Species at Risk Act
Management Plan Report Series

Report on the Progress of Management Plan Implementation for the Bridle Shiner (*Notropis bifrenatus*) in Canada for the Period 2011-2016

Bridle Shiner

2017

Canada

Recommended citation:

Fisheries and Oceans Canada. 2017. Report on the Progress on the Management Plan Implementation for the Bridle Shiner (*Notropis bifrenatus*) in Canada for the period 2011-2016. *Species at Risk Act* Management Plan Report Series. Fisheries and Oceans Canada, Ottawa. vi + 16 pp.

For copies of the progress report, or for additional information on species at risk, including COSEWIC Status Reports, recovery strategies, residence descriptions, action plans, and other related recovery documents, please visit the SAR Public Registry.

Cover illustration: Ellen Edmonson, New York State Department of Environmental Conservation.

Également disponible en français sous le titre
Rapport sur les progrès de la mise en oeuvre du Plan de gestion du méné d'herbe (*Notropis bifrenatus*) au Canada pour la période 2011–2016.

ISBN 978-0-660-06444-4
Catalogue no. En3-5/14-1-2016E-PDF

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 Section 72 of the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the competent ministers are responsible for reporting on the implementation of the management plan for a species at risk, and on the progress towards meeting its objectives within five years of the date when the management plan was placed on the Species at Risk Public Registry and in every subsequent five-year period, until its objectives have been achieved or the species' recovery is no longer feasible.

Reporting on the progress of management plan implementation requires reporting on the collective efforts of the competent minister(s), provincial and territorial governments and all other parties involved in conducting activities that contribute to the species' recovery. Management plans identify broad strategies and approaches that will provide the best chance of recovering species at risk. Some of the identified strategies and approaches are sequential to the progress or completion of others and not all may be undertaken or show significant progress during the timeframe of a Report on the Progress of Management Plan Implementation (Progress Report).

The Minister of Fisheries and Oceans Canada and the Canadian Coast Guard, and the Minister responsible for Parks Canada Agency are the competent minister(s) under SARA for the Bridle Shiner and have prepared this Progress Report.

As stated in the preamble to SARA, success in the recovery of species at risk depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in the management plan and will not be achieved by Fisheries and Oceans Canada and Parks Canada Agency, 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 the Management Plan for the Bridle Shiner for the benefit of the species and Canadian society as a whole.

Acknowledgments

Fisheries and Oceans Canada (DFO) highlights the contribution of all individuals and organizations that contributed to the progress made since the Bridle Shiner became protected under the *Species at Risk Act*. DFO would like to thank Marc-Antoine Couillard (ministère des Forêts, de la Faune et des Parcs du Québec) for revising the document and for his valuable assistance at the Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre]. For the review, DFO would also like to thank Chantal Côté (ministère des Forêts, de la Faune et des Parcs du Québec), Priscilla Gareau (Groupe Ambioterra), Geneviève Audet (Société de conservation et d'aménagement du bassin de la rivière Châteauguay), Scott Reid (Ministry of Natural Resources and Forestry) and Nick Mandrak (University of Toronto) as well as Brigitte Lévesque (DFO) for map production. Lastly, DFO thanks Marthe Bérubé (DFO) who coordinated production on behalf of DFO with help from Myriam Bourgeois (DFO) responsible for drafting, and from Amy Boyko (DFO).

Executive Summary

The Bridle Shiner has been listed as a species of Special Concern under the *Species at Risk Act* (SARA) since June 2003. In 2013, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) reassessed and reconfirmed its status. The Management Plan for the Bridle Shiner (*Notropis bifrenatus*) in Canada was published in June 2011. The plan describes the main threats to the Bridle Shiner as the following: agricultural, urban and industrial pollution; removal/destruction of riparian and aquatic vegetation; large-scale fluctuation of water levels; climate change; local modification of natural flow regimes; and, the spread of invasive species and disease. Commercial baitfish harvesting is a threat of lesser concern.

The objectives set in the Management Plan for Bridle Shiner populations and distribution are:

i. To ensure the protection of known populations and habitats;

ii. To evaluate threat factors impacting the species and its habitat and mitigate them when possible;

iii. To improve the quality of impacted habitats currently used by the Bridle Shiner;

iv. To determine the extent, abundance and demographics of Bridle Shiner populations;

v. To increase public awareness regarding the presence, threats and conservation of the Bridle Shiner and its habitat, and its status as a Canadian species at risk; and,

vi. To develop contacts and raise awareness among the various partners, recovery teams, interest groups, organizations and landowners interested in supporting the conservation of the Bridle Shiner.

During the period covered by this report, progress was made in monitoring the species' distribution. The species' preferred habitat was characterized and a specific sampling protocol was adopted in Quebec, which allowed for a greater focus on finding and protecting the species and its habitat. Efforts must continue to maintain or improve the riparian environment, especially in agricultural areas, and to assess and mitigate threats, particularly those that affect aquatic vegetation. Monitoring of Bridle Shiner populations must continue while efforts need to be pursued to standardize and compile occurrence data in a timely fashion.

Because of the decline in its distribution, especially in Quebec agricultural areas, and, consequently, because of the inferred decline in abundance, COSEWIC (2013) concluded that the Bridle Shiner's status comes close to meeting Threatened species status and that the species may become Threatened if factors suspected of negatively affecting its persistence are not reversed.

Since 2011, the species has been observed in 40 watercourses in Quebec and, in Ontario, in 10 lakes as well as several locations in Lake Ontario and along the St. Lawrence River. Some of these observations represent new locations and broaden the known distribution range, while others confirm that the species is still in watercourses where it has not been observed for many years. Although population numbers are unknown, these observations indicate that the species' situation may be more positive than that portrayed by COSEWIC (2013).

