Species at Risk Act
Action Plan Series

Action Plan for the Carmine Shiner (*Notropis percobromus*) in Canada

Carmine Shiner

2018

Canada

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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 action plans for species listed as Extirpated, Endangered, and Threatened for which recovery has been deemed feasible. They are also required to report on progress five years after the publication of the final document on the SAR Public Registry.

Under SARA, one or more action plan(s) provides the detailed recovery planning that supports the strategic direction set out in the recovery strategy for the species. The plan outlines what needs to be done to achieve the population and distribution objectives (previously referred to as recovery goals and objectives) identified in the recovery strategy, including the measures to be taken to address the threats and monitor the recovery of the species, as well as the proposed measures to protect critical habitat that has been identified for the species. The action plan also includes an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation. The action plan is considered one in a series of documents that are linked and should be taken into consideration together, those being the COSEWIC status report, the recovery strategy, and one or more action plans.

Fisheries and Oceans Canada is the competent minister under SARA for the Carmine Shiner and has prepared this Action Plan to implement the recovery strategy, as per section 47 of SARA. It has been prepared in cooperation with the Carmine Shiner Recovery Team.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this Action 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 Action Plan for the benefit of the Carmine Shiner and Canadian society as a whole.

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

Acknowledgments

Fisheries and Oceans Canada would like to thank the following organizations, who are members of the Carmine Shiner Recovery Team, for their support in the development of this Action Plan: Manitoba Sustainable Development, Manitoba Hydro, the Canadian Peat Moss Association, and the University of Manitoba.

Executive Summary

In 2003, the Carmine Shiner was legally listed as Threatened under the *Species at Risk Act* (SARA). In 2006, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) re-examined and confirmed the status of the Carmine Shiner as Threatened based on an updated status report (COSEWIC 2006). Subsequent to listing the Carmine Shiner as Threatened is the requirement for the development of a recovery strategy. The Carmine Shiner Recovery Team developed the first Recovery Strategy, which was posted on the Species at Risk Public Registry in 2008 (Carmine Shiner Recovery Team 2007). In 2013, the Recovery Strategy was revised (including the identification of critical habitat) and re-posted to the Public Registry (Fisheries and Oceans Canada 2013). This Action Plan addresses the ongoing and future activities towards meeting the objectives listed in the Recovery Strategy for the Carmine Shiner since its publication in 2008 and the revised Recovery Strategy.

The goal of the 2008 Recovery Strategy (Carmine Shiner Recovery Team 2007), "to maintain self-sustaining populations of the Carmine Shiner by reducing or eliminating potential threats to the species and its habitat" remains the same in the 2013 recovery strategy (Fisheries and Oceans Canada 2013). The key objectives listed in the 2013 Recovery Strategy are: 1) to maintain Carmine Shiner populations at their current abundance and within their present distribution within the Whitemouth, Birch and Winnipeg River systems; 2) to identify and protect critical habitat of the Carmine Shiner; and 3) to identify potential threats to the Carmine Shiner from human activities and ecological processes and develop plans to avoid, eliminate, or mitigate these threats.

This Action Plan includes an implementation schedule with recovery measures that include: research and monitoring; management and regulatory actions; and education and outreach.

An evaluation of the socio-economic costs and benefits of the Action Plan are included; costs are anticipated to be low with the majority of funds for implementation being provided by two levels of government. Measures identified in Tables 1 and 2 will contribute to the scientific understanding of the species and its habitat, and will enable better targeting of future efforts.

Methods for measuring and reporting on the implementation of the Action Plan, and the ecological and socioeconomic impacts of the Action Plan, are also included.

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1. Recovery Actions

1.1 Context and Scope of the Action Plan

In Canada, Carmine Shiner (*Notropis percobromus*) has been reported to exist only in southern Manitoba and is geographically separated from Carmine Shiner populations in northwestern Minnesota. The Carmine Shiner was legally listed as Threatened under the *Species at Risk Act* (SARA) in 2003. In 2006, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) re-examined and confirmed the status of the Carmine Shiner as Threatened based on an updated status report (COSEWIC 2006).

