

Report on the Progress of Recovery Strategy Implementation for the Cultus Pygmy Sculpin (*Cottus aleuticus*, Cultus Population) in Canada for the Period 2007 – 2015

Cultus Pygmy Sculpin



2016

Recommended Citation:

Fisheries and Oceans Canada. 2016. Report on the Progress of Recovery Strategy Implementation for the Cultus Pygmy Sculpin (*Cottus aleuticus*, Cultus Population) in Canada for the Period 2007 – 2015. *Species at Risk Act* Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa. iii + 16 pp.

For copies of the progress report, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the [Species at Risk Public Registry](#).

Cover illustration: Cultus Pygmy Sculpin (*Cottus aleuticus*, Cultus Population). Photo credit: Michel Joseph.

Également disponible en français sous le titre « Rapport sur les progrès de la mise en oeuvre du programme de rétablissement du chabot pygmée du lac Cultus (*Cottus aleuticus*, population Cultus) au Canada pour la période allant de 2007 à 2015 »

© Her Majesty the Queen in Right of Canada, represented by the Minister of Fisheries and Oceans Canada, 2015. All rights reserved.

ISBN 978-0-660-06328-7

Catalogue no. En3-4/43-1-2016E-PDF

Content (excluding the cover illustration) may be used without permission, with appropriate credit to the source.

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 46 of the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the competent ministers are responsible for reporting 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 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 recovery strategy 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. Recovery strategies 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 Recovery Strategy Implementation (Progress Report).

The Minister of Fisheries and Oceans is the competent minister(s) under SARA for the Cultus Pygmy Sculpin (*Cottus aleuticus*, Cultus Population)¹ and has 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 recovery strategy 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 Recovery Strategy for the Cultus Pygmy Sculpin for the benefit of the species and Canadian society as a whole.

Acknowledgements

This Progress Report was prepared by The Department of Fisheries and Oceans Canada. The Department of Fisheries and Oceans would also like to express its appreciation to all individuals and organizations who have contributed to the recovery of the Cultus Pygmy Sculpin.

¹ In Schedule 1 of the *Species at Risk Act* this species is officially listed as "Coastrange Sculpin – Cultus Population." In this document, the common name "Cultus Pygmy Sculpin" is used throughout, to maintain consistency with the Recovery Strategy (NRTCPS 2007).

Executive Summary

The Cultus Pygmy Sculpin was assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2000, and subsequently listed under the *Species at Risk Act* as such in June of 2003. In October of 2007 the final *Recovery Strategy for Cultus Pygmy Sculpin (Cottus sp.) in Canada* was posted to the Species at Risk Public Registry. An updated COSEWIC assessment in 2010 reconfirmed the species' status as Threatened (COSEWIC 2010).

Threats to the Cultus Pygmy Sculpin, as identified in the *Recovery Strategy for Cultus Pygmy Sculpin (Cottus sp.) in Canada* (NRTCPS 2007), include: exotic species, altered predation rates, water use and quality, water-oriented recreation, land use, and climate change. The recovery goal for Cultus Pygmy Sculpin is to ensure the long-term viability of the population in the wild.² This taxon is likely to remain at an elevated risk due to the population's extremely limited distribution.

This report documents the progress of Recovery Strategy implementation for the Cultus Pygmy Sculpin. It summarizes progress that Fisheries and Oceans Canada, the Province of British Columbia's Ministry of Environment, and other interested parties have made towards achieving the goal and objectives set out in the Recovery Strategy, including:

- conducting new research and monitoring activities (including advancing studies to support the identification of critical habitat); and,
- completing management activities that help Canadians reduce impacts on, and better understand threats to, the Cultus Pygmy Sculpin.

² The geographic extent of this recovery goal will be clarified in a forthcoming Action Plan for the Cultus Pygmy Sculpin.

Table of Contents

Preface	i
Acknowledgements.....	i
Executive Summary	ii
Table of Contents.....	iii
1. Background.....	1
1.1 Species Status.....	1
1.2 Threats	1
1.2.1 Threats.....	1
1.2.2 Activities Likely to Destroy Critical Habitat.....	1
2. Recovery.....	2
2.1 Recovery Goal and Objectives	2
2.2 Performance Measures	2
3. Progress towards Recovery	2
3.1 Research and Monitoring Activities.....	3
3.2 Management Activities.....	8
3.3 Summary of Progress towards Recovery.....	11
4. References	15

1. Background

1.1 Species Status

Assessment Summary – April 2010

Common name

Cultus Pygmy Sculpin – Cultus Population

Scientific name

Cottus aleuticus

Status

Threatened

Reason for designation

This species is a small Canadian endemic freshwater fish found in a single lake in the lower mainland region of southwestern British Columbia, an area undergoing sustained and rapid urbanization. The lake is heavily used by recreationists and drains into the lower Fraser River area where many invasive species are well-established. Trends in indices of abundance suggest a persistent decline and the single location makes the species particularly vulnerable should either habitat quality decline or vertebrate invasive species become established in the lake.

