

2001 OCTOBER 04

TO: CITY MANAGER
FROM: DIRECTOR PARKS, RECREATION & CULTURAL SERVICES
SUBJECT: TREE DECLINE AT BURNABY LAKE
PURPOSE: To provide response to Council's inquiries regarding tree decline at Burnaby Lake.

RECOMMENDATION:

- 1. THAT this report be received for information purposes.

REPORT

At its meeting of 2001 October 03, the Parks, Recreation and Culture Commission received the above noted report and adopted the two recommendations contained therein.



Kate Friars
DIRECTOR PARKS, RECREATION
AND CULTURAL SERVICES

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Attachment
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cc: Director Planning and Building

SUBJECT: TREE DECLINE AT BURNABY LAKE

RECOMMENDATIONS:

1. THAT a copy of this report be forwarded to Council.
2. THAT a copy of this report also be forwarded to: Environment and Waste Management Committee, GVRD, Burnaby Lake Park Association, Burnaby Horsemen's Association, and Mr. J. Roff.

REPORT

BACKGROUND:

Staff have been monitoring the tree decline around the equestrian trails at Burnaby Lake since 1997. Assessment of site conditions, tree health/decline and causes for the problem have been documented by City of Burnaby staff, GVRD and private consultants. Throughout the process, the City of Burnaby along with several other groups with vested interest in the area have been active participants in reviewing the findings and developing an appropriate solution for restoration of the area. This report provides answers to specific questions brought forward by City Council and the Parks, Recreation and Culture Commission regarding the extent of the study and the inclusion of stakeholder opinion.

DISCUSSION

The report responds to three questions asked by Council on 2001 August 13:

1. Have the parties accountable for causing the tree decline, been determined?
2. Have all the stakeholders been consulted? Why is there no response by some?
3. Are we selecting the best option for restoration of the area?

To address the questions above, background reports were received, and stakeholders were contacted to confirm reporting was accurate. The following observations were made:

1. **Have the parties accountable for causing the tree decline been determined?**

To answer the question about accountability, the circumstances that led to the problem and the control systems that were in place to prevent the problem have been summarized. For your information the discussion includes information about control systems for future planning projects.

The Problem

The City of Burnaby Urban Forestry Report, produced in May 1997 clearly states that the trees have been in decline over a number of years. The tree decline has been caused by increased flooding within the southeast corner of the park. The Drainage Problem Investigation report by GVRD, August 2000, indicates the flooding is attributed largely to a combination of hydrologic changes within the larger Buena Vista Creek watershed as well as localized drainage problems such as blocked culverts and beaver damming.

The hydrologic changes that have contributed to the flooding problem are related to increased urbanization within the watershed including construction of the Cariboo Heights subdivision during the 1980's and to a lesser degree the TransCanada highway expansion in the 1990's. Urbanization has removed sections of the forest and increased the hard surface area. While the forest acts as a sponge to absorb the rainwater, hard surfaces sheet drain water directly into piped stormwater systems and out to streams. Urbanization has increased the number and peak volume of flow events over the past two decades. The highway, the sewer pipeline, Avalon access road, the Burnaby Horsemen's installations and the Cariboo heights subdivision all contribute to the addition of hard surfaces in the watershed.

Accountability

The GVRD has taken responsibility for correcting the localized drainage problems by repositioning culverts and removing /controlling beaver activities. These actions were identified as necessary in both Option B and C, outlined in Attachment 1. Ongoing control of beaver activity will continue to be a challenge for the GVRD.

The City has recognized the downstream impacts of urbanization on watercourses and has been working to mitigate these impacts. In 1999, City Council adopted an integrated stormwater management plan for Stoney Creek as part of the Brunette Basin Watershed Plan. This pilot project provided stormwater runoff criteria for all new developments within the Stoney Creek watershed. New technologies such as detention chambers and pervious ground surfaces are now required to reduce peak runoff flows into downstream watercourses. Stormwater runoff criteria from this pilot plan are now being extended and adapted to other parts of Burnaby. While these criteria may be used to control new development, it is more challenging to retrofit stormwater control measures in existing urban areas.