Carmine Shiners are slender, elongate minnows. They are omnivorous lower to mid-level consumers and spawn in early summer. In summer, fish are found mostly at midwater depths of clear, brown colored, fast flowing creeks and small rivers with clean gravel or rubble substrates, usually in or near riffles. Recent studies have increased knowledge of the species biology, habitat preference, life history, and distribution (Stol et al. 2013; Stol 2013; Watkinson and Sawatzky 2013).

There is no evidence that Carmine Shiner populations have declined over time, but because of its limited distribution and abundance, the species may be sensitive to future anthropogenic disturbances. Threats to the species may include: overexploitation, species introductions, habitat loss/degradation, and pollution. Habitat loss and/or degradation associated with flow regulation, shoreline development, landscape changes, and climate change may occur in some reaches of the rivers inhabited by Carmine Shiner, and may pose a threat to the species at some locations. The potential for mitigation varies with the type of threat and the affected waterbody.

Consequently, the Recovery Strategy focuses on the conservation of existing populations and their habitats. Its goal is “to maintain self-sustaining populations of the Carmine Shiner by reducing or eliminating potential threats to the species and its habitat.” The three main objectives are to: 1) maintain Carmine Shiner populations at their current abundance and within their present distribution within the Whitemouth, Birch and Winnipeg River systems; 2) identify and protect critical habitat of the Carmine Shiner; and 3) identify potential threats to the Carmine Shiner from human activities and ecological processes and develop plans to avoid, eliminate, or mitigate these threats. Three broad strategies are proposed for helping to achieve the recovery goal and objectives: 1) research and monitoring; 2) management and regulatory actions; and 3) education and outreach. Within each of these, a number of individual approaches are outlined.

This Action Plan should be considered along with the Recovery Strategy for the Carmine Shiner (Fisheries and Oceans Canada 2013). The Recovery Strategy provides more details on the strategic approaches for recovery of the Carmine Shiner, critical habitat information, and background information on the species and its threats.

1.2 Measures to be Taken and Implementation Schedule

Success in the recovery of this species is not solely dependent on the actions of any single jurisdiction; rather it requires the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this Action Plan.

This Action Plan provides a description of the measures that provide the best chance of achieving the population and distribution objectives for Carmine Shiner, including measures to be taken to address threats to the species and monitor its recovery, to guide not only activities to be undertaken by Fisheries and Oceans Canada, but those for which other jurisdictions, organizations and individuals 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 Carmine Shiner through undertaking measures outlined in this Action Plan.

Fisheries and Oceans Canada recognizes the important role of the Carmine Shiner Recovery Team and its member organizations and agencies in the implementation of recovery measures for this species.

Table 1 identifies the recovery measures to be undertaken by Fisheries and Oceans Canada, in cooperation and consultation with other agencies, organizations and individuals as appropriate, to support the recovery of Carmine Shiner.

Table 2 identifies the recovery measures to be undertaken by other partners in collaboration with Fisheries and Oceans Canada to support the recovery of Carmine Shiner. Recovery of Carmine Shiner will be dependent on this overall collaborative approach, in which Fisheries and Oceans Canada is a partner in recovery efforts.

As all Canadians are invited to join in supporting and implementing this Action Plan for the benefit of the Carmine Shiner and Canadian society as a whole, Table 3 identifies habitat protection and restoration as a measure that other jurisdictions, groups and individuals interested in the recovery of Carmine Shiner can participate in. If your organization is interested in participating in one of these measures, please contact the Species at Risk – Central and Arctic office at fwisar@dfo-mpo.gc.ca[1].

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

[1] fwisar@dfo-mpo.gc.ca

Table 1. Measures to be undertaken by Fisheries and Oceans Canada

#	Recovery measures	Priority[2]	Threats or objectives addressed	Timeline
Broad strategy: Research and monitoring				
	Approach: R1. Clarify life history (and habitat) requirements			
1	Collect samples of Carmine Shiner and describe life history characteristics such as; longevity, fecundity, size at age, age at maturity, diet, etc., and describe associated habitat for each life history stage (juvenile, adult, etc.).	High	Habitat alteration/degradation; flow alteration; climate change	2018
	Approach: R2. Clarify species distribution			
2	Survey areas adjacent to the known distribution in the Birch River to determine species presence and identify critical habitat.	High	Habitat alteration/degradation; flow alteration; climate change	2018 and ongoing
	Approach: R3. Identify limiting factors			
3	Perform laboratory experiments to determine the thermal preference of Carmine Shiner and relate it to oxygen concentration in the water.	High	Habitat alteration/degradation; flow alteration; climate change	2018
4	Develop a general computer model to predict habitat requirements for Carmine Shiner under conditions of climate change.	High	Climate change	2018
5	Perform laboratory experiments to analyze the standard and activity metabolic rate of the Carmine Shiner over a range of water temperatures and dissolved oxygen concentrations. Acquired information will be applied in a bioenergetics habitat model to predict how Carmine Shiner populations will react to natural and anthropogenic flow and climate changes, and help identify potential habitat.	High	Habitat alteration/degradation; flow alteration; climate change Identify critical habitat	ongoing through 2019

