

**Dewdney Area Improvement District
Lake Level Select Committee
Box 3005, Mission, B.C., V2V 4J3**

Request for Written Support, Feedback, and Funding, where available.

Date: February 28, 2005

To: See Distribution List Attached

From: DAID Hatzic Lake Level Select Committee
Steve Dimond, Chairman

Re: **Request for Support and Input from Affected Parties
Seasonal Water Level Control for Hatzic Lake, Mission, B.C.
To Improve Fish Access and Habitat and to Enhance Recreational Opportunities**

Greetings. This memo is being distributed to parties who have an interest in the Hatzic Lake system as our **request for your written support and for feedback on the implementation of lake level controls, including concerns or suggestions for information and data collection. We would also ask that any agencies which may have an interest and access to contributing funding sources accept this as an application for assistance.** The water levels in Hatzic Lake affect, among other things, fish populations, weed populations, flood control abilities, recreational pursuits, fire fighting abilities, irrigation requirements for adjacent farms, ditch and creek maintenance, and farming area drainage.

The Dewdney Area Improvement District formed a select committee in 2001 to review water levels on Hatzic Lake and to learn what seasonal control of the those levels would have on affected parties. The committee has resolved to implement a test flow control installation at the dike to continue gathering of meaningful data to further understand the lake system and to allow a more technical review of the hydraulics within the lake and its tributary systems. The committee will seek approval from Fisheries and Oceans Canada for the implementation and request specific support from agencies concerned with fish habitat and fish access into the lake system as well as public concerns.

Both sturgeon and salmon frequent the Hatzic Lake system during their life cycle and the committee understands that assured access to and from the lake during control periods is essential for a successful project. The committee wishes to improve the access to and from the lake for fish populations — this is currently not in place due to the operation of the control gates at the dike.

To be sure, the issue of flood protection is paramount with the Dewdney Area Improvement District. In concert with the committee s review will be studies on the risk of flooding in the August and September periods and the conditions which contribute to flooding, if any, in the late summer period. All of these factors must be considered and adequately addressed for permanent changes to the lake control systems.

We ask that you please write to the Dewdney Area Improvement District in order that we may gauge support for the control of lake levels and the improvement of fish habitat in the lake and properly include and address all issues in our review of changes to the lake system. This is a volunteer effort on the part of the committee and we hope to enlist financial and physical support for these works.

How you can help :

1. Do you have data on Hatzic Lake which could be shared ?
 - water level or flow data
 - lake and stream bed sand gradation sieve results
 - flow or level information for tributary creek systems
 - quality of water testing data for the lake
2. Are you aware of funding for volunteer projects for fish habitat improvement?
 - contact us with any queries or suggestions regarding eligibility requirements
3. Are you aware of habitat degradation in Hatzic Lake due to low lake levels?
 - evidence of trapped fish
 - reduction in accessibility in fish passageways due to low lake levels
 - elevation of water temperatures in the lake
4. Can you add to our records of Sturgeon sightings in Hatzic Lake?
5. Do you have concerns with lake level controls in late summer? Are you in favour?
6. Can you provide volunteer assistance?
7. Can you contribute materials (wood, concrete, aluminum) or heavy equipment for the installation of a test system?
8. Can you contribute digital flow measuring devices or gauges?
9. Do you have expertise in hydraulics and fluid flow for evaluating outflows with various designs of the fish ladder?
10. Do you have experience with fish ladders and their installation?
11. Do varying lake levels affect in any way a commercial enterprise you may have ?

All of these questions are relevant and many answers are required. During and after a test installation, a wealth of data will be collected. Any assistance you may provide will be greatly appreciated. Any feedback or comments you may provide are most welcome and specifically requested.

Background information on the lake and the proposed installation is provided hereinafter.

**Thank you,
DAID Lake Level Select Committee**

Mary Bryant, Robert Dale, Ernie Loewen, Ron Pearson, Joel Pineau, Peter Schalkx,
David Scott, Steve Dimond, Chairman

DISTRIBUTION LIST : CALL FOR FEEDBACK & SUPPORT

Changes to Hatzic Lake - Improving the Habitat - Improving the Recreational Opportunities

Elected Officials

Randy Hawes, MLA, Mission

33058 - 1st Avenue
Mission, BC, V2V 1G3
randy.hawes.mla@leg.bc.ca
(604) 820-6203
Copy: Wilson Sieg, Exec Asst
wilson.sieg@leg.bc.ca

Chuck Strahl, MP, Chilliwack-Fraser Canyon

Deputy Speaker of the House of Commons
Unit 108-8615 Young Road
Chilliwack, BC, V2P 4P3
Phone: (604) 792-4070
FX: (604) 792-4234
riding@chuckstrahl.com

Mr. Randy Kamp, MP, Dewdney Alouette

Conservative Deputy Critic for Fisheries and Oceans
22720 Lougheed Hwy
Maple Ridge, BC, V2X 2V6
tel: (604) 466-2761
FX: 604-463-4927
randy@randykamp.com

Honourable Bill Barisoff

Minister of Water, Land and Air Protection
Telephone: 250 387-1187
Facsimile: 250 387-1356
PO BOX 9047, STN PROV GOVT.
Victoria, BC, V8W 9E2
Bill.Barisoff.MLA@leg.bc.ca

Honourable John van Dongen

Minister of Agriculture, Food and Fisheries
PO Box 9058, STN PROV GOVT
Victoria, BC, V8W 9E2
Phone: 250 387-1023
Fax: 250 387-1522
John.Vandongen.MLA@leg.bc.ca

Lloyd McKimmon, Dir., Electoral Area G

Fraser Valley Regional District
& Hatzic OCP Committee
45950 Cheam Avenue
Chilliwack, BC, V2P 1N6
Ph: 604-826-9382
lmckimmon@fvrld.bc.ca

Dick Bogstie, Dir., Electoral Area F

Fraser Valley Regional District
& Hatzic Valley Watershed Committee
45950 Cheam Avenue
Chilliwack, BC, V2P 1N6
Ph: 604-702-5000
Fax: 604-792-9684
dbogstie@fvrld.bc.ca

Mayor Abe Neufeld, Mission, B.C.

& Fraser Valley Regional District Board
& Emergency Program Exec Committee
District of Mission,
8645 Stave Lake Street,
Box 20, Mission, B.C., V2V 4L9
604-820-3704
aneufeld@mission.ca

First Nations

X : YTEM Longhouse Interpretive Centre

35087 Lougheed Highway
Mission, British Columbia,
Canada V2V 6T1
Phone: (604) 820-9725,
Fax: (604) 820-9735
xaytem@dowco.com

St : I Development Corporation

Unit 29 - 6014 Vedder Road
Chilliwack, BC V2R 5M4
Tel: 604-858-0009
Fax: 604-858-3829
sdcmgr@uniserve.com

St : I Nation

Building #1-7201 Vedder Road
Sardis, BC, V2R 4G5
Tel: (604) 858-3366
Fax: (604) 824-2424
Toll Free 1-800-665-3224
Valerie Sam - Lands Manager
valerie.sam@stolonation.bc.ca

Government

Graham Daneluz

Planner I - Long Range
Hatzic OCP Coordinator
Fraser Valley Regional District
45950 Cheam Avenue,
Chilliwack BC V2P 1N6
Tel: 604 702-5046
Fax: 604 792-9684
gdaneluz@fvrld.bc.ca

Glen Robertson

Chief Administrative Officer
District of Mission
8645 Stave Lake Street,
Box 20, Mission, B.C., V2V 4L9
604-820-3704
Glen_Robertson@mission.ca

Storrier, Brian

Director Of Parks, Recreation And Culture
District Of Mission
8645 Stave Lake Street,
Box 20, Mission, B.C., V2V 4L9
604-820-5355
Brian_Storrier@mission.ca

Edwards Bruce, FVRD Coordinator

Provincial Emergency Program
Hartley Road
Mission BC
tel: (604) 820-3646
CBFire@telus.net

Neil J Peters

Section Head, Flood Hazard Management
& Inspector of Dikes
Ministry of Water, Land and Air Protection
10470 152nd St, Surrey, BC, V3R 0Y3
Tel: 604 582-5301
Fax: 604 930-7119
Neil.Peters@gems3.gov.bc.ca

Ron Henry, P.Eng.