The City has put measures in place to control development with the goal of minimizing downstream impacts on watersheds. At the same time the GVRD continues to work on managing the beaver population and keeping the culverts clean and flowing in this particular zone of Burnaby Lake. Neither of these measures, however, will reverse the flow of water into the site and therefore it has been anticipated that high water levels will likely continue in the area.

2. **Have all the stakeholders been consulted. Why is there no response from the Burnaby Lake Park Association?**

It should be noted that the summary of the stakeholder opinions reported by the GVRD in the stakeholder summary in [Attachment 2](#) does not fully represent all of the discussion and feedback that has taken place around this subject. Throughout the review process several key questions are asked by the stakeholders and the public and those have been summarized in [Attachment 3](#). To review the input process, the stakeholders were contacted to confirm their opinions about the various restoration/repair solutions to ensure the true intent of each stakeholder was recorded. In brief, Option B was preferred by Parks, Recreation and Cultural Services, Planning, Burnaby Lake Park Association, The Provincial Ministry of Transport, and the GVRD Utilities Operations and Maintenance. The Burnaby Horsemen's Association have opted for Option C. Conversations with the Burnaby Lake Park Association and the Burnaby Horsemen's Association offer the following insights:

- Many verbal discussions have taken place between the GVRD and the Burnaby Lake Park Association. Unfortunately no written response was recorded so it may be misinterpreted that the Burnaby Lake Park Association had not been consulted. Mr. Gunn (Chair) has stated that the group does not want aggressive treatments or drastic actions to be taken as the outcome may be more damaging to the site. The preference is to let the site reach an equilibrium. The Burnaby Lake Park Association intends to work with the GVRD as they study this area and the overall forest around the lake. They also want to work with the GVRD to develop a strategy for forest management. There has been a joint application submitted to the Federal Government for eco-action funds to support the reforestation project.
- The Burnaby Horsemen's Association identified Option C as the preferred solution. In clarifying their position, however, they have agreed in principle to any suggestion that will solve the problem and maintain the trails. They do not advocate further damage to the environment by large machinery which is inherent in carrying out Option C. Some reassurances of the ability of existing drainage system to operate effectively would be required to appease the worries of this group.

The discussion about the problem and repair plans have not been concluded to date, although there is general consensus that retrenching the creeks by drastic intervention would not be appropriate. The GVRD has undertaken all of the repair work outlined in Option B as a matter of maintenance. To complete the project the GVRD has evaluated the choice of retrenching of the stream channels as outlined in Option C or developing a strategy for a habitat consistent with wetter conditions. Respecting the feedback from the stakeholders, the GVRD has opted to move forward with planning a new wet habitat zone. A forest management study is now underway that will provide technical direction on how to do this.

3. Are we selecting the best option for restoration of the area?

The degree of intervention one takes to correct the problem and restore the site is a subjective call that has been weighed against many factors including:

- the value of the original resource;
- the impact of construction on the surrounding environment;
- impact on the function of the ecosystem (fallout in air and water);
- ability to develop new habitat in place of the lost one;
- ability to sustain the site once it is restored.

In the consultation process, the GVRD presented some information about how the environment may be effected by a range of simple to drastic interventions. The lack of detail in the report made it difficult for the stakeholders to understand the implication of Option C, however, in reviewing the reports, staff have noted 2 key points that are critical in understanding the complexity of the problem.

To restore the area into a mixed conifer/deciduous forest, one would have to restore the water balance in the local area. The predominant ways to alter the water flow are either reducing the incoming water or increasing the outgoing water in the area. The negative impacts of entertaining either measure outweighed the value of implementing them.

1. Redirecting the water (by berms and ditches around the site) simply relocates the excess water problem to other areas around the lake.
2. Making the drainage system more efficient amounts to channelization of the stream beds. The impact of such a solution would likely be devastating to the streams, adding silt to the water and removing shade trees along the watercourse. Channelization in general is not an environmentally friendly action.

Further study has not confirmed that negative outcomes of Option C would indeed happen but given the history and experience of staff working on similar projects the outcome is highly likely. Therefore, the general consensus of selecting Option B seems justified.

