

COMMENTS ON THE SCIENTIFIC REVIEW PANEL'S DRAFT REPORT, "PROTECTING VANCOUVER'S WATER", AND RELATED MATTERS

Written and Presented by Will Koop, July 7, 1997

I must say that I am personally very impressed with the caliber of the contributions that we have received today. I am quite surprised that there are so many people here with knowledge about the watersheds, and with knowledge of either forestry, or hydrology, or some of the factors that we are dealing with here today. (Summary of the June 28, 1997 workshop, by Peter Pearse, chair of the scientific review panel)

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INTRODUCTION

The following report is a formal response to the GVRD's appointed scientific review panel's June 1997 draft background report, Protecting Vancouver's Water. As the review panel state in the Preface of their draft report, they wish to solicit comments and corrections from the public. As such, this report does not pretend to be a thorough response, but one which attempts to summarize some key issues, and to tell a few stories.

By way of background, since 1991 I have taken a self-funded interest in the history and management of the Greater Vancouver watersheds. As such, I have been an observer at the majority of Water Committee meetings since 1992. A five page letter evolved into a revised draft manuscript in April 1993, entitled "Wake Up Vancouver", available in the Greater Vancouver Public library system. I have also written a number of subsequent reports which are included in my reference section.

There are three occasions which I have directly quoted from public comments made by the Chair of the scientific review panel, Peter Pearse: one made during his 1976 commission on B.C.'s forest resources; and recent comments on a radio interview. These quotations are not meant to confront the Chair or the other panel members, but are simply comments relevant to the present inquiry, and I hope that they will be accepted and understood in that context.

There has been much justified public concern and confusion around the planning process for the first public workshop, held last June 28, 1997, on the Dominion Day long weekend. The public were never told about how the meeting would be conducted, and the introductory draft background report was not made available to the public participants until five days before the workshop. Initially, only previous watershed tour participants were invited to a limited seating workshop, a matter which was quickly altered to accommodate all of the public by Water District staff. In the future, as many workshop participants stated, there must be carefully planned meetings in which the public can participate in organizing, where future review panel reports will be distributed well in advance of future meetings, and there is adequate time for preparing written submissions. A disturbing element of the meeting, which was thankfully altered at the last moment, was that Water District staff had planned for the review panel to prepare recommendations for management policy to the GVRD Board for the end of July 1997, even though the review panel had no prior knowledge of this. Until written information from the ecological inventory consultants is released and carefully assessed, how could the Water District possibly have justified asking the panel to recommend a management philosophy?

The public meetings regarding the future management of our watersheds were originally scheduled to coincide with the release of information on the ecological inventory. So far, the Water District has not requested its ecological inventory consultants to produce technical reports on their methodology and findings. Without them, why was the first public workshop scheduled, and what did the public learn?

For the most part the panel had an opportunity to learn from the public. The majority of the public at the first workshop were very clear on a number of key issues, foremost of which, and repeatedly emphasized by applause, was their insistence of an end to logging in the watersheds. The public also urged that the GVRD request the ecological consultants to produce technical reports; that public interest groups be granted observer status and access to the watersheds, because on-the-ground information is critical to the public process; that the Amending Indenture be revised; and that a network of hydrometric stations be established in the watersheds. Hopefully, as Johnny Carline summarized the value of the workshop for the public participants, the scientific review panel “will be passing (their) views on to the politicians.”

Finally, the panel should re-title their draft report to “Protecting Greater Vancouver’s Water”, rather than “Vancouver’s Water”.

1. THE “PRIMARY PURPOSE” ARGUMENT

Some of the current provisions (of the Amending Indenture) do not necessarily encourage the GVWD to preserve and enhance water quality. To the contrary, they seem to present the GVWD with a constant dilemma of choosing between water quality protection and timber production to an AAC (Annual Allowable Cut) and sustained yield objectives. (August 1991, Final Summary Report, page 28)

The three Greater Vancouver watersheds, from the 1960’s onwards, have not been managed for “one primary purpose: to provide a clean and healthy water supply,” as the editor of the background draft report states. They used to be, that is from the late 1920’s until the early 1960’s, and we are still waiting for some clear direction from the GVRD Board on this matter. This “primary purpose” missionary statement was cleverly incorporated in a sustained yield logging contract with the

provincial government in 1967, called the Amending Indenture, to keep unsuspecting politicians confident. But that was not all the 1967 agreement was to accomplish:

... that the timber on the said lands should be managed on a sustained yield basis for the purpose of developing, protecting and improving the water-yielding characteristics of the lands.

How can you possibly develop, protect, and improve the “water yielding characteristics” all in the same breath? Out of the 27 clauses in the 1967 agreement, it is only after 23 clauses of logging jabber that the most important issue is raised:

That the parties hereto recognize that the highest priority in the management of the lands to which this amending Indenture applies must be given to water supply purposes, both in terms of quality and quantity of water and that the provisions of the forest management plan must be second to this objective. (Clause 24)

As wonderful as the primary directive may have appeased our politicians and the public, in reality it was impossible to maintain the primary purpose with the Water District’s previous commitment for an annual allowable cut.

From the 1960’s until the early 1990’s logging became the “primary” pursuit of the Water District in the watersheds. To conduct its new business operation, the Water District created its own forestry department to administer Tree Farm Licence #42, with logging plans annually inspected and five year plans routinely authorized by the Ministry of Forests. All undeveloped valleys were systematically scheduled for road building, and all accessible old growth forests in the designated “management zones”, which were redefined a number of times, were tabled for liquidation. Prior to the Water District’s logging program, there were no roads above the Seymour and Coquitlam watershed intakes in the 1960’s, and only one “tote” road in the Capilano to service B.C. Hydro’s transmission line. Since then, over 300 kilometers of roads were constructed. It is widely recognized in forestry research literature, and observed in thousands of valleys in this province, that roads in mountainous terrain alter and increase water runoff rates and destabilize soils, ingredients which often degrade stream channels downslope. Roads are often responsible for dramatic increases of sediments, and roads along steep terrain cause debris torrents and landslides.

In the early 1980’s municipal health officials and the Water District began receiving a number of complaints about dirty water, turbidity. Late autumn and winter storms were affecting roads, cutblocks, and remote areas in the watersheds, causing landslides and the movement of sediments into the reservoirs. After a water quality technical committee was struck to review these matters in 1985, the forestry department suddenly began reducing its cutblock sizes, despite their maintenance of the annual allowable cut. Had it not been for the processes which led up to the 1991 public review of watershed management, being the public informational campaign by the Western Canada Wilderness Committee which began in 1988, and the related attention received during the Coquitlam natural gas pipeline inquiry in 1989, the long term logging plan for the watersheds would still be in full swing. For instance, there were about 23 cutblocks scheduled for the Coquitlam watershed in 1993 alone. Just about 5000 hectares of prime old growth forests have been lost to roads and logging since the 1960’s.

Since 1967, “timber” became the “primary” consideration, and in many ways that mindset is still in effect, with three professional foresters in charge of watershed operations. Once the panel

recognizes the flaws in the “primary purpose” argument, and presents accurate information on the long term effects that logging practices will have to each of our reservoirs, and when many of these matters are finally mitigated, and when the District hires an ecologist and limnologist as part of their staff, only then will the primary purpose argument begin to become meaningful.

