

Report on the Progress of Recovery Strategy
Implementation for the Carmine Shiner
(*Notropis percobromus*) in Canada for the
Period 2008-2013

Carmine Shiner



2015

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Preface

Section 46 of the *Species at Risk Act (SARA)* requires the competent Minister to report on the implementation of the recovery strategy for a species at risk, and on the progress towards meeting its objectives within five years of the date when the recovery strategy was placed on the Species at Risk Public Registry.

Reporting on the progress of recovery strategy implementation requires reporting on the collective efforts of the competent Minister, provincial organizations and all other parties involved in conducting activities that contribute towards the species' recovery.

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Executive Summary

In 2003, the Manitoba population of Carmine Shiner was legally listed as a “Threatened” species under the *Species at Risk Act (SARA)*. In 2006, COSEWIC re-examined and confirmed the status of the Carmine Shiner as “Threatened” based on an updated status report (COSEWIC 2006). Once a species is listed under the *SARA* as “Threatened”, a recovery strategy must be developed. The Carmine Shiner Recovery Team developed the first recovery strategy (Fisheries and Oceans Canada 2008) which was posted on the Species at Risk Public Registry in 2008. The recovery strategy was revised and re-posted to the Species at Risk Public Registry in 2013 (Fisheries and Oceans Canada 2013). This report addresses the progress towards meeting the objectives listed in the Recovery Strategy for the Carmine Shiner in Canada, since its publication in 2008.

Significant accomplishments in meeting the recovery objectives as stated in the recovery strategy are:

- In 2011, Fisheries and Oceans Canada (DFO) Science division completed extensive sampling and survey work to help identify critical habitat, as identified on the Recovery Strategy Schedule of Studies.
- In 2011, DFO held an advisory meeting to assess the recovery potential of the Carmine Shiner (DFO 2013). Experts from Fisheries and Oceans Canada, the provincial government, and academia were invited to participate in the meeting.
- In 2013, the Carmine Shiner Recovery Team revised the recovery strategy to include the identification and protection of critical habitat for the Carmine Shiner.
- DFO has been involved in outreach activities to provide information on Species at Risk at the local, regional and national level. Presentations have included information on the status of the Carmine Shiner and its critical habitat. DFO has also developed and provided Species at Risk education packages to teachers.

The goal of the 2008 recovery strategy, “To maintain self-sustaining populations of the Carmine Shiner by reducing or eliminating potential threats to the species and its habitat” remained the same in the 2013 recovery strategy. The key objectives listed in the 2013 recovery strategy are:

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.

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1. Background

1.1. COSEWIC Assessment Summary

ASSESSMENT SUMMARY – April 2006

Common name

Carmine Shiner

Scientific name

Notropis percobromus

Status

Threatened

Reason for designation

This freshwater fish species occurs in an extremely restricted area of Manitoba. The major threat to the species is the alteration in water flow as a result of stream regulation.

Occurrence

Manitoba

Status history

Designated Special Concern in April 1994. Status re-examined and designated Threatened in November 2001 and in April 2006. Last assessment based on an updated status report.

1.2. Threats

1.2.1. Threats to the Species at Risk

An assessment of the threats to the Carmine Shiner in the Whitemouth River system, the Bird River and the Pinawa Channel, Manitoba is described in Table 1. A brief description of the methods and assessment of threats are provided in the Appendix.

1.2.2. Threats to Critical Habitat

Critical habitat was not identified in the 2008 *Recovery Strategy for the Carmine Shiner (Notropis percobromus) in Canada*, due to limited knowledge of the biology, life history or habitat requirements of the Carmine Shiner. Critical habitat has since been identified to the extent possible in an updated recovery strategy that was posted on the Species at Risk Public Registry in 2013.

Table 1. Carmine Shiner threats assessment summary by location.