River Engineering Specialist and Deputy
Inspector of Dykes
Ministry of Water, Land and Air Protection
10470-152 Street,
Surrey, BC, V3R 0Y3
PH. 604 582-5371
Fax 604 930-7119
Ron.Henry@gems6.gov.bc.ca

Bob Herath,

Land & Water Licensed Officer
Land and Water Operations Division
200 - 10428 153rd St
Surrey, BC, V3R 1E1
Tel: 604 586-4423
Fax: 604 586-4434
Bob.Herath@gems1.gov.bc.ca

Ministry of Sustainable Resource Management

B.C. Conservation Data Centre
P.O. Box 9358 Stn Prov Govt
Victoria, BC. V8W 9M2
<http://srmwww.gov.bc.ca/cdc/cdcdata@victoria1.gov.bc.ca>

Ministry of Water, Land & Air Protection

Biodiversity and Conservation Section,
Wildlife Branch
PO Box 9398 Stn Prov Govt
Victoria, BC V8W 9M4
Fax: (250) 356-9145
Telephone: (250) 356-9343
<http://wlapwww.gov.bc.ca/wld/gail.harcombe@gems4.gov.bc.ca>
Wildlife@victoria1.gov.bc.ca

HCTF - Habitat Conservation Trust Fund

Elizabeth Stanlake
Head, Biologist and Evaluation Services
PO Box 9354 Stn Prov Govt
Victoria, BC, V8W 9M1
Liz.Stanlake@gems4.gov.bc.ca

British Columbia Conservation Data Centre

Andrew Harcombe, Manager
Ministry of Environment, Land and Parks
PO BOX 9358 STN PROV GOVT
Victoria, BC, V8W 9M2
Tel: 250 387-9798
Fax: 250 387-2733
andrew.harcombe@gems2.gov.bc.ca

Fraser Health, Corporate Office

300 - 10334 - 152A Street
Surrey, BC, V3R 7P8
Phone 1-877-935-5669
604-587-4600
Fax 604-587-4666
feedback@fraserhealth.ca

Health Protection / Licensing

32618 Logan Ave,
Mission, BC° V2V 6C7
Phone: 604-814-5515
Fax: 604-814-5518

Environmental Groups

Fraser River Sturgeon Conservation Society

Troy C. Nelson, Executive Director,
Resource Management Biologist,
c/o LGL Limited environmental research
associates
3299 137-A Street Crescent Beach,
BC V4P 2B5 CANADA
Phone: 604-535-1768
Fax: 604-535-1769
tnelson@lgl.com

The Fraser Valley Salmon Society

Fraser Valley Salmon Society
P.O. Box 42, Chilliwack Stn. Main
Chilliwack, B.C., V2P 6H7
fraservalleysalmonsociety@shaw.ca

NatureServe Canada

Steve Curtis, Dir, Canada Partnerships
phone: (613) 759-1861
email: curtiss@agr.gc.ca

Canadian Wildlife Service

Environment Canada
Ottawa, Ontario °K1A 0H3
Tel.: (819) 953-3215
Fax: (819) 994-3684
cosewic/cosepac@ec.gc.ca

Ducks Unlimited Canada

Institute for Wetland and Waterfowl
Research
P.O. Box 1160
Stonewall, Manitoba, R0C 2Z0
iwwr@ducks.ca
webfoot@ducks.ca

Ducks Unlimited Canada, BC Branch

954 A Laval Cres.
Kamloops, BC, V2C 5P5
Tel: (250) 374-8307
fax: (250) 374-6287
du_kamloops@ducks.ca

Habitat Conservation Trust Fund

Brian Springinotic, Manager
PO Box 9354, Stn Prov Govt
Victoria, BC, V8W 9M1
Toll Free Number: 1-800-387-9853
Local Number: 387-9853
Fax Number: 250-952-6684
brian.springinotic@gems9.gov.bc.ca

Vancity EnviroFund® Grants

VanCity Centre, PO Box 2120
Station Terminal, Vancouver, BC
V6B 5R8
1 (888) VANCITY
(604) 877-7000
moira_teevan@vancity.com

VanCity, Branch 36

Unit 150 - 32555 London Avenue
Mission, BC, V2V 6M7
604-877-7000

Administrator, Shell Environmental Fund

PO Box 100, Station M,
Calgary, AB, T2P 2H5
Phone: (403) 691-2071
Toll-Free: (800) 338-1410
Fax: (403) 269-8031
admin.sef@shell.ca
<http://www.shell.ca/sef>

Habitat Conservation Trust Fund

P.O. Box 9354, Stn. Prov. Gov t.
Victoria, B.C., V8W 9M1
Toll-Free: 1-800-387-9853
Fax: (250) 952-6684
<http://www.hctf.ca>

Wilburforce Foundation

3601 Fremont Avenue North, Suite 304
Seattle, Washington 98103-8753, U.S.A.
Sam Tucker, B.C. Representative
Phone: (206) 632-2325, ext.106
Fax: (206) 632-2326
grants@wilburforce.org
sam@wilburforce.org
<http://www.wilburforce.org>

Mountain Equipment Co-op

Environment Fund Coordinator,
149 W 4th Ave Vancouver, B.C., V5Y 4A6
Phone: (604) 707-3343
Toll Free: 1-866-MEC-FUND
Fax: (604) 731-3814
envirofund@mec.ca
<http://www.mec.ca/envirofund>

The Brainerd Foundation

Ann Krumboltz, Executive Director
1601 Second Ave., Suite 610
Seattle, WA 98101
Phone: (206) 448-0676
Fax: (206) 448-7222
E-mail: info@brainerd.org
Website: <http://www.brainerd.org>

Friends of the Environment Fund (FEF)

Tanya Bell, Regional Manager
700 West Georgia Street
TD Tower - 3rd Floor
Vancouver, BC V7Y 1A2
Tel: (604) 654-8832
Fax: (604) 654-5531
tanya.bell@td.com
<http://www.fef.ca>

The West Coast Environmental Law Research Foundation

1001 - 207 West Hastings,
Vancouver, B.C., V6B 1H7,
Phone (604) 684-7378
fax (604) 684-1312
wcelrf@unixg.ubc.ca

Pacific Salmon Foundation - Grants

Mr. Ian Angus, President
Suite 430 - 744 West Hastings St.
Vancouver, British Columbia V6C 1A5
Phone: (604) 664-7664
Fax: (604) 664-7665
salmon@psf.ca
www.psf.ca

Resources for Community Collaboration

Kimery Wiltshire, Project Director
1001 Bridgeway #703
Sausalito, California, 94965
Phone: (415) 332-1230
Fax: (415) 332.2250
grants@rccproject.org
<http://www.rccproject.org/>

Real Estate Foundation of British Columbia

Suite 570 - 355 Burrard Street
Vancouver, BC V6C 2G8
Telephone: 604-688-6800
Fax: 604-688-3669
pgomez@realestatefoundation.com

Living Oceans Society,

PO Box 320,
Sointula, BC, V0N 3E0
Phone: (250) 973-6580
Fax: (250) 973-6581
info@livingoceans.org