2. LOGGING ROADS, AND THE LINK TO TURBIDITY

Concerning water quality, technical literature has consistently indicated that road construction and maintenance activities may be major contributors to sediment production in forest activities. (August 1991 Final Summary Report, page 43)

The Panel concluded that the short and long term benefits of roads (allowing access for fire protection, water quality monitoring, forest surveillance and erosion control) far outweigh their relatively minor contribution to sediment and turbidity. (January 1991 *Draft Summary Report*, page 51)

The Panel found that the guidelines for developing the road system were not sufficiently documented or were lacking in some cases. (August 1991 *Final Summary Report*, page 43)

In summary, the Panel found that the GVWD is developing a good road system to provide access to remote areas within the watersheds. (Ibid., page 45)

The only way to get away from “debating” (page 2 of the scientific review panels’ draft report) to what degree turbidity is directly related to logging, which the panel describe as a critical issue in the watersheds (page 8), is to conduct a comprehensive and formal inquiry into this matter. Such an inquiry has been entirely avoided and is essential. Even the August 1991 *Final Summary Report* supports the essence of this concern:

The Panel did make a recommendation regarding implementing a comprehensive water quality monitoring program at key locations within the watersheds. Such a program would enable a better fingerprint of troublesome areas, would document water quality at specific project sites, and would enable GVWD to prioritize erosion control measures. (Page 21)

... the current water quality monitoring program does not focus on sub-drainages within the watershed.... (Page 58)

Expanded water quality monitoring is needed to better document impact of harvest operations. (Page 61)

However, in contrast to the 1991 panel’s recommendation, and recognition of there being no data for pinpointing the source of turbidity generation in the watersheds, the panel mysteriously concluded from long term turbidity data collected at the three reservoir intakes, that the data does “not suggest a correlation between harvesting practices and turbidity at the water intakes” (August 1991 *Final Summary Report*, page 39). This is not a scientific conclusion, so why did this statement appear in the report? Did, and how often did, members of the 1991 panel actually spend time in the managed areas of the watersheds, and if they did then what did they see, and where are their field notes? Did they spend time assessing situations during seasonal rainstorms and rain on snow events? Did they interview Water District staff and examine their files? Perhaps such an assessment

is being done through the ecological inventory, but no reports exist for the public's scrutiny on these matters.

In recent years Water District administrators have repeatedly denied the link between turbidity and logging, and it will be critical for the independent scientific review panel to present accurate, descriptive, and detailed information to both highlight and challenge the Water District on this controversial subject. For instance, the latest repeated refrain from Water District administrators is that there are "literally thousands" of natural slide gulleys in the three watersheds, and that sediments are naturally generated. The original source of this incantation is from 1994/95 map information in the Seymour watershed, computer modeling, which has been generated from data collected from their recently hired ecological inventory consultants. What the public do not hear is that we have had, and will continue to have, many problems in addition to the generally low and fluctuating natural background turbidity levels, problems which, because of cumulative disturbances to the natural hydrology from logging practices, are collectively unfolding in various areas in the watersheds. The only effective means by which the panel can begin to properly grasp and document this relationship is by numerous field trips to the watersheds, especially in the late Fall and winter months.

The discussion and investigations on the cumulative impacts of clearcut logging and roads to water quality and degradation in our watersheds has, from all the information I have already reviewed, been routinely generalized, denied, and tight-lipped. I will provide you with a number of examples of this, even though there are many more. The main problem that I have encountered in the last five years is that Water District staff have prevented members of the public from documenting information in the three watersheds (related to this of course, is public access to Water District files and reports). In fact, the public is held captive to information disseminated from Water District staff alone, information which is either entirely absent or uninformative. Such matters have seriously injured the Water District's credibility and created avenues of suspicion. During the June 28th public workshop with the scientific review panel, the public consistently stated, in the three workshop pods, that the Water District finally allow public interest groups access to monitor the watersheds.

EXAMPLE #1.

I have spent three consecutive years video documenting the erosion of glacial till and sensitive lacustrine clays from a very large outslope at Hurricane Creek on the Hollyburn road directly into the Capilano Reservoir, as well as a number of other problematic locations in the area (I presented a summary of my video information on May 20, 1997 to Water Commissioner Johnny Carline. Refer to Appendix A.). The Water District constructed and widened a road over the Capilano Timber Co.'s old railway bed in 1968, and exposed a number of sensitive till and clay banks, the largest of which has now evolved to 58 meters in slope length, at Hurricane Creek. These clays are particularly problematic for the Water District because they consist of extremely fine particles, or flour, which remain in a state of suspension in the reservoir for weeks on end. The total amount of sediments from this site alone has been substantial over the last ten or more years. The Water District hired Terrence Lewis in 1987 (see references) to analyze this matter, who described the site as having a "chronic erosion problem", and recommended immediate mitigation. For ten years the Water District has failed to act on his report and to properly mitigate the problem. I have written two reports on this area since early 1995, which included photographs of the area, and which I presented to the Water Committee and the GVRD Board (see references). A photograph and description of the site was also published in the North Shore News.

After I gave two presentations to the Burnaby Environment Committee in 1996 and 1997 about my research on the Hollyburn road, they supported my recommendation to deactivate the road and passed this resolution to Burnaby Council, who then passed it along to the Water Committee. In response, Water District forestry manager Bob Cavill provided a poor rebuttal to the Burnaby Environment Committee on June 17th, 1997, where he completely avoided the issue and summarized the years of cutslope erosion and road failures at Hurricane Creek as merely “tricky parts”. The Water District has still not publically admitted to the input of turbidity and have neglected mitigation of this site. Is water quality truly a “primary” concern here?

EXAMPLE #2.

Another example is from the erosion of extensive, steep, and sometimes very high cutslopes along the southern Eastcap valley logging road in the Capilano watershed. This year on June 21, I went on a visit to this site with the GVRD’s public watershed tours. The exposed cutslope walls along approximately three kilometers of road, which I have been concerned about for a number of years, had, despite numerous attempts at hydroseeding, slumped and unraveled from weathering during the recent winter and spring seasons. Recent hydroseeding was evident along the entire stretch of road, where seeds were pasted to cutslope walls. It was also obvious that Water District maintenance staff had recently removed accumulated sediments and materials from ditches beneath the cutslopes, scooped out sediments in well-established pre-culvert pools, and end-hauled the slumped debris off the road. Along the entire problematic length of road I did not once see a single silt fence in place. The only silt fence which I did note along the entire 22 kilometers of road from the Capilano security gate to Rogers Lake was at a scheduled tour stop beside the remaining Capilano concrete railway bridge support in the Capilano River. While traveling to our stop at Rogers Lake in the tour bus I noted many sections of the ditchline, on the western side of the Capilano River, where silt fences should have been placed.

