

# 2019-2022 Provincial Forest Health Strategy

PREPARED BY THE FOREST HEALTH UNIT, RESOURCE PRACTICES  
BRANCH

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## **Provincial Forest Health Strategy: 2019–2022**

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### **Executive Summary**

This document outlines a three-year Forest Health Strategy identifying key goals, objectives, critical success factors and targeted collaborative actions that will enable the Forest Health program to achieve its mission: providing science-based information to mitigate the impacts of damaging forest health agents (insects, pathogens, wildlife and abiotic factors).

October 2019

## INTRODUCTION

The Forest Health Program was originally established to protect forest resources by managing bark beetles and defoliating insects. Management protocols to plan and implement treatment programs were developed and incorporated science-based information on insect pest and host biology, impacts, and management options. The program has since expanded to protect and manage British Columbia's (BC) forest resources from the impacts of a wide range of forest health agents. The program is responsive to the influence of climate change, and the threat of introduced invasive insect pests and pathogens on forests. Regional and headquarters program specialists support the program goals and objectives, which includes proactive management of forest resources, by generating supporting scientific information through directed research projects.

This Forest Health Strategy supports the Ministry of Forest, Range, Natural Resource Operations and Rural Development's (FLNRORD) **Vision:**

*Stewardship of the Province's Crown land and resources that reflects the diverse values and interests of all British Columbians.*

and **Mission:**

*We make, support and advise on stewardship decisions for British Columbia's land and resources and deliver services to provide environmental, economic, cultural and social benefits for all British Columbians. Our work supports a sustainable economy in all parts of the province and provides a foundation for true and lasting reconciliation with indigenous people.*

The Ministry's mandate is to maintain and improve the productivity of forests in BC, extend the supply of the timber resource, and protect forest resource values considering native and introduced forest health agents (insects, pathogens, wildlife and abiotic causes) and a changing climate. Losses to forest resources caused by damaging forest health agents are natural and expected events, and in some cases are manageable or preventable. These losses can be estimated and quantified with forest health data, which can influence Timber Supply Review (TSR) estimates.

The Provincial Forest Health Program's goals represent a key objective of the BC FLNRORD mandate to:

*"Manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia (Ministry of Forests and Range Act, Section 4b)".*

The priorities for FLNRORD are outlined in the Ministry Action Plan<sup>1</sup> (December 2018) under the goal of sustainable natural resource management; and under the key action / mandate commitment to “respond to natural hazards”.

This third iteration of the *Provincial Forest Health Strategy* identifies three overarching goals<sup>2</sup> that contribute to the provincial forest management framework, and direct program investments and resource allocation. Subprograms within each goal are outlined and accompanied by specific objectives, strategies, communication and collaboration activities to be achieved during the period 2019–2021. The strategic direction will be reflected in regional and district forest health strategies and will guide funding and resource allocation decisions in the Ministry’s implementation plans for programs such as the Land Based Investment Strategy (LBIS), Forest Improvement and Research Management Branch’s Intended Outcomes Research program, Forests For Tomorrow (FFT) the Integrated Stewardship Strategies (ISS), the Forest Carbon Initiative (FCI) and the Forest Enhancement Society (FES).

## VISION STATEMENT

To be leaders in developing and implementing knowledge-based, reactive and proactive forest health management

## MISSION STATEMENT

Provide evidence-based, economically rationalized management practices that prevent or mitigate the impacts of forest health agents.

### ***Pests or Forest Health Agents?***

*In the integrated pest management lexicon, the term “pest” refers to a biological agent that causes enough damage to be a management concern. Such damage could be in the form of mortality, growth loss, or damage affecting merchantability or form. The terms “forest health agent” or “forest health factor” are used by the Provincial Forest Health Program to describe a wider range of damaging agents that include insects, diseases, animals (wild and domesticated) and abiotic damage. The program detects, assesses and manages damage caused by forest health agents, some of which are also damaging enough to be regarded as “pests”.*

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<sup>1</sup> 2019 Ministry Action Plan (internal access only):

[https://gww.nrs.gov.bc.ca/flnrord/files/flnrord/media/internal\\_communications/ministry\\_action\\_plan\\_2019.pdf](https://gww.nrs.gov.bc.ca/flnrord/files/flnrord/media/internal_communications/ministry_action_plan_2019.pdf)

