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May 14, 2004

Environmental Appeal Board
4th Floor, 747 Fort Street,
PO Box 9425 STN PROV GOVT
Victoria, British Columbia

Attention: Alan Andison

Dear Mr. Andison;

Re: File No.:2002-Wat-003/004

Water Act Appeal of Two Water Licenses CWL119342 and CWL119338
And Stay Application:

CWL119342 replaces CWL 62623 issued March 24, 1972 for 4,015,000 gallons (the 1972 license).

CWL119338 replaces CWL17626 issued March 15, 1946 for 7,300,000 gallons. (the 1946 license).

Total gallons: 11,315,000 gallons.

Accompanying this letter is the report of Dr. Brian Guy, dated May14, 2004 which addresses a number of issues raised in the rebuttal material filed on April 23, 2004.

Issues

1. Objectors

In response to the letter of April 22, 2004 from LWBC listing objectors, I have been retained by Karl Uhrle, Frank and Caron Hawrychuk, , Ronald and Carla Knight and a host of others who have land on the lake or are water users. I have signed authorizations from these people. Sharon and Brian Croft are working cooperatively with AAQWA which is the grass roots community organization representing people with an interest in this matter. Sharon and Brian Croft are members of AAQWA.

2. Prior use

LWBC erred in assuming both licenses were in current use.

2.1 Both licenses were transferred from Whittaker to Garden Bay Waterworks in 1983.

- 2.2 Garden Bay has never had any equipment in Hotel Lake to use the two licenses and thus there has never been any prior use of these two licenses by Garden Bay Waterworks.

Refer to the affidavit of Joe Harrison dated, signed and sworn May 8, 2004. Joe Harrison was the Director for Area A of the SCRCD from 1978 to 1982, President of the Pender Harbour Rate Payers Association from 1977 to 1995 and is currently a Director of the Sunshine Coast Conservation Society.

The Harrison affidavit states that on May 5, 2004, the current Area A Director, John Rees told a public meeting of the Sunshine Coast Conservation Society that "Garden Bay Waterworks" have never had any equipment on Hotel Lake that would allow water to be pumped from Hotel Lake".

- 2.3 The 1946 license was issued to operate a pelton wheel which is a device to generate electricity. This license was used until hydro came to Pender Harbour some time in the 1950's. It has not been used since.
- 2.4 The 1972 license supplied water via a wooden stave (pipe) and tank located on the Whittaker properties. At some time prior to 1983 the license was discontinued when the Whittaker properties were hooked up to the Garden Bay Waterworks district and the tank was removed. Refer to the affidavit of Nina Whittaker dated, signed and sworn May 8, 2004. Nina Whittaker has lived on the Whittaker property since 1966.

3. Assumption that Water is Available at time of transfer of licenses.

LWBC erred in assuming "that water is available" when they transferred the two licenses by assuming the two transferred licenses were in use and that the water was already being drawn from Hotel Lake. See email of Bob Herath dated March 22, 2004 addressed to Brian Croft attached as Exhibit A to the affidavit of Joe Harrison.

The error was compounded by then following their policy not to revisit decisions on already issued licenses unless there is new scientific evidence. However the decision to issue the 1946 license was primarily to supply water to generate electricity. When hydro took over responsibility for the supply of electricity the use of the license ceased.

The 1972 license became inactive for when Garden Bay Waterworks took over the supply of water to the Whittaker property and the license became inactive and was no longer required.

4. Absence of New Scientific Evidence

BCLW erred in assuming there was no new scientific evidence to consider and making the decision to transfer the licenses in a vacuum by relying on conditions at the time of grant and ignoring the environmental changes and new science since that time.. Since the date of grant of the two licenses in 1946 and 1972, there are issues of greenhouse warming and increasing temperatures, climate change, drier and hotter summers and wetter winters. BCLW also ignored the loss of water by seepage from the lake to the aquifer which is new science not considered when the licenses were initially issued.

5. Sources of Water Loss and Drawdown Calculations

5.1 Hotel Lake loses water four ways. The Harris report which is very problematic (See the Report of Dr. Brian Guy attached) calculated draw down solely on pumping for licensed users. This is a static view of the lake and ignores the dynamic and complex interaction of the pumping along with the other three sources of water loss: (i) evapo-transpiration, (ii) natural outflow through Mixal Creek and (iii) seepage from the lake as a summit lake into the underlying aquifer.

Hotel Lake is the summit lake [highest in elevation] of the aquifer and supplies water by seepage [recharges] the underlying aquifer and the lower lakes and wells dependent on the aquifer. These lakes are in order of descending elevation: Garden Bay Lake, Catherine Lake and Mixal Lake.

5.2 The Harris report did not include the two transferred licenses and actually omitted two others for four missing licenses totaling 13,220,202 Imperial Gallons annually. (Figures from LWBC website). The Harris report also omits eight unlicensed users at 500 Imperial Gallons per day for a total of 1,461,000 gallons annually. See Appendix 12 of Harris Report (attached).

John Heinonen, a Physical Scientist with Habitat and Enhancement Branch, Fisheries and Oceans Canada states: "that the average inflow estimate on an assumed precipitation of 1100mm/year by the Harris Report omitted issues of interception, evaporation and transpiration. See item 8 of the Heinonen email dated December 15, 2003 attached as Exhibit B to the affidavit of Joe Harrison.

John Heinonen clarified his statement about the volume of water in item 21 of his email by a new email dated May 13, 2004. He states the corrected volume to be:

"somewhat less than 275,000 m³, depending on the bathymetry of the upper 1 meter of lake bed...275,000 m³ is roughly 60,500,000 Imperial Gallons according to the unit conversion program I consulted."

See email of John Heinonen dated May 13, 2004.

5.4 As the water licenses have never been used by Garden Bay Waterworks, their transfer should have been treated as new licenses and therefore be subject to the same due diligence by LWBC as the 2003 new license for 14,000,000 gallons. If there was not enough water for the 2003 new license, there is not enough water for the two transferred licenses.

5.5 The Harris report was sufficiently problematic that LWBC in their November 19, 2003 letter rejected the application for a new license of 14,000,000 gallons stated:

"It is our opinion that the hydrological analyses of Hotel Lake given in the consultants' reports have not adequately substantiated the availability of water. We require a more comprehensive hydrological study to confirm the availability of water in Hotel Lake and the impact of further withdrawal of water from the lake on its water level. We are, therefore, not in a position to adjudicate the application in your favour until a new study is completed. .. To accommodate your study needs, Land and Water British Columbia Inc. (WBC) will park your water licence

application for six months. We feel that this should be sufficient time to complete the necessary work. If you complete your study within six months, we will continue with our adjudication process.”

See attached letter dated November 19, 2004. The situation remains the same and no work has been done.

6. Refill In Winter Irrelevant To Water Issues In Dry Season

The refill of the lake in the winter is irrelevant to the question of adequacy of water. Any additional water in the system flows through and is not available during the summer months.