The 1991 Final Summary Report review panel commented in general that roads do have drawbacks, but then argued that the Water District “has developed road planning, construction and maintenance techniques to minimize these risks” (sedimentation and turbidity). These risks were certainly not minimized on the Eastcap road. Not once did the Water District tour guide for the afternoon, the administrative director of the forestry department, Bob Cavill, describe or comment to the tour group about these cutslopes, their long-term problems, and their relationship to water quality. I was once again astounded by another tour guide’s utter silence on this matter. I consider this to be a classic example of how the public have been given selective information and education of watershed management by the Water District over the last few decades. Sediment input from roads and cutblocks in the watersheds doesn’t need to be “debated” (page 2) - it is a reality. Information on sediment input from logging activities in our watersheds has been consistently kept from the public, down-played, and denied by Water District staff.

EXAMPLE #3.

The panel should exercise caution about the methodology and conclusions on turbidity generation in reports from some Water District consultants. For instance, in the scientific review panel’s draft report, the statement about slope stability adjacent to the Capilano Reservoir:

The periodic landslides that carry these sediments into Capilano Reservoir were judged to be natural events, typical for that type of geological formation, and very difficult to control.

(Page 11, referring to the 1996 Thurber Engineering report on the October 1995 landslide into the Capilano Reservoir)

And the Chair's statement about the GVRD's consultants during a radio interview:

The controversy lies with respect to the management of the watersheds, and how the valleys up there and the forests are managed. The lightning rod is logging. And there is a strongly held view among a lot of people that logging is the cause of this occasional turbidity problem that we talked about. And indeed in past years the GVRD has logged up there quite heavily. It phased out the logging after 1991, and there is now no commercial logging going on in the watersheds. But some people believe that the turbidity problem is aggravated by past logging and they are concerned that it will start again. The problem with that is that the professional consultants that the GVRD has hired to analyze the causes of this turbidity have found that logging has not had a great deal to do with it. It's primarily a problem of the Capilano watershed, not the other two. And there is a geologic problem of silt deposits that have been left hanging in the valleys by retreating glaciers 10,000 years ago. And now we've dammed up the river and raised the level of the water up to those silt deposits, and we draw it down every summer, and it fills up every Fall, and it becomes quite unstable when the rains start, when the water is very low in the Fall, and it slushes the silt into the Reservoir, and causes this problem. And what we've got to do is to make sure that the planning system is capable of figuring out the causes of this turbidity, whether it's just natural landslides or its aggravated by logging, and what we can do to arrest it. (Peter Pearse, Vancouver radio station AM1040, June 30, 1997)

The Water District hired Thurber Engineering to evaluate why the disastrous October 1995 Capilano Reservoir landslide occurred, which shut down 40% of the Greater Vancouver population's water supply for about 6 months. The area investigated by Thurber had been extensively clearcut about 70 years ago. The steep slopes above the west side of the Capilano River, composed of sensitive clay soils, were exposed by the Capilano Timber Co. at that time, an event which was not "natural". The early logging history in the Capilano, and its associated long term impacts on the landscape, combined with more recent forestry activities, may account for why the Capilano has a reputation as having the highest frequencies of excess turbidity. Some of these evolving problems could have been addressed by the Water District years ago, had they not been so busy in planning for and logging in the watersheds.

Furthermore, the denial of the link between logging and turbidity is rooted in the Water District's forestry consultant's December 1956 forest inventory report, which made the following assessment of the long term repercussions from accelerated clearcut logging by the Capilano Timber Co.:

Investigations of the logged and/or burned areas in the Capilano Valley failed to show that erosion was appreciably increased by logging. (C.D. Schultz Co. Report, Chap. 5)

Descriptive historical comments on clearcut logging by the Capilano Timber Co. are strangely absent in Thurber's report, even though they had analyzed aerial photographs from the 1930's, which clearly show the destruction and degradation of steep mountain slopes. These historical accounts are presented in my December 1995 report, *Not Coming Clean*, matters which are necessary in understanding why the northwestern slopes and streams about the Reservoir may be experiencing so many problems. One of Thurber's principals, in charge of the Capilano landslide

investigation, had received and read my report in December 1995, but my report was not cited in the reference section of their draft and final reports.

EXAMPLE #4.

The 1991 Thurber report should also be approached with some caution. I believe that the most critical component of this report are conclusions rendered on the cause of a large landslide in the Seymour's Jamieson drainage. The landslide, which initiated in the northwestern sector of the steeply inclined 25 hectare cutblock, 2-79, in November 1990, and about 100 meters above a logging road, and six years after it had been clearcut, was interpreted by Thurber as unrelated to logging. Thurber deduced that the site (and 5 other sites which originated in cutblocks) was hydro-geologically stressed prior to logging, and that the slide would have occurred naturally. Their deduction is extremely hypothetical, and is simply too convenient. Five to six years, according to forest scientists, is the estimated time that denuded tree roots lose most of their soil binding characteristics, and is more likely the cause of the mass movement. This likely cause was, according to Thurber's executive summary, not a "critical role" in the landslide, later commenting in their report that:

Live tree roots undoubtedly provide a stabilizing influence on the surficial soil layer. Dead or decaying roots have reduced influence.... Deterioration of root strength may have had a role, but an uncertain one.... (Page 19)

The Jamieson landslide ripped through a standing forest below clearcut 2-79 and plummeted into the Jamieson Creek canyon where the coagulated mass formed a large dam, the dam was later breached by a wall of water forming behind it, the wall of water and debris tore through the narrow s-shaped canyon, then gouged a long section of stream channel, demolished a forest hydrology experimental weir station at the mouth of the creek, destroyed a bridge, eroded more stream channel on its way to the Seymour River, caused more destruction along the main Seymour River channel, and sediment and debris eventually emptied into the Seymour Reservoir where the public's water supply remained murky for weeks.

Cutblock 2-79 was part of a long term forest hydrology experiment which began in 1969 to monitor the associated effects of logging and road building in the watersheds. On November 9, 1988, UBC forest hydrology professor Doug Golding, who was in charge of the long term experiment since 1978, wrote the following analysis for the GVRD Water Committee, two years before the failure:

The results of the post-logging study (1984-1988) show no significant hydrological changes resulting from the harvest. The GVWD (Water District) can be fairly confident that their forest management creates no deleterious effects.

Almost one and a half years later, and eight months prior to the landslide, professor Golding, one of the appointed panel member of the GVRD's 1991 public review on the management of the watersheds, wrote the following in a letter to the editor:

The University's of B.C.'s faculty of forestry has been conducting an intensive hydrological research program in these watersheds for the last twenty years. We have measured sediment production in one of the sub-drainages for the eight years before and twelve years after timber harvesting began. There has been absolutely no increase in sediment. (March 6, 1990, page A14, Vancouver Sun)

When the Draft Summary Report on the forestry management appeared in January 1991, there was oddly no mention of the landslide in the report, despite the fact that the incident had received a lot of media attention in November 1990. The incident simply contradicted the findings of the review panel member Dr. Golding, which he had repeatedly and confidently stated in the past, and had once again summarized in the Draft Summary Report on pages 31 to 33. In Table S-9 of the Draft Report, it stated that there was “no significant difference” before and after logging in terms of sediment production, and that the experiment provided “confidence that more conservative harvesting practices being carried out in other areas of the watershed are not creating increased turbidity or other negative water quality impacts.” Thurber’s investigation on the landslide occurred between the publication of the 1991 Draft and Final Summary Reports, a time when the public were intensely debating watershed management issues. To have concluded that the widely publicized landslide was a direct result of logging would have humiliated the Water District during a critical public review, and would have seriously jeopardized the Water District’s ambition for future watershed logging.

