

5.3 Timber Management Indicator 2. Maintenance of Forest Health

5.3.1 Background:

Forest health is thought to be maintained if populations of forest health agents (i.e. forest insects and diseases) are controlled.

Forest health agents of concern in Bulkley TSA include mountain pine beetle, balsam bark beetle, spruce bark beetle, *Dothistroma* needle blight, spruce root rot and Aspen-Poplar twig blight. Spruce budworm, certain pests of young stands (e.g. stem rusts, leader weevils, *Mycosphaerella* needle blight), and other forest health agents¹ are also present, but occurrences are isolated. To date, no forest health agent has reached epidemic population levels within TSA boundaries.

In Bulkley TSA, forest health agent assessment and control practices take different forms, depending on the agent of concern.

Mountain pine beetle (IBM), Spruce bark beetle (IBS)

These forest pests are stand-level mortality agents of commercially valuable tree species, so are intensely controlled.

- GPS'd waypoints are mapped for concentrated areas of recently killed timber, based on District-based aerial surveys.
- Waypoints are ground-probed for beetle presence.
- Depending on the size of population, recommended treatment is on an individual tree basis (e.g. trap trees, fall and burn) or on an opening basis (e.g. harvesting of brood areas, or incorporation into cutblocks).
- Babine Corridor Park is a known concentration area for beetle populations. Special Beetle Management Areas (BMA's) have been set up to concentrate beetle outflow from Babine Corridor Park into BMA high hazard areas, for subsequent control through sanitation harvest or other suitable treatment.

Balsam bark beetle (IBB)

Balsam bark beetle has not been actively controlled in this TSA because:

- it is widespread throughout balsam-leading stands at higher elevations, historically at light intensity levels. It's considered a chronic, endemic pest;
- many of these stands remain inaccessible;
- control methods used for IBM and IBS are considered ineffective for this pest;
- it was thought to be an individual tree versus a stand-level mortality agent, so of minimal concern. However, attack has resulted in about 5% mortality per year, and over time significant stand-level mortality has occurred.

In contrast with IBM and IBS, IBB attack areas are mapped at a broad scale during provincial aerial overview surveys. Control is indirect, through incidental harvest.

¹ The Bulkley Forest Health Plan (November 2000) has a comprehensive list of pests that are known to be present in Bulkley TSA. This document is available for download at <http://www.for.gov.bc.ca/dss/>

***Dothistroma* needle blight**

- affects young pine and spruce stands, primarily in the ICH; can result in stand-level mortality
- becoming increasingly widespread since 2001
- no mapping currently available for Bulkley, but known to be present in most pine-leading plantations in the ICH and most significantly in Evelyn Pasture.
- treatment is silvicultural, i.e. underplant with mixed species or non-host species.

***Tomentosus* root rot**

- interior spruce stands of all age classes are highly susceptible. Lodgepole pine, western hemlock, Sitka spruce, and sub-alpine fir are moderately susceptible.
- not mapped, but all spruce stands are considered at risk. TSR2 assumes up to 18,000 m³/year mortality, which translates to an average of 60 ha/year.
- Control is silvicultural (i.e. plant with mixed species or non-host species; avoid planting adjacent to infected stumps).

Aspen-Poplar twig blight

- attacks trembling aspen, balsam poplar and cottonwood. Large area of severe intensity attack in Bulkley TSA in 2002.
- mapped at a broad scale during provincial aerial overview surveys.
- not controlled

Other pests

- mapped at provincial overview level, or mapping not available.
- pests are known to be present, but have scattered and isolated occurrence and are presently at endemic levels.
- controlled indirectly through application of silvicultural strategies (e.g. reforestation with non-host tree species, or with a mix of species to diffuse impacts; increasing planting densities, etc.).

5.3.2 Measures:

1. IBM, IBS - waypoints mapped versus waypoints controlled, by year (hazard context provided by overlaying with maps of areas of moderate to high susceptibility).
2. IBB, other pests (*Dothistroma*, aspen-poplar twig blight, spruce budworm)
 - extent of mapped infestation areas (based on provincial aerial overview mapping).

