

Gabriola Streamkeepers—Water levels and quality

Observations at Coats Marsh, Gabriola Island

—with notes on Coats Marsh Creek, East Path Creek, and Stump Farm Streams.

References:

[RDN Coats Marsh Regional Park](#), 2011–2021 Management Plan, Appendix A.

[Coats Marsh hydrogeology](#) .

Coats Marsh RP and 707 CP Trail [Maps](#): Maps Y and Z.

Gabriola Stream and Wetlands [Atlas](#) .

Coats Marsh Species [Checklists](#) .

Coats Marsh – human disturbance of breeding and migratory [ducks and geese](#).

Coats Marsh Management - [paper on](#).

Field observations—2021 (July—Sept.)

THIS FILE ([Field Observations 2021-2](#)) IS A SUPPLEMENT TO:

“[Observations at Coats Marsh, Gabriola Island](#)” File: 673.

For an up-to-date list of supplements see [here](#) .

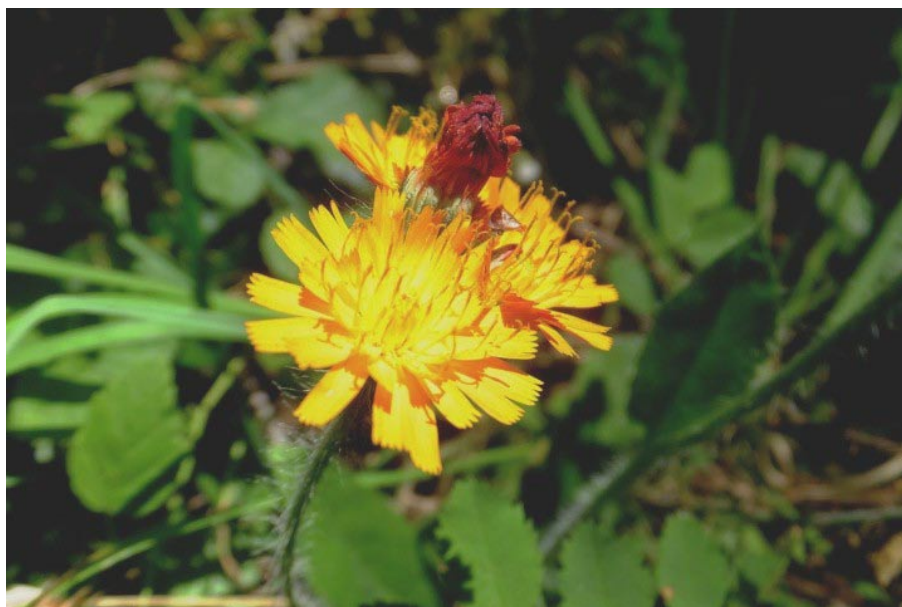
July 20, 2021 (day 2194, 2192+2): NanRG cum. 0.0 mm (norm. 1 mm).

LAKE LEVEL summary from 2010 onwards with comments on the beaver dam has been added to File 673 and can be found in [File 673b](#).



The dry weather is distressing some of the Douglas-firs, which is unusual, but most so affected live in the upland drier areas in the

adjacent 707CP, places where there are no cedars, and along old logging roads, now major trails, that have been opened up to the sun.



Flowering Cooley's hedge nettle along Little Creek. No need to grasp it to see if it stings. Also an "orange dandelion". First saw it when



camera-less in late-June, a few days later the orange flower had confusingly been superseded with yellow ones. Little idea what species, probably exotic, i.e. another European weed, possibly a hawkweed, *Hieracium aurantiacum*, the devil's paintbrush, but yellow? I'll leave it off the species list for now. Incredibly hairy plant (appealingly so I think). Just one, so far.

July 25, 2021 (day 2199, 2192+7): NanRG cum. 0.0 mm (norm. 11 mm).



Bats are back at the Stump Farm site.

Unexpected.

"...Sometimes bats use different roosts early in the season and then switch to a maternity site so this would be quite in line with that behaviour."

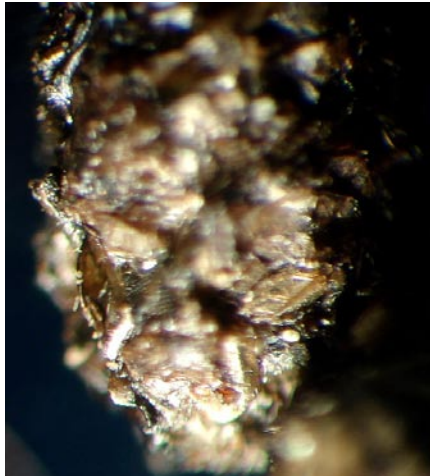
Vanessa C.



Mice or bats?

Guano full of the undigestible parts of flying insects settles that.

I tried growing gooseberries once, but although the plants were happy, so were the species of something that liked to eat their leaves. I can still spot a gooseberry leaf a mile off though.



