2022

IMPLEMENTATION REPORT:

MULTI-SPECIES ACTION PLAN

for Banff National Park of Canada

(2017-2022)

Parks Canada Parcs Canada

Canada

Recommended Citation

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For copies of the report, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, recovery strategies, action plans and other related recovery documents, please visit the Species at Risk (SAR) Public Registry[1].

Photo credits:

Cover (listed clockwise from top right): Cascade Creek restoration work for Westslope Cutthroat Trout, Parks Canada Agency (PCA); Banff Springs Snail, A. Athwal; Roosting Little Brown Myotis, J. Headley.

This page: Banff Springs Snail hotsprings habitat, PCA; **Page i:** Woodland Caribou in meadow, R. Bray, PCA; **Page ii:** Park staff planting Whitebark Pine, PCA; **Page iii:** Woodland Caribou in meadow, R. Bray, PCA; **Page 1 (left to right):** Olive-sided Flycatcher, B. Yee; Town of Banff, K. Fisher; Researcher at Johnson Lake, A. Forshner, PCA; Little Brown Myotis on a branch, E. Micalizzi; Caging Whitebark Pine cones, PCA; Common Nighthawk on a branch, J. Janelle; Visitors by a lake in Banff National Park, S.W. van der Linden; Banner in the Town of Banff, K. Fisher; Little Brown Myotis on a tree, J. Headley; Woodland Caribou, PCA; **Page 16:** Happy volunteers, H. Irwin, PCA; Cascade Creek restoration work for Westslope Cutthroat Trout, PCA; **Page 17:** Westslope Cutthroat Trout facing to the right, PCA; Westslope Cutthroat Trout facing to the left, PCA; **Page 21:** Park staff setting up a bat detector, E. Knight, PCA; **Page 22:** Close-up of Whitebark Pine cones, PCA; Close-up of Whitebark Pine branches, R. Bray, PCA; **Page 26:** Map of Whitebark Pine seedling planting and restoration sites in Banff National Park (left) and Whitebark Pine seedlings ready to be planted (right), PCA.

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[1] http://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996)[2] agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), action plans outline measures that will be taken to implement recovery strategies for SARA-listed Extirpated, Endangered and Threatened species. Parks Canada's multi-species action plans address a suite of species of conservation concern within one or more Parks Canada managed areas, including species that require an action plan under SARA.

The Minister responsible for the Parks Canada Agency (the Minister of the Environment and Climate Change) is the competent minister under SARA for species found in Banff National Park of Canada, and in 2017 published the Multi-species Action Plan for Banff National Park of Canada.

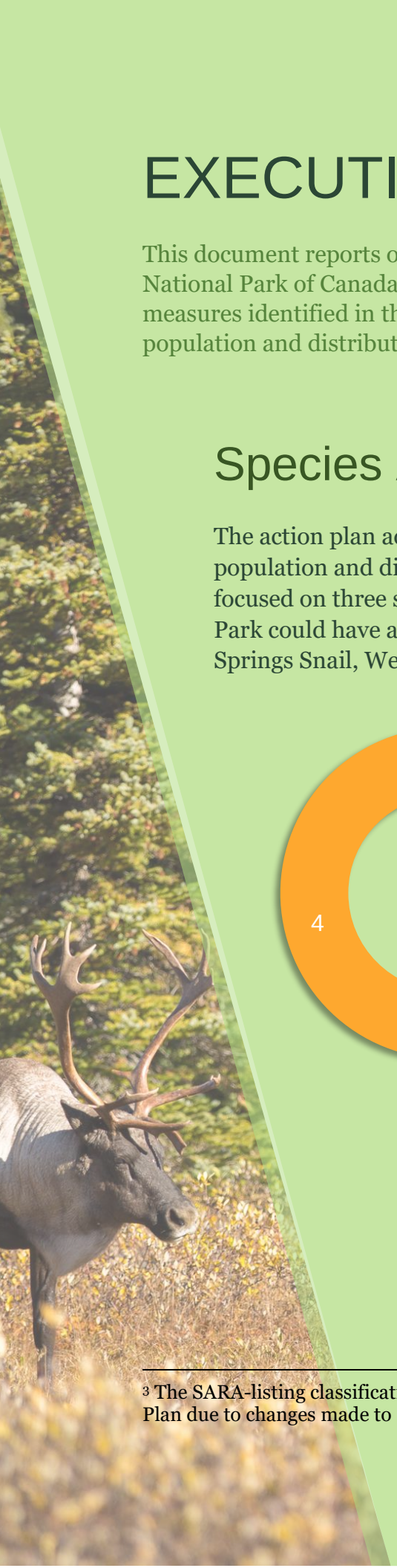
Under section 55 of SARA, the competent minister must monitor the implementation of an action plan and the progress towards meeting its objectives, and assess and report on its implementation and its ecological and socio-economic impacts five years after the action plan comes into effect. A copy of the report must be included in the Species at Risk Public Registry. The Minister responsible for the Parks Canada Agency has prepared this Implementation Report: Multi-species Action Plan for Banff National Park of Canada (2017-2022).

The achievement of population and distribution objectives identified within the recovery strategy or management plan for a species may require a long time frame. In these cases, a five-year reporting window may not be sufficient to show demonstrable progress towards meeting site-based population and distribution objectives identified for that species within a Parks Canada site-based action plan. Parks Canada monitors, evaluates and, as necessary, adapts measures taken to achieve species survival or recovery, and will report on progress towards meeting site-based population and distribution objectives every five years.

[2] http://www.canada.ca/en/environment-climate-change/services/species-risk-act-accord-funding/protection-federal-provincial-territorial-accord.html

Acknowledgments

Parks Canada would like to acknowledge all staff, partners, stakeholders, volunteers and researchers who have contributed to implementation of the Multi-species Action Plan for Banff National Park of Canada.

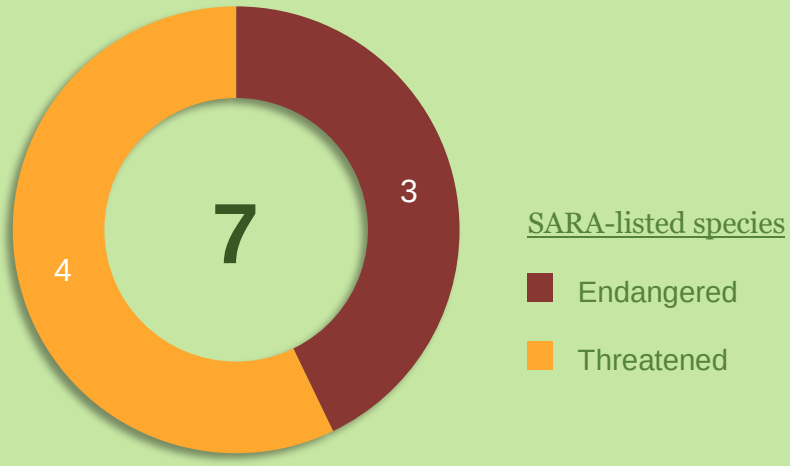


EXECUTIVE SUMMARY

This document reports on implementation of the Multi-species Action Plan for Banff National Park of Canada between 2017 and 2022. It reports on implementation of measures identified in the plan, assesses progress towards meeting site-based population and distribution objectives, and evaluates socio-economic impacts.