THREAT: Mechanism/ Source		WATERBODY					
		Whitemouth River***		Bird River		Pinawa Channel	
		Threat significance*	Mitigation potential**	Threat significance	Mitigation potential	Threat significance	Mitigation potential
OVER-EXPLOITATION:	Bait fisheries	L	H	L	H	L	H
SPECIES INTRODUCTIONS:	Predation, competition, food web disruption	M	L	?	L	?	L
HABITAT LOSS / DEGRADATION:	Flow alteration	?	H	?	L	?	M
	Shoreline/ riparian development	M	M	?	M	?	M
	Landscape changes	?	M	?	M	?	M
	Climate change	?	L	?	L	?	L
POLLUTION:	Point sources	?	M	?	H	?	H
	Non-point sources	?	M	?	M	?	L
OTHER:	Scientific sampling	L	H	L	H	L	H
	Hybridization	L	L	L	L	L	L

*Threat significance: High (H), Moderate (M), Low (L)

**Mitigation potential: High (H), Moderate (M), Low (L)

*** Includes the Winnipeg River main stem in the vicinity of the Whitemouth River outfall.

? Denotes uncertainty, and the need for research.

The following are the activities likely to destroy critical habitat as summarized from the Recovery Strategy (Fisheries and Oceans Canada 2013):

- Shoreline development: Extensive development on the shoreline and riparian areas from cottages, year-round homes and agriculture;
- Pollution: Over-application of fertilizer and improper nutrient management;
- Landscape activities: Altered flow regimes and work in and around water resulting in siltation and turbidity; and
- Landscape changes: Dredging, grading, excavation, placement of material or structures in the water, shoreline hardening, and construction of physical barriers (dams, roadways, culverts).

2. Recovery

2.1. Recovery Goals and Objectives

Recovery goal

There is no evidence to date that populations of the Carmine Shiner in Manitoba have suffered any serious decline in abundance or distribution over time. However, the species abundance and distribution do appear to be very limited, which may make it sensitive to future anthropogenic disturbances. Consequently, the emphasis of the recovery goal should be to ensure the continued existence of healthy, self-sustaining populations within their current distribution. This goal can be achieved through mitigating existing or potential threats to the species and through increasing our knowledge of the species biology, ecology, and life history to improve our ability to manage and protect the species and its habitat. As species recovery is not required, the recovery strategy focuses on the maintenance or conservation of existing populations and their habitats. The recovery goal for the Carmine Shiner is:

“To maintain self-sustaining populations of the Carmine Shiner by reducing or eliminating potential threats to the species and its habitats”

Recovery Objectives (Short-term: 5-years)

To achieve the above goal, a number of recovery objectives are also proposed. These include both population and distribution objectives, and threat mitigation objectives. The objectives take into consideration the uncertainty associated with our knowledge of the species biology, life history, abundance, and habitat requirements, as well as the impact of identified threats to its survival. The recovery 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 to

3. Identify potential threats to the Carmine Shiner from human activities and ecological processes, and incorporate mitigation measures into the Action Plan to avoid, eliminate, or mitigate these threats.

2.2. Performance Measures

The Recovery Team will monitor the implementation of the recovery strategy and any associated action plans for the Carmine Shiner on an ongoing basis. The Team will be responsible for reviewing and evaluating the performance and implementation of the recovery strategy and associated action plans, and their success in achieving the stated recovery goals and objectives. It will meet annually over a period of five years to evaluate the success of the strategy and to recommend any changes in direction. During the fifth year, the overall recovery strategy will be re-visited to determine whether:

- The goals and objectives are still being met;
- The goals and objectives need to be amended; or
- A fundamental change in approach to addressing the goals and objectives may be warranted.

Appropriate action, including amending or rewriting the strategy, will be considered at that time. Evaluations shall be based on the comparison of specific performance measures to the stated recovery objectives. Whenever possible, scientific studies will also be peer reviewed.

The recovery approaches identified in the Recovery Strategy are as follows:

- Research and monitoring (R);
- Management and regulatory actions (M);
- Public education and outreach (E).