5.3.3 Results and Discussion, Measure 1:

Figures 28 and 29 show mapped beetle waypoints (by year of mapping) over a base of areas at moderate to extreme hazard to mountain pine beetle and spruce bark beetle attack, respectively. Table 13 reports on the number of these waypoints treated in 2001 and 2002 that were the responsibility of the Small Business Forest Enterprise Program

(forest industry waypoint actioning information was not available). SBFEP waypoints that were not treated were either inaccessible, or didn't require treatment because beetles were no longer present. The proportion of waypoints that required some treatment (25% in 2001, 31% in 2002) provides some perspective on total beetle population size.

The figures indicate that outbreaks have been kept to endemic levels from 1999-2002, most likely due to the intensity of control effort. In the case of mountain pine beetle, it may also be a factor of the scattered nature of stands at hazard to attack.

Table 13 – Waypoint Actioning Information for Small Business Forest Enterprise Program: 2001, 2002

Year	Pest	Treatment					Totals:
		Fall & Burn	Incorporate into Cut Block	Pheromone	Trap Tree	Brood Removal	
2001	IBM	14	1	16			31
	IBS		2	33	8	30	73
Totals:		14	3	49	8	30	104
						Total SBFEP waypoints, 2001	409
						Total waypoints for 2001	1394
2002	IBM	83		10			93
	IBS	3		8			11
Totals:		86		18			104
						Total SBFEP waypoints, 2002	332
						Total waypoints for 2002	1075

5.3.4 Results and Discussion, Measure 2:

Figure 30 shows the extent of balsam bark beetle attack on forest stands at moderate to extreme hazard. The figure illustrates a significant increase in moderate to severe attack intensity² in recent years, although the regional entomologist believes a significant portion of moderate intensity attack areas may actually be mistyped light intensity.

Figure 31 provides similar information for other pests for which provincial aerial overview mapping is available (Aspen-Poplar Twig Blight, *Mycosphaerella* needle blight, and 2-Year Cycle Spruce Budworm). For the most part, the figure indicates that incidence is scattered. Aspen-Poplar Twig Blight attack areas have increased in 2002, but attack severity is predominately light to moderate.

5.3.5 Data Sources:

Ministry of Forests Forest Health Aerial Overview flights 2000, 2001, 2002

PMOIS "Pest_Be" database

Bulkley Forest Cover, 1997 Inventory

Field Guide to Forest Damage in BC (http://www.for.gov.bc.ca/hfp/forsite/pest_field_guide)

Bulkley SBFEP Beetle Management Area Strategy (May 2002)

² Provincial Health Overview Mapping: Light intensity = <10% recent mortality of susceptible tree species in mapped area; Moderate intensity = 10-30% recent mortality; Severe intensity = >30% recent mortality

