy's goals and targets.

Management planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that plans may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the plan itself, but are also summarized below.

This Management Plan will benefit the environment by promoting the conservation of the Mountain Sucker, Pacific populations, thereby contributing to FSDS Goal 4 (Conserving and Restoring Ecosystems, Wildlife and Habitat, and Protecting Canadians). Specifically, it will help to attain the associated Target 4.1 which is to have populations of federally listed species at risk exhibit trends that are consistent with recovery strategies and management plans. In addition, it could help to meet the target associated with 4.6, whereby pathways of invasive alien species introductions are identified, and risk-based intervention or Management Plans are in place for priority pathways and species.

The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. For information on how the Management Plan and Mountain Sucker potentially link to, or interact with, other species and the ecosystem, refer to the following sections of the document: Species Description, Needs of the Mountain Sucker, and Measures for the Conservation of the Species.

More specifically, within the distribution of the Mountain Sucker, it is unlikely that the broad strategies recommended within this document will negatively impact other fish or wildlife species. The broad strategies for conservation suggested in Tables 2-4 will help to address threats to the Mountain Sucker, Pacific populations, and its habitat, such as improving water quality by limiting sediment inputs, which will also benefit other native species at risk including Umatilla Dace (*Rhinichthys umatilla*), Salish Sucker (*Catostomus* sp. cf. *catostomus*), White Sturgeon (*Acipenser transmontanus*), Green Sturgeon (*Acipenser medirostris*), and Columbia Sculpin (*Cottus hubbsi*). Furthermore, conservation efforts may benefit species downstream of the distribution of Mountain Sucker as improvements in water quality could be conveyed to these areas.

Appendix B: Record of Cooperation and Consultation

The Minister of Fisheries and Oceans (DFO) is the competent minister for the Mountain Sucker, Pacific populations, in Canadian waters and prepared the Management Plan, as per section 65 of SARA. To the extent possible, it has been prepared in cooperation with environmental non-governmental organizations, species experts, and the Province of British Columbia as per section 66(1) of SARA. Processes for coordination and consultation between the federal and British Columbia governments on management and protection of species at risk are outlined in the *Canada-British Columbia Agreement on Species at Risk*.

In October 2017, the draft Management Plan was circulated to Indigenous organizations, local, regional and provincial governments, academia, environmental non-government organizations, and industry for a 30-day external review. One comment was received and resulted in minor revisions.