Species at Risk Act
Management Plan Report Series

Report on the Progress of Management Plan Implementation for Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), British Columbia Population, in Canada for the Period 2017 to 2021

Westslope Cutthroat Trout

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Preface

The *Species at Risk Act* (S.C. 2002, c.29) (SARA) requires reporting on the implementation of the management plan for a species at risk, and on the progress towards meeting its objectives within 5 years of the date when the final management plan was placed on the Species at Risk Public Registry, and every subsequent 5 years, until its objectives have been achieved. This reporting must be done by the competent ministers.

The Minister of Fisheries and Oceans and the Minister responsible for Parks Canada (PC) are the competent ministers under SARA for the Westslope Cutthroat Trout (British Columbia population) and have prepared this progress report.

Reporting on the progress of management plan implementation requires reporting on the collective efforts of the competent ministers, provincial and territorial governments, and all other parties involved in conducting activities that contribute to the species' conservation. Management plans set goals and objectives for maintaining sustainable population levels of 1 or more species that are particularly sensitive to environmental factors, but which are not in danger of becoming extinct. Some of the identified broad 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).

As stated in the preamble to SARA, success in the conservation of species at risk depends on the commitment and cooperation of many different groups and will not be achieved by Fisheries and Oceans Canada (DFO), PC, 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 benefit of Westslope Cutthroat Trout (British Columbia population) and Canadian society as a whole.

Acknowledgments

This progress report was prepared by Marlena McCabe (DFO) with inputs from Manon Morrissette (DFO), Erin Gertzen (DFO), Ahdia Hassan (DFO), Shelley Humphries (PC), and Diane Casimir (PC). To the extent possible, this progress report has been prepared with inputs from Heather Lamson (British Columbia Ministry of Forests [BC MOF]), Matt Neufeld (BC MOF), Kevin Heidt (BC MOF), Nick Mazany-Wright (Canadian Wildlife Federation [CWF]), Nicolas Lapointe (CWF), Georgia Peck (Living Lakes Canada), and Rich McCleary (DFO). DFO would also like to express its appreciation to all individuals, PC, and other organizations who have contributed to the conservation of Westslope Cutthroat Trout (British Columbia population).

Executive summary

Westslope Cutthroat Trout (British Columbia population; *Oncorhynchus clarkii lewisi*) (herein referred to as WCT) was listed as special concern under the *Species at Risk Act* (SARA) in 2010. The "Management Plan for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), British Columbia Population, in Canada" was published on the Species at Risk Public Registry in 2017 (DFO 2017).

The threats identified for WCT include: forest harvest; mining; linear projects[1]; agriculture; residential, recreational, and commercial development; water use; permanent water withdrawal (consumptive); water use (temporary diversions/dams; non-consumptive); fishing; aquaculture, hatcheries, and stocking; and climate change and severe weather.

The management goal for WCT is long-term persistence of WCT within its native range.

The management objectives for WCT are to:

1. maintain the native distribution and genetic diversity of populations
2. maintain wild populations at abundance levels that prevent at-risk status assessment
3. maintain, or rehabilitate, the capacity of natural habitat to meet abundance targets for populations

The "Report on the Progress of Management Plan Implementation for Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), British Columbia Population, in Canada for the Period 2017 to 2021" reports on the progress made by DFO, its partners, stakeholders and the broader conservation community towards implementing the management plan and achieving its objectives. During this time period, progress includes:

- barrier assessments and habitat use studies to identify where restoring habitat connectivity could support WCT conservation within the Elk Valley
- genetic studies on introgression to assess hybridization rates of WCT with Rainbow Trout (*Oncorhynchus mykiss*)
- implementation of a Whiteswan Lake Provincial Park management plan that has helped reduce hybridization risk through construction of a barrier to prevent migration of Rainbow Trout into WCT habitat in the White River
- development and annual implementation of standardized protocols to determine WCT total abundance in specific provincially-managed streams
- barrier remediation and fish passage restoration for WCT, other salmonids, and other species at risk
- development of novel non-lethal methods for whirling disease monitoring in WCT

While progress has been made towards meeting the management plan's management goal and objectives, additional work is necessary to ensure the long-term viability of WCT. Further work may include: preventing and mitigating hybridization with Rainbow Trout, continuing barrier remediation projects, and continued characterization and mitigation of threats to WCT and its habitat.