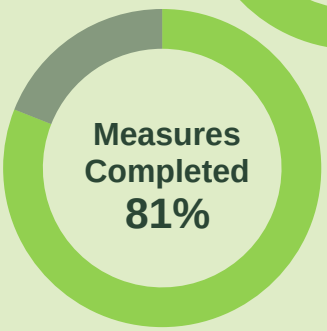
Species Addressed[3]

The action plan addressed seven SARA-listed species. Measures and site-based population and distribution objectives identified within the action plan were focused on three species, for which management actions within Banff National Park could have a substantive impact on species survival or recovery: Banff Springs Snail, Westslope Cutthroat Trout, and Whitebark Pine.

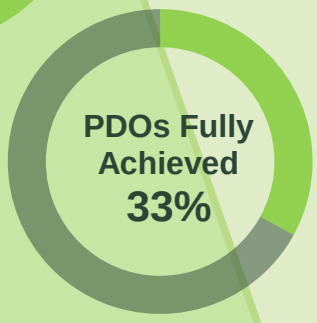


[3] The SARA-listing classifications for the species in this report may differ from the Multi-species Action Plan due to changes made to Schedule 1 of the *Species at Risk Act* since the action plan was published.

Implementation of the Action Plan



32 measures (recovery actions) were identified in the multi-species action plan. One measure was excluded from reporting, as it was dependent on the presence of caribou in the park and this has not occurred. Implementation of the action plan is assessed by determining progress towards completing 31 measures, and is outlined in Section 2 of this report. During the five-year period, all 31 measures were initiated[4] and 25 were completed.

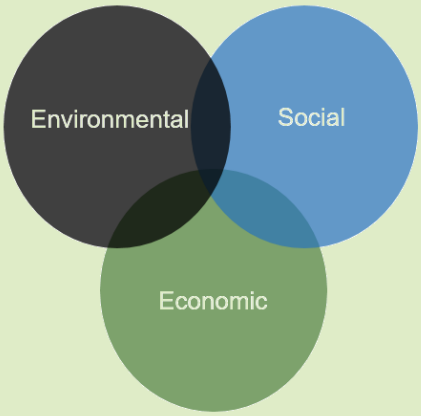


Ecological Impacts

3 site-based, population and distribution objectives (PDOs) were developed in the action plan. Ecological impacts are assessed by measuring progress towards achieving each of the site-based population and distribution objectives and are outlined in Section 4. Progress was made on all objectives[5] including one that was fully achieved.

Socio-Economic Impacts

Direct costs of implementing this action plan were borne by Parks Canada. Indirect costs were minimal, mainly through visitor restrictions to certain areas of the park to protect Banff Springs Snails and short-term closures during recovery activities for Westslope Cutthroat Trout. Benefits included positive impacts on park ecological integrity, greater awareness of species and enhanced opportunities for engagement of visitors and local communities.



[4] Includes measures that are 100% completed.
[5] Includes PDOs that are fully achieved.

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1. CONTEXT

This document reports on implementation of the Multi-species Action Plan for Banff National Park of Canada[6] between 2017 and 2022, assesses progress towards meeting its population and distribution objectives, and evaluates its socio-economic impacts. It addresses seven SARA-listed Extirpated, Endangered, and Threatened species (for which an action plan is required)[7].

Site-based population and distribution objectives were developed for three species for which implementation measures within Banff National Park could have a substantive impact on recovery: Banff Springs Snail, Westslope Cutthroat Trout, and Whitebark Pine.

2. IMPLEMENTATION OF THE ACTION PLAN

Implementation of the Multi-species Action Plan for Banff National Park of Canada is assessed by measuring progress towards completing the recovery measures identified in the action plan (Table 1). Refer to the original action plan for a description of each measure, the desired outcomes, and the threats that each measure addresses.

In 2020 there were several restrictions put in place at Banff National Park to combat the spread of COVID-19, including temporary restriction of park management activities. This impacted the ability of the park to complete the implementation of some parts of the action plan. Specifically, several park communication, education and outreach activities focussed on species at risk were cancelled.

[6] Parks Canada Agency. 2017. Multi-species Action Plan for Banff National Park of Canada. Species at Risk Act Action Plan Series. Parks Canada Agency, Ottawa. iv + 27 pp.
[7] The status of these species may have changed over the reporting period.

Table 1. Progress towards completing recovery measures committed to by Banff National Park (* indicates an ongoing measure that may continue into a future multi-species action plan).