[2] "Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the recovery objective for the species. Medium priority measures may have a less immediate or less direct influence on reaching the recovery population and distribution objectives, but are still important for recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the recovery objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

#	Recovery measures	Priority[2]	Threats or objectives addressed	Timeline
	Approach: R4. Monitor population trends			
6	Collect samples of Carmine Shiner and describe population biological characteristics such as age and length distribution, relative abundance, etc.	High	Habitat alteration/degradation; flow alteration; climate change	2018 and ongoing
	Approach: R5. Inventory habitat			
7	Survey areas inhabited by Carmine Shiner and describe habitat characteristics such as water temperature, water oxygen concentration, velocity, depth, conductivity, substrate, etc.	High	Habitat alteration/degradation; flow alteration; climate change	2018

Table 2. Measures to be undertaken collaboratively between Fisheries and Oceans Canada and its partners

#	Recovery measures	Priority[3]	Threats or objectives addressed	Timeline	Potential partners
Broad strategy: Research and monitoring					
	Approach: R2. Clarify species' distribution				
1	Survey the Petersen Creek area and Upper Pinawa Channel to determine if Carmine Shiner is present. Work done under the umbrella of the Canada – Manitoba Fisheries Advisory Committee agreement to engage in cooperative science.	High	Distribution and abundance	2018 and ongoing	Manitoba Sustainable Development
2	Develop laboratory techniques for environmental DNA analyses for Carmine Shiner and test for presence of Carmine Shiner in areas adjacent to the known species distribution.	High	Distribution and critical habitat identification	Ongoing through 2018	University of Manitoba
	Approach: R5. Inventory habitat				
3	Development of a predictive model of Carmine Shiner occurrence based on the integration of macro-level landscape analysis with species-specific biological information. Work done under the umbrella of the Canada – Manitoba Fisheries Advisory Committee agreement to engage in cooperative science.	High	Distribution and abundance Identify critical habitat	2018	Manitoba Sustainable Development University of Saskatchewan
Broad strategy: Management and regulatory actions					
	Approach: M1. Data conservation				

[3] "Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the recovery objective for the species. Medium priority measures may have a less immediate or less direct influence on reaching the recovery population and distribution objectives, but are still important for recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the recovery objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

#	Recovery measures	Priority[3]	Threats or objectives addressed	Timeline	Potential partners
4	Preserve and archive samples and scientific data on Carmine Shiner.	High	Public education and population monitoring	Ongoing	University of Manitoba
	Approach: M3. Protect habitats				
5	Conduct instream flow and environmental assessment programs. This includes the review of large water withdrawal requests in particular, but also other regulated development projects (i.e., shoreline development).	Medium	Flow alteration, habitat loss/ degradation	Ongoing	Manitoba Sustainable Development

Table 3. Measures that represent opportunities for other jurisdictions, organizations or individuals to lead

#	Recovery measures	Priority[4]	Threats or objectives addressed	Potential participants
Broad strategy: Management and regulatory action				
	Approach: M3. Protect habitats			
1	Develop conservation easement agreements.	High	Habitat loss/ degradation	Manitoba Habitat Heritage Corporation
2	Integrate protection of riparian habitat within provincial forest management plan.	High	Habitat loss/ degradation	Manitoba Sustainable Development
	Approach: M4. Monitor bait harvests			
3	Periodic monitoring of bait harvests. Implement policy of no new bait blocks sanctioned in areas where Carmine Shiner is known to exist or might reasonably be expected to exist.	Medium	Bait fisheries	Manitoba Sustainable Development
	Approach: M7. Rationalize stocking programs			
4	Revision of current provincial Fisheries Branch stocking strategy. Will include a section regarding consideration for SARA species during stocking program.	High	Species introductions	Manitoba Sustainable Development

[6]"Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the recovery objective for the species. Medium priority measures may have a less immediate or less direct influence on reaching the recovery population and distribution objectives, but are still important for recovery of the population. Low priority recovery measures will likely have an indirect or gradual influence on reaching the recovery objectives, but are considered important contributions to the knowledge base and/or public involvement and acceptance of species.

