

DEWDNEY AREA IMPROVEMENT DISTRICT
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TRUSTEES BOARD MEETING

Wednesday November 26, 2014 – 7.00 PM
Hatzic Prairie Community Hall, 10845 Farms Road, Hatzic Prairie

MINUTES

In Attendance:

Deb McKay (Acting Chair)
Gus Derewenko
Ernest Loewen
Douglas Sinitsin

Larry Wiens – project manager
Peter Hanslo – administrator and finance officer
Bruce Edwards – engineering consultant
Ron Beck – dike manager
Darrell McDonald – assistant dike manager

Absent:

Doug McNeill
Craig Brooks
Steve Dimond (out of province)
Peter Schalkx
Brett Vander Wyk

**Ratepayers in
attendance:**

45

Call to Order:

Chair 7.03 pm.

Notice:

Acting Chair Deb McKay gave notice to all meeting attendees that the presence of only four trustees failed to meet quorum requirements for conduct of district business (Improvement District Manual, section B page 24 paragraph 3), and that this meeting would proceed on an "information only" basis for BC-FLNRO (Dept. Forests, Lands and Natural Resource Operations) invasive plant specialists Crystal Klym and Becky Brown to give their scheduled presentation on the aggressive Flowering Rush invasion on Hatzic Lake. All other agenda items to be tabled for the next board meeting.

Flowering Rush Presentation hosted by BC-FLNRO's Crystal Klym and Becky Brown

Crystal opened with a slide-presentation providing a biological description of the Flowering Rush, its habitat and reported sightings in two water bodies within B.C. - the Cariboo and the Fraser Valley (Hatzic Lake). Becky followed with a report on the spread of the species within Hatzic Lake, lake margins and the adjunct sloughs, streams and ditches. She described the impact on bodies of water where the Flowering Rush had gained foothold. She also emphasized that treatment methods are extremely limited, and that, once established, populations increase and persist indefinitely. She added that the Ministry will continue its studies on the subject and will provide its own funding in the process. A lengthy question-and-answer session followed the presentation after which Becky expressed her appreciation for audience input which, she said, provided her with better insight into conditions on, and around Hatzic Lake and its environs. A copy of the Ministry's pamphlet hand-out at the meeting, is attached.

Flood Warning: L. Wiens

Mr. Wiens reported that due to the heavy and persistent rainfall over the last several days, all five pumps have been operating to keep Hatzic Lake levels within safety margins. It is calculated that without this pumping capacity lake levels would have been around 3.5 meters above sea level (masl)- major flood conditions. DAID engineering consultant Bruce Edwards' Winter Lake Levels Report forms part of these minutes and has also been posted on DAID's website at www.daid.ca

Ratepayers' question period

All questions raised by district property owners and DAID board members and staff during the course of the evening's meeting, were responded to by BC-FLNRO's Crystal Klym and Becky Brown.

Set date, time and location of next board meeting.

Next board meeting scheduled for Wednesday January 21, 2015 starting 7.00 pm held at the Hatzic Prairie Community Hall, 10845 Farms Road, Hatzic Prairie. B.C.

Meeting adjourned: 9.10 pm

*DM Kay
Acting Chair*

FLOWERING RUSH (BUTOMUS UMBELLATUS) BC PROHIBITED SPECIES ALERT



REPORT PROHIBITED WEEDS



Report-A-Weed: www.reportaweedbc.ca

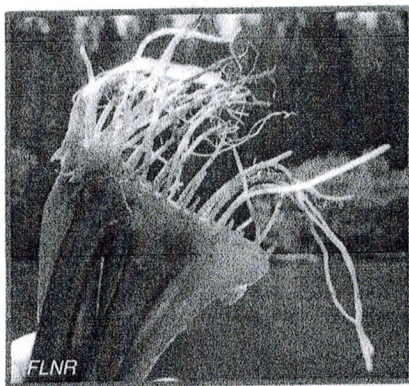
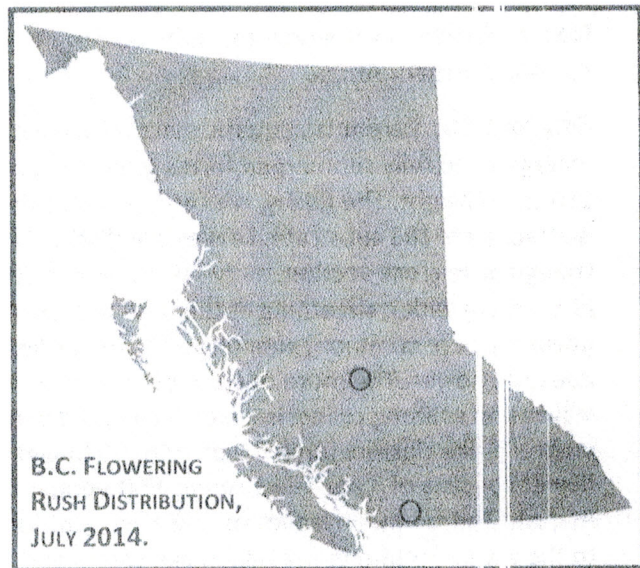


1-888-WEEDSBC

HABITAT: Prefers slow-moving, fresh water ecosystems such as, irrigation channels, streams, lake margins, riparian corridors, wetlands and storm water retention ponds. Establishes readily in areas with fluctuating water levels, typically unfavorable to native species.