[1] Developments including, but not limited to, roads, railways, trails, pipelines, and associated water crossings.

DFO and PC remain committed to the conservation of WCT. The progress made to date has built a strong foundation for continued research and management of this species over the next reporting period. This progress would not have been achieved without the contributions from partners such as BC MOF. DFO and PC look forward to continuing these successful collaborations and welcomes the participation of additional partners.

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1 Introduction

The “Report on the Progress of Management Plan Implementation for Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), British Columbia Population, in Canada for the Period 2017 to 2021” (herein referred to as the progress report) outlines the progress made towards meeting the management goal and objectives listed in the “Management Plan for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*), British Columbia Population, in Canada” (herein referred to as the management plan) (Fisheries and Oceans Canada [DFO] 2017) from 2017 to 2021. The management plan consists of 2 parts: part 1, federal addition to the “Management Plan for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) in British Columbia,” (herein referred to as the federal addition) prepared by DFO; and part 2, “Management Plan for the Westslope Cutthroat Trout (*Oncorhynchus clarkii lewisi*) in British Columbia,” prepared by the British Columbia (BC) Ministry of Forests (herein referred to as the “BC management plan”). The BC management plan was adopted under section 69 of the *Species at Risk Act* (SARA), which, along with the federal addition, fulfills the requirements of a SARA management plan.

The progress report is part of 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 2006; COSEWIC 2016) and the management plan (DFO 2017).

Section 2 of the progress report summarizes key information on the threats to the species and the management goal and objectives for achieving its conservation. For more details, readers should refer back to the management plan (DFO 2017). Section 3.1 reports on the progress of implementing essential recommended actions identified in the management plan to support achieving the management goal and objectives. Section 3.1 also reports on progress towards monitoring of whirling disease, an emergent and substantial threat to Westslope Cutthroat Trout (British Columbia population) (herein referred to as WCT). Though no actions were initially identified in the management plan for whirling disease monitoring, these measures have arisen as an important component of WCT management. Section 3.2 summarizes the progress toward achieving the management objectives.

2 Background

2.1 COSEWIC assessment summary and threats to the species

In 2006, COSEWIC assessed WCT (*Oncorhynchus clarkii lewisi*) as special concern (COSEWIC 2006). The species was subsequently listed as special concern under Schedule 1 of SARA in 2010, which led to the 2017 publication of the management plan (DFO 2017). In 2016, COSEWIC re-examined and confirmed the status of WCT[2] as special concern (COSEWIC 2016).

[2] COSEWIC renamed Westslope Cutthroat Trout (British Columbia population) to Westslope Cutthroat Trout (Pacific populations) in its 2016 assessment (COSEWIC 2016). The species is called Westslope Cutthroat Trout (British Columbia population) under Schedule 1 of SARA and is referred to as such throughout this report, where not abbreviated to WCT.

Assessment Summary - November 2016

Common name
Westslope Cutthroat Trout - Pacific populations

Scientific name
Oncorhynchus clarkii lewisi

Status
Special concern

Reason for designation
This species inhabits cold streams and lakes in southeastern British Columbia. Although some subpopulations appear to be stable, others are experiencing substantial hybridization with Rainbow Trout, most are susceptible to increasing water temperatures associated with climate change, and many are exposed to substantial recreational harvest. The recent discovery of Whirling Disease close to the range of these populations is an additional cause for concern.

Occurrence
British Columbia

Status history
Designated special concern in May 2005. Status re-examined and confirmed in November 2006 and November 2016.

Section 8 of the management plan identifies the threats to the conservation of WCT. The threats include: forest harvest; mining; linear projects; agriculture; residential, recreational, and commercial development; water use; permanent water withdrawal (consumptive); water use (temporary diversions/dams; non-consumptive); fishing; aquaculture, hatcheries and stocking; and climate change and severe weather.

2.2 Conservation

This section summarizes the information found in sections 5 and 6 of the management plan (DFO 2017) on the management goal and objectives that are necessary for the conservation of WCT.

Management goal

- Long-term persistence of WCT within its native range

Management objectives

1. maintain the native distribution and genetic diversity of populations
2. maintain wild populations at abundance levels that prevent at-risk status assessment
3. maintain, or rehabilitate, the capacity of natural habitat to meet abundance targets for populations

The management plan did not include performance measures. The management objectives will be used as interim performance measures to assess progress made towards the conservation of WCT.