North Fraser Community Futures Development Corporation

2386 Fletcher Avenue
Mission, BC V2V 5T1
Phone: (604) 826-6252
Toll Free: (888) 826-6252
Fax: (604) 826-0052
cfdc@northfraser.org

Fraser Basin Council

Fraser Valley Regional Office
Regional Coordinator: Marion Robinson
PO Box 3006
Mission, BC V2V 4J3
Tel: (604) 826-1661
Fax: (604) 826-6848
mrobinson@fraserbasin.bc.ca

Industry - Business**Canadian Pacific Railway**

Gulf Canada Square
401-9th Ave. SW
Calgary, Alberta, T2P 4Z4
(888) 333 6370
community_connect@cpr.ca

Lindsay Morris Consulting Services

525 Ascot Street
Coquitlam, BC, V3J 6H5
604 936-1418
ljmorris@shaw.ca

Albert Godin

Terasen Pumps

3175 Turner Street
Abbotsford, V2S 7T9
Tel: 604-557-4786
fax: 604-557-4780
www.terasen.com
albert.godin@terasen.com

Terasen Gas

Dean Pelkey, Media Relations Manager
Phone: (604) 576-7300
dean.pelkey@terasengas.com

Sidhu and Sons Nursery

9623 Sylvester Road
Mission, B.C., V2V 7K6
Tel: (604) 826-3537
Fax: (604) 820-9680
info@sidhunursery.com

Anderson Sod Farm

attn: Mike Anderson
36422 Hyde Buker Road
Box 131 Dewdney, BC, V0M 1H0
Mission: 1.604.826.2383
info@andersonsod.com

Golder Associates Ltd.

Jay Hammond, MSc., B.Sc., R.P.Biologist
Environmental Resources Manager
#500 - 4260 Still Creek Drive
Burnaby, BC, V5C 6C6
Tel: (604) 296-4230
Fax: (604) 298-5253
jhammond@golder.com

Fred s Fishing Adventures

Unit #1, 5580 Vedder Road
Chilliwack, BC Canada V2R 3M7
Ph: 1-604-858-7344
info@freds-bc.com

British Columbia Real Estate Assoc.

600 - 2695 Granville Street
Vancouver, BC V6H 3H4
Phone: 604.683.7702
Fax: 604.683.8601
bcrea@bcrea.bc.ca

Genstar Development Co,

4585 Canada Way # 104,
Burnaby, BC, V5G 4L6
Tel: 604-299-4325
Fax: 604-294-5214
Geoff Croll, Development Manager
info@silvermere.ca
vancouver@genstar.com

Fraser Valley Building Supplies Inc

(604) 820-1134
7072 Wren Street
Mission, BC, V2V 3B1
Phone: 820-1134
Fax: 820-9494
Contact: David Nick
Email: fvbs@msn.com

Rona Revy Home & Garden #120

32290 Lougheed Hwy
Mission, BC, V2V 1A4
Ph (604) 826-6248
Fax (604) 826-9105

Home Depot #7141

1956 Vedder Way
Abbotsford, BC, V2S 8K1
Ph (604) 851-4400

Harrison Hot Springs Marina

P.O. Box 15, 102 Rockwell Drive,
Harrison Hot Springs, BC, V0M 1K0
nmoser@telus.net
604.796.8623

Lafarge Canada Inc.,

Construction Materials Group
2300 Rogers Avenue,
Coquitlam, BC, V3K 5X6
Phone: 604.521.8811
Fax: 604.521.8800
Contact: Brad Kohl
<http://www.lafargenorthamerica.com/>

LAFARGE CANADA INC. Aggregate Div.

1080 Bradner Road
Abbotsford BC, V4X 1H8
Phone: 604-856-5521
Fax: 604-856-2877
Contact: Tony Genovese
tony.genovese@lafarge-na.com

Allard Contractors Ltd.

PO Box 47,
Port Coquitlam, BC, V3C 3V5
Phone: 604.944.2556
Fax: 604.464.7794
James T.Allard, B.Sc
jtallard@telus.net

Mainland Sand & Gravel Ltd.

9512 - 194A Street,
Surrey, BC, V4N 4G5
Phone: 604.882.5650
Fax: 604.882.5660
Contact: Brian Weeks
bweeks@mainlandsg.com

Davies Sand & Gravel

7085 Bridge St
Mission, BC V2V 2X5
Phone: 604-826-6736
Fax: 604-826-6716
Pager: 604-504-6316
dsg@uniserve.com

Fraser Valley Aggregates Ltd.

17341- 56 th Avenue,
Surrey, BC, V3S 1C2
Phone: 604.576.1361
Fax: 604.576.8631
Contact: Gary Breaks
<http://fvagg.com/>
breaksbulldozing@telus.net
shirleyw@bbcontracting.com

B&B Contracting Ltd.

17341 56th Avenue
Surrey BC Canada V3S 1C2
Phone: 604-576-1361
Fax: 604-576-8631
info@bbcontracting.com

Ekset Contracting Ltd.

10200 Sylvester Road
Mission, B.C., V0M 1H0
Phone: (604) 826-2404
c/o BBContracting

Castle Aggregates

7753 Taulbut Street,
Mission, BC, V2V 4X4
Phone : 1.604.814.2777
Fax : 1.604.814.2770
Contact : Len Castle
rockwoman2000@shaw.ca

Zorbie Products Ltd.

30624 Dewdney Trunk Road,
Mission, BC V4S 1C3
Phone: 604.290.2218
Fax :604.462.9548
Contact: Russ Simpson
info@zorbieman.com
www.zorbieman.com

Rivtow Marine Inc.

PO Box 3650,
Vancouver, BC V6B 3Y8
Phone: 604.251.0222
Fax: 604.251.0213
Contact: Robert Dodds
generalbarging@rivtow.com

Swans Point Resort and Trailer Park

9341 Shook Road,
Mission, BC, V2V 7M2
British Columbia
(604) 826-2328
Chris Ker, chris@repax.net
eric@thalen.ca
glen_dennis@telus.net

Everglades Resort

The Management Board
8400 Shook Road
Mission, B.C.
tel: (604) 826-3858
fax: (604) 826-3858
azastre@telus.net
qualityinsertions@telus.net

Thank You

**for any and all
feedback and assistance
you may provide in this worthwhile
community cause.**

Hatzic Lake, Mission, B.C.

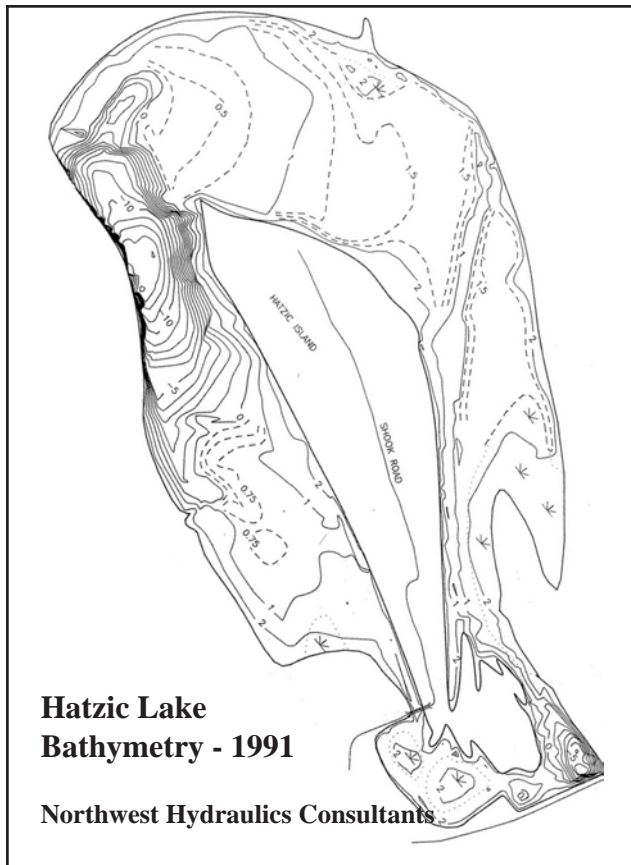
Background on Water Levels

The water levels in Hatzic Lake are completely dependent on the level of the Fraser River.