Although no berries, I think this plant is a black gooseberry (*Ribes lacustre*). East Path Creek riparian area. Young growth very bristly with vicious spines at the leaf nodes. [see Aug.4, mabe *R. lobbi*]

Cooley's (left) and water-plantain at the lake (right), which is not rare but uncommon.



It lives in the lake's parafluvial fringe, and there are both native and exotic broad-leaf species, hard to differentiate. This one is probably an import. Would not be surprising given the lake's history. Some are more than 170 cm tall.

July 28, 2021 (day 2202, 2192+10): NanRG cum. 0.0 mm (norm. 16 mm). Weir +100 mm WPB scale. Cistern -52 mm SCB. Evening.
[cal. datum: weir -0.547 m, cistern +0.315 m, $\Delta = 0.86$ m].

Weir-pool level is strange.

From day 2190 to 2202 (12 days) change in level +150 mm (+13 mm/day).

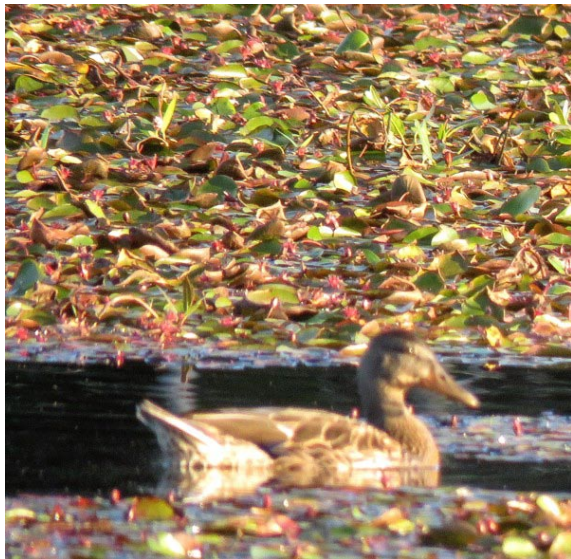
Cistern

From day 2190 to 2202 (12 days) change in level -60 mm (-5 mm/day).

In the absence of precipitation, a rise in the weir-pool level can be attributed to one of two causes: a leak in the beaver dam, or an observational error. The loss of -5 mm/day at the cistern is high but still consistent with established evapotranspiration (EV) loss at the marsh (File: [673t](#)) given how hot it has been.

Assuming that the EV loss was the same both sides of the dam, the rise at the pool seems to have been $+150 + 60 = 210$ mm. Quite a substantial influx of water. There is currently no outflow possible from the weir pool into Coats Marsh Creek.

The problem was solved when today I discovered that the RDN had, on July 23, installed a second water-level gauge on the outside-side of the dam.



You have to cross the dam to access it, something I am normally reluctant to do because it often disturbs waterfowl, which this summer are still around

though hard to spot in their eclipse plumage among the aquatic vegetation.

My surmise is that at the same time as they installed the gauge, the RDN syphoned water across the dam, simulating a leak.



The new metric gauge reading was 1265 mm, which for the time-being I take to be equivalent to my +0.315 m [calibrated] at the cistern at the east end of the lake, a difference of 0.950 m, to be subtracted from the RDN gauge to get the calibrated CWB level.

The reluctance of the RDN to share this kind of information with interested citizens is, shall I say, "regrettable". In my view, and I believe the view of residents along Coats Marsh Creek, re-engineering the work of the beavers at the dam is quite unnecessary. The priority should be making the old wooden baffle more secure; lifting it used to completely drain the marsh and it's going to have to be replaced some day to avoid such a catastrophic ecological event.¹



Path *right* is the top of the dam, which is stabilized by vegetation. The gradients of creeks running into the shallow-water wetland (East Path and NE Arm) are low, making for a low-energy environment overall.

July 30, 2021 (day 2204, 2192+12): NanRG cum. 0.0 mm (norm. 18 mm).
RDN outer gauge 1260 mm. [cal. +0.310 m].

If we take the relative areas of the weir pool and the outer area into account (~20), evapotranspiration loss² seems to be -4.2 mm/day with a

¹ I also wonder, not being able to read the engineering report, why failure of the wooden baffle was deemed nothing to worry about on the grounds that rot of wood underwater in anaerobic conditions was a slow process; yet, this same consideration did not apply to the beaver dam.

² "Normal" mid-summer evapotranspiration loss is around -3.5 mm/day.

~10 mm drop in the level of the main area and ~200 mm rise in the weir pool due to the recent syphoning.³

July 31, 2021 (day 2205, 2192+13): NanRG cum. 0.0 mm (norm. 19 mm).

Rain in July confined to two days when drops were observed; but not enough to clean off the dust, or actually wet anything, so we can count July rainfall as being 100% below long-term month's average. We've only had such a sub-millimetre total for July four times in the last 77 years.⁴

Total for the first seven months of this year now 29% below average.



A small patch of shasta daisies in the western burn-pile clearing, a 20th-century cultivar, but, nevertheless, a refreshing glimpse of "summer snow", evocative of the summit of their name-sake, Mount Shasta in California, and reminiscent of all the 4000-plus metre summits I have known.