3 Progress towards conservation

The management plan divides conservation effort into recommended actions. Each recommended action was categorized as essential, necessary or beneficial. Progress in carrying out the essential recommended actions is reported in section 3.1 of this progress report[3]. Section 3.2 reports on the progress toward meeting the management objectives.

Though not explicitly addressed in the management plan, whirling disease (infection by *Myxobolus cerebralis*) was subsequently identified as an emergent and substantial threat to WCT. While not listed as a recommended action in the management plan, Parks Canada (PC) has since taken action on monitoring this threat and conducts periodic monitoring for whirling disease at high-use locations within national parks. Fish suspected of infection are opportunistically tested. To date, whirling disease has not been confirmed in the distribution of WCT in national parks (Humphries pers. comm. 2022).

[3] The management plan (DFO 2017) notes that essential recommended actions “can serve as benchmarks and performance measures to evaluate progress towards meeting the (management) plan objectives.”

3.1 Activities supporting conservation

Table 1 provides information on the implementation of essential recommended actions identified in the management plan.

Table 1. Details on implementation of essential recommended actions supporting the conservation of Westslope Cutthroat Trout, British Columbia population, from 2017 to 2021.

#	Essential recommended actions	Description and results	Participants
1	Define populations using predictive model: • Confirm status in unknown areas including peripheral areas • Consider data on range of movement, barrier data, hydrological units, genetics, threats, stocking records • Ground-truth species composition, logical hydrological units, genetics, demography, barrier surveys, habitat disturbances using standardized approaches	A predictive model for Westslope Cutthroat Trout, British Columbia population (WCT) is being developed for the Elk Valley and could be adapted for other populations in the future (Neufeld pers. comm. 2022). A cumulative effects assessment was conducted using a simulation model. It looked at the risk to valued components (social, economic, cultural or environmental values) caused by human and natural disturbance over time. WCT was included as 1 of 2 valued aquatic components in the model; however, the model variables were not well-defined for WCT and as such it was not possible to predict impacts to the species (Gibson pers. comm. 2021; Neufeld pers. comm. 2022). Barrier surveys and associated modelling of different barrier types for potential impacts to fish passage were completed by the Canadian Wildlife Federation (CWF). This information increased understanding of WCT habitat connectivity in the Elk Valley (Mazany-Wright and Lapointe 2021).	ALCES (A Landscape Cumulative Effects Simulator) Landscape & Land-Use Ltd, British Columbia Ministry of Forests (BC MOF), CWF, Fisheries and Oceans Canada (DFO), Ktunaxa Nation
2	Establish status of introgression in WCT populations: • Complete a genetic inventory update and gap analysis • Where hybridization is occurring, determine direction and rate of change	In BC MOF's Kootenay Region, Rainbow Trout stocking transitioned from diploid to triploid individuals in 2003 to help mitigate the risk of introgression and maintain the genetic integrity of WCT (Freshwater Fisheries Society of British Columbia 2021; Neufeld pers. comm. 2022).	BC MOF, DFO, Parks Canada (PC), University of Montana

#	Essential recommended actions	Description and results	Participants
		Starting in 2012, introgression of WCT with Rainbow Trout has been studied throughout the Canadian range of WCT, regional data collection is ongoing. The introgression research aims to determine the direction and rate of change in WCT hybridization with Rainbow Trout with the goal of protecting and conserving WCT from further hybridization. Extensive introgression surveys have been completed across Yoho and Kootenay National Parks (Humphries pers. comm. 2022). Those areas with pure WCT based on microsatellite genetic markers were reassessed using higher-resolution genetic markers (Humphries pers. comm. 2022). Data collection on introgression also informs research to define native and historically-stocked populations of WCT, and will help identify their historical range (Lamson pers. comm. 2021). Further, work is being conducted on WCT genetics across the species' broader range (Neufeld pers. comm. 2022).	
3	Identify naturalized Rainbow Trout spawning locations focusing on locations where they are likely to concentrate (for example, in lower elevation creeks), prioritize areas where there is potential cross-breeding with WCT.	Rainbow Trout spawning surveys have been conducted since 2012 and are ongoing throughout the Upper Kootenay River watershed, including Whiteswan Lake, Kikomun Creek, and numerous areas where Rainbow Trout are known to have been stocked. A naturalized population of Rainbow Trout has been identified in Assiniboine Provincial Park upstream of Kootenay National Park from historical stocking completed by PC (Humphries pers. comm. 2022). This naturalized population poses a persistent hybridization threat to WCT from cross-breeding (Humphries pers. comm. 2022).	BC MOF, PC