The primary recovery actions that were undertaken in this reporting period fall under the recovery approach: Research and monitoring.

3. Progress Towards Recovery

The recovery strategy for the Carmine Shiner divides the recovery effort into three recovery approaches: 1) Research and monitoring (R), 2) Management and regulatory actions (M), and 3) Education and outreach (E). Progress in each of these three recovery approaches is addressed separately in Sections 3.2, 3.3 and 3.4. Section 3.1 describes the activities taken from the Schedule of Studies to identify critical habitat.

3.1. Activities from the Schedule of Studies to Identify Critical Habitat

Table 2. Research activities conducted/ongoing and associated with the Schedule of Studies to identify critical habitat.

Activities	Recovery objectives addressed ¹	Results	Agencies involved	Funding sources	References
Description of life history characteristics (Recovery approach: R1. Clarify life history requirements)					
Species life history	1	<ul style="list-style-type: none"> A large sample of Carmine Shiner were collected from the Birch River in 2011 for detailed analyses. Each fish was processed for age, length, weight, gender, and sexual maturity stage. Fecundity (number of eggs) was determined for mature females. Data analyses are ongoing at this time. 	DFO	DFO	n/a
Description of habitat use by life stage (Recovery approach: R5. Inventory habitat)					
Fish survey and habitat use assessment in Birch River	2	<ul style="list-style-type: none"> Field surveys to collect fish and habitat data were conducted from June - October 2011 in the Birch River. More fish were caught in the downstream portion of the study area. Carmine Shiner tended to use less silt and more sand habitat than would be expected, based on availability. Gravel, cobble and boulder habitat use was similar to availability. Habitat used by the mature and immature fish did not vary significantly. Data analyses are ongoing at this time. 	DFO	DFO	n/a
Identification, location and inventory of habitat (Recovery approach: R3. Identify limiting factors)					
Inventory habitat: Habitat assessment in Birch River	2, 3	<ul style="list-style-type: none"> In April 2011, the Birch River was surveyed with acoustic sonar equipment from its confluence with the Boggy River, downstream to its confluence with the Whitemouth River, in order to collect data on depth and substrate type. Over a four day period, three parallel tracks were completed approximately one third of the river width from the right and left banks, and centre of the channel. Data analyses are ongoing at this time. At two locations in the Birch River and one location in the Boggy River, a complete year of hourly water temperature data was collected from April 2011 to April 2012. At three locations in the Birch River, two weeks of hourly oxygen data was collected in September 2012. 	DFO	DFO	n/a

¹ Refers to all relevant recovery objectives from the recovery strategy as stated within Section 2.1.

3.2. Research and Monitoring Activities

Table 3. Research and monitoring activities conducted/ongoing since the completion of the recovery strategy.

Activities	Recovery objectives addressed ¹	Results	Agencies involved	Funding sources	References
Recovery approach: R2. Clarify species' distribution					
Fish survey	1	<ul style="list-style-type: none"> Additional sampling has been conducted in the Birch River. The sampling confirmed that Carmine Shiner were present in the entire study area (52 km reach); an upstream extension of the species known range by 7.5 river kilometres. 	DFO	DFO	n/a
Recovery approach: R3. Identify limiting factors					
Habitat preference and avoidance of Carmine Shiner in relation to water temperature and oxygen	2	<ul style="list-style-type: none"> Oxygen concentrations within the distribution range of Carmine Shiner were extracted from long term data sets and additionally measured over 24-hour periods. The data revealed that hypoxia occurs spatially and temporally in the Birch River. Laboratory studies showed that the preferred temperature of Carmine Shiner is related to the oxygen concentration. Consequently, the oxygen concentration in the Birch River is likely to influence the habitat use of Carmine Shiner. The publication of these research results is expected for 2015. Further research is needed to evaluate how growth, reproduction and survival of Carmine Shiner will be affected by the low oxygen conditions in the Birch River. 	DFO	DFO; Fisheries Enhancement Fund of Manitoba Water Stewardship	n/a
Recovery approach: R4. Monitor population trends					
Population monitoring	1	<ul style="list-style-type: none"> The data collected in the Birch River, 2011 could be used as baseline relative abundance for Carmine Shiner. This data could be compared to future data collections to monitor population trends. 	DFO	DFO	n/a

¹ Refers to all relevant recovery objectives from the recovery strategy as stated within Section 2.1.

