CITY OF KELOWNA

MEMORANDUM

Date: January 10, 2006
File No.: 6130-07

To: City Manager

From: Urban Forestry Supervisor

Subject: Management of Pine Beetle on Private Properties

RECOMMENDATION

THAT Council receive the January 10, 2006 report of the Urban Forestry Supervisor regarding a potential strategy for management of pine beetle on private properties.

AND THAT Council direct staff to actively pursue funding from other levels of government in order to provide assistance to private property owners.

BACKGROUND

Western pine beetle (WPB) is a serious pest of ponderosa pine, capable of killing mature trees within a relatively short period of time. Infested areas have been increasing in the Central Okanagan region in the last few years, particularly in the Mission Creek Regional Park (Hall road) area, Glenmore landfiill / Roberts Lake areas, and in the Mission. Parks has received numerous calls from concerned landowners, prompting a public education campaign to help inform citizens about management options for this pest.

Beetle populations also appear to be building up in fire scorched trees along the south slopes, to the point where some of the remaining green unscorched trees are now being attacked. A similar problem occurred after the Salmon Arm fire of 1998.

Bark beetles have recently caused extensive tree loss in other B.C. interior cities such as Kamloops and Prince George, although those cities are also dealing with mountain pine beetle. Projections by the Canadian Forest Service are suggesting that virtually all pine stands in the B.C. interior (including the forests around Kelowna) will be affected by mountain pine beetle by 2014, causing significant impacts to natural and urban forests throughout most of the Province.

The Parks Division has had an aggressive beetle control program in place since 1998, helping to keep populations on city owned property in check. However, approximately 200 beetle-killed trees were detected in 2005 on city properties, mostly around the Glenmore landfill, Knox Mountain and Mission areas. Surveys for beetles are on-going and more will likely be discovered over the winter.

POTENTIAL IMPACTS

A 2004 forest cover inventory of the City indicates that most major pine stands (>50% pine) are concentrated in the north half of the city, with significant stands in southeast Kelowna and in the

Mission (Fig. 1). Areas that have a higher proportion of Douglas-fir, such as Knox Mountain Park, would not be affected as much. However, Fig. 1 does not show the many mixed stands or backyard trees that are dispersed throughout the city.

Some of the potential impacts of beetle infestation include:

- Increased fire hazard due to accumulation of dead trees;
- Changes in hydrology (drainage) due to loss of tree cover;
- Changes in biodiversity and wildlife habitat (both positive and negative);
- Major changes in aesthetics and the natural beauty of Kelowna's urban forest;
- Possible impacts to Kelowna's air quality, since trees can help to improve air quality, and also as a result of increased burning of infested debris;
- Increased hazard to land owners and recreational users due to dangerous trees; and
- Significant economic impacts associated with the removal and disposal of dead, infested trees.

The future extent of this problem is very difficult to predict, however, as it will depend upon factors such as weather and climate, the future status of infestations on adjacent Crown, private or Regional lands, and the willingness of property owners to manage the beetle proactively.

MANAGEMENT OPTIONS AND CHALLENGES

Attached is a fact sheet from the City of Kelowna website, outlining the major management options for WPB. **Pine beetle does not respect boundaries, therefore for any management strategy to be effective in the long run, it is essential that an integrated, coordinated approach is used.**

1. Removal and treatment of infested trees

The primary method of control is "sanitation logging", the removal and treatment of infested trees prior to beetle emergence. Unfortunately, this tactic can be very expensive for the average homeowner, as ponderosa pine is not considered to be a valuable timber species. Some property owners have indicated that they are spending anywhere from $300 to $2,000 to remove single trees.

One of the biggest challenges is wood disposal. Infested wood must be thoroughly debarked, processed, or destroyed prior to beetle flight, however:

- Debarking can be done with specialized equipment or tools but is labour intensive and still requires disposal of wood later on;
- Recent changes to the burning bylaw to allow burning of infested wood are apparently not helping many landowners, due to restrictions on property size, diameter of wood that may be burned, and difficulties associated with burning green wood;
- Wood may be taken to the landfill, but there are costs associated with trucking and tipping fees; and
- Alternatives such as air-curtain burners or tub grinders are prohibitively expensive for most landowners.

