Limber and Whitebark Pine Recovery in Alberta

Partners in recovery

Provincial recovery plans for whitebark pine and limber pine cover a large area that crosses jurisdictions. Collaboration and partnerships have been a core part of the process.

- Alberta Environment and Parks is the responsible agency as species at risk in Alberta are listed under the Wildlife Act.
- Co-chairs of the provincial recovery implementation team are Robin Gutsell (Environment and Parks) and Jodie Krakowski (Agriculture and Forestry).
- Agriculture and Forestry, Forest Management Branch is mainly responsible for operational activities on provincial land.
- Alberta Environment and Parks is responsible for recovery within parks. Data is stored in the provincial species and ecosystems at risk tracking system (ACIMS: Alberta Conservation and Information Management System).
- Much of the species' range is within Rocky Mountain National Parks. Under the federal Species at Risk Act, a federal Whitebark Pine recovery strategy is expected to be released in 2016. Limber pine is being evaluated for federal Endangered listing and if approved, a recovery plan will be developed.
- Academic institutions and government agencies have collaborated to address identified research gaps. Partners to date include:
    - British Columbia Ministry of Forests, Lands and Natural Resource Operations
    - Government of Alberta (Agriculture and Forestry, Environment and Parks)
    - Kings University College
    - Montana State University
    - Natural Resources Canada-Canadian Forest Service (Pacific, Laurentian, and Atlantic Forestry Centres)
    - Parks Canada (Rocky Mountain Parks)
    - United States Department of Agriculture Forest Service (Dorena Genetic Resource Center, Coeur D'Alene Forest Nursery, and Rocky Mountain Research Station)
    - University of Alberta
    - University of British Columbia

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- University of Calgary
- University of Northern British Columbia
- University of Calgary
- University of Northern British Columbia
- University of Victoria

- The Whitebark Pine Ecosystem Foundation of Canada is a non-profit agency that can leverage funding, provide volunteers, and connect partners to enable sharing of information and work on projects related to the recovery plan.

Accomplishments

Baseline data collection has been key to documenting the status and trends of whitebark pine and limber pine. The recovery plan identifies priorities and actions taken by various agencies. Ongoing monitoring will show their effectiveness over time.

Pre-2015

- since 1995: Federal and Provincial agencies established and measured about 250 long term monitoring plots to identify trends, health status, and stand dynamics. This data was essential for provincial and federal endangered status listings
- 2014:received ministerial approval for provincial species recovery plans
- 2002 to 2014: seed from un-selected trees is gathered in an Alberta range-wide collection and stored at the provincial seed centre

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- location records were collected and submitted to provincial Alberta Conservation and Information Management System database
- 2008: cross-species compatibility grafting tests between limber and whitebark pine were conducted
- 2010: seed from 10 whitebark pine trees was tested through the United States Department of Agriculture Forest Service Intermountain Region whitebark pine recovery program. This program includes a seed zone overlapping southwestern Alberta and northern Montana and has an established seed orchard and clone bank in Idaho
- 2010: seed from Alberta limber pine collections sent to Canadian Forest Service labs to study whether individual trees can be multiplied through somatic embryogenesis
- 2012-2014: seed germination and viability studies are conducted to maximize collection and storage efficiency
- 2014-ongoing: seed from 5 Alberta limber pine populations are tested through a partnership between Canadian Forest Service-Pacific Forestry Centre and United States Department of Agriculture to survey for major single-gene resistance at Dorena Genetic Resource Center, Oregon
- seed and seedlings from Alberta limber pine populations are planted in various small post-fire restoration trials with Kings University College

2015-16

Rust resistant trees for genetic conservation and to produce seed for restoration

- identified, tagged, documented 85 potentially rust-resistant limber pine trees (candidate trees) and stand data
- collected a total of 12.4 kg of seed (152,500 seeds) as well as cuttings from these candidate trees
- locations of candidate trees are recorded so they can be protected against mountain pine beetle attack
- seed from 50 candidate limber pine trees was sent to the United States Department of Agriculture facility in Dorena Oregon for screening to verify their level of disease resistance
- grafted cuttings from 48 candidate trees as a trial using non-dormant shoots, which would save costly return visits in winter when shoots are usually collected
- collected cuttings from selected whitebark pine trees being tested for rust resistance at the United States Department of Agriculture Facility in Coeur D'Alene Idaho to add to their gene archive for that breeding zone
- sent seed from 8 candidate whitebark pine trees to the provincial program at Kalamalka Research Station, Vernon British Columbia where up to 40 trees per year are tested for rust resistance. This was the first time they have accepted material from outside British Columbia

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- trained provincial and federal staff to identify white pine blister rust, select and document potentially resistant trees, and collect cones

Information sharing on high value trees and stands

- sent candidate tree locations to identify species at risk in the South Saskatchewan Regional Plan
- sent candidate tree locations to Alberta's Wildfire Management Branch to incorporate in fire management planning
- sent candidate tree locations and associated data to Alberta Environment and Parks to incorporate in their management planning and include in the provincial Alberta Conservation and Information Management System database

Improved mapping of whitebark pine and limber pine

- after typical forest inventory (AVI: Alberta Vegetation Inventory) was determined to be unreliable for documenting occurrence and abundance of limber and whitebark pine, worked with a contractor to develop a spatial provincial range-wide habitat suitability model for both species (excluding national parks). 68 townships had additional remote sensing vegetation analysis to model stand density.
- collected additional field data to verify the habitat models
- conducted range-wide reconnaissance for cone crops to most efficiently plan next field season's activities