DISTRIBUTION:

Confirmed sites in BC are limited to two water bodies in the regions of the Fraser Valley and Cariboo.

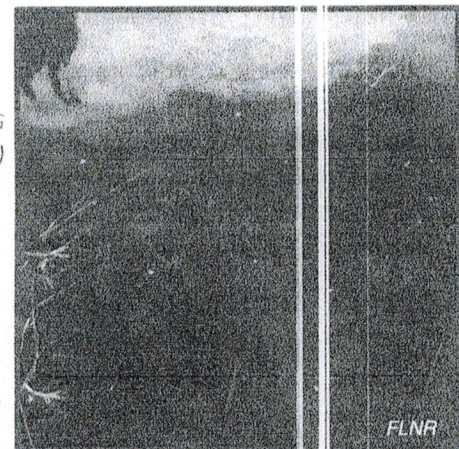


RHIZOMES THICK WITH BULBOUS NODES (LEFT)

SUBMERGED, NON-FLOWERING RUSH (RIGHT)

PREVENTATIVE MEASURES:

- REPORT sightings
- SELECT non-invasive plants for your water garden



FLOWER (BELOW)



LOOK-ALIKES: Bur-reed (*Sparganium* spp.), native sedges, bulrushes, and true rushes (when not in flower).

** Flowering rush is the only species in the Butomaceae family. Two key identification features are the distinct triangular cross-section of the leaves and rhizomes that are thick with bulbous nodes.**

Report-A-Weed: www.reportaweedbc.ca or call 1-888-WEEDSBC
For more info: www.for.gov.bc.ca/hra/invasive-species/prohibited.htm

Revised July 2014

B.C. Ministry of Forests, Lands & Natural Resource Operations

FLOWERING RUSH (BUTOMUS UMBELLATUS)
BC PROHIBITED SPECIES ALERT



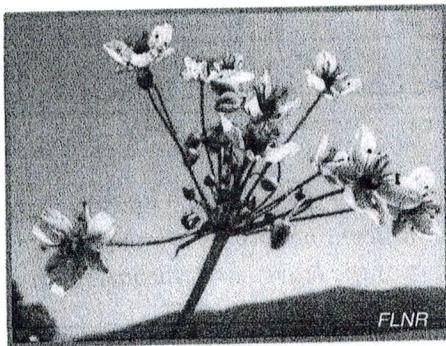
PRIMARY THREAT: *Impedes use of recreational, irrigation, and industrial shallow waters.*

NATIVE RANGE: Temperate and subtropical Eurasia; northern Africa.

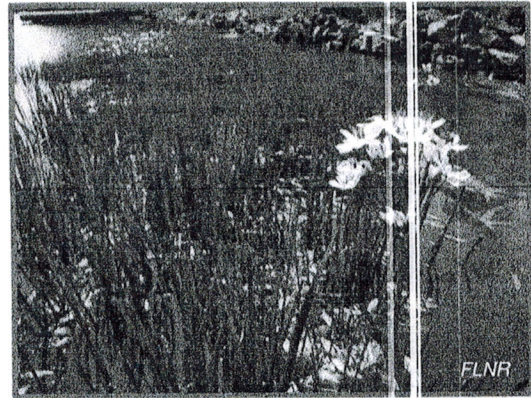
DESCRIPTION: Perennial, aquatic macrophyte with emerged and fully submerged forms growing up to 150 cm in height. The fleshy, winter-hardy rhizome is attached to the substrate. **Leaves are distinctly triangular in cross-section**, all basal, linear and sword-shaped (0.5-1.0 cm wide); sheathing at the base and twisting at the tip. The less obvious (more common) submerged form has limp, narrow leaves and does not flower. The more obvious emergent form has erect, leaves and solitary, cylindrical stems crowned with pink, umbrella-like clusters (umbels) of 20 to 50 flowers. Each flower consists of 3 petal-like sepals that appear from June to August. The senesced leaves on the emergent form collapse to the water bottom in the fall, unlike cattail and bulrush which remain erect through the winter.