John Heinonen's email of December 15, 2003 attached as Exhibit B to the affidavit of Joe Harrison, explains why:

“Global warming is projected to influence precipitation type and amount, however the season distribution of precipitation may not be affected uniformly. Current thinking is that low-flows in rainfall driven watersheds will occur over an extended summer period relative to the past, due to drier summer conditions. There is some indication that this may have already begun to occur over the last 15 years or so. If there is an increase in annual precipitation but it tends to occur in winter when storage in the lake is fully occupied, it will simply flow through. It is the June through October, which appears to be the most critical time for water use from Hotel Lake, this period may become drier, rather than wetter, if climate change projections are realized. Drier, warmer weather would tend to accentuate water draw down in Hotel Lake during the summer season via evaporation and demand increases.”

7.0 No Surplus Of Water

Jacques Whitford in their letter of April 23, 2004 states there is a “surplus of water in Hotel Lake, on an annual basis”.

Item 6 above makes it clear that the annual refill of water overflows and is not available in the drier summer months making the Jacques Whitford statement meaningless that there is a surplus of water

Additionally, the Jacques Whitford reports of 2003 state there is an outflow from Hotel Lake Creek of 150,000,000 Imperial Gallons a year and zero loss from seepage. Dr. Guy's report on page 4 and in Table 5 shows this to be impossible and that the outflow is closer to 9 million Imperial Gallons a year. The alleged “surplus” does not exist.

8. No environmental impact

LWBC erred in not undertaking their due diligence of the transferred licenses by choosing to ignore changes in the environment since the original date of grant of the licenses in 1946 and 1972 and by assuming that the licenses were in use. In so doing, as stewards of the land, they ignored the environmental impact of the loss of water from the two licenses.

See the quote of John Heinonen in Item 6 above about the effect of extended summer conditions. The report of Dr. Guy discusses the effect of the licenses on the seepage from Hotel Lake to the underlying aquifer and that affect on other lakes and wells and water sources. With the use of the two licenses, the lake is projected to be in a deficit for two months, which will affect the seepage to the aquifer supply of water to the lower lakes and wells.

For example, a development on Mixal Lake which uses wells supplied by the aquifer which is recharged by Hotel Lake, reported a drastic change in their wells in 2003. They gave reported the presence of arsenic and high PH levels that were not present before. Refer to the May 11, 2004 letter from Broncel Construction Inc. authored by Ron and Helen LeBlanc.

9. Damage to fish stock

The Jacques Whitford Environment Ltd. reports rely on the Harris Report regarding the draw down from the lake and lake volumes which ignores seepage. Jacques Whitford Environment Ltd. incorrectly assumes that natural outflow from Hotel Lake is 150,000,000 Imperial Gallons and that this water is a surplus that can be stored. Dr. Guy's report clarifies that the DFO figure of 9,000,0000 gallons a year is appropriate and that 90-95% of natural outflow is due to seepage which Jacques Whitford ignores.

Because of the problems in the Harris report, previously cited the reliance by Jacques Whitford Environment Ltd .on the Harris Report plus the incorrect assumption that the natural outflow is 150,000,000 gallons through Hotel Lake Creek, is fatal to the reliability and credibility of their reports. Accordingly their conclusions about damage to fish stock must be disregarded. Simple observation of the creek makes it abundantly clear the 150,000,000 gallons a year through the creek is impossible. The creek has barely a trickle of water in the summer months.

In addition the transfer of the two licenses does not require any remedial action as the issue of the 2003 new license required.

Attached are:

- (1) the first memorandum of Dr. John Field dated August 24, 2004 regarding potential impact of reduced water levels in Hotel Lake on salmon fish stock; and
- (2) second memorandum of Dr. John Field dated September 14, 2003 critiquing the Jacques Whitford Environment Ltd. report regarding the effect on fish stocks.

The second memorandum details numerous mistakes in the report and states:

“For both of the above reasons, in my opinion, it is inappropriate to put much confidence in the fish data obtained and therefore the recommendations that are based upon them.”

The second Field memorandum also criticizes the assumption that lake-resident salmonids spawn in late winter. Dr. Field states:

“...I don’t think this assumption is necessarily valid...For these reasons I believe that there may be fall-spawning cutthroat trout throughout accessible streams of the Sakinaw Lake watershed...The mitigation measures described in the report would not benefit a fall-spawning cutthroat. If anything they would have a detrimental effect...It would be best to obtain data specific to Hotel Lake before allowing any possibility of the lake being drawn below the outlet sill level earlier in the year as proposed in the mitigation measures described in the assessment report.

9. Phosphate Levels

This issue is dealt with extensively in Dr. Guy’s report. He advises that the basis for the BC drinking water guideline is the potential for elevated P concentrations to cause algae growth, which increases the cost of water treatment (e.g. filtration) and can cause aesthetic (taste and odour) concerns.

The proposed increase in water withdrawal could reduce the dilution effects of rainfall and runoff on P inputs and alter shoreline processes. The changes in lake level could result in additional turbulence of lake sediments near the shoreline. Phosphorus release from littoral zones in small lakes as the result of turbulence can make up a more significant source of P than it would in larger lakes and therefore be a source of concern in Hotel Lake.

Dr. Michael Jackson advises in his memo of May 13, 2004 that the switch from a macrophyte clear water state to a phytoplankton-dominance in shallow lakes depends on the breakdown of chemical and biological feedback mechanisms that buffer the macrophyte-dominated state and resist change. The withdrawal of water for drinking and irrigation purposes might be a triggering factor if the littoral zone of the lake is eliminated. The plants and animals that live in the littoral zone maintain water clarity through feedback mechanisms that contribute to the stability of the whole lake ecosystem.

“In the case of Hotel Lake, the increase in population over the past 20 years has inevitably led to increases in phosphates and nitrates in the water and sediments which increases the production of algae and other aquatic forms. These nutrient levels will continue to rise, unless some remedial action is taken to stem the source of the eutrophication.”

10. Balance of Convenience

As stated the two transferred licenses are not in use and Garden Bay Waterworks does not have any waterworks in Hotel Lake to enable their use.

Use of the licenses would require a 700-metre pipe to connect Garden Bay Waterworks with the SCRD waterworks on Hotel Lake. Officials of SCRD, Steve Lee and John Rees have both advised Joe Harrison, the President of AAQWA that the SCRD is proposing the allocation of \$150,000 to build the pipe for the express purpose of purchasing from Garden Bay Waterworks the water required for Daniel Point. There is therefore no prejudice to the SCRD or Daniel Point Development in staying the transfer of the two licenses until the full appeal is heard.