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
1) Common Nighthawk: Implement measures (e.g. best management practices, seasonal closures if required) to protect known nest sites and known nesting habitat from destruction or disturbance.	Individuals and their nests are protected from direct disturbance during the breeding season.	No Common Nighthawk nests or nesting habitat have been located in Banff National Park. Any nests that have not been located are protected by default under the *Canada National Parks Act*, the *Migratory Birds Convention Act* and the *Species at Risk Act*.	100%*
2) Common Nighthawk: Identify breeding and nesting sites opportunistically, targeting high probability sites, and encourage the public to share observations.	Knowledge of species distribution, and in particular, nesting areas, informs park management.	A data summary of Common Nighthawk observations derived from eBird and Parks Canada databases did not reveal any nesting sites in Banff National Park. Visitors are encouraged to report opportunistic observations through the park's iNaturalist project.	100%*
3) Little Brown Myotis: Determine the distribution and relative abundance of Little Brown Myotis, with emphasis on identifying hibernacula and maternity roosting sites.	1. Increase knowledge of bat presence and populations in caves/mines and maternity roosts over each 5-year period. 2. Presence and populations are known for high-potential hibernacula in first 5 year reporting period.	A systematic acoustic inventory of bats at 13 sites throughout Banff National Park was conducted from 2020-2022 to document bat distribution and relative abundance prior to the arrival of white-nose syndrome. Targeted acoustic and mist-netting inventory was also conducted at select priority sites in 2018 and 2019. Roosting ecology research conducted in collaboration with University of Calgary from 2020 to 2022 identified numerous natural and anthropogenic roost sites, including maternity roosts. Only one	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
		hibernaculum site has been located in a small cave in the park. Three additional high potential sites have been identified to conduct future inventory work.	
4) Little Brown Myotis: Limit spread of white-nose syndrome by sharing protocols (such as the Canadian National White-Nose Syndrome Decontamination Protocol) for cave researchers, and maintaining access restrictions, to protect bats and their residences.	1. Action plan developed for access to significant bat hibernacula and roosts before WNS arrives. 2. Limit human caused spread of WNS through increased awareness, enforcement of restricted access, and implementation of decontamination protocols and BMPs for researchers.	The creation of an access action plan is now deemed unnecessary to meet the desired outcome of protecting hibernacula and maternity roosts in Banff National Park. Emphasis has been shifted to identification and monitoring of potential hibernacula and maternity roosts, and best management practices. Implementing the *Canadian National White-nose Syndrome Decontamination Protocol* is a mandatory permit condition for access to caves/mines and research involving handling bats. Access to all cave and mine sites are restricted under the *Canada National Parks Act*.	100%*
5) Little Brown Myotis: Adopt best practices for the maintenance or decommissioning of park infrastructure that contains Little Brown Myotis roosts.	1. Establish best practices for Parks Canada staff and park stakeholders to address maintenance of infrastructure that contains roosts. 2. Important roosts are identified for infrastructure requiring maintenance, and impacts are mitigated.	Procedures have been developed for managing bats in buildings in Banff including an operational response flowchart, requirements for pest management practitioners, a brochure for building owners/residents, and a tracking database. These procedures have been shared with Town of Banff staff to ensure understanding and collaboration. The only known maternity roost in a Parks Canada structure has been protected via a closure and signage, and Parks staff are working with a third party to protect and	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
		monitor a large maternity roost located in their building.	
6) Little Brown Myotis: Enhance current communications aimed at raising awareness, and develop targeted communications in support of actions to prevent disturbance, disease transmission, and potential human-caused mortality.	1. Raise awareness about this species among priority audiences. 2. Support an integrated approach towards increased compliance to prevent habitat degradation and human-caused mortality.	A wide range of communications products help raise awareness about bats and their conservation including interpretive campground theatre and school programs, a virtual learning program, seasonal social media posts including during Bat Week, children's playing cards, interpretive signage, media stories and updated web content. Targeted information about timing of construction/renovation projects to protect bats is distributed to residents and leaseholders through factsheets and brochures, and stow-away bat posters are posted at park campgrounds.	100%*
7) Whitebark Pine: 1. Identify putatively rust resistant individuals (Plus Trees) at high priority sites. 2. Conduct Plus Tree seed resistance testing for high probability trees. 3. Collect seed for genetic conservation. 4. Protect high value Plus Trees from mountain pine beetle.	1. Where conditions permit, identify rust resistant trees or high value individuals, and conserve genetic resources. 2. Where mountain pine beetle protection is required, protect high-value individual Whitebark Pine trees.	Between 2017 and 2022, an additional nine high conservation value Plus Trees have been identified in Banff National Park. All Plus Trees in or near areas with active mountain pine beetle are protected annually using verbenone. Over 3000 seeds have been sent to the National Tree Seed Centre for genetic conservation.	100%*
8) Whitebark Pine: 1. Complete predictive habitat model and map of	1. Predictive map of Whitebark Pine distribution and	Parks Canada has developed a guide for determining fine-scale critical habitat for Whitebark Pine. Using this guide, a map of potential critical habitat in the park has been	50%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
Whitebark Pine distribution for the park. 2. Where stand assessments are completed, they include aspects of stand health (i.e., rust presence/absence and stand density).	suitable habitat for the park. 2. Assessed high-value stands in high risk areas. 3. Data inform targeted and efficient management and recovery.	prepared. While results from the long-term health monitoring will inform infection levels at the broad scale, expected levels of blister rust and mountain pine beetle have not been mapped across Banff National Park. Fire and fire suppression activities have been mapped in Banff National Park and this information is used to inform targeted and efficient management actions.	
9) Whitebark Pine: Plant putatively rust resistant seedlings, and when available, confirmed rust resistant seedlings, in priority restoration sites.	1. Plant a minimum of 2500 rust-resistant Whitebark Pine seedlings by 2019. Continue annual planting beyond 2019 as resources are available and based on priority areas for restoration need. 2. Where available, inoculate at least 50% of seedlings with mycorrhizal fungi prior to planting.	Between 2017 and 2021, 3242 Whitebark Pine seedlings were planted in multiple areas of suitable habitat across Banff National Park. For the portion of the measure regarding inoculating at least 50% of seedlings with mycorrhizal fungi prior to planting, it was not possible to inoculate seedlings due to unavailability of fungi. Additional research and identification of potential source fungi is required before this element of the measure can be implemented. This was excluded from reporting as it was not applicable.	100%*
10) Whitebark Pine: Protect and, where feasible, increase the number and extent of existing stands and of blister rust resistant individuals through habitat	1. Restore WBP habitat (e.g. prescribed fire and mechanical thinning) to a degree that will allow the persistence or expansion of existing stands and the potential	Whitebark Pine habitat restoration and threat mitigation has been conducted in priority high value stands through prescribed burning (441.5 ha) and mechanical thinning (189 ha) in priority areas in the park.	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
management and restoration.	for generation of new stands. Target 30 ha by 2019, and continue beyond as resources are available based on priority areas for restoration need. 2. Mitigate threats in priority high value stands.		
11) Whitebark Pine: Continue communication activities aimed at increasing awareness of, and reducing human-caused impacts on, Whitebark Pine as outlined in the CoRe Whitebark Pine conservation project.	1. Increase awareness about this species among priority audiences. 2. Reduce accidental harm/removal of Whitebark Pine trees.	The Mountain Parks have collaborated on and delivered a 5-needle pine Communications Plan. A wide range of new communications products across multiple platforms include interactive interpretive panels and bronze ID plaques installed along a hiking trail, campground theatre programs, activity stations, a mobile exhibit, a virtual learning program, social media posts, two animated short films and a feature film on five-needle pine restoration. Urban audiences have been reached through a new mural and a theatre show in Calgary.	100%*
13) Woodland Caribou: Work with partners to determine next steps for augmentation of the Jasper/Banff Local Population Unit in Jasper National Park, and investigate the feasibility of re-introduction within the	Increasing population trend for one herd in short-term (3-5 years post beginning of herd augmentation) and other herds to follow. Herds are self-sustaining in the long-term.	Recovery work for the Jasper/Banff Local Population Unit is being conducted in Jasper National Park, which has active herds of caribou, historically higher density populations, more abundant habitat, and lower predation rates than Banff. Multi-year funding has been secured for population augmentation (captive breeding) in Jasper National Park. Lessons learned in Jasper	50%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
historic range in Banff National Park. Prioritize actions based on assessment of conditions including predator-prey dynamics, predation risk, and translocation recovery priority of other caribou populations (e.g., British Columbia).		will give caribou recovery in Banff National Park the best chance of success.	
14) Woodland Caribou: Monitor and manage predator-prey populations and distribution.	Predator-prey processes and densities within and adjacent to caribou range are understood, and are at levels conducive to caribou recovery, as identified in critical habitat requirements.	Wolf densities within caribou range in Banff National Park are at levels conducive to caribou recovery. Wolf densities have remained below 3 wolves/1000 km^2 from 2017 through 2021, as calculated annually using remote camera data and reports from the public that are verified by Parks biologists.	100%*
15) Woodland Caribou: 1. Manage forests near caribou range to maintain and/or increase caribou habitat quality and availability. 2. Reduce the impact of wildfire on caribou habitat through fire management planning.	1. No large catastrophic fires in caribou range. 2. Managed fire maintains dynamic forest mosaic ensuring adequate abundance of old forest, and predator-prey dynamics conducive to caribou recovery.	There have been no large catastrophic fires in caribou range in Banff National Park between 2017 and 2022. Several prescribed burns have been conducted in critical habitat, including in the Dormer and Alexandra Valleys, as well as burns to maintain meadow habitat in the Panther, Dormer and Flints/Stoney areas. These burns all fall within the range of historic disturbance and do not negatively affect predator/prey dynamics (i.e. an adequate abundance of old forest is maintained).	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
16) Woodland caribou: Reduce threat of predator access to high quality caribou habitat by managing extent and timing of human activities.	Maintain safe and secure high quality habitat, without human-facilitated predator access.	This measure is not assessed because it was dependent on the presence of caribou in Banff National Park and this has not occurred. Human access restrictions are not currently necessary to prevent human facilitated predator access to caribou habitat.	N/A
17) Woodland Caribou: Continue communications activities delivered as part of ongoing efforts to communicate and raise general awareness about Woodland Caribou.	1. Raise general awareness about this species among priority Parks Canada audiences; 2. Maintain public support for the implementation of caribou conservation actions and for potential Woodland Caribou reintroduction in Banff National Park.	Limited targeted communication about caribou has been conducted since they were extirpated from Banff National Park in 2009. There are plans to include caribou in the species at risk exhibit at the new Lake Louise visitor centre.	50%*
18) Banff Springs Snail: Increase understanding of snail genetics to better inform both emergency response options and considerations for repeated reintroduction in response to extirpation of current populations as a result of thermal water failure (natural drying events).	Knowledge of genetic structure and distribution of snail populations.	Research using genomics to determine the extent of genetic variation among thermal springs containing Banff Springs Snails indicate that each population is genetically distinct. This does not support the transferring of individuals between sites for population augmentation/rescue.	100%