Nine months after landslide 2-79, the panel concluded in their September 1991 Final Technical report, which once again repeated Golding’s conclusion:

... there was no evidence during the study to indicate that logging on Jamieson watershed increased erosion or bedload/sediment production. (Page V-28)

The panel conveniently relegated the occurrence of landslide 2-79 as being just outside of the research study period, stating that it “was not evaluated in the context of earlier work” (ibid.). This shoddy sort of logic provided a green light for the panel to make the following proclamation:

The Panel has found no compelling water quality reason to suspend the present timber harvesting program (Final Summary Report, page ES12)

... the Panel found no evidence to conclude that present harvesting practices have been a significant causative factor of excess turbidity in GVWD sources. (Ibid., page 40)

EXAMPLE #5.

After logging was being actively curtailed in the early 1990’s, the forestry department implemented a strategy around “stream stabilization” to provide both logging profits and employment. The Meech Creek project is the prime example of this.

During the 1982 Halloween storm, a landslide came down between Root and Meech Creeks in the southwestern corner of the Coquiltam watershed. During this time, some runoff had been diverted to the north of the slide into Meech Creek which eroded some of the steep clay banks, causing turbidity to enter the Reservoir. The area is still contributing turbidity during heavy rainstorms. Staff decided to place rip rap rock in a long section of Meech Creek, but didn’t fortify the area that was creating the turbidity. And in order to place the rip rap, two roads were constructed, with very wide right-of-ways, through very large stands of old western red cedar and douglas fir, which happened to provide the Water District a handsome timber profit. Some of these douglas firs are close to 300 feet tall, and one of the cedars was almost five meters in diameter. Ironically, to access the sites, both of the roads exposed clay soils, in particular the lower road, where a very large clay cutslope is prominent. When the rip rap was placed in the Creek, staff cut quite a number of “danger trees” along both sides of the Creek, being mostly enormous and sturdy douglas firs and some

healthy cedars. Many of these trees were fallen across the creek, destabilizing the opposite bank, and forcing materials into the creek area. These are some of the last and tallest douglas fir in Canada, one of which is recorded now at 310 feet in height, a Canadian record. According to the 1991-1995 management plan, which was rejected because of the 1991 public inquiry, this area was scheduled to be harvested in 1993. And it so happens that the upper rip rap access road had been constructed in almost the exact location as indicated on their management plan.

The five examples should provide the panel with additional perspectives on the issue of logging and turbidity. Certainly one of the attending myths that the panel should address is the constant notion, that because the Water District has stopped logging in the early 1990's the public should rest assured. The effects from logging in our watersheds will have long term impacts, impacts that will continue to affect our water quality.

3. LOGGING AND ITS IMPACTS ON OUR RESERVOIRS

Another critical dimension related to the logging activities in our watersheds is that our reservoirs are filling up more quickly with sediments and materials. The displacement of woody debris and duff, the erosion of sediments, the alteration of stream channels, and the movement of bedload, are all slowly working their way into our reservoirs. Almost all reservoirs have limited life spans, due to the accumulation of matter which, in time, effectively decreases storage capacity. The rate at which sediments accumulate in a basin is dependent on the amount of materials released and transported from above the reservoir. The rate of deposition usually increases over natural rates when we alter the landscape. The more we intervene and disturb the landscape, the greater the level of deposition. Eventually, when the reservoirs do fill up, we will be faced with either removing the accumulated materials and sediments, a matter which is not only financially prohibitive, but problematic in terms of the logistics of transferring materials to a dumping site, or to build another storage reservoir.

One of the earliest measured studies on the relationship between erosion, the settling of material, and the problems of turbidity in a reservoir was conducted in southwestern Oregon, the Hills Creek Reservoir Turbidity Study. The reasonably thorough study, published in late 1971, studied the nature of persistent turbidity problems in the reservoir with its effects to fish, wildlife, and recreation. The drainage basin is 389 square miles of mountainous terrain, with 610 miles of logging access roads (at that time), and thousands of acres of forest which had been conventionally removed. Landslides related to logging, road failures, cutbank slumps, and natural erosion problems were observed in the sub-drainages above the reservoir.

Roads and land slides are a major source of turbidity. The literature on sources of turbidity points out that the clear-cut areas produce substantial amounts of turbidity for the first two to three years, whereas the roads are continuous sources of turbidity. (Hills Creek Study, page 42)

During a four month period, between December 1970 and March 1971, it was estimated that 110 million pounds, or 1.1 million cubic feet, of sediment entered the Hills Creek Reservoir. The importance of the study was in the observation of the influx of materials above naturally induced rates which were rapidly affecting the holding capacity at the head of the reservoir, a condition which was increasing turbidity events. In turn, the effect that drawdown conditions of the reservoir

had on increasing turbidity levels, related to the erosion of deep sediment accumulations at the mouth of streams entering the reservoir from streamflow, were significant. These conditions are, in some ways, similar to the streamflow dynamics in the Capilano and Seymour reservoirs, where turbidity, generated at times from the delta formations at the mouth the rivers, is transported to each of the reservoir intakes.

In Capilano, the largest delta is of course that of the inflow Capilano River The range of flows in the Capilano River upstream of the lake were selected for late fall and early winter. This period is when increasing amounts of rainfall cause river flows to increase and disturb deltaic zones around the lake, thus raising the potential for particulate resuspension. (Page 24, Limnotek)

Some high turbidity events at the intake occurred with a combination of relatively low drawdowns.... suggesting that turbidity may be reduced if Capilano is kept near its full supply level. This analysis also suggests that exposure of the drawdown zone at relatively high river flows greatly increases the risk of a turbidity event. (Ibid., page 27)

The Coquitlam reservoir, however, is distinctly different from its neighbors, mainly because it is much deeper, and that currents transporting debris and sediments are pulled toward the diversion tunnel into Buntzen Reservoir, which means that turbidity levels essentially bypass the relatively small current associated with the Coquitlam intake, a relationship which is not generally understood. Water quality from the Coquitlam Reservoir has always had the best reputation in relation to the other two reservoirs, mainly because of the diversion tunnel. Not too long in the future, the GVRD will be using more of its inherent water rights in the Coquitlam Reservoir, meaning that the 'current' relationship will be somewhat altered, and will then undoubtedly tend to raise the historically low turbidity levels for its consumers.