Enclosures:

1. Report of Dr. Guy
2. Affidavit of Joe Harrison
3. Affidavit of Nina Whittaker
4. Email of John Heinonen dated December 15, 2004
5. Appendix 12 of Harris Report
6. Email of John Heinonen dated May 13, 2004
7. LWBC dated November 19, 2003.
8. Letter from Broncel Construction faxed May 11, 2004
9. Dr. Field Memo - August 24, 2003
10. Dr. Field Memo - September 14, 2004
11. Dr. Michael Jackson Memo – May 13, 2004

Yours truly,

Joanne S. McClusky

- cc. Land & Water B.C. attention: Alec Drysdale, Bob Herath
- cc. Jacques Whitford Environment Ltd. Attention: Ward Prystay
- cc. Hugh Harris
- cc. Daniel Point Development Ltd.
- cc. Murdy & McAllister - SCRD

AFFIDAVIT

I, Joe Harrison, of Site 4, Compartment 9, Rural Route 1, Garden Bay, British Columbia, V0N 1S0, 13226 Oyster Bay Road, MAKE OATH AND SAY AS FOLLOWS:

1. THAT from 1978 to 1982 I was the Director for Area "A" of the Sunshine Coast Regional District (SCRD), President of the Pender Harbour Rate Payers Association from 1977 to 1995 and am currently a Director of the Sunshine Coast Conservation Society, and as such have personal knowledge of the matters hereinafter deposed to except where stated to be on information and belief in which case I verily believe them to be true;
2. THAT as an elected Director of the SCRd, I was responsible for local government functions of Area "A" which included the area encompassed by the Garden Bay Waterworks and Hotel Lake.
3. In the course of my duties I was responsible for subdivision referral appeals to the full board which necessarily included the provision of water services.
4. That the two water licences, numbers 119338 and 119342 on Hotel Lake, which are the subject of the Appeal to the Environmental Appeals Board, were held by Henry Whittaker who owned two properties adjacent to Hotel Lake.
5. THAT the two licences supplied water via a wooden stave pipe pumped up to a tank on the Brian Wright property adjacent to the Lakeside Motel.
6. THAT prior to 1983 this use was discontinued when the Whittaker properties were hooked up to the Garden Bay Water Works. The tank was subsequently removed.

7. Mr. Whittaker sold the two licences to Garden Bay Waterworks in 1983.
8. THAT at a Board Meeting of the Sunshine Coast Conservation Association on Wednesday, May 5th, 2004 in Sechelt, British Columbia, at which I was present, the current Area "A" Director, John Rees, told the Board:
 - i) that the two licences have not been used for many years, and
 - ii) that the Garden Bay Waterworks have never had any equipment in Hotel Lake that would enable water to be pumped from Hotel Lake, and
 - iii) that he has recommended, through the Infrastructure Committee, that the Board of the SCR D cap the present SCR D water licence at Eleven (11) Million gallons, and
 - iv) that the SCR D connect the Garden Bay Waterworks to the Irvines Landing Water Works on Hotel Lake to enable the SCR D to purchase Six (6) million gallons of water annually from the Garden Bay Waterworks, and
 - v) that the SCR D have made an agreement with the Garden Bay Waterworks to purchase water for two (2) years on an interim basis until a detailed scientific analysis is completed that meets the concerns of Land and Water B.C. Inc., and
 - vi) that Hotel Lake is "tapped out" and that the SCR D is developing a water plan for Area "A" over a three (3) year period for which they are budgeting Two Hundred and Fifty Thousand (\$250,000.00) Dollars.
9. THAT on Friday, May 7th, 2004 I met with John Rees at the SCR D offices in Sechelt, B.C. and he confirmed to me that his statements recited in paragraph 8 above will be included in a series of recommendations from the Infrastructure Committee of the SCR D to the full Board of the SCR D at a meeting scheduled for May 15th, 2004.

10. THAT at the same meeting, noted in paragraph 9 above, John Rees also advised me that an Interim Agreement encompassing the points made in paragraphs 8 and 9 would be forthcoming for the consideration of the Area "A" Quality Water Association.

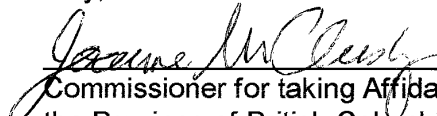
11. THAT attached hereto and marked Exhibit "A" to this my affidavit is an e-mail addressed to Brian Croft, a member of the Area "A" Quality Water Association, from a Water Manager at Land & Water B.C. Inc. stating:
 - i) that: to the best of Land & Water B.C. Inc.'s knowledge there was no evidence that they could find that would indicate that the water licences in question had **not** been used, and
 - ii) that Land & Water B.C. Inc. would be urging the Sunshine Coast Regional District to withdraw the May 15th, 2003 application for an additional Fourteen (14) million gallon water licence.

12. THAT Land & Water B.C. Inc. assumed incorrectly, therefore, that the two licences in question were being used when they granted the transfers on March 5th, and March 8th, 2004.

13. THAT attached hereto and marked Exhibit "B" to this my affidavit is John Heinonen's e-mail dated December 15th, 2003, regarding Hotel Lake Hydrology Issues - Review, to David Nanson of the Department of Fisheries and Oceans which was a review of the Harris and Jacques Whitford reports.

14. THAT attached hereto and marked Exhibit "C" to this my affidavit is my letter of May 3rd, 2004 to John Heinonen, in which I point out to him, the error in paragraph 21 of the Harris report relating to the volume of water and asking for him to correct the inaccuracies in his review.

Sworn before me, at Garden Bay,
British Columbia this 8th Day of
May, 2004



Commissioner for taking Affidavits in
the Province of British Columbia

)
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)
) 
) _____
) Joe Harrison
)

aaqwa

From: "Brian Croft" <Brian_Croft@telus.net>
To: "Cheryl Steernberg" <aaqwa@dccnet.com>
Subject: Fw: Hotel Lake - Transfer of Water Licence

Cheryl here is the answer to my objection to the transefer of water licence from Garden Bay.

Brian Croft.

----- Original Message -----

From: Davidson, Glen W LWBC:EX
To: 'Brian Croft'
Cc: Herath, Bob LWBC:EX
Sent: Friday, March 05, 2004 10:23 AM
Subject: RE: Hotel Lake - Transfer of Water Licence

Dear Mr. Croft:

In response to your email I have looked into this issue which is currently being addressed by our staff in the the LWBC office in Surrey. My understanding of this issues is limited but I can give you the following basic answers to your questions:

1. Yes, an application for a transfer of apputenancy was received in January of this year.
2. These transfers are governed by Section 19 of the Water Act. Since a transfer does not allocate an additional quantity of water, applications are not generally referred to other licences. There is also no new scientific evidence to suggest that the Hotel Lake cannot meet the water demands on these existing licences.
3. The SCR D application for a new licence to draw 14M gallons of water was not refused. Instead, it has been put on hold (Parked), pending the completion of a detailed study. The new studies on Hotel Lake submitted to LWBC in connection with the recent SCR D water licence application did not show in an acceptable manner whether or not it could meet additional water demands. Once the proposed transfer of appurtenancy comes into effect, however, we will be advising SCR D to abandon the water licence application. LWBC staff from the Surrey office have not come across any evidence to suggest that the Garden Bay Water Works (Hotel Lake) water licences were never used.