August 4, 2021 (day 2209, 2192+17): NanRG cum. 0.0 mm (norm. 23 mm).

Everything waiting now for the rain. On looking around a bit, the black gooseberry ID (Jul. 25) could be wrong. Gummy gooseberry is more common, and the "bristles" are not golden and more like hairs.

³ Achievable in say 1-2 hours with a 200-mm ID PVC pipe.

⁴ 1958, 2010, 2013, and 2017. July is our driest month of the year.



Syphon intake: [4 hoses 5"OD, 0.8m head, ~87 L/s total; my guess, simulating a 200mm ID PVC pipe]

August 6, 2021 (day 2211, 2192+19): NanRG cum. 0.0 mm (norm. 24 mm).

The RDN have commenced draining the lake, for how long, and for what purpose other than conforming to their plan to install a pond leveller, the details of which are known only to themselves and certainly not to any one actually living on Gabriola and actually familiar with the marsh and with the rhythms of its hydrology and its aquatic and parafluvial environment.

All we know is that the plan was developed by Scot Merriam from SRM Projects (Sustainable Resource Mechanical Engineering and Project Management) in Nanaimo, who visited the dam and weir and "walked the creek" with Chris van Ossenbruggen from the RDN one morning in May 2020. Residents along Coats Marsh Creek downstream of the lake have expressed no concerns about the beaver dam, but how that is reflected in the plan is to this day unknown to them.

This fits the pattern in recent times of Gabriola governance authorities relying entirely on the input of off-island consultants for guidance on environmental issues, when those consultants, no matter how formally qualified or how well-meaning, do not have the time to make use of local knowledge. The inevitable mistakes that are made are characterized, for example, in the reports of the hazardous slope study (mixing up tree and ground height as a consequence of relying on photographs) and the riparian area regulation

identification (no contact with Gabriola Streamkeepers on fish-bearing streams, some of which are consequently not subject to the LTC's RARs).

The draining of the lake now going on amidst a drought that could last another two months resulting in a 300 mm evapotranspiration loss of water is potentially very damaging for the ecology of what is a shallow-water wetland rather than a lake, setting it back possibly for several years to come.

In places, the shoreline has already retreated six feet leaving behind numerous disoriented young frogs and stranded aquatic plants. A mature bald eagle patrolling the lake margin is also not comforting. No sign or sound of ducks.



Coats Marsh Creek flowing in early August!
Carrying water from the marsh down through the forest to Hoggan Lake where it will eventually evaporate, be used for the greens, run-off into the sea, or who knows, improve the environment down there.



August 7, 2021 (day 2212, 2192+20): NanRG cum. 3.6 mm (norm. 25 mm).
Weir +362 mm WPB scale. RDN outer gauge 1085 mm.
[cal. datum: weir -0.285 m, RDN outer gauge +0.135 m, $\Delta = 0.42$ m]

Coats Marsh Creek is still running at a modest pace. There is something slightly amiss with the weir calibration as the pond leveller is only trickling with its bottom just in the water while the calibrated old gauge says the level of the bottom of the leveller is at -0.450 mm and the sill at -0.640 mm. In any case, the weir pool level is still falling but the RDN syphon across the beaver dam has practically stopped draining the outer marsh. It's just dribbling at the rate of a kitchen tap. Will try to recalibrate both gauges next week.



Meanwhile, I would like to see the rationale for the RDN asserting no adverse environmental effects will occur, reportedly quoting the project biologist, Trystan Willmott from Madrone in Duncan.

August 8, 2021 (day 2213, 2192+21): NanRG cum. 3.6 mm (norm. 25 mm).
Weir +259 mm WPB scale. RDN outer gauge 1080 mm.
[cal. datum: weir -0.388 m, RDN outer gauge +0.130 m, $\Delta = 0.52$ m]

Coats Marsh Creek has stopped flowing at the Marsh Trail culvert, and there is no more flow from RDN's four syphon hoses. The pond leveller at the weir is still gently flowing (~0.1/L/s), but that water is being absorbed by ponding or by infiltration in the watercourse of Coats Marsh Creek before it reaches the Marsh Trail.



Only wildlife fauna seen, nine Canada geese, presumably escaping from the drying-up of their usual haunts.



Mats of bladderworts, *Utricularia macrorhiza*, in the reedy, muddy sulphurous-smelling, margins of the lake. Truly delightful.

August 10, 2021 (day 2215, 2192+23): NanRG cum. 3.6 mm (norm. 26 mm). Weir +259 mm WPB scale. RDN outer gauge 1075 mm. [cal. datum: weir -0.388 m, RDN outer gauge +0.125 m, $\Delta = 0.51$ m]

Syphoning stopped, two of the four hoses disconnected, no flow from the weir-pond leveller or over the sill of the baffle, but quite

strangely there is a minor flow from the drainage pipe from Lot 5 on the downstream side of the berm. Although not unknown for it to not stop flowing until August, it is unusual for it to start up in August without significant precipitation (ref: File [668](#), p.18).