In late 1991 and early 1992 the Capilano Reservoir was lowered by some 25 meters, during which time the large delta at the mouth of the Capilano River was inspected by Thurber Engineering and Limnotek consultants. Estimates of the amount of exposed deposition at the delta was "roughly" calculated, and estimates of the amount of material eroded by the Capilano River through its delta, as the water table lowered, were made as well:

Within the two weeks required for the total drawdown, a large zone of organic and inorganic deltaic material at the north end of Capilano Lake became exposed. The amount of this material has been roughly estimated to be 500,000 cubic meters (R. Gerath, Thurber Engineering Ltd. Pers. Comm.) ... With this material exposed, the Capilano River eroded a path that roughly conformed to the original river channel before impoundment (Gerard and Smith, 1993). Sediment and other debris that had accumulated in this path since any previous exposure was resuspended, a process that continued for about four weeks; the time required for water flow to cut a path to cobble and boulder substrata that formed the original river channel. Field visits confirmed that the river cut a channel up to 2.5 meters deep through the deposited material. (Page 34, Limnotek)

Four years later, after the large and silty landslide into the Capilano Reservoir in October 1995, the Water District shut off the water intake for almost 25 weeks, and once again lowered the reservoir, this time to flush out the suspended sediments and to allow vehicular access to repair the site. During the drawdown period, materials which had accumulated at the mouth of the Capilano River were once again eroded by the river flow as it cut down farther into the annual deposits, carrying

sediments downstream into the reservoir and out into the Capilano River south of the dam. For months thick and brown turbid Capilano water was emptying into Burrard Inlet. It is not known if the Water District had permission from the Department of Fisheries and Oceans to discharge excessive turbidity into a fish bearing river and the Burrard Inlet.

4. TURBIDITY AS A HEALTH AND COST ISSUE

Turbidity is initially described by the panel as an aesthetic issue, which it is not:

The GVRD considers this occasional turbidity its most serious water-quality problem - not for health reasons - but because it presents an esthetic problem. (page 7)

Similar emphasis was also recently restated to the public during a radio interview:

Basically it is not a health problem, because it is simply sediment. And we do add a little bit more chlorine to the water when that happens because bacteria can cling to the particles of this very fine sediment. But the public health officials and doctors keep assuring us that it is not a health problem, don't worry about it, in fact some say it's good for you, it's got minerals in it. (June 30, 1997, interview of Peter Pearse on Vancouver radio station AM-1040)

However, the panel's draft document is inconsistent on this matter:

Waterborne diseases can be controlled by chlorine disinfection when water turbidity is low and by ozone or biological filtration at higher turbidity. (Page 15)

The information on turbidity as not being a health issue conflicts with the Greater Vancouver Water District's own information, summarized in the following report by Water District's chief engineer, John Morse, to the GVRD Board, April 26, 1989:

Turbidity itself does not present an immediate risk, but does present a problem if there are bacteria present in the system. To control this event, chlorine is used to attack the micro-organisms. However, turbidity can shield the bacteria and make it difficult for chlorine to act, and depending upon the type of material, organic or inorganic, the effect on chlorine varies. It is generally understood that organic matter (such as dirt in the water) will have less effect on chlorine than will organic matter. However, there are concerns as to the water quality if high turbidity levels coincide with the presence of Giardia contamination or other bacterial presence in the water supply. Chlorine will not be effective and bacteria will not be removed from the system.

The 1991 Final Summary Report also recognizes turbidity as a health issue. For instance Table S-2 on page 19 summarizes that "high turbidity reduces the effectiveness of disinfection", and on page 20 that "turbidity is important to drinking water from both health and aesthetic standpoints".

The panel, in discussing turbidity as a health issue, should examine the scientific literature (refer to the reference section for some examples), and cite appropriate references.

Turbidity is an additional concern to municipalities because sediments accumulate in the water distribution system where their presence induces bacterial growth. Flushing of water mains to remove sediments is an extremely expensive procedure, and is yet another economic burden to taxpayers.

5. THE ISSUE OF PUBLIC ACCESS, PUBLIC RECREATION

The panel's background report raises the issue of public recreation (page 13), an issue which has been strongly rejected by the Water District since the 1920's. The issue of public access, roads, industrial activities, and recreation were addressed by the Water District after it was established in February 1926. Public access was restricted in order to prevent the spread of human fecal contamination to the water supply, the risk of escaped campfires burning the watershed forests, and from industrial activities damaging the forests and threatening water quality. The Water District had a right to be concerned about fires, especially since the Capilano Timber Co. started 37 fires during their 14 years of occupation, the largest of which burned some 3200 acres in the summer of 1925. During the controversial years when the Capilano Timber Co. was finishing its operations up until 1931, health officials monitored all company employees through blood tests, and the company had to respect very rigid guidelines regarding all waste products. When the company left the valley, all railway lines were removed. In 1930 the Water District got the provincial government to pass legislation banning mining from the watersheds. During the second world war, armed guards prevented all public access to the watersheds to prevent potential enemy sabotage of the water supply. And from the 1920's until about the 1960's, the Water District made a special provision to organized hiking clubs, whereby Water District staff would escort groups, who were all blood tested, to mountain peaks a few times a year, as in the Capilano watershed. This program ended around the time that logging began in the watersheds.

The early Water District administration were extremely proud about their exclusive control and protection of the watersheds from both logging and public access. These views, for instance, are summarized in a 30 page brief by Water District Commissioner T.V. Berry, who defended against the proposal for a public highway in the Capilano watershed:

It will be virtually impossible to repel the pressure that will be put later on the Water District and the Provincial Government to permit the area to be used for fishing, hiking, mountaineering and picnic parties.... It will be very difficult to prevent the exclusion of logging and other industrial activities once a road traverses it. At the moment as you know, the catchment area is free from encroachment by certain provisions given in the Forest Act, the Mineral Act and the Game Act. In my travels in the East and the West of both the United States and Canada, there are many communities that think we are very fortunate to have 225 square miles of catchment area free of human occupancy, activity and encroachment of industry.

It has been charged by some people, who in most cases are motivated by self-interest, that the policy of the Water District since its inception in keeping the area isolated from travel and recreation has been one of extreme caution by "over zealous officials". The answer to this irresponsible suggestion is that in the twenty-eight years of administration of 225 square miles of watershed area, the District's assets have been preserved from pollution and loss by fire. It has been suggested also, that some "compromise" should be available. There is no

compromise with a burned-out valley or a polluted water. (Proposed Public Highway Through the Capilano, February 15, 1954)

In 1976, the Chair, Peter Pearse, on page 186 in volume one of his 1976 commission, “Timber Rights and Forest Policy in B.C.”, formally recommended that the GVRD Board consider the idea of public recreation in the Greater Vancouver watersheds:

Presently, public access into these areas is tightly restricted, apparently to protect water quality; but expert opinion suggests that withholding recreational access on these grounds cannot be easily justified, and that municipal watersheds should not be regarded as “sacred groves” from which recreation must be excluded.... The relevance for the present discussion is that these two watersheds contain some of the last remaining stands of old-growth timber within easy reach of these population centres, and a strong case can be made for preserving examples of these stands for public education and enjoyment. In both cases, however, the old-growth timber is being liquidated under harvesting plans. I strongly recommend that the Regional District Boards initiate a reassessment of both the restrictions on access to these lands and the liquidation of the remaining old-growth timber.