Nonetheless, there are still significant stresses, as seen in Lake Saint-Pierre, where large numbers of this species are found. In addition, as COSEWIC (2013) mentioned, the observations made at the new sites most likely do not represent a real increase in the scope of the distribution range and could instead be the result of the sampling efforts at those locations.

Table of contents

1 Background

This progress report describes the progress made towards meeting the objectives listed in the Management Plan for the Bridle Shiner (*Notropis bifrenatus*) in Canada, from 2011 to 2016. The report should be considered as one in a series of documents for this species that are linked and should considered together, including the Management Plan and the COSEWIC Assessment and Status Report on the Bridle Shiner (*Notropis bifrenatus*) in Canada (2013). The status of the Bridle Shiner was also assessed in 2001 (COSEWIC 2001) and in 1999 (Holm et al. 1999).

Section 2 of the progress report reproduces or summarizes key information on the challenges the species is facing, objectives for achieving its conservation, and approaches to meeting those objectives. For more details, readers should refer to the Management Plan for the Bridle Shiner (*Notropis bifrenatus*) in Canada. Section 3 reports on the progress of activities identified in the management plan in support of the objectives as well as progress following recovery efforts.

2 General Information

2.1 COSEWIC Assessment Summary

The listing of the Bridle Shiner as a species of Special Concern in 2003 gave rise to the publication of a Management Plan for the species in June 2011. The Management Plan was mainly based on the information in the COSEWIC assessment and status report on the Bridle Shiner (COSEWIC 2001). In 2013, COSEWIC reassessed the species' status and confirmed it to be Special Concern (COSEWIC 2013). The following summary comes from the 2001 assessment, which was used in the Management Plan.

Species Assessment Information Summary from COSEWIC – November 2001

Common Name
Bridle Shiner

Scientific Name
Notropis bifrenatus

COSEWIC Status
Special Concern

Reason for Designation
This species has a limited distribution in Canada and is susceptible to increased water turbidity from agricultural practices and urban development.

Occurrence
Ontario, Quebec

Status History
Designated Special Concern in April 1999. Status re-examined and confirmed in November 2001 and May 2013.

2.2 Threats

This section summarizes the information in the Management Plan (Boucher et al. 2011) regarding threats to the Bridle Shiner.

2.2.1 Threats to the Bridle Shiner

Table 1 summarizes the threats to the Bridle Shiner. For more information, refer to Section 1.5 of the Management Plan (Boucher et al. 2011).

Table 1. Threats to Bridle Shiner populations in Canada, listed in order of their overall level of concern, from highest to lowest (some variability may occur locally, in the severity and level of concern).

Threat Category	Overall Level of Concern	Stress
Agricultural Pollution	High	- Increased mortality - Decreased production - Reduction in available resources - Modification or loss of habitat quality
Urban and Industrial Pollution	High	- Increased mortality - Decreased production - Low reproductive success - Physiological changes - Behavioural changes
Removal/Destruction of Riparian Vegetation	High	- Reduction in population abundance - Reduction in available resources - Increased sedimentation and turbidity
Large-Scale Fluctuation of Water Levels	High	- Reduction in available resources - Modification or loss of habitats
Climate Change	High	- Decrease in abundance - Modification or loss of habitat
Local Modification of Natural Flow Regimes	Medium	- Reduction in available resources - Modification or loss of habitats
Removal/Destruction of Aquatic Vegetation	Medium	- Low reproductive success - Reduction in available resources
Spread of Exotic Species and Disease	Medium	- Decrease in abundance - Modification or loss of habitat
Baitfish Harvesting	Low	- Decrease in abundance

2.3 Management

This section summarizes the information in the Management Plan (Boucher et al. 2011) regarding the target objectives for Bridle Shiner populations and their distribution. The section also describes the performance indicators used to measure progress towards meeting the target objectives.

2.3.1 Bridle Shiner Management Objectives

To ensure the presence of viable Bridle Shiner populations throughout the species' current and historical range in Canada, the following short-term objectives (five years) were defined in Section 2 of the Management Plan (Boucher et al. 2011).

i) To ensure the protection of known populations and habitats;
ii) To evaluate threat factors impacting the species and its habitat and mitigate them when possible;
iii) To improve the quality of impacted habitats currently used by the Bridle Shiner;
iv) To determine the extent, abundance and demographics of Bridle Shiner populations;
v) To increase public awareness regarding the presence, threats and conservation of the Bridle Shiner and its habitat, and its status as a Canadian species at risk; and,
vi) To develop contacts and raise awareness among the various partners, recovery teams, interest groups, organizations and landowners interested in supporting the conservation of the Bridle Shiner.

2.3.2 Performance Indicators

The Management Plan (Boucher et al. 2011) contains no performance indicators. Section 3 describes progress toward the Management Plan objectives, made through implementation measures, and, results obtained for each recommended approach.

3 Progress Towards Recovery

The Management Plan (Boucher et al. 2011) divides recovery efforts into five approaches: research; population surveys and monitoring; habitat restoration and protection; communications and outreach; and, partnerships and coordination.

The conservation measures outlined in the Management Plan are discussed in Section 3.1. Progress achieved as a result of these measures is described in Section 3.2.

Few projects focused specifically on the Bridle Shiner for the period covered by this report; however, the species often benefits from ecosystem-based or multi-species initiatives such as fish surveys or habitat improvement projects.