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
19) Banff Springs Snail: Ensure continued protection of snails through current measures which include a combination of area closures, surveillance, public education and enforcement.	Maintain healthy populations of snails throughout historic range with minimal human disturbance.	Measures implemented to protect snails and their habitat from human disturbance continue to be effective. Measures include a combination of area closures, surveillance, public education and enforcement.	100%*
20) Banff Springs Snail: Monitor current distribution. Through active management (two reintroductions) and natural dispersal, the Banff Springs Snail now occupies all viable habitats within its known native range. Continued baseline monitoring will track changes over time at an annual scale.	Adequate knowledge to assess health of populations and to determine if active management efforts are required.	Through protection and reintroduction, snails occur in all viable habitats. Annual monitoring confirms that all sites are occupied and no active management is required at this time.	100%*
21) Banff Springs snail: 1. Continue communication activities identified for protecting the critical habitat of the Banff Springs Snail on the Sulphur slopes. 2. Enhance communication products aimed at external target markets.	1. Increased awareness of the linkages between the Banff Springs Snail and the overall SAR program. 2. Reduced incidents of disturbances to thermal water critical habitat.	The Banff Springs Snail is highlighted in interpretive programming at the Cave and Basin National Historic Site, including interpretive signage and guided tours. Social media posts, media coverage and updated web content also serve to increase awareness about the species. Signage at the area closure helps to protect snails and their critical habitat, although some existing signs should be renewed.	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
22) Westslope Cutthroat Trout: Conduct research on the ecology and genetics of Westslope Cutthroat Trout to help identify critical habitat, understand threats and develop restoration techniques.	Learn more about the life history and habitat needs of Westslope Cutthroat Trout to inform management and conservation. (e.g. paleolimnological investigations on populations where uncertainty exists concerning origin of fish in a waterbody).	Parks Canada has worked with researchers in Canada and the USA to analyze cutthroat trout genetics across Banff National Park, leading to a better understanding of population sources, genetic diversity and hybridization, as well as highlighting the need for additional restoration actions. New techniques used included eDNA assessment of sediments to confirm historic fish distribution for critical habitat identification, environmental flows techniques to ensure habitat suitability at restored sites, eDNA monitoring of chemically removed non-native populations and limnological assessments during fish removal. Pathogen testing has been conducted on selected donor populations for Westslope Cutthroat Trout reintroductions. The research and monitoring conducted during non-native fish removals, as well as habitat and flow restoration work, will help future management and recovery of Westslope Cutthroat Trout.	100%*
23) Westslope Cutthroat Trout: 1. Conduct inventory/mapping to determine distribution of pure WSCT vs hybrids. 2. Identify potential new critical habitat. 3. Identify candidate sites for protection and restoration.	1. Short-term: Complete population/distribution monitoring across the park with the potential to identify pure populations and habitat preferences via occupancy data. Data will help prioritize sites suitable for restoration. 2. Long-term: repeat population/	Genetic assessments have been conducted on many populations across the park to determine the distribution of pure Westslope Cutthroat Trout vs hybrids. Sensitivity of the latest (Rapture) techniques has revealed hybridization and foreign genetic sources in some populations previously believed to be pure, as well as risks due to low genetic diversity at some pure sites. New pure populations have also been identified and sites have been identified for protection and restoration.	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
	distribution monitoring every 10 years in order to track pure populations and potential threats over time.		
24) Westslope Cutthroat Trout: Remove non-native fish populations, if logistically feasible, when and where they threaten Westslope Cutthroat Trout via hybridization (e.g. rainbow trout) or direct competition (e.g. brook trout).	1. Short-term: Complete the removal of non-native brook trout from Hidden Lake and Badger Lake. 2. Prioritize populations by threats. 3. Investigate effectiveness of alternate tools via a Strategic Review process, currently underway via National Office. 4. Long-term: Speed recovery by completing concurrent non-native fish removals from multiple lakes at once.	Non-native brook trout have been removed from four priority sites: Badger Lake, Helen Lake, Hidden Lake and Cascade Creek. Yellowstone cutthroat trout have been removed from Katherine Lake. Rainbow trout have been removed from Little Herbert Lake. Fish were removed concurrently from Hidden and Little Herbert Lakes, and Helen and Katherine Lakes. A systematic review of non-native fish removal methods was completed in collaboration with Carlton University. Various methods of non-native fish removal have been investigated (physical, biological and chemical) and multiple methods have been implemented (physical and chemical).	100%*
25) Westslope Cutthroat Trout: Re-introduce pure Westslope Cutthroat Trout as habitat is made available (through removal of non-natives or physical habitat restoration) within the historic range.	1. Complete the re-introduction of WSCT to Hidden Lake. 2. Identify other candidate sites for re-establishing pure populations within their native watershed,	Westslope Cutthroat Trout reintroduction has begun at Hidden Lake, Hidden Creek and Corral Creek through remote streamside incubation. Multiple donor populations have been tested for pathogens and genetics. Reintroduction to these sites is a multi-year process with two years of stocking remaining.	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
	and determine feasibility of re-introduction.	Reintroduction is underway at Cascade Creek, with pathogen testing and genetic work to identify source populations completed, and reintroduction planned to start in 2023. Additional candidate locations for reintroductions have been identified and assessed.	
26) Westslope Cutthroat Trout: Enhance current communication products aimed at increasing awareness and reducing human-caused impacts on Westslope Cutthroat Trout.	1. Continue to increase general awareness about this species among priority Parks Canada audiences; 2. Reduce human-caused impacts.	New communications products include presentations, campground theatre programs, virtual classroom events, annual social media posts, traditional media stories, interpretive trail signage, hands-on interpretive programs (e.g., Cool, Clean and Connected: Bringing Life Back to Cascade Creek), and a guided SAR hike that focuses on Westslope Cutthroat Trout. During non-native fish removals and habitat restoration work, onsite interpreters provided information. Closures have been posted where core populations of Westslope Cutthroat Trout remain to increase awareness of the sensitivity of the locations. Urban audiences have learned about Westslope Cutthroat Trout through the Bow Habitat Station Fish in Schools Program and a touch table activity at the Ripley's Aquarium in Toronto.	100%*
27) All species in plan: Increase general awareness about species at risk that are found in the park, through interpretive programming, targeted	1. Increased support and action for SAR conservation and associated management activities. 2. Priority audiences, including park visitors,	A wide variety of new species at risk communications products contribute to increased awareness and support for recovery actions among diverse audiences. Examples include factsheets developed specifically for local residents and businesses, Xplorer booklets targeting children, campground theatre programs,	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
communications, and outreach.	youth, urban and new Canadians, learn about species at risk found in the park.	red chair interpretive panels, Banff Avenue Square art banners, seasonal social media posts, media pitches and renewed web content. Volunteer opportunities engage regional residents, youth, urban and new Canadians in habitat restoration (riparian restoration planting) towards recovery of native trout species at risk. Live programming on park conservation, including species at risk, at the Telus Spark Centre targets urban families.	
28) All species in plan: Provide timely and effective species-specific communications to target audiences to disseminate knowledge, enhance understanding, and ensure compliance with SARA requirements.	Visitor activities are successfully managed to prevent habitat destruction or harm to individuals of a species.	Several species-specific communication products have been developed aimed at regulatory compliance. Examples include seasonal social media posts about bat-friendly timing window to undertake construction/renovation projects, and interpretive panels and roving interpretation that highlight closures in place for species and habitat protection.	100%*
29) All species in plan: Acquire data on species distribution and habitat use to fill knowledge gaps in order to increase efficacy of conservation and recovery actions. Data will be acquired through research and monitoring, and by promoting the reporting of observations by park staff, stakeholders, and visitors.	1. Sufficient data are gathered to increase confidence in Detailed Assessments that can be used to inform the next State of the Park Report (SOPR) and the Park Management Plan (PMP). 2. Habitat mapping provides key data for the identification of critical habitat.	Reporting observations of species at risk is encouraged in annual staff orientations and with park visitors through the Banff National Park iNaturalist Project. Species-specific research and monitoring programs are in place to fill data gaps and map habitat for many species at risk (e.g. bats, Westslope Cutthroat Trout, Banff Springs Snail, Whitebark Pine).	100%*