Occurrence

British Columbia

Status history:

Designated Special Concern in April 1997. Status re-examined and designated Threatened in November 2000 and in April 2010.

Species at Risk Act status:

Listed, Threatened

1.2 Threats

1.2.1 Threats

Threats to the Cultus Pygmy Sculpin (*Cottus aleuticus*, Cultus Population), as identified in Section 3 of the *Recovery Strategy for Cultus Pygmy Sculpin (Cottus sp.) in Canada* (NRTCPS 2007), include: exotic species, altered predation rates, water use and quality, water-oriented recreation, land use, and climate change.

1.2.2 Activities Likely to Destroy Critical Habitat

Neither critical habitat nor activities likely to destroy critical habitat were identified for the Cultus Pygmy Sculpin in the Recovery Strategy; however, these will both be identified in a forthcoming Action Plan.

2. Recovery

2.1 Recovery Goal and Objectives

The Recovery Goal and Objectives³ (identified in Sections 7 and 8 of the Recovery Strategy respectively) are as follows:

Recovery Goal

Ensure the long-term viability of the population in the wild.⁴ This taxon is likely to remain at an elevated risk due to the population's extremely limited distribution.

Recovery Objectives

1. Foster awareness of Cultus Pygmy Sculpin and its conservation status. Encourage active local involvement in stewardship and habitat protection.
2. Maintain, and where possible enhance, the ecological integrity of habitat for Cultus Pygmy Sculpin.
3. Increase scientific understanding of Cultus Pygmy Sculpin through additional investigation of its natural history, critical habitat and threats to its persistence.

2.2 Performance Measures

Performance Measures (as outlined in Section 9 of the Recovery Strategy) are reproduced in detail in Section 3.3 of this report.

3. Progress towards Recovery

Section 46 of the Species at Risk Act requires the competent Minister to report on the implementation of the Recovery Strategy and the progress towards meeting its objectives, within five years after it is included in 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. In the interest of capturing the most recent progress on the recovery of the Cultus Pygmy Sculpin, this document includes actions completed up to 2015.

³ Referred to in the forthcoming Action Plan for the Cultus Pygmy Sculpin as "population and distribution objectives."

⁴ The geographic extent of this recovery goal will be clarified in a forthcoming Action Plan for the Cultus Pygmy Sculpin.

3.1 Research and Monitoring Activities

Table 1. Summary of achievements towards completing the Schedule of Studies and/or identification of critical habitat, as well as new research and monitoring activities conducted/ongoing since the completion of the Recovery Strategy

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved ⁵
Activities from Schedule of Studies outlined in 2007 Recovery Strategy. / General Approach: Delineate and protect key habitats.				
1	Develop a better understanding of habitat use by different life stages of Cultus Pygmy Sculpin.	2, 3	<ul style="list-style-type: none"> • Woodruff (2010) and Woodruff and Taylor (2013) conducted: <ul style="list-style-type: none"> ○ trawling and minnow trapping in Cultus Lake (2007-08; further informing areas inhabited by the species); and, ○ a behavioural study (2007-08) analyzing depth selection in laboratory. 	UBC; ⁶ BC MOE; ⁷ WWF; ⁸ NSERC ⁹
			<ul style="list-style-type: none"> • DFO¹⁰ conducted trawling and minnow trapping in Cultus Lake (2011-12, 2014-15) further informing areas inhabited by the species. • DFO's CLSRL¹¹ conducted habitat monitoring through water quality and plankton sampling in summer and fall of 2011. 	DFO
2	Review historic and current habitat availability.	1, 2, 3	<ul style="list-style-type: none"> • The following activities assisted in the determination of baseline habitat features, and the comparison between habitats over time (Fraser Basin Council n.d.): <ul style="list-style-type: none"> ○ oral histories to establish lake base-lines collected from senior Cultus Lake residents; housed at Chilliwack Museum; ○ a literature review of 72 Cultus Lake scientific documents; housed at FVRD;¹² and, 	CLASS & Partners ¹³
			<ul style="list-style-type: none"> ○ a review of current habitat availability in a CSAS¹⁴ Science Advisory Report (DFO 2012) and Research Document (Chiang et al. 2015). 	DFO

⁵ This column is based on the best available information; DFO acknowledges the large network of people that contribute to recovery of this species, and regrets any potential omissions in Tables 1 and 2.

