

# Report on the Progress of the Management Plan Implementation for the Banded Killifish (*Fundulus diaphanus*), Newfoundland Population, in Canada for the period of 2011-2016

## Banded Killifish (Newfoundland Population)



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For copies of the Management Plan, or for additional information on species at risk, including COSEWIC Status Reports and other related recovery documents, please visit the [SAR Public Registry](#).

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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. Section 72 of the *Species at Risk Act* (S.C. 2002, c.29) (SARA) requires that the competent minister monitor the implementation of the management plan for a species of special concern, and assess its implementation five years from the date it was placed on the Species at Risk Public Registry, and in every subsequent five-year period, until its objectives have been achieved.

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 towards the species' management and conservation. Management plans identify measures for the conservation of a species of special concern. Some of the identified measures may be sequential to the progress or completion of others; and not all may be undertaken or show significant progress during the time frame of a report on the progress of management plan implementation (Progress Report).

The Minister of Fisheries and Oceans is the competent minister under SARA for the Banded Killifish, Newfoundland population and has prepared this Progress Report.

As stated in the preamble to SARA, success in the conservation of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in the management plan and will not be achieved by Fisheries and Oceans Canada 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 Banded Killifish, Newfoundland population for the benefit of the species and Canadian society as a whole.

## Acknowledgments

This Progress Report was prepared by Fisheries and Oceans Canada (DFO). This Progress Report has been prepared with input from the Qalipu Mi'kmaq First Nation Band. The Department of Fisheries and Oceans would also like to express its appreciation to all individuals and organizations who have contributed to the conservation of the Banded Killifish, Newfoundland population.

## Executive Summary

The Newfoundland population of Banded Killifish (*Fundulus diaphanus*) was listed as a species of special concern under the *Species at Risk Act* (SARA) in 2005. The Management Plan for the Banded Killifish (*Fundulus diaphanus*), Newfoundland population, in Canada was finalized and published on the Species at Risk Public Registry in 2011.

The main threats identified for the Banded Killifish include sedimentation and altered water flows resulting from land use activities (e.g., forest harvesting, road construction/maintenance). The goal of the Banded Killifish Management Plan is to maintain existing Banded Killifish population levels and distribution, and protect habitat within watersheds in which this species is found. This goal is supported by four objectives: 1) conduct surveys and population monitoring, 2) develop site-specific best management practices to protect habitat, 3) reduce bycatch mortality in the American Eel fishery, and 4) increase-public awareness and stewardship.

During the time period reported by this Progress Report, progress has been made towards fulfilling the objectives of the Management Plan. Recent research and survey work undertaken by DFO Science has verified 42 sites in Newfoundland (objective 1) (Sargent *et al.* in prep: Figure 1). Existing best management practices/mitigation measures that support the protection of fish and fish habitat also apply to Banded Killifish (objective 2). In the American Eel fishery it is mandatory to release all bycatch (including Banded Killifish) in a manner that causes it the least harm (objective 3). In addition, a number of educational and stewardship activities have taken place to increase awareness of Banded Killifish including the creation and distribution of educational material, participation in outreach programs, presentations to fish harvesters and school visits (objective 4).

As per the Management Plan, population surveys and monitoring will be continued on an opportunistic basis to improve knowledge of the Banded Killifish distribution in Newfoundland. As new information becomes available on the Banded Killifish, Newfoundland population, educational material will be updated as necessary and shared with partners, Aboriginal groups, stakeholders, and the general public.

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# 1 Introduction

This Progress Report outlines the progress made towards meeting the objectives listed in the Management Plan for the Banded Killifish from 2011 to 2016 and should be considered as one in a series of documents for this species that are linked and should be taken into consideration together; including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports (COSEWIC 2003, 2014), and the Management Plan for the Banded Killifish (*Fundulus diaphanus*), Newfoundland Population (Fisheries and Oceans Canada. 2011).