<sup>2</sup> The Forest Health Program excludes management of established invasive plants, which is currently administered by the Ministry’s Range Branch (<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species> )

## PROGRAM ORGANIZATION

The Forest Health Program is administered and delivered by specialists at FLNRORD headquarters (Resource Practices Branch) and in the regions, with support from district stewardship staff. Headquarters staff (Forest Health Officer, Provincial Forest Pathologist, and Provincial Forest Entomologist), work in the Office of the Chief Forester and report to the Chief Forester through the Deputy Chief Forester. The main roles of this Forest Health Unit are to provide provincial-level strategic direction, policy advice, program budget oversight and the integration of forest health within other Ministry programs. Headquarters specialists also deliver the gypsy moth eradication program and produce the annual summary of provincial forest health conditions.

Regional and district staff report to their respective area assistant deputy minister through their regional executive directors, and deliver operational projects, monitor local forest health conditions, gather and analyze forest health research data, and provide extension and expert advice and recommendations to local decision makers, industry, and the public.

An efficient and co-ordinated delivery of forest health activities is achieved through communication and collaboration between all forest health specialists, supporting district staff and their respective management teams.

The Forest Health Program currently obtains its operational funding through LBIS. In addition, targeted research funding is available to address priority forest health issues. Administrative and salary support is covered primarily by base budgets.

To evaluate the wide range of biotic and abiotic damaging forest health agents, the program implements the concepts of Integrated Pest Management (IPM). This systematic decision making process centres on detection, assessment, treatment and monitoring activities, and providing training and extension services.

### ***Elements of IPM:***

- 1. Planning and managing forestry production systems to prevent insects, diseases and wildlife from becoming pests.*
- 2. Identifying pests, their natural population regulators and damage.*
- 3. Monitoring populations of pests and beneficial organisms, pest damage, and environmental conditions.*
- 4. Making control decisions based on potential damage, cost of control methods, value of production, impact on other pests and pathogens, beneficial organisms and the environment.*
- 5. Using strategies that may include a combination of behavioural, biological, chemical, cultural and mechanical methods to reduce pest populations to acceptable levels.*
- 6. Evaluating the effects and efficacy of management decisions.*

## Forest Legislation Related to Forest Health

- The *Forest & Range Practices Act* (FRPA) and regulations outline how all forest and range practices and resource-based activities are to be conducted on Crown land in British Columbia.
  - FRPA is based on the principle of professional reliance when planning forestry operations.
- The primary tool for planning forestry operations is the Forest Stewardship Plan (FSP) whose content requirements are defined under the *Forest Planning and Practices Regulation* (FPPR).
  - Within this plan are commitments and standards for harvesting and reforestation, including stocking standards, which may directly influence forest health risk.

Also, under *FRPA section 26*, the minister may direct private landowners and agreement holders (licensees) to conduct remedial forest health control activities under certain conditions.

See: <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health/forest-health-legislation>

## FOREST HEALTH STRATEGIC GOALS

1. ***Forest Health Factors are detected and assessed***  
New and recurring disturbances caused by forest health factors are detected, and assessments of risk and impact to forest resource values are provided.
2. ***Practices are adapted to accommodate known forest health risks***  
Evidence-based information is used to develop recommendations and modify forest management practices to mitigate the impacts of forest health factors.
3. ***Resource values are protected***  
Forest resource values are protected from forest health factor damage through appropriately applied direct management actions including treatment and monitoring. This includes the support and implementation of proactive management activities.

The Forest Health Strategic Goals are a collaborative undertaking including other Ministry programs, First Nations, industry, academia and other stakeholders with the vision of collectively addressing forest health impacts on values of interest.

### ***1. Forest Health Factors Are Detected and Assessed***

Detecting forest health conditions is a cornerstone activity of the Provincial Forest Health Program. Understanding the temporal and spatial ranges of forest health-related disturbances is essential to the management and interpretation of forest health factors. To meet this goal occurrence, incidence and severity data is required to support estimations of risk and impact on forest management investment decisions. These estimates can be factored into timber supply analyses and other resource planning processes.