3.1 Activities Supporting Recovery

This section briefly describes the measures implemented, whereas the next section (Progress Towards Recovery) presents the progress made by the measures implemented, as well as the next steps.

The following tables present an account of the progress achieved based on each approach and on each measure recommended in the Management Plan implementation schedule. The progress status for each measure is considered based on the following four possibilities:

- Completed: activity was conducted and finished;
- In progress: activity is in progress but not yet finished;
- Not started: activity was planned, but has not started, and,
- Cancelled: activity will not be started or finished.

The list of acronyms used in the tables is in Appendix 1.

Table 2. Research and Monitoring Measures for Bridle Shiner Populations.

Recommended measures	Progress	Results/details	Objectives	Participants[1]
Establish standardized sampling and identification methods. Define habitat requirements.	Completed	• Publication of the Protocole d'échantillonnage du fouille-roche gris (*Percina copelandi*), du dard de sable (*Ammocrypta pellucida*) et du méné d'herbe (*Notropis bifrenatus*) au Québec [sampling protocol for Channel Darter, Eastern Sand Darter and Bridle Shiner in Quebec] (Couillard et al. 2011). This sampling and habitat characterization protocol defines suitable habitats and promotes the collection of standardized data. • In Quebec, the species' preferred habitat was characterized in the Bilan de l'information disponible sur cinq espèces de poissons à statut précaire au Québec et de l'état d'avancement des activités de rétablissement [Review of available information on five fish species at risk in Quebec	i, iii and iv	**DFO** **MFFP** **MNRF** **Universities**

[1] Lead participants are listed on top and in bold; other participants are listed alphabetically. Not all activities have specific participants identified.

		and progress of recovery activities] (Couillard et al. 2013) from data compiled from various sources for Bridle Shiner habitat for the 1930–2009 period. • In Ontario, a sampling methodology adapted to wetlands fishes at risk, including the Bridle Shiner, is currently being developed.		
Consolidate existing Bridle Shiner data and create a centralized database.	In progress	Bridle Shiner occurrence data are continuously compiled in the Centre de données sur le patrimoine naturel du Québec (CDPNQ) [Quebec Natural Heritage Data Centre] database and there was a major catch-up in data collection and compilation (1930–2009).	iv	**DFO** **MFFP**
Conduct fish surveys in current, historical and suitable sites, and map and locate suitable sites to guide sampling efforts.	In progress	• Since 1995, the Fish Monitoring Network has been continuing its systematic and recurrent multi-species sampling of the St. Lawrence River. The network samples lentic, lotic, littoral and deep-water habitats for seven sections of the river between the Ontario border and the St. Lawrence upper estuary on six- to seven-year cycles. • Surveys, targeted and not targeted toward the Bridle Shiner or species at risk, were conducted in Ontario and in the St. Lawrence and Ottawa River watersheds by governmental and non-governmental organizations (NGOs), and by corporations developing infrastructure projects. The surveys have focused on historical or suitable sites where no Bridle Shiner have previously been found. Both suitable sites and occupied sites were located and characterized during some of these surveys. Maps of recent and historical occurrence sites are presented in Subsection 3.2.1.	i and iv.	**DFO** **MFFP** **MNRF** Companies FN NGOs PCA Universities
Assess and mitigate threats.	In progress	• Shoreline conditions were assessed and suitable measures to maintain/improve riparian habitat were proposed to farmers and shoreline landowners in the St. Lawrence watershed through stewardship activities. See progress in Subsection 3.2.2. • In 2013, the Quebec government legislated the use of bait	ii	**Agricultural sector** **MFFP** **NGOs** **Universities** AAFC

		fishes, and in 2017, it intends to prohibit the use of bait fishes in the summer period, regardless of whether they are alive or dead. • A study has documented the effect of turbidity on various imperilled species including the Bridle Shiner (Gray et al. 2014). See progress in Subsection 3.2.1.		DFO Municipalities Shoreline landowners
Study the population dynamics.	Not started	No results; research opportunities were limited. The feasibility of this type of measure is deemed to be very low and it could be abandoned.	iv	*N/A*

Table 3. Habitat Protection and Restoration Measures.

Recommended measures	Progress	Results/details	Target objectives	Participants[2]
Habitat protection	In progress	NGOs and the agricultural sector, including Agriculture and Agri-Food Canada (AAFC), received funding to work with municipalities, shoreline landowners and farmers for shoreline strip protection in the St. Lawrence River watershed. See progress in Subsection 3.2.2.	i and ii	**AAFC** **Agricultural sector** **NGOs** ECCC DFO Municipalities Shoreline landowners
Encourage stewardship	In progress	• Various funds are available for species at risk. ECCC, with DFO collaboration, manages the Habitat Stewardship Program (HSP) and the Aboriginal Fund for Species at Risk (AFSAR), which provide funding to NGOs and First Nation (FN) organizations to implement species at risk recovery measures. AAFC received money from the Interdepartmental Recovery Fund (IRF).	i, ii, v, vi	**DFO** **ECCC** **Conservation Authorities** **MNRF**

[2] Lead participants are listed on top and in bold; other participants are listed alphabetically. Not all activities have specific participants identified.

