

# Memo



Date: April 14, 2010  
File: 6300-00  
To: City Manager  
From: Blair Stewart, Urban Forest Health Technician  
Subject: Douglas-fir Tussock Moth Update

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## Recommendation:

THAT Council receive, for information, the report of the Urban Forest Health Technician dated April 14, 2010;

AND THAT Council approve aerial spraying of Nuclear Polyhedrosis Virus ("NPV") on private and public property pending approval of a spraying permit from the Province;

AND FURTHER THAT Council directs staff to submit a final budget request of \$30,000.00 to cover the cost of aerial spraying and public communications.

## Purpose:

To provide Mayor and Council with an update to the status of the Douglas-fir Tussock Moth in the City of Kelowna and recommendations for treatment.

## Background:

The Douglas-fir Tussock Moth is a native insect in the low-lying, dry belt regions of southern British Columbia. Outbreaks of Tussock Moth usually occur every 10-12 years and cause significant damage and mortality to Douglas-fir stands in these areas. Ornamental spruce and fir trees in urban areas are also sometimes infested. During an outbreak, trees may be killed in one year because the Douglas-fir Tussock Moth feeds voraciously on both new and old needles. Tussock moths are covered in thousands of tiny hairs, which may give some people an allergic reaction, known as tussockosis. About 1 in 5 people are susceptible to tussockosis.

The last outbreak of this native pest was in the late 1990s. At that time, parks staff treated the affected area in Knox Mountain Park with Nuclear Polyhedrosis Virus (NPV). NPV is a naturally occurring virus within the tussock moth population. Typically the virus would spread through caterpillar contact and cause the entire population to crash. The Ministry of Forests and Range staff have made a recommendation to spray NPV and Btk (*Bacillus thuringiensis* variety *kurstaki*) on the blocks identified in Map 1 in the middle of May to early June as it is best applied when insect populations are low or early in the outbreak cycle (year 1 or year 2). Due to concerns from a local organic farmer staff have removed Btk from the City's proposed spray program. The virus is only available for application by the Ministry of Forests and Range. The application would be done by helicopter.

The Regional District of Central Okanagan (RDCO) is planning a spray of the public lands at Steven Coyote Ridge as well as on some sites outside of the City boundaries. Other infestations within the City of Kelowna fall on private properties. However, staff are very concerned about the potential spread of this insect to other public and private properties if left unchecked. Kelowna's urban forest is already being threatened by pine beetle, and a 2007 study found that the most common tree in Kelowna is Douglas-fir,

comprising about 30% of the entire canopy. Therefore staff are recommending that the city fund an aerial spray operation for infestations on private property, with the consent of the landowners, in order to help prevent spread and damage to the rest of the City. Only one egg mass has been detected in Knox Mountain park so far but staff are also suggesting a small spray in the park to help ensure inoculation of any tussock moth that are already present. The park would be closed to the public for 24 hours and signage would also be posted. Staff will also work together with the RDCO and help facilitate the spray around Stevens Coyote Ridge if possible.

In previous years, the Ministry of Forests and Range has helped co-ordinate communication and the application process for aerial spray applications in rural or urban areas. However due to increased interest and public requests for NPV spraying the Ministry of Environment is requesting that local government staff apply for this permit. The full permit process may require up to 60 days of public consultation, therefore it may not be possible to receive a permit this year. However, staff feel that it is worth trying and that the Ministry may agree to a shorter consultation period if this effort is supported by City Council. The areas in question are well away from urban residential housing and the use of a naturally occurring product makes this a very low risk application. As well initial comments to staff from landowners and residents in the infected areas have been positive.

**External Agency/Public Comments:**

Staff are working with RDCO staff as well as Ministry of Forests and Range staff on this project.

**Financial/Budgetary Considerations:**

The cost to spray the areas identified in map 1 is approx \$30,000, which would cover a total of 250 hectares, permit fees and communication costs for the project.

**Legal/Statutory Procedural Requirements:**

A Ministry of Environment Pesticide use permit is required for aerial spraying of NPV.

**Existing Policy:**

The application of a pesticide for the management of a pest that constitutes a danger to people or may impact agriculture or forestry is exempt under the City of Kelowna Pesticide Use Regulation Bylaw No. 9920 section 6(b). Council policy No. 279 authorizes staff to spray Knox Mountain Park with either NPV or BTK as the need arises but this policy does not address other areas of the city.

**Considerations not applicable to this report:**

**Internal Circulation:**

**Legal/Statutory Authority:**

**Personnel Implications:**

**Community & Media Relations Comments:**

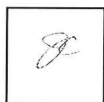
**Alternate Recommendation:**

Submitted by:



B. Stewart, Urban Forest Health Technician

Approved for inclusion:



(Joe Creron, Director of Civic Operations)

CC: Jim Paterson, GM of Community Sustainability  
Carla Stephens, Director of Community and Media Relations