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
30) All species in plan: Strengthen species at risk recovery by working with Indigenous communities to incorporate traditional knowledge into SAR understanding.	Indigenous traditional knowledge is incorporated to fill species knowledge gaps.	Banff is in the early stages of establishing relationships with Indigenous Peoples. In 2018, the Banff Indigenous Advisory Circle was established as a means for Parks Canada to better understand Indigenous perspectives and priorities for their future relationship with Parks Canada and their desired role in the park. It is an interest-based group comprised of the Treaty 7 Nations and the Métis Nation of Alberta (region 3). A new Park Management Plan was consulted on with interested Indigenous groups having historic ties to the park. This plan provides the policy framework for park management over the next 5-10 years. Parks Canada has provided opportunities for Indigenous groups with connections to the park to express an interest in, and collaborate on, projects that involve ecological restoration and species recovery such as fire management planning, aquatic stewardship and Westslope Cutthroat Trout recovery.	50%*
31) All species in plan: 1. Explore the interests of various Indigenous communities in SAR education and recovery. 2. Collaborate with interested communities on outreach, education and visitor experience actions in mutually agreed upon ways.	Increased Indigenous community involvement in the delivery of SAR outreach, education, and visitor experience actions.	Parks Canada has provided opportunities for Indigenous groups with connections to lands and waters in the park to express an interest in, and collaborate on, projects that involve outreach and education for species at risk such as Westslope Cutthroat Trout and Whitebark Pine.	50%