		• To promote the conservation of the Bridle Shiner and its habitat in Ontario, DFO presented information to stakeholders, including the threats facing the species and the stewardship actions that can be implemented. See Subsection 3.2.3 for further details.		
Promote the use of sampling guidelines and methods.	In progress	Use of the Protocole d'échantillonnage du fouille-roche gris (*Percina copelandi*), du dard de sable (*Ammocrypta pellucida*) et du méné d'herbe (*Notropis bifrenatus*) au Québec [sampling protocol for Channel Darter, Eastern Sand Darter and Bridle Shiner in Quebec] (Couillard et al. 2011). See details in Subsection 3.2.1.	ii, iv, vi	**DFO** **MFFP**
Habitat restoration	In progress	Measures for maintaining/improving riparian habitat were completed by farmers and shoreline landowners in the St. Lawrence River watershed through stewardship activities. See progress in Subsection 3.2.2.	ii, iii	**Agricultural sector** **NGOs** AAFC DFO ECCC MFFP Shoreline landowners

Table 4. Measures of Communications, Outreach, Partnerships and Coordination.

Recommended Measures	Progress	Results/Details	Objectives	Participants[3]
Communications and outreach	In progress	• DFO produced and distributed material to promote species and habitat conservation (information sheet and postcard). • Targeted awareness campaigns were conducted in the St. Lawrence River watershed in Quebec and within the Ontario range of the Bridle Shiner for relevant stakeholders and	v, vi	**DFO** **NGOs** **Conservation Authorities** Agricultural sector

[3] Lead participant are listed on top and in bold; other participants are listed alphabetically. Not all activities have specific participants identified.

		individuals (NGOs, municipalities, agricultural sector, shoreline landowners, FN). • Interpretive species at risk signs have been installed along a stretch of the St. Lawrence River in Ontario where the Bridle Shiner is found. *See details on communications and outreach in Subsection 3.2.3.*		FN Municipalities Shoreline landowners
Adopt a coordinated approach with the recovery teams and with other partners.	Completed	• The Équipe de rétablissement des cyprins et petits percidés du Québec [Quebec Cyprinids and Small Percids Recovery Team], and the Ontario Freshwater Fish Recovery Team facilitate dialogue (information sharing and recovery planning) between the federal and provincial governments, industry, FN and local NGOs. • The Cooperation Agreement for the Protection and Recovery of Species at Risk in Quebec (2012–2022), and the Canada-Ontario Agreement on Species at Risk (2011-2021), were introduced to coordinate interventions for species of common interest and their habitats. • DFO species experts and managers exercice information sharing and a coordinated approach for management of species at risk (e.g., expertise, management planning, permitting). *See details on the coordinated approach in Subsection 3.2.3.*	All	**DFO** **MFFP** **MNRF** Agricultural and municipal sectors FN Industry NGOs PCA Shoreline landowners

3.2 Recovery Progress

This section presents the progress made following the measures undertaken (see the previous section) and possible conservation activities in the pursuit of recovery efforts.

3.2.1 Research and Monitoring of Bridle Shiner Populations

In Quebec:

The Ministère des Forêts, de la Faune et des Parcs du Québec (MFFP) [Quebec department of forests, wildlife and parks] published the Protocole d'échantillonnage du fouille-roche gris (*Percina copelandi*), du dard de sable (*Ammocrypta pellucida*) et du méné d'herbe (*Notropis bifrenatus*) au Québec [sampling protocol for Channel Darter, Eastern Sand Darter and Bridle Shiner in Quebec] (Couillard et al. 2011). The protocol is an important tool for sampling cyprinids and small percids, and to standardize habitat data collection. It is used by federal and provincial governmental authorities and by non-governmental organizations (NGOs).

In Quebec, Bridle Shiner occurrence and habitat data have been compiled for the 1930–2009 period, with the cooperation of DFO and MFFP. This compilation led to a MFFP report on habitat characteristics in the Bilan de l'information disponible sur cinq espèces de poissons à statut précaire au Québec et de l'état d'avancement des activités de rétablissement [Review of available information on five fish species at risk in Quebec and progress of recovery activities] (Couillard et al. 2013), which helps in planning conservation activites.

Since 2011, targeted and non-targeted Bridle Shiner surveys have been conducted by DFO, MFFP, Aboriginal and environmental organizations, as well as by private companies (e.g. as part of infrastructure development projects). These resulted in the species being detected for the first time or having its presence confirmed in several watercourses. Since the last COSEWIC report (2013), data collected (Figure 1) extended the known range northward (Ottawa River, Saint-Maurice River). In addition, while COSEWIC report (2013) indicated that the species had not been observed in a long time in the Yamaska, Châteauguay and Saint-François rivers, the species' presence has since been confirmed in the Yamaska and Châteauguay watersheds and in the Saint-François River. However, as stated in COSEWIC (2013), this is probably the result of sampling efforts at these locations and not an extension of the distribution range. In addition, the MFFP review (Couillard et al. 2013) identified the Lake Saint-Pierre grass beds as a hot spot for the Bridle Shiner and these grass beds have experienced significant pressure since the 2000s (de la Chenelière et al. 2014).

Since 2011, the species' presence has been confirmed in: Ottawa River; Saint-Maurice River, Saint-François River; Aux Cerises River (a tributary of Lake Memphrémagog); Brome Lake; des Deux Montagnes Lake; Lake St. Francis and its tributaries (Aux Saumons, Rouge, La Guerre and other rivers); Lake Saint-Louis and its tributaries (including the Châteauguay River and others); Mascouche River; Du Loup River, Beaurivage River near Québec; and, in the St. Lawrence River (Bécancour) and tributaries south of Lake Saint-Pierre. Figure 1 presents capture sites of Bridle Shiner in Quebec from 1930 to 2015. Observations of the Bridle Shiner in an area relatively far north in the Laurentians (Lakes Borcoman and des Journalistes), which were reported in the Management Plan, have been overturned since its publication in 2011. Occurrences are grouped together in the Centre de données sur le patrimoine naturel du Québec (CDPNQ) [Quebec Natural Heritage Data Centre] database.