August 11, 2021 (day 2216, 2192+24): NanRG cum. 3.6 mm (norm. 27 mm). Weir +241 mm WPB scale. Cistern -255 mm SCB. RDN outer gauge 1073 mm. [cal. datum: weir -0.406 m, cistern +0.112 m, RDN outer gauge* +0.123 m, $\Delta = 0.53$ m]. *with -950 mm cal., not indicated -961 mm.

The lake at the east end looking devastated. I imagined that I had never seen the portion of the lake that is outside the regional park but within the community park (go figure!) looking so dried out, but then I must have. It is even questionable whether the level at the cistern datum I have been using for years is still valid it is so far from open water. There were three low-flying vultures circling around.



One or two waterbirds seen at a distance, resident summer mallards? Elsewhere, an all-alone juvenile (pre-fledgling) diving duck (so not a mallard).

If the drought continues, the area threatens to become cloaked with rotting watershield. That's the brown stuff in the photograph nearest the shore; that's not dead tree leaves, it's former healthy habitat.

The RDN drawdown of 400 mm may eventually have added 100 days to the length of this summer's drought.



A week or so ago before draining commenced I had to wear my waders to stand where the photograph above was taken. I was wearing my town shoes yesterday. The east end of the marsh, where the experts seldom go, is relatively flat, so a small drop in water level makes a big difference to the surface area and location of the strand.

A summary of lake level measurements is in [File 673b](#), a link which is not always correctly advertised. Sorry. This file also contains a summary of the history of the lake, which is not completely accurately told in the old out-of-date 2011 Management Plan that the RDN are accustomed to quoting.

August 12, 2021 (day 2217, 2192+25): NanRG cum. 3.6 mm (norm. 27 mm).
Cistern -261 mm SCB.
[cal. datum: cistern +0.106 m]

Hot and windy; making evapotranspiration uncommonly high.

August 16, 2021 (day 2221, 2192+29): NanRG cum. 3.9 mm (norm. 28 mm).
Weir +174 mm WPB scale. Cistern -268 mm SCB.
[cal. datum: weir -0.473 m, cistern +0.099 m, $\Delta = 0.57$ m].

No flow from the weir-pond leveller or over the sill of the baffle, but minor flow from the drainage pipe from Lot 5 continues. Not enough to reach the Marsh Trail culvert. No syphoning. The main wetland area is now down to a level not seen since the summer of 2016.

The mood at the marsh very different to what it has been. Blue skies gave way to a patchy smoky cover and a red-complexioned sun, and now

to an amorphous, hueless grey nimbostratus. The air feels moist; any



sounds quiet and muffled. Small patches of sun-burnt grasses, small pieces of Canadian prairie, bowed down and billowed as if by squalls; but there has been no wind nor has there been rain heavy enough even to dimple the surface of the lake.

Three ducks in eclipse plumage seen in the space of half an hour winging their way over the marsh from east to west;

for them at least, the flightless phase of their moult is over.

The distinctive smell of a dead deer along the path.

August 18, 2021 (day 2223, 2192+31): NanRG cum. 3.9 mm (norm. 29 mm). Weir +326 mm WPB scale. Cistern -284 mm SCB. RDN outer gauge 1045 mm. [cal. datum: weir -0.321 m, cistern +0.083 m, RDN outer gauge* +0.095 m, $\Delta = 0.42$ m] *with -950 mm cal., not the indicated -962 mm.

Syphoning resumed with new longer pipes, a 4-man job. Old syphon had acquired a few small evidently unrepairable holes, all equally about nail size. Might have been sabotage, but that seems unlikely.

Getting access to the dam unseen is not that straightforward. It would have been easier in any case to have just pulled the inlets out of the water. Another conjecture is that they were punctures made inadvertently by wire ends left exposed after snipping the protective welded-wire 4"x 2" mesh fences to size.

Existing pond leveller running. Levels evidently not stable (calibrated cistern level is 12 mm higher than RDN outer gauge level at the dam). More than one possible reason including measurement error. Madrone out in a boat using a sounding pole around the syphon intake.

Kingfishers, at least five of them, noisily scouting out the weirpool.



Estimate that drawing the lake level down 400 mm will cause the shoreline to retreat toward the centre of the lake by 10 metres. [File 668](#), appendix. What impact this will have on tree-cavity nesters, we'll just have to wait and see, I guess.

August 19, 2021 (day 2224, 2192+32): NanRG cum. 3.9 mm (norm. 29 mm). Weir +460 mm WPB scale. RDN outer gauge 1030 mm. [cal. datum: weir -0.187 m, RDN outer gauge 0.080 m, $\Delta = 0.27$ m] Evening.

August 20, 2021 (day 2225, 2192+33): NanRG cum. 3.9 mm (norm. 30 mm). RDN outer gauge 1000 mm. [cal. datum: RDN outer gauge +0.050 m].

Coats Marsh Creek still running. Kingfishers still at the weirpool. As far as I know, the last time anybody saw them at the marsh was more than five years ago.



Evening check on the 20th about 7 hours later

Weir +471 mm WPB scale. RDN outer gauge 942 mm.