#	Recovery measures	Priority[4]	Threats or objectives addressed	Potential participants
Broad strategy: Education and outreach				
	Approach: E4. Discourage species introductions			
5	Manitoba has tabled new Aquatic Invasive Species legislation. This legislation is designed to limit movement of foreign biota as well as the conveyors of these biota (e.g., water, mud etc.). Within its annual workplan, the Aquatic Invasive Species (AIS) portfolio will continue to undertake: 1) public education about AIS; and 2) its monitoring and boat inspection activities. Specific emphasis will focus on reducing the potential for AIS to travel into Manitoba via the watercraft traffic that is moved along the TransCanada highway, and on limiting the spread of rusty crayfish, which are known to inhabit the Birch River.	High	Aquatic invasive species	Manitoba Sustainable Development

2. Critical Habitat

2.1 Identification of the Species' Critical Habitat

2.1.1 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 a recovery strategy or in an action plan for the species*." [s. 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*." [s. 2(1)]

Critical habitat for the Carmine Shiner has been identified, to the extent possible, within section 7.2 of the Recovery Strategy (Fisheries and Oceans Canada 2013) using the best available information and the "bounding box" approach.

Sections 7.2.1 and 7.2.2 of the Recovery Strategy (Fisheries and Oceans Canada 2013) contain specific details about the identified critical habitat; including geographic extent and biophysical functions, features and attributes. To date, few studies have examined the biology, life history, or habitat requirements of the Carmine Shiner. As such, little is known of the location of spawning, nursery, rearing, feeding, or food supply areas or the timing or extent of migrations, should they occur.

2.2 Activities Likely to Result in Destruction of Critical Habitat

Examples of anthropogenic activities likely to result in the destruction of Carmine Shiner critical habitat can be found in section 7.4 of the Recovery Strategy (Fisheries and Oceans Canada 2013).

2.3 Proposed Measures to Protect Critical Habitat

Under SARA, critical habitat must be legally protected from destruction within 180 days of being identified in a recovery strategy or action plan. For the Carmine Shiner critical habitat, it is anticipated that this will be accomplished through a SARA Critical Habitat Order made under subsections 58(4) and (5), which will invoke the prohibition in subsection 58(1) against the destruction of the identified critical habitat.

3. Evaluation of Socio-Economic Costs and Benefits

The SARA requires that an action plan include an evaluation of the socio-economic costs and benefits to be derived from its implementation (SARA 49(1)(e), 2003). This evaluation addresses only the incremental socio-economic costs of implementing this

Action Plan from a national perspective as well as the social and environmental benefits that would occur if the Action Plan were implemented in its entirety, recognizing that not all aspects of its implementation are under the jurisdiction of the federal government. It does not address cumulative costs of species recovery in general, nor does it attempt a cost-benefit analysis. Its intent is to inform the public and to guide decision making on implementation of the Action Plan by partners.

The protection and recovery of species at risk can result in both benefits and costs. The SARA recognizes that "*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons*". Self-sustaining and healthy ecosystems with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians. A review of the literature confirms that Canadians value the preservation and conservation of species and actions taken to preserve a species, such as habitat protection and restoration. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White 1996; Fisheries and Oceans Canada 2008). Furthermore, the conservation of species at risk is an important component of the Government of Canada's commitment to conserving biological diversity under the *International Convention on Biological Diversity*. The Government of Canada has also made a commitment to protect and recover species at risk through the *Accord for the Protection of Species at Risk.* The evaluation describes, to the extent possible, the benefits that may accrue, as well as the costs that governments, industry and/or Canadians may incur due to activities identified in this Action Plan.

