



2022

IMPLEMENTATION REPORT:

MULTI-SPECIES ACTION
PLAN

for Yoho National Park of
Canada

(2017-2022)



Parks
Canada

Parcs
Canada

Canada

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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 Registry¹.

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This page: Natural Bridge in Yoho National Park, Z. Lynch, PCA; **Page i:** Researcher setting up bat detector, A. Forshner, PCA; **Page ii:** Close-up of Little Brown Myotis, T. McAllister; PCA; **Page iii:** Little Brown Myotis with radio-transmitter, E. Micalizzi; **Page 1 (from left to right):** Mountain Lion, W. Lynch, PCA; Aerial photo of Field, B.C., A. Krause, PCA; Elk, C. Siddall, PCA; Water rushing through canyon, C. Siddall, PCA; Close-up of Little Brown Myotis, T. McAllister, PCA; Forest with sun shining through, A. Forshner, PCA; Researcher setting up bat detector, A. Forshner, PCA; White-flowered Mountain Avens, J.F. Bergeron, PCA; Kicking Horse River, J.F. Bergeron, PCA; Trees with mountains, PCA; **Page 10:** Close-up of Little Brown Myotis, T. McAllister; PCA; **Page 13:** Researcher holding a radio receiver antenna, S. Skarsgard; **Page 14:** Researchers setting up a mist net for bats, A. Forshner, PCA; **Page 15:** Visitors on a guided hike, R. Creary, PCA; **Page 18:** Whitebark Pine cone caging, PCA; Tree debris burning on a rocky slope, 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 Yoho National Park of Canada, and in 2017 published the Multi-species Action Plan for Yoho 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 Yoho 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

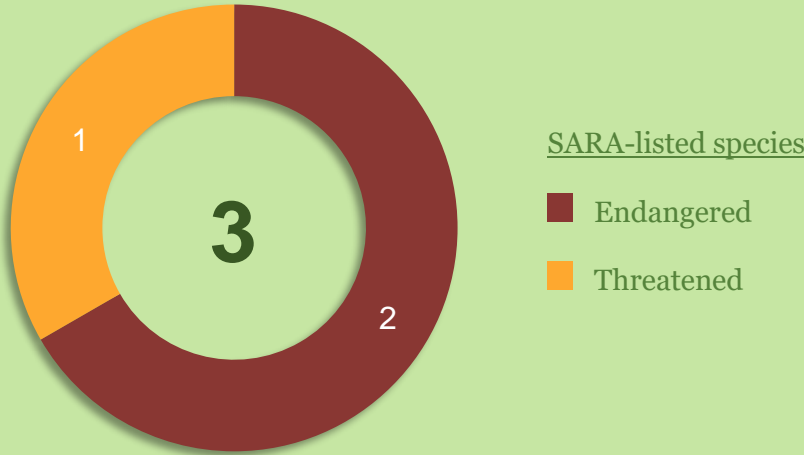
Parks Canada would like to acknowledge all staff, partners, stakeholders, volunteers and researchers who have contributed to implementation of the Multi-species Action Plan for Yoho National Park of Canada.

EXECUTIVE SUMMARY

This document reports on implementation of the Multi-species Action Plan for Yoho 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 Addressed³

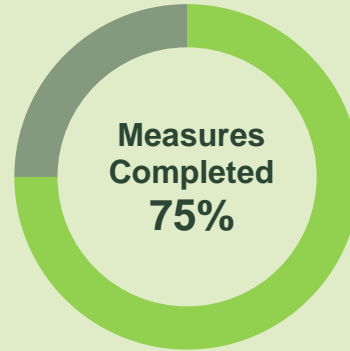
The action plan addressed three SARA-listed species. Measures and site-based population and distribution objectives identified within the action plan were focused on one species, for which management actions within Yoho National Park could have a substantive impact on species survival or recovery: Whitebark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



³The 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

16 measures (recovery actions) were identified in the multi-species action plan. Implementation of the action plan is assessed by determining progress towards completing each measure, and is outlined in Section 2 of this report. During the five-year period, all 16 measures were initiated⁴ and 12 were completed.