The intent of Option B is to correct the existing drain channels and monitor the site. As it reaches a new equilibrium, the redevelopment plan will be outlined. The safety of the riding trails will continue to be monitored and maintained as a facility within the area. (The trails actually act as

a containment device that help to control the water therein protecting larger portions of the forest from flooding). New habitat development opportunities are possible by accepting the wetter conditions and preparing an associated plan for long term restoration with this as a known factor. Option B is a logical and measured solution that will allow restoration options to be evaluated in context with the larger forest.

SUMMARY

The flooding, and tree decline is a problem that has not been fully corrected to date. The GVRD has consulted affected parties through the course of studying the issue and the development of corrective strategies. The corrective measures outlined in Option B have been undertaken and the decision to not proceed with retrenching of the stream channels is consistent with the desires of the majority of the stakeholders and the consultants. The GVRD and the stakeholders have been diligent in assessing the implications of undertaking the work in Option C in context with the larger environment and have chosen not to pursue retrenching at this time.

The physical restoration of the area will begin as soon as the findings from the forest management plan are brought forward and adopted. The implementation of site improvements is anticipated to take 18 months. The Burnaby Lake Park Association is currently pursuing funding grants to assist in the first phase of the restoration plan.

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Attach. (3)

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cc: Director Planning and Building

BURNABY LAKE REGIONAL PARK

ATTACHMENT 1

Options to Address Flooding/Tree Loss within Equestrian Loop Trail Network
(For Discussion Purposes)

	<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
<p>Description of actions for each Option</p>	<p>Cease Beaver Trapping and Dam Removal on the Buena Vista Creek System within Burnaby Lake Regional Park</p> <p>Cease dismantling of beaver dams on Buena Vista Creek system between Highway 1 lands and the Avalon Trail (area within equestrian loop trails).</p> <p>Cease trapping/removal of beavers within the area.</p> <p>Proceed to let "nature takes its course"; allow areas to flood, creation of beaver ponds and habitat conditions to change.</p> <p>Continually assess the condition and liability of the equestrian loop trails. If unacceptable risks arise from uncontrollable flooding, trail washouts, tree falls, etc. equestrian trails would be permanently closed.</p>	<p>Continue Current GVRD Park Operations Program to Manage Beaver Activity, Hazard Trees and Maintain Equestrian Loop Trails</p> <p>Continue dismantling of beaver dams on Buena Vista Creek system between Highway 1 lands and the Avalon Trail (area within equestrian loop trails) as required (2 to 3 times per week at present).</p> <p>Dead trees would be left standing as wildlife snags, unless a safety risk to trail users.</p> <p>Opportunity would be assessed to replant previously flooded low-lying areas with "wet" tolerant tree and shrubs. Could include creation of raised hummock landforms for improved planting conditions (i.e. drier sites).</p>	<p>Excavate and "Channelize" Buena Vista Creek Flows from Highway 1 to Avalon Trail</p> <p><u>Key recommendations from Drainage Problem Investigation Report completed by GVRD Parks Engineering in 2000</u></p> <ul style="list-style-type: none"> Expand beaver trapping/removal program to cover Buena Vista Creek system between Highway 1 and Avalon Trail. Retrench section east and west creek channels to remove sedimentation and improve stream flows, limit flooding. Trench new channel outlet from beaver pond to west creek. Retrench Buena Vista Creek channel from Highway 1 through flooded beaver pond area south of trail loops to re-establish flows, limit flooding of this area. <p><u>In addition</u></p> <ul style="list-style-type: none"> Fish and fish habitat impacts would have to be avoided/minimized during creek retrenching work. Dead trees would be left standing as wildlife snags, unless assessed to be a safety risk to trail users. Equestrian loop trails would be maintained. Opportunity would be assessed to replant previously flooded low-lying areas with "wet" tolerant tree and shrubs. Could include creation of raised hummock landforms for improved planting conditions (i.e. drier sites).