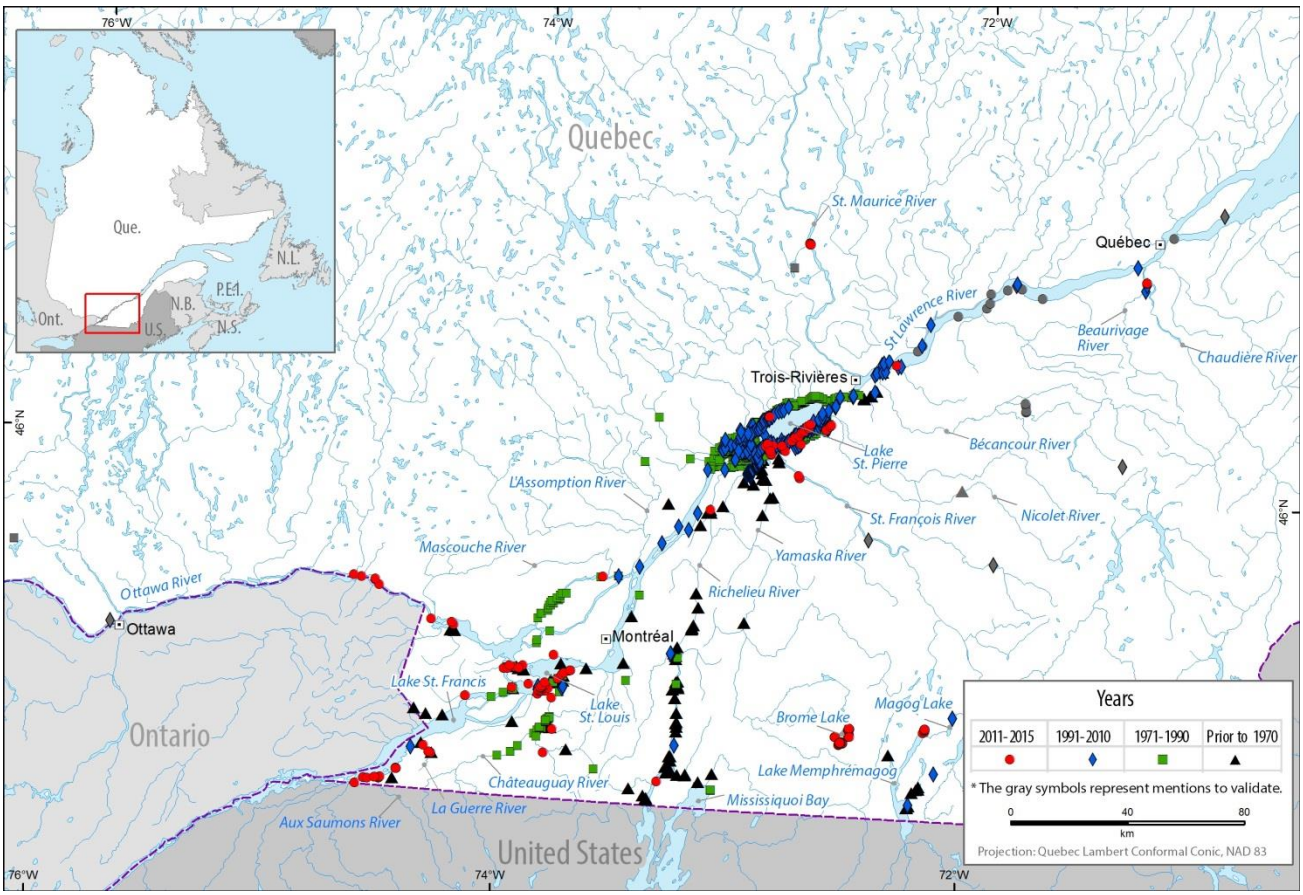

Figure 1. Capture sites of Bridle Shiner in Quebec. Historical (1930–2010) and recent data (2011 to 2015). *Source: DFO and MFFP, compilation conducted in February 2016.*

With regard to threat characterization and mitigation, measures have been implemented through stewardship activities in the riparian environment. Details appear below, in Subsection 3.2.2. In addition, the Government of Quebec announced its intent to reduce the risks associated with the use of bait fishes through regulations that will prohibit the use of any type of bait fishes (live or dead) in the summer, starting in 2017. However, anglers will be allowed to continue the use of bait fishes (live or dead) for winter fishing.

In Ontario:

A study has documented the effect of turbidity on various imperilled species including the Bridle Shiner (Gray et al. 2014). The authors conclude that excessive turbidity (more than 8 TNU) can alter Bridle Shiner behaviour and swimming performance, and, in historically clear natural systems, it may lead to serious repercussions for Bridle Shiner populations.

Since the publication of the Management Plan in 2011, targeted surveys for the Bridle Shiner have been conducted throughout its Ontario range by DFO, Ontario Ministry of Natural Resources and Forestry (MNRF), Parks Canada Agency, and through species at risk graduate studies. Sampling was carried out in sites where Bridle Shiner was historically present and at new sites containing suitable habitat. Seventeen known Bridle Shiner locations and 22 new locations have been sampled since 2011. Of the 17 known locations, Bridle Shiner was confirmed at six (Cranberry, Newboro, Opinicon, Sand, and West lakes, and Weller's Bay), while sampling at new locations yielded Bridle

Shiner from seven locations (Pleasant Bay, North Beach, Consecon Lake, Long Lake in the Leeds and Thousand Islands area, Long Lake in Lanark County, Loughborough Lake, and Presqu'ile Bay) (DFO, unpubl. data). Most of the new locations fall within the current range of the species, although the new location at Presqu'ile Bay indicates a slight range expansion to the southwest. Figure 2 illustrates all historical and recent observations of Bridle Shiner in Ontario.