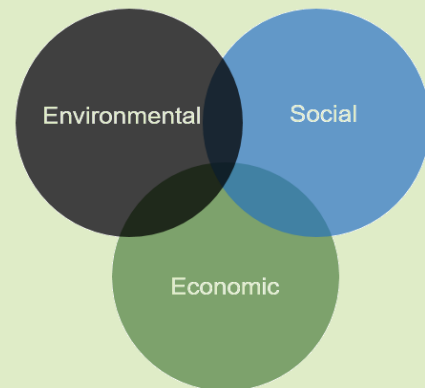


Ecological Impacts

1 site-based population and distribution objective (PDO) was developed in the action plan. Ecological impacts are assessed by measuring progress toward achieving this site-based population and distribution objective and are outlined in Section 4. Progress was made on this long-term objective.

Socio-Economic Impacts

Direct costs of implementing this action plan were borne primarily by Parks Canada. Indirect costs were minimal, while 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.

TABLE OF CONTENTS

PREFACE.....	i
ACKNOWLEDGMENTS.....	ii
EXECUTIVE SUMMARY	iii
1. CONTEXT.....	1
2. IMPLEMENTATION OF THE ACTION PLAN.....	1
3. ACTION PLAN HIGHLIGHT	10
4. ECOLOGICAL IMPACTS	11
5. SOCIO-ECONOMIC IMPACTS.....	13



1. CONTEXT

This document reports on implementation of the [Multi-species Action Plan for Yoho National Park of Canada](#)⁵ between 2017 and 2022, assesses progress towards meeting its population and distribution objective, and evaluates its socio-economic impacts. It addresses three SARA-listed Endangered, and Threatened species (for which an action plan is required)⁶.

Site-based population and distribution objectives were developed for one species for which implementation measures within Yoho National Park could have a substantive impact on recovery: Whitebark Pine.

2. IMPLEMENTATION OF THE ACTION PLAN

Implementation of the Multi-species Action Plan for Yoho 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 Yoho 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 interpretation programs that were focussed on species at risk were cancelled in 2020 and 2021.

⁵ Parks Canada Agency. 2017. Multi-species Action Plan for Yoho National Park of Canada. Species at Risk Act Action Plan Series. Parks Canada Agency, Ottawa. iv + 18 pp.

⁶ The status of these species may have changed over the reporting period.