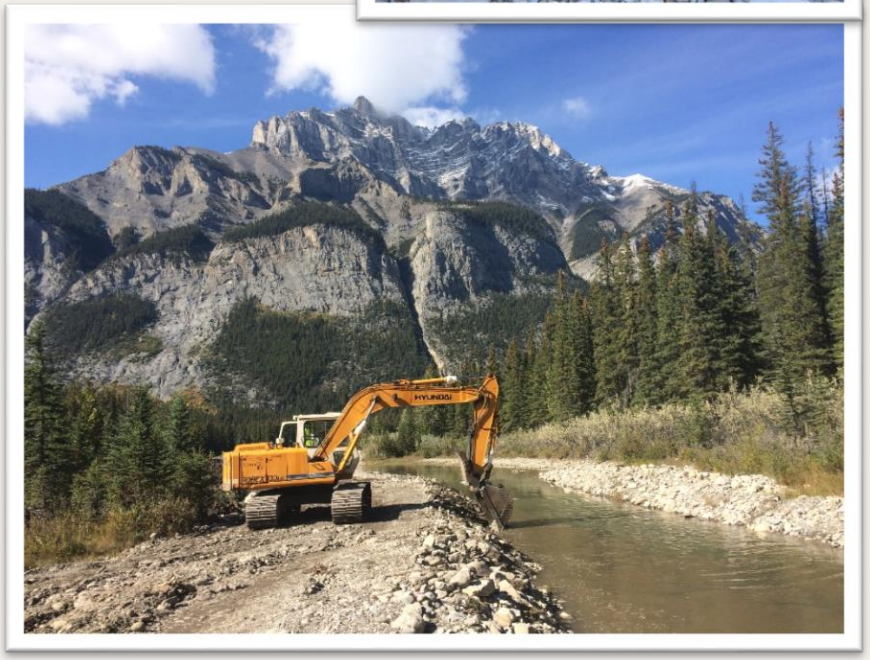
Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
32) All species in plan: Work with adjacent land management agencies, conservation scientists, and others to improve understanding and knowledge of populations of species at risk, and to increase the level of recovery of species occurring across park boundaries within multiple jurisdictions throughout the species' range.	1. Data are shared between Parks Canada and other conservation agencies involved in the protection and recovery of species at risk. 2. Different agencies collaborate and keep each other informed of species at risk planning and recovery initiatives.	Banff National Park participates in a number of regional collaborative initiatives to recover species at risk (e.g. the Alberta Bat Working Group, the Alberta Native Trout Coordinating Committee, and the Conservations Standards Five Needle Pine Working Group). A data mining exercise was conducted in 2021 to share Banff's species at risk data with provincial ACIMS (Alberta Conservation Information Management System) and FWMIS (Fish and Wildlife Management Information System) databases.	100%*
33) All species in plan: Maintain or increase law enforcement patrols to prevent disturbance, destruction or removal of species at risk and their habitats.	Law enforcement capability is maintained or improved to prevent disturbance to SAR and associated habitat.	Law enforcement capacity in Banff National Park remains stable, with protecting critical habitat, residences and species as a high priority. Species at risk compliance is listed in the service delivery agreement for the northern portion of Banff National Park (LLYK Field Unit) and wardens regularly patrol the park to monitor SARA compliance. Although targeted species at risk patrols are not part of the service delivery agreement for the southern portion of the park (Banff Field Unit), park wardens respond to reports of SARA infractions (e.g. destruction of Banff Springs Snail critical habitat, cutting Whitebark Pine).	100%*

3. ACTION PLAN HIGHLIGHT: Restoring Westslope Cutthroat Trout

The Cascade Creek Restoration Project

Construction of the Minnewanka Dam in Banff National Park in 1941 diverted the Cascade River for hydro power. This reduced flows to 9 km of the Cascade River (now Cascade Creek) by more than 99%. For decades, stream flows were insufficient to support a healthy ecosystem or downstream connectivity. Roads, railways, historical aggregate mining and past introduction of non-native fish further impacted the creek. Native trout, including Westslope Cutthroat Trout, were displaced from the stream due to degraded habitat and competition from invasive species.

In collaboration with TransAlta and Fisheries and Oceans Canada, the ongoing Cascade Creek Restoration Project is reversing decades of ecosystem impacts. This includes non-native invasive species removal, habitat and stream flow restoration, Westslope Cutthroat Trout reintroduction and a comprehensive monitoring and adaptive management program to ensure sustained results. Located in one of the busiest frontcountry areas of Banff National Park, this project is well placed to raise awareness about and engage Canadians in freshwater ecosystem restoration and species at risk recovery. This is being achieved through interactive, on-site interpretive and theatre programs, educational signage, and volunteer involvement in riparian (streamside) vegetation planting, as well as virtual learning, media stories, social media posts and web content. Key restoration stories are shared via multiple platforms including those of our partners.



Saving Threatened Trout Project

Starting in 2018, Parks Canada began a multi-year Saving Threatened Trout Project to remove non-native trout and reintroduce Westslope Cutthroat Trout to sites where they were historically found in northern Banff National Park.

Non-native fish have been removed from four headwater systems of the Bow River and removals have begun at a fifth location. Margaret Lake removals required improving a seasonal barrier to fish migration into a full barrier by creating a 2.5m vertical drop in Margaret Creek. Removal efforts have been assisted by members of Fisheries and Oceans Canada, Montana Fish Wildlife and Parks, Alberta Environment and Parks, British Columbia Ministry of Forests Lands Natural Resource Operations and Rural Development, Trout Unlimited, and Freshwater Life.

Genetically pure Westslope Cutthroat Trout have been reintroduced to Hidden Lake and Corral Creek using remote streamside incubators. Gametes (eggs and sperm) were collected from wild donor populations. Fertilized eggs were incubated to the 'eyed stage' and then distributed throughout restoration and donor waterbodies to complete development in remote streamside incubators. This method ensures the survival of the fertilized eggs and allows newly hatched fish to adapt to their natural environment at the start of their lives.

Various monitoring methods (physical presence, CABIN protocols, limnological surveys, amphibian surveys, water quality, environmental DNA, pathogen analyses, and genetics analyses) have been implemented to assess the effectiveness of restoration actions and ensure the protection and survival of native flora and fauna.

4. ECOLOGICAL IMPACTS

Ecological impacts of the action plan are assessed by measuring progress towards meeting the site-based population and distribution objectives described in the action plan (Table 2). See the original action plan for national Population and Distribution Objectives (where available) and General Information and Broad Park Approach for each species. A more detailed description of progress made towards the site-based population and distribution objectives for Whitebark Pine is outlined in Appendix A.

Table 2. Progress towards achieving site-based population and distribution objectives for species at risk in Banff National Park of Canada[8].

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
Banff Springs Snail	Maintain self-sustaining populations and habitats by mitigating human-related threats.	1. Baseline monitoring of current population and distribution. 2. Undertaking genetic analysis to better understand species status at individual sites, and options for emergency response in the event of thermal spring drying events.	Individuals and critical habitat are protected through area closures of some thermal pools, education, surveillance and enforcement. Populations have been successfully restored to all viable sites within the species historic range (e.g. Kidney Spring & Upper Middle	100%

[8] This table differs slightly from the posted action plan, as some species did not require Site-based Population and Distribution objectives. Instead, monitoring for these species was included in the Recovery Measures tables.