[cal. datum: weir -0.176 m, RDN outer gauge -0.008 m, $\Delta = 0.17$ m]

Red squirrel my only companion.

Water flowing over the sill. There are still several ducks on the lake but they've all retreated to the east end as has the beaver.

August 21, 2021 (day 2226, 2192+34): NanRG cum. 3.9 mm (norm. 30 mm). Weir +460 mm WPB. RDN outer gauge 920 mm. [cal. datum: weir -0.187 m, RDN outer gauge -0.030 m, $\Delta = 0.16$ m].

RDN Director Vanessa Craig visit. We inspected the dam and "infrastructure" the RDN are so fearful of being held liable for. A log cabin, the owner valued for the purposes of discussion at \$25,000 if it were totally lost in the highly unlikely event that the entire beaver dam structure failed.⁵ [Online](#). Nothing more. The annual insurance cost to cover the risk would be, I wildly guess, about the



same as the annual insurance on one new car or truck.

Only one of the four syphon hoses running and that only feebly. Creek running strongly. The drawdown since July 17 is now by my reckoning 40 cm.

My guess, nothing more, is that the RDN are intent on lowering the level to 400 mm below their July 23 level which I saw on July 28 as being +1265 mm, which calibrated to the weir datum is -0.090 m.



⁵ Hydrological monitoring of beaver dams in low-order channels, low-energy environments, and stabilized by vegetation, such as the one at Coats Marsh, by the University of Exeter (UoE) throughout Britain since 2014 has rarely observed complete failure of a dam.

August 22, 2021 (day 2227, 2192+35): NanRG cum. 3.9 mm (norm. 31 mm). Weir +376 mm WPB scale. Cistern -420 mm SCB. RDN outer gauge 900 mm. [cal. datum: weir -0.271 m, cistern -0.053 m, RDN outer gauge* -0.050 m, $\Delta = 0.22$ m] *with -950 mm cal., not the indicated -953 mm.

Drawdown continuing unabated. By my reckoning now 42 cm. Marsh is looking stressed with open water breaking up into ponds, and a distinct smell of rot in the air. There were a dozen or more ducks abandoning the drying-out sedgey fringes of the "lake" now not much more than a pond, and the beaver at the east end of the lake is frequently breaking the surface because the water has become so shallow.



The flow in Coats Marsh Creek from the pond leveller has turned inky black presumably as the syphons dredge up gyttja.

One of the hazards of allowing both the dam and the weir baffle to dry out is that wood rots far faster in aerobic environments than anaerobic ones. Whether or not this has been considered in the plan is not known.

August 23, 2021 (day 2228, 2192+36): NanRG cum. 3.9 mm (norm. 31 mm). Weir +375 mm WPB scale. RDN outer gauge 890 mm. [cal. datum: weir -0.272 m, RDN outer gauge -0.060 m, $\Delta = 0.21$ m].

Everything still running but subdued. Beaver is at his lodge.



August 24, 2021 (day 2229, 2192+37): NanRG cum. 3.9 mm (norm. 31 mm). Weir +369 mm WPB scale. Cistern -444 mm SCB. RDN outer gauge 870 mm. [cal. datum: weir -0.278 m, cistern -0.077 m, RDN outer gauge* -0.080 m, $\Delta = 0.20$ m] *with -950 mm cal., not the indicated -947 mm].

Syphoning continuing. Coats Marsh Creek still running black at the Marsh Trail culvert.



View from the downstream side of the deck (seen at the bottom of the picture) looking down at the gap in the middle of the concrete weir. In this view, water flows from bottom (the weir pool) to top (Coats Marsh Creek). The turquoise pipe below the re-bar is the outlet of the pond leveller running below the deck and above the sill.

The woody debris below the pipe has just been put there by the beaver and is on top of the baffle. You can see the slots in the concrete sides of the gap that used to be used for sliding the baffle up and down, thus controlling the flow of water, long before the leveller was installed.

The industrious beaver has managed to stop the flow over the sill, so that flow through the weir is now only via the pond leveller. The sill measured in August 2015 was at -0.640 m, what is I believe a quite arbitrary level set by the previous owner before 2008, some 0.360 m below the present weir-pool level.

The summer resident ducks have now taken to using the weir pool as a refuge with the result that it is quite impossible to cross the dam to read the gauge or inspect the syphons without putting them all to flight. They'll soon be abandoning the site.

A fiasco. Completely unnecessary. Created and approved by people who do not live here, and who do not know this place.

August 25, 2021 (day 2230, 2192+38): NanRG cum. 3.9 mm (norm. 32 mm). Weir +369 mm WPB scale. RDN outer gauge 858 mm. [cal. datum: weir -0.278 m, RDN outer gauge -0.092 m, $\Delta = 0.19$ m].

Evening.

Nothing heard, nothing seen except the enterprising beaver who's been collecting watershield to use as a futile plug. No ducks. No bats. No swallows. No song birds. No frogs. No ravens. Few dragon flies. Only some moths and an occasional buzzing fly.⁶

Drying-out aquatic plants rapidly turning brown as the water retreats, like leaves in the shrubby woodland toward the end of a summer-long drought.