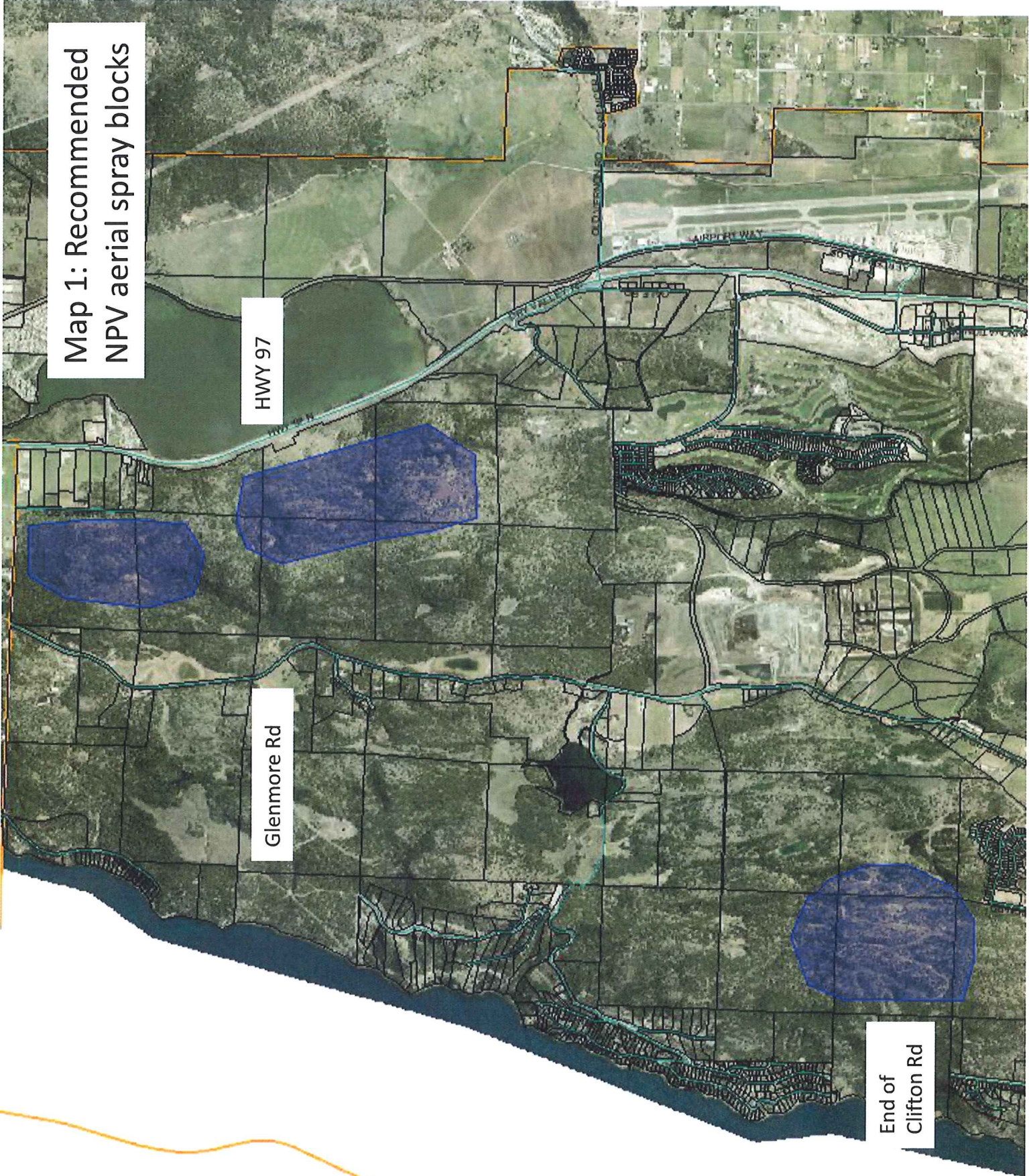


Map 1: Recommended  
NPV aerial spray blocks

HWY 97

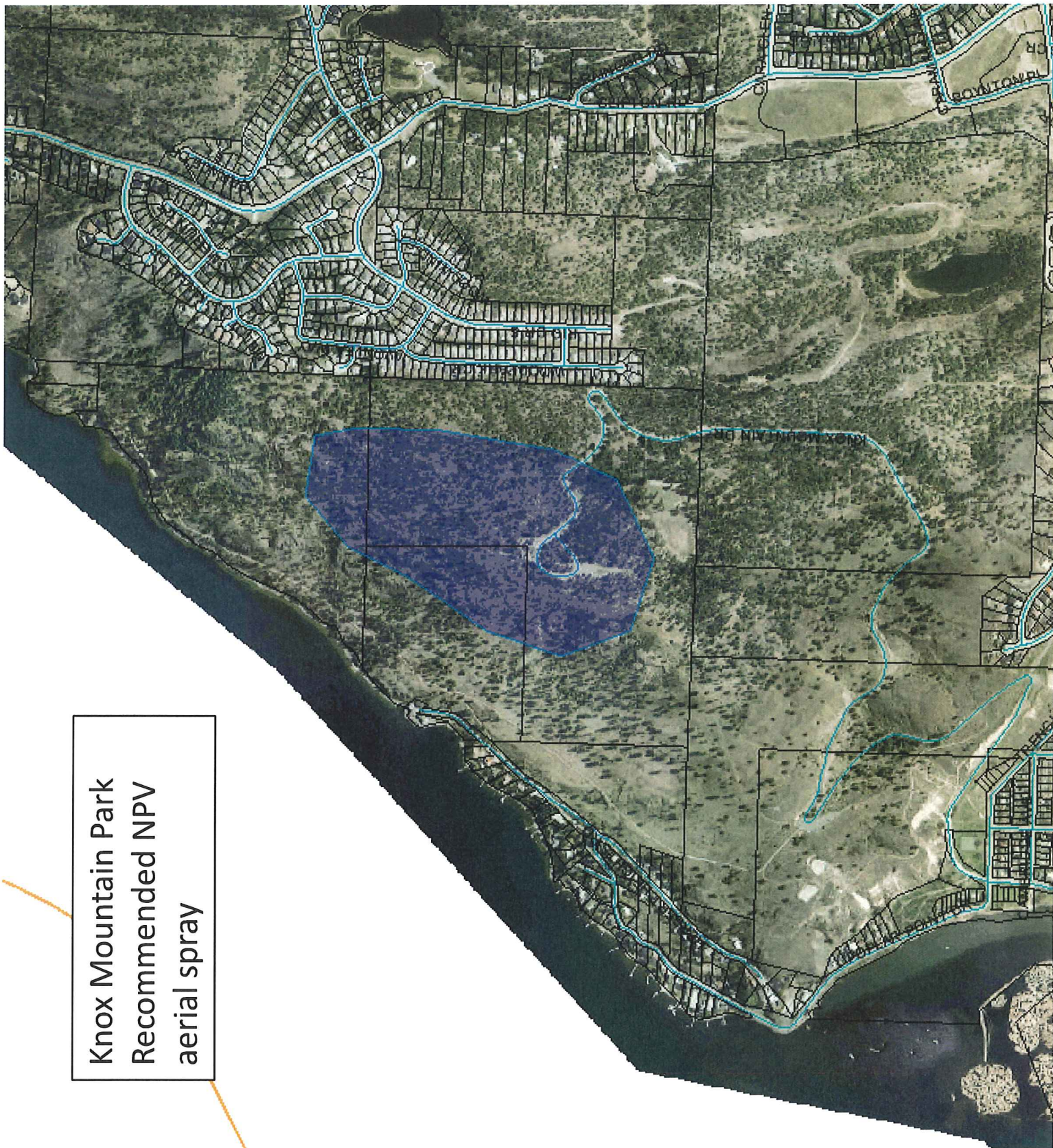
Glenmore Rd

End of  
Clifton Rd



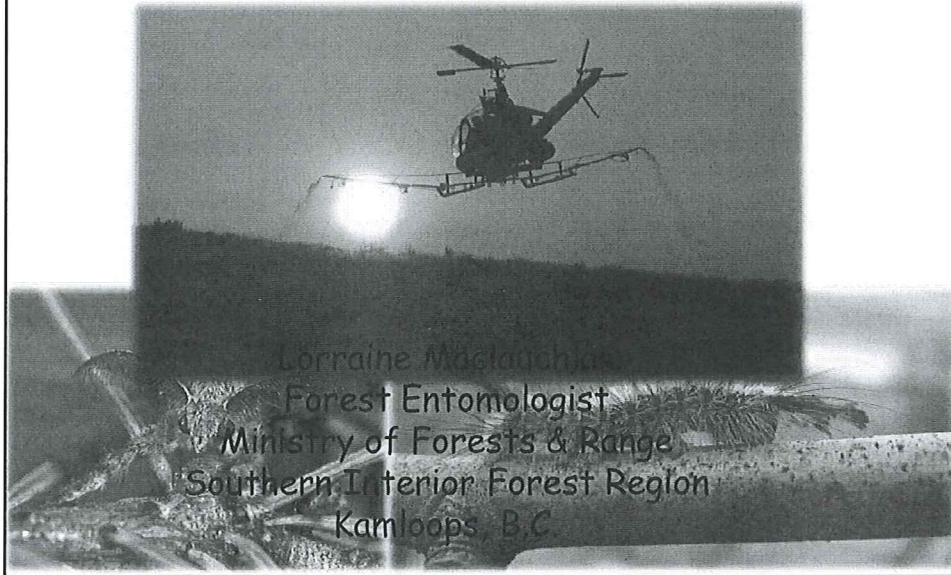


Knox Mountain Park  
Recommended NPV  
aerial spray





## Douglas-fir tussock moth, *Orgyia pseudotsugata*



Lorraine MacLachlan  
Forest Entomologist  
Ministry of Forests & Range  
Southern Interior Forest Region  
Kamloops, B.C.

