



Forest Legislation and Policy Reference Guide 2009

Chapter Nine

Forest and Range Health

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Forest and Range Health

9.1 Forest Health

9.1.1 Policy Objective

What is Forest Health?

A healthy forest is naturally resilient to damage. A healthy forest is characterized by biodiversity, it contains sustained habitat for timber, fish, wildlife, and humans, and meets present and future resource management objectives. Note that there are several other definitions of forest health (see Canadian Forest Service, Canadian Institute of Forestry, etc.).

One of the eleven values described in FRPA is for the Timber resource. Government's broad objective for the timber value is to "maintain and enhance and economically valuable supply of commercial timber from British Columbia's forests." (**FRPA 6(a)**). FSPs must propose strategies to meet this objective. Although the timber objective does not explicitly state that management of forest health impacts is one of the means of "maintaining and enhancing timber supply", it is certainly a contributing factor (along with silviculture and gene conservation).

Importance of Managing for Forest Health in British Columbia

Alienation of the forest land base, social issues and economic realities have made it necessary to achieve a higher utilization of the working forest. Integrated and aggressive forest health management offers an opportunity to capture a significant portion of the estimated 30 million cubic metres of timber that are killed or destroyed annually by forest pests (now up to >600 million cubic metres due to the mountain pine beetle of which an undetermined amount will be salvaged). Often, slight modifications to how and when we harvest; when, where and what we reforest with; and how we manipulate our stands can drastically reduce present and future pest impacts.

In addition, issues such as forest ecosystem health, biodiversity, sustainability and good forest land stewardship demand a broader perspective than that afforded by what has previously been called pest management. We now need to understand better both the beneficial and detrimental roles (from the anthropocentric perspective) of insects, pathogens and other **damage factors** in forest ecosystems.

Forest health management is a critical and integral component of **good** forest management.

The Mountain Pine Beetle Outbreak

The largest mountain pine beetle (MPB) outbreak in recorded history has slowed down and is even considered over in some areas of the province while in other areas, the outbreak is just starting. So far, the cumulative damage exceeds 600 million cubic metres of mature pine and is expected to reach over 800 million cubic metres (80% of the Provincial total) when the outbreak finally runs its course in 2017. This unprecedented level of damage has generated several high profile initiatives of which the forest professional should be aware.

1. The Emergency Bark Beetle Management Area

The Forests for Tomorrow (FFT) program was created to address reforestation issues arising from the large fires in 2003 and 2004 and the potential opportunities for rehabilitation of unsalvaged bark beetle killed timber. More information on this program is available in Chapter 11.2. Unprecedented attack on young (20 - 50 yr old) lodgepole pine plantations are considered high priority reforestation areas for FFT if they meet the appropriate Return on Investment (ROI) criteria.

2. The Emergency Bark Beetle Management Area

The purpose of the Emergency Bark Beetle Management Area set by the Minister is to define areas within the province that are under attack by bark beetles (primarily from mountain pine beetle) where special provisions could be utilized to expedite the destruction of beetle populations using harvesting. The objective is to identify the strategically important areas where harvesting and/or other treatments could be used to slow or significantly reduce the beetle outbreak. The FPC Bark Beetle regulation established the authority to establish Emergency Management Units (the bark beetle coordinator) and provisions and these have been carried forward in the **FPPR sec. 109**.

3. The Mountain Pine Beetle Action Plan

The provincial government formed a mountain pine beetle task force in April of 2004 and released its first Action Plan at that time. That plan, in addition to forming the task force, established a Minister's Community Advisory Group on MPB and set an objective to seek innovative uses for timber damaged by MPB. An updated plan for 2006 - 2011 was released in September 2006. The Action Plan defines seven broad objectives for government to respond to the problems and issues generated from the outbreak. The MFR has several initiatives that support the Action Plan relating to research, inventory, spread control, and more.

See: www.for.gov.bc.ca/hfp/mountain_pine_beetle/.

The majority of activities identified by the action plan are now being administered by the Ministry of Community Development's Mountain Pine Beetle Epidemic Response Team: www.cd.gov.bc.ca/pine_beetle_epidemic_response/index.htm.