In 2005, Prince George was successful in gaining $570,000 in funding from Human Resources and Skills Development Canada (now called Service Canada) to assist with wood disposal from private lands. The City of Prince George contributed $250,000. Each property owner was

responsible for falling and moving the infested materials to the property edge, where HRSDC crews chipped and/or hauled materials away for disposal.

2. Mass-Trapping

In certain circumstances, WPB may be mass-trapped with baited traps. However, this tactic could only be used in large acreages with ample space. If traps are placed too close to healthy trees, they may induce attack on the trees.

3. Beetle Proofing

U.S. Forest Service researchers have found that one of the best long-term options for prevention of WPB attack is the thinning of pine stands ("beetle proofing") which improves the health and vigour of the remaining trees and mimics the natural stand structure that would have historically been created by frequent fires. This also has a side benefit in that it reduces fire hazard.

4. Repellents / Insecticides

There are currently no pesticides registered in Canada specifically for use against western pine beetle. Sevin (Carbaryl) is registered against mountain pine beetle.

However, recent research has found two additional experimental tactics for the protection of single trees from attack:

- **Repellents:** WPB produce a natural repellent odour (verbenone) which helps prevent them from attacking a tree so heavily that they outcompete each other. Results with this repellent on it's own have been inconsistent, but researchers in California recently found that a blend of verbenone with other "non-host" odours was very promising. Essentially this makes a pine tree smell like a non-host (e.g. aspen) tree that is already full of beetles.
- **Injectable insecticides:** U.S. forest service researchers have also found that a pesticide known as emmamectin benzoate was very effective when injected into the tree. Injection of pesticides is much more environmentally friendly than spraying chemicals on the bark.

We have been in contact with the manufacturer of these repellents as well as Dr. Dezene Huber from the University of British Columbia (who also worked on the studies out of California). Both are quite interested in facilitating this type of research here in Kelowna, for further testing with the side benefit of protection of high value trees (although there are no guarantees it would work). Some funding may also be available for this research. Research permits would be necessary for both of these experimental treatments, and we would need to try to expedite this process with federal authorities for the work to occur in 2006.

5. Pine Beetle Bylaw

There are currently no bylaws in place in Kamloops or Prince George requiring pine beetle control. However, such a tool could be very helpful. Although most property owners are compliant, an owner who refuses to control the beetle could ultimately defeat the efforts of neighbouring private or public properties.

Pine beetle used to be part of the regional "noxious insect" bylaw but was removed approximately four years ago. According to RDCO staff, it was removed because of:

- Lack of adequate resources to enforce the bylaw;
- Concerns over enforcement: if an owner refused to comply, a contractor could be hired to do the work and the costs charged back to the owner. However, these costs to the owner could potentially be very high; and
- Concerns over removal of trees in steep slopes or environmentally sensitive areas.

RECOMMENDATIONS

This is a complex issue with many unknowns. The losses are potentially very high on both private and public properties. On the other hand, it is possible that no matter what is done, our efforts may be unsuccessful in the long run.

In order to maximize the chances of success, staff recommend the following should be included in a future program:

1. Develop a larger educational program, outlining the management options available to the public and encouraging proactive and aggressive management. **Budget: $25,000.**
2. Continued lobbying of the provincial and federal governments for assistance with funding. Currently there are programs in place for mountain pine beetle but not western pine beetle, including $1.2 million in funding to assist the City of Prince George with "forest rehabilitation and fuel management costs" in their urban forest.
3. Encourage landowners to start re-planting as soon as possible by offering free seedlings, so that the long-term impact on the urban forest is minimized. In most areas this will mean re-planting with ponderosa pine due to site conditions, although these pines will not become susceptible to beetle until they mature. In wetter micro-climates other species would be encouraged. Seedlings normally have to be specially ordered a year in advance. **Budget: $5,000.**
4. Work with academic and private partners to offer experimental treatments such as repellents or injectable insecticides to land owners.
5. Work with the Regional District and report back on the costs and implications of reinstating pine beetle as part of the noxious insect bylaw.
6. Pursue federal Service Canada funding to assist wood disposal on private properties, such as the program implemented in Prince George. This program would likely require some funding on the part of the City. **Budget: $50,000.**
7. Assist private property owners on lots smaller than 1 ha with the costs of wood disposal, through a program which may include grinding, free tipping fees at the landfill and/or providing an air curtain burner. **Budget: $100,000 (with staff to seek additional funding from Provincial or Federal Sources).** Staff are recommending that this assistance is only offered to properties less than 1 ha at this time, because larger properties:
    a. have the option of burning debris under the new exemptions to the burning bylaw; and
    b. may have the ability to hire a logging contractor who can utilize some of the timber and keep the overall costs lower.
8. Hire a qualified contractor or staff person to help organize and coordinate this entire program. This person would also help inspect and certify infested wood, ensuring that non-infested wood is not reimbursed under this program. **Budget: $100,000.**

It should be noted that this program may have to continue up to 2020 and beyond. As well, depending on the rate and extent of spread of the beetle the costs could be considerably higher in future years.