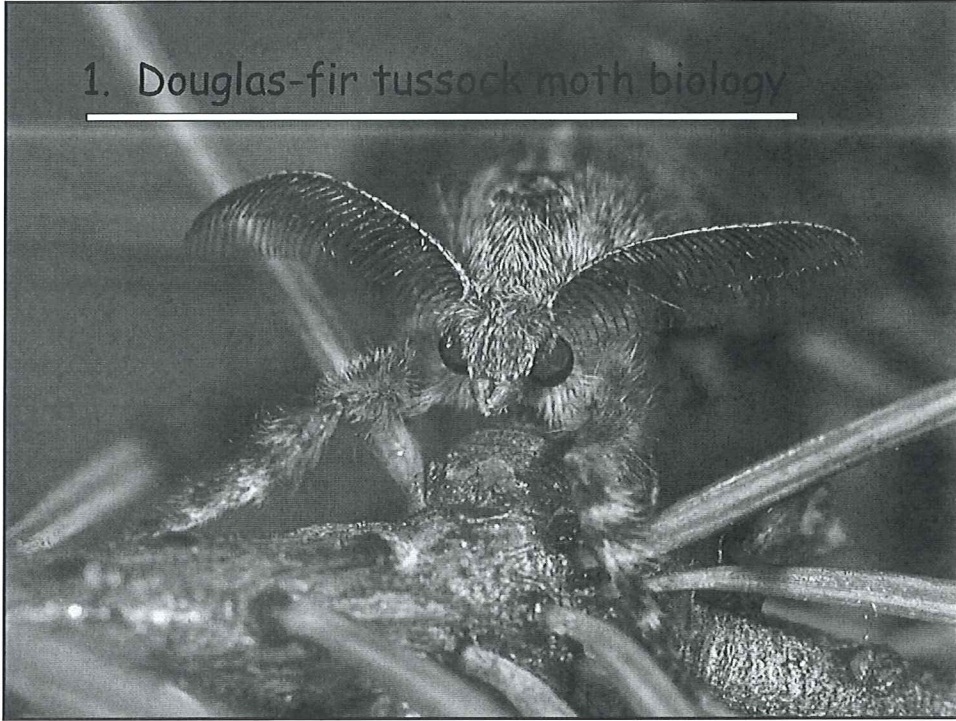


## Douglas-fir tussock moth, *Orgyia pseudotsugata*

1. Douglas-fir tussock moth biology
2. Outbreak dynamics
3. Past treatments by Ministry of Forests & Range
4. Management Options:
  - Pesticides: Virus and *B.t.k.*
5. 2010 treatment proposals

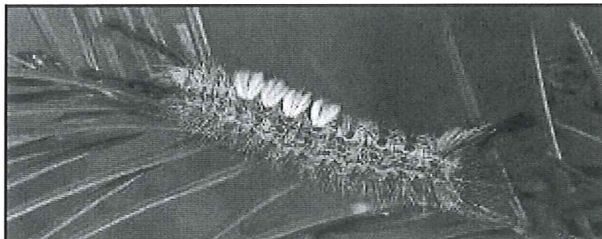


## 1. Douglas-fir tussock moth biology

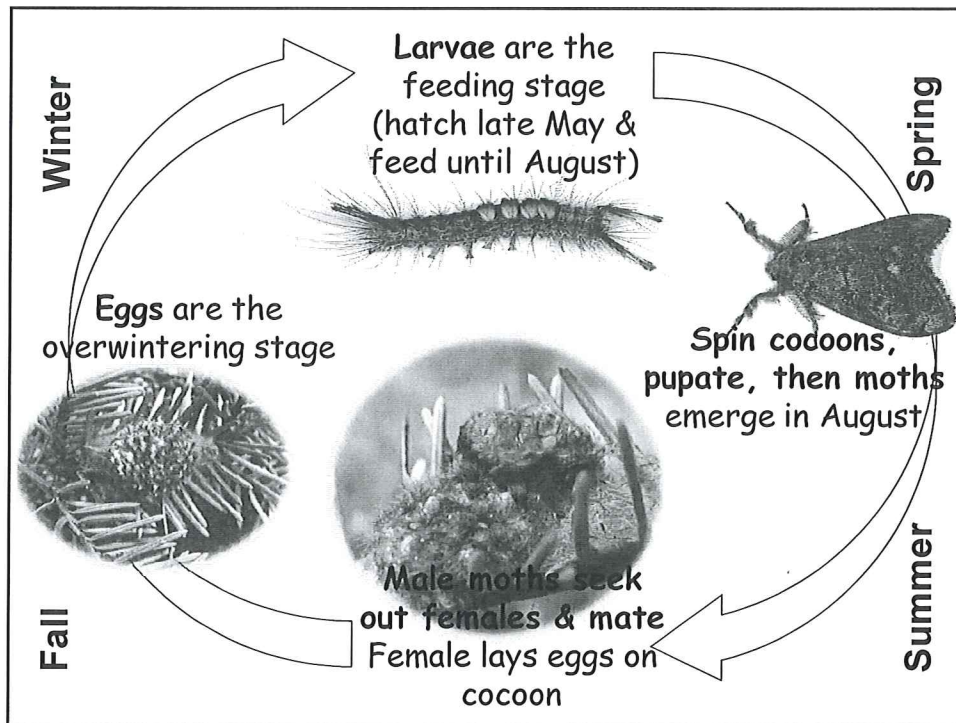


### Douglas-fir tussock moth

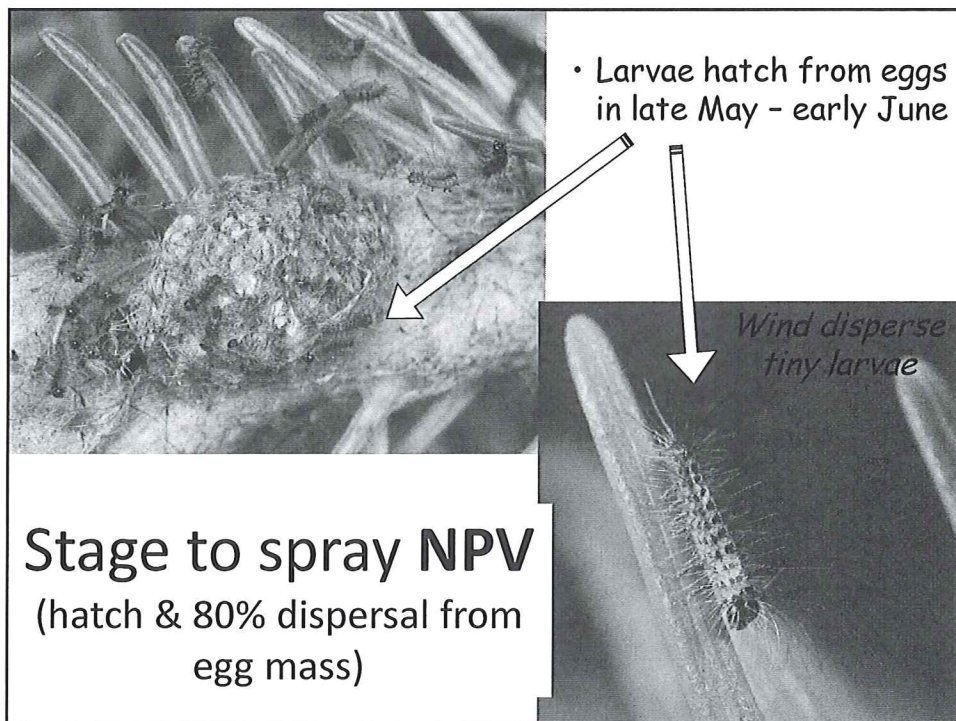
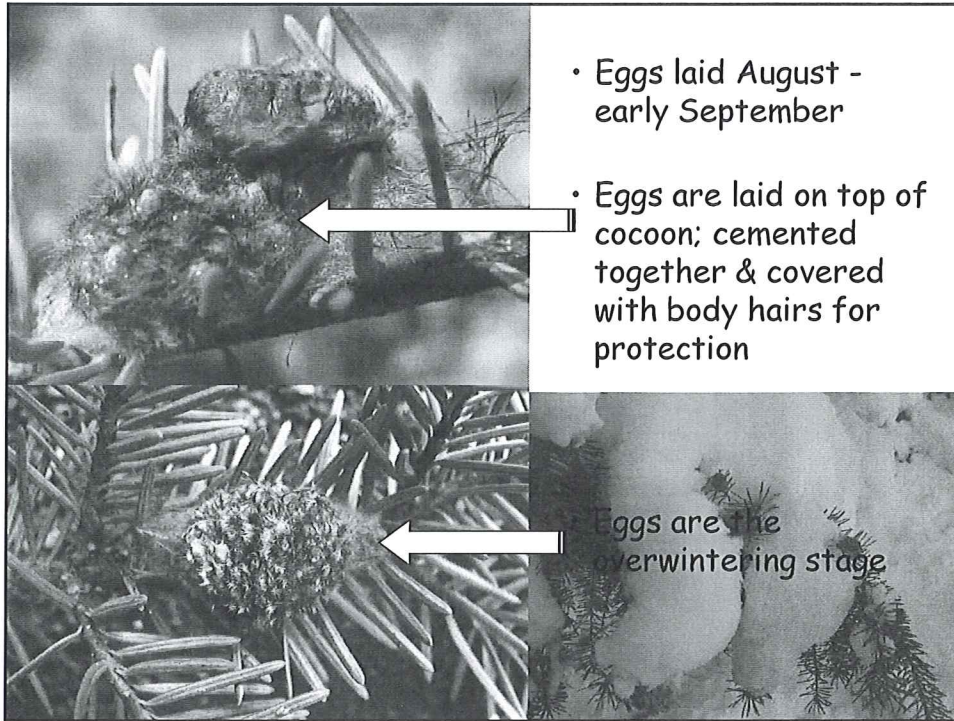
- Larvae feed on Douglas-fir, spruce, (Ponderosa pine), ornamentals
- Can kill trees in one year - feed on new & old foliage
- 2-4 year outbreak in low elevations - very confined
- Caterpillar hairs can cause human (and animal) skin allergy - *tussockosis*