9.1.2 Current Policy

How is forest health maintained through Forest Management Policy in BC?

Forest health is maintained primarily by altering forestry practices to prevent or minimize the impacts of pests that are deemed to cause significant impacts through a risk assessment process. Some of these methods have been legislated or accommodated for in legislation by providing on-site flexibility of planning and treatment. Most forest health activities are non-obligatory (non-legal) and are carried out through mutual agreement by industry and government.

How are strategic priorities set for forest health?

The MFR forest health specialists in headquarters, regions and districts have developed a Provincial Forest Health Strategy: www.for.gov.bc.ca/hfp/health/Strategy/FH%20Strategy.pdf. This document identifies the key priorities and objectives for forest health in the Province as determined by the MFR.

In general, the government's three key strategic objectives for maintaining forest health in BC are to:

1. Protect forest resources from pest damage by direct actions if operationally possible and justified;
2. Alter stand establishment activities to minimize the expected impact of known forest health factors; and,
3. Provide accurate estimates of pest impacts on forest values.

Meeting the objectives

The first two objectives for forest health can involve licensees when a forest health issue arises. Some of these actions are obligated through the *Forest and Range Practices Act* and its regulations, but most activities are carried out through non-legal means.

Objective 1 – Protecting the resource from pest damage (through detection and treatment) by direct action if operationally possible and justified:

Action The first step in addressing significant forest health issues is to assess the pest conditions (detect and evaluate).

FRPA does not specify any requirements for conducting surveys or assessments as a content requirement for an FSP. FRPA was written with the intent of having TSA level assessments being conducted by the licensees collectively as part of their Defined Forest Area Management obligations. The DFAM initiative was terminated and the annual detailed surveys and assessments for bark beetle management have reverted back to the MFR and/or the lead licensees who voluntarily carry out bark beetle management activities and funded by the FIA Land Based Investment Program. Thus, licensees are not obligated to do any assessments but are expected to utilize information provided by the MFR to plan sanitation and salvage harvesting depending on the bark beetle strategy in place for the particular area. The MFR also conducts an annual aerial overview survey of forest health conditions across the province and in some cases this is the only source of aerial survey information that can be provided to the licensees.

The FSP does not have to include any reference to current forest health conditions despite the fact that the FSP may be referring to forests that are under going attack by bark beetles.

No specific pest incidence surveys are required for a Site Plan. Under FRPA, the prescribing forester takes the necessary actions (including conducting appropriate surveys and assessments) to prepare a reforestation prescription based on the professional's assessment of the risk that significant pest damage will occur. Evidence of such surveys and assessments is likely vital to support a due diligence defense if a stand fails to meet free-growing requirements due to unacceptable pest damage but this is up to the prescribing forester to document.

Action When pest risks are significant, measures or management strategies are specified.

Pest risk assessments are done at various levels - Provincial down to the TSA level - and their results are presented in the corresponding Forest Health Strategy. High priority pests should be managed to minimize their expected impacts.

At this time, the FSP has no requirement to specify acceptable management strategies (FRPA 5), if any, to mitigate impact of significant forest health factors that would otherwise prevent the “maintenance and enhancement of an economically valuable supply of commercial timber” (**FRPA 6(a)**). Thus, the FSP does not provide the district manager with any statement that the licensees have considered forest health when planning harvesting operations. The long (up to five years) term of the FSP does not lend itself well to annually changing strategic forest health planning and the vague descriptions of the location of the Forest Development Units does not provide specific information on the impact of harvesting activities on treating bark beetle infestations.

Specifying measures or management strategies may be better implemented through non-regulatory means. The annually updated TSA Forest Health Strategy provides a non-obligatory description of priorities and strategies that are applicable in the TSA and mutually agreed upon by all TSA members. The strategy would identify the pest issues that should be addressed and the management options that are available. Implementation of detection and treatment activities would be dependent on the availability of resources and the agreed upon roles and responsibilities. Successful implementation of the TSA's forest health strategy is highly dependent on the efforts of all TSA members to work towards a common forest health objective.

Action Conducting treatments if required to control destructive pests.