⁶ University of British Columbia.

⁷ Province of British Columbia's Ministry of Environment.

⁸ World Wildlife Fund.

⁹ Natural Sciences and Engineering Research Council.

¹⁰ Fisheries and Oceans Canada.

¹¹ Cultus Lake Salmon Research Laboratory.

¹² Fraser Valley Regional District.

¹³ Cultus Lake Aquatic Stewardship Strategy; refer to Section 3.3 for a more detailed list of CLASS partners.

¹⁴ Canadian Science Advisory Secretariat.

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved ⁵
3	Review historic and current population abundance.	3	<ul style="list-style-type: none"> The most recent CPS¹⁵ COSEWIC Status Report (2010) suggests there is no robust data to ascertain a population trend. Chiang et al.'s (2015) critical habitat Research Document acknowledges no tangible historic or current population estimate value exists. All available abundance data are being considered in the development of a forthcoming Action Plan. 	COSEWIC; DFO
4	Set recovery targets for each major life stage.	3	<ul style="list-style-type: none"> Woodruff's Master's Thesis (2010) acknowledges information gaps for multiple life stages, potentially assisting in developing more specific recovery targets. 	UBC; BC MOE; WWF; NSERC
5	<p>Develop quantitative relationships between habitat and abundance.</p> <p>Use population targets and relationships between habitat types and abundance to determine how much of the different habitats are required to maintain a viable population of Cultus pygmy sculpin, and identify specific locations of these habitats in the wild.</p> <p>Conduct studies to help define critical habitat for Cultus pygmy sculpin.</p>	1, 2, 3	<ul style="list-style-type: none"> Woodruff (2010) and Woodruff and Taylor (2013) conducted: <ul style="list-style-type: none"> trawling and minnow trapping in Cultus Lake (2007-08; further informing distribution and habitat preferences, and potentially facilitating future abundance estimates); and, a behavioural study (2007-08) analyzing depth selection in laboratory. 	UBC; BC MOE; WWF; NSERC
			<ul style="list-style-type: none"> In 2011, DFO conducted the following activities providing new information on habitat use and behavior of the CPS: <ul style="list-style-type: none"> a technical workshop seeking input on critical habitat identification with resulting publications (DFO 2012, Chiang et al. 2015) making recommendations for critical habitat identification; a workshop seeking input for a CPS Action Plan; and, in 2012, a community open house consulting on the draft Action Plan. 	DFO; BC Parks; BCMFLNRO; ¹⁶ ECCC; ¹⁷ CLASS
			<ul style="list-style-type: none"> DFO conducted trawling and minnow trapping in Cultus Lake (2011-12), further informing distribution and habitat preferences, and potentially facilitating future abundance estimates. 	DFO
General Approach: Undertake specific research activities to fill knowledge gaps and clarify threats.				
6	Assess taxonomic status of Cultus pygmy sculpin.	3	<ul style="list-style-type: none"> Woodruff (2010) and Woodruff and Taylor (2013) collected samples to confirm the identity of the CPS, and assess phylogeographic differences from Coastrange Sculpin through mtDNA¹⁸/microsatellite analysis and morphometric measurements. 	UBC; BC MOE; WWF; NSERC

¹⁵ Cultus Pygmy Sculpin.

¹⁶ British Columbia's Ministry of Forests, Lands, and Natural Resource Operations.

¹⁷ Environment and Climate Change Canada

¹⁸ Mitochondrial deoxyribonucleic acid.

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved ⁵
7	Address information gaps that inhibit conservation of Cultus pygmy sculpin.	1, 2, 3	<ul style="list-style-type: none"> • Refer to rows 1, 2, 3, 5, 6, and 8. 	Refer to rows 1, 2, 3, 5, 6, and 8.
			<ul style="list-style-type: none"> • Between 2012 and 2015 DFO conducted: <ul style="list-style-type: none"> ○ analyses of CPS gut contents to infer diet preferences; and, ○ target strength analyses to inform potential hydroacoustic enumeration techniques. • In 2014-15 DFO experimentally assessed benthic habitat preferences of CPS. 	DFO
			<ul style="list-style-type: none"> • CLASS (2013), volunteers, and students from Sardis Secondary School developed a 3D map of the Cultus Lake Watershed, housed at the Cultus Lake Park Board Office. 	CLASS & Partners
			<ul style="list-style-type: none"> • CLASS collaborated with DFO to investigate nutrient mass balance in Cultus Lake in 2011-12, including the following specific activities (Robinson pers. comm. 2013): <ul style="list-style-type: none"> ○ collected water samples; ○ developed a model to determine the source and quantity of nutrients; ○ initiated nutrient analysis of bird guano; ○ estimated the retention of nutrients using a lake-bed core; and, ○ initiated a scientific report on nutrient sources and loadings. 	CLASS; DFO
			<ul style="list-style-type: none"> • The Cultus Lake Project was initiated in 2010, consisting of volunteer divers collecting information on topography, flora, fauna, and habitat of Cultus Lake, and behavior of CPS via photo and video footage (Cultus Lake Project n.d.). • Specifically, the Cultus Lake Project has conducted: <ul style="list-style-type: none"> ○ general observational surveys of the littoral and sub littoral zones; ○ observations of CPS behaviour with respect to debris and man-made structures; and, ○ observational dives in suspected reproductive areas. 	Cultus Lake Project
<ul style="list-style-type: none"> • Putt (2014) conducted the following: 	SFU; ¹⁹ NSERC;			