#### ***Objectives***

1. Provide current data on the occurrence, incidence and severity of forest health factors in BC's forests.

2. Ensure forest health detection methods are the most current and suitable for large and fine scale surveys.
3. Ensure that forest health data is made accessible to all internal and external clients (government, industry, academia, and the public) in a timely manner.
4. Integrate forest health data with other forest management information systems and program areas.
5. Ensure that risk and impact assessments incorporate proven protocols and that the methodologies used are transparent.
6. Assess the effects of forest management practices on the distribution, severity and incidence of forest health factors.
7. Assess the effects of climate change on the distribution, severity and incidence of forest health factors.
8. Assess the impacts of forest health factors on meeting carbon sequestration targets and identify opportunities to minimize or capture carbon emissions.
9. Employ proactive forest health management activities to mitigate the impacts forest health factors.

### **Strategies**

- Conduct aerial surveys annually over more than 80% of the province’s forests.
- Maintain or improve the quality of forest health data collected in existing operational surveys (i.e., silviculture surveys, inventory and research plots, etc.) through increased training, extension delivery, quality assurance monitoring and maintenance of data quality standards.
- Ensure data collected by the Provincial Forest Health Program is included in government data repositories, such as the Reporting Silviculture Updates and Land Status Tracking System (RESULTS) and the BC Geographic Warehouse, and communicate the availability of this data and its metadata and data standards.
- Publicly distribute annual provincial summaries of forest disturbances and status of major forest health factors.
- Address risks and impacts of priority forest health factors, as identified through the timber supply analysis process, annual aerial surveys or through client communication.
- Support Forest Analysis and Inventory Branch (FAIB) to standardize the procedure for calculating Non-Recoverable Losses (NRL) for each Timber Supply Area (TSA) and provide all TSAs with updated NRL estimates.

### **Collaboration and Communication**

- Assess the impacts of drought and other abiotic events on forest health in collaboration with other government programs and provide regular updates to forest managers.
- Collaborate and support forest health data collected by the Forest Analysis and Inventory Branch’s (FAIB) Young Stand Monitoring (YSM) and the Forest and Range Evaluation Program’s (FREP’s) Stand Development Monitoring (SDM 2.0) programs with training, quality assurance monitoring, and data analysis and interpretation.

## **2. Practices Are Adapted to Accommodate Known Forest Health Risks**

Damaging forest health factors can prevent stands from reaching stated management objectives (economic and environmental) by suppressing growth rates, causing stem deformities or causing tree mortality. The Provincial Forest Health Program provides evidence-based recommendations to minimize the risk of significant forest health factor damage to managed and unmanaged stands.

These recommendations are produced by forest health specialists who synthesize scientific and operational information derived from monitoring and survey activities, operational and formal research trials, and peer-reviewed research publications. Forest health specialists influence the adoption of new or improved forest health practices through training field personnel on pest identification, survey and treatment methodologies, and through the interpretation of policies, guidelines, legislation, and timber pricing. Forest health specialists also recommend adaptations to management practices that account for forest health factor responses to a changing climate. Some examples are described in Appendix 1.

### **Objectives**

1. Provide current and accessible evidence-based advice to all clients.
2. Develop the proficiency of operational staff in forest health factor detection, identification and management.
3. Refine management practices and policies through continuous improvement.
4. Promote evidence-based decision making in operational plans and prescriptions. Provide tools to assess the risks inherent to conducting forestry activities on sites with endemic forest health factors under a changing environment.
5. Promote effective, innovative and sustainable measures and practices to prevent or minimize forest pathogen impacts.
6. Update management practice documents to reflect evidence-based treatment options and mitigation strategies for the most common forest health factors addressable during forest operations.
7. Ensure that, where feasible, government incentives available to mitigate damage to future stands are promoted.

### **Strategies**

- Interpret and incorporate evidence-based knowledge to continuously improve decision-making and application of forest practices.
- Incorporate stocking standard recommendations related to forest health into district forest health strategies to address locally significant high-risk pests and pathogens.
- Utilize forest health data from RESULTS, SDM 2.0 and other relevant sources, to adjust and refine management practices.
- Promote, through knowledge transfer, the deployment of currently available resistant seed for western white pine (white pine blister rust), lodgepole pine (western gall rust) and Sitka and white spruce (spruce weevil). Promote the use of resistant or tolerant clonal material for reforestation with black cottonwood or hybrid poplar (*Septoria* stem canker).
- Develop or refine the damage criteria for free-growing surveys, SDM 2.0 and YSM with information from long-term damage monitoring plots and the results of impact analysis work.