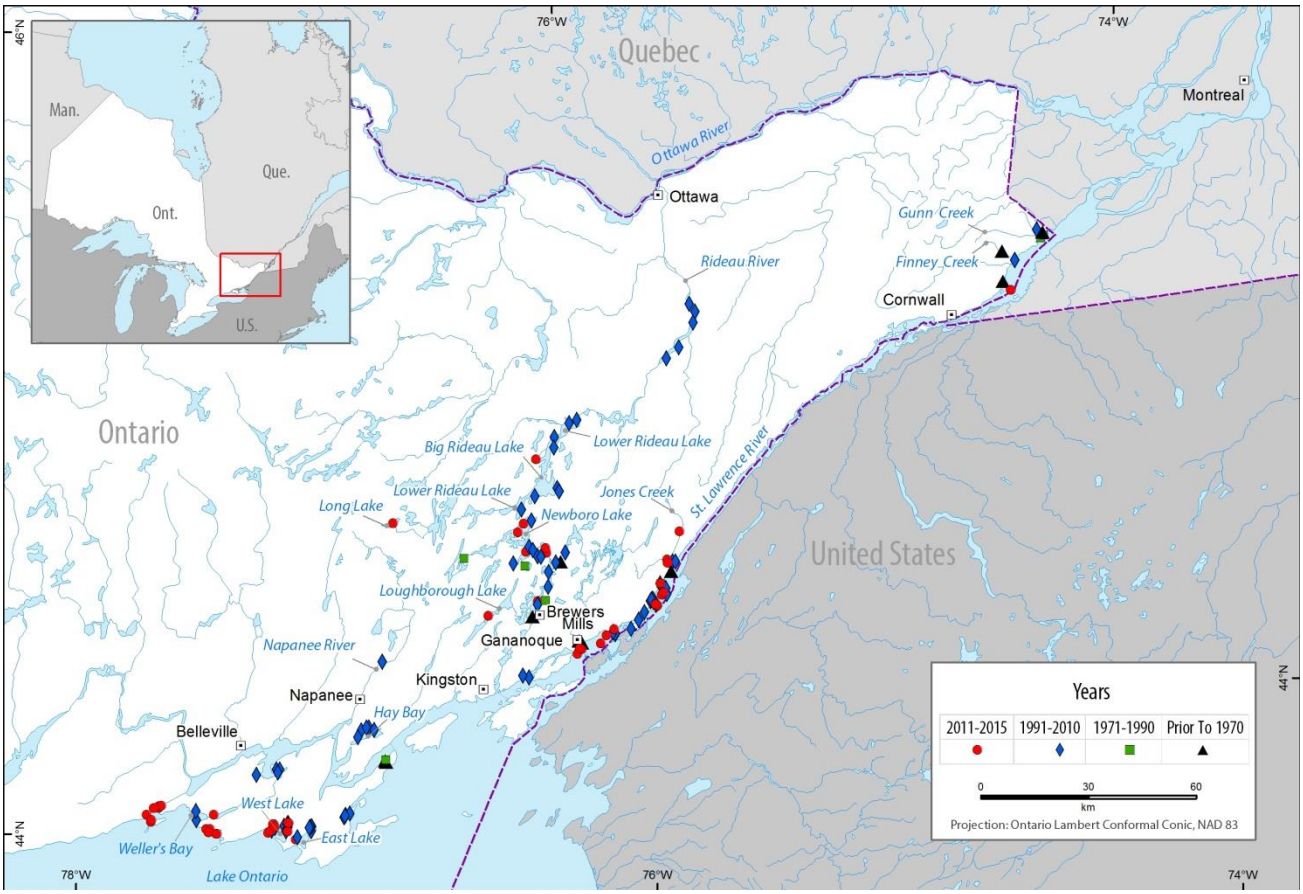

Figure 2. Bridle Shiner catch sites in Ontario. Historical (1930-2010) and recent (2011 to 2015) data. *Source: DFO, compilation conducted in February 2016*.

Next Steps:

Next steps with respect to monitoring and research should focus on ensuring resources are used efficiently to conduct further targeted surveys and population assessments within the Canadian range of the species and in areas lacking records but containing suitable habitat.

The following areas may be of particular interest for future targeted sampling: regions of Outaouais, Estrie, Mauricie, Centre-du-Québec and Chaudière-Appalaches, where the species' presence may be under-estimated because of a lack of sampling; in watercourses where the species had historically been found, such as north of Montreal, the head of Saint-Pierre Lake (including some tributaries) where the species was historically abundant; and, lastly, in a perimeter that includes Missisquoi Bay and the upper reaches of the Richelieu River. Efforts must also be made to obtain and centralize standardized data. Additionally, it would be advisable to monitor areas of aquatic vegetation and the loss of this type of habitat, with which the species is closely related, and to work to mitigate this threat.

In Ontario, there are several historical Bridle Shiner sites that have not been surveyed recently that should be targeted, such as: Prinyer Cove in the Bay of Quinte; tributaries of Lake St. Francis (Finney, Fraser, Gunn, and Wood creeks); several sites along the upper St. Lawrence River (e.g., Gananoque, Brown's Bay, Adelaide Island); Napanee River; and, Hart Lake. In addition, the Ottawa River watershed downstream of Ottawa should also be targeted as Bridle Shiner records exist on the Quebec side of the river.