¹⁹ Simon Fraser University.

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved ⁵
			<ul style="list-style-type: none"> ○ constructed water and nutrient budgets for the Cultus Lake watershed to identify major sources of nitrogen and phosphorus loadings; and ○ developed a steady-state water quality model to explore water quality changes in response to various scenarios of nutrient loading. 	FSWP; ²⁰ CWFESF ²¹
8	Clarify and address threats to Cultus pygmy sculpin.	1, 2, 3	<ul style="list-style-type: none"> • CLASS collaborated with DFO to investigate nutrient mass balance in Cultus Lake in 2011-12, assisting in evaluating nutrient loading from direct and indirect human impacts. • The Fraser Basin Council held a Water Quality and Milfoil Technical Workshop²² February 15, 2013 and produced subsequent reports (Fraser Basin Council 2013). • The FVRD enabled traffic counters with data available annually to better understand levels of recreational use in Cultus Lake (CLASS 2013). • CLASS initiated studies to better understand predation on CPS (e.g. histopathology of predator species and analysis of their stomach contents) (Robinson pers. comm. 2013). 	CLASS & Partners
			<ul style="list-style-type: none"> • An RPA²³ (DFO 2008) acknowledged the potential threat of salmonid predation on CPS. • A CSAS Science Advisory Report (DFO 2012) and Research Document (Chiang et al. 2015), as well as a forthcoming Action Plan reviewed and updated threats to the CPS. 	DFO
9	Develop and implement a long-term monitoring program.	3	<ul style="list-style-type: none"> • Woodruff's (2010), Woodruff and Taylor's (2013), and DFO's minnow trapping and trawling (refer to Row 5 of Table 1) have contributed short term monitoring efforts. 	DFO; UBC; BC MOE; WWF; NSERC
			<ul style="list-style-type: none"> • Harvey and Brown (2013b) incorporated best monitoring approaches into a draft SARA multi-species compendium report, which will inform the development and implementation of a comprehensive monitoring plan. 	DFO
			<ul style="list-style-type: none"> • The Cultus Lake Project developed identification slates to educate and assist members in the observation of CPS (Carlisle pers. comm. 2013). 	Cultus Lake Project

²⁰ Fraser Salmon and Watersheds Program.

²¹ Canadian Wildlife Federation Endangered Species Fund.

²² Attended by the Mississippi State University, Okanagan Basin Water Board, Idaho Department of Agriculture, and Invasive Species Council of BC.

²³ Recovery Potential Assessment.

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved ⁵
10	Develop sound protocols for scientific investigations (e.g. limit number of fish collected each year, etc.).	2, 3	<ul style="list-style-type: none"> • Harvey and Brown (2013a, 2013b) incorporated best collection and monitoring approaches into draft SARA multi-species compendium reports, which will inform the development and implementation of a comprehensive monitoring plan. • Applications for scientific study involving CPS undergo permitting considerations per section 73 of the <i>Species at Risk Act</i>. 	DFO

3.2 Management Activities

Table 2. Summary of activities undertaken to reduce or eliminate threats to the CPS