- Improve the knowledge and skills of field staff in biotic and abiotic factor identification and management through delivery of training and extension, including the development of mobile applications, and continuously update the content on the FLNRORD forest health website.
- Participate in initiatives outlined in the FLNRORD’s Forest Stewardship Action Plan for Climate Change Adaptation including proposing legislative and regulatory amendments to address climate change adaptation and forest health in general.
- Conduct forest health research to support the development and improvement of beneficial practices.
- Complete and maintain insect and pathogen risk assessments to help in the selection of densities and tree species for planting or retention during forest operations.
- Update and promote use of damage appraisal tools (e.g., SWAT, GRIM and CRIME, BEC hazard ratings) to improve estimates of forest health impacts at the stand and management unit levels.
- Update management practice documents to incorporate new knowledge and practical experience gained from reviewing past forest practices.
- Communicate with Timber Pricing Branch on the use and value of appraisal cost recognition for stump removal and other beneficial reforestation treatments.

### ***Collaboration and Communication***

- Collaborate with research staff to ensure forest health trials are maintained within the research trial database, and continue to support the establishment and maintenance of high-priority, long-term forest health research installations.
- Collaborate in the monitoring and assessment of the Assisted Migration Trials and other permanent sample plots established to test climate change adaptation practices.
- Collaborate with Forest Improvement and Research Management Branch (FIRM) to identify priority pest issues to address in breeding efforts for pest-resistant trees.
- Participate in tree breeding initiatives with FIRM on developing pest resistant material.
- Work with FLNRORD staff and licensees to implement legislation, policies and management practices through technical inputs to operational plans and prescriptions.
- Communicate information on beneficial practices information through extension events, training courses, presentations, publications, and policy development to support evidence based decision making as key to the success of professional reliance.
- Communicate findings from forest health research studies.

### ***3. Resource Values Are Protected***

Protection of forest resource values is a key activity of the Forest Health Program. Treatments are recommended and applied to limit tree mortality and growth impacts. Considering treatment programs often require significant investments of government resources, careful planning and prioritization is essential. This would include the consideration of proactive management tools to mitigate the impacts of forest health factors such as bark beetles. To determine the most effective use of resources, treatment decisions are based on a critical assessment of biological conditions and economic factors in support of protecting resource values.

The highest priority for resource protection is to minimize impacts to the current and mid-term timber supply by implementing direct control activities. Treatments have also been conducted to protect non-timber resources (*e.g.*, critical caribou and mule deer habitat), as the value of these resources has been documented and factored into treatment rationales. This expansion of the values considered in treatment decisions reflects the Ministry's broader mandate. Where treatment options can be constrained by non-timber values, management recommendations are updated to accommodate these more complex treatment scenarios.

## **A. Bark Beetle Management**

Guidelines have been designed to focus limited resources where direct management can have the greatest impact on beetle populations within areas identified as priorities to protect the current and mid-term timber supply. These guidelines are based on our current knowledge of bark beetle biology, stand susceptibility and management options but were designed for mountain pine beetle population management before the mountain pine beetle outbreak erupted in the early 2000s. Updated guidelines will address the current forest landscape and land management priorities.

The application of suppression activities for mountain pine beetle continues in a few locations in southeastern BC and in the Skeena Region, where opportunities still exist to maintain inventories of healthy mature lodgepole pine.

Management activities to suppress pre-outbreak and outbreak populations of Douglas-fir and spruce beetles are being implemented primarily in areas where the co-operative efforts of licensees (including the small-scale salvage program) can be utilized to aggressively treat bark beetle populations across a management unit. Management options for these beetle species are limited and a different set of management strategies are required to effectively limit their damage.

### **Objectives**

1. Focus bark beetle management investments in areas that maximize benefits.
2. Implement policies that encourage industry participation in efficient and effective beetle management.
3. Continuously improve strategies and tactics for beetle management.