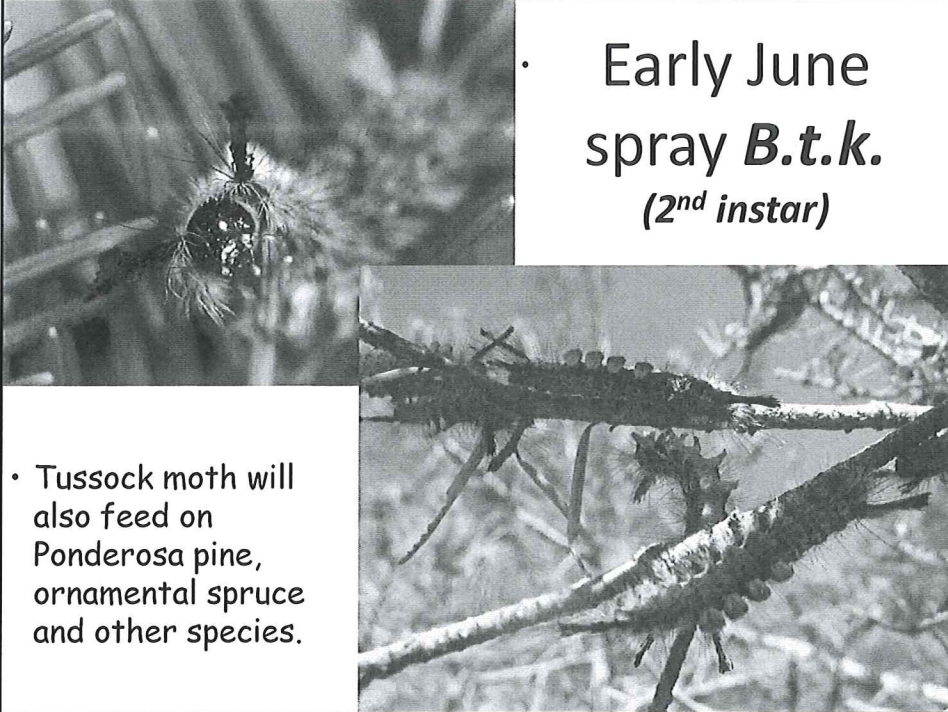




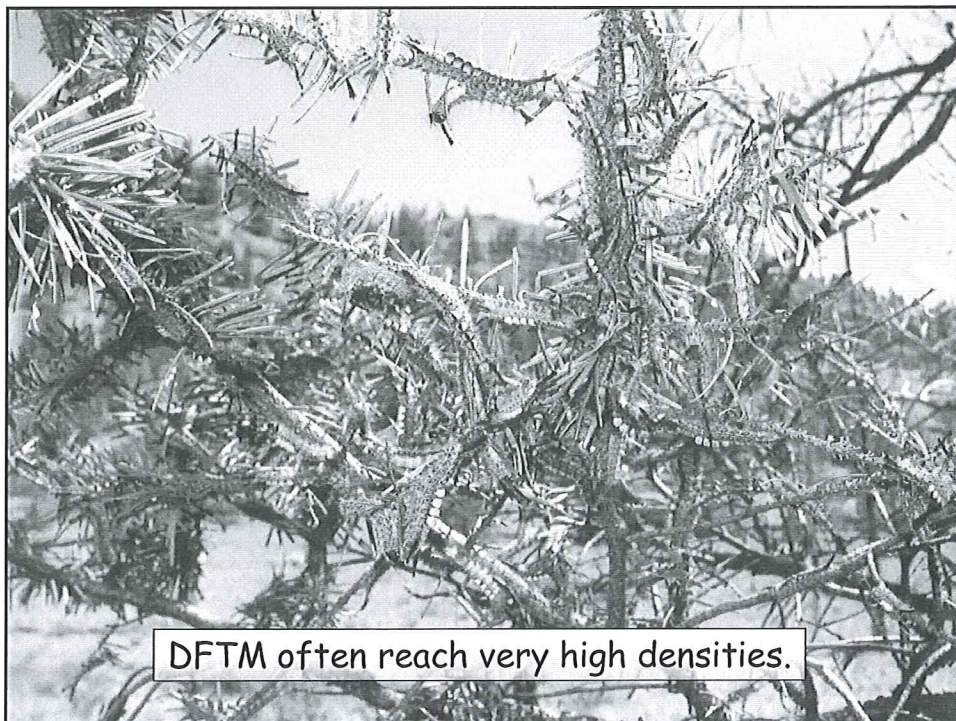




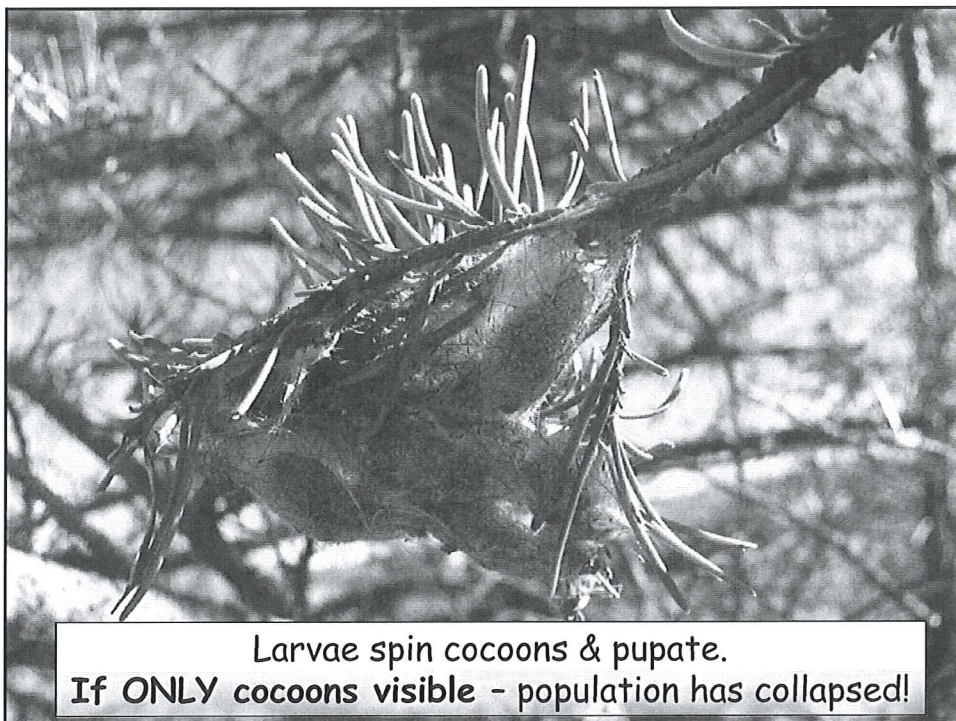
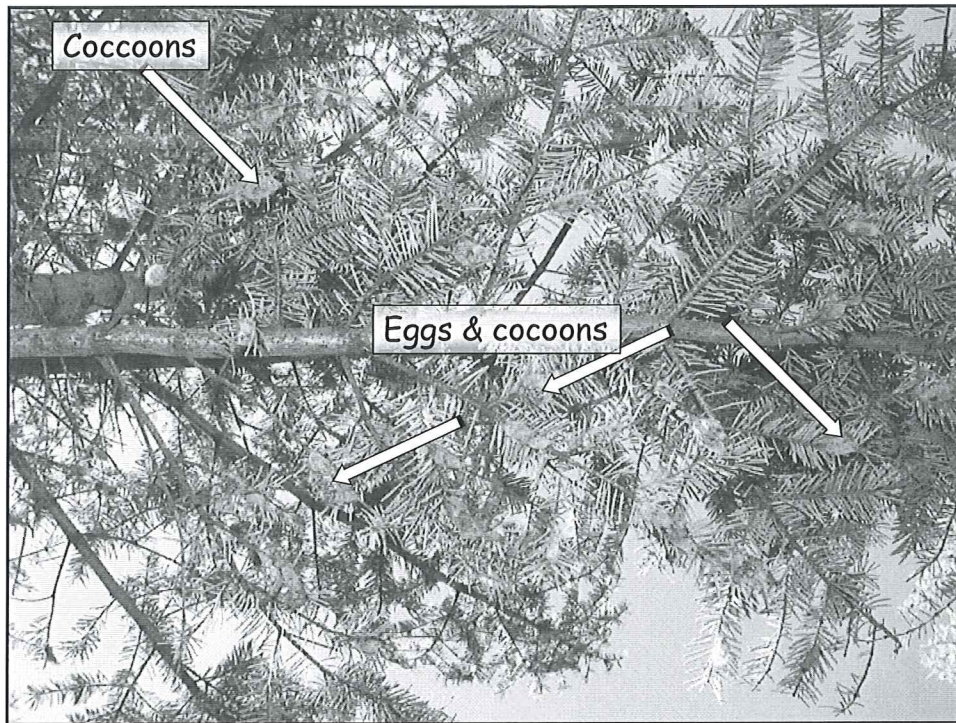




