

Restoring WSCT in Banff National Park

Parks Canada have successfully reintroduced a small population of at-risk westslope cutthroat trout (WSCT) into Hidden Lake in Banff National Park. The Saving Threatened Trout Project is a Parks Canada led initiative. It hopes to conserve and restore the populations of at-risk species of native trout through active management within Banff National Park. This project targets five headwater systems within the Park including Hidden Lake, Little Herbert Lake, Helen Lake, Katherine Lake, and Margaret Lake. At a January presentation to Bow Valley Naturalists, Brad Stitt, Project Manager in the Resource Conservation branch at Parks Canada presented the interim results of this project. Then he emphasized their success at Hidden Lake (and Hidden Creek) to date.

The project's intent is to reintroduce WSCT back into three of these five headwater systems which are part of their historical range of distribution. Two systems are historically fishless. In these systems, various species of sport fish such as brook trout have outcompeted WSCT. Parks Canada intentionally stocked these sport fish for recreational purposes until as recently as the 1980s. The reintroduction is achieved through a process requiring the complete removal of non-native trout from these lakes and streams followed by the translocation of genetically pure strain WSCT into these systems. A significant level of monitoring is required at all stages to ensure success.

So far, non-native fish removals have occurred at four of the five locations and these removals require the application of a toxicant known as Rotenone. The use of toxicants on a natural system may rightly instill fear in some readers, especially when considering any potential unintended negative consequences that may occur through its application. However, Rotenone is a toxicant that is naturally occurring in the environment – it is derived from the roots of a legume plant – and specifically targets gill breathing organisms by disrupting their ability to process dissolved oxygen from water. Indigenous communities used this toxicant for sustenance fishing and Rotenone's use in these kinds of applications had been studied extensively for decades. Rotenone is applied in specific concentrations dictated by the volume and flow characteristics

of a given waterbody and its application is followed up by a neutralizing agent – potassium permanganate.

Across two consecutive field seasons in 2018 and 2019, the Parks Canada project team applied Rotenone to Hidden Lake and Hidden Creek to incapacitate and remove all brook trout from that area. The project team conducted two types of monitoring to ensure that all brook trout had been removed; physical monitoring (i.e. gillnetting, angling, electrofishing etc.) and environmental DNA (eDNA) analysis. Parks Canada conducted the monitoring on the waterbodies following treatments in 2018 and 2019, and again in 2020, a year after the last Rotenone treatment. Following the final treatment in 2019, no brook trout was found through physical monitoring, but trace evidence of brook trout eDNA was found – although inconclusive. One year later, the project team conducted another sweep of the area using both physical and eDNA monitoring methods. No brook trout were detected – meaning that Parks Canada could begin planning for WSCT reintroduction.

For reintroduction to be successful, Parks Canada needed to ensure that the populations of benthic macroinvertebrates (i.e. larval stage insects, snails, or worms) in Hidden Lake had recovered following the application of Rotenone. This was done by comparing Hidden Lake to pristine conditions at various reference locations. Macroinvertebrates were studied annually from 2017 and, despite an observed population decrease in 2019 following toxicant application, the population successfully rebounded to pristine reference conditions in 2020. This gave the project team the green light to proceed with the reintroduction of WSCT at Hidden Lake.

Genetic analysis and pathogen testing was

required to ensure potential donor populations of WSCT were genetically pure strain and disease free. The WSCT population at Big Fish Lake was selected for translocation. The method used for restocking is known as remote (or streamside) incubation. This involves collecting gametes from the donor waterbody, incubating eggs on location at the receiving waterbody, and then releasing successfully hatched fry. The Hidden Creek reintroduction efforts started with collection at Big Fish Lake in June 2021 during the heat dome event. This meant that environmental conditions were suboptimal for collection and fertilization. Coolers full of ice had to be flown into the remote location in order to cool the 4,000 eggs that were collected. Of these 4,000 collected eggs, only 471 survived to the incubation stage. A total of 311 fry were successfully reintroduced into Hidden Creek despite the challenging environmental conditions.

This is a hugely successful result and offers a ray of hope for the recovery of this Threatened species. The distribution of WSCT and their habitat has shrunk and fragmented due to numerous threats: invasive species, habitat destruction, overfishing, pollution, climate change, and the cumulative, combined effects of these various threats. If successful, the Saving Threatened Trout Project should hopefully re-establish WSCT populations in waterbodies within the historical range of this species and provide a protected refuge for their recovery within National Park boundaries. We applaud Parks Canada's initiative on this project, and look forward to reviewing the results for the other two waterbodies where this project intends to reintroduce WSCT.

– Phillip Meintzer



Westslope cutthroat trout are listed as threatened under the Alberta Wildlife Act and by COSEWIC - the national Committee on the Status of Endangered Wildlife in Canada. Photo ©R. Blanchard