Section 2 of the Progress Report reproduces or summarizes key information on the threats to the species, objectives for its conservation, activities to meet the objectives, and performance indicators to measure the progress of the management actions. For more details, readers should refer back to [The Management Plan for the Banded Killifish \(\*Fundulus diaphanus\*\), Newfoundland Population, in Canada](#).

Section 3 reports on the progress of activities and performance indicators identified in the Management Plan, to support achieving the outlined objectives. Section 4 summarizes the progress toward achieving the objectives.

## 2 Background

### 2.1 COSEWIC Assessment Summary

The listing of the Banded Killifish, Newfoundland population, as special concern in 2005, which led to the development and publication of the Management Plan for the Banded Killifish (*Fundulus diaphanus*), Newfoundland population, in Canada in 2011, was based on the information provided in the COSEWIC Status Report ([COSEWIC 2003](#)). This information has also been included in Section 1.1 of the Management Plan.

<b><u>Assessment Summary:</u></b>	May 2003
<b><u>Common name:</u></b>	Banded Killifish (Newfoundland population)
<b><u>Scientific name:</u></b>	<i>Fundulus diaphanus</i>
<b><u>Status:</u></b>	Special Concern
<b><u>Reason for designation:</u></b>	The population is separated from others by a major barrier to movement, i.e. 200 km of ocean. Newfoundland populations have a very limited area of occupancy. The possibility of range expansion is limited by steep gradients and impassable rapids and/or falls. Habitat degradation resulting from proposed logging would negatively impact populations in some areas
<b><u>Occurrence:</u></b>	Newfoundland
<b><u>Status history:</u></b>	Last assessment based on an update status report.

In 2014, COSEWIC re-examined and confirmed the status of the Banded Killifish, Newfoundland population, as “special concern” ([COSEWIC 2014](#)).

## 2.2 Threats

This section summarizes the information, found in the Management Plan, on threats to conservation of the Banded Killifish, Newfoundland population.

Table 1 summarizes the threats identified for Banded Killifish, Newfoundland population. Please refer to Section 1.5 of the Management Plan (Fisheries and Oceans Canada 2011) for more information on these threats.

**Table 1:** Summary of threats identified for the Banded Killifish, Newfoundland population, based on the Management Plan (Fisheries and Oceans Canada 2011).

Threat	Stress	Activity	Level of Concern	Mitigation Potential
<b>Increased suspended sediment loads</b>	Decreased primary production; decreased feeding success for sight feeding species; increased mortality; damage to gills; increased susceptibility to disease and predation	Forest Harvest	Low	High
		Other land use/Development (road development/ Maintenance)	High	High
<b>Altered water flow regime</b>	Increased mortality; increased susceptibility to disease, prey availability	Other land use/ Development (road development/ Maintenance)	Medium-High	High
<b>Impediments to migration</b>	Habitat fragmentation; habitat conversion; isolation; increased susceptibility to predation	Other land use/ Development (road development/ Maintenance)	Low	Medium
<b>Contamination (e.g. fluids from equipment, oil spills, run-off, etc.)</b>	Lower reproductive rates; increased mortality; increased susceptibility to disease and predation	Other land use/ Development (road development/ Maintenance)	Low-Medium	Medium-High
		Other land use/ development (mineral exploration, urban/cabin development )	Medium	Medium-High
<b>Directed catch, use as bait</b>	Mortality	Harvested for bait	Low	Unknown
<b>Bycatch in American Eel Fishery</b>	Mortality	Commercial fishing	Low-Medium	High
<b>Predation</b>	Mortality	Invasive species	Unknown	Unknown

## 2.3 Management Objectives

This section summarizes the information found in the Management Plan (Fisheries and Oceans Canada 2011) related to the objectives that are necessary for the conservation of the Banded Killifish, Newfoundland population, and on performance indicators that provide a way to define and measure progress toward achieving the objectives.