Finally, research opportunities are limited in some research areas; for example, further work needs to be done to identify the habitat requirements for each life stage of the Bridle Shiner, as well as to determine the population dynamics of this species. However, the feasibility of this type of research is deemed to be very low.

3.2.2 Habitat Protection and Restoration

In Quebec:

DFO and MFFP are collaborating on collecting Bridle Shiner data. MFFP also produced a sampling protocol adapted to the species (see 3.2.1.). The protocol describes suitable habitats, which allows one to locate and map the areas where the species may be found.

Over a dozen NGOs (2 agricultural, 9 environmental and 2 Aboriginal) and AAFC were involved in stewardship projects with the support of federal funding (HSP, AFSAR and IRF). Most of the stewardship projects are multi-species and focused on the shoreline strip, which indirectly protects the Bridle Shiner and its preferred habitat of aquatic grass beds.

Stewardship projects have been implemented in the St. Lawrence River watershed. Outreach activities focused on the shoreline strip were conducted by agricultural and environmental organizations for concerned stakeholders in the municipal sector, mainly in the Richelieu and Châteauguay watersheds and the Mille-Îles River. In these same areas, in the Lake Saint-Pierre tributaries and in the L'Assomption and Ouareau river watersheds, shoreline landowners and farmers were also called upon and made aware of the wealth and benefits of their riparian environment, of threats to fish habitat, of the importance of maintaining/restoring the shoreline strip and what they can do to help.

As a result of this work with landowners and farmers, the riparian environment was improved and restored in some watercourses, including the Mille-Îles River and the Lake Saint-Pierre tributaries, and some watercourses in the Richelieu, Châteauguay, L'Assomption and Ouareau river watersheds. Bank stabilization, reshaping and re-naturalization activities took place, as well as changes to cultural practices and warning signs to locate and protect the riparian strip. Activities were conducted with the collaboration of shoreline landowners and farmers, and under the direction of agricultural and environmental organizations subsidized as such.

In Ontario:

The majority of species at risk are found in southwestern Ontario, outside of the range of the Bridle Shiner, resulting in fewer stewardship projects focused in eastern Ontario. However, the HSP did provide multi-year funding to NGOs for stewardship work on the Pugnose Shiner, a species whose range partially overlaps that of the Bridle Shiner in eastern Ontario. Funding was provided for species at risk inventories and monitoring, habitat protection through land securement, habitat restoration, and management planning for landowners adjacent to species at risk.

Next Steps:

To ensure the protection and restoration of Bridle Shiner habitat throughout its range, continuing stewardship activities are required to raise awareness and involve municipalities, agricultural sector and shoreline landowners. Measures that would improve the riparian environment and water quality are essential, especially in Lake Saint-Pierre and its tributaries, where a large portion of the Bridle Shiner populations in Quebec are found, and in the eastern-most Ontario populations in the Raisin River watershed (Fraser, Finney, Gunn, Wood creeks), where water quality is highly impacted.

3.2.3 Communications and Outreach

DFO has developed outreach material specifically focused on the Bridle Shiner. Its purpose is to raise awareness of the species, its Management Plan, and how to become involved in its recovery. Targeted outreach has been conducted (municipalities, agricultural areas and shoreline landowners). See details in Section 3.2.2.

In Ontario, an extensive amount of information related to species at risk (including the Bridle Shiner), their habitat, the threats they face, as well as ways in which the public can help, has been communicated to close to 1000 attendees from a wide variety of groups including: partners (such as other government agencies and conservation authorities); municipal staff such as planners and drainage superintendents/engineers; First Nation groups; the general public, including landowners, cottagers, farmers, students; and, others such as private stakeholders, consulting and conservation groups, etc.

Finally, species at risk interpretive signs have been installed at six locations along the St. Lawrence River within the range of Bridle Shiner and several other species at risk. The signs provide information regarding the status of the Bridle Shiner as well as the threats facing the species and what can be done to help it.

3.2.4 Partnerships and Coordination Between Partners

The key players involved and interested in Bridle Shiner conservation are part of the Quebec cyprinids and small percids recovery team and the Ontario Freshwater Fish Recovery Team. These teams bring together concerned stakeholders from the federal and provincial governments and from industry and local organizations.

Furthermore, the Cooperation Agreement for the Protection and Recovery of Species at Risk in Quebec 2012 – 2022, between the governments of Canada and Quebec, and the Canada-Ontario Agreement on Species at Risk (2011-2021), between the governments of Canada and Ontario, are in effect. The purpose of these Agreements is to establish the methods by which the Parties can coordinate their activities in relation to the protection and recovery/conservation of species at risk of common interest and their habitats, and to promote collaboration to avoid duplication of efforts.

Continuing collaboration among all levels of government and continuing dialogue within recovery teams is recommended. For the species to be considered (e.g., during multi-species stewardship projects or fish surveys) and for the efficient use of limited resources, coordination among partners is essential. In addition, information obtained on the species is often incidental, as in cases where the species is found during sampling that targets another species. In these circumstances, sharing information is encouraged through dialogue and collaborative activities.