#	Essential recommended actions	Description and results	Participants
4	Develop policy and regulations for protection and restoration of wild WCT populations including consideration of: • Regulations: opportunistic removal in areas of high hybridization and naturalized Rainbow Trout populations • Policies: refugium/transplantation; barrier use; nutrient supplementation; and hatchery supplementation • “Habitat banking”: explore as a compensation option and determine if/when using this might be appropriate	Progress has been made towards developing provincial regulations that would help manage opportunistic removal of the barrier at Outlet Creek (outlet to Whiteswan Lake, which contains reproductive Rainbow Trout) without increasing introgression risk to WCT downstream of the creek (Neufeld pers. comm. 2021). Within this reporting period (2017 to 2021), there has been no significant progress on developing provincial policies related to refugium/transplantation, barrier use, or nutrient supplementation. A provincial stocking policy and regional stocking practices are in place (Province of British Columbia 2007). Current stocking of Rainbow Trout uses triploid (sterile) individuals to mitigate the risk of introgression and maintain the genetic integrity of WCT (Freshwater Fisheries Society of BC 2021; Neufeld pers. comm. 2022). DFO has published an interim policy on fish habitat banking that could be relevant as a compensation option for WCT where appropriate (DFO 2021). The policy can guide planning, establishment and management of fish habitat banks as offsetting measures for works resulting in death of fish and/or harmful alteration, disruption or destruction of fish habitat (DFO 2021). PC has trialled remote streamside incubation of WCT in Yoho National Park (Humphries pers. comm. 2022). Remote streamside incubation, combined with disease and genetic testing, could help to support restoration of WCT in depleted waterbodies (Lamothe et al. 2019).	BC MOF, DFO, PC

#	Essential recommended actions	Description and results	Participants
		Possession limits of 0 for WCT are in place for all angling within Yoho and Kootenay national parks (PC 2020).	
5	Develop Whiteswan Lake management plan for WCT due to confirmed hybrid status (WCT x Rainbow Trout) in watershed. Plan should include stocking recommendations, naturalized Rainbow Trout population management, barrier use, etc.	The Whiteswan Lake Provincial Park management plan was developed in 2013 (Lotic Environmental 2013). Implementation of this management plan is ongoing, including the design and construction of a fish barrier to minimize Rainbow Trout movement and to reduce the risk of hybridization with WCT in the White and Upper Kootenay rivers. The success of plan implementation is monitored through creel surveys (angling surveys primarily focused on data collection regarding catch, effort, and harvest), spawning surveys, and genetic analyses of WCT hybridization rates in watersheds connected to Whiteswan Lake (White River and Outlet Creek) (Neufeld pers. comm. 2021). Further, diploid stocking of Rainbow Trout was discontinued in 2003 (Lamson pers. comm. 2022). Living Lakes Canada (LLC) completed a Foreshore Integrated Management Plan (FIMP) for Whiteswan Lake (Masse et al. 2021). This FIMP maps the foreshore habitats of Whiteswan Lake to help guide future development with the goal of maintaining foreshore ecosystem function, including as habitat for WCT. It also provides data on barrier use and management considerations for Whiteswan Lake, taking into account potential hybridization risks to WCT (Masse et al. 2021).	BC MOF, DFO, LLC
6	Identify wild, exploited stream and lake Westslope Cutthroat Trout populations (include subgroups if necessary) for individual stock assessment	During the reporting period (2017 to 2021), WCT abundance surveys were conducted in 5 Classified[4] (Bull, Wigwam, St. Mary, Skookumchuck, and White Rivers) water systems and 1 Non-Classified system (Lussier River).	BC MOF

[4] Highly productive trout streams where limited fishing licences are sold and for which non-resident anglers pay higher fees to fish.