Bark beetle treatments are primarily dealt with through the non-legal approach following the mutual agreement of MFR and licensee licensees to commit to aggressive conventional and small volume harvesting of active infestations in suppression beetle management units within a TSA. Funding for suppression related detection and treatment are available for licensees to access through the Land-based Investment Program (LBIP) of the Forest Investment Account (FIA) and by targeted FIA bark beetle funding for lead-licensees voluntarily working on behalf of the TSA and the MFR.

Defoliation treatments are typically conducted solely by the MFR. Private land owners and licensees who wish to protect trees under their ownership or obligation are encouraged to “piggy back” onto MFR projects to obtain economies of scale and use the planning expertise of the MFR specialists. In return, non-MFR participants would directly pay for treatment costs based on a per ha rate. Treatment of other pests like root diseases is rarely done due to the costs (usually borne by the licensee as a reforestation cost) and the availability of alternative management options in some cases.

Where a licensee or private land owner is not reacting quickly enough or simply not managing an important infestation, **FRPA 26 and 27** may be used which permits the district manager to direct licensees to harvest or treat specific infestations. This section applies mainly to the treatment of bark beetle infestations.

Action Expediting harvest plan approvals where required to kill bark beetle brood before the next flight.

Expediting sanitation harvesting of bark beetle infestations by exempting requirements for an FSP (**FRPA 4**) or granting approval of FSP or WLSP in an emergency (**FRPA 17**) or exempting specified provisions of FRPA, regulations or standards (**FRPA 25**). Government declares a forest health emergency and designates an Emergency Management Area (**FRPA 27**) where specific measures may be ordered.

Action Promptly disposing of infested slash.

Action is not required under FRPA although it is assumed licensees will be following best practices and ensure prompt disposal of infested material.

Action Promptly treating baited trees or trap trees.

FPPR 41

Objective 2 – Altering stand establishment activities to minimize potential pest damage

Action Establish a healthy stand - by conducting appropriate site preparation, stock selection and stand tending options.

Establish a free-growing stand of healthy, well-spaced trees. (**FRPA 29**);

FPPR 16 and Schedule 6 – factors relating to stocking standards (**sec. 6 (2)**)

FPPR 26(3) and (4), the proposed regeneration date and the stocking standards must result in the area being stocked with ecologically suitable species that address the immediate and long-term forest health issues on the area, among other considerations,

FRPA 72 – general defence - person exercised due diligence to prevent the contravention where free-growing obligations are not met.

FRPA 107 and FPPR 97 - the licensee can declare that a free-growing obligation has been met under FRPA 107 with the details on the information requirements, considerations, timing and acceptance criteria for these declarations being described in FPPR 97. Considerations for forest health are stated in **FPPR 97(6)** as "...a stand that is subject to a written declaration under FPRA 107 is not free-growing on the date of the declaration if it is more likely than not that the stand, 20 years after the commencement date, will not conform to the applicable stocking standards or will be impeded in its growth because of the effects on the area of forest health factors."

Objective 3 – Provide accurate estimates of pest impacts on forest values

This objective is primarily the responsibility of the Provincial government as it requires investments in research, inventory and forest health specific data collection. Industry is encouraged to assist government in obtaining better impact information voluntarily by making this an eligible activity under the FIA.

What is the role of the professional in ensuring forest health issues are addressed?

Most forest professionals only have a basic understanding of forest health. With this in mind, what can be done to ensure that forest health issues are adequately addressed when prescriptions or plans are being prepared? The professional must recognize or make themselves aware of the most significant forest health issues in the area being managed and determine if these issues involve them. They then must gather the best available knowledge about the topic that includes the FPC Forest Health Guidebooks, TSA forest health strategies, Canadian Forest Service publications, and other publications and literature. From this information, a list of management options can be generated. The professional can also call upon Regional, District or Branch forest health specialists for advice if available. The professional should always know what the client's and their own legal obligations are and keep these in context of any prescription being developed. As noted in the previous sections, most of the opportunities for managing forest health issues are dealt with through non-legal means. It is important from an ethical perspective to be aware that gains made through management decisions accommodating forest health concerns may occur beyond the free-growing obligation and the public (Crown) are the main benefactors. **Good forest health management is just a part of performing good stewardship.**

9.1.3 Policy Dealing with Specific Forest Health Problems

Root Diseases

No specific requirement is made for assessing the risk to root disease. The results-based approach assumes that the RPF will adequately assess and prescribe the appropriate treatment for blocks at risk to root diseases. The Free-growing declaration can be delayed up to 20 years since the commencement date where forest health factors, particularly root diseases and stem rusts, are expected to have a significant impact as specified in an FSP (**FPPR 16 (1) and 44 (1)**).