From February to March 1977, the Water Committee and the Board dealt with Pearse’s recommendation, and even hired a consultant to produce a report on the matter:

The Water and Waste Committee had considered a section from the Pearse Report of 1976, recommending that Municipal watersheds be made available for public recreation purposes and that Regional District Boards initiate a reassessment of restrictions.... It is recommended that, in view of the Pearse Report recommendation, an in-depth review be made of the policy on the watershed area for all uses. (Administration Board, February 23, 1977)

The Water District consultant’s report summarized that if the Board should accept public access that it would have to construct an expensive filtration plant to mitigate the direct possibility of human bacteria in the water supply system:

If the watersheds are opened up for public recreation the first of the barriers noted above - “the near exclusion of people” would no longer apply. The only protection remaining would then be chlorination of the raw water. Screening is not in itself a protection since small particles, which can pass through the screens, can contain large numbers of bacteria. Increasing chlorine dosages moreover would not guarantee adequate increased protection since any gross pollution particles passing the screens would not necessarily be reduced in size so that the chlorine could act on bacteria and viruses contained within, nor may the contact time be sufficient to enable the necessary reactions to take place before the water were ingested.

In order to restore an adequate degree of protection to the consumer another ‘barrier’ should be introduced to replace that which would be removed by permitting general access to the watersheds. With the available technology the only practicable ‘barrier’ would be the provision of a plant to filter the water combined with an effective level of disinfection. (Report to the Greater Vancouver Water District on Probable Consequences of Opening Watersheds to Public Access. Ker, Priestman & Associates Ltd., March 1977.)

The Water and Waste Committee abided by their original policy to exclude public recreation, and also dealt with the added recommendation by Pearse to protect some of the old growth forests from logging:

It is our understanding from communications received from the public that the maintenance of a premium quality in our water is valued very highly. There is no doubt that the opening of the watersheds to the public would require degradation of the high quality the consumers in the area now enjoy.

Until 1961 the forests in the watershed were left virtually untouched.... For the most part, the watershed lands, or at least the accessible parts, were logged off by the early part of the 1920's. Thus there are no stands of old growth timber accessible to the public even if they were permitted into the watersheds.

As far as public access is concerned there does not appear to be any reason at this time for departing from the policy followed from the District's inception in reserving the watershed lands for water supply use and the exclusion, insofar as it can be carried out, of all individuals seeking entry for other purposes or uses.

As far as forest management is concerned, there does not appear any reason at this time to vary the program undertaken in 1961 to replace the mature and decadent forest cover with young thrifty stands of growing timber. (March 16, 1977, Water and Waste Committee)

Of course, we know that there is, or should I say, were, a lot of old growth forests very accessible to the public in the watersheds along their recently constructed road systems, forests which were being systematically logged. That is not to suggest that the watersheds should be opened to the public, it is merely a matter of the truth. Why the Committee stated that there was no accessible old growth in the watersheds was no doubt related to informational direction from staff at the forestry department. The forestry department did not want the public to see the magnificent old growth forests it was destroying, as it would start to raise alarm bells. For instance:

It is our concern that a provision for public involvement [to comment on forest development plans] will lead to a vociferous minority bringing out issues not related to the Working Plan and not consistent with our obligation to provide potable water to the inhabitants of the Greater Vancouver area. We wish to maintain a low key in our watershed management program.... (Correspondence from forestry manager Ed Hamaguchi, to the provincial chief forester Bill Young, July 13, 1979)

Ironically, of course, the Committee's concerns about water quality and access were being simultaneously transgressed by logging activities, and for access to people conducting the logging operations.

Our three watersheds are quite unique in that they have the only remaining low to mid-elevation antique stands of forests in the Lower Mainland. Our old growth forests are our assets, which were carefully handed down to us from visionary Water District administrators in the 1920's. These forests are invaluable in terms of their research possibilities, their heritage, their contribution to water quality and water runoff, and in terms of wildlife habitat. How we are going to recognize this, and to constructively deal with it as a public access issue, remains to be seen. The early Water

District officials were quite wise about many things. So, before the panel considers this possibility, they need to consider a lot of information on this matter.

The panel has stated that the off-catchment lands, that is the Or Creek drainage in the Coquitlam, and the Lower Seymour, or Seymour Demonstration Forest, will not be dealt with. I think that the panel should address these areas in relation to public recreation because they are part of the Water District's lease and private lands in the watersheds. The consideration of these areas as future public parks are very high in the public's interest (Refer to the *Seymourgate* document in this Website).

6. THE NECESSITY OF ECOLOGICAL INVENTORY REPORTS

As I have already briefly stated, one of the main recommendations from the June 28th public workshop was to have technical reports on the ecological inventory. This important request was actually brought to the attention of the Water District and the Water Committee about one and a half years ago by the Regional Water Advisory Committee (RWAC). RWAC, which is composed of 15 members, was formed by the Water District in 1992, just after the establishment of the ecological inventory, to solicit the input and advice of public representation on important matters regarding our water, which includes watershed management issues. And for no apparent reason the RWAC have not been asked to be involved in the planning of this present scientific review process, though they were asked for direction in the important 1994 public debate on chloramine as a disinfectant. During that process a number of public meetings were held in various locations throughout the Greater Vancouver area.

I recall the first time that the ecological inventory team and the Water District's Project Manager for the ecological inventory, Tom Griffing, presented information on their findings to the public during a GIS conference in downtown Vancouver on the afternoon of March 29th, 1995. I also recall how the Project Manager, moments before the meeting, marched in my direction and unsuccessfully ordered me not to video tape their presentation. If this is truly a public process, funded by public taxpayers, now to the tune of over three million dollars, then why are we being short-changed on this project?

On October 4, 1995, I sent an open letter to the GVRD Water Committee members regarding recent announcements about a planning process for public involvement in the ecological inventory. I recounted information I presented on this subject in my August 1995 critique, *Misinforming the Public*, wherein I provided two options:

- (a) For the public to evaluate the reports and data from the ecological inventory consultants by technical experts of their choosing BEFORE any management decisions are considered and proposed by the forestry department. Public involvement of such a critical issue should in hindsight not be relegated solely to the forestry department's interpretation of the data.
- (b) That the GVRD engage in public panel discussions similar to those conducted on water treatment in 1994 (in each municipality), rather than a process which might simply become an open house format. Adequate funding for both these processes should be required by the GVRD. (*Misinforming the Public*, page 15)

On November 22, 1995, the RWAC met to discuss matters relating to the ecological inventory (the meeting was recorded and transcribed by a hired consultant). In fact, almost all of the ecological

inventory consultants were there to give presentations and to field questions. The only written information provided to the RWAC was the November 1995, 15 page summary draft report (it still remains in this draft form), entitled GVRD Seymour Watershed Ecological Inventory. Despite the fact that most of the RWAC had not read nor received the report prior to the meeting, the committee recommended that the Water District provide full technical reports. On January 26, 1996, I sent a two page letter to Water District Manager John Morse about the meeting, and the RWAC's request for full technical reports. The letter was cc'd. to many municipal and some provincial representatives, public advocacy groups, legal institutions, and the press:

A number of the (RWAC) Committee members asked if there was any other documentation to support the brief fifteen page Summary Report, and then specifically recommended that each of the Ecological Inventory Team provide a full report on their field work and findings. These members stressed the necessity of a full report as a basic requirement which would be available to inform interested members of the public on the methodology, various investigations, and conclusions briefly mentioned in the Summary Report. The coordinator of the Ecological Team, Scott Hanna, responded that the Team members could not prepare a full report unless their client, the Greater Vancouver Water District, specifically requests it.