#	Essential recommended actions	Description and results	Participants
	including Classified Waters and non-Classified Waters: • Classified Waters: Bull, Wigwam, Elk, St. Mary, Skookumchuck, White, and Upper Kootenay rivers • Non-Classified Waters: Flathead, Akolkolex, Goat, Findlay, and Lussier rivers • other small populations	During the reporting period, 2017 to 2021, abundance surveys were also completed on other small populations in the Fording River, Mayuik Creek, and Michel Creek (Heidt pers. comm. 2022).	
7	Develop and implement standard protocols to determine WCT total abundance. • Consider the following methods: ○ snorkeling – adult count of entire river ○ mark recapture – watershed or reach scale ○ catch per unit effort (could be hyper-stable, needs investigation before use) ○ genetic analysis (needs investigation to determine if plausible) • Determine fry/parr densities (for example, night-time snorkeling) • Determine if the different methods produce equivalent results	Standard protocols to estimate adult and juvenile WCT total abundance (derived from catch per unit effort) have been implemented since the 1990s and are updated periodically (Neufeld pers. comm. 2021; Heidt pers. comm. 2022). Different methodologies have not been tested to determine if they produce equivalent abundance estimates for WCT.	BC MOF, Westslope Fisheries

#	Essential recommended actions	Description and results	Participants
	• Document, test, and prioritize each protocol • Develop long-term sampling strategy to obtain data for carrying capacity		
8	Review fish barrier information and further investigate to confirm significance of threat (for example, reduction in carrying capacity) to WCT.	Any works, undertakings, or activities that result in the death of fish (including WCT) or the harmful alteration, disruption, or destruction of fish habitat are subject to regulatory review and authorization under the federal *Fisheries Act*. BC MOF reviews barrier removal project proposals and provides guidance to prevent hybridization impacts on WCT (Lamson pers. comm. 2021). The FIMP for Whiteswan Lake (Masse et al. 2021) includes measures for collecting fish barrier information and other management needs, which take into account potential hybridization risks to WCT (refer to row 5 of this table). The BC Fish Passage Restoration Initiative began in 2020 with a goal to increase fish passage to benefit salmonids and other species at risk, including WCT (CWF 2020). A total of 2 fish barriers were remediated, helping to restore seasonal fish passage and stream habitat access for WCT (CWF 2020). Ongoing CWF research has characterized rail and road crossing as medium- and high-rated threats to WCT, respectively, for their potential to affect fish passage and has recommended 4 confirmed barriers for remediation in the Elk Valley (Mazany-Wright et al. 2023). Anthropogenic barrier surveys are completed within Yoho, Kootenay, Mount Revelstoke and Glacier national parks (Humphries pers. comm. 2022). Barriers identified are	BC MOF, BC Timber Sales, CWF, DFO, LLC, PC

#	Essential recommended actions	Description and results	Participants
		remediated or maintained depending on whether they serve as negative or positive contributions to conservation of WCT (Humphries pers. comm. 2022). For example, WCT populations found above 2 anthropogenic barriers in Kootenay National Park show no signs of Rainbow Trout introgression so these barriers are maintained to preserve genetic integrity (Humphries pers. comm. 2022).	
9	Complete stream restoration activities in streams with identified habitat deficiencies, impacts, or high fishing pressures.	There are 4 streams (Wigwam River, White River, Skookumchuck Creek, and Flathead River) within the Upper Kootenay River drainage have been identified as areas that would benefit from Wildlife Habitat Areas[5] (WHAs) protection to support long-term conservation of WCT and Bull Trout (*Salvelinus confluentus*) (Meunier and Oliver 2018). These streams are under consideration for designation as WHAs. Stream restoration planning for recommended WHAs is underway with a goal to help maintain or rehabilitate natural habitat through improving riparian habitat, water availability and water quality (Ministry of Environment 2021; Neufeld pers. comm. 2021). Under the BC Fish Passage Restoration Initiative (refer to row 8 of this table), work was completed to replace 2 culverts on Freeman Creek (a tributary of the West Yahk River) which helped to increase seasonal fish passage and spawning opportunities for genetically pure WCT (CWF 2020).	BC MOF, CWF, PC, DFO

[5] Wildlife Habitat Areas are mapped areas that are necessary to meet habitat requirements for identified wildlife elements within the Province of British Columbia.