Stocking standards proposed in the FSP should "result in the area being stocked with ecologically suitable species that address immediate and long-term forest health issues on the area – with root disease being defined as a “long-term” forest health issue. Guidance on the management of root diseases is available in the Root Disease Management Guidebook, the Establishment to Free-Growing Guidebooks and consulting regional forest health specialists.

Bark Beetles

Bark beetles are highly aggressive tree killers whose damage can be minimized by prompt treatment while infestations are small. The provincial strategy is to stratify the province into "Beetle Management Units" (usually aligned with Landscape Unit boundaries). Based on current beetle survey data, volume of susceptible host and known management options, each BMU is assigned the following strategy - Suppression, Holding Action, Salvage, Monitor, No Action. Suppression BMUs require the most aggressive and complete treatment using all available resources. Holding Action requires targeted harvesting as the only treatment. The Salvage strategy focuses on the recovery of dead trees before they become degraded. BMUs with a Monitor strategy are aerially surveyed and usually have no active populations but have susceptible host. No Action areas are either unmanageable, not in the timber harvesting land base, or have no host. MFR resources are allocated based on the BMU. Allocations between bark beetle species (i.e., spruce beetle, Douglas-fir beetle, mountain pine beetle) are dependent on the values at risk and the feasibility of management. A more detailed description of the prioritization process is found at: www.for.gov.bc.ca/hfp/health/fhdata/bbstrategy.htm

Bark beetle management relies heavily on the use of harvesting to remove infested timber and mill the wood before the beetles emerge. Beetle infestations are detected annually through aerial and ground surveys that are then used to identify potential areas to harvest. The normal operational planning process can, for the most part, accommodate beetle infestations through baiting (to hold the beetles in a stand for one year), and through minor and major plan amendments. However, in some cases where the potential for serious infestation spread advocates immediate treatment, conventional sanitation harvesting can only be achieved by expediting the plan approval process to permit the harvesting of beetle infested timber. This is achieved by either shortening or eliminating the plan approval and review period while ensuring that other resource values are accommodated. Several specific sections in the regulations and legislation have enabled expedited harvesting for beetle management.

Another widely used technique for beetle management is to harvest small volumes in patches to eliminate spot infestations before they grow larger and coalesce. Special provisions have also been made in the legislation and regulations to expedite this process.

Infestations that are not harvested but require treatment are felled and burned through the winter months. The responsibility for this single tree treatment is primarily the MFR's and if a licensee is ordered to carry this treatment out, **FRPA 26(5)** states that the government must pay for the treatment.

Bark Beetle Regulation

A special regulation came into force on December 10, 2001 that has the minister (via the Bark Beetle Coordinator), define an area where an expanded set of exemptions is applicable. These additional exemptions facilitate harvest of beetle attacked timber in an attempt to slow the expansion of the current mountain pine beetle outbreak in the central interior.

This bark beetle regulation was transitioned into **section 27 of FRPA and FPPR 109**. Under **FRPA 27**, the Lieutenant Governor in council (LGIC) can designate an emergency forest health management area (FHEMA). Within the FHEMA, the power of the minister may order the holder of a licence agreement to carry out measures in areas within a FHEMA covered by the holder's agreement to prevent, contain or limit the spread of forest health factors. The ability to declare an Emergency Bark Beetle Management area (EBBMA) by the bark beetle coordinator is carried forward from the original Bark Beetle Regulation by FPPR 109. However, it is important to note that an FHEMA and the EBBMA are not the same things as they are declared using two different legal mechanisms (**FRPA 27 vs. FPPR 109**). With that said, the minister cannot order licensees to carry out specific measures in the EBBMA unless the area has been officially designated as a FHEMA. There are no such areas established in the province to date. The current role of the EBBMA is to identify specific areas where blanket salvage permit rates apply in the interior appraisal manual.