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved
General Approach: Establish and support stewardship initiatives.				
11	Establish and support a Recovery Implementation Group (RIG) or alternative working group for Cultus pygmy sculpin.	1	<ul style="list-style-type: none"> • CLASS was established in 2007 (CLASS 2013), and subsequently added the implementation of Cultus Pygmy Sculpin recovery measures to its portfolio. 	CLASS & Partners
12	Inform and educate stakeholders and the general public about the species and general biodiversity values.	1	<ul style="list-style-type: none"> • CLASS and partners conducted the following educational activities (Robinson pers. comm. 2013; Toth pers. comm. 2015): <ul style="list-style-type: none"> ○ produced a Cultus Lake User Survey Report to determine public environmental awareness (CLASS 2011); ○ participated in community parades promoting CPS awareness; ○ launched “PS [Pygmy Sculpin] I Love You” campaign with T-shirts and postal box postings on Valentine's Day; ○ promoted the “Caring for Cultus Lake” handbook for residents and visitors (Fraser Basin Council n.d.); ○ promoted the development of an Aquatic Invasive Species Regulation under the <i>Fisheries Act</i>; ○ communicated scientific information to local government (e.g. the need for sewer pipe to manage nutrient loading); ○ contributed to longhouse events on the topic of Cultus Lake for stewards and community members (hosted by Soowahlie First Nation, Stó:lō elders and others; Fraser Basin Council n.d.); ○ established a sewerage committee to explore and document nutrient reduction options (Fraser Basin Council n.d.). ○ CLASS participant and President of the Chilliwack Arts Council created a one meter long species sculpture displayed in parades and community events (e.g. Cultus Pikeminnow Derby, ~1000 in attendance); ○ Soowahlie First Nation youth published CPS art work with booklets in their health center, and Stó:lō school Library; ○ produced a five year report on the accomplishments of CLASS between 2007 and 2012 (CLASS 2012); ○ promoted public awareness of water quality research conducted by DFO and SFU (CLASS 2015); and, 	CLASS & Partners

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved
			<ul style="list-style-type: none"> ○ launched a new website to promote CLASS and its activities. • Divers granted the use of photos to CLASS for outreach purposes (Robinson pers. comm. 2013). 	Cultus Lake Project
General Approach: Minimize impacts from land and water use.				
13	Jointly develop land management strategies for crown and private lands.	1, 2	<ul style="list-style-type: none"> • DFO held a March 2011 workshop to gather input for a CPS Action Plan, and a subsequent November 2012 community open house to consult on this draft Action Plan, including critical habitat identification. • In 2012, DFO sent letters regarding consultation on a draft Action Plan for CPS to approximately 150 private landowners to encourage involvement in recovery of the species. • A forthcoming Action Plan for the CPS recommends consideration of the Cultus Lake watershed and CPS conservation into the Official Community Plan process for the Electoral Area E of the FVRD. 	DFO
			<ul style="list-style-type: none"> • The <i>Caring for Cultus Lake</i> handbook (South Coast Conservation Program n.d.) recommends stewardship actions for land owners. 	South Coast Conservation Program
			<ul style="list-style-type: none"> • The CLPB²⁴ is collaborating with the FVRD to develop the <i>PlanCultus Community and Park Plan</i> (PlanCultus 2014). 	CLPB; FVRD
14	Establish water quality and water use objectives for Cultus Lake.	1, 2	<ul style="list-style-type: none"> • A forthcoming Action Plan for the CPS identifies water quality objectives, particular areas of interest for monitoring efforts, and attributes of critical habitat related to water quality. 	DFO
			<ul style="list-style-type: none"> • FVRD's <i>Cultus Lake South Sewerage Planning Study</i> assessed current and historic sewage practices, and made recommendations for mitigating nitrogen loading with respect to a septic field (FVRD 2012). • Building on the <i>Cultus Lake South Sewerage Planning Study</i>, the FVRD's <i>Sewer Infrastructure Assessment</i> (ISL Engineering 2014) assessing the options for effluent discharge to the ground or surface water. • The FVRD is also undertaking a liquid waste management plan which addresses water quality for Cultus Lake (FVRD 2015). 	FVRD
15	Develop a watershed-scale land use plan that identifies and protects key areas, and ensures that cumulative impacts of development in the	1, 2	<ul style="list-style-type: none"> • A forthcoming Action Plan for the CPS recommends consideration of Cultus Lake watershed and the CPS conservation into the Official Community Plan process for the Electoral Area E of FVRD to ensure further land development plans in the Columbia Valley protect the integrity of Cultus Lake from cumulative impacts. 	DFO

²⁴ Cultus Lake Park Board.

#	Strategy	Recovery Objectives Addressed	Activities Completed or Underway	Organizations Involved
	watershed do not adversely impact key habitats.		<ul style="list-style-type: none"> • The CLPB is collaborating with the FVRD to develop the <i>PlanCultus Community and Park Plan</i> (PlanCultus 2014). 	CLPB; FVRD
16	(Other; not identified in 2007 Recovery Strategy).	2	<ul style="list-style-type: none"> • In 2015, DFO approved the <i>Aquatic Invasive Species Regulations</i> under the federal <i>Fisheries Act</i>, providing a suite of regulatory tools that can be used to prevent new introductions and manage spread of aquatic invasive species. 	DFO

3.3 Summary of Progress towards Recovery

Action Planning

Fisheries and Oceans Canada, in cooperation with the Province of British Columbia's Ministry of Environment, is developing an Action Plan for the Cultus Pygmy Sculpin as part of the Government of Canada's ongoing commitment to the conservation of species at risk through the implementation of the *Species at Risk Act*.