3.3. Management and Regulatory Actions

Table 4. Management and regulatory actions conducted/ongoing since the completion of the recovery strategy.

Activities	Recovery objectives addressed ¹	Results	Agencies involved	Funding sources	References
Recovery approach: M3. Protect habitat					
Conservation easements for riparian habitat protection	1, 2, 3	<ul style="list-style-type: none"> The Manitoba Habitat Heritage Corporation (MHHC) has a mandate to conserve, enhance and restore fish and wildlife habitat by working voluntarily with landowners and organizations. Through the Habitat Stewardship Program, MHHC has protected 199 acres of riparian area along the Birch River and a further 70 acres of upland restored. This was done by establishing three separate conservation easements. Additional conservation easements for Carmine Shiner habitat are a focus for MHHC. 	MHHC	Habitat Stewardship Program DFO, Environment Canada	n/a
Protection of riparian habitat	1, 2, 3	<ul style="list-style-type: none"> Manitoba Conservation and Water Stewardship Forestry and Fisheries Branches have integrated (in 2013) protection of riparian habitat within the provincial forest management plan for the area that includes the Birch/ Whitemouth river watershed. 	Manitoba Conservation and Water Stewardship – Forestry and Fisheries Branch	n/a	n/a

¹ Refers to all relevant recovery objectives from the recovery strategy as stated within Section 2.1.

3.4. Public Education and Outreach Activities

Table 5. Public education and outreach activities conducted/ongoing since the completion of the recovery strategy.

Activities	Recovery objectives addressed ¹	Results	Agencies involved	Funding sources	References
Recovery approach: E1. Improve awareness of the species Recovery approach: E2. Encourage stakeholder participation					
Workshops, conferences, education and outreach	1, 2, 3	<ul style="list-style-type: none"> • Multiple presentations and informal discussions with respect to Carmine Shiner, its status as a Species at Risk, and its critical habitat were conducted; including: <ul style="list-style-type: none"> ○ Prairie Conservation and Endangered Species Conference, Red Deer, Alberta, February 2013; ○ Great Plains Fishery Workers Association Annual Meeting, Winnipeg, February 2013; and ○ National Fish and Wildlife Conservation Congress, Ottawa, May 2012. • The conferences and workshops ranged from local/provincial to Prairie and Great Plains-based to bi-national. Participants included; local, provincial and federal governments, First Nations, NGO's, academia, industry, community and farm-based groups. • This information is also included in an education package about prairie species that is made available to teachers and educators. 	DFO	DFO	n/a

¹ Refers to all relevant recovery objectives from the recovery strategy as stated within Section 2.1.

3.5. Summary of Progress Towards Recovery

Implementation of the recovery objectives have been assessed as follows:

1. Maintain Carmine Shiner populations at their current abundance and within their present distribution within the Whitemouth, Birch and Winnipeg river systems.

No known instances of population or habitat decline have occurred and there is no information to suggest that the population has declined.

2. Identify and protect critical habitat of the Carmine Shiner.

Critical habitat was not identified in the 2008 recovery strategy. However, the 2011 surveys provided preliminary information on critical habitat; which was used to update the recovery strategy in 2013. To protect critical habitat for the Carmine Shiner, a Critical Habitat Order will be finalized in 2015.

3. Identify potential threats to the Carmine Shiner from human activities and ecological processes and incorporate mitigation measures into the Action Plan to avoid, eliminate, or mitigate these threats.