The District Manager also has the authority to order control treatments of beetle (and other pest) infestations on both private land and crown land under tenure (**FRPA 26**).

A section in **FPPR 41** was written to ensure the judicious use of pheromones and trap trees. When these techniques are used to attract bark beetles, it is essential that the infested trees are removed or treated before the broods emerge. Past practices have created new infestations in areas where follow-up treatment of baited trees or trap trees was not done thereby causing more harm than good.

A chronic problem with the disposal of landing and roadside debris that could be breeding sites for bark beetles had been dealt with by through **section 19** of the Timber Harvesting and Silviculture Practices Regulation. However, although an equivalent regulation has not been established under FRPA, disposal of potential breeding material may be dealt with by declaring it as fuel that, under **section 12** of the Wildfire Regulation, poses a fire hazard. **FRPA 26(6)** may also specify large slash disposal as a measure to control or dispose of infested material.

9.1.4 Legislation to Facilitate Beetle Management

Forest and Range Practices Act

General Content of forest stewardship plan 5 (1)

requirements forest stewardship plan must

- (a) include a map that
 - (i) uses a scale and format satisfactory to the minister, and
 - (ii) shows the boundaries of all forest development units,
- (b) **specify intended results or strategies, each in relation to**
 - (i) **objectives set by government**, and
 - (ii) other objectives that are established under this Act or the regulations and that pertain to all or part of the area subject to the plan, and
- (c) conform to prescribed requirements.

Exemptions FSP Exemption - FRPA sec. 4 – for harvesting timber not exceeding 500 m³ that, in the opinion of the minister,

- (i) is in danger of being significantly reduced in value, lost or destroyed by insect infestation, fire, or disease, or
- (ii) has been treated or will be treated by the holder or timber sales manager to facilitate the entrapment or elimination of pests (i.e., trap trees).

Sanitation exemption – FRPA sec. 25

The minister may exempt a person in writing from **specified provisions of this Act, the regulations or the standards** if the minister considers it necessary or desirable so that the person may follow a course of action specified by the minister for the purposes of limiting or mitigating or both limiting and mitigating the spread of forest pests.

Forest Health Emergency – FRPA sec. 27

- (1) LGIC can designate the area by regulation as a forest health emergency management area
- (2) The minister may order
 - (a) the holder of an agreement under the *Forest Act* that authorizes timber harvesting in the emergency management area, or
 - (b) the timber sales manager to carry out measures in the emergency management area, limited in the case of the holder, to the area of the holders agreement, to prevent, contain or limit the spread of forest health factors
- (3) specify the measures to be carried out by a specified date
- (4) A person is exempt from any provisions of this Act, the regulations, the standards, an agreement under the *Forest Act*, a forest stewardship plan or a woodlot licence plan that, if complied with, would prevent the person from carrying out the measures referred to in **subsection (2)**.

Exemption from preparing a Woodlot Licence Plan FRPA 12(3)

Despite **subsections (1) and (2)**, the minister, in the circumstances and on the conditions, if any, that are prescribed may authorize the holder of a woodlot licence to obtain a cutting permit or road permit

- (a) to deal with a forest health emergency, or
- (b) to harvest timber that has been damaged and is in danger of being significantly reduced in value, lost or destroyed

Ordering Treatment

Ordering Control of destructive agents on private or Crown land FRPA sec. 26

For forest land on private land or areas under an FSP, WLSP or other operational plan, the minister determines that there are insects, diseases, animals or abiotic factors that are causing damage to the forest, the minister, by written notice given to the holder of the plan, may require the holder to submit, for that forested area, a proposal that conforms to **subsection (3)** to control or dispose of the insects, diseases, animals or abiotic factors

Ordering Treatment

Forest Health Emergency - FRPA sec. 27 - (2)

The minister may order

- (a) the holder of an agreement under the *Forest Act* that authorizes timber harvesting in the emergency management area, or
- (b) the timber sales manager to carry out measures in the emergency management area, limited in the case of the holder, to the area of the holders agreement, to prevent, contain or limit the spread of forest health factors
- (3) specify the measures to be carried out by a specified date
- (5) If an order made by the minister under this section requires the holder of an agreement under the *Forest Act* or the timber sales manager to carry out a measure other than timber harvesting, then to the extent provided in the regulations, the expenses of the measure are to be paid by the government

Other

Modification of insect behaviour

FPPR 41 – A person who uses trap trees or pheromones to concentrate insect populations must ensure that the insect brood is destroyed before the insects emerge.