When the Fraser River levels are low, generally most times outside of June through August, the lake levels are also low — water simply drains out of the gravity gates at the dike. Over time, with silt and sand deposition from upstream tributaries, the lake bottom has also risen. The combination of low water and higher bottom elevations means there is often insufficient water in areas of the lake for even the smallest of fish to pass through the system.

The bathymetry of the lake changes with each passing year of sediment deposition. We can see from a 1991 survey completed by Northwest Hydraulics Consultants that large sections of the lake are less than 1 metre in depth at the height of the summer waters (2.55m water surface elevation - geodetic). When one sees the lake during low water periods, as is shown in the spring 1999 air photo, there is a large difference in water surface areas. In fact, during low water, there are over 70 hectares of exposed sand bed - roughly one quarter of the lake.

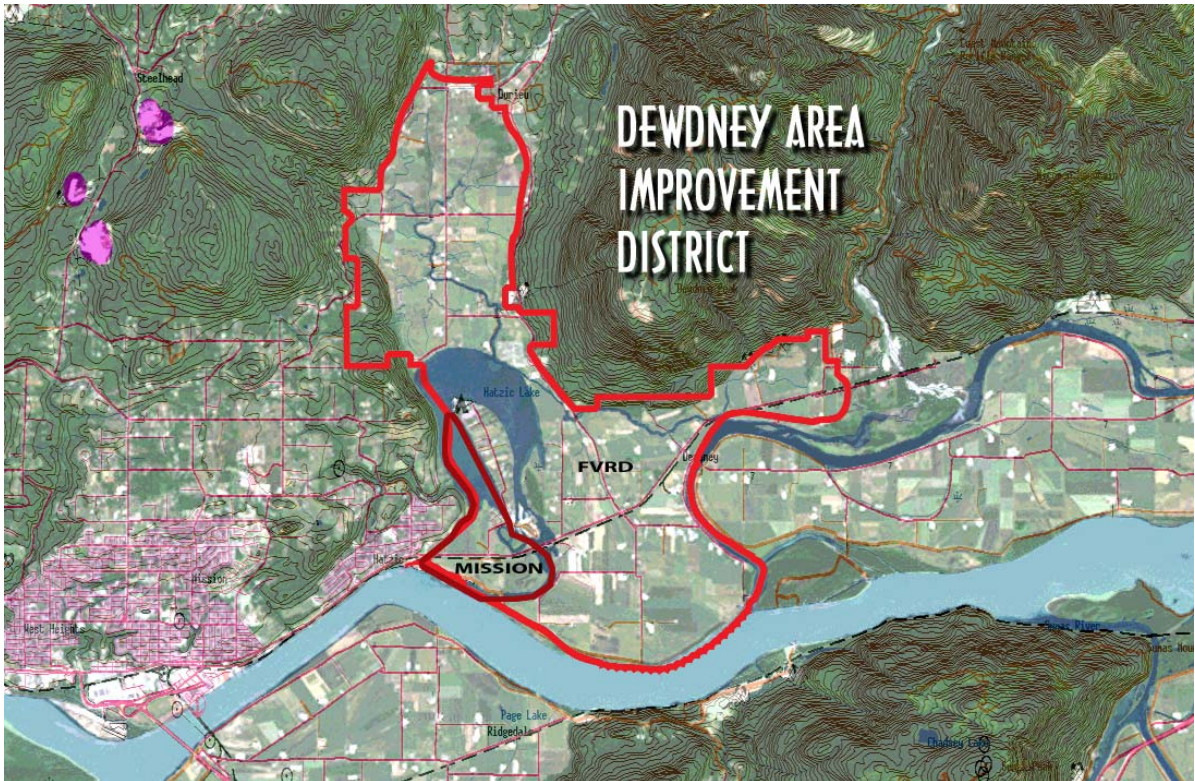
In August and September, 2003, meaningful data was gathered during a 10 day flow control install when the lake outflow was restricted and water levels were gauged at numerous locations around the lake. The results proved that Hatzic Lake has significant and separate areas which uniquely contribute to the water movement patterns in the lake, depending on the water levels in the lake.



The lake level at the pumphouse rose over that 2003 10 day period a total of 33 cm. During the first 5 days, only the east side of the lake rose and it was not until the levels had reached about 1.6m at the dike (a 30 cm increase on the east side), did we have any movement in the water level on the west side of the lake. Water flow from Legace Creek did not contribute to the west side elevation until the levels south of the Shook Road bridge allowed a northward flow. During low



Aerial Photo of Hatzic Lake and Valley. (top)
Dewdney Area Improvement District, east of Mission, BC (bottom)



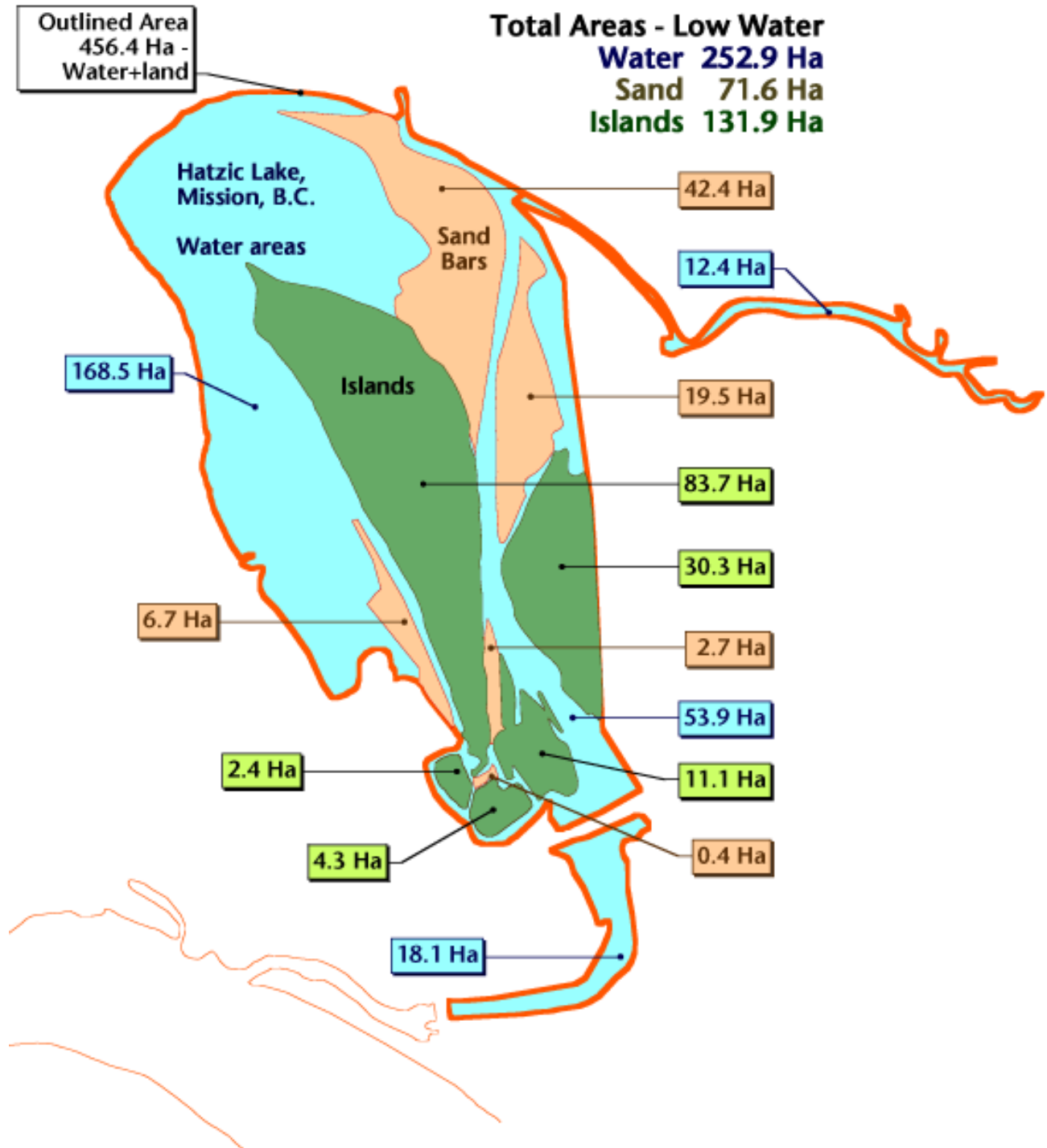
lake conditions, the sand bars in the north end of the lake completely cut off waters from Legace Creek to the west side of the lake. We see this scenario all too often.