I have passed along your request for a review of the Garden Bay licence along with your objection to the transfer of appurtenancy to LWBC staff involved in these decisions. If you have any additional questions or comments I request that you contact Bob Herath of LWBC in Surrey. The technical and administrative information related to these licences along with the statutory authority on these issues reside in that office.

Glen Davidson
Manager, Water Licensing and Dam Safety

-----Original Message-----

From: Brian Croft [mailto:Brian_Croft@telus.net]
Sent: February 27, 2004 4:22 PM
To: Davidson, Glen W LWBC:EX
Subject: Hotel Lake - Transfer of Water Licence

Dear Mr. Davidson

As a property owner on Hotel Lake, Garden Bay, Sunshine Coast I hold water licence C039324. Hotel Lake is under considerable pressure during the summer months with levels dropping alarmingly. A proper study of Hotel Lake is well overdue despite many calls for one and The SCR D has not followed through with many similar calls for the development of a comprehensive water plan for this area.

I have recently learned (unofficially) that a Hotel Lake licence for 14M gallons currently held (but never used

aaqwa

Quite separately yet coincidentally, last year an application (for the same proposed use above) for 14M gallons was refused on the basis of considerable and detailed concerns raised at the time.

I dont want to hear from you about the legalities of water right transfers. Rather I want to hear about the Land and Water B.C.'s stewardship of this fragile resource, Hotel Lake. In particular I would like to know:

1. Please confirm the existence of the aforementioned application to transfer 14M gal currently held by the Garden Bay Water Works. What date was it filed.
2. Why has Land and Water BC not formally advised the other licence holders on Hotel Lake of this proposed transfer?
3. If last years application for 14M gal was not approved due to extensive concerns documented and tabled at that time, what possible basis can there be for Land and Water BC to approve the conveniently identical 14M transfer of a "dormant and unused" licence to active draw-down status without following through with the recommended study of Hotel Lake.

I respectfully submit my formal objection, as an affected water-licence holder, to the this proposed transfer.

Furthermore I ask Land and Water BC to review the unused Garden Bay licence with a view to revoking it as dormant and irrelevant to the needs of Garden Bay Water Works.

I look forward to your reply.

Brian Croft

4676 Beaumont Rd
Garden Bay B.C.

Incoming mail is certified Virus Free.
Checked by AVG anti-virus system (<http://www.grisoft.com>).
Version: 6.0.529 / Virus Database: 324 - Release Date: 16/10/2003

Nanson, Dave

From: Heinonen, John
Sent: Monday, December 15, 2003 2:51 PM
To: Nanson, Dave
Subject: Hotel Lake Hydrology Issues ~ Review

This is Exhibit "B" referred to in
the affidavit of Joe Harrison
sworn before me at Sanda Bay BC
this 8 day of May 2004
Joanne McClell
Commissioner for taking Affidavits
for British Columbia

Hi Dave,

I have focussed my review on issues of dispute between the HGH Preliminary Report and the AAQWA review of this report.

Given the minimal amount of information derived directly from actual measurements from within the basin, and reliance on regional data, the significance of some of the calculations must be considered in the context of the level of uncertainty which inevitably results regionally based estimates. For example, the 7-day low flow is estimated as the average 7-day unit low flows of two nearby watersheds, whose values are +/-25% from the averaged value applied to Hotel Lake. The possibility of climate change also imposes some doubt about the amount and seasonal distribution of precipitation available for allocation. Uncertainty heightens the need for conservative approaches, both in protecting the aquatic environment and in the careful stewardship of the water that is extracted for consumptive use.

Regarding HGH Reply (Sep. 21, 2003) points:

4. My sources indicate that 220 Imp Gal/m³ is the correct conversion ratio.

6. The Water Licence Report for Hotel Lake included 13 current licences and one active application (the one at issue) as of Nov. 25, 2003. The HGH report (Appendix 12) refers to 9 licences effective as of 6/11/01 (Nov. 6, 2001) and printed out from an internet site. The additional four current licences have priority dates in 1946, 1965, 1969, & 1972 and involve 108,609 m³ (23,893,215 imp. gallons) annually by my calculation, or roughly a 30 cm depth worth of storage off the Lake when it is full (based on HGH report data). Clearly these water licences have not been accounted for in water calculations in the HGH report. Whatever the reason for the missing four licences, a full and accurate calculation of licensed water is possible and really must be completed to assess impacts of licensing the additional applied for amount of water on the aquatic resource. Check the licences out at: http://www.elp.gov.bc.ca:8000/pls/wtrwhse/water_licences.input ...and search for "Hotel Lake". I assume a similar seasonal distribution of licence utilization could be applied when the additional volumes are included and corrected calculations made.

7. The typo is unfortunate and seems to have been the basis of some misunderstanding.

8. The average inflow estimate based on an assumed precipitation rate of 1100 mm/yr appears to only have been used to estimate "flow through time" for Hotel Lake. Interception, evaporation, and transpiration do not seem to be considered for purposes of this estimate. The "flow through time" is primarily of interest in the context of water quality.

9. The numbers involved in calculating water consumption are very confusing and their rationale is not always explained clearly. The variety of units describing water volume is also not helpful.

10. The typo regarding the number of properties is also unfortunate, as it does seem to have led to a high water demand number which in turn affected the AAQWA drawdown calculation.

12. Like several other points, fundamental factual information is in dispute and I cannot comment one way or the other as to what might be correct.

13. Climate records from the Stillwater Power House (1931-1999 data record consulted) indicate 1985 was the lowest rainfall year on record with 793.9 mm (total precipitation was 894.9 mm), and 1944 was the driest year with total precipitation of 879.9 mm.

14.3. Global warming is projected to influence precipitation type and amount, however the seasonal distribution of precipitation may not be affected uniformly. Current thinking is that low-flows in rainfall driven watersheds will occur over an extended summer period relative to the past, due to drier summer conditions. There is some indication that this may already have begun to occur over the last 15 years or so. If there is an increase in annual precipitation but it tends to occur in winter when storage in the lake is fully occupied it will simply flow through. It is the June through October period

which appears to be most critical for water use from Hotel Lake, this period may become drier, rather than wetter, if climate change projections are realized. Drier, warmer weather would tend to accentuate water drawdown in Hotel Lake during the summer season via evaporation and demand increases.

15. I don't know what he means about confirmation of the Garden Bay or Tri Lakes licences, they are shown on the web site as existing, what else is required? Saying that they may have been cancelled seems to be purely speculative. Perhaps the existence and status of these licences should be confirmed by the province in writing, to verify that the web site information is correct. It seems to me that this issue is key, and once confirmed the licences ought to be factored into the water balance and drawdown calculations for the lake.