9.1.5 Looking Ahead

Without a doubt, the biggest challenge facing governments of all levels, industry, communities (including First Nations) and the environment is mitigating the effects of the mountain pine beetle epidemic throughout the province. Will policy be required to encourage licensees to maximize their harvest of recently attacked timber to maximize crown revenues before it becomes significantly degraded? Will new forms of tenure be required to accommodate non-traditional uses of fibre (i.e., co-generation of power, wood alcohol production, etc.)? How long will dead timber be suitable for sawlogs and what are the variables that affect this “shelf life”?

What are the impacts on non-timber values (wildlife, fisheries, water, etc.) of accelerated salvage harvesting and/or extensive areas of dead pine? Many of these questions are being tackled through the government's "Mountain Pine Beetle Action Plan". See: www.for.gov.bc.ca/hfp/mountain_pine_beetle/.

With the end of the MPB outbreak in some areas, the value of protecting the remaining live forest now dominated by non-pine species has increased. More attention will be given to increasing efforts to implement spruce and Douglas-fir bark beetle and defoliator management programs.

Other challenges for forest health will include managing forests for anticipated forest health problems driven by climate change (being addressed by the Chief Forester's Future Forest Ecosystems Initiative), establishing government's objectives for timber and what it means to forest health as a sub-value, evaluating the direct and indirect impacts of MPB on younger pine stands, and developing effectiveness evaluation monitoring protocols for forest health.

The FREP has added another monitoring protocol that focuses on evaluating the performance of post-free-growing stands (>10 years after their declaration date). This program is called Stand Development Monitoring (SDM) and its main objective is to determine if stands are still growing on the same growth trajectory as was projected from the free-growing survey data. Information will be gathered to determine a new inventory label and the cause of any significant deviations from the projected growth trajectory (i.e., forest health factors). This program is currently being piloted in several districts and builds on the detailed work described on the FREP web site: www.for.gov.bc.ca/hfp/frep/publications/reports.htm#rep13.

Impacts of potential invasive pests are unknown but forest managers must remain vigilant and aware of potential threats to BC's forests. Early detection by the Canadian Food Inspection Agency monitoring of ports and other points of entry provide some early warning and government agencies and industry must be prepared to act quickly in response to introductions of potential threats. Several examples across Canada include the Asian and European Gypsy Moth, Emerald Ash Borer, Brown Spruce Longhorned Beetle, Asian Longhorned Beetle, Sirex wood wasp, and *Phytophthora ramorum* (Sudden Oak Death).

9.1.6 References

- Mountain Pine Beetle Action Plan:
www.for.gov.bc.ca/hfp/mountain_pine_beetle/
- Mountain Pine Beetle Initiative: mpb.cfs.nrcan.gc.ca/
- *Forest and Range Practices Act*: www.for.gov.bc.ca/tasb/legsregs/frpa/frpa/frpatoc.htm
- FRPA Regulations: www.for.gov.bc.ca/tasb/legsregs/frpa/frparegs/frparegs.htm
- FPC Forest Health Guidebooks:
www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm
- MFR Forest Practices Branch: www.for.gov.bc.ca/hfp/index.htm
- Bark Beetles in BC: www.for.gov.bc.ca/hfp/bark_beetles/index.htm
- FRPA General Bulletin #11:
www.for.gov.bc.ca/hth/timten/FRPA_implementation/Bulletins.htm

9.1.7 Apply the Knowledge

1. What are the current mandatory and optional (i.e., at the District Manager's discretion) requirements for forest health content in the Forest Stewardship Plan?