	<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
<p>Potential Benefits of each Option</p>	<p>Cease Beaver Trapping and Dam Removal on the Buena Vista Creek System within Burnaby Lake Regional Park</p> <p>Creation of stream channel pools and beaver ponds can benefit fish species, wildlife (i.e. marsh birds, waterfowl) and amphibians.</p> <p>Beaver ponds and impoundments (i.e. dams) can help regulate stream/stormwater runoff flows, which is consistent with progressive urban stormwater management objectives.</p> <p>Standing dead trees in flooded areas can become wildlife snags for woodpeckers, cavity nesters and other species.</p>	<p>Continue Current GVRD Park Operations Program to Manage Beaver Activity, Hazard Trees and Maintain Equestrian Loop Trails</p> <p>Controls beaver activity impacts (i.e. flooding due to dam construction) within equestrian loop trails (does not include area between Highway 1 and trails).</p> <p>Beaver ponds on Ministry of Highways lands between Highway 1 and the equestrian loop trails would continue to provide habitat for fish, wildlife and amphibians.</p> <p>Equestrian loop trails would be maintained.</p> <p>Wildlife snags provide habitat for woodpeckers, cavity nesters and other species.</p>	<p>Excavate and "Channelize" Buena Vista Creek Flows from Highway 1 to Avalon Trail</p> <p>Would re-establish historical creek channel flows and drain low-lying areas prone to flooding in recent years.</p> <p>Further risk of tree loss from flooding would likely be reduced.</p> <p>May improve access and habitat for some fish species with removal of beaver dams and fine sediment deposits on the creek bottoms.</p> <p>Equestrian loop trails would be maintained.</p>
<p>Potential Impacts of each Option</p>	<p>Likely further loss would occur of mature conifers and other trees due to continued flooding from beavers constructing dams on creek channels.</p> <p>Possible increase in size of beaver ponds and extent of flooded areas.</p> <p>Loss of deciduous tree cover adjacent to creeks and ponds due to beavers removing as food source/dam building material.</p> <p>Based on previous Parks' experience, equestrian loop trails in vicinity of existing beaver ponds would be subject to washouts during heavier winter rains. Trails would not be repaired and therefore would need to be closed for safety/liability.</p>	<p>Some further loss of trees may occur from flooding due to extent of beaver activity and existing sedimentation within the creek channels. Efforts would be made to minimize extent of flooding through ongoing program to remove beavers/dismantle dams.</p> <p>Beavers might expand "territory" south of trail loops causing further flood damage and loss of trees.</p> <p>Temporary closures of trail sections may be required from time to time due to flood events or removal of hazard trees which pose a safety risk to trail users.</p>	<p>Clearing of a corridor (8-10 metre width) for excavation equipment access to retrench the creek channel sections would require removal of a number of trees.</p> <p>Existing large pond south between loop trails and Highway 1 would be reduced in size or completely disappear with drainage improvements. Fish, wildlife and amphibians within this pond environment would be impacted.</p> <p>Construction of an access road and channel excavation could pose a risk to the existing sanitary sewer.</p> <p>Creek channelization could result in higher velocity storm flows, with potential channel erosion problems posing a risk to the sanitary sewer.</p> <p>Visual impacts would remain of corridors cleared for excavation equipment access along creek channel sections for a period of time until covered by revegetation.</p> <p>Channelization of creek flows is not consistent with progressive urban stormwater management objectives (i.e. regulated flows to simulate natural conditions).</p> <p>Does not resolve potential for further infilling/flash flooding of creek due to ongoing development in upper watershed.</p>