Draining the wetland continues, uninterrupted.

⁶ Oct. 6, discovered that this was the day TNT visited and flew a drone over the marsh.



August 26, 2021 (day 2231, 2192+39): NanRG cum. 4.8 mm (norm. 32 mm).
Gentle rain. A drizzle. So begins the approach of fall.



Unexpected flock of nine or ten wood ducks arrived. Mostly females, but two males in their unfamiliar summer garb, and a couple of the



smaller ones looking like they might not yet be grown up. I guess they're on their way to somewhere else.

Grass in the clearings and up at the old farm site that might once have been ready to hay, now, bereft of any nourishment, only good for straw. Beaten down by droplets (dropples).

Coats Marsh Creek still running. The syphons and the pond leveller are working together at the moment to maintain a constant weir-pool level.



If the weir-pool level drops below the equilibrium level, the syphon head increases, consequently so does the flow into the weir pool, and the pond leveller exhausts water more slowly until the weir-pool level rises back to the equilibrium level.

If the weir-pool level rises above the equilibrium level, the syphon head decreases, consequently so does

the flow into the weir pool, and the pond leveller exhausts water faster until the weir-pool level drops back to the equilibrium level.

August 28, 2021 (day 2233, 2192+41): NanRG cum. 4.8 mm (norm. 32 mm). Weir +287 mm WPB scale. RDN outer gauge 845 mm. [cal. datum: weir -0.360 m, RDN outer gauge -0.105 m, $\Delta = 0.26$ m].

The end of equilibrium, the syphons not working anymore. Coats Marsh Creek only ponding at the culvert. The pond leveller continues to dribble, drawing down the weir-pool level. No wildlife of note seen.



Sapsucker in Lot 5. The wrong side of the berm to be counted as an inhabitant of the RP, but I'll nevertheless count it as an "accidental".

Courtesy GM and CB. September 2012.

know what the future looks like; it'll look like the past.

No comments reported from TNT about the purported need for the drawdown: the stability of the dam and the weir, the risk to and value of the downstream "infrastructure", the impact of human disturbance at the dam, especially in winter, of whatever water-levelling device the RDN is going to install, nor the water levels the RDN are hoping to



Back in August 2015, open water was lacking and there were few to no summer-resident waterfowl (typically only two mallards) in contrast to 2021 when waterfowl (several species) have been present during the summer and ducks when in their annual moult.

The drawdown based on the level on July 28 is now 42cm, and based on that of July 17, 48 cm.

The Nature Trust of BC (TNT) who half-own the park have visited the site. I gather not involving anyone on the island, and so leaving key questions unaddressed.

Seems from the reporting that TNT's focus is on the bad optics that the "temporary" drawdown is creating by concealing the water beneath the leaves of the watershield (*Brasenia schreberi*). Drying-out is, in fact, easy to see as the watershield dies quickly once water depth is less than a foot (0.3 m), but it is true the watershield may look like land.

An aerial photograph from TNT shows open water, but the open water is a result of the higher water levels in the spring and early summer; open water won't be there next summer. We

maintain on a "permanent" basis throughout the year. Nature will adapt TNT are reported as saying (it usually does), but why does it have to?

Watershield, for example, is rooted in the "lake" bed and thrives in water depths between 1 & 6ft.(0.3-1.8m), struggles when deeper than 7ft.(2m), and leaves open water at 9ft.(2.7 m). Do the planned levels allow for open water in summer?



The pre-2015 levels certainly did not. And if not, are the species of waterfowl that require open water to gain flight, and the pied-billed grebes that nest on floating vegetation, going to return?

August 31, 2021 (day 2236, 2192+44): NanRG cum. 4.8 mm (norm. 35 mm). Weir -99 mm WPB scale. Cistern -492 mm SCB.[cal. datum: weir -0.746 m, cistern -0.125 m, $\Delta = 0.62$ m]. RDN gauge must have been around 840 mm.

Rainfall in August soft; 83% below long-term month's average. Total for the first eight months of this year now 31% below average.

Creek dry. At the weir, only drips from the pond leveller, but the drainage from Lot 5 continues. This can only be leakage from under the berm. It and evapotranspiration has drawn the weir-pond level below the sill so there can't be any leakage to speak of through the beaver dam and the syphons must have stopped.

Forwent (why not forgo'ed?) visiting the dam as there were several ducks I could hear in the weir bay as I threaded my way through the snaggy woods. They were splashing and bathing ebulliently, maybe seeing the end of their eclipse plumage. Left them undisturbed, they seemed to be having such fun. Wood ducks I suspect.

I've cleaned up one of the appendices of the hydrogeology [file](#) and continue to update the level summary [file](#). The drawdown based on the level on July 28 is now 44cm, and based on that of July 17, 50 cm.

September 4, 2021 (day 2240, 2192+48): NanRG cum. 8.6 mm (norm. 38 mm).