A detailed review of options to finance an ongoing program has been done by the Parks, Recreation and Culture Services, Works and Utilities and Financial Services Departments. At this point recognizing Council's other expenditure priorities over the next few years, staff have been unable to identify ongoing funding to cover the City share of this program.

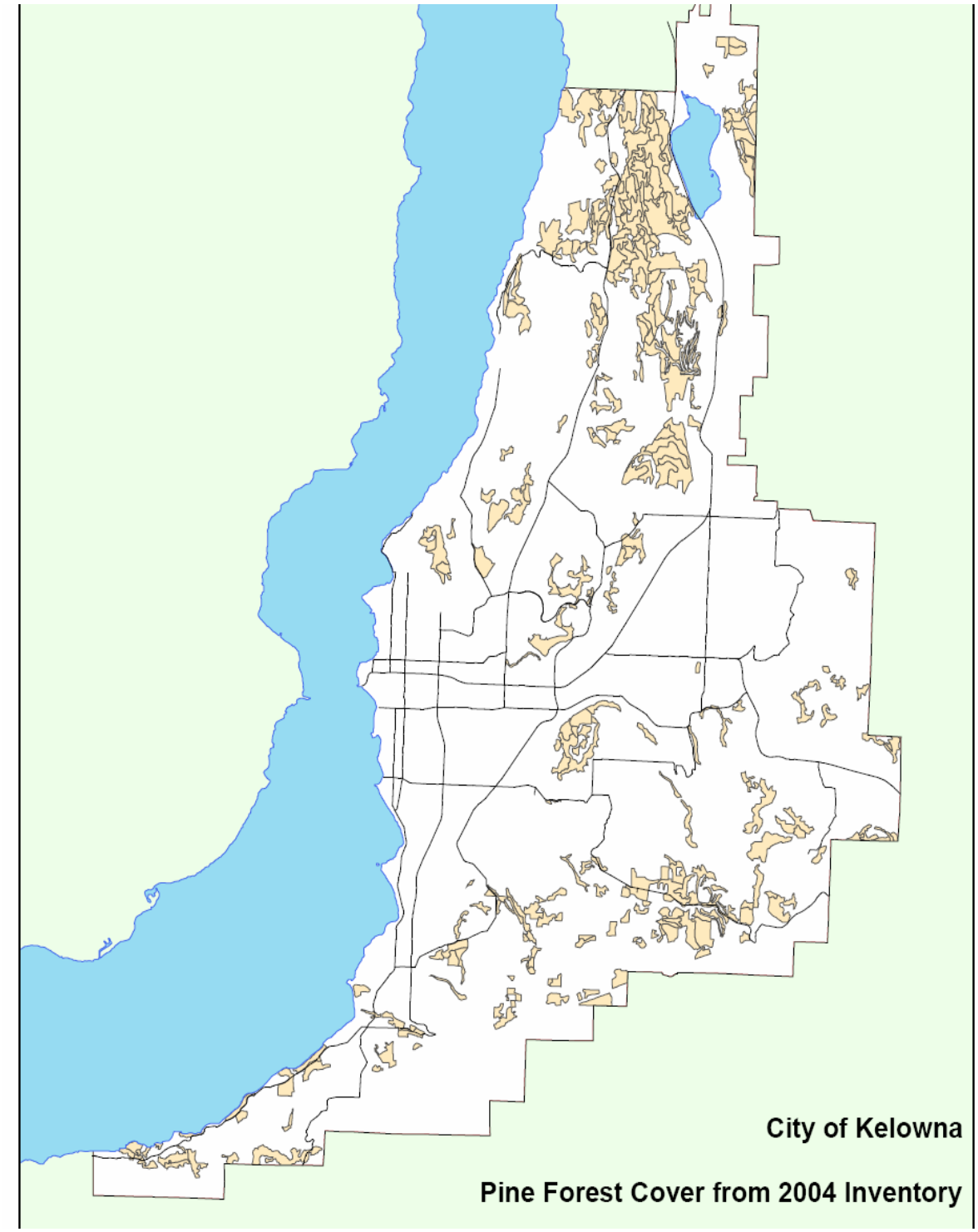
Staff recommend that additional work be conducted to seek outside funding to assist in the delivery of part or all of the recommended program.