The Carmine Shiner Species at Risk Recovery Team meets yearly and has discussed updates to the Carmine Shiner Recovery Strategy. The recovery goal and objectives remain the same and a revised recovery strategy was updated to include the identification of critical habitat. Potential threats to the Carmine Shiner remain static. In 2011, Fisheries and Oceans Canada conducted an advisory meeting (DFO 2013) to assess the recovery potential of the Carmine Shiner. Experts from Fisheries and Oceans Canada, the province of Manitoba, and academia were invited to participate in the meeting. The Recovery Potential Assessment of Carmine Shiner (*Notropis percobromus*) in Canada was published in May 2013.

Action plans: The action plan for the Carmine Shiner was developed with the Carmine Shiner Recovery Team and will be finalized in 2015.

4. Recommendations

The goal of the 2008 recovery strategy “***To maintain self-sustaining populations of the Carmine Shiner by reducing or eliminating potential threats to the species and its habitats***” remains valid. There is no evidence that the distribution, abundance or habitat has declined in the Whitemouth, Birch and Winnipeg river systems.

As a result of the information collected since 2008, the recovery strategy was revised and re-posted to the Species at Risk Public Registry in 2013 to include the identification of critical habitat. Future revisions to the recovery approaches may be warranted and

recovery goals and objectives may be revised to include more specific goals; however, the overall goal of maintaining a self-sustaining population should remain the same.

5. References

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2006. COSEWIC assessment and update status report on the carmine shiner (*Notropis percobromus*) in Canada. Ottawa. vi + 29 pp.
- DFO. 2013. Recovery potential assessment of Carmine Shiner (*Notropis percobromus*) in Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/015.
- Fisheries and Oceans Canada. 2008. Recovery Strategy for the Carmine Shiner (*Notropis percobromus*) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. viii + 40 pp.
- Fisheries and Oceans Canada. 2013. Recovery Strategy for the Carmine Shiner (*Notropis percobromus*) in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada. Ottawa. viii + 46 pp.

Appendix

Threats assessment analysis

Knowledge of the threats to a species and potential to mitigate those threats is fundamental to a species' recovery. In this assessment, the Carmine Shiner Recovery Team identified the following threats for consideration:

- **Over-exploitation**
 - Bait fisheries
- **Species introductions**
 - Predation
 - Competition
 - Food chain disruption
- **Habitat loss/degradation**
 - Flow alteration
 - Shoreline/riparian development
 - Landscape changes
 - Climate change
- **Pollution**
 - Point sources
 - Non-point sources
- **Other**
 - Scientific sampling
 - Hybridization

Because so little is known of the species' life history and habitat requirements, the assessment of each potential threat was qualitative rather than quantitative, with each factor being rated as "low", "moderate" or "high". These assessments were based on the best professional judgement of the Recovery Team, and determined by consensus following discussions. For each potential threat at each location where the species is known to occur, the following factors were considered:

Likelihood of occurrence – The probability of a threat occurring. Those that presently affect the species were rated "high".

Extent of occurrence - The spatial range of each identified threat. Those that affect most or all of the area occupied by the species were rated "high".

Severity of impact – The severity of the direct or indirect impact of a threat on the survival or recovery of the species. Impacts with the potential to extirpate the species were rated "high".

Immediacy of impact - The immediacy of the anticipated impact from a threat. Ongoing threats that are impacting the species were rated "high".

Threat significance – The risk of damage to a Carmine Shiner population from a particular threat, based on its likelihood and extent of occurrence and on the severity and immediacy of its impacts. Threat significance was rated “low” where severity of the impact was deemed low, and otherwise was difficult to predict given present knowledge.

Mitigation potential - The biological and technical feasibility of mitigating a threat. Where there are no biological impediments and proven technology exists to successfully mitigate threats, the mitigation feasibility was rated “high”.