We can approximate the net water inflow during this dry, low water period of September 2003. While there was some water flowing out of the system and the surface areas did increase marginally as water levels increased, it can be estimated that the water inflow to the lake was 0.75 to 1.0 m³ per second. (84.4 Ha (east side of lake, plus Chilqua and Hatzic Slough) x 10,000 m² /Ha x 0.3m rise = 253,200 m³ net water inflow over 4 days x 24 hour/day x 3600 s/hr = 0.73 m³ per second inflow.) During winter storm events, this water inflow can increase to 100 m³ per second and higher. Outflows to the Fraser River can be significant and well over 60 m³/s through the outflow boxes.



Annual low Hatzic Lake levels. Photos from 2003, 2001

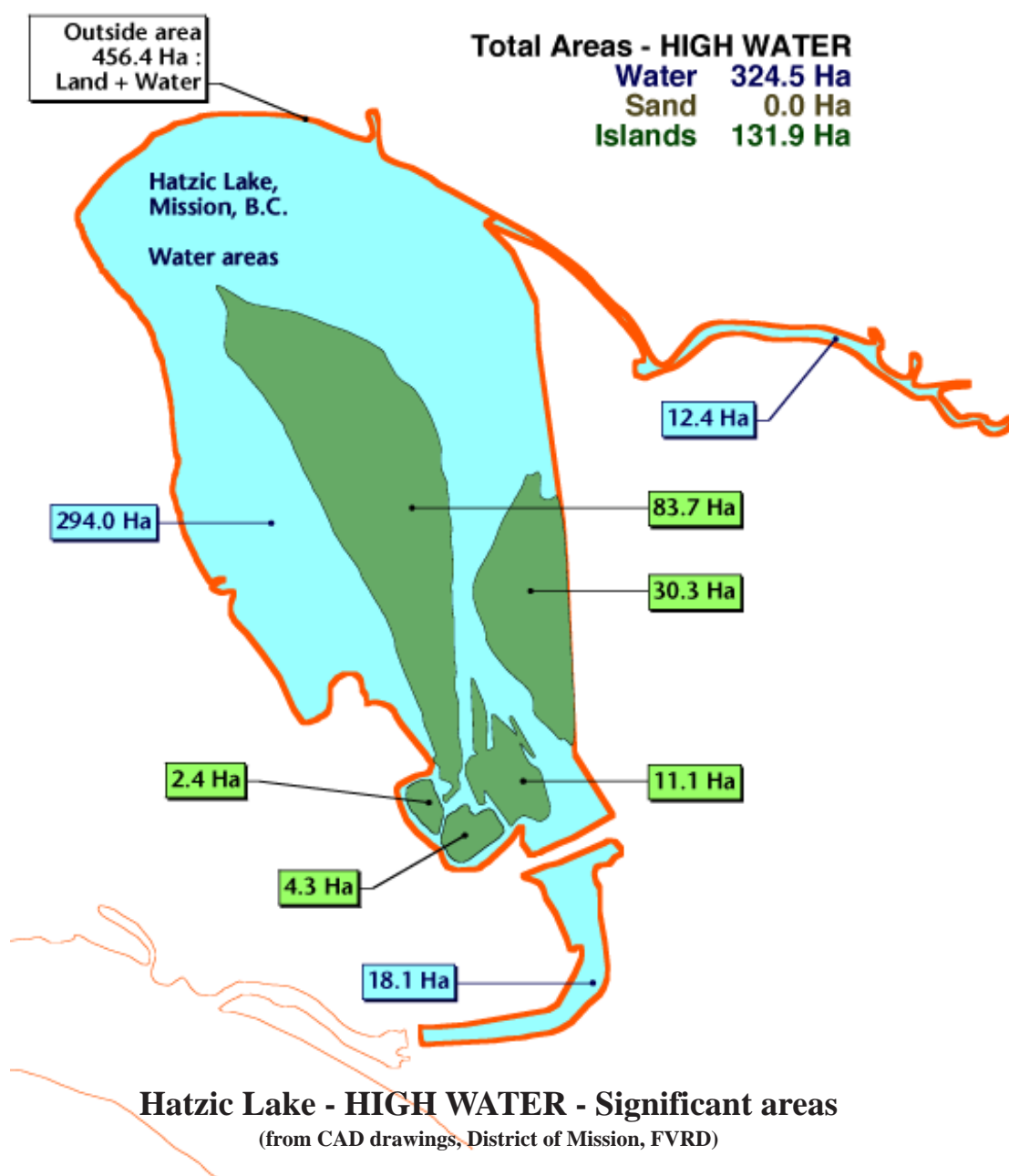




Hatzic Lake - LOW WATER - Significant areas
(from CAD drawings, District of Mission, FVRD)

We learned that storage capabilities provided by the lake are significantly reduced for lake levels below 1.6 m. With only 84.4 hectares of water surface area, less than 1/4 of the full lake (324.5 ha) storage volume per vertical foot is available. In a storm event, where lake net inflows reached 20 m³/s, the storage provided in 0.3m over this reduced area of 84.4 ha would be filled in 3 hour and 30 minutes. During winter storms, we have seen the lake rise at 0.60 m in 24 hours or, with the 324.5 Ha in use, at a sustained net rate of 22.5 m³/s. To put in relative terms, the storage in 0.3m (1 foot) on 84.4 hectares of lake equates to a depth of 0.067m, (2.7 inches), over the 380 hectares of low farmlands in the Hatzic prairie identified by ARDSA criteria.

It can be said based on this that keeping the lake level at a minimum level of approximately 1.7m would not significantly contribute to flooding in the area.