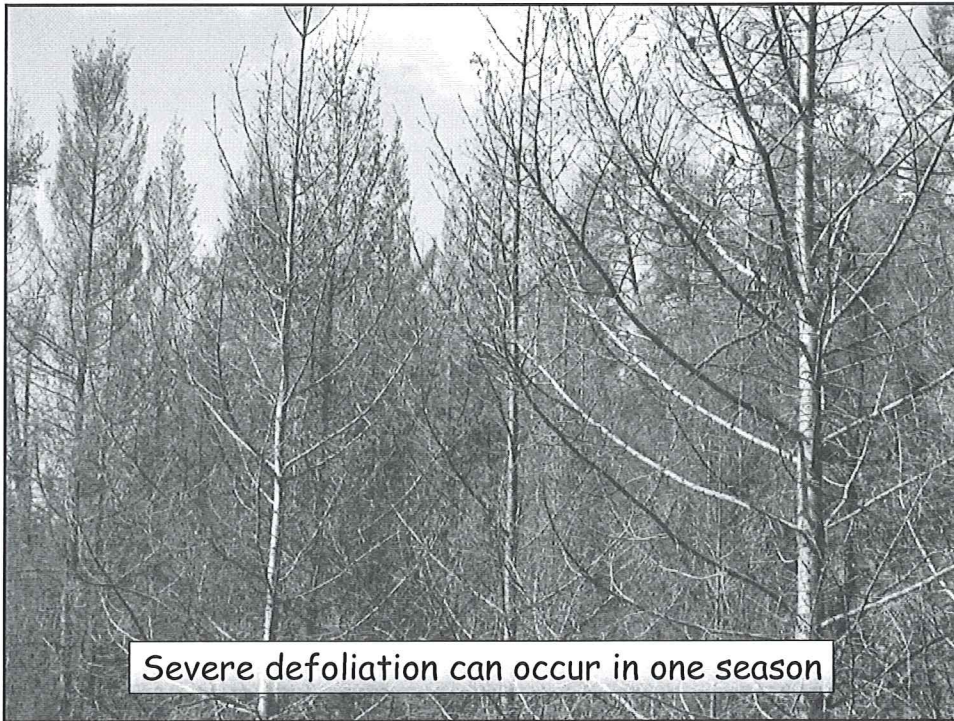
- Early June spray *B.t.k.* (*2<sup>nd</sup> instar*)
- Tussock moth will also feed on Ponderosa pine, ornamental spruce and other species.



