

**REPORT TO REGIONAL WATER SUPPLY COMMISSION
MEETING OF WEDNESDAY, 21 FEBRUARY 2007**

SUBJECT IMPACTS TO WATER SERVICES FROM FALL 2006 STORMS

PURPOSE/ISSUE

This report provides information on the impacts caused by the 2006 fall storms to the Capital Regional District (CRD) Water Services water supply system.

BACKGROUND

From November through December 2006, the Capital Region experienced a number of rain, wind and snow storms. Within this period, there were two particular storms that resulted in significant damage to the region; the snow fall event of November 25, 2006 and the subsequent wind storm of December 14, 2006. As a result of falling trees, snow loading and run-off, the impacts from these storms resulted in significant damage to power and communication utilities, blockage of roads and flooding and damage to buildings, vehicles and properties across the region.

Impacts to CRD Water Services from these storms resulted in the loss of power and communications to key distribution facilities and significantly restricted access within the Western Communities and the Juan de Fuca distribution system. Within the Greater Victoria water supply area, the snow and winds downed trees blocking roads to key water supply facilities and pulled down power and communication lines. At a landscape level, the impacts from these storms pushed over thousands of trees throughout the Greater Victoria water supply area. Impacts and interruptions to other components of the water system were minimal. There were no direct impacts to source water quality from these storms.

Greater Victoria Water Supply Area

Snow Storm – November 25, 2006

Trees downed by the heavy snow blocked roads and downed power and communication lines to key water supply facilities, including the Japan Gulch Disinfection Plant, Sooke Dam and Head Tank and the Mt. McDonald communications complex. Power outages for these facilities ranged from 70 to 148 hours. The snow also caused damage to the UV Treatment Plant roof, resulting in water leaks.

Virtually every road within the water supply area was blocked with snow and downed trees; a total distance of 384 kilometers. Crews set out to clear the priority roads however, the amount of work required to re-establish access quickly exceeded available resources and additional heavy equipment had to be brought in. Blocked access to key water supply facilities ranged from just a few hours to approximately 68 hours. Once access had been restored, crews had to maintain these roads, as additional snow and trees continued to fall.

Based on a preliminary assessment, there was snow damage to the adjacent forests. The heavy snow accumulated in the crowns of the trees, resulting in breakage, leaning and fall down. In older stands, the weight caused the trees to lean heavily however, few of these older trees fell. For a 5 day period, staff entering the chloramination facility, part of the Japan Gulch Disinfection Plant, did so only when absolutely necessary due to unsafe work condition associated with a number of large Douglas fir trees leaning towards the building.

The majority of the damage was to the younger stands of trees; trees ranging in age from 20 to 80 years. The damage to the younger trees was in the form of breakage and patches of fall down. These patches ranged from a few trees up to approximately one hectare or so in size. Before a comprehensive assessment of the impacts caused by the snow could be made, the area was hit by the December 14 – 15, 2006 wind storm.

Wind Storm – December 14 – 15, 2006

Within the Greater Victoria water supply area, winds peaked at 147.9 km/hour, resulting in downed trees, loss of power and damage to power and communication lines, and blocking of all roads open at the time. The damage caused by this storm augmented the damage caused by the November 25, 2006 snow storm.

Although there were a significant number of downed trees, crews responded and were able to deal with priority sites due, in part, to the lack of snow.

Power outages to key water supply facilities ranged from 67 to 312 hours. Road access to the Japan Gulch Disinfection Plant was never jeopardized and, for a short period of time, access to the Sooke Dam via the Sooke Main Road was blocked but was easily reopened in a few hours. It took up to 142 hours to reopen remaining primary routes.

The wind storm also resulted in damage to the Flowline. Along its 21 km length, there are hundreds of downed and leaning trees, resulting in a number of breaks. Fortunately these breaks are manageable but will require repair in the near future. Plans are being developed and repairs are scheduled.

Damage to the forests was concentrated on the older stands of trees ranging in age from 60 to over 250 years. Within these stands, the taller trees received the greatest impact. It is very likely that root rot infections contributed to the damage however, more detailed ground surveys will be required to confirm and quantify this. To date, the most extensive damage has been observed in stands located in the southern portion of the Sooke water supply area and the mid and southern portions of the Goldstream water supply area. These stands experienced clumps of blow down or gaps (approximately .25 ha in size) and single stems blown down randomly across the landscape. Larger patches of blow down were observed near Cabin Pond and near 4G/7N roads in the Goldstream water supply area. These patches were up to 3 hectares in size (estimated).

The attached pictures illustrate the types of impacts and damage caused by the snow and wind storms to the infrastructure and forests of the Greater Victoria water supply area, **Attachment 1**. An overview map illustrating the location of key water supply facilities within the Greater Victoria water supply area, the location of weather stations, maximum wind speeds and directions, and areas with the greatest number of downed trees is also provided, **Attachment 2**.

FINANCIAL IMPLICATIONS

Greater Victoria Water Supply Area

To date, CRD Water Services has spent approximately \$60,000 responding to the impacts from the November 25, 2006 snow storm and the December 14 – 15, 2006 wind storm within the Greater Victoria water supply area. Expenditures to date covered basic requirements including the servicing of back up generators during power outages, initial repairs to power and communications lines, and the cutting and moving of trees blocking roads to key water supply facilities. It is estimated that an additional \$575,000 is required to complete the clean up and repairs caused by the storms. Remaining work includes repairs to the Flowline and the UV Treatment Plant, removal of damaged trees and slash from roads, power line rights of ways and from around facilities, repairs to the roads including re-ditching and resurfacing with gravel, removal of broken branches and limbs blocking culverts, and repairs to security fencing and signs. In total, the estimated cost to repair and clean up the damage caused by these two storms is \$625,000. There will be some revenue recovered through the sale of logs, which is estimated at \$80,000 to \$100,000. The 2007 Watershed Protection budget for roads is \$547,122.

There is a possibility that the province, through the Provincial Emergency Program, may reimburse some of the initial response costs. A request for support was submitted at the end of January 2007.

CONCLUSIONS

Upon review of the impacts, resource requirements and circumstances, a number of conclusions have been reached as outlined below:

1. CRD Water Services needs assurances from power and communication utilities that water supply facilities are designated as priority sites.
2. Clean up and removal of road side slash is required prior to fire season (April).
3. As part of the road maintenance program, trees growing beside primary roads will be thinned to reduce the likelihood of snow press. This will be implemented over the long term affecting the young trees.
4. Trees threatening water supply facilities and power and communication lines needs to be trimmed or removed.
5. A ground assessment needs to be carried out to better determine the extent of damage and any remedial actions required. If the impacts have resulted in elevated fuel loading for example, the results will be incorporated into the Wildfire Risk Management Plan, to be completed and presented to the Regional Water Supply Commission by this summer
6. From a broader perspective, there is evidence that storm event frequencies and impacts may be changing. Supported by studies, there appears to be a trend towards more frequent and dynamic storms during the winter and dryer conditions over the summer period. This is of concern and requires additional research, potentially impacting how we plan and manage the Greater Victoria water supply area.
7. The expenditure of funds required to deal with the impacts from these storms will result in a reduction in the amount available for transfer to capital at year end.

RECOMMENDATIONS

That the Regional Water Supply Commission:

1. Receive this report for information; and
2. Direct staff to take action to address the conclusions noted in the report.

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Attachments (2)