A full report would allow for a lengthy clarification on a number of important matters and concepts behind the field work conducted over the past three years. Each of the component inventories - forest hydrology, terrain stability, forest species cover and age classification, fire history, and forest health - should be comprehensively documented by each of the team consultants. Matters such as the methodology used for field investigations, total time each of the team members spent in the field, which areas of the Seymour were and were not visited, how much of the time was spent interpreting information from air photos, reference material, and a summary of their findings, should be required. For instance, the March 1993 Seymour Pilot Study, which was to be the litmus test for the ecological inventory, was 221 pages in length, and included discussions on many of the items mentioned above. (Will Koop, correspondence dated January 26, 1996, two pages)

As the review panel can clearly see, the issue of technical reports was presented to the GVRD long ago. And yet, why have the ecological inventory consultants not been requested to present technical reports, despite a public advisory committee's recommendations to do so? The panel should be reminded that at that time, in early 1996, the public were expecting the first round of public input and meetings on the future management of our watersheds, a matter which was once again deferred to the present time. Ideally, there should be a separate inquiry into this matter, relating to why the RWAC has not been involved in the present process, and why the Water District has not asked its consultants for technical reports.

Since the release of the Pilot Ecological Inventory Study in 1993, the Water District has not given the public a formal opportunity to meet with the ecological inventory consultants. Such a forum, which would allow the consultants time to make presentations, followed by adequate time to field questions from the audience, and the opportunity to follow up with written comments and responses, should have been held long ago.

7. GREATER VANCOUVER WATERSHEDS HISTORY

That the alienated timber in the [Capilano and Seymour] watershed should be completely controlled by those responsible for the supply of water to the Cities and Districts concerned is beyond question.” “The pre-eminent object to be attained is the maintenance of an adequate supply of pure (i.e. unpolluted) water - all other considerations are subordinate: and to that end the watershed should be preserved inviolate. (E.A. Cleveland, The Question of Joint Control of Water Supply to the Cities and Municipalities on Burrard Inlet, October 1922, pages 92, 93.)

The District’s policy is to preserve all the timber both commercially loggable and otherwise in the watersheds for the conservation of the run-off and to preserve the area from human occupation either temporary or permanent.... I would not attempt to set a value on the watershed lands in the Coquitlam, Seymour and Capilano watersheds as they constitute an almost invaluable asset of the District permitting the complete and entire control of the purity of the water supply for all time so that neither now nor in the future will filtration or sterilization of the water be required. (E.A. Cleveland, First Water District Commissioner, correspondence, December 16th, 1936.)

From 1926 to the 1950’s, Water District officials, with the support of municipal politicians, ardently maintained their policy to protect the watersheds from logging, and fought off many attempts by industry and the government to change that policy over subsequent years. The events which led up to that policy were one of the most interesting and intense debates on forest resource issues in the early part of this century. However, in the 1960’s Water District officials took a sudden and strange turn from the 1926 policy. There is no doubt that the Greater Vancouver Water District has, since the 1960’s, essentially distanced and purged itself from its earlier era and original mandate which protected the watersheds from logging. This is reflected in the treatment, revision, and categorical avoidance of this historical era by Water District staff over the last thirty or more years. Examples of this are evident in many Water District reports, correspondence, and in the dissemination of public educational information.

For instance, there is little to absolutely no information on why the Water District was formed in 1926, and why and who protected the watersheds from logging proposals. The Water District has defended its public image on logging in the watersheds so often through its own interpretation of history that many members of the public now believe and blindly recite those doctored messages. And this is not unique to the Greater Vancouver Water District. Similar revisionistic accounts have also been carefully and carelessly manipulated in a number of other cities in both British Columbia and the United States, where the controversy of logging has occurred in municipal water supplies. It is to the point where public information from municipal government agencies cannot be relied upon, a situation which necessitates careful historical research and footnoting.

For example, the following quote from the 1991 Final Summary Report:

When the Water District was formed in the 1920’s, the GVWD did not inherit pristine watersheds in their natural states. To the contrary, significant areas of the watersheds had been logged and burned.... page 8.

A significant area of the lower Capilano watershed was logged in the early part of this century, and the lower half of the Seymour Demonstration Forest area was. The Coquitlam watershed was never

logged at all, except for small fragments near the intake area, because the Coquitlam was protected from logging by a 1910 federal order-in-council, amended in 1942 by a 999 year lease. This historical fact has never been alluded to in any of the Water District literature since 1931. Why not? The Seymour watershed was not logged above its present water intake at the Seymour Reservoir, including most of the valley bottom north of Hydraulic Creek to the present dam. The upper Capilano sub-drainages, Healmond, Hesketh, Eastcap, Daniels, Enchantment, and Andrews valleys were never logged, although the main Capilano valley was extensively logged south of Daniels Creek.

Doug MacKay, a former Water District commissioner and chief engineer, also made the same comment in an article he submitted to the Vancouver Sun on February 26th, 1992:

Also, the impression has been left that the watersheds are pristine areas of old-growth forest. The fact is that in the last century and the early part of this century the watersheds, along with most of the North Shore, were extensively logged and burned.

MacKay had been with the Water District for over twenty years, and didn't he understand its history? Why is this information being presented to the public in this form? Is it bad research, is it guesswork, or is it calculated? If people were to learn that most of our watersheds were "pristine" prior to the 1960's, and if they were reminded about why they were left in such a state, and if the public really understood the magnificent forests that were recently logged, then the public 'might just' criticize the intentions of the Water District. The public relies on its administrators to provide information on the watersheds, and if this information is twisted and distorted, for whatever purpose, then the public not only loses confidence in its administrators, but also loses a lifelong appreciation of its own local history.

The chronological outline of the last one hundred years of watershed history in the panel's draft report (pages 8 to 16) is almost entirely copied from a similar outline in the Water District's 1995 booklet *Protecting a Precious Resource*, and was obviously not written by the panel. The panel, especially as independent review members who have allowed this information to be included in their draft report, should observe great caution about historical information and interpretations on our watersheds from Water District staff. In my August 1995 report, *Misinforming the Public*, I wrote a brief critique of the Water District's watershed management booklet's historical outline and provided a number of important historical facts missing from the Water District's extremely selective and interpretive chronology. I will do the same again.

But before I do so, I would like to comment on some of the matters mentioned in the Water District's historical outline.

1936-1961. Where is the information in the Water District's historical files which supports this interpretation, that a serious forest infestation, for 15 years, gave the Water District anxiety attacks? The hemlock looper attack in the mid-1930's, in a area south of the present Seymour dam, was abated. The only other insect that arrived in this time period was initially detected in 1959, the balsam woolly aphid, an introduced predator. The review panel should obtain all original information from Water District files on the actual nature and extent of the infestation and damage to the watersheds from the woolly aphid, and present that to the public.

1962. The panel should obtain all the information from the Water District, including aerial photographs, showing the “major timber blowdown in all three watersheds” from Typhoon Frieda.