**Table 2:** Conservation objectives and corresponding performance indicators for the Banded Killifish, Newfoundland population, found in the Management Plan (Fisheries and Oceans Canada 2011)

Objectives	Performance Indicator
1) Conduct surveys and population monitoring	1) Where opportunities have been present, have surveys and monitoring of Banded Killifish been completed?
2) Develop site-specific best management practices to ensure habitat protection	2) Has information regarding the biology, threats and distribution of Banded Killifish been shared with those responsible for land use planning and project referral reviews? 3) Have Banded Killifish concerns been incorporated into land use planning and the project referral review process?
3) Reduce bycatch mortality in the American Eel fishery	4) Has information regarding the impact of bycatch in American Eel fisheries been considered in fisheries management plans, license conditions and fisher educational programs?
4) Increase public awareness and stewardship	5) Has a communications strategy been implemented?

## 3 Progress towards Management Objectives

The Management Plan for the Banded Killifish, Newfoundland population, (Fisheries and Oceans Canada 2011) has four management objectives for the conservation of the species: 1) conduct surveys and population monitoring, 2) development of site-specific best management practices to ensure habitat protection, 3) reduce bycatch mortality in the American Eel fishery, and 4) increase public awareness and stewardship. Progress on activities to support the management objectives and towards meeting the performance indicators is reported in Section 3.1.

### 3.1 Activities Supporting Conservation and Status of Performance Indicators

When the Banded Killifish Management Plan was published there were only 10 documented locations of Banded Killifish in Newfoundland. Recent research and field surveys conducted by DFO (from 2013-2015) has verified 42 sites of Banded Killifish including the Avalon Peninsula, the Northern Peninsula, as well as additional watersheds in southwestern Newfoundland, on the



Burin Peninsula, and in Bonavista north (Figure 1). However, some reports are yet to be verified and there are likely more unreported locations on the island. Work is still ongoing on an opportunistic basis to identify additional Banded Killifish locations in insular Newfoundland. Sargent *et al.* (in prep.) was unable to confirm the presence of Banded Killifish at the First Pond, Grand Bay West and York Harbour locations. Sargent *et al.* (in prep.) noted that the record from Star Lake was actually Stagg Lake. However, the Stagg Lake location has not been confirmed during DFO field surveys.

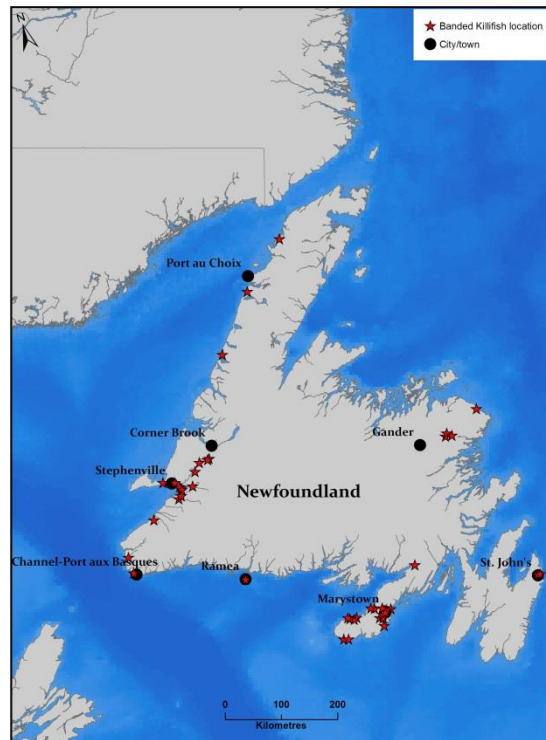


Figure 1: Current (2015) known distribution of Banded Killifish in Newfoundland

Table 3 provides information on the implementation of activities undertaken to address the management objectives and the status of performance indicators identified in the Management Plan. Each indicator has been assigned one of four statuses:

- 1) *Not met*: The performance indicator has not been met, and little to no progress has been made
- 2) *Not met, underway*: The performance indicator has not been met, but there has been moderate to significant progress made
- 3) *Met*: The performance indicator has been met and no further action is required
- 4) *Met, ongoing*: The performance indicator has been met, but efforts will continue until such time the management objectives have been achieved (i.e. the indicator will be reported against in the next five-year progress report)

**Table 3:** Details of activities supporting the conservation of the Banded Killifish from 2011 to 2016, and status of performance indicators.