Table 1. Progress towards completing recovery measures committed to by Yoho 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)
<p>1) Little Brown Myotis: Determine the distribution and relative abundance of Little Brown Myotis, with emphasis on identifying hibernacula and maternity roosting sites.</p>	<p>1. Increase knowledge of bat presence and populations in caves/mines and maternity roosts over each 5-year period.</p> <p>2. Presence and populations are known for high-potential hibernacula in first 5 year reporting period.</p>	<p>A survey of important bat habitats including buildings was completed in 2018. Little Brown Myotis and five additional bat species were confirmed through mist-netting and acoustic surveys. These locations can be re-surveyed to determine the effects of white-nose syndrome when it arrives. Roosting ecology research conducted in collaboration with University of Calgary from 2020 to 2022 identified numerous natural and anthropogenic roost sites for Little Brown Myotis, including one maternity roost.</p> <p>Surveys conducted between 2017 and 2022 have identified one maternity roost located in a building. One probable hibernaculum was located in a cliff face. One high-potential hibernaculum site has been identified and will be the subject of future inventory work.</p>	<p>100%*</p>
<p>2) 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</p>	<p>1. Action plan developed for access to significant bat hibernacula and roosts before white-nose syndrome arrives.</p> <p>2. Limit human caused spread of white-nose syndrome through increased awareness,</p>	<p>An action plan is now deemed unnecessary, and emphasis has been shifted to annual monitoring of potential hibernacula and maternity roosts. There is currently one known maternity roost in a third party structure. Property managers are following best management practices to protect bats in this building.</p> <p>Best management practices have been developed and adopted to manage bats in buildings in third</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
restrictions, to protect bats and their residences.	enforcement of restricted access, and implementation of decontamination protocols and best management practices for researchers.	<p>party structures and Parks Canada infrastructure. These practices promote coexistence if possible, but exclusion where necessary. Information is available to ensure any exclusions are conducted in a bat friendly manner.</p> <p>Entry to caves or mines in the park requires a restricted activity permit. The application of the <i>Canadian National White-nose Syndrome Decontamination Protocol</i> is a condition of all restricted activity permits issued for access to caves and mines.</p>	
<p>3) Little Brown Myotis:</p> <p>1. Adopt best practices for the maintenance or decommissioning of park infrastructure that contains Little Brown Myotis roosts.</p> <p>2. Work with partners and the community to protect important bat sites in buildings.</p>	<p>1. Establish best practices for Parks Canada staff and park stakeholders to address maintenance of infrastructure that contains roosts.</p> <p>2. Important roosts are identified for infrastructure requiring maintenance, and impacts are mitigated.</p>	<p>National guidance for maintenance of infrastructure containing roosts has been implemented. Consistent with Banff and Kootenay national parks, procedures have been shared to assist third-party managers of bats in buildings in Yoho with safe and lawful management practices: either coexistence or exclusion. These procedures include an operational response flowchart, requirements for pest management practitioners, and a brochure for building owners/residents.</p> <p>As of 2022, one building in the park has been found to host a maternity roosting site for Little Brown Myotis. Parks Canada is working with the owner to protect this maternity roost. One additional building undergoing renovation was assessed for roosting sites, but no evidence of Little Brown Myotis roosts was found.</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
<p>4) 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.</p>	<ol style="list-style-type: none"> 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. 	<p>This measure has been implemented through a park campground interpretive program in 2018, 2019 and 2022. The goal is to deliver this program every year, however the campground program was cancelled in 2020 and 2021 due to the COVID-19 pandemic.</p> <p>New communication products that can be used at maternity roosts in Yoho, Kootenay or Banff national parks were developed in 2018. In 2019, communications products focused on protecting and recovering Little Brown Myotis were developed for wide distribution to visitors and stakeholders. Information on preventing bat stowaways in camping vehicles is provided in campgrounds. Species at risk fact sheets that include Little Brown Myotis have been developed and distributed to residences, businesses and leaseholders. Social media stories are posted during Bat Week each year.</p>	<p>80%*</p>
<p>5) Whitebark Pine:</p> <ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<p>Between 2017 and 2022 a total of 26 Plus Trees were identified in the park. During the same period, 30 Plus trees from Yoho were submitted for resistance testing. This includes 24 Plus Trees identified since 2017, and seeds from other trees identified prior to 2017 that were re-submitted for testing after the initial submissions failed to germinate. Between 2017 and 2022 a total of 36,930 seeds were collected from Whitebark Pine Plus Trees in Yoho National Park. Plus Trees have been treated with</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