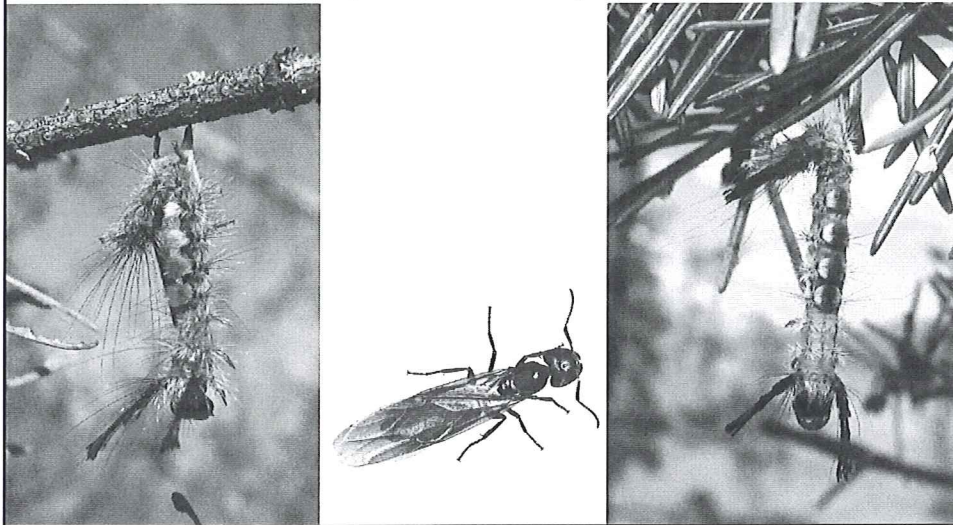




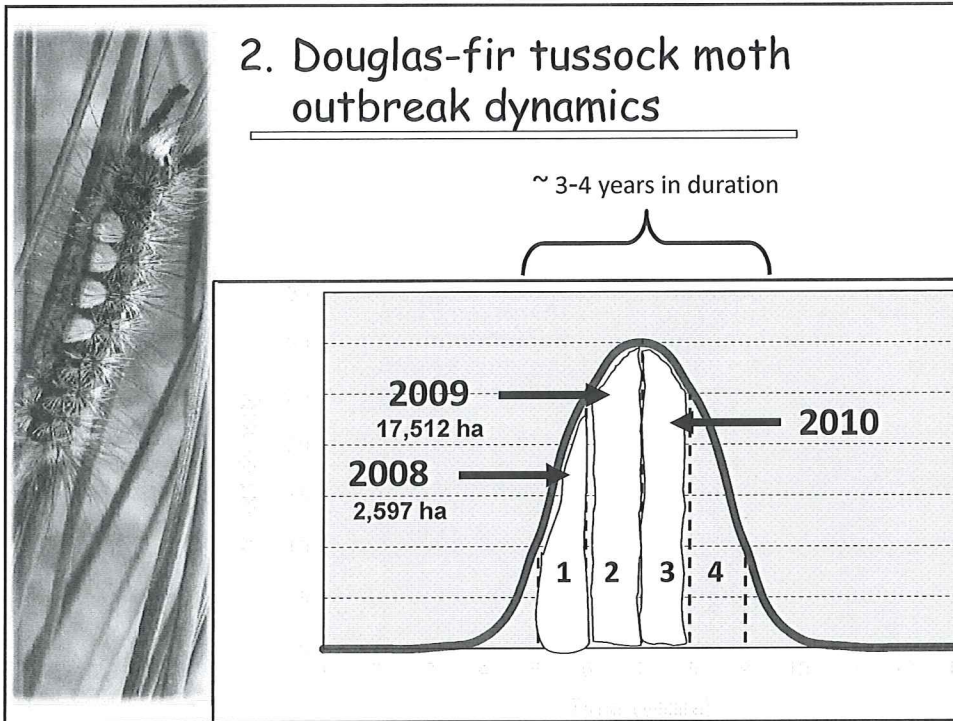




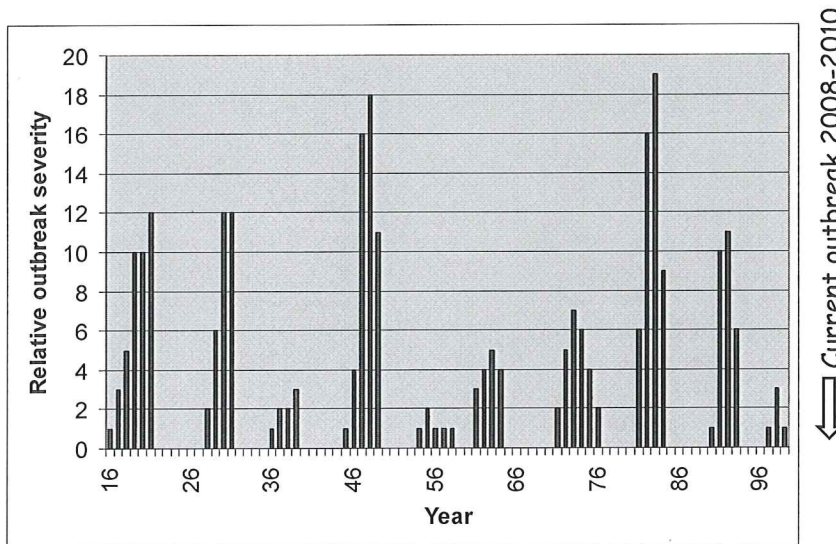
Collapse of tussock moth outbreaks has primarily been attributed to a naturally occurring nuclear polyhedrosis virus (NPV) and other natural enemies, such as parasites and predators.







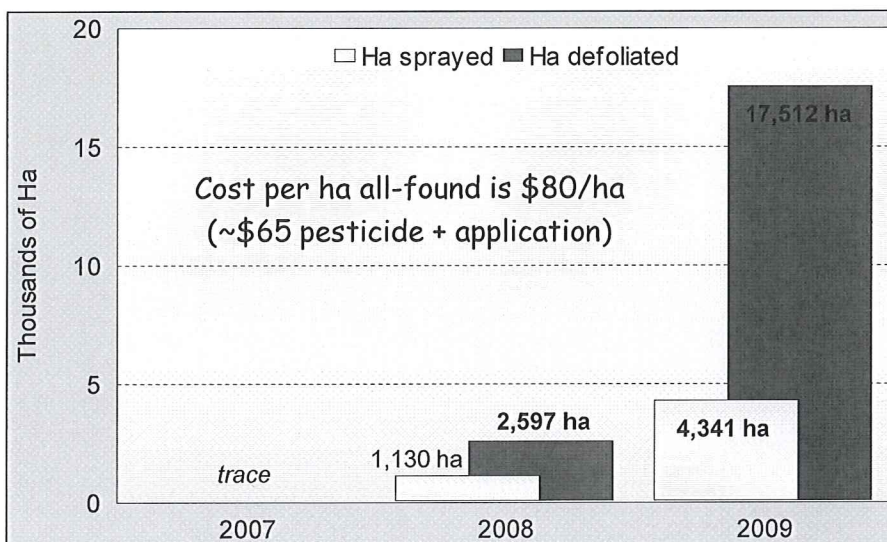
### Douglas-fir tussock moth outbreak dynamics in B.C.




### 3. Past & proposed treatments by MFR



Area defoliated by Douglas-fir tussock moth and area sprayed with NPV (nuclear polyhedrosis virus) 2007-2009





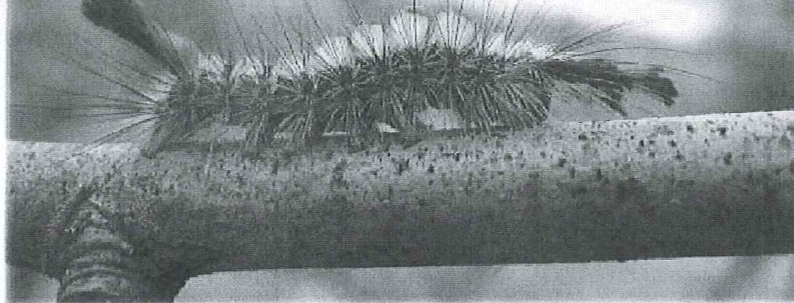



### 2010 Treatment Plans in the Central Okanagan

	Block Size (ha)	Treatment
Postill / Ellis Lk	571	<i>B. t. k.</i> & NPV
Ellis / Dead Pine Drive	487*	<i>B. t. k.</i> & NPV
Woodlot #344	97.0	<i>B. t. k.</i>
Trepanier Creek	972*	<i>B. t. k.</i> & NPV
Glenmore Road Area	200	NPV
<b>Total ha in Okanagan:</b>		
	<b>2,327</b>	

#### 4. Management of Douglas-fir tussock moth

- Do nothing - outbreak will collapse in 2-4 years
- Promote lower densities, mixed species
- Monitor & hazard rate in historic outbreak areas
- Treat incipient and high population areas with virus or *B. t. k.*, respectively







**Considerations when proposing direct control measures for Douglas-fir tussock:**

- Resource issues - forest and range
- Human health (proximity to homes, parks, playgrounds or other recreational settings)

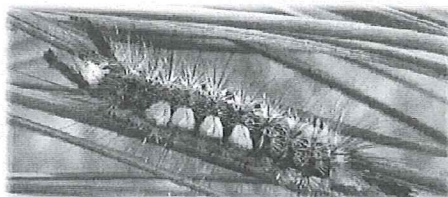
• Stage of the outbreak:  
 year 1  
 year 2  
 years 3-4

- Intensity/severity of outbreak (insect density)
- Condition of affected trees
- Cost (\$\$) and logistics

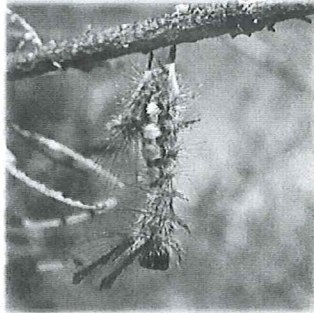
### Mode of Action of NPV (baculovirus)

- NPV must be ingested by caterpillars
- NPV is specific to tussock moth larvae
- **Virus** particles enter the insect's "blood" *via* the gut
- **Virus** invades cells, multiplies, and kills the insect.
- The integument ruptures releasing very large amounts of virus particles thus spreading among the population.