16. The water balance must reflect all valid licensed withdrawals. Nearly 24 million Imperial gallons appears to be missing from the annual water withdrawal calculations.

19. The volume at 1 m depth in the graph on page 44 appears to be shown as slightly more than 1.2 million m³ (the value in Table No.1 in the HGH report that was later described as a typo), not the 1.4 million that is apparently the correct number. I don't know what an appropriate average daily water use value is, but assume the quoted SCRD figure of 348 Imp. Gal. per day should be used.

19.2 The issue of "flooding" seems clear, if the water level of the lake is elevated, by any means, some shore land that would otherwise be above water would end up being below the water level, at least for a greater length of time. The disagreement seems to stem from differences in perception of magnitude of impacts of higher water levels would have on shore land and possibly a different interpretation of the word "flooding". Flooding might be considered to be a rise in water level above the high water level which might be expected on an annual basis.

21. The volume of water in the upper 1 m of Hotel Lake is about 310,000 m³ (the HGH report volume of the top 1 m of Hotel Lake calculated from data in Table 1, using the corrected value of 1,408,060 m³ for the lake volume below 1.00 m contour), which is roughly 68,264,000 Imp Gallons. However the Lake surface area is described as 273,720 m² in the report, and 275,885 m² in the response letter, which may mean the actual volume in the surface meter of water is slightly greater. The Sept. 11, 2003 Jacques Whitford letter indicates that total demand including the water licence in question is about 260,000 m³/year or about 83 cm depth worth of storage off the Lake when it is full. This latter calculation does account for the water licences that were missing from the HGH report Appendix 12. The inclusion of the previously missing four water licences and the proposed new water licence would put the average monthly water balance into a net deficit situation (outflows exceeding inflows) in four months rather than the current 2 months. The average monthly deficit would, it appears, be overcome by the installation of a 200 mm high concrete weir at the outlet of the lake. I assume that you are completely comfortable with the biological affects of this weir structure (e.g. fish passage, spawning habitat, insect drift, ecological functions etc.).

Please let me know if I have over-looked any key issues or if there are new items (the most recent document I have is the Nov. 9, 2003 Jacques Whitfield letter). The HGH report and the AAQWA response were difficult to understand and it took a few attempts to get to the point where I felt like saw where the problems lay. The summary documents were much easier to follow but I needed to read through the main text to address the issues. It seems that there is enough water in Hotel Lake on average to meet the demands that would be added by this new water licence application, especially when combined with the proposed weir. The magnitude of unlicensed water extraction should be evaluated (by the province?), all water users ought to be metered, and comprehensive water conservation practices implemented. Please contact me if you want to discuss any of the above comments. I will hang onto the HGH Report for the time being, unless you want it back right away.

John Heinonen

physical scientist
Habitat and Enhancement Branch / Direction de l'habitat et de la mise en valeur
Fisheries and Oceans Canada / Pêches et Océans Canada
Suite 200 - 401 Burrard Street / 401, rue Burrard, bureau 200
Vancouver, BC V6C 3S4 / Vancouver, (C.-B.) V6C 3S4
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cogito ergo sum

MEMORANDUM

TO: John Heinonen, Physical Scientist, D.F.O.
E-Mail: heinonenj@pac.dfo-mpo.gc.ca
From: Joe Harrison, President, Area "A" Quality Water Assoc.
E-Mail: aaqwa@dccnet.com
Date: May 3, 2004
Subject: Hotel Lake Hydrology Issues - Review Heinonen report to Dave Nanson, December 15, 2003

This is Exhibit "C" referred to in
the affidavit of Joe Harrison
sworn before me at Garden Bay, BC
this 8 day of May, 2004
Jeanne McCleary
A Commissioner for taking Affidavits
for British Columbia

I wish to draw your attention to item 21 which might alter your conclusions in the last paragraph.

"...volume of water in upper 1 meter"

The HGH figure 310,000 m³ is incorrect and impossible for a surface area of 275,884 m². Page 33 of the appeal documents (letter September 11th, 2003, Jacques Whitford to Bob Herath, LWBC) and table 1 in particular the last column yields a more accurate value of 265,894 m³.

Although HGH claimed that although his original larger number was a typo, the revised 310,000 m² figure was equally irrational unless the whole lake shore was undercut with submerged caverns.

The total water licence demand of 260,000 m³ translates to 57.2 million gallons which is also incorrect. The correct number is 43 million gallons or about 195,454 m³ or about 0.71 m on the lake.

The Jacques Whitford Hydrology material, pages 28 - 51, "desktop analysis" is unreliable which can be demonstrated by one example from page 34 of the appeal package (page 3, September 11, 2003 Environmental Technical Response)

Table 2 purportedly shows that over the course of the year the annual water volume that discharges from the lake via the outlet creek will decrease by 9.3% from 684,486 m³ to 629,830m³ (150.6 million gallons to 138.6 million).

HGH records the flow at 90,000 m³ or roughly 19 million gallons for the study period (winter 2002-2003). AAQWA for the winter of 2003-2004 estimate the flow at not greater than 27,000 m³ or 6 million gallons for the discharge period December/03 through May/04.

The downstream lake level gauge at Mixal Lake and Mixal Creek (Grant McBain, DFO) indicates a flow rate of 400 litres per minute or 103,680 m³ or 22.8 million gallons for the 6 month discharge period, which has been consistent over many years.

The Hotel Lake contribution to this combined flow based on the total of the drainage areas is approximately 1/3 of the 22.8 million gallons which is close to observed values by AAQWA members.

HGH records a number of observational difficulties during the 2002-2003 study period which may account for his 19 million figure which is higher. What is obvious is that the Jacques Whitford number of 150.6 million gallons is very far from 6 million (AAQWA) and 19 million (HGH) and well over 6 times the drainage flows from the combined flows from Hotel Lake and Mixal Lake recorded by DFO over many years.

Your conclusion about availability of water in the last paragraph should also be reconsidered in light of the April 22nd, 2004 letter of LWBC water manager, Alec Drysdale to the Environmental Appeal Board saying "there is however no acceptable scientific evidence before Land Water B.C. Inc. suggesting that the lake is in an annual deficit or annual surplus condition". On November 19, 2003, LWBC ordered the SCRD water licence application parked and instructed them to undertake new studies. They stated that the Hyrdological studies undertaken by HGH did not constitute acceptable scientific evidence.

The following is a quote from a document dated April 23, 2004, and filed by the SCRD Legal Counsel to the Environmental Appeal Board in regard to planned studies, which states "...the SCRD Board also directed staff to conduct a study on Hotel Lake to identify the water levels of the lake in relation to population and licence allocation. The goal is to ensure that the SCRD does not cause permanent damage to the Hotel Lake System."