<p>6) Whitebark Pine:</p> <p>1. Complete predictive habitat model and map of Whitebark Pine distribution for the park.</p> <p>2. Where stand assessments are completed, they include aspects of stand health (i.e., rust presence/absence and stand density).</p>	<p>1. Predictive map of Whitebark Pine distribution and suitable habitat for the park.</p> <p>2. Assessed high-value stands in high risk areas.</p> <p>3. Data inform targeted and efficient management and recovery.</p>	<p>verbenone pheromones to protect against mountain pine beetle each year from 2018-2022.</p> <p>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 prepared. A detailed guide to Whitebark Pine critical habitat identification has also been produced to guide staff in delineating critical habitat in the field.</p> <p>Stand assessments are completed by monitoring permanent transects on a 5-year cycle. All 11 permanent transects in Whitebark Pine habitat in Yoho were monitored in 2019. Two new stand assessments were completed in Yoho in 2022.</p>	<p>100%*</p>
<p>7) Whitebark Pine:</p> <p>1. Plant putatively rust resistant seedlings, and when available, confirmed rust resistant seedlings, in priority restoration sites.</p> <p>2. Inoculate seedlings with mycorrhizal fungi to improve establishment.</p>	<p>1. Plant a minimum of 2000 rust-resistant Whitebark Pine seedlings by 2019. Continue annual planting beyond 2019 as resources are available and based on priority areas for restoration need.</p> <p>2. Where available, inoculate at least 50% of seedlings with mycorrhizal fungi prior to planting.</p>	<p>A total of 3,609 seedlings were planted in three different areas of the park in 2021.</p> <p>No seedlings have been inoculated with mycorrhizal fungi, as fungi are not available. Additional research and identification of potential source fungi is required before this element of the measure can be implemented. Consequently, this was excluded from reporting as it was not applicable.</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
<p>8) Whitebark Pine: Protect and, where feasible, increase the number and extent of existing stands and of blister rust resistant individuals through habitat management and restoration.</p>	<p>1. Restore Whitebark Pine habitat (e.g. prescribed fire and mechanical thinning) to a degree that will allow the persistence or expansion of existing stands and the potential for generation of new stands. Target 30 ha by 2019, and continue beyond as resources are available based on priority areas for restoration need.</p> <p>2. Mitigate threats in priority high value stands.</p>	<p>A total of 5.5 hectares of habitat has been thinned in two locations around Whitebark Pine Plus Trees. Debris piles have been burned on 3.5 hectares. The thinned areas will reduce threat from wildfire, reduce competition and increase regeneration habitat. Prescribed burns are the principal tool that will be used to enhance Whitebark Pine habitat in the park. Appropriate conditions to implement prescribed burns were not attained during this reporting period.</p>	<p>18%*</p>
<p>9) 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.</p>	<p>1. Increase awareness about this species among priority audiences.</p> <p>2. Reduce accidental harm/removal of Whitebark Pine trees.</p>	<p>Target was five interpretive programs or products. The Mountain Parks have collaborated on a 5-needle pine Communications Plan. This has been delivered in the park with a range of products on Whitebark Pine and Limber Pine, including video, guided hikes, campground interpretive programs, visitor guide content, and urban outreach.</p>	<p>100%*</p>
<p>10) ALL: Increase general awareness about species at risk that</p>	<p>1. Increased support and action for SAR conservation and</p>	<p>This has been achieved through a variety of programming, including interpretive hikes focused on Whitebark Pine, general</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
<p>are found in the park, through interpretive programming, targeted communications, and outreach.</p>	<p>associated management activities.</p> <p>2. Priority audiences, including park visitors, youth, urban and new Canadians, learn about species at risk found in the park.</p>	<p>communications to park visitors and businesses on obligations for protecting species at risk, and outreach communications on bats.</p>	
<p>11) ALL: Provide timely and effective species-specific communications to target audiences to disseminate knowledge, enhance understanding, and ensure compliance with SARA requirements.</p>	<p>Visitor activities are successfully managed to prevent habitat destruction or harm to individuals of a species.</p>	<p>This measure reflects communications delivered as part of the Whitebark Pine and Little Brown Myotis conservation efforts. See measures 4 and 9 above.</p>	<p>100%*</p>
<p>12) ALL: 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.</p>	<p>1. Sufficient data are gathered to increase confidence in detailed assessments that can be used to inform the next State of the Park Report and the Park Management Plan.</p> <p>2. Habitat mapping provides key data for the identification of critical habitat.</p>	<p>This measure is implemented annually through regular operations and by orientation training for park staff to encourage reporting of species observations.</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
<p>13) ALL: Strengthen species at risk recovery by working with Indigenous communities to incorporate traditional knowledge into SAR understanding.</p>	<p>Indigenous traditional knowledge is incorporated to fill species knowledge gaps.</p>	<p>Yoho National Park is in the early stages of establishing relationships with Indigenous peoples. Agreements have been established with the Ktunaxa and Secwepemc nations that provide a framework for collaboration on projects of mutual interest. A working group has been established to develop an aquatic stewardship plan for the park.</p>	<p>50%*</p>
<p>14) ALL: 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.</p>	<p>Increased Indigenous community involvement in the delivery of SAR outreach, education, and visitor experience actions.</p>	<p>Parks Canada has provided opportunities to Indigenous groups with connections to the park to express an interest in and collaborate on projects that involve outreach and education, including species at risk such as Whitebark Pine.</p>	<p>50%*</p>
<p>15) ALL: 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</p>	<p>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.</p>	<p>Data are shared regularly between Parks Canada and other agencies.</p>	<p>100%*</p>