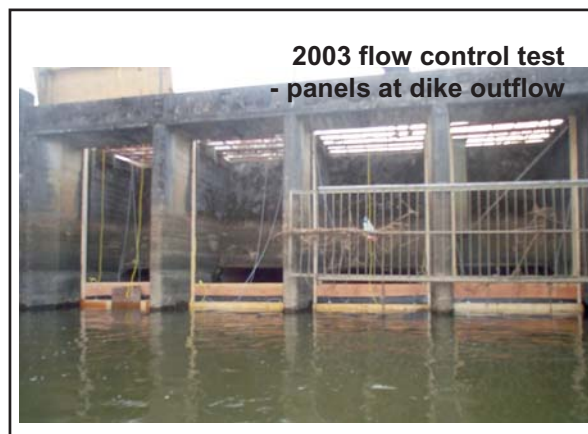
Low water levels have numerous negative effects :

- a) **Potential to trap fish** in ponds created as levels subside.
- b) **Warming of water temperature in the shallow areas of the lake.** 22°C is lethal to salmon. We found water temperatures up to 27°C in the lake. Dead fish were reported throughout the late summer and fall periods.
- c) **Passageway restriction for spawning salmon and rearing sturgeon.** In the fall of 2001 and 2002 Hatzic Lake water levels were so low that fish passage through to the spawning areas was not possible for many. Dead salmon were widely observed in the 3 to 6 inches of water in the channel on a number of occasions. As well, juvenile sturgeon require 0.5m water depth to survive which is much more than the 0.23m required for salmon.
- d) **Increased weed growth** — milfoil. The past two warm and dry summers have resulted in extremely low lake levels and increased water temperatures. Water levels have been at normal summer levels for less than 40 days each summer in 2003 and 2004. Weed growth in the lake is reported to be the worst it has ever been.
- e) **Increased potential for bacterial growth and coliform** from, in part, exposed and baked bird droppings and elevated water temperatures.
- f) **Elimination of pumping ability for irrigation of farmlands.** The installed works in 2003 came about in part because a lakeside nursery with 5,000,000 plants could not irrigate from the lake. 250 jobs were at risk and the 10 day installation assisted in keeping the operation functioning.
- g) **Elimination of water pumping for fire suppression.** We all recall the Okanagan fires of 2003 and there should be water available in the lake for this purpose.
- h) **Reduction/elimination of recreational opportunities.** (canoes, fishing, swimming)
- i) **Visually unsightly** mud bottom exposed.

The key factor towards seasonal lake and flow controls is to show that elevated water levels in August and September would not significantly increase the change of flooding.

One positive of having low lake levels is an increased storage capacity within the lake for storm drainage with a resulting reduced chance of flooding. Quantifying this chance of flooding will be the subject of a separate review. Everglades Resort has contributed \$5,000 towards this study. If it can be shown that the risk of flooding or the change in risk is small and manageable, modifications to the lake levels could proceed to improve upon the numerous negative effects.

One further result of the 2003 experience is that the installed works at the dike are far less than ideal when considering the permanent residents of the waterways — fish. Since the Fraser River is tidal, and has up to a 2 metre tide at the dike, there are extended periods of time where fish access to the lake is cut off. The recommended top speed of water flow is 1.5m/s for passage of juvenile salmon. During low water levels and low tides, water will still pass out of the lake at speeds in



excess of this. Thus, between shut-off periods and periods of higher exit water velocity, the entrance to the lake is not accessible for juvenile salmon.

Even though the 2003 installation at the dike to restrict water flow rates out of the lake did have openings for fish, the water velocities through those openings proved to be too high. However, even with those conditions, we found that juvenile fish access to the lake could be increased by up to 80% with simple modifications to the works which were in place.

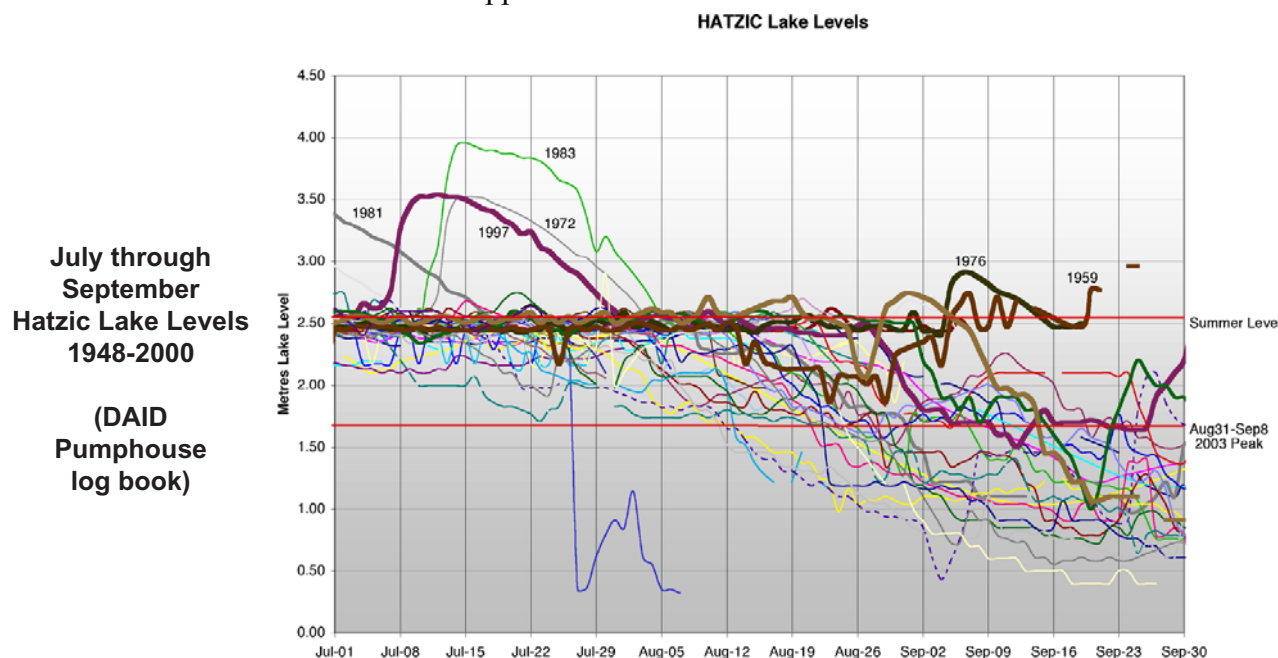
Since September 2003, a detailed review of both water velocities and the design of fish weirs and openings has been undertaken. A member of the committee completed the design of a fish ladder/weir system which could increase access for fish to the lake up to 280% of that which exists today. The committee would like to undertake a test installation with this type of design in order to observe the flows at the dike, fish access patterns, and the impacts throughout the system.

Support for Control of Hatzic Lake Summer Water Levels

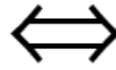
The support for improved control for summer water levels is extremely high amongst the residents of the area. A study completed by the Fraser Valley Regional District during the completion of the area Official Community Plan found that 60% of respondents ranked the low summer lake level as the most important issue facing the community.

A meeting in the summer of 2003 convened on the island and a petition circulated received well over 400 signatures in support of summer lake level controls. A significant portion of this 400+ would have been from the 639 owned recreational and residential sites on Hatzic Island who collectively only have 9 of the just over 500 DAID votes.

A review of the Hatzic Ratepayers minutes from the 1970 s and early 1980 s found a number of requests for control of lake levels. This situation is not new and a solution has been sought for decades. We would like to make it happen.



July through September Hatzic Lake Levels 1948-2000 (DAID Pumphouse log book)



From Flood to Drought - yearly sightings on Hatzic Lake.

Do fish get stranded?



Annual low Hatzic Lake levels. Above photos from 2003, 2001. March, September. Below from www.fvrd.bc.ca



Proposed Installation

The committee has targetted an installation which would accommodate improved fish access to the lake and allow for the control of water flows out of the lake. The photo illustrates where the works would be installed at the dike. Further work is required to determine the most appropriate materials and final design for a test installation. The results will contribute towards a permanent improvement to lake outflows and habitat conditions.