Report on Performance Measures

Performance measures (as outlined in the Recovery Strategy) and their outcomes are addressed below.

1) Has a RIG or working group been established? Is the RIG adequately supported with funding and technical expertise? Has an Action Plan been developed? Is the RIG achieving the goals outlined in the Recovery Strategy?

Groups such as CLASS and the Cultus Lake Project perform the functions of RIGs. Funding is largely obtained on a year-to-year basis. Specifically, CLASS is supported via technical expertise, cash, and in-kind contributions by the following organizations: Fraser Basin Council, Fisheries and Oceans Canada, Fraser Valley Regional District, municipal government staff, BC Parks, Canadian Wildlife Federation, Pacific Salmon Foundation, Fraser River Salmon Table, BC Family Fishing, Vancity, Soowahlie First Nation, Ts'elxwéyeqw Tribe, Stó:lō Tribal Council, Stó:lō Nation members, Fraser Salmon Watershed Program, Lindell Beach ratepayers, Columbia Valley residents, Cultus Community Association, youth, school districts, teachers, artists, businesses, industry, various non-governmental organizations, and others.

DFO developed a draft Action Plan for the Cultus Pygmy Sculpin in cooperation with the Province of British Columbia's Ministry of Environment, as per section 48(1) of the *Species at Risk Act*. DFO conducted regional consultations on this draft in November and December 2012. A Proposed Action Plan for the Cultus Pygmy Sculpin is currently under development.

The goal of the Recovery Strategy may never be fully achieved due to the Cultus Pygmy Sculpin's extremely limited distribution. However, in the timeframe of this report many achievements (outlined in Tables 1 and 2) are contributing to the recovery of the species.

2) Has taxonomic status of Cultus Pygmy Sculpin been clarified?

Woodruff (2010) and Woodruff and Taylor (2013) published taxonomic research and a recommendation with respect to Designatable Unit status under COSEWIC.

3) Are there key information gaps that inhibit conservation of Cultus Pygmy Sculpin?

Several information gaps have been addressed, particularly regarding: life history, taxonomic status, and habitat use (DFO unpub. data, Woodruff 2010, Woodruff and Taylor 2013); diet (DFO unpub. data); genetics (Woodruff 2010, Woodruff and Taylor 2013); predation (Robinson pers. comm. 2013); threat clarification (DFO 2012, Chiang et al. 2015, Fraser Basin Council 2013); and monitoring of Cultus Lake (e.g. nutrient mass balance, water quality, plankton sampling; M. Robinson pers. comm. 2013, DFO unpub. data). However, several additional items remain to be addressed, namely related to: population abundance and dynamics; basic biology;

water quality; nutrient loading/eutrophication; and, potential interactions with Cultus Lake Sockeye Salmon recovery efforts.

4) Have threats been clarified and assessed? Are threats being mitigated?

All research and monitoring conducted (refer to Rows 1, 2, 3, 5, 6, 7, 8, and 9 of Table 1) improves the understanding of threats to the Cultus Pygmy Sculpin. For example recording locations of Cultus Pygmy Sculpin captures and changes in habitat over time may indicate when and where threats are the most prominent. Increased knowledge of genetics may inform the degree of the Cultus Pygmy Sculpin's endemism and overall susceptibility to threats. And, specific studies on nutrient loading, predation, and invasive species have further added to the body of knowledge for this species. Threats are further clarified and expanded upon in a CSAS Science Advisory Report (DFO 2012) and Research Document (Chiang et al. 2015), as well as a forthcoming Action Plan which outlines measures for mitigation and protection.

5) Has critical habitat been defined for Cultus Pygmy Sculpin?

DFO published a CSAS Science Advisory Report titled *Recommendations for Cultus Pygmy Sculpin critical habitat* (DFO 2012) and a Research Document titled *Identification of critical habitat for Coastrange Sculpin (Cultus Population) (Cottus aleoticus)* (Chiang et al. 2015). A forthcoming Action Plan for the Cultus Pygmy Sculpin will officially identify critical habitat.

6) Have monitoring programs been implemented? How long has a monitoring program been in place? Is it effective? Is it a benign activity for the population? Is funding secure for the long term?