4 Concluding Statement

This progress report presents an updated picture of the Bridle Shiner's distribution. New surveys and information gathered recently extends the distribution area north and west. It supports the notion that the situation is likely not as serious as suggested by available information at the time of the 2013 COSEWIC assessment. The progress report includes a number of sites where the species was recently observed, either for the first time or where it had not been observed before for many years. Since 2011, Bridle Shiner has been observed in over 40 watercourses in Quebec and over 10 in Ontario, in addition to others in Lake Ontario and along the St. Lawrence River. Also, it is possible that the species is more widely established in the Outaouais, Estrie and Mauricie Quebec regions, where certain sites were not known to harbour the species. The presence of Bridle Shiner is now confirmed in the Saint-François River and in the watershed of the Châteauguay and Yamaska rivers, where it was believed to have been extirpated (COSEWIC 2013). Upstream distribution in the St. Lawrence River is also more extensive, with recent observations in the Ottawa River, Lake St. Francis and Lake Saint-Louis, and their tributaries. In addition, Bridle Shiner was caught in 2012, in an area near Quebec City, and in 2015 in Ottawa and Saint-Maurice rivers, which broadens the distribution range in comparison to the Management Plan (Boucher et al. 2011) and the COSEWIC report (2013).

However, COSEWIC (2013) states that threats to Bridle Shiner habitat are more severe in Quebec, especially in agricultural areas, and that the species " *may become Threatened if factors suspected of negatively influencing its persistence are not reversed* ". Pressure is significant, for example, in Lake Saint-Pierre, where large numbers of Bridle Shiner are found. Since the 2000s, the large grass beds of Lake Saint-Pierre frequented by Bridle Shiner have been disappearing in favour of a filamentous layer of benthic cyanobacteria (de la Chenelière et al. 2014). The water quality at the mouth of the tributaries, channelling of the waterway, and loss of habitat (erosion, silting, encroachment and drying up) are still of particular concern. Similarly in Ontario, the tributaries to Lake St. Francis (i.e., Finney, Fraser, Gunn, and Wood creeks) are impacted by the removal/destruction of riparian and aquatic vegetation, channelization, and sediment and turbidity loading. The impacts that some invasive species can have, as well as global warming, are added to these concerns. Efforts must continue with municipal managers and officials, the agricultural sector, and shoreline landowners to protect or improve the riparian environment and the water quality throughout the species' range.

Overall, conservation activities conducted over the last five years have helped to provide a clearer understanding of the range and extent of the Bridle Shiner in Canada and its preferred habitat. This progress helps to better focus efforts to locate and protect the species and its habitat. Stewardship and outreach activities have helped to conserve the Bridle Shiner and its habitat. Taken together, these activities indicate that progress has been made towards the goal of maintaining viable Bridle Shiner populations throughout the species' range in Canada. These efforts need to continue, including to carry out targeted inventories; ongoing data standardization and compilation; definition of habitat requirements based on biological stage, and understanding of population dynamics; characterization, monitoring and the mitigation of threats to habitat, particularly aquatic vegetation and water quality; and, finally, awareness and collaboration.

5 References

Boucher, J., M. Bérubé, A. Boyko, and M. Bourgeois. 2011. Management plan for the Bridle Shiner (*Notropis bifrenatus*) in Canada (Final version). *Species at Risk Act* Management Plan Series, Fisheries and Oceans Canada, Ottawa. v + 43 p.

Couillard, M.A., J. Boucher, and S. Garceau. 2013. Bilan de l'information disponible sur cinq espèces de poissons à statut précaire au Québec et de l'état d'avancement des activités de rétablissement, ministère du Développement durable, de l'Environnement, de la Faune et des Parcs du Québec, Direction générale de l'expertise sur la faune et ses habitats. 58 p. + annexes.

Couillard, M-A., J. Boucher, and S. Garceau. 2011. Protocole d'échantillonnage du fouille-roche gris (*Percina copelandi*), du dard de sable (*Ammocrypta pellucida*) et du méné d'herbe (*Notropis bifrenatus*) au Québec, ministère des Ressources naturelles et de la Faune du Québec, Faune Québec et Secteur des Opérations régionales. 27 p.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2013. COSEWIC assessment and status report on the Bridle Shiner *Notropis bifrenatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 30 p.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2001. COSEWIC assessment and status report on the bridle shiner *Notropis bifrenatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 19 p.

de la Chenelière, V., P. Brodeur, and M. Mingelbier. 2014. Restauration des habitats du lac Saint-Pierre: un prérequis au rétablissement de la perchaude. Le Naturaliste canadien, 138(2):12.

Gray, S.M., F.M.E. Bieber, L.H. McDonnell, L.J. Chapman, and N.E. Mandrak. 2014. Experimental evidence for species-specific response to turbidity in imperiled fishes. Aquatic Conservation 24:546–560.

Holm, E., P. Dumont, J. Leclerc, G. Roy and E.J. Crossman. 1999. COSEWIC status report on the bridle shiner *Notropis bifrenatus* in Canada, *in* COSEWIC assessment and status report on the bridle shiner *Notropis bifrenatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 19 p.

Appendix 1

Acronyms:

AAFC: Agriculture and Agri-Food Canada
AFSAR: Aboriginal Fund for Species at Risk
CDPNQ: Centre de données sur le patrimoine naturel du Québec [Quebec Natural Heritage Data Centre]
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
DFO: Department of Fisheries and Oceans (Fisheries and Oceans Canada)
ECCC: Environment and Climate Change Canada
FN: First Nations
HSP: Habitat Stewardship Program for Species at Risk
IRF: Interdepartmental Recovery Fund
MAPAQ: Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec [Quebec Department of Agriculture, Fisheries and Food]
MFFP: Ministère des Forêts, de la Faune et des Parcs du Québec [Quebec Department of Forests, Wildlife and Parks]
MNRF: Ontario Ministry of Natural Resources and Forestry
NGOs: Non-governmental organizations
PCA: Parks Canada Agency
SARA: *Species at Risk Act*