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
			Spring). Annual monitoring indicates that populations fluctuate annually but are persisting at all viable sites.	
Westslope Cutthroat Trout	1. Protect and maintain the existing ≥ 0.99 pure populations within Banff National Park at self-sustaining levels (currently believed to be 10 subpopulations - comprised of 4 lakes and 27.7 km of stream and river). 2. Where feasible, re-establish and maintain pure populations of WSCT in sites within their historic range in Banff National Park that recognizes diversity of life history strategies in Alberta.	1. Population (e.g. mark/ recapture; hydroacoustics) or distribution (e.g. occupancy) estimates will be completed on known core (and possibly conservation) populations every 10 years. 2. Monitor genetic purity park wide (e.g. genetic sampling concurrent with population or distribution monitoring) as well as specific sites related to critical habitat. 3. Monitor for any positive downstream effects of restoration such as improved genetics or stabilization or decrease in the presence of non-native fish.	Most of the population believed to be pure in 2016 have been maintained. New genetic methods have revealed that at least 2 of these populations were actually hybrids, and a few new pure populations have also been identified. One pure population has been extinguished since 2016 (Consolation Lakes), with plans for restoration. Initial steps have begun to re-establish pure populations at two sites within the park (Hidden Lake and Cascade Creek), with additional sites being planned. Both population and genetic monitoring are underway.	55%

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
Whitebark Pine	To establish a self-sustaining, rust-resistant population of Whitebark Pine throughout the species' range in the park that demonstrates natural seed dispersal, connectivity, genetic diversity and adaptability to changing climate.	1. Disease infection, stand density and mortality rate via stand health transects. 2. Hectares of habitat created or restored. 3. Number of potentially resistant trees identified and protected and number of these with stored seeds. 4. If fire is applied, the amount of regeneration 5-years post-fire.	Whitebark Pine condition continues to decline. Stand health transects conducted in 2019 showed an increasing trend of blister rust infection compared to 2014. Restoration activities have been applied across the park such as habitat creation/restoration, and the identification, protection and seed storage from potentially rust-resistant trees. See Appendix A for more detailed information.	1%

5. SOCIO-ECONOMIC IMPACTS

The *Species at Risk Act* requires the responsible federal minister to report on the socio-economic costs of the multi-species action plan (MSAP) and the benefits derived from its implementation. The MSAP only applies to protected lands and waters under the authority of the Parks Canada Agency, which are often subject to fewer threats (e.g., industrial activities) compared to other areas as the lands are managed to preserve ecological and commemorative integrity. This section does not include socio-economic impacts of existing permitted activities that may be occurring in Parks Canada places as those have been addressed through other processes (e.g., impact assessments). This socio-economic assessment is narrow in scope, as it is focused on the measures implemented within the action plan, and primarily focuses on Indigenous partners, leaseholders, licensees, residents and visitors. The overall socio-economic impacts of the MSAP for Banff National Park, described as costs and benefits, are outlined below.

Costs

The majority of costs to implement this action plan were borne by Parks Canada out of existing salaries and goods and services dollars. This includes incremental salary costs, materials, equipment, and contracting of professional services for measures outlined in Appendix B (Recovery measures that will be implemented in Banff National Park) of the plan. Additional resources were provided by Fisheries and Oceans Canada to purchase scientific equipment and interpretive signage for Westslope Cutthroat Trout restoration projects. Deferred habitat offset funds were also used for Westslope Cutthroat Trout habitat restoration and recovery work at Cascade Creek.

No major socio-economic costs to partners, stakeholders or Indigenous groups resulted from this action plan. Action plan measures were integrated into the operational management of Banff National Park. These costs were covered by prioritization of existing funds and salary dollars and did not result in additional costs to society.

The action plan applies only to lands and waters in Banff National Park and the Ya Ha Tinda Ranch, and did not bring any restrictions to land use outside the sites. As such, this action plan placed no additional socio-economic costs on the public. However, some restrictions were placed on visitors to Banff National Park. To protect and recover Banff Spring Snails, closures are in place at thermal springs that comprise the critical habitat for this species. During Westslope Cutthroat Trout restoration work, short-term closures were implemented between 2018 and 2022 at Cascade Creek, Hidden Lake, Corral Creek, Little Herbert Lake, Helen Lake and Creek, Katherine Lake and Lake Margaret.

Benefits

Measures presented in the action plan for Banff National Park contributed to meeting recovery strategy objectives for Threatened and Endangered species. These measures had an overall positive impact on ecological integrity and enhanced opportunities for appreciation of the sites and the species by visitors and the general public. Parks Canada is working with Indigenous groups with longstanding connection to Banff National Park to develop recovery programs that draw on and value both Indigenous knowledge systems and western science. This is anticipated to yield additional benefits for species at risk in the future. The action plan included measures that likely resulted in benefits to Canadians, such as positive impacts on biodiversity and the value individuals place on preserving biodiversity.

The measures sought a balanced approach to reduce or eliminate threats to at-risk populations and habitats. This has included protection of individuals and their habitat (e.g., restrictions to human activities within areas occupied by the species, combined with ongoing research and monitoring), species re-establishment, and increasing public awareness and stewardship. For example, putative rust-resistant Whitebark Pine seedlings have been planted in the park, and multiple projects have been implemented to restore Westslope Cutthroat Trout. Various communications products focusing on species at risk have been developed including interpretive signage, visitor programs, virtual learning programs, and highlights in communication media.

Potential economic benefits of the recovery of the species at risk found in these sites cannot be easily quantified, as many of the values derived from wildlife are non-market commodities that are difficult to appraise in financial terms. Wildlife, in all its forms, has value in and of itself, and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons. The conservation of wildlife at risk is an important component of the Government of Canada's commitment to conserving biological diversity, and is important to Canada's current and future economic and natural wealth.

Maintaining healthy ecosystems and a full range of native biodiversity is a key component of visitor experience in Banff National Park. Banff's high visitation numbers, profile and global interest presents an opportunity to showcase Parks Canada achievements in the protection of species at risk as a means to increase awareness and garner support.

Implementing this action plan had positive benefits for park visitors and local residents. Interpretive programming has brought messages about species at risk to park visitors through campground theatre programs, guided walks, interactive day-use area programming and red chairs interpretive panels. Beautiful species at risk banners now adorn Banff Avenue Square. Volunteer programs have enabled public involvement in species inventory through the Banff iNaturalist project, and participation in Westslope Cutthroat Trout recovery, through habitat restoration work and native fish reintroduction. Youth have been targeted with Xplorers Booklets and new virtual learning programs. Additionally, the park has engaged urban audiences with outreach programing in Calgary, such as theatre programs at the TELUS Spark Science Centre and participation in the Beltline Urban Mural Project, in Vancouver via the Vancouver Urban Outreach Team, as well as activities at Ripley's Aquarium in Toronto.