1967. The characterization of the original Indenture as not having “recognized active management of the land and forest for watershed purposes” is twisting the reason the Indenture for Crown lands was negotiated with the provincial government in 1927. The Indenture, and the accompanying Water District policy, was established to prevent logging, and “recognized” the repercussions that logging would have.

ADDITIONAL INFORMATION ON THE WATERSHEDS TIMELINE.

Late 1880’s. First water intake constructed at the mouth of Coquitlam Lake.

1905. First small dam constructed on the mouth of Coquitlam Lake by the B.C. Electric Railway Co. Water is illegally diverted from Coquitlam Lake to Buntzen Lake, contravening federal legislation, to provide water for their hydro electric plant on Indian Arm, and the first hydro electricity to the population of Greater Vancouver.

1910. Federal order-in-council protects the undeveloped Coquitlam watershed from all logging.

1913. After years of controversial public acceptance of a new 70 foot dam, and after a court case with the City of New Westminster, the dam replaces the original dam at the mouth of Coquitlam Lake.

1918-1931. The Seattle-based Capilano Timber Co. constructs railway corridors and clearcuts most of the lower Capilano watershed. The public are upset about the logging activities and protest for many years.

1922. E.A. Cleveland, the provincial Water Comptroller, presents his report, The Question of Joint Control of Water Supply to the Cities and Municipalities on Burrard Inlet, on the Capilano and Seymour watersheds, to the Minister of Lands and Forests, T.D. Pattullo, in October. Because of concerns from Cleveland’s ministry, and from politicians and citizens, Cleveland advises that the Greater Vancouver municipalities gain control of Crown and private lands in order to protect them from being logged.

1925. The 3200 acre forest fire started by the Capilano Timber Co. is the catalyst for the formation of the Greater Vancouver Water District, and the protection of the watersheds from logging.

1926. The Greater Vancouver Water District is formed on February 3rd (the Greater Vancouver Water District Act was passed by the province in late 1924). Legislation is passed by the province in 1927 for a 999 year lease for Crown lands in the Capilano and Seymour watersheds, to gain control of these lands against future logging [the lease was not negotiated in 1930, as stated in the panel’s chronology]. E.A. Cleveland, the former provincial Water Rights Comptroller, is the Commissioner of the Water District from 1926 to 1952. Cleveland consistently enforces the Water District’s mandate against logging.

1930. The provincial government passes legislation on March 25th to protect the Seymour and Capilano watersheds from mining: “An Act Creating a Mineral Reserve within the Watershed Area of Greater Vancouver Water District.”

1931. The Water District negotiates with the City of New Westminster to incorporate the Coquitlam watershed in its administration. The Capilano Timber Co. stops its commercial logging in the Capilano.

1942. After the Water District discovers that the Ministry of Forests permitted a timber sale in the Coquitlam, in the Root and Meech Creek area, without approval from the Water District, the Water District obtains a 999 year lease for the Coquitlam watershed, replacing the 1910 federal order-in-council.

1951-1954. The Howe Sound Highway Committee lobbies the provincial government for a highway through the Capilano watershed. Commissioner Cleveland and Berry, with passionate and detailed reports, and the support of all the municipalities, successfully defend the watershed from an intense lobby. They both comment on the negative effects roads would have in the watersheds.

1953-1956. The Water District hires the C.D. Schultz Co. to conduct an inventory of the watersheds. The Schultz Co. finalizes a two volume report in December 1956, and recommends the Water District commercially log the watersheds, and to begin logging in the off-catchment lands. The report is not accepted at that time.

1958-1960. Construction of the Seymour dam and clearing of the reservoir site. In 1959 the Water District’s first forester discovers the balsam woolly aphid, and recommends clearcutting the Water District’s private lands in the Lower Seymour valley.

1961-1966. The Water District logs the mixed old growth forests on its private lands in the Seymour and Capilano, to combat the balsam woolly aphid. In 1963, Commissioner Berry sends a letter to the Minister of Lands and Forests to request that they change their 1927 agreement to allow commercial logging in the watersheds for profit. For four years the Water District and the Minister of Lands and Forests negotiate an agreement for a tree farm licence.

1967. In March the province passes legislation to allow commercial logging. Politicians are told that logging would be minimal.

1969. The UBC forest hydrology paired basin experiment in the upper Seymour valley begins. The experiment, with a control and treatment drainage, is meant to measure the effects of logging to water runoff, water chemistry, and water quality in the Greater Vancouver watersheds. Consistent funding from logging revenues is provided by the Water District. The experiment continues until the early 1990’s. No final technical report is produced, and all historical files are finally discarded by former UBC forest hydrologist supervisor, Doug Golding.

1985. The Seymour Advisory Committee, comprised mostly of professional foresters for logging interests, is formed to counteract a proposal to establish a public park in the Lower Seymour area. The former chief forester for the province, Bill Young, is the first chairman of the Committee. The Advisory Committee later name the area the “Seymour Demonstration Forest”. The Committee quietly endorse proposals for continued logging of the Lower Seymour.

1989. The province proposes a natural gas pipeline through the Coquitlam watershed. Opposition from the GVRD Board forces the government to hold an inquiry and appoint a former Water District Commissioner, Doug MacKay, to chair the commission. Weak arguments by the Water District's chief engineer, which scores big points for the gas company's proposal, allows the gas pipeline to be built. The mayors are furious.

1992-1997. After spending over 3 million dollars of taxpayer's money on the ecological inventory in the watersheds, there are still no technical reports for public scrutiny, despite a recommendation from the Regional Water Advisory Committee to do so in November 1995.

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APPENDIX A - HOLLYBURN ROAD VIDEO COMPILATION: THE AREA AT AND NEAR TO HURRICANE CREEK. COMPILED BY WILL KOOP, AS ORIGINALLY PRESENTED TO THE BURNABY ENVIRONMENT COMMITTEE ON FEBRUARY 11TH, 1997. PRESENTED TO JOHNNY CARLINE ON MAY 20TH 1997.

Descriptions of video sequence in relation to running time in terms of minutes.

1. Video taken on February 26, 1995. 0:00 - 5:44. - Shows rain-on-snow washout of Hollyburn road immediately south of Hurricane Creek and debris on road below steep cutslopes.
2. Video taken on October 14, 1996. 5:45 - 6:38. - Shows high water flow on Hurricane Creek.
3. Video taken on February 10, 1996. 6:39 - 9:40. - Demonstrates annual pattern of debris below cutslope.
4. Video taken on October 14, 1996. 9:41- 10:50. - Shows waterfall over cutslope.
5. Video taken on November 27, 1996. 10:51 - 14:16. - Closeup and examination of cutslope.
6. Video taken on February 1, 1997. 14:17 - 26:15. - Demonstrates conclusively the annual problem. - Demonstrates second cutslope north of Hurricane Creek area.
7. Video taken on October 14, 1996. 26:16 - 28:45. - Demonstrates the annual accumulation of fine sediments in ditch.
8. Video taken on October 14, 1996. 28:46 - 30:23. - Cutslope problems at switchback north of Hurricane Creek.
9. Video taken on February 3, 1997. 30:24 - 34:17. - Shows problems of cutslope just south of bridge, area below video.