I would appreciate if DFO could correct the inaccuracies in item 21 of the Heinonen letter by way of a memo to AAQWA at your earliest convenience. We would ask that these corrections be forwarded to anyone who received a copy of the original memorandum.

cc. David Nanson
Brian Guy

AFFIDAVIT

I, Nina Whittaker, of Site 14, Compartment 7, Rural Route 1, Garden Bay, British Columbia, V0N 1S0, 4612 Sinclair Bay Road, MAKE OATH AND SAY AS FOLLOWS:

1. THAT I am the Daughter-In-Law of Henry Whittaker and as such have personal knowledge of the matters hereinafter deposed to save and except where stated to be on information and belief in which case I verily believe them to be true.
2. THAT the two water licences, numbers 119338 and 119342 on Hotel Lake, which are the subject of the Appeal to the Environmental Appeals Board, were held by Henry Whittaker who owned two properties adjacent to Hotel Lake, commonly known as "The Whittaker Property";
3. THAT I have lived on the Whittaker Property from 1966 to present, and accordingly have first hand knowledge of all physical changes to that land.
4. THAT the two licences supplied water from Hotel Lake via a wooden stave pipe pumped up to a tank on the Brian Wright property adjacent to the Lakeside Motel.
5. THAT at sometime prior to 1983 the use of the two licences was discontinued when the Whittaker properties were hooked up to the Garden Bay Water Works. The tank was subsequently removed.
6. THAT my father-in-law, Henry Whittaker sold the two licences to Garden Bay Waterworks in 1983 for the sum of One (1) Dollar and other good and valuable consideration.

7. THAT the original wood stave pipe is exposed and has rotted.

Sworn before me, at Garden Bay,)
British Columbia this 8th Day of)
May, 2004)
Joanne McQuest)
Commissioner for taking Affidavits in)
the Province of British Columbia)

Nina Whittaker
NINA WHITTAKER



Water Licences Report

Scroll to bottom of page for unique count of licences found in your search

Licence No	WR Map/ Point Code	Stream Name	Purpose	Qty	Unit	Qty Flag	ReDiv Flag	Licensee	District/Precinct
C016733	92.F.070.2.3 A (PD44536)	Hotel Lake	Domestic	500	GD	T	N	SUNSHINE COAST SCHOOL DISTRICT NO 46 BOX 220 GIBSONS B C V0N1V0	VAN - JERVIS
C024211	92.F.070.2.4 D (PD44538)	Hotel Lake	Domestic	4000	GD	T	N	NELSON PETER J 11670-218 ST MAPLE RIDGE V2X5M1	VAN - JERVIS
C030375	92.F.070.2.4 B (PD44542)	Hotel Lake	Domestic	2000	GD	T	N	387987 BC LTD 600 815 HORNBY ST VANCOUVER BC V6Z2E6	VAN - JERVIS
C037713	92.F.070.2.4 J (PD44543)	Hotel Lake	Domestic	500	GD	T	N	UHRLE KARL 481 VENTURA CRESCENT NORTH VANCOUVER BC V7N3G8	VAN - JERVIS
C037714	92.F.070.2.4 K (PD44537)	Hotel Lake	Domestic	500	GD	T	N	HAWRYCHUK FRANK & CARON BOX 7 GARDEN BAY BC V0N1S0	VAN - JERVIS
C039324	92.F.070.2.4 L (PD44545)	Hotel Lake	Domestic	500	GD	T	N	BAGAN RUSSELL & MAY M 4445 WALLACE ST VANCOUVER B C V6S2J5	VAN - JERVIS

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.../water_licences.output?p` Source Name=Hotel+Lake&p Licence No=&p Priority Issue Date/6/11/01

C045086	92.F.070.2.3 C (PD44534)	Hotel Lake	Domestic	500	GD	T	N	JAMES RALPH B 12011 MITCHELL RD RICHMOND BC V6V1M7	VAN - JERVIS
C113624	92.F.070.2.4 (PD74083)	Hotel Lake	Nurseries	1	AF	T	N	KNIGHT RONALD LEONARD & CARLA 2710 WALPOLE CRESCENT N. VANCOUVER BC V7H1K8	VAN - JERVIS
"	92.F.070.2.4 (PD74088)	Hotel Lake	Domestic	500	GD	T	N	KNIGHT RONALD LEONARD & CARLA 2710 WALPOLE CRESCENT N. VANCOUVER BC V7H1K8	VAN - JERVIS

Total number of Licences and/or Applications found is 8

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Joanne McClusky

From: HeinonenJ@pac.dfo-mpo.gc.ca
Sent: May 13, 2004 6:40 PM
To: jmccclusky@lumiguide.com
Subject: RE: email to Joe Harrison sent this week regarding Hotel Lake

Here is the text of my e-mail to Joe Harrison:

- Thank you for bringing this error to my attention. Obviously, if the area of Hotel Lake is about 275,000 m² then the volume of the upper 1 meter of the Lake is somewhat less than 275,000 m³, depending on the bathymetry of the upper 1 meter of lake bed. The possibility of submerged caverns is novel and intriguing but extremely unlikely. 275,000 m³ is roughly 60,500,000 Imperial Gallons according to the unit-conversion program I consulted. I am guessing that the initial error resulted from back calculating the volume from some of the faulty numbers in the report rather than taking the straightforward approach of area X depth, I can't be sure as I haven't reviewed the material in this file for several months.

Please contact me if you have any additional comments or questions.

John Heinonen
physical scientist
Oceans, Habitat and Enhancement Branch
Fisheries and Oceans Canada
Suite 200 - 401 Burrard Street
Vancouver, BC V6C 3S4
Telephone: (604) 666-0126 (Téléphone)
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E-mail: heinonenj@pac.dfo-mpo.gc.ca (Courriel)
cogito ergo sum
/ Direction des océans, de l'habitat et de la mise en valeur
/ Pêches et Océans Canada
/ 401, rue Burrard, bureau 200
/ Vancouver, (C.-B.) V6C 3S4

November 19, 2003

Sunshine Coast Regional District
5477 Wharf Road
Box 800
Sechelt BC V0N 3A0

Attention: Mr. Steve Lee
General Manager Infrastructure Services

Dear Mr. Lee:

Re: Water licence application, Sunshine Coast Regional District, Hotel Lake

We have now completed our review of your above water licence application. In completing the review we have very carefully considered all the reports and other documentation submitted by you and your consultants, Hugh G. Harris & Associates Inc. and Jacques Whitford Environment Limited. Also, we have reviewed comments from referral agencies and the public.

It is our opinion that the hydrological analyses of Hotel Lake given in the consultants' reports have not adequately substantiated the availability of water. We require a more comprehensive hydrological study to confirm the availability of water in Hotel Lake and the impact of further withdrawal of water from the lake on its water level. We are, therefore, not in a position to adjudicate the application in your favour until a new study is completed. Further more, the review of any new submission will be subjected to all the steps required by our application process, including advertisements, notifications to concerned parties, and public hearings.