Activity	Performance Indicator Status	Details	Participants
Objective 1: Surveys and population monitoring Performance Indicator: 1			
Development of Monitoring Protocols	Met, ongoing	<ul style="list-style-type: none"> <li>DFO developed and is using a standard protocol to conduct surveys.</li> </ul>	<b>Fisheries and Oceans Canada</b>
Population Surveys to Identify Additional Banded Killifish Location	Met, ongoing	<ul style="list-style-type: none"> <li>DFO conducted research and surveys that have verified 42 locations, 27 of which were previously unreported (Sargent <i>et al.</i> in prep).</li> <li>Sightings/locations have been and are being reported and recorded by Fishery Officers, other DFO personnel and external sources. DFO gave presentations on Banded Killifish to fishery guardians in 2015 and 2016.</li> <li>Through Aboriginal Funds for Species at Risk, the Mi'kmaq Alsumk Mowimsikik Koqey Association (MAMKA), particularly the Qalipu Mi'kmaq First Nation Band, conducted surveys to identify killifish locations from 2008-2010.</li> <li>Through the Habitat Stewardship Program, MAMKA and the Qalipu Mi'kmaq First Nation Band conducted a study in 2015 regarding variations in abundance and habitat utilization of killifish in St. George's Bay.</li> </ul>	<b>Fisheries and Oceans Canada, MAMKA, Qalipu Mi'kmaq First Nation Band</b>
Objective 2: Development of site specific best management practices to ensure habitat protection Performance Indicators: 2 and 3			
Circulate Banded Killifish Distribution Information to Jurisdictional	Met, ongoing	<ul style="list-style-type: none"> <li>DFO attended a Forestry Planning Team meeting with the Provincial Department of Natural Resources (regarding the Indian Bay watershed) and presented information on Banded Killifish and habitat protection measures.</li> <li>A <a href="#">Banded Killifish factsheet</a> was produced by DFO and distributed to DFO Area Offices on the island and around the province.</li> <li>DFO has been and continues to present information on Banded</li> </ul>	<b>Fisheries and Oceans Canada, Department of Environment and Conservation,</b>

Authorities and Land Managers.		Killifish as opportunities arise (e.g. presentation on Banded Killifish provided at Eastport Marine Protected Area Committee meeting).	Department of Natural Resources
Develop Site-Specific Best Management Practices as Necessary.	Met	<ul style="list-style-type: none"> <li>Existing mitigation measures/best management practices for the protection of fish and fish habitat previously developed by the former Habitat Management Program, now the Fisheries Protection Program, of DFO still apply and site-specific protocols have not been necessary.</li> <li>The DFO "<a href="#">Projects Near Water</a>" website provides information and guidance for those conducting work near water, including a list of measures to avoid harm to fish and fish habitat and links to SARA.</li> <li>In conducting project referral reviews, DFO Fisheries Protection Program considers SARA-listed species, including Banded Killifish.</li> </ul>	<b>Fisheries and Oceans Canada</b>
Objective 3: Reduce bycatch mortality in the American Eel fishery Performance Indicator: 4			
Include Mandatory Bycatch Release in Eel License Conditions and Future Fisheries Management Plans.	Met, ongoing	<ul style="list-style-type: none"> <li>Mandatory bycatch release of Banded Killifish has been implemented through licence conditions.</li> <li>Fishery Officers conduct patrols and monitor the bycatch of Banded Killifish in eel fyke nets and pots in western Newfoundland.</li> <li>Fishery Officers and Guardians promote information to anglers.</li> <li>MAMKA conducted a monitoring program to monitor Banded Killifish bycatch in the American Eel fishery.</li> </ul>	<b>Fisheries and Oceans Canada, MAMKA</b>
Objective 4: Increase public awareness and stewardship Performance Indicator: 5			
Distribute Banded Killifish Identification Cards.	Met, ongoing	<ul style="list-style-type: none"> <li>Identification cards have been updated with the most recent location data, and continue to be distributed through various venues, e.g. school visits and Ocean's Day events.</li> <li>An additional wallet-sized identification card has been developed for distribution to fish harvesters, recreational fishers and local residents in areas where Banded Killifish may be encountered.</li> </ul>	<b>Fisheries and Oceans Canada</b>