IMPACT: Dense stands interfere with irrigation, reduce water quality and availability, interfere with boat propellers and water recreations, alter valuable fish and wildlife habitat and displace native aquatic and riparian species. Treatment methods are extremely limited, once established, populations increase and persist indefinitely.

BIOLOGY AND SPREAD: Reproduces both asexually by rhizomes and bulblets (triploid form) and sexually through seed production (diploid form). Moving water is the primary mechanism for local dispersal. Nursery sale is the main pathway for long distance spread. In addition to rhizomes, bulblets detach from the rhizome and the base of the flower stalk and produce new plants by quickly germinating on the soil or water surface.

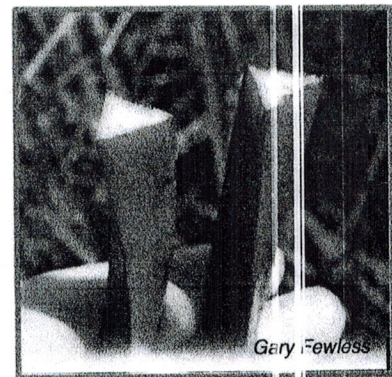


UMBELS OF 20-50 FLOWERS
(LEFT)



EMERGENT FLUSH (ABOVE)

TRIANGULAR LEAF CROSS-SECTION (BELOW)



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For more info: www.for.gov.bc.ca/hra/invasive-species/prohibited.htm

Revised July 2014

B.C. Ministry of Forests, Lands & Natural Resource Operations

Hello Jim;

Thanks for your question regarding the Hatzic Lake water level. It's a simple question, but there's no simple answer.

One-way flap gates are installed in flood boxes through Dewdney dike. Whenever the Fraser River is lower than Hatzic Lake, four 6x6' flap gates open to permit Hatzic Lake to drain into the Fraser. Whenever the Fraser River is higher than Hatzic Lake, the flap gates close to prevent back-flow from the Fraser into Hatzic Lake. When they are closed, the only way to drain the rainfall that runs into Hatzic Lake from the 81.7 square-Km watershed, is to pump it into the Fraser. DAID's five pumps can pump a maximum total of 18 CMS (Cubic Metres per Second) into the Fraser River, but a heavy rainfall could exceed 50 CMS. To prevent flooding under such conditions, Hatzic Lake should be kept low enough to provide an adequate safety margin. Also, keeping lake level low permits low-lying ditches and agricultural fields in the prairie to drain, and lowers the water-table.

To work fields, the water table must be kept at least 1 metre below the surface. Since the lowest fields are at 2.8 mASL (metres Above Sea Level), to maximize agricultural productivity the water table, and Hatzic Lake which drains it, should be kept below 1.8 mASL.

The lower the level of Hatzic Lake, the more time we have after a heavy rainfall before flooding occurs and to warn residents if flooding may overwhelm our pumping capacity. For example, if the Lake is at 1.8 mASL before a heavy rainfall which causes 40 CMS to enter the lake, the three new pumps will buy us 18 hours before the pump intake reaches 2.4 mASL (prairie flooding). At that point the 1949 pumps can be started, which will buy us an additional 26 hours before serious flooding occurs throughout the valley (3.0 mASL). By that time, the rainfall and the resulting high influx should have abated. If Hatzic Lake is kept at 2.4 mASL, flooding will begin within a few hours after a heavy rainfall.

On the other hand, it costs about \$600/day to run one pump, or \$3,000/day to run all five. A ten-day run would cost \$30,000, averaging roughly \$60 for each taxpayer. An additional large cost to be minimized is BC Hydro's monthly demand charge, which depends, as shown in the table below, on the maximum number of pumps running in a billing period, (usually 30 days) after which the demand meter is reset.

BC Hydro demand charges

0 pumps	\$0
1 pump	\$1,700
2 pumps	\$4,300
3 pumps	\$7,000
4 pumps	\$10,000
5 pumps	\$13,000

For example, if no pumps are started during the billing period, no demand charge would be incurred. If one pump is started, even for a minute, a demand charge of \$1700 is incurred. If all five pumps are run, even for a minute, a demand charge of \$13,000 is incurred. There is a way to start pumps briefly to test them, but it requires skill, coordination and luck. The art is in preventing flooding while minimizing taxes.

During the heavy rainfall from October 13 until November 9 (See attached graph), rainfall south of Hope and in the upper Fraser during the full moon caused the Fraser River to rise, which closed the flap gates so that Hatzic Lake began to rise. One of the new pumps was started to keep the lake safely low. As rain in the Hatzic Watershed increased, another new pump was started, then the third. As this couldn't keep up with the influx, when the Lake rose to over 2.4 mASL, the two 1949 pumps were started (They can't be run below 2.4 mASL. We hope to install Formed Suction Intakes so they can run down to 1.8 mASL). In the past, such heavy rainfall would have resulted in serious flooding. Thanks to our new pumps and our initial work in Hatzic Prairie, flooding was prevented for the first time since 1948.