Ian Wilson, MPM, RPF, Certified Arborist
Urban Forestry Supervisor

c.c. Director of Recreation, Parks and Cultural Services
Director of Works and Utilities
Director of Planning and Corporate Services
Parks Manager
Fire Chief
Environment and Solid Waste Manager

Enclosures.

Fig. 1. Large pine stands that could be at risk of infestation (from a 2004 forest inventory). This map only includes stands >50% pine, and does not include smaller mixed stands, backyard trees, etc.



Parks Division
(250) 71-PARKS

PesTopics: Bark Beetles

Prevention and Early Detection Are Key

There are many bark beetle species native to the forests of British Columbia, but only a few species are tree-killing pests. In the Okanagan, western pine beetle (*Dendroctonus brevicomis*) is the most common pest in urban areas, with occasional outbreaks of Douglas-fir beetle (*D. pseudotsugae*), or mountain pine beetle (*D. ponderosae*).

Tree mortality can occur rapidly, so prevention of attack and early detection are key to minimizing damage.

Fig. 1. Western pine beetle galleries

Identification and Life Cycle

Bark beetles are small (usually less than 6-7 mm long) black or brown beetles that bore into the bark of trees and construct galleries (Fig. 1) where they lay their eggs. The larvae are small, creamy white and grublike.

Host tree preferences vary for each species of bark beetle, although they all prefer to attack large, mature trees. Western pine beetle (WPB) only attacks ponderosa pine in this area, whereas Douglas-fir beetle (DFB) infests Douglas-fir. Mountain pine beetle (MPB) will attack ponderosa, lodgepole, and Scotch pine.

DFB and MPB normally have a one-year life cycle, emerging in the late spring / early summer. WPB can have multiple generations in a year, with several emergence peaks over the course of a season.

Once they have found a suitable host, beetles begin emitting an “aggregation pheromone”, a chemical scent that attracts other beetles in order to mass-attack a tree and overcome the tree’s natural defences.

Management

Ensure that you have properly identified the problem with the help of a tree or pest management professional. Some types of bark beetles or wood borers do not kill living trees, but only attack once a tree is already dead or dying. Bark beetles can attack apparently healthy trees, but usually prefer weakened trees. Look for evidence of other factors that might predispose trees to attack, such as root damage, disease, drought, or heavy pruning. Keeping trees healthy through good fertility, watering and proper tree

care practices will help increase their resistance to attack, particularly during summer droughts when most beetle flight occurs.

The primary method of bark beetle control is sanitation: brood-containing trees are removed and destroyed or treated with a registered insecticide[1]. Infested trees should not be used as firewood, transported, or stored for any length of time unless they are first debarked to destroy the brood. Ideally, the infested bark should be chipped, burned or buried to ensure adults and larvae are killed.

Bark beetle damage often is not detected until infested trees start to die and turn yellow or red. By the time damage is visible, the beetles may have already moved on. Therefore it is critical to find the attacked trees that still contain live brood. Look for trees in the nearby area that have symptoms of fresh attack. The most common symptoms are "pitch tubes" (small pitch blisters oozing out of beetle entrance holes), tiny entrance holes in the bark, and/or frass (boring dust) on the bark or at the tree base. An axe may be used to confirm the presence of live beetles within or just under the bark.

In forested areas, thinning of dense stands can help to reduce the susceptibility to infestation and help to prevent outbreaks for the WPB and MPB.

For more information

Western pine beetle:

http://www.na.fs.fed.us/spfo/pubs/fidls/we_pine_beetle/wpb.htm
http://www.barkbeetles.org/western/WPBFIDL1.htm

Douglas-fir beetle:

http://www.barkbeetles.org/douglasfir/dfir.html

Mountain pine beetle:

http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/
http://www.pfc.forestry.ca/entomology/mpb/index_e.html

[1] Check with a pest management professional prior to use of an insecticide to ensure compliance with all applicable legislation.