	<u>Option A</u>	<u>Option B</u>	<u>Option C</u>
Costs Associated with the Actions of each Option	<p>Cease Beaver Trapping and Dam Removal on the Buena Vista Creek System within Burnaby Lake Regional Park</p> <p>Equestrian loop trails would continue to be maintained as long as safely possible under Regional Parks Operations and Maintenance budget for Burnaby Lake Regional Park.</p> <p>Decommissioning of sections of the equestrian loop trails due to ongoing flooding, safety concerns would be funded under the Parks Operations budget.</p>	<p>Continue Current GVRD Park Operations Program to Manage Beaver Activity, Hazard Trees and Maintain Equestrian Loop Trails</p> <p>Equestrian loop trails are inspected minimum two times per week using existing Parks staff resources. Other trails in the Regional Park are inspected minimum once per week.</p> <p>Beaver trapping is contracted out to a licensed trapper at an annual cost of approximately \$2,700.</p> <p>Annual monitoring program would assess effectiveness of culvert replacement and beaver dam removal in affected areas. Costs of monitoring program would be part of existing Parks Operations budget.</p>	<p>Excavate and "Channelize" Buena Vista Creek Flows from Highway 1 to Avalon Trail</p> <p>Preliminary estimate for trenching creek channels based on described actions above in Option C is \$20,000-\$30,000.</p> <p>Environmental impact assessment and mitigation study would be a requirement of environmental regulatory agencies and is estimated at \$5,000-\$10,000 to complete. The assessment does not guarantee that environmental agencies would approve the actions under Option C. If approved, however, environmental compensation work would be required (i.e. fish habitat creation, native species replanting, etc.). Cost unknown at this time, but could easily double the cost of overall work.</p> <p>Beaver trapping is contracted out to a licensed trapper at an annual cost of approximately \$2,700. Additional annual costs to monitor new channels for trapping of beavers and dismantle dams.</p>
Regulatory Approvals Required	None	Ministry of Environment (trapping/relocation of beavers – managed through registered licensed trapper under contract with GVRD Parks).	<p>Ministry of Highways (work on MOTH lands).</p> <p>Department of Fisheries and Oceans & Ministry of Environment (environmental approvals for instream work).</p> <p>Provincial Water Management Branch.</p> <p>Ministry of Environment (trapping/relocation of beavers – managed through registered licensed trapper under contract with GVRD Parks).</p>

BURNABY LAKE REGIONAL PARK

Trail Flooding And Tree Decline Issue Comments

AGENCY OR STAKEHOLDER	PREFERRED OPTION OR COMMENT
1. John Kirbyson, City of Burnaby, Parks & Recreation	No option selected. Recommended meet with MOELP to discuss feasibility of Option C. Tree planting, fisheries enhancement, wetland enhancement also recommended.
2. Robyn Wark, City of Burnaby, Planning	Option B preferred. Monitoring flooding problem and possible replanting in conjunction with Option B.
3. Ministry of Transportation and Highways	No response. Will cooperate in anything GVRD decides.
4. Helen Phillips, President, Burnaby Horseman's Association	Option C preferred.
5. Burnaby Lake Park Association	No response.
6. Ed von Euw, GVRD, Utilities Operations and Maintenance (Sewer and Drainage)	Option C <i>not</i> recommended due to risk to sanitary sewer and channelization resulting in higher velocity storm flows, potential channel erosion and risk to sanitary sewer. By implication Option A or B acceptable.

Questions and answers about the tree decline at Burnaby Lake:

1. Can we better control drainage into this area of the forest?

In this specific location, work on the slope could redirect some runoff, however we don't want to displace the problem to another area of the lake.

2. Can we drain the area and re-establish the same forest with little disturbance to the environment?

No, not without serious impact on the ecosystem. Chanalizing the drain system would require large machinery that would footprint the forest floor, require clearing of channel side trees and add a good deal of silt to the water course.

3. What options do we have for cleaning up the and redeveloping the area?

The drainage improvement items listed in Option B of the report and have been implemented already. What is missing is further detail on how the proposed habitat area will be established. These will come from the GVRD as they monitor the site and complete the forest management study that is now underway.

4. Why has the Burnaby Lake Park Association not responded to the GVRD report and the development options?

They have responded verbally and not in writing. They are in agreement with the GVRD plan of action and do not advocate Option C in the report.

5. Did the Trans Canada Freeway construction cause the drainage problem?

The freeway alone did not cause the problem. All hard surfacing in the watershed combined added to the problem. Over the past decade there has been a 39% increase in hard surface in the watershed. This has resulted in decreased water infiltration capability into the ground and a increase in water flowing into the area. The Ministry of Highways has agreed to comply with whatever the GVRD requests in the way of site repairs therein becoming part of the solution.

6. Are the hog fuel trails part of the drainage problem?

The trails are not considered part of the problem. The problem is the quantity of water coming in and going out. The hog fuel trails have, if anything, helped to contain the area of flooding.

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