We are also aware that you are currently looking at the need for a coordinated water management plan to meet the overall future water needs of your community, with the most efficient use of available resources. We support a rational approach to developing community water supply with minimum environmental impact, and the notion of developing a master water allocation plan for your community before making specific water licence applications. To help you in getting the desired end result, we would be happy to contribute to the terms of reference for such a coordinated water allocation plan for your community.

To accommodate your study needs, Land and Water British Columbia Inc. (WBC) will park your water licence application for six months. We feel that this should be sufficient time to complete the necessary work. If you complete your study within six months, we will continue with our adjudication process.

LWBC continues with its policy to encourage development, create new jobs and bring economic benefit to British Columbians. If you have any questions, please call Bob Herath, Section Head, Land and Water Allocation, at (604) 586 4423.

Yours truly,

Alec Drysdale
Regional Manager
Land and Water Management

pc: Hugh G. Harris & Associates Inc., P.O.Box 79061, RPO Kingsway, Vancouver BC
V5R 5Z6 - Att: Mr. Hugh Harris

Jacques Whitford Environment Ltd., Unit 1 - 3771 North Fraser Way, Burnaby BC
V5J 5G5 - Att: Mr. Ward Prystay

Area "A" Quality Water Association, c/o. R.R.1, Site 11, Compartment 15, Garden
Bay BC V0N 1S0 - Att: Ms. Cheryl Steernberg, Secretary

Ms. Joanne McClusky, Barrister & Solicitor, Suite 900 - 525 Seymour Street,
Vancouver BC V6B 3H7

BRONCEL
CONSTRUCTION INC.
5150 HAMMOND RD. S-6 C-9
GARDEN BAY B.C.
VON 1S0
PH. (604) 883-1180 FAX (604) 883-9703

SCRD
Fax: 604-885-7909
Attention: Steve Lee

Re: Water Study at Hotel Lake

Dear Sir:

We understand that there is an impact study to be conducted on the water situation at Hotel Lake in the near future.

Our situation is this. We have a small subdivision nearby consisting of 20 lots on Camp Burley Road, to which we supply water to with 2 drilled wells of approx. 200 feet deep. Last year we noticed a drastic change in our wells, which has adversely affected our water quality and now have arsenic and high PH levels which weren't present before. We are uncertain as to why this change could happen, however, we understand that several factors could impact it, i.e. drought, followed by record rainfalls, together with more wells being drilled in the immediate area. We are also informed that 11,000,000 gallons + of water was taken from the Hotel Lake reservoir last year. We understand this was over 3,000,000 from what was normally used.

We have no concrete evidence of course, however it is our belief that if surface water is removed it must impact the hydraulics underground or the aquifers and possibly change the quality of their water. We are deeply concerned for our future, and we would strongly urge that a study be included to report or give opinion to show if removing large volumes of water from Hotel Lake changes the aquifers in our area.

We elected to use well water for our subdivision rather than the lake water, and subsequently formed a utility company to provide water to this subdivision. We feel that this is the correct and safest approach to ensuring quality water for now and the future. It is our hope that we will all continue to move forward and look to the aquifers rather than surface water as the lakes should be used for filtering the water to the aquifers, and also enjoyed for fishing, boating and swimming which is apparent.

As we mentioned the water quality that we have has changed, however we have been successful with a pilot project with Amrak to remove the arsenic levels and adjust our PH to provide our development with high quality water. It is our feeling that a grid system, which would or could connect existing well waters in the area could provide adequate water for now and the future.

We appreciate your addressing our concerns, and look forward to your comments

Yours truly,


Ron & Helen LeBlanc

Cc: John Rees, Area A Director
Cc: Tim Adams, Health
Cc: Bob Heath, Lands and Water
Cc: Rick Couroux, Prov. Gov't, waterworks

*Fayed.
May 11, 04*

MEMORANDUM

TO WHOM IT MAY CONCERN
From: Jonn Field, PhD

24 August 2003

Re: Withdrawal of water from Hotel Lake

The following is a personal opinion about the potential effects on salmon of reduced water levels in Hotel Lake and other water-supply lakes in Pender Harbour, based on my observations as a community salmon enhancement program volunteer and my professional experience as an aquatic biologist.

Introduction

The Salmon Enhancement Committee of the Pender Harbour & District Wildlife Society has been working, under the direction of the federal Department of Fisheries and Oceans (DFO), since the late 1970's to restore Pacific salmon populations on the northern Sechelt Peninsula (Pender Harbour and Egmont area). Since I became involved in this volunteer effort in 1987, we have worked on enhancement of chum and coho salmon stocks in the Anderson Creek/Myers Creek system, and with coho (and in a minor way with sockeye) in the Sakinaw Lake system.

During most of the 15 years of my involvement, our enhancement efforts focused mainly on hatchery operations: capturing wild broodstock as adults entered streams, incubating the eggs and, in the case of coho, rearing juveniles for up to fourteen months. The society operates its own hatchery facility on Lions Creek, on property kindly loaned by the Pender Harbour Lions Club. In recent years, our focus switched to conservation and restoration of salmon habitat, and the hatchery is currently maintained primarily only for emergency use. The change was made for two reasons. Firstly, despite the fact that we were releasing tens of thousands of hatchery-raised coho in each system every year, the resulting returns of adult fish were disappointing - our efforts were not accomplishing the desired outcome: restoration of self-sustaining populations at historic levels. Secondly, research into the biology of coho indicated that a critical factor in the survival of this species was provision of adequate juvenile rearing habitat. Since coho live in fresh water for eighteen months before smolting and going to sea, the streams and lakes where they rear must provide them with high-quality water, shelter and food organisms year-round. We now recognize that we can be more effective at enhancing wild coho by conserving and restoring their habitat than in raising and releasing hatchery fish.

The coho of 'Hotel Lake Creek'

The Sakinaw Lake watershed is a complicated system of interconnected lakes and streams, many of which are used by coho salmon for spawning and rearing. Hotel Lake lies near the headwaters of one branch of this system. From it, Hotel Lake Creek flows into Mixal Lake, which discharges into Mixal Creek and then into Sakinaw Lake. Garden Bay Lake and Katherine Lake discharge into Mixal Creek via a separate tributary stream.

The primary coho spawning grounds of this system are in Mixal Creek, and the Society has maintained a broodstock collecting station on this stream for many years. Most of the resulting

hatchery-raised juveniles were released into Sakinaw and Mixal Lakes, as DFO had determined these to be the primary rearing areas. In more recent years, and coinciding with greater numbers of spawning coho in the system (as well as our increased focus on habitat), we confirmed our expectation that the spawning grounds extended further upstream in the system, in all tributaries accessible to coho.