Figure 28

Mountain Pine Beetle:
New Waypoints by Year,
1999-2002

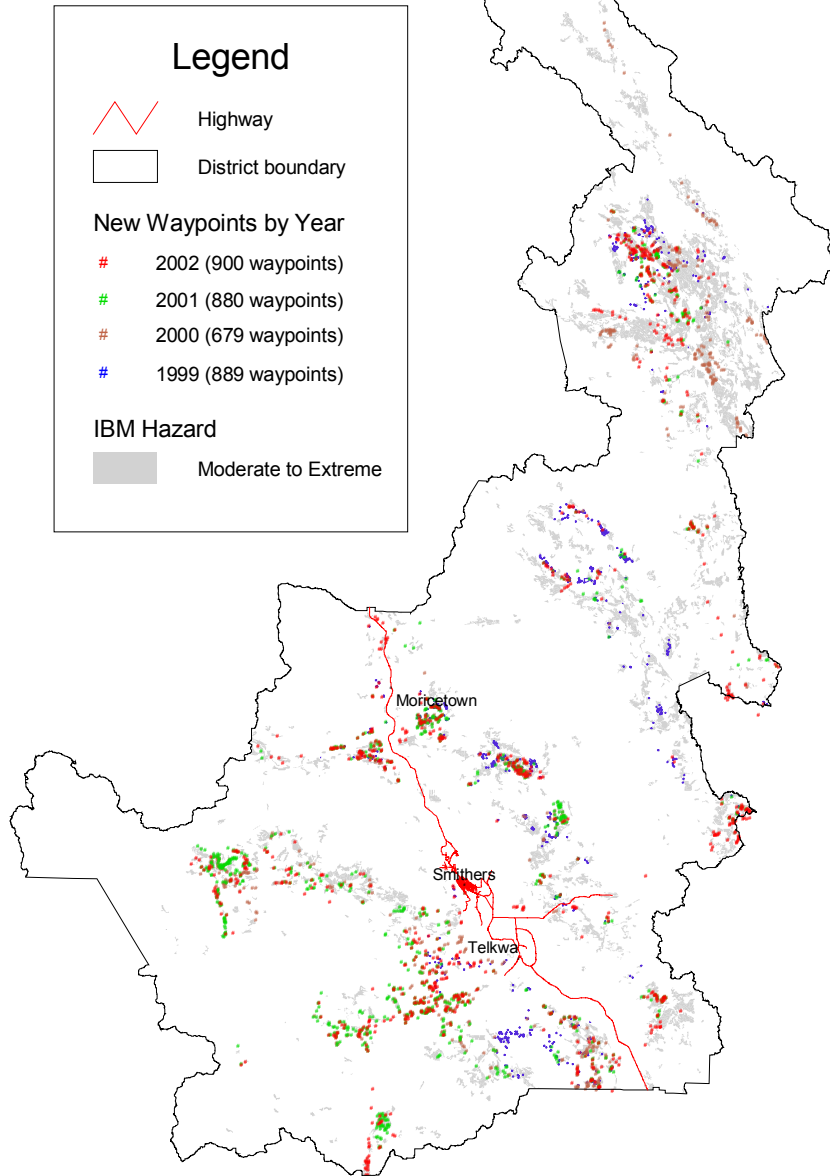


Figure 29

Spruce Bark Beetle:
New Waypoints by Year,
1999-2002

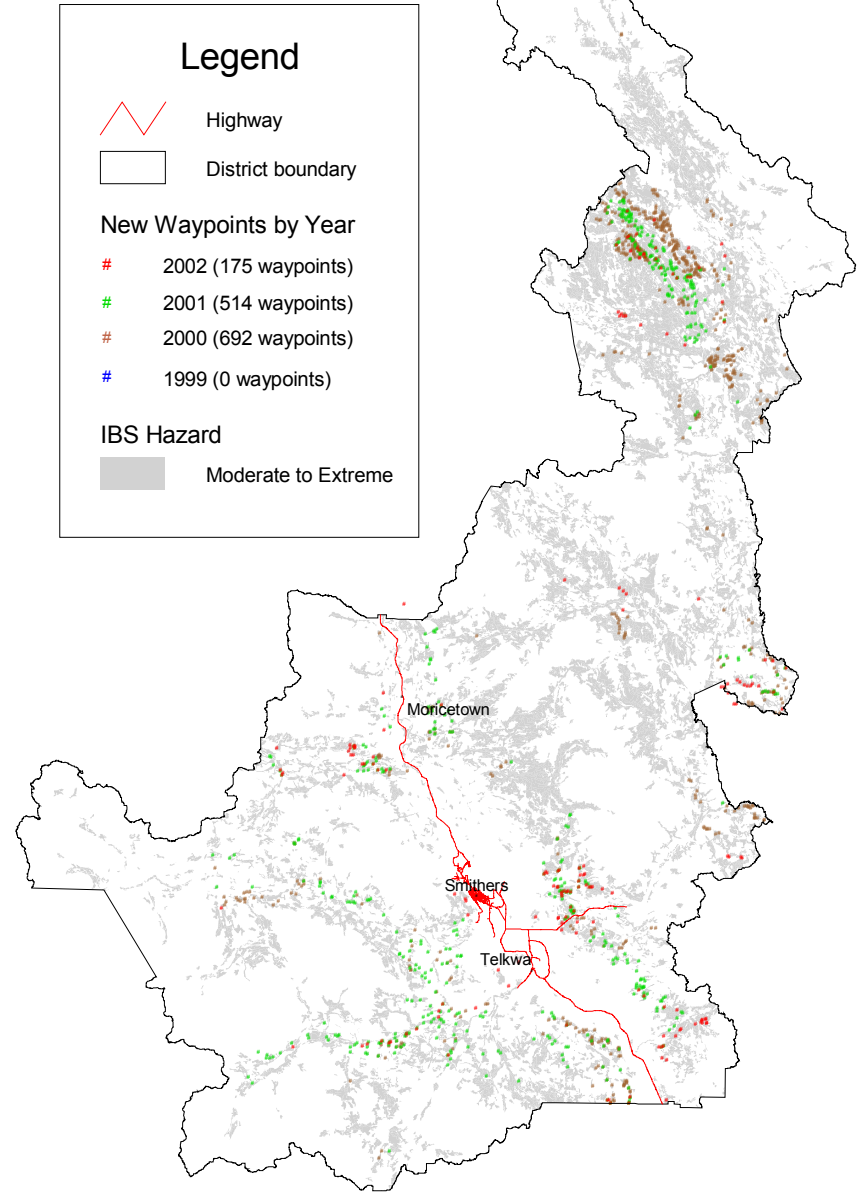


Figure 30