Weir -301 mm WPB scale*. Cistern -502 mm SCB. RDN gauge 835 mm [cal. datum: weir -0.948 m, cistern -0.135 m, $\Delta = 0.81$ m, RDN gauge -0.115 m **]. *hard to measure, the water is below the bottom of the scale in mud. **with -950 mm cal., not the indicated -970 mm. The correct value is averaging out at -958 ± 8 mm rather than -950 mm.]



Weir pool continues to slowly drain, level now well below the sill. Creek still dry at the culvert. Syphons not working.

Rain. Paths puddled. No sign of animal life beyond frogs and fluttering birds sheltering in the bush. A go-to-bed-early-with-a-book kind of rain that makes comforting monotonous sounds on the roof and on the great dark outside.

Bulrush and burdock, fashionably spikey.

September 5, 2021 (day 2241, 2192+49): NanRG cum. 8.6 mm (norm. 39 mm).



Cooper's hawk nonchalantly watching the "pond" from up-high.





The beaver's green-topped lodge, its entrances no longer flooded. Beavers are commonly social animals but Coats Marsh seems to be home for a hermit. Such solitary individuals usually inhabit old abandoned farm ponds, as does ours, and they aren't members of a family unit, though our "hermit" does sometimes go missing for two or three months at a time when he likely follows Coats Marsh Creek down to Hoggan Lake for a change of pace and perhaps some entertainment.

September 9, 2021 (day 2245, 2192+53): NanRG cum. 10.7 mm (norm. 43 mm). Weir -239 mm WPB scale. Cistern -507 mm SCB. [cal. datum: weir -0.886 m, cistern -0.140 m, $\Delta = 0.75$ m].



All leakage into Coats Marsh Creek at the weir stopped. The Lot 5 leakage may be a delayed reaction to weir-pond level changes. It normally has stopped running this time of year.



Wood ducks in their post-breeding plumage again in the weir bay inhibiting access to the RDN paraphernalia out on the dam.

Ducks in this moulting phase are vulnerable (they're sitting ducks) as they are for a time flightless and their need to spend time foraging without human disturbance is high. This is the first year ducks have been seen in such numbers at this time of year.

As usual, when the weir-pond level is at its lowest, water has retreated from the base of the beaver dam on the downstream side.



First mushrooms of the season. Inky caps of some kind, likely *Coprinopsis atramentaria*.

September 14, 2021 (day 2250, 2192+58): NanRG cum. 16.3 mm (norm. 49 mm).

The RDN are going ahead and installing a permanent syphon this week. They don't appear interested in anybody else's opinion as to the need for it, or the down-grading of the ecosystem of the wetland it will have wrought.



RDN: "The project is being overseen by a biologist [Madrone environmental services] to minimize detrimental effects to wildlife".



An interesting surprise in the west burn-pile clearing, a few great mulleins (*Verbascum thapsus*). I've never noticed them in the park before.

These flowers, in the same figwort family as foxgloves, have a poor reputation, a "Eurasian weed" (*molène*) being a common attribute. Each of the many buds on its pole-like stem opens only for one day. Its habitat is invariably disdainfully given as "waste and bare



places", "dry open scrub", and "sparsely grassy places" —the abode of vulgar things— and it's placed in the CM 2011-2021 Management Plan in the same invasive category as himayalan blackberries, tansy ragwort, canada thistles, and scotch broom.

Having not noticed it during hundreds of visits over the years, I give it a pass on being a nasty foreign threat, and consider it, on the contrary, a worthy addition to the waste-place ecology. Its leaves are beautifully soft and woolly, just like the ears of my dog.

And speaking of softness, flying tufts of thistle down were easily out-numbered by the dragon flies. One or two thistles still blooming, such audacious weeds.

September 19, 2021 (day 2255, 2192+63): NanRG cum. 64.2 mm (norm. 57 mm). Cistern -435 mm SCB.[cal.datum: cistern -0.068 m]

Rain. Many puddles on the bare hard-packed trails, big enough to splash through, their surfaces "dimpled" both with rising "blebs" and falling "dropples" (John Clare).

On the trails, woolly bears searching for a place to hibernate, garter snakes, puffballs, frogs singing out-of-season, and slugs of course, but ominously for the latter, a gastropod-eating ground beetle scurrying across the way, very agile and anxious to keep out of sight; *Scaphinotus angusticollis*.

New syphon installed but not in operation. Looks to be a simple system, nothing automatic. Four 4" PVC pipes, each starting when primed with a pump that has to be brought out on to the dam. Should be interesting in foul winter weather when the trumpeter swans are there.

Not clear what the snorkels without fittings are for. The syphons can be closed manually each pipe has a gate valve.





September 23, 2021 (day 2259, 2192+67): NanRG cum. 66.0 mm (norm. 64 mm). Weir +250 mm WPB scale. RDN outer gauge 871 mm. [cal. datum: weir -0.397 m, RDN outer gauge -0.079 m with -950 mm cal.].

Evening.

All deathly quiet. The open water like a mirror.

RDN/Madrone have been out all day working on their new syphon system. They also made adjustments to the existing pond leveller by the weir so the old levels no longer apply.