As the rainfall decreased, and as the Fraser River dropped (interior rainfall decreased and the full moon began to wane), pumps were stopped one at a time until the flap gates were open during a long enough period to prevent the lake level from rising without pumping.

For example, on November 22 high tide was 2.3 mASL at ~ 9 AM , and low tide was ~0.8 mASL at ~5 AM on November 23. As shown in the attached graph, when the Fraser dropped, the flap gates opened at ~9:30 PM on November 22 when the Lake was at 1.76 mASL and closed at ~9 AM on November 23 leaving the Lake at 1.72 mASL, a drop of 4 cm or 1.6 inches in 11.5 hours. At present, all four flap gates are now partially open every day and the Lake is at 1.9 mASL, with the Fraser River daily average stage staying relatively constant.

In contrast, the current influx of rain runoff would raise Hatzic Lake by 20 cm or 8 inches in each 24 hour period if the flaps were closed all day by high tides. This would require major pumping to prevent flooding.

The lower Hatzic Lake is, the more margin we have to prevent flooding in case of heavy rainfall, such as the rain that ended on November 9, and the heavy rainfall forecast for the next few weeks. Other than during the summer when there is little rain and danger of flooding, the provisional maximum target Lake level is therefore 1.7 mASL to permit the water table in farmers fields to drain, but it may drop to 0.7 mASL. Furthermore, system maintenance will require occasional lowering of the lake to 0.7 mASL.

To cost-effectively and safely operate the five pumps, four slide gates, four flap gates, 5 flap valves and three siphon vents, lake level is not a matter of arbitrary decision. Flood prevention and satisfying DFO while minimizing your diking tax (Hydro electricity is a large part of the budget) requires constant measurement of many parameters, mathematical prediction, and careful balancing of many factors including:

1. Oceanic tides

1. Tidal harmonic constituents including the phase of the moon
2. Storm surges as measured at Point Atkinson
3. Output of the DFO tide-table model

2. Factors within the Hatzic Valley watershed

1. Watershed rainfall amount in 24 hours recorded at our four rainfall loggers
2. Rainfall intensity
3. Time lag between rainfall and runoff into watercourses
4. Flow resistance of watercourses
5. Beaver dams blocking flow
6. Water storage in farmers fields
7. Inaccuracy of weather forecasts
8. Transpiration rate
9. Evaporation rate from water surfaces,
10. Snowfall
11. Snow-melt
12. Soil saturation with water
13. Surface temperature of the soil in the watershed
14. Gradient across the seriously-undersized CPR culverts
15. Invasive species which impede water flow
16. Date when BC Hydro resets its demand meter
17. Lake temperature
18. Lake flushing
19. Fish passage
- 20.
- 21.

3. Conditions in the Fraser Valley downstream of Hope

1. Discharge of the Fraser River at the gauge stations between Hope and the Great Divide (the Alberta border)
2. Rainfall
3. Snowfall as recorded by the snow-pillow network

4. Conditions in the Fraser Basin between the Alberta border and Hope

1. Discharge of the Fraser River at the gauge stations between Hope and the Great Divide (the Alberta border)
2. Rainfall amount in 24 hours throughout the Fraser Basin from the border with Alberta
3. Soil saturation with water
4. Snowfall
5. Snowpack
6. Snow-melt

Useful numbers

1. If no water is entering the lake, and it is at 2.0 mASL, the three new pumps working together can lower the stage by 8" in 24 hours. Of course, water is always entering the lake, so that performance figure isn't useful. The useful figure is that, for winter pumping,

each new pump will discharge 2.7 CMS. When the Fraser River is between 3 and 4 mASL, each pump will discharge 3.4 CMS.

2. The three new pumps can pump down to 0.7 mASL
3. The three new pumps can pump at 1.05 CMS against a Fraser River stage of 10.6 mASL, which is the ultimate crest of the dike.
4. During winter flooding, the two 1949 pumps can discharge up to 4 CMS but can only pump against a Fraser River stage of 8 mASL
5. The 1949 pumps should not be operated below 2.4 mASL. As part of the required upgrade, it is hoped to install Formed Suction Intakes so the pumps can be started at 1.8 mASL.
6. Flooding of the Prairie and ditches begins at 2.3 mASL
7. The peak stage of Hatzic Lake occurs about 24 hours after the peak at Dale Road West Bridge.

This is our first year operating the complete system, so we are developing the required expertise as we go.

Hoping this answers your question,

Sincerely,

C. Bruce Edwards M.A.Sc.
Engineering Consultant
Dewdney Area Improvement District
604-820-3646
cbefore@telus.net

10588875 Pump intake