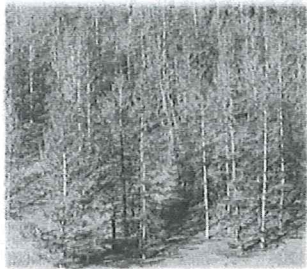


### Pro's & Con's of NPV



**PRO:** NPV will collapse the outbreak; no spraying is necessary on that site in subsequent years

**CON:** NPV takes 5-6 weeks to take effect; larvae feed during this time & aggravate allergies

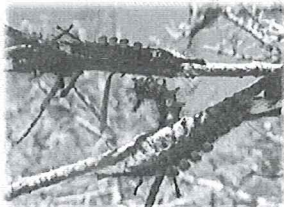


**PRO:** NPV is specific to tussock moth

**CON:** NPV can only be used by Prov or Fed Govt

**Virus** will build up naturally in outbreak areas over time.

*However, spraying new or incipient outbreaks with NPV will precipitate an early collapse of the outbreak (shorten the outbreak cycle).*



## 5. MFR plans for 2010

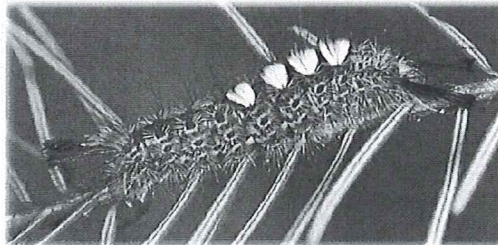


⇒ 7,500 ha with *B.t.k.* (1 application @ 4 litres/ha)

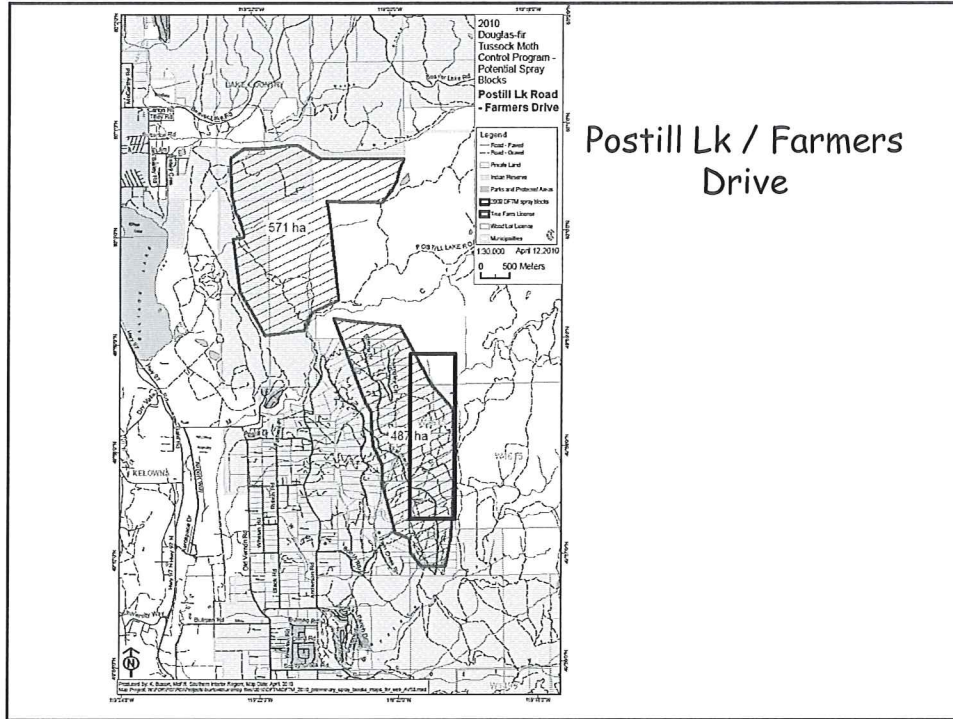
2,000 ha with NPV (10 litres/ha)

⇒ 2010 spray program will be centred around Ashcroft-Kamloops, Kelowna, Trepanier, Boundary-Kootenay