A. There are very few mandatory forest health related content requirements in an FSP. Licensees do not have to acknowledge that the plan covers an ongoing bark beetle outbreak or that they are harvesting using methods that compliment the TSA's forest health strategy. Such statements would be optional. Forest health concerns are primarily addressed by the selection of stocking standards that, according to the FPPR 26(3) "... will result in the area being stocked with ecologically suitable species that address immediate and long-term forest health issues on the area".
2. Licensees have recently submitted an unprecedented volume of early free-growing declarations. What are the risks to the Crown of this happening with regards to forest health? What role does the professional have in determining if an early free-growing declaration is appropriate?

A. The Crown is at risk of inheriting forest health problems whose symptoms occur in older trees. These symptoms may have been visible if the free-growing survey was done during the normal time period. The professional should be aware of the known forest health risks in the area of the free-growing declaration by reviewing hazard and risk information for the ecosystem in question. The challenge for the professional is to balance the needs of the employer (licensee) to reduce their liabilities while recognizing that there may be a significant risk to the Crown (the public) of passing on this liability too early.
3. What types of forest health impacts are included in the chief forester determination of a TSA's AAC? How is this information acquired?

A. Area of forest land denuded by pests, unsalvaged losses, regeneration delays, pest impacts on site productivity (adjusting operational adjustment factors), accelerated harvests causing earlier fall downs, and frequency of outbreaks. This information is acquired through MFR forest health specialist data and advice, research (MFR, CFS, Universities, other), Forest Analysis Branch, and studies funded by licensees primarily through FIA.
4. What section of FRPA addresses liability for establishing a free-growing stand? What does the person responsible for establishing a free-growing stand have to prove to limit their liability in case a plantation fails to meet free-growing status due to pests or fire?

A. The person has to show that they exercised due diligence to prevent the failure to comply with the requirement or order (FPC sec 162.2(4)(a); also see sec 162.2(4) (b) and (c) and under FRPA 72).

5. How does a prescribing forester find information on the current hazards and risks of pests in the area he/she is working in?
- A. The best source of information would be to contact and consult with the MFR regional forest health specialists who are familiar with the area you are operating in. Written information should be available locally through the district's TSA Forest Health Strategy that should be updated annually. This document identifies the current status of high priority pests within the TSA. Baseline information for major forest health agents and their management is available in the Forest Practices Code forest health guidebooks. Although some parts require updating with new information, the guidebooks' general descriptions of the pests, detection and management options are still relevant. Other sources of information on biology and management include the Canadian Forest Service, U.S. Forest Service and other provincial forest health departments. Species selection guides also provide information on more site specific risks and these are routinely updated as new information becomes available. Currently, a web based application is being developed to provide more access to the users and the providers of this type of information. MFR specialists in headquarters, regions and districts are the main source of relevant information. Recent improvements in staffing and funding support have meant that this function can be more adequately addressed.*
6. What is the responsibility of a forest professional when planning out the harvest and reforestation of a block as it relates to forest health?
- A. See code of ethics (11.3 Responsibility to the public – in particular, subsections 11.3.1, 11.3.3, 11.3.7, 11.3.9). At minimum, the professional must consider pests that threaten the achievement of a free-growing stand but they must also look beyond the FG window to determine if damage can be prevented through their actions. Damage prevention is achieved by 1) taking the most current hazard, risk and impact information into account, and 2) prescribing the best available practices to minimize potential impacts.*
7. Climate change is expected to dramatically change the suitability of commercial conifer species over the next rotation due to growth and forest health factors. At the same time, the creation of a massive new forest in the central interior offers a unique opportunity to design a new forest that will minimize the risk of future mountain pine beetle outbreaks. What is the professional forester's role in species selection with these two issues in mind?
- A. The answer to question 6 also applies. The professional should keep current with the recommendations from climate change research. With regards to limiting the risk to future MPB outbreaks, current stocking standards do not limit the amount of pine for reforestation so presently the only limits are voluntary. In both cases the recommended action would be to promote mixed-bag planting to ensure diversity of plantations*
8. Alien invasive species are a constant threat to BC and Canada's ecosystems. Where are the best sources of information for keeping current on these threats?
- A. Monitor these sites:*
CFIA: www.inspection.gc.ca/english/plaveg/pestrava/pestravae.shtml
CFS: cfs.nrcan.gc.ca/?lang=en

9.2 Invasive Plants

Refer to Chapter 7.18