Species and measure	Desired outcome	Progress towards outcome	Progress (% complete)
jurisdictions throughout the species' range.			
16) ALL: 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.	SARA compliance, including protecting critical habitat, residences and individuals of a species, is a high priority for law enforcement. Park wardens regularly patrol the park to monitor SARA compliance.	100%*

3. ACTION PLAN HIGHLIGHT: Little Brown Myotis



Little Brown Myotis are considered Endangered because they are at risk of extinction due to an introduced infectious disease called ‘White-Nose Syndrome’. There is no evidence yet of White-Nose Syndrome in Yoho National Park, but infected bats have been found across eastern Canada and as far west as Saskatchewan.

Rapidly declining numbers of Little Brown Myotis in eastern Canada and USA served as a catalyst to collect information for protection and recovery of this nocturnal, flying mammal species in the park. In 2018, Parks Canada completed a bat inventory with staff, volunteers, researchers and external agencies. Using mist-nets and acoustic recorders, staff documented Little Brown Myotis, and five other bat species breeding at several sites in the park. This baseline information provides an important foundation for future monitoring, especially in the event that white-nose syndrome is detected in the area.

In 2020-2022, Parks Canada teamed up with researchers from the University of Calgary to study roosting habitat of female Little Brown Myotis in Yoho and Banff national parks. Researchers and staff radio-tagged and tracked 50 female bats to determine the relative importance of roosts in buildings versus natural habitat. Roosts were found in 48 buildings, 14 trees, and 8 rock areas. Roosts in buildings were critical to females that were raising their pups. All identified maternity

colonies, where female bats communally raise their pups, were in buildings. However, there were also maternity roosts of pregnant females in trees, particularly after cool nights. These females used torpor, a resting state similar to short-term hibernation, to adjust their energy requirements. Best practices have been established for Parks Canada staff and park stakeholders to address maintenance of infrastructure that contains building roosts, with emphasis on coexistence or humane exclusion as an important component of protecting and recovering Little Brown Myotis.

4. ECOLOGICAL IMPACTS

Ecological impacts of the action plan are assessed by measuring progress towards meeting the one site-based population and distribution objective 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 the site-based population and distribution objective for a species at risk in Yoho National Park of Canada⁷.

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.	<ol style="list-style-type: none"> 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 	<p>Whitebark Pine condition continues to decline. Stand health transects conducted in 2019 showed an increasing trend of blister rust infection compared to 2014.</p> <p>Recovery actions have been applied across the park</p>	26%

⁷ 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)
		<p>number of these with stored seeds.</p> <p>4. If fire is applied, the amount of regeneration 5-years post-fire.</p>	<p>including habitat creation and restoration, identification and protection of potentially rust-resistant trees, seed collection and storage, and planting of Whitebark Pine in high quality habitat. See Appendix A for more detailed information.</p>	



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 and the benefits derived from its implementation. The multi-species action plan 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 multi-species action plan for Yoho National Park, described as costs and benefits, are outlined below.

Costs

Most 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 (Conservation and recovery measures that will be conducted in Yoho National Park) of the action plan. Additional resources were provided by the University of Calgary to support graduate student research and inventories for bats in the park, including Little Brown Myotis.