In addition, further gauges would be installed around the lake to permit detailed records of water levels. Specific attention to the surrounding environment will be required. This includes, foremost, the Fraser River levels, and precipitation amounts. Because the test installation would be manually controlled, attention is required each day during the test.

The water levels in the lake during the test installation could be regulated by the heights of the control devices at the dike. With control of these heights, the lake level can be controlled and allowed to rise or fall to meet any requirements for, say, upstream instream works which may be planned in Legace Creek and above. The test installation will allow changing of lake water levels (up or down) and monitoring of ground water levels, and creek levels up to the Dale Road bridge.

A test installation would not interfere with any instream works planned upstream of Hatzic Lake.

Significant volunteer person-hours would be expended in the recording of data and regular visits to the pumphouse during the test period proposed. The design of the fish ladder has not been done in detail. However, it is expected that costs for the test installation could range from \$20,000 to \$50,000 depending on the design and the level of contributed time and materials. A volunteer effort with donated materials could make it happen for less.



**Proposed concept - fish access weirs on north flood box
(photo from 2003 installation)**

Flooding in Hatzic Lake

Flooding events in Hatzic Lake range from nuisance events, felt more at Everglades Resort than in other areas, to full scale valley-wide flood events with associated road closures and Provincial Emergency Program (PEP) involvement.. Flooding is largely related to the level of the Fraser River - if the Fraser is high, there is no natural drainage out of the watershed. River levels largely dictate the type and severity of floods around the lake. We have seen no flooding when the level of the Fraser River remains low - below about 1.5 m.

Nuisance lake flood events : Typically, these would result from brief storm events where lake water levels rise to between 2.6 and 2.9 m - \approx 1 foot higher than summer norms..

Minor lake flood events : These lake flood events would include lake levels which rise above 2.9m and up to 3.2m.

Major lake flood events : Major lake floods would be after significant storm events and result in removal of trailers from Everglades Resort, closure of roads in the Hatzic Valley, and water levels rising in prairie drainage ditches.

Hatzic prairie flood events : Serious flooding in the Hatzic prairie can occur with only nuisance flooding on the lake. Siltation over time has raised the levels of the valley creek bottoms and the inability of the watershed creek systems to accommodate large flows leads to flooding over the prairie floor. When these events continue with some duration, levels in the lake rise and may extend through the three types of lake events.



October 2003 @3.5m - Peak @3.8m



June 2000 @ 3.2m - Peak @3.3m



3 photos January 2005. Prairie flooding, but only nuisance flooding at Everglades (same day)



The risk of flooding in August and September is low for two reasons. Firstly, the total precipitation is low during this period and, secondly, the Fraser River is low during this period. Pumphouse data shows Hatzic Lake has never flooded where the Fraser River has remained below 1.5 metres. Although the storms of 2004 and 2005 have shown that the lake level can be 0.85 metres higher at the Lougheed bridge than the lake level recorded at the pumphouse.

In terms of flooding, summer events have the longest duration (# of major flood days. - 75 days for June and July, 24 for November and December) However, for all 50 + years of pumphouse records, the number of months where flooding occurred is higher for November and December than for June and July.

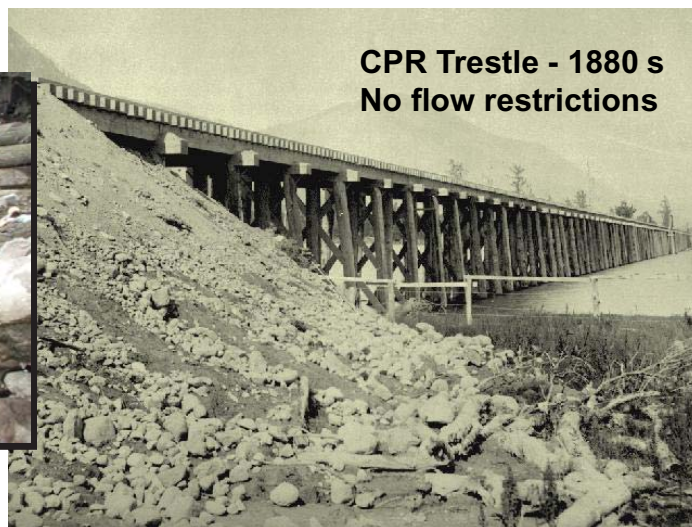
	# Days Pumps Operating	# Flood Days > 2.6m	# Flood Days > 2.9m	# Major Flood Days > 3.2m	# Major Floods >3.2m
January	-	4	-	-	-
February	10	8	4	3	1
March	2	1	-	-	-
April	17	15	1	1	1
May	802	130	24	8	2
June	1,312	227	79	27	3
July	987	122	68	48	4
August	272	22	2	-	-
September	39	27	3	-	-
October	16	12	7	-	-
November	25	30	18	14	5
December	25	23	19	10	6
	18,993	3,507	621	225	111
				111	22

Pumphouse Data to 2000 (levels recorded AT pumphouse - inside and outside of dike)

The winter floods are thus more frequent. This is because the Fraser River levels eventually fall to allow the lake water to free flow out. However, the actual winter event occurrences would be higher due to the restriction at the CPR culvert and consequent higher lake levels north of the culvert.



1 of 3 CPR Culverts relining - 2000



CPR Trestle - 1880 s
No flow restrictions

Some members of the committee strongly suspected that inward leakage of water at the dike during high Fraser River levels is a contributor to flooding on the lake, and the resulting length of floods in the Hatzic Prairie. Because the flap gates at the dike operate on pressure and gravity principles, where the river and lake levels rise slowly, the gates will not shut tight.

As part of a monitoring program, the flows at the dike can be recorded for this instance and the gates will be investigated for their ability to seal at the dike.

Data Application and Collection — Further Conclusions to-Date

Since 1948, records have been kept at the pumphouse for water levels on the Fraser River side and on the Hatzic Slough (lake) side. As part of the monitoring program in 2003, gauges were set in a number of locations and, in 2004, further gauges were constructed from aluminum and surveyed in to further locations.

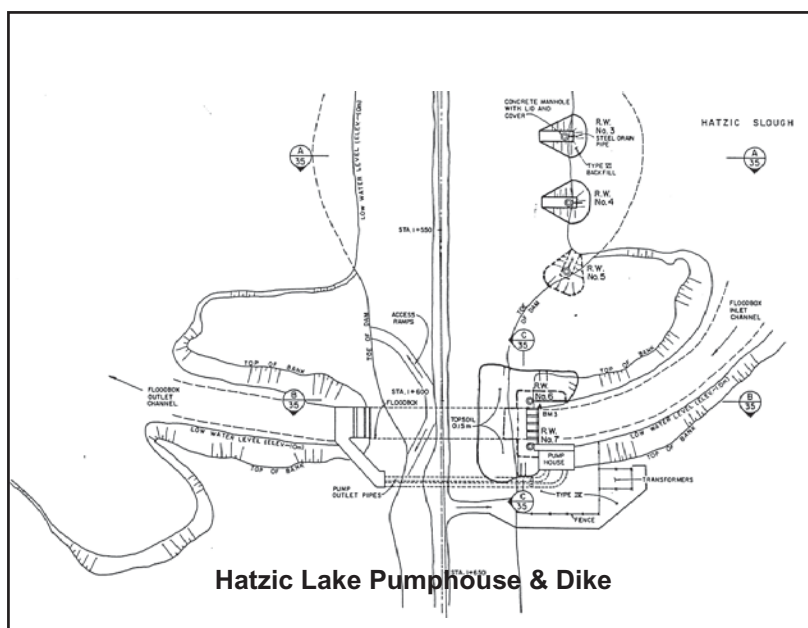
As a result of this, a number of key findings in the November 2004 flood and the January 2005 flood. In each case, the lake water levels at the Lougheed Bridge, north of the CPR culverts, were found to be much higher than in the Hatzic Slough, 1300 m west inside of the dike. This fact raises questions about the data available at the dike. Since the levels were seen to be as much as 0.86 m difference, the number of flood occurrences in winter months must be more than is recorded at the dike and shown in the above chart ! This would not be the case for summer flooding since high Fraser River levels reduce the outflow volume capable of leaving the lake and thus the head drop across the culvert.