Western Balsam Bark Beetle:
Provincial Overview Mapping,
Moderate to Severe Attack Intensity

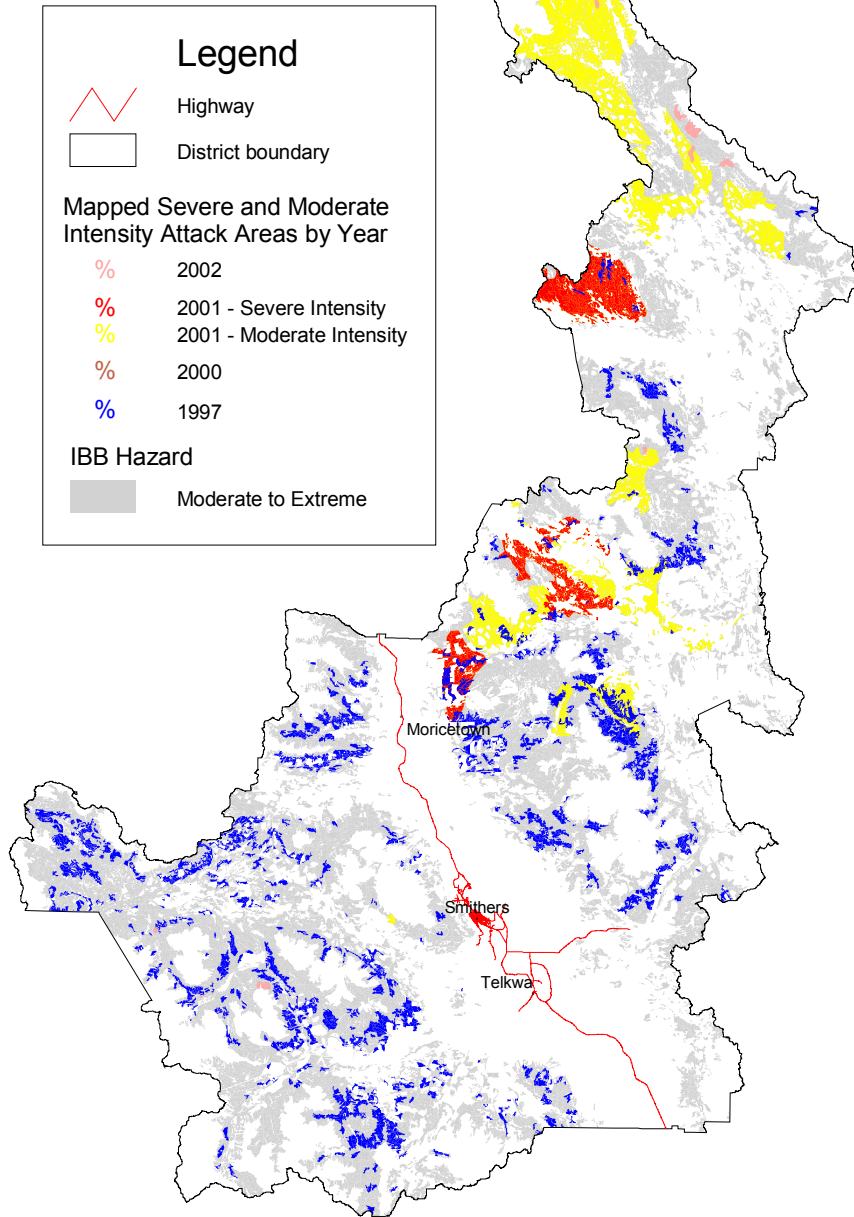


Figure 31

Other Forest Health Concerns
Provincial Overview Mapping,
Light to Severe Attack Intensity