### **Strategies**

- Facilitate the use of regulatory, resource tenure and revenue tools to provide district managers with the ability to implement effective pest reduction harvesting.
- Update beetle management unit (BMU) strategy setting guidelines to reflect the differences in biology, detection methods, and treatment options between mountain pine beetle, spruce beetle and Douglas-fir beetle.
- Apply suppression tactics to high-priority beetle management units, as determined by the provincial beetle management ranking system, to protect current and mid-term timber supply and other resource values. Ensure TSA Forest Health Strategies are updated with the most current BMU strategies.

- Monitor and manage Douglas-fir and spruce beetle populations, particularly in timber supply areas heavily affected by mountain pine beetle, to mitigate impacts on both timber and non-timber resource values.
- Support resource requests for beetle management through a strong business case.
- Improve bark beetle management tools through research and development.
- Ensure data necessary to evaluate management programs are collected and archived in a standardized manner.
- Explore opportunities to expand treatment to prevent the loss of mature trees for carbon sequestration purposes.

## **B. Defoliator Management**

Treatment of defoliating insects reduces the growth loss, top kill, mortality and site degradation associated with defoliation events. BC's forests are damaged by a diverse array of defoliator species. Despite this diversity, operational treatment programs are only implemented for western spruce budworm, Douglas-fir tussock moth and western hemlock looper. Outbreak populations of other potentially significant defoliators like 2-year-cycle budworm and blackheaded budworm may warrant treatment in the near future.

### **Objectives**

1. Protect critical current and mid-term timber supply through implementation of targeted defoliator treatment programs in areas that were severely impacted by mountain pine beetle.
2. Protect public health and forest resource values by reducing Douglas-fir tussock moth populations on Crown land.
3. Protect critical wildlife habitat identified by FLNRORD and Ministry of Environment and Climate Change Strategy (MoECCS) wildlife habitat specialists through reductions in tree mortality caused by western hemlock looper.
4. Continuously improve treatment methods, stand selection criteria, damage thresholds, and return on investment for defoliator management.

### **Strategies**

- Within timber supply areas impacted by the mountain pine beetle, target all high-priority western spruce budworm areas for treatment with the biological pest control agent *Bacillus thuringiensis* subspecies *kurstaki* (Btk)
- Develop operational treatment criteria and define optimal timing of Btk applications for 2-year cycle budworm in high-elevation stands.
- Using targeted aerial and ground surveys, continue to monitor other potentially important defoliator populations to allow a rapid response to emerging outbreaks.
- Continuously improve the Return on Investment estimations for defoliator management.
- Update defoliator management procedures with the latest research findings.

## **C. Management of Introduced Insects and Pathogens**

British Columbia is under continuous threat from invasive non-native pests and pathogens. Responsibility for the detection, treatment, and regulation of exotic species lies with the federal Canadian Food Inspection Agency. However, once an invasive species is declared established, or if it enters BC from another part of Canada where it is established, the agency generally limits its resource commitments to regulations that address foreign trade implications, thereby deferring active pest management to the province or other jurisdictions. When this decision is made, the Provincial Forest Health Program conducts a risk analysis that determines the best course of action to minimize the pest's impact.

### **Objectives**

1. Prevent the establishment of invasive species currently found in other parts of Canada and abroad.
2. Develop policies and management strategies to mitigate damage by established non-native invasive species.
3. Maintain BC's gypsy moth-free status.
4. Plan and co-ordinate activities with federal and provincial partners to facilitate timely and effective plant health emergency responses.

### **Strategies**

- Continue to work collaboratively with the Canadian Food Inspection Agency, Canadian Forest Service, Ministry of Agriculture, and Ministry of Environment and Climate Change Strategy to maintain BC's gypsy moth free status. Chair the BC Gypsy Moth Technical Advisory Committee and lead eradication efforts in the province.
- Continue active participation in the Inter-Ministry Invasive Species Working Group, the BC Plant Pest Advisory Committee, and the Critical Plant Pest Committee, (the last being a multi-agency body specifically tasked with co-ordinating responses to plant health emergencies).
- Implement policy and regulatory mechanisms, and develop operational strategies, to limit use and transportation of hybrid poplar clones susceptible to *Septoria musiva* into and within BC.
- Support surveys to define the expanding distribution of balsam woolly adelgid and assess the potential risk to forest resource values as this pest becomes distributed province-wide, and develop best management practices to minimize the spread
- Continue support of the Canadian Council of Forest Minister's National Forest Pest Strategy initiative that has identified improving coordination between jurisdictions for multi-jurisdictional forest health emergencies as one of its key objectives.