No major socio-economic costs to partners, stakeholders or Indigenous groups resulted from this action plan. The recovery measures were integrated into the operational

management of Yoho 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 Yoho National Park, and does not include any restrictions to land use outside park boundaries. This action plan, therefore, did not result in any significant socio-economic impacts to the public. No new restrictions were placed on visitor activities on regulated lands to protect and recover species at risk. However, existing regulations prohibiting entry to caves were considered important for protecting Little Brown Myotis and other bats from the potential threats of white-nose syndrome.

Benefits

Measures presented in the action plan for Yoho 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. Yoho National Park is working with partners to incorporate Indigenous knowledge into recovery programs. 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 native species and ecosystems.

The measures sought a balanced approach to reduce or eliminate threats to at-risk populations and habitats, and 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 a new guided hike that focuses on the conservation of Whitebark Pine has been developed to provide visitors an opportunity to learn about this key alpine species. Communication products focused on protecting Little Brown Myotis were also produced and distributed in the park.





Potential economic benefits of the recovery of the species at risk found in the park 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 Yoho National Park. Wildlife viewing is one of the most common visitor activities in the park and this helps support the economic health of the communities in the area.

Implementation of this action plan has provided new opportunities for park visitors to learn about species at risk through guided hikes, campground interpretive programming, and various communication products. Local residents and businesses have been provided information on how they can contribute to the recovery of species at risk. The park has also engaged urban audiences with outreach programming in Calgary and in Vancouver that includes content on species at risk. Yoho National Park is building relationships with Indigenous partners that will provide opportunities to incorporate traditional knowledge into species recovery measures.

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. Direct costs of implementing this action plan were borne primarily by Parks Canada. Indirect costs were minimal, while 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 increased from 41% in 2003 to 51% in 2019; this rate remains moderate compared with most areas of Whitebark Pine habitat. Stand density of cone producing trees is 6.3 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.	Over 3,600 seedlings have been planted since 2017 and more than 36,000 seeds have been collected. Based on recent restoration plans for similar areas, it is likely that 90,000 seedlings may be required to meet long-term objectives.	4%
		3. Number of potentially resistant trees identified and protected and number of these with stored seeds.	Fifty-seven potentially resistant trees have been identified, and 30 of these trees are in blister rust resistance testing programs. Early results have yet to identify any trees that have resistance, while seven trees are not resistant.	0%

Species	Site-based population & distribution objectives	Population monitoring	Progress towards site-based population and distribution objectives	Progress (% achieved)
		4. If fire is applied, the amount of regeneration 5-years post-fire.	<p>Progress is measured based on the Open Standards draft⁸.</p> <p>Yoho National Park has not experienced a significant mountain pine beetle outbreak in the past 5 years, and pheromones have been applied annually to protect high value trees. All of the 57 (100%) plus trees are still alive.</p> <p>Prescribed fire for Whitebark Pine restoration has not yet been applied. Mechanical thinning and debris burning has been completed in 3.5 hectares which is a small area relative to the amount of Whitebark Pine habitat.</p> <p>Overall progress is calculated as an average of the four monitoring components.</p>	<p>100%</p> <p>Not reportable</p> <p>Overall 26%</p>

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 these data are 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.

Since the Action Plan was written, restoration experts have identified goals to measure progress to meet population and distribution objectives for Whitebark Pine recovery⁹. The approach, which can be refined for a region, recommends a network of “component

⁸ The Open Standards Whitebark and Limber Pine Working Group has drafted recommendations for the number of resistant trees needed for restoration in a region: good condition is > 10 confirmed resistant (elite) trees and > 100 parent trees, fair condition is 50-100 parents and 5-10 elite trees and poor condition is < 5 parent trees and < 5 elite trees. We measured our progress against “good condition”.

⁹ Peer reviewed paper published in Forest Ecology and Management: <https://doi.org/10.1016/j.foreco.2022.120282>

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. In future, monitoring the condition of “component populations” may be identified as the best approach to measure progress toward meeting population and distribution objectives.



Figure 1. Whitebark Pine cone caging (left) and burning of thinned tree debris during habitat restoration at Paget Lookout (right) in Yoho National Park. (Photo credits: Parks Canada).