In 1999 we observed adult coho and evidence of limited spawning activity in the lower part of Hotel Lake Creek, downstream of Camp Burley Road. In early December 2001, at the peak of a major run of coho into the Sakinaw Lake system, I monitored 200-300 fish ascending Hotel Lake Creek en masse during a freshet. Most of these fish died without spawning within the next two days as the stream returned to its pre-freshet level. I believe that the mortality was caused by oxygen depletion – there were too many fish in an insufficient volume of water. There was considerable evidence of attempted spawning activity, but apparently most of it was unsuccessful, either due to insufficient time or inadequate substrate. The short duration of this freshet indicated that the surge of water in Hotel Lake Creek likely originated in tributary streams; i.e. it was mainly surface run-off rather than discharge from Hotel Lake. If the lake had been contributing significant water to the stream, the increased flow should have been longer-lived and more sustaining for the fish.

The extensive wetlands, both upstream and downstream of Camp Burley Road, through which Hotel Lake Creek flows make ideal rearing habitat for juvenile coho. The main limiting factor that currently prevents them from achieving their maximum potential in this respect is adequate water flow during the summer and autumn months of July through October or November. During this period there is a mere trickle of water in the stream, and fish are limited in their distribution to occasional shaded pools in the streambed.

Hotel Lake and its watershed is the principal source of water for Hotel Lake Creek. However, it is my understanding that the lake is artificially drawn down below its outlet sill for long periods during the late summer and autumn months (July to November); therefore it likely contributes little if any water to Hotel Lake Creek and the wetlands it supports. I have observed that it takes this lake (and other water-supply lakes like it that are seasonally drawn down – Garden Bay Lake) several weeks of rain to re-charge after the dry season ends. In the many years that I have been involved with salmon enhancement, it has sometimes (e.g. autumn 2002) been as late as mid-December before streams in the system, including the critically important Mixal Creek, begin to flow at levels adequate to support incoming spawning coho.

If Hotel Lake and other water supply lakes are allowed to be drawn down even more during the dry season than is happening now, I am confident that the ability of the system's creeks to support coho salmon will likely be further compromised. The period of minimal stream flow will be lengthened, reducing the ability of the streams themselves to support juvenile fish. And the date when adult fish will be able to enter the streams will be further delayed – it is inevitable that such delays would result in a) higher mortality of spawners forced to hold in Sakinaw Lake, and b) reduced quality of eggs in gravid females forced to retain them beyond normal spawning time.

MEMORANDUM

TO WHOM IT MAY CONCERN 14 September 2003

From: John Field, PhD

Re: Fish assessment of Hotel Lake and outlet creek

The Area A Quality Water Association recently asked me to review an environmental assessment

report of Hotel Lake and its outlet creek prepared by Jacques Whitford Ltd in February 2003.

The following are my observations concerning the methods used and certain conclusions drawn by the author(s) of the report.

1. It is my experience that minnow traps are relatively ineffective as a fish sampling method during the winter months (December – February). In part this is because fish feed very little when water temperatures are low, so they respond poorly to baited traps. Fish are also relatively inactive, so are less likely to encounter traps (this would also explain why the gill nets used in another part of the assessment were so unsuccessful). With regard to the observation that no fish were seen in the outlet stream – juvenile salmonids in particular generally spend the winter well hidden under rooted cutbanks and logs.

2. The only salmonid caught during the fisheries assessment was identified as a rainbow trout (apparently incorrectly as intimated in a subsequent letter responding to a query from DFO biologist Dave Nanson). It is surprising that the authors did not refer to the fact that Hotel Lake is well known by anglers in Pender Harbour and beyond for its cutthroat trout. And it is even more surprising that they would prepare mitigation measures only for rainbow trout (in the original report) based on the capture of just one fish.

For both of the above reasons, in my opinion it is inappropriate to put much confidence in the fish data obtained and therefore the recommendations that are based upon them.

3. The mitigation measures presented in the report are based on an assumption that lake-resident salmonids spawn in late winter. At this time the outlet creek would be expected to be flowing, and therefore fish would be able to enter it for spawning. Based on the following observations, I don't think that this assumption is necessarily valid. (1) Ruby Lake, one of the other lakes in the larger Sakinaw Lake watershed (of which Hotel Lake is also a part) is well known for its fall-spawning race of cutthroat trout. (2) In mid-November 2001, I observed fully mature cutthroat trout migrating out of Sakinaw Lake into Ruby Creek. (3) In December 2000, a Salmonid Enhancement Program volunteer reported capturing a running-ripe female cutthroat trout in Mixal Creek. For these reasons, I believe that there may be fall-spawning cutthroat trout throughout accessible streams of the Sakinaw Lake watershed. The mitigation measures described in the report would not benefit a fall-spawning race of cutthroat trout. If anything, they would have a detrimental effect.

4. Another assumption made in the report is that peamouth chub from Hotel Lake spawn in the outlet creek sometime in late April or early May. I don't have specific knowledge about the habits of chub in this lake, but I would like to point out that this species has been observed spawning during early June in Mixal Creek. It would be best to obtain data specific to Hotel Lake before allowing any possibility of the lake being drawn below the outlet sill level earlier in the year, as proposed in the

mitigation measures described in the assessment report.

5. It is incorrectly stated in the report that coho salmon spawn in Mixal Creek in "October/November". It is amply documented that adult fish *enter* Sakinaw Lake at that time, but that they then hold in the lake for a month or more while they mature. They begin to enter the streams where they spawn, such as Mixal Creek and its feeder lakes and tributaries, in early December (in most years). The major run occurs early in the season, but small numbers of fish have been observed spawning into the middle of January.

Recent theory suggests that many lake ecosystems can exist as one of two alternative stable states, dominated by either submerged macrophytes or phytoplankton, but mechanisms that might induce the shift between them are poorly understood. The switch from macrophyte- to phytoplankton-dominance in shallow lakes is unlikely to be directly nutrient-induced, as both states can exist over an overlapping nutrient range. Rather, it depends on the breakdown of chemical and biological feedback mechanisms that buffer the macrophyte-dominated state and resist change. Hypothesized mechanisms that might cause the switch have included shading of submerged macrophytes by phytoplankton, suppression of macrophyte growth by epiphytes and filamentous macro-algae, changes in fish community structure and organochlorine pesticide toxicity. Abstraction of water for drinking and irrigation purposes might also be a triggering factor if the littoral zone of the lake is eliminated. It is the plants and animals that live in the littoral zone that maintain water clarity through feedback mechanisms that contribute to the stability of the whole lake ecosystem. In the case of Hotel Lake the increase in population over the past twenty years has inevitably led to increases in phosphates and nitrates in the water and sediments, which increases the production of algae and other aquatic life forms. These nutrient levels will continue to rise, unless some remedial action is taken to stem the source of the eutrophication. The slow reduction in resilience of the system caused by increasing eutrophication results in a greater likelihood that a triggering event will push the system from its present macrophyte-rich clear water state into the phytoplankton dominated alternative. If the system switches to the algal-dominated state then water quality is liable to be seriously compromised.

Dr M J Jackson

May 13th 2004