Other recovery plan activities

- health monitoring plot data is used to identify high priority areas for recovery activities
- shared information on Alberta's whitebark and limber pine recovery program with diverse agencies and non-government organizations involved in species at risk, native plants, and ecosystem recovery
- Developed a communications plan to increase awareness of species issues
- collaborated with Alberta Environment and Parks to update their whitebark and limber pine web pages
- prepared a draft strategy for whitebark pine and limber pine intended to align with Alberta's Wetland Policy. Activities impacting these species and habitats would be mitigated or compensated by implementing recovery plan activities (under review)

2016-17

Long term monitoring for status and trends

- Established and measured 2 long term monitoring plots in the northernmost stands of whitebark pine with Forest Health staff

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- Established a long term limber pine provenance trial testing 1320 seedlings grown from 145 trees representing 30 populations from Alberta to New Mexico, in a project led by the USDA Forest Service, Fort Collins, Colorado and supported by University of British Columbia – 1 site is in Alberta and 1 is in Colorado.

Rust resistant trees for genetic conservation and to produce seed for restoration

- sparse to no cone crop in Alberta for either species in almost all regions
- no candidate trees needed protection against mountain pine beetle because they were in low hazard areas based on 2015 surveys
- field crew revisited 383 trees from which Alberta has collected seed. They documented the parent tree health status, and also identified and documented 51 new potentially rust-resistant limber pine trees and 47 whitebark pine trees
- Agriculture and Forestry spatial resource specialist built an app to more efficiently and accurately collect and manage field data on candidate trees and stands
- continued training for field crews, parks staff, and NGO volunteers
- sent seeds from 50 potentially resistant limber pine trees to United States Department of Agriculture facilities at Dorena (limber pine) and seeds from 8 potentially resistant whitebark pine trees to BC Ministry of Forests, Lands and Natural Resource Operations at Kalamalka Forestry Centre (whitebark pine) for disease resistance screening

Information sharing on high value trees and stands

- sent updated data on potentially rust resistant tree locations and value to Alberta Wildfire, Alberta Forest Management Branch, Alberta Environment and Parks, and other agencies to support planning and management
- collaborated on logistics, access and field work with Alberta Environment and Parks, Forest Management Branch, Parks Canada, and local volunteers
- All locations of plus trees are now available to Alberta Government staff internally via GIS

Better mapping of whitebark pine and limber pine

- Quality control was completed for habitat suitability models for whitebark and limber pine across Alberta. The models provide reliable information to support management and recovery actions, but are not intended to precisely predict where every tree is – just where there is suitable habitat. This represents a significant advance because it is the first reasonably accurate map of these species in Alberta
- These models have been posted to the provincial spatial GIS data warehouse and are available to all Alberta Government staff, and have also been posted online to the Open Data site to support public use and conservation of these species. Data will be used to identify core areas for recovery work.

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- Density mapping was completed for both species across their provincial ranges. Data quality control is pending before releasing it.
- Alberta Agriculture and Forestry spatial resource specialist developed a citizen science app enabling interested volunteers to document trees and stands and submit data to the province

Recovery plan extension and priorities

- collaborated with partners to support activities identified in recovery plans
- produced and distributed extension materials to increase awareness of these species and programs
- developing various Best Management Practices for working with these species at risk in collaboration with the Crown Managers Partnership
- continued reporting on provincial recovery efforts and conservation status at provincial, national and international forums, and online
- continued to recognize and work with staff and volunteers in the field
- participate in Whitebark Pine Ecosystem Foundation Annual Science and Management Workshop in Jasper, a joint US-Canada WPEF event

2017-18

Rust resistant trees for genetic conservation and to produce seed for restoration

- continue to search for potentially disease resistant trees and collect seeds
- no candidate trees will need protection against mountain pine beetle because they were in low hazard areas based on 2016 surveys
- continued training for field crews, parks staff, and NGO volunteers
- continue to send seeds of potentially resistant trees for disease resistance screening

Information sharing on high value trees and stands

- send updated GIS links or data on potentially rust resistant tree locations and value to Alberta Wildfire, Alberta Forest Management Branch, Alberta Environment and Parks, and other agencies to support planning and management

Better mapping of whitebark pine and limber pine

- Complete quality control for density modelling of whitebark and limber pine and release the models.

Recovery plan extension and priorities

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- collaborate with partners to support activities identified in recovery plans, and planning for 2019 remeasurement of the network of 250 long term monitoring plots
- finalize Best Management Practices for working with these species at risk in collaboration with the Crown Managers Partnership nm
- continue reporting on provincial recovery efforts and conservation status at provincial, national and international forums, and online
- continued to recognize and work with staff and volunteers in the field
- produced and established interpretive signs to increase awareness of the recovery program and activities in the field at trailheads, caged trees, and interpretive centres

2018-19 and beyond

Whitebark and limber pine trees grow very slowly, requiring a long term commitment for their recovery. Identifying enough trees that are potentially disease resistant from each region, collecting seeds, testing the parent trees for disease resistance, propagating, and planting enough resistant seedlings to restore populations across the range will take decades

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