This evaluation does not address the socio-economic impacts of protecting critical habitat for the species represented in this Action Plan. Under SARA, Fisheries and Oceans Canada must ensure that critical habitat identified in a recovery strategy or action plan is legally protected within 180 days of the final posting of the recovery strategy or action plan. Where a SARA ministerial order will be used for critical habitat protection, the development of the order will follow a regulatory process in compliance with the *Cabinet Directive on Regulatory Management* (2012), including an analysis of any potential incremental impacts of the order that will be included in the Regulatory Impact Analysis Statement. As a consequence, no additional analysis of the critical habitat protection has been undertaken for the assessment of costs and benefits of the Action Plan.

Policy Baseline

The policy baseline consists of the protection under the *Species at Risk Act* for the Carmine Shiner, along with other legislation that may provide direct or indirect habitat protection, such as the federal *Fisheries Act* and the *Canadian Environmental Assessment Act 2012*. Provincially, a headwater section of the Whitemouth River was designated as an Ecological Reserve and may provide some incidental protection.

The baseline also includes any recovery measures already undertaken. These recovery actions included the three conservation easements funded by the Government of

Canada's Habitat Stewardship Program (HSP) for Species at Risk, partnering with Manitoba Habitat Heritage Corporation. HSP funds for these easements in 2010/11, 2011/12 and 2012/13 ranged between $20K and $40K. Total expenditures for these easements would be approximately double the HSP funds.

Socio-Economic Profile and Baseline

The habitat of the Carmine Shiner occurs mainly in the rural municipalities of Whitemouth and Reynolds (both in Manitoba). Much of the land in this area consists of treed vegetation and wetlands. The area has a low population level and the land use in these municipalities consists mainly of limited amounts of agriculture and forestry. Agricultural activities occur mainly on the better drained land along the Whitemouth and Birch rivers. Logging activity has been minimal in recent years. Some resource extraction (peatmoss) occurs and there are some cottage developments in the area.

Socio-Economic Costs of Implementing this Action Plan

The activities identified in Tables 1 and 2 are short-term research projects to be undertaken by government and academia. The activities identified in Table 3, measures that could be undertaken voluntarily, focus on the management and regulatory actions, along with education and outreach.

The costs associated with all the actions in this Action Plan are estimated to be low[5]. Costs to implement these actions would be incurred by the federal government, the provincial government, the University of Saskatchewan, the University of Manitoba, and the Manitoba Habitat Heritage Corporation.

Benefits of Implementing this Action Plan

The primary benefit of this Action Plan is improved scientific knowledge of the species. The short-term research activities identified in this Action Plan will improve scientific understanding of the Carmine Shiner, including its distribution, habitat needs, and threats to the species. This will enable better targeting of efforts to protect and restore key habitats in the future.

An additional benefit of this Action Plan is improved habitat for Carmine Shiner and other species. Implementing the activities identified in Table 3 could protect habitat, provide additional information on the species, and improve awareness of the species. Habitat protection for the Carmine Shiner could also benefit other species in the ecosystem.

Distributional Impacts

The federal government, the provincial government, the University of Saskatchewan, the University of Manitoba, and the Manitoba Habitat Heritage Corporation will incur the costs of implementing the Action Plan.

[5] Low costs are defined as less than $1 million annually.

The Canadian public will benefit from the implementation of the Action Plan through increased scientific knowledge of the Carmine Shiner and its habitat, and any resulting ecosystem improvements.

4. Measuring Progress

The performance indicators presented in the associated recovery strategy provide a way to define and measure progress toward achieving the population and distribution objectives.

Reporting on *implementation* of the Action Plan (under s. 55 of SARA) will be done by assessing progress towards implementing the broad strategies.

Reporting on the ecological and socio-economic impacts of the Action Plan (under s. 55 of SARA) will be done by assessing the results of monitoring the recovery of the species and its long term viability, and by assessing the implementation of the Action Plan.

5. References

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Appendix A: Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals. 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.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of action plans may 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 Action Plan itself, but are also summarized below in this statement.

The Action Plan will clearly benefit the environment by promoting the recovery of the Carmine Shiner. In particular, it will encourage the protection and improvement of instream and riparian habitat for not only Carmine Shiner but other taxa (including birds, reptiles, fishes and plants) and thus the implementation recovery actions for the Carmine Shiner will contribute to the preservation of biodiversity in general. The potential for these recovery actions to inadvertently lead to adverse effects on other species was considered. The SEA concluded that the implementation of this document will clearly benefit the environment and will not entail any significant environmental effects.