Develop Factsheet	Met, ongoing	<ul style="list-style-type: none"> <li>• DFO developed a factsheet on the Banded Killifish, Newfoundland population in 2008.</li> <li>• DFO developed a new brochure in 2016, with the most recent location data included and contact information to report sightings.</li> <li>• The province of Newfoundland and Labrador, Department of Environment and Conservation developed a <a href="#">factsheet</a>.</li> </ul>	<b>Fisheries and Oceans Canada</b> , Department of Environment and Conservation
Promote Banded Killifish Conservation During Outreach Events	Met, ongoing	<ul style="list-style-type: none"> <li>• Identification cards, factsheets, and information have been and continue to be distributed during school visits and conservation outreach events (e.g. Oceans Day).</li> </ul>	<b>Fisheries and Oceans Canada</b>
Implement Communications Strategy	Met, ongoing	<ul style="list-style-type: none"> <li>• Educational material was and continues to be developed and distributed by DFO.</li> <li>• Fishery Officers and Guardians promote information to anglers (meetings, signage, etc.).</li> <li>• Banded Killifish information is available online.</li> <li>• Banded Killifish was included on portable DFO-SARA displays which have been used at public outreach events.</li> <li>• Media has been engaged in the conservation and protection of the Banded Killifish when possible (e.g. media releases when trail signage installed).</li> </ul>	<b>Fisheries and Oceans Canada</b>

\*Lead participant(s) is/are listed on top and in bold; other participants are listed alphabetically

\*\*Not all activities have specific participants identified

## 4 Concluding Statement

Progress has been made on the objectives outlined in the Management Plan, including research and survey work to increase knowledge of distribution, information has been provided to land users, eel license conditions include mandatory bycatch release, and educational outreach through school visits and conservation outreach events.

Based on recent DFO Science research and field surveys, the Banded Killifish, Newfoundland population, has a larger distribution than previously documented. Forty-two locations were verified during this study, 27 of which are new sites documented or confirmed within the last three years (Sargent *et al.* in prep; Figure 1).

Given the new information about Banded Killifish, Newfoundland population, educational material has been updated and is being shared with partners, Aboriginal groups, stakeholders and the general public.

Continuation of management plan implementation is required to fully achieve all the objectives. Population surveys and monitoring will be continued on opportunistic basis to improve knowledge of the Banded Killifish distribution in Newfoundland. Public education and stewardship activities by DFO will continue and information will be updated as necessary.

## 5 References

COSEWIC. 2003. COSEWIC assessment and updated status report on the Banded Killifish *Fundulus diaphanus*, Newfoundland population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. Vii+21 pp.

COSEWIC. 2014. COSEWIC assessment and status report on the Banded Killifish *Fundulus diaphanus* Newfoundland population in Canada. In Committee on the Status of Endangered Wildlife in Canada. Ottawa. x+22 pp.

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Sargent, P., K. L. Dalley, and D. R. Osborne. (*in prep.*) Eastern banded killifish (*Fundulus diaphanus diaphanus*) and northern mummichog (*F. heteroclitus macrolepidotus*) distributions in insular Newfoundland waters: implications for a species at risk.