Summary

The recovery measures in the action plan had limited socio-economic impact and placed no restrictions on land outside the boundary of the national park. The majority of direct costs of implementing this action plan were borne by Parks Canada. Indirect costs were minimal, mainly through visitor restrictions to certain areas of the park to protect Banff Springs Snails and short-term closures during recovery activities for Westslope Cutthroat Trout. Benefits included positive impacts on park ecological integrity, greater awareness of species and enhanced opportunities for engagement of visitors and local communities.

Appendix A: Technical Compendium - Population and Distribution Objectives

Whitebark Pine

The following table supports the summary population and distribution progress statements in Table 2.

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
Whitebark Pine	To establish a self-sustaining, rust-resistant population of Whitebark Pine that demonstrates natural seed dispersal, connectivity, genetic diversity and adaptability to changing climate.	1. Disease infection, stand density and mortality rate via stand health transects.	Whitebark Pine condition continues to decline. Blister rust infection rates for live trees remains somewhat stable from 16% in 2009 to 18% in 2019; this rate remains low compared with most areas of Whitebark Pine habitat. Stand density of cone producing trees is 1.27 m^2 per hectare which is good (<2 m^2 is poor). This means that natural regeneration is still occurring.	0%
		2. Hectares of habitat created or restored.	Since 2017, 3242 seedlings have been planted and approximately 6000 seeds collected. Based on recent restoration plans for similar areas, it is likely that 210,000 seedlings may be required to meet long-term objectives.	1.5%
		3. Number of potentially resistant trees identified and protected and number of	Due to the low blister rust infection rates in Banff National Park, naturally resistant trees cannot be identified. Staff have helped support the establishment of a seed orchard to grow naturally	Not reportable

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
		these with stored seeds.	resistant trees from outside the park. In addition, over 1300 seedlings from 13 parent trees showing natural resistance to blister rust have been planted in the park.	
		4. If fire is applied, the amount of regeneration 5-years post-fire.	In 2020, a prescribed-fire in the Flints/Stoney area opened up 44 ha of Whitebark Pine regeneration habitat. 3820 seedlings were planted in this burn area in 2021 and 2022. Regeneration has not been assessed as sufficient time has not yet elapsed post fire. In 2022, prescribed fires in the Dormer and Alexandra valleys opened an additional 61.5 ha and 336 ha of Whitebark Pine core and regeneration habitat.	Not reportable
			Overall progress is calculated as an average of the four monitoring components.	Overall: 0.75%

A monitoring program began in 2003 to measure the condition of Whitebark and Limber Pine in the Canadian Rocky and Columbia Mountains. Permanent plots from the Canada-United States border to the Willmore Wilderness in the north have been re-measured every 5-years. The data about blister rust infection levels, tree mortality and natural regeneration helps direct restoration action across national parks, provincial parks, and Alberta and British Columbia provincial lands. While this data is important, Whitebark Pine is very slow-growing, and it will take many decades for this type of population monitoring to respond to restoration action such as seed collecting, seedling planting, or prescribed fire (Figure 1).

Since this action plan was written, restoration experts have identified goals to measure progress to meet population and distribution objectives for Whitebark Pine recovery[9]. The approach, which can be refined for a region, recommends a network of "component populations" that consist of >5,000 mature parent trees located within 12 km of another component population (within 30% of the species' regional range). Given existing seedling survival estimates (~50%), roughly 10,000 putatively resistant seedlings should be planted in each component population. This approach synthesizes the best available datasets and science into a flexible, data-informed decision-making process that can be applied consistently across large geographic areas, and importantly, we can measure progress toward recovery. Moving forward, monitoring the condition of "component populations" may be identified as the approach to measure progress toward meeting Population and Distribution Objectives.

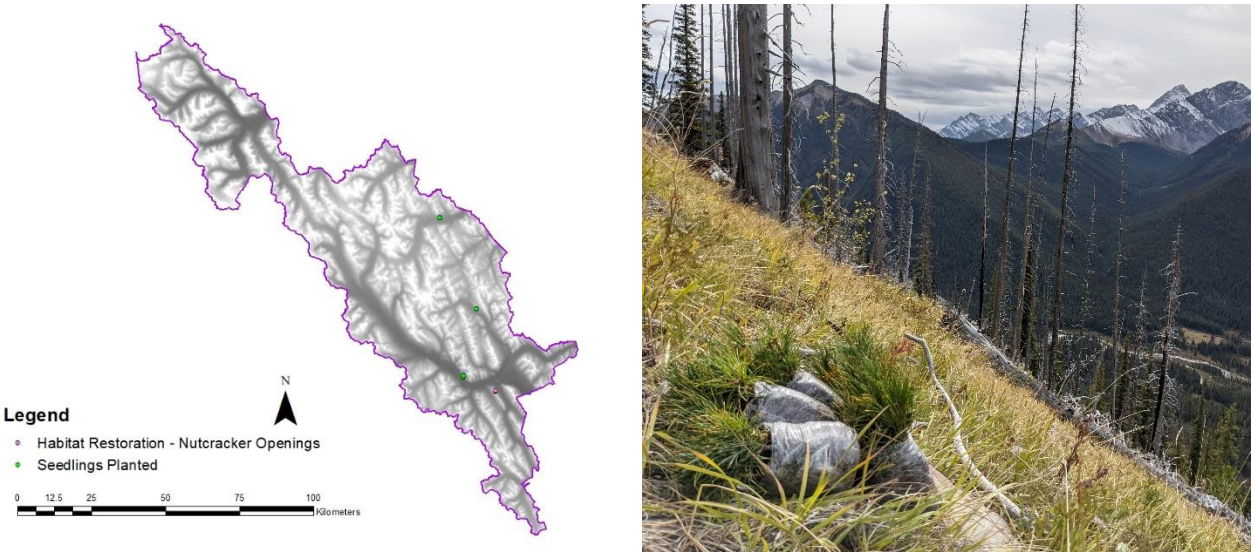


Figure 1. A map of Whitebark Pine seedling planting and restoration sites in Banff National Park (left) and Whitebark Pine seedlings ready to be planted (right). Photo credits: Parks Canada.

[9] Peer reviewed paper published on Forest Ecology and Management: https://doi.org/10.1016/j.foreco.2022.120282