## **FOREST HEALTH CHALLENGES AND OPPORTUNITIES**

Forest health challenges can only be met by science aimed at understanding the processes governing pest, pathogen and forest, and responses to environmental and management changes. These challenges also provide an opportunity for harnessing the full potential of evidence-based information to deal with major forest health issues.

### **Climate Change**

Climate change is increasing the risk of establishment and spread of native and introduced pests and pathogens. Changing temperature and precipitation profiles have the ability to affect the severity and timing of outbreaks and change the distribution and range of many pest species. Altered local environments have the potential to affect a tree species ability to respond to attack by pests. Although it is challenging to prepare for risks that are difficult to predict, it will be important to facilitate adaptive practices to mitigate forest health issues caused by climate change.

### **Professional Development**

Effective implementation of Forest Health strategies (provincial, regional or district) will require professional and knowledgeable staff with well-developed support networks. Professional development, including involvement in scientific forums, technical conferences and field of practice workshops, is critical to maintaining a high level of skill, competency and the knowledge necessary when carrying out forest health practices in BC.

### **Succession Planning**

As demographics influence the Forest Health Program, succession planning is an important factor that the Ministry needs to implement to develop new leaders who are prepared to ensure that the forest health mission and strategic goals are carried out.

## SUMMARY

The Ministry has a mandate to protect the economy, the environment, and the capacity of our land resources from the negative impacts of damaging forest health agents. For decades the Ministry has worked to achieve this mandate through legislation, policy, procedures, targeted funding, and education. The *Provincial Forest Health Strategy* builds on this foundation and lays out a framework of future prevention and management activities.

This *Provincial Forest Health Strategy* provides a roadmap for the Forest Health Program over the next three years. It outlines key goals and activities that are both new and continuing. This strategy will be used to help prioritize resources and activities that support the Ministry's mandate to maintain and improve the productivity of BC's forests.

This strategy commits the Forest Health Program to:

- Build on the strengths of existing partnerships, thereby aligning resources, policy, and information, and to explore and establish new partnerships.
- Maintain and expand the capacity to monitor and detect native and non-native forest health agents.
- Deliver treatment programs to mitigate damaging forest health agents.
- Where feasible, move towards pro-active management to mitigate future forest health impacts.
- Facilitate forest health knowledge transfer through training and education.
- Continue evidence-based prioritization of forest health agents for planning and decision making, including setting thresholds using the best available information.
- Regularly report on forest health issues, actions and outcomes.

### For More Information:

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Web: <https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health>

APPENDIX 1 – Forest health advice that influences specific forest management activities.

Practice Information	Purpose	Information Source
<b>Stocking standards</b>	Provide forest health information related to provincial stocking standards that will minimize risks from pests and pathogens which seriously affect stand yield. Provide guidance to delegated decision makers on forest stewardship plan stocking standard approvals.	<b>Stocking Standard Forest Health Test Guidance to Delegated Decision Makers</b> ( <a href="http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/stocking-standards">http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/stocking-standards</a> ). District forest health strategies will describe TSA-specific stocking standard recommendations designed to accommodate potential forest health risks.
<b>Forest Health damage criteria and Chief Forester's data submission standards</b>	Provide specific forest health criteria to define acceptability of forested stands. Provide recommendations to the Chief Forester regarding the acceptable quality of forest health data to be entered into RESULTS.	Damage criteria in place for even-aged stands, multi-layered stands, broadleaves, and for use in mid-rotation monitoring. <b>Free-Growing damage criteria:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/free_growing_damage_criteria.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/free_growing_damage_criteria.pdf</a> . <b>Broadleaf Free Growing damage criteria:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/broadleaf_free-growing_damage_criteria.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/broadleaf_free-growing_damage_criteria.pdf</a> <b>Multi-layer Free Growing damage criteria:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/multi-layer_free-growing_damage_criteria.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/multi-layer_free-growing_damage_criteria.pdf</a> <b>Stand Development Monitoring damage criteria:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/stand_development_monitoring_damage_criteria.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/stand_development_monitoring_damage_criteria.pdf</a> <b>Young Stand Monitoring damage criteria:</b> A better, more specific link? <a href="https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/cmi_ground_sampling_appendices_2018.pdf">https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/cmi_ground_sampling_appendices_2018.pdf</a>  <b>RESULTS Information Submission Specifications:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-results/results_information_submission_specifications_government_funded_activities_edition_5_june_2018.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-results/results_information_submission_specifications_government_funded_activities_edition_5_june_2018.pdf</a>
<b>Stand tending guidelines</b>	Provide damage thresholds to determine acceptability of stands for incremental silvicultural investment.	Existing guidelines are continually update based on activity of mountain pine beetle and other forest health agents. <b>Forest Health Stand Tending Decision Keys:</b>  <b>Coastal:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-</a>