3.2 Summary of progress towards conservation

3.2.1 Status of management objectives

Table 2 provides a summary of the progress made toward meeting the management objectives detailed in section 2.2 of this progress report[6]. Each management objective has been assigned 1 of 4 statuses:

1) not met: the management objective has not been met, and little to no progress has been made
2) partially met, underway: moderate to significant progress has been made toward meeting 1 or more elements of the management objective, and further work is ongoing or planned
3) met: the management objective has been met and no further action is required
4) met, ongoing: the management objective has been met, but efforts will continue until the population is considered to be conserved

Table 2. Summary of progress made toward meeting the management objectives for Westslope Cutthroat Trout, British Columbia population, from 2017 to 2021.

Management objective	Status	Details
1. Maintain the native distribution and genetic diversity of populations	Partially met, underway	The management plan identifies distribution and genetic integrity as indicators to track progress towards meeting management objective 1. Introgression studies are ongoing and will help confirm the scope, span, and direction of hybridization (see table 1, row 2; Lamson pers. comm. 2021). Continued mitigation of introgression impacts from Rainbow Trout (including stocking of triploid [sterile] individuals) helps maintain the genetic integrity of Westslope Cutthroat Trout (WCT) (Freshwater Fisheries Society of BC 2021). Due to historical stocking of non-native fishes, no natural WCT populations exist within the lakes of Kootenay or Yoho National Parks. Parks Canada is in the early planning stages of reintroducing the species within these parks. Early planning efforts using appropriate genetic donors and streamside incubation are underway (Humphries pers. comm. 2022 [refer to table 1, row 9]).

[6] Table 2 of the management plan (DFO 2017) details indicators, measures, targets, and status of meeting targets for each of the 3 management objectives.

Management objective	Status	Details
2. Maintain wild populations at abundance levels that prevent at-risk status assessment	Partially met, underway	Standardized abundance surveys (refer to table 1, row 6) for WCT suggest the population is generally stable; however, regional variation exists (Heidt pers. comm. 2022). The Government of British Columbia adaptively manages the angling fishery to maintain WCT at abundance levels above regional conservation thresholds (Heidt pers. comm. 2022).
3. Maintain, or rehabilitate, the capacity of natural habitat to meet abundance targets for populations	Partially met, underway	Stream restoration planning underway for recommended Wildlife Habitat Areas will help maintain or rehabilitate natural habitat through improving riparian habitat, water availability and water quality (refer to table 1, row 9). Work has been completed on barrier remediation including: replacing 2 culverts to increase seasonal fish passage for WCT, identifying connectivity threats based on rail/road stream crossings, and identifying/planning for future barrier removal (refer to table 1, row 8). Barrier removal and management considerations for WCT are also described in the Whiteswan Lake Provincial Park management plan (refer to table 1, row 5).

4. Concluding statement

Over the last 5 years of implementing the recommended actions identified in the management plan (DFO 2017), progress has been made in conserving WCT. Notable achievements from 2017 to 2021 include:

- barrier assessments and habitat use studies to identify where restoring habitat connectivity could support WCT conservation within the Elk Valley
- genetic studies on introgression to assess hybridization rates of WCT with Rainbow Trout
- implementation of a Whiteswan Lake Provincial Park management plan which has helped reduce hybridization risks through construction of a barrier to prevent migration of Rainbow Trout into WCT habitat in the White River
- development and annual implementation of standardized protocols to determine WCT abundance in specific provincially-managed streams
- barrier remediation and fish passage restoration for WCT, other salmonids, and other species at risk
- development of novel non-lethal methods for whirling disease monitoring in WCT

The overall management goal for WCT is the long-term persistence of the species within its native range. Current data suggests the population is stable based on standardized abundance surveys. Further work is needed in the following areas:

- hybridization research to help prioritize WCT populations for protection through fisheries management
- continuing barrier remediation projects to improve habitat connectivity for WCT
- developing and implementing standard protocols to determine juvenile WCT abundance, density estimates and catch per unit effort comparisons
- continued characterization and mitigation of threats to WCT and its habitat

DFO and PC remain committed to the conservation of WCT. The progress made to date has built a strong foundation for continued research and management of this species over the next reporting period. This progress would not have been achieved without the contributions of partners including the British Columbia Ministry of Forests and the Canadian Wildlife Federation. DFO and PC look forward to continuing these successful collaborations and welcomes the participation of additional partners.

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