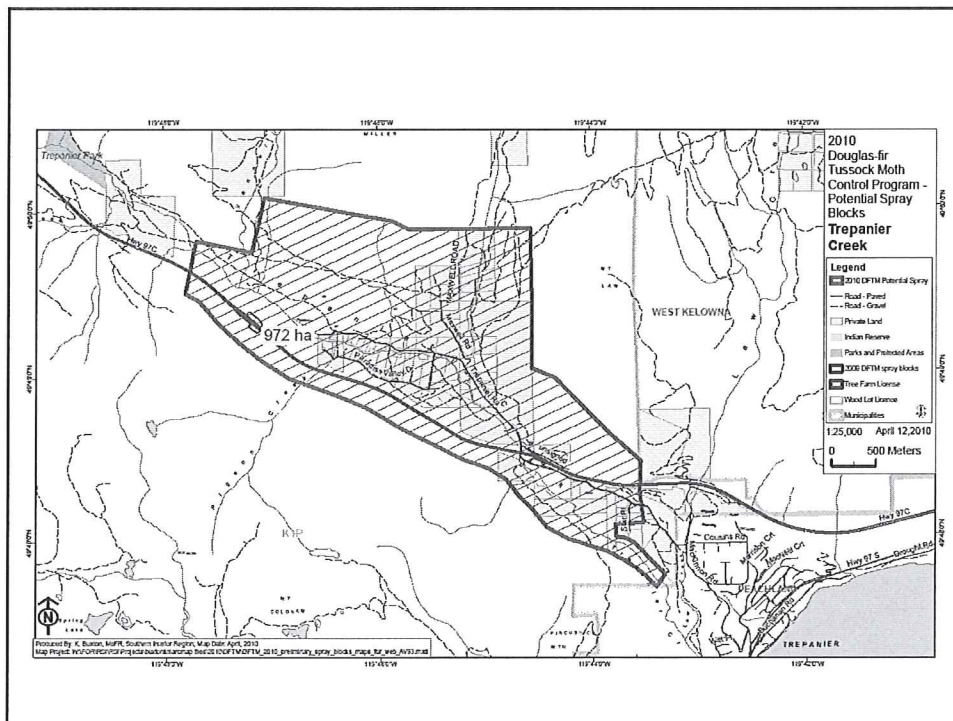
⇒ Continue to monitor outbreak

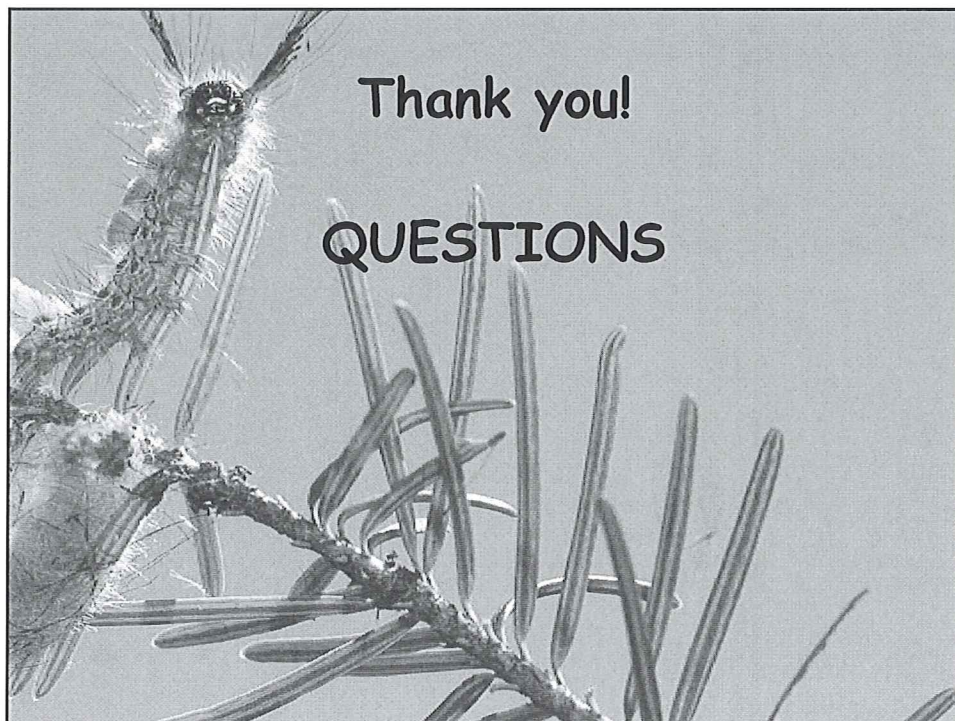
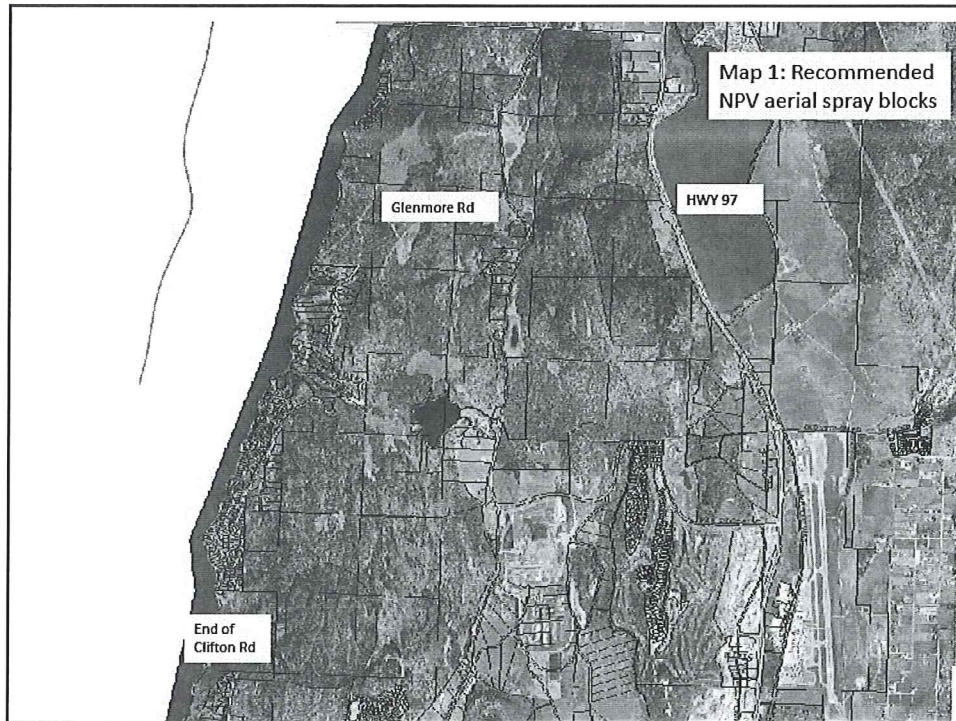






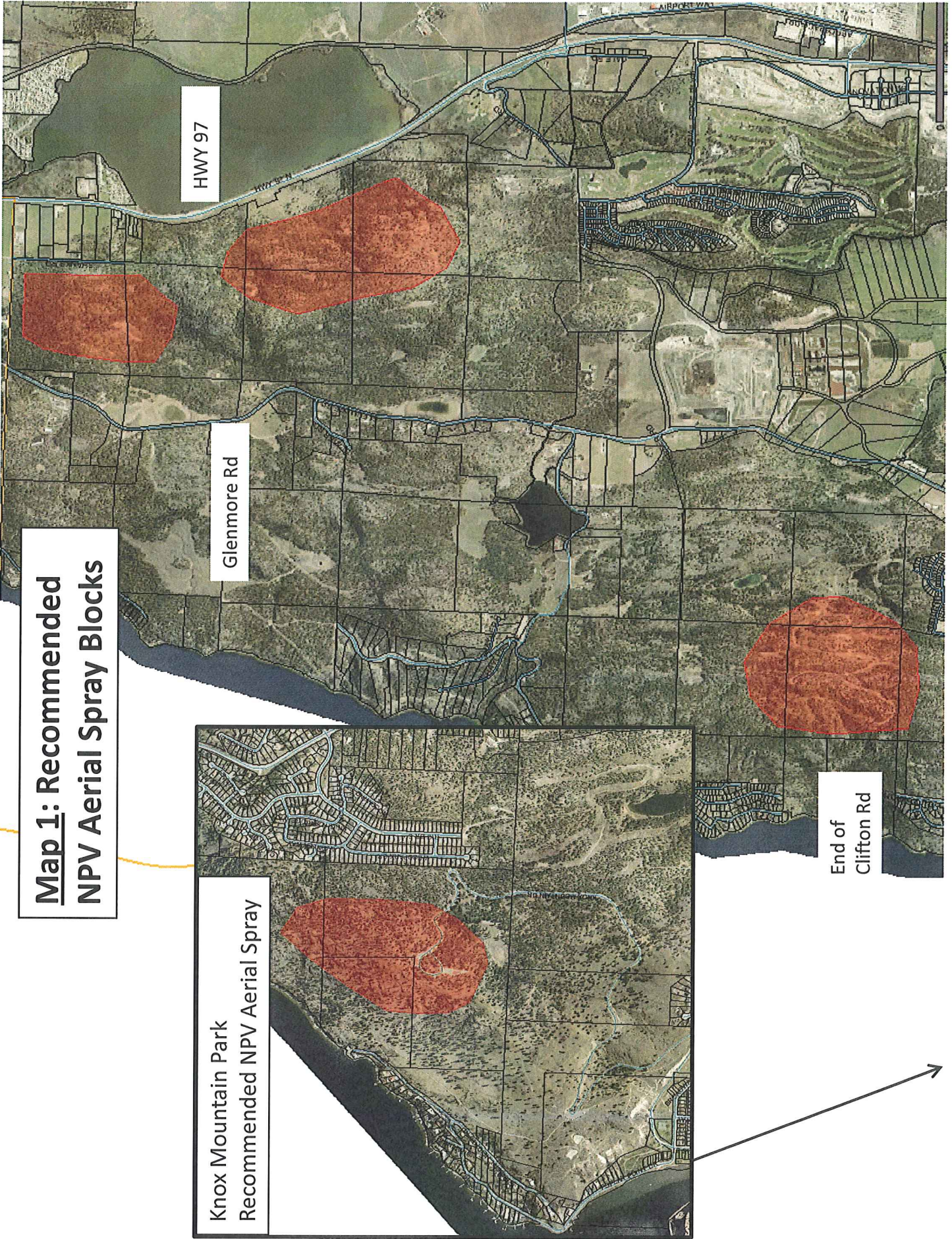
### Postill Lk / Farmers Drive







**Map 1: Recommended NPV Aerial Spray Blocks**



HWY 97

Glenmore Rd

End of Clifton Rd

Knox Mountain Park  
Recommended NPV Aerial Spray