As well, lake levels were at 2.65 m at Lougheed, or just over the flood level start, while the levels at the dike were less than 2.1 m. The pumps are normally turned on at 2.4 m. Thus, even though it was flooding on the lake, the pumps were not turned on due to insufficient suction head.

Further, with a significant drop in the water surface elevation from north of the Lougheed bridge to the dike, there will be a reduction in outflow at the dike when the Fraser River drops due to reduced water levels at the dike and a consequent lessening of the potential head pressure across the dike. Lower head pressure reduces total outflow volumes.

The CPR culverts are contributing to flood conditions.

There is no doubt.

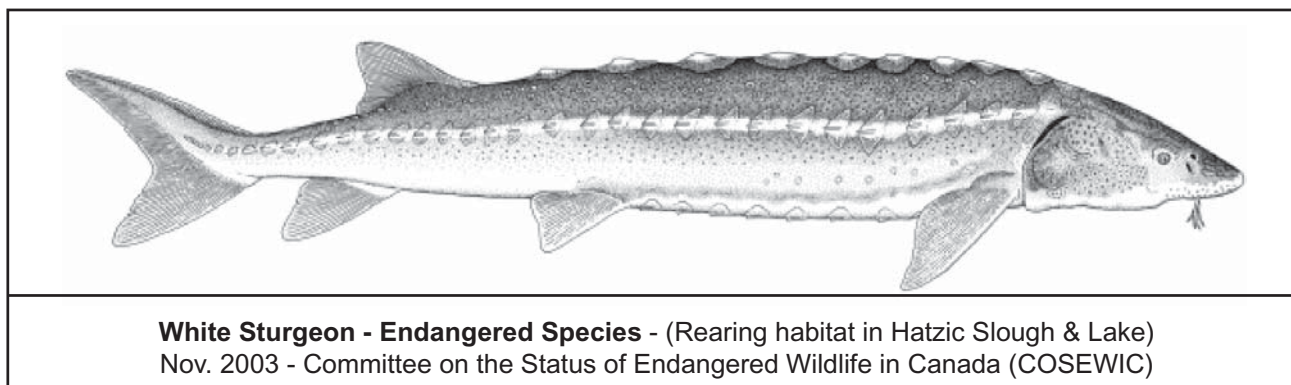


Clearly, this information became apparent with the closer watch on the lake levels by the committee in the past several years and the benefits of this effort are obvious. The increased level of monitoring is responsible for our better understanding of flood conditions and the lake hydraulics. A new test installation will add to this newly recorded knowledge.

Year Round Fish Access

When we view the tide charts for the Mission gauge, we see that the annual tide peak levels are well below summer lake levels and there is up to a 2 m swing from high to low tides. Only during storm events when the Fraser is elevated is there a requirement to have the dike gates closed. With proper controls, the dike could be accessible for fish on a year round basis. It may also be found that setting minimum lake levels for fish habitat may not be a significant contributor to flooding.

The research and investigation has been successful to date in that the hydraulics of the lake are better understood. However, more data collection is necessary. If this pilot project is successful, future installations could afford minimum lake levels for the fish population, useable levels in late summer for recreational purposes, and improved year-round access for fish into the lake.



Pump Upgrade

The only solution to drastically reduce flooding events on Hatzic Lake is to upgrade the existing pumps at the dike. The two existing 55 year old in-line axial pumps are entirely inadequate. However, with a \$6MM price, this solution will require many levels of government assistance.

The committee acknowledges that replacement of the pumps is a primary objective, but also believes that small changes to the installed works can take place in advance of this at much less cost and with significant benefits.

We ask for the support of those who value the fish population, including the regular salmon runs and sturgeon rearing in the Hatzic area. We ask for the support of those who value Hatzic Lake as an asset worthy of improving for the benefit of many.

A test fish ladder installation is proposed and you can help.

Please take the time to contact us with comments, concerns, suggestions, support, volunteer capabilities, and any funding opportunities you may know of or be able to provide.

As volunteers, we know your feedback fuels further success.

We also encourage those who wish to be informed on Hatzic Lake issues to join the email list by sending a request to steve@dimond.ca

Thank you for your time.

DAID Lake Level Select Committee

Hatzic Lake Summary Data

Source: *The Angler s Atlas Feb. 2001*

Surface area:	368 Hectares (909 Acres)
Mean depth:	2.4 metres (8 feet)
Maximum depth:	16.8 metres (55 feet)

Source: *BC Fish & Game Branch, Dept of Recreation & Conservation 1951*

Surface area:	439 Hectares (1084 Acres)
Mean depth:	2.4 metres (8 feet)
Maximum depth:	16.8 metres (55 feet)
Perimeter:	10,460 metres (34,320 feet)
Volume:	8,969,897 m ³ (7272 Acre Feet)
Calc Average Depth:	2.04 metres (vol / surface)

Source: *Northwest Hydraulic Consultants (21 June, 1990)*

(digitized air photo SRS 4335-135)

Surface area:	324.7 Hectares (802 Acres)
Mean Water Surface Elev:	2.55 metres (8.4 feet)
Minimum Bed Elev:	-14.5 metres (47 feet)
Calc Max Depth:	17.05 metres (55.9 feet) (mean-min)
Perimeter:	10,000 metres (32,862 feet)

Source: *Stephen Dimond, M.Sc., P.Eng., DAID Trustee (January 2005)*

(Cadastral CAD files from FVRD and Mission . See images - pages 6 & 7)

Water surface area (LOW):	≈ 222.4 Hectares (550 Acres)
Water surface area (HIGH):	≈ 294.0 Hectares (726 Acres)
Total water surface (HIGH):	≈ 324.5 Hectares (802 Acres) (inc Chilqua & Hatzic Slough)
Sand Bank area (LOW):	≈ 71.6 Hectares (177 Acres)
Water Perimeter (HIGH):	10,094 metres (33,117 feet)
	3,379 metres (11,086 feet Hatzic Slough)
	6,299 metres (20,666 feet Chilqua Slough)

Fish Stocking Data

<i>Species</i>	<i>Date Released</i>	<i># of Fish</i>	<i>Species</i>	<i>Date Released</i>	<i># of Fish</i>
Rainbow Trout	1-Jan-51	10,000	Cutthroat Trout	1-Jan-42	50,000
Rainbow Trout	1-Jan-50	10,000	Rainbow Trout	1-Jan-42	4,000
Rainbow Trout	1-Jan-49	6,107	Cutthroat Trout	1-Jan-41	50,000
Rainbow Trout	1-Jan-48	10,000	Cutthroat Trout	1-Jan-38	25,000
Rainbow Trout	1-Jan-47	10,000	Cutthroat Trout	1-Jan-37	50,000
Rainbow Trout	1-Jan-46	4,000	Cutthroat Trout	1-Jan-35	20,000
Rainbow Trout	1-Jan-45	4,000	Cutthroat Trout	1-Jan-33	20,000
Rainbow Trout	1-Jan-44	100,000	Cutthroat Trout	1-Jan-32	46,000
Rainbow Trout	1-Jan-43	5,000	Cutthroat Trout	1-Jan-31	40,000
Rainbow Trout	1-Jan-43	100,000			