Harvey and Brown (2013b) incorporated best monitoring approaches into a draft SARA multi-species compendium report, which will inform the development and implementation of a comprehensive monitoring plan; handling is minimized in this approach, and is expected to be benign to the population. Effectiveness of a monitoring program is pending full implementation and analysis of data. Funding is largely obtained on a year-to-year basis.

7) Have key areas in the watershed (i.e., those that are disproportionately important for maintaining habitat) been identified? Has a watershed plan that recognizes these habitats as important been developed? Have key habitats been effectively protected?

Woodruff's Master's Thesis (2010) documented and confirmed habitat usage patterns observed historically, assisting in the identification of key areas in the watershed. DFO also developed a CSAS Science Advisory Report titled *Recommendations for Cultus Pygmy Sculpin critical habitat* (DFO 2012) and a Research Document titled *Identification of critical habitat for Coastrange Sculpin (Cultus Population) (Cottus aleoticus)* (Chiang et al. 2015). In addition, the Cultus Lake Park Board is collaborating with the Fraser Valley Regional District to develop the "PlanCultus Community and Park Plan"; the document takes management of the Cultus Lake watershed and its wildlife into consideration (PlanCultus 2014).

Under SARA, critical habitat must be legally protected from destruction within 180 days of being identified in a recovery strategy or action plan. A forthcoming Action Plan for the Cultus Pygmy Sculpin will identify critical habitat. It is anticipated that the protection of the species' critical habitat from destruction 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.

8) Have water quality and water use objectives been established and communicated to relevant regulators and stakeholders?

A forthcoming Action Plan for the Cultus Pygmy Sculpin identifies the development and implementation of an integrated land and water use plan (including investigating and establishing appropriate water quality objectives) as an activity to be undertaken voluntarily by other agencies, organizations and individuals.

9) Have educational materials been produced? Has public perception and awareness been affected? How many classes have received educational presentations?

Many educational materials have been produced including: a scale model of the species, identification slates, photos, T-shirts, postal box postings, a *Caring for Cultus Lake* handbook, a *Cultus Lake User Survey Report*, Soowahlie First Nation art work, a summary report of activities conducted by CLASS from 2007 to 2012; and, a new CLASS website (refer to rows 12 and 13 of Table 2 for more details).

With respect to public perception, CLASS developed a *Cultus Lake User Survey Report* (2011). This survey asked ~157 people to indicate their level of concern for the Cultus Pygmy Sculpin, among other species. Without a follow-up survey for comparison it remains difficult to assess whether public perception has been affected or not. Therefore, the 2011 report may serve as a baseline from which progress can be measured in the future.

An estimated 11 school classes have received educational presentations (Robinson pers. comm. 2013; CLASS 2015).

10) Have land management criteria been developed? Is land development meeting the criteria? Have BMPs^[25] been developed and communicated? Is there compliance with BMPs?

The FVRD's Official Community Plan for Electoral Area "E" (now "H") includes numerous policies on Development Permit Area requirements in the Cultus Lake South – Lindell Beach area for sewage treatment and riparian area assessments, as well as development policies for rezoning that address storm water management impacts to Cultus Lake (Smith pers. comm. 2015). In addition, a forthcoming Action Plan for the Cultus Pygmy Sculpin identifies the development and implementation of an integrated land and water use plan as an activity to be undertaken voluntarily by other agencies, organizations and individuals; development of land management criteria is inherent in this activity. Development of official BMPs is also identified in a forthcoming Action Plan as an activity to be undertaken voluntarily by other agencies, organizations and individuals. Compliance monitoring is pending the establishment of official BMPs.

11) Have scientific investigation protocols been set and communicated? Have they been implemented?

Harvey and Brown (2013a, 2013b) incorporated best collection and monitoring approaches into draft SARA multi-species compendium reports, which will inform the development and implementation of a comprehensive monitoring plan. Communication and implementation of protocols are pending publication. Applications for scientific study involving the Cultus Pygmy

²⁵ Best management practices.

Sculpin undergo permitting considerations per section 73 of the *Species at Risk Act*. Additional protocols may also be required as part of provincial permitting processes.