Two of the four pipes are now flowing so draining the lake is resuming. Gate valves on the two inner pipes are closed. Snorkels have been disconnected and attachment points sealed.

Their to-and fro-ing is creating a path through the woods and across the dam.

Bats. No sign of the beaver which is usually active this late in the day or of the flock of ducks in weir bay. Migrating geese and a few ducks overhead going west.

September 25, 2021 (day 2261, 2192+69): NanRG cum. 67.3 mm (norm. 69 mm). Weir +180 mm WPB scale. Cistern -457 mm SCB. RDN outer gauge 855 mm. [cal. datum: weir -0.467 m, cistern -0.090 m, RDN outer gauge -0.095 m with -950 mm cal.**]

**the correct value is now averaging out at -954 ±9 mm rather than -950 mm.

Coats Marsh Creek is



running again at the culvert but there is no flow over the sill or through the leveller. Two of the four syphons running.

The beaver has not been seen for some time and the local resident believes it may have abandoned the site. No tail-slapping in the evenings heard now and the weir has sprung a small leak at the edge of the concrete deep down on the north side, which should have attracted his attention.

Twenty plus ducks at the far east end of the lake, sheltering from the human disturbance out on the beaver dam. Must be more unseen among the snags and reeds. Too far away to be identified but wood ducks, widgeons possibly, and a few mallards, not the usual early-arriving winter residents (buffleheads and ring-neckeds).

Checked with a construction transit (theodolite) calibration for the water level out beyond the beaver dam. Result showed: outer water level cal. = -0.121 m rel. to CWB.

Since the calibrated cistern level (presumably the same) was -0.090 m, this implies that the cistern SCB datum at +367 mm determined on August 30/31, 2018 is 31 mm too high and should, according to the new measurement, be +336 mm. And to get the level directly from the RDN outer gauge, its reading should be reduced by 976 mm.

The top of the dam was measured to be +0.451 m above CWB. In August 2018 (A-B page C9) we measured +0.462 m above CWB. Confirmation that the beaver is not interested in raising the height of the dam any more.

Also checked the weir gauge, which we've not done before with the transit. Odd result. Measured to be -0.559 m instead of the expected -0.467 m. The calibration constant -0.647 ± 0.017 m was determined four times previously and corresponds to a zero close to the level of the sill, so it's disappointing that the new observation says it should be -0.739 m.

Sill level was measured at -640 mm which is exactly the same as measured in 2015.

For the time being, I'm going to keep all the old calibrations as it is not clear which of the differing calibrations is more correct.

September 28, 2021 (day 2264, 2192+72): NanRG cum. 93.3 mm (norm. 76 mm). RDN outer gauge 895 mm. [cal. datum: RDN outer gauge -0.055 m]
Everything but for the drainage from Lot 5 stopped running.



Coats Marsh Creek no flow, no flow over the sill, pond leveller high and dry, no leakage at the concrete weir itself, all four syphons with gate valves shut.

The earth is thirsty, and the rain, as if hesitant to run-off in rivulets, forms puddles that patiently wait to infiltrate. Mosses spring to life, and cover the ground in thick, poly-green-hued blankets, turning boots to slippers. Dead conifer-needles, the browned victims of the drought, are rain-rafted together where they sometimes squelch underfoot. But there's no sign of ponding in the course of East Path Creek or in the NE Arm wetland. Still, early days; the lake's catchment area remains quite small.

September 30, 2021 (day 2266, 2192+74): NanRG cum. 120.2 mm (norm. 80 mm). Weir +403 mm WPB scale. RDN outer gauge 870 mm. [cal. datum: weir -0.244 m, RDN outer gauge -0.095 m]

Rainfall in September +168% above long-term month's average (well over double). Total for the first

nine months of this year now -18% below average. For the six months of summer (Apr.Sep.), it was -16% below average, which is less than the one-sigma deviation thanks entirely to these late-September downpours.

Draining has resumed.

No information forthcoming as to the RDN/TNT plan and reasons for it beyond ill-informed platitudes and generalities:

- catastrophic beaver dam failures can be dangerous
- nature will adapt
- don't worry we've done this before
- we have qualified experts on site
- we're protecting valuable infrastructure downstream
- the ecosystem will be the same as before, only smaller.

This despite several requests for what should, I'd have thought, be information readily available to taxpayers, their elected representatives, local residents, journalists, volunteer and non-profit societies, and interested citizens who live on Gabriola.





Coats Marsh Creek flowing at around 40-50 L/s, flow over the sill (depth 40 mm), pond leveller flowing but now pointing skyward ominously like a gun, the knuckles of all four syphons retro-fitted with bleed valves and their gate valves now all open.



Still no sign of the beaver, even in his usual haunt in the spindly alders at the mouth of the NE Arm where he has a small dam (now dry).

A large (30-40-ish) flock of ducks (female wood ducks?). Super-sensitive to disturbance, so much so that if you don't listen for them on approach or don't know where they'll be, it's impossible to appear on the shore without spooking them. ◇



Amanita gemmata.

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