		<p><a href="#">surveys/forest health stand tending decision keys coastal.pdf</a></p> <p><b>Interior:</b>  <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/forest health stand tending decision keys interior.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/silviculture/silviculture-surveys/forest health stand tending decision keys interior.pdf</a></p>
<b>Application of pest-resistant seed</b>	Set guidelines for the use of seed bred for resistance to a specific insect or disease.	Currently available for Class A seed bred for resistance to several insect and diseases. <b>Chief Forester’s standards for Seed Use:</b> <a href="https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/tree-seed/legislation-standards/consolidated_cf_stds_amended_5apr2018.pdf">https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/tree-seed/legislation-standards/consolidated_cf_stds_amended_5apr2018.pdf</a>
<b>Insect and disease management guidelines</b>	Guide use of practices to reduce the potential impact of diseases.	<p><b>Forest Health Website:</b>  <a href="https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health">https://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/forest-health</a></p> <p><b>Forest Practices Code guidebooks</b> (archived at <a href="https://www.for.gov.bc.ca/ftp/HFP/external!/publish/FP_C%20archive/old%20web%20site%20contents/fpc/fpcguide/">https://www.for.gov.bc.ca/ftp/HFP/external!/publish/FP_C%20archive/old%20web%20site%20contents/fpc/fpcguide/</a> )</p> <p><b>Stand Establishment Decision Aids</b> (<a href="https://www.for.gov.bc.ca/ftp/HFP/external!/publish/Forest Health/SEDAs/">https://www.for.gov.bc.ca/ftp/HFP/external!/publish/Forest Health/SEDAs/</a> ); appraisal manuals).</p>
<b>Landscape-level species selection advice</b>	Guide deployment of tree species appropriately across a landscape to meet landscape-level objectives and to prepare for the potential impacts of climate change.	Referenced on the <b>Tree Species Selection website</b> ( <a href="http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/tree-species-selection">http://www2.gov.bc.ca/gov/content/industry/forestry/managing-our-forest-resources/silviculture/tree-species-selection</a> ).
<b>Dothistroma guidelines (Forest Planning and Practices Regulation, Section 96)</b>	Identify areas where pine planting should be minimized due to Dothistroma hazard. Define areas where licensees may claim relief if stands are not free-growing because of Dothistroma.	<b>FORREX’s Stand Establishment Decision Aid</b> ( <a href="https://www.for.gov.bc.ca/ftp/HFP/external!/publish/Forest Health/SEDAs/vol10_no1_art1-Dothistroma%202009.pdf">https://www.for.gov.bc.ca/ftp/HFP/external!/publish/Forest Health/SEDAs/vol10_no1_art1-Dothistroma%202009.pdf</a> ).
<b>Blanket Salvage Permit Guidance</b>	Define criteria where application of a blanket salvage permit would be suitable for sanitation beetle harvesting	<b>Resource Tenures Blanket Salvage Permit Guidance:</b> ( <a href="https://www2.gov.bc.ca/gov/content/industry/forestry/forest-tenures/forest-tenure-administration/cutting-permit-road-tenure-administration/blanket-salvage-cutting-permit">https://www2.gov.bc.ca/gov/content/industry/forestry/forest-tenures/forest-tenure-administration/cutting-permit-road-tenure-administration/blanket-salvage-cutting-permit</a> )