4. References

- Carlisle, D., pers. comm. 2013. *E-mail to A. Gerick*. August 2013. Coordinator, Cultus Lake Project, British Columbia.
- Chiang, E., L. Pon, D.T. Selbie, J.M.B. Hume, P. Woodruff, and G. Velema. (2015). Identification of critical habitat for Coastrange Sculpin (Cultus Population) (*Cottus aleuticus*). DFO Canadian Science Advisory Secretariat Research Document 2015/033.
- CLASS. 2011. Cultus Lake aquatic stewardship strategy: Projects completed. [Cultus Lake user survey report](#) [accessed May 2015].
- CLASS. 2012. 5 – year report Oct. 2007 to March 2012. Available online at: [5 – year report Oct. 2007 to March 2012](#) [accessed August 2015].
- CLASS. 2013. Cultus Lake Aquatic Stewardship Strategy. Available online at: [Cultus Lake Aquatic Stewardship Strategy](#) [accessed May 2015].
- CLASS. 2015. Water quality threatened at Cultus Lake says research. Available online at: [Water quality threatened at Cultus Lake says research](#) [accessed August 2015].
- COSEWIC. 2000. COSEWIC report on the Cultus pygmy sculpin *Cottus* sp. in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 9 pp.
- COSEWIC. 2010. COSEWIC assessment and status report on the Coastrange Sculpin *Cottus aleuticus*, Cultus Population in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 28pp.
- Cultus Lake Park. 2013. Community planning. Available online at: [Terms of reference: Cultus Lake Park official community plan](#) [accessed May 2015].
- DFO. 2008. Science Advisory report on Recovery potential of the Cultus Pygmy Sculpin (*Cottus* sp.). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2008/033.
- DFO. 2012. Recommendations for Cultus Pygmy Sculpin critical habitat. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2011/074.
- Fisheries and Oceans Canada. 2014. [Draft] Action Plan for the Cultus Pygmy Sculpin (*Cottus aleuticus*-*Cultus* population) in Canada. *Species at Risk Act* Action Plan Series. Fisheries and Oceans Canada, Ottawa. vi + 35 pp.
- Fraser Basin Council. n.d. Cultus Lake. Available online at: [Cultus Lake Aquatic Stewardship Strategy \(CLASS\)](#) [accessed May 2015].
- Fraser Basin Council. 2013. Workshop summary. [Water Quality and Eurasian Watermilfoil Technical Workshop](#) [accessed May 2015].
- FVRD. 2012. Cultus Lake south sewerage planning study. Available online at: [Cultus Lake South Sewerage Planning Study](#) [accessed May 2015].
- FVRD. 2015. Cultus Lake liquid waste management plan. Available online at: [Cultus Lake Liquid Waste Management Plan](#) [accessed August 2015].
- Harvey, B., and T.G. Brown. 2013a. [Draft] Guidance on protocols for collection of coastal freshwater species. Government of Canada, Ottawa. 27 pp.
- Harvey, B., and T.G. Brown. 2013b. [Draft] Monitoring recovery in a group of SARA-listed freshwater fish species. Government of Canada, Ottawa. 56 pp.
- ISL Engineering. 2014. Cultus Lake sanitary sewer infrastructure assessment. Available online at: [Cultus Lake Sanitary Sewer Infrastructure Assessment](#) [accessed August 2015].
- NRTCPS (National Recovery Team for Cultus Pygmy Sculpin). 2007. Recovery Strategy for Cultus Pygmy Sculpin (*Cottus* sp.) in Canada. *Species at Risk Act* Recovery Strategy Series, Fisheries and Oceans Canada, Ottawa. v + 21 pp.
- PlanCultus. 2014. PlanCultus community and park plan. Available online at: [Plan Update](#) [accessed May 2015].
- Putt, A.E. 2014. Spatiotemporal nutrient loading to Cultus Lake: Context for eutrophication and implications for integrated watershed-lake management. M.R.M. Thesis, Simon Fraser University, Burnaby, British Columbia. vii + 102 pp.

- Robinson, M., pers. comm. 2013. *Emails to A. Gerick*. August and November 2013. Manager, Special Projects, Fraser Basin Council, Vancouver, British Columbia.
- Smith, D., pers. comm. 2015. *E-mail to A. Gerick*. August 2015. Planner, Fraser Valley Regional District, British Columbia.
- South Coast Conservation Program. n.d. Cultus pygmy sculpin: Resources. Available online at: [Caring for Cultus Lake: A handbook for residents and visitors](#) [accessed May 2015].
- Toth, C., pers. comm. 2015. *Telephone discussion with A. Gerick*. Assistant Regional Manager for the Fraser Valley, Fraser Basin Council, British Columbia.
- Woodruff, P. 2010. A genetic and behavioural analysis of the distinctiveness of the Coastrange Sculpin (Cultus Population) (*Cottus aleuticus*) and implications for its conservation. M.Sc. Thesis, University of British Columbia, Vancouver, British Columbia. ix + 102 pp.
- Woodruff, P.E., and E.B. Taylor. 2013. Assessing the distinctiveness of the Cultus pygmy sculpin, a threatened endemic, from the widespread coastrange sculpin *Cottus aleuticus*. *Endangered Species Research* 20(2013):181-194.