



Water management with MPB:



Black Mountain Irrigation District

An aerial photo of Belgo (Ideal) Reservoir.

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Helping individuals and communities anticipate and prepare for the increased challenges they are likely to face due to the mountain pine beetle (MPB) infestation and associated forest management activities was the focus of a recent workshop held in Kelowna. The event was designed to give water managers the latest information on the potential hydrologic effects of MPB.

Held this past June, the workshop, co-ordinated by FORREX and sponsored by the Southern Interior Beetle Action Committee (SIBAC), had the following objectives:

- Increase awareness and knowledge of potential impacts of MPB and salvage harvesting on consumptive-use watersheds.
- Identify concerns and actions to address the potential effects of MPB and salvage harvesting on a range of water values.
- Bring together water purveyors (including municipal and local governments, First Nations, and private utilities) and researchers to develop new collaborative opportunities to help address the increased challenges associated with MPB.

The day began with several technical presentations that summarized the current MPB epidemic in BC and its potential effects on hydrologic processes and watershed function. **Lorraine Maclauchlan** of the BC Ministry of Forests and Range indicated that most entomologists feel that the MPB infestation is currently in a declining phase, while other forest health agents are on the increase. However, even

in this declining phase, more hectares of forested land have been affected annually by MPB than any other previous beetle infestation observed in BC. The current extent of the MPB infestation in the province is approximately 13 million hectares, with projections showing 77% mortality of pine in BC by 2014.

The death of pine forests, combined with salvage harvesting, may have effects on the quantity, timing, and quality of water from affected watersheds.

Rita Winkler from the BC Ministry of Forests and Range gave an overview of potential hydrologic effects, with the summary phrase “more water, more quickly, more often,” depending on post-MPB forest management, the watershed, and the weather. “More water” refers to the potential for increased streamflow and groundwater recharge due to increased winter snowpacks and a reduction in evaporative losses to the atmosphere in beetle affected stands. “More quickly” refers to the potential for earlier snowmelt due to increased radiation and more rapid streamflow response to melt runoff and rainfall as a result of altered hillslope flowpaths. “More often” refers to an increased frequency of streamflow events of a given size, relative to an undisturbed/unharvested watershed.

Subsequent presentations supported the “more water, more quickly, more often” mantra, with researchers giving water resource managers the following key points to consider:

- Snowmelt rates in salvage harvested stands are greater than those in stands where the dead pine is retained, and this effect can persist for about 30 years.
- Model simulations indicate that peak flow magnitudes increase with the area of salvage harvesting.
- A regional study found little short-term influence of MPB infestation on chemical water quality across BC, and that water quality concerns arising from the MPB infestation are primarily related to forest management responses (e.g., road building and salvage harvesting).

The second session of the workshop featured presentations on applied aspects of managing community water supplies to adapt to and mitigate the potential impacts of MPB and salvage harvesting. The incremental challenge for water purveyors is that they generally have limited or no direct



Will things be different?

control on land-use activities in the source area watersheds, unless the watershed is owned and managed by the water purveyor (e.g., the watershed that supplies Victoria is about 95% privately owned by the water purveyor). The key messages from presentations and a panel discussion during this second session included:

- As water quality is degraded, treatment costs increase. This can be more problematic for water systems that do not have back-up sources (e.g., off-line storage or groundwater sources) and a relatively low ability to install the required treatment infrastructure. For this reason, a multi-barrier approach to drinking water protection (source through to treatment) is desirable.
- Water managers have no control (and potentially little input) on managing source water areas, which makes it difficult to ensure water quality stays high from the source to the tap. Therefore, it is important that water purveyors work closely with land and water management agencies and licence holders that are conducting activities within the watershed to ensure that source water concerns are included in managing upland water source areas.
- MPB and salvage harvesting are not the only (or even primary) threats to water quality in community watersheds. Forest fire risk and the possible damage to stream channels and riparian zones by off-road vehicle enthusiasts and livestock are also concerns in maintaining clean water supplies.
- Within the Southern Interior, climate change has the potential to affect water quality through warmer water temperatures and, when combined with forest disturbance, increased nutrient loading to lakes and reservoirs, which can lead to algae blooms. These effects are expected to be greater at mid- and low-elevation reservoirs.
- There is uncertainty about the post-infestation effects of forest regrowth on future water supplies in the mid- to long term.

To assess potential risks to water supplies due to MPB, wildfire, and other disturbances, water purveyors in the Okanagan are leading a number of initiatives, including:


- Black Mountain Irrigation District, Wildfire Preparedness Plan

- Greater Vernon Water, Duteau Creek Watershed Assessment and Preparedness Plan
- District of Summerland, Trout Creek Watershed Assessment

The final presentation of the day was by **Kathleen**

Miller, a researcher with the National Centre for Atmospheric Research in Boulder, Colorado and a lead author of a number of publications by the Intergovernmental Panel on Climate Change. Miller's research is focused on climate change impacts and adaptation related to water resources. Miller advocated the development of climate change and disturbance response strategies that explicitly account for uncertainties. She noted that all land management and policy decisions should be:

- robust to predictable changes,
- resilient to surprising changes, and
- adaptable to changing conditions and new information.

The workshop handbook, containing extended abstracts for each of the presentations, is available for download from the FORREX website (www.forrex.org/program/water/mpb_water_management.asp). In addition, video highlights of selected presentations are available for viewing on the SIBAC website (www.sibacs.com). 



Kathie Swift photo

Recent MPB salvage harvesting with cup poles and single tree retention.

Sources of further information

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