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 hydrology .

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—2020 (January—June)

THIS FILE (Field Observations 2020) IS A SUPPLEMENT TO:

"Observations at Coats Marsh, Gabriola Island" File: 673.

For an up-to-date list of supplements see here .

2020 NOTES

January 10, 2020 (day 1637, 1461+176): NanRG cum. 421.0 mm. Weir +424 mm WPB scale.

Small patches of wet snow.

January 16, 2020 (day 1643, 1461+182): NanRG cum. 466.9 mm. Weir +366 mm WPB scale.

Deep snow. Lake frozen over. Only one or two deer tracks.

January 22, 2020 (day 1649, 1461+188): NanRG cum. 527.4 mm. Weir +454 mm WPB scale.

January 25, 2020 (day 1652, 1461+191): NanRG cum. 531.9 mm. Weir +442 mm WPB scale.

Lots of orange-jelly fungus (*Dacrymyces chrysospermus*) on the alders this winter. It flourishes after rain.

Unusual flow over East Path from the NNE Arm. This minor spillway is north of the one at the Ridgeway junction and water usually seeps unseen under the path from a pond to the east. There's a similar spillway on the Three Gates Trail where Little Creek usually flows unnoticed under the trail.

NE Arm wetland living up to its name. Frogs to be heard here all winter and occasionally you see mallards. The beaver dam is overflowing in two or three places, but no flooding at the weir deck yet. The pond leveller is just holding its own.

January 27, 2020 (day 1654, 1461+193): NanRG cum. 534.7 mm.
Two long-sought-after springs discovered in the East Path Creek delta. Account written up in File:668. Emerging from among cedar tree roots at the bottom of the 1-2 metre incline marking the shoreline of the paleo-meltwater-lake. East Path Creek in full flood, the most likely source. Photographs show the NE spring *left* and the SW spring *right*.

The late-Pleistocene lake level, as marked by thick gleysol,[1] was slightly higher than the present level even though the lake is flooded at present and the level has been raised by the beaver dam. Possibly indicates that the meltwater lake was at the time of its formation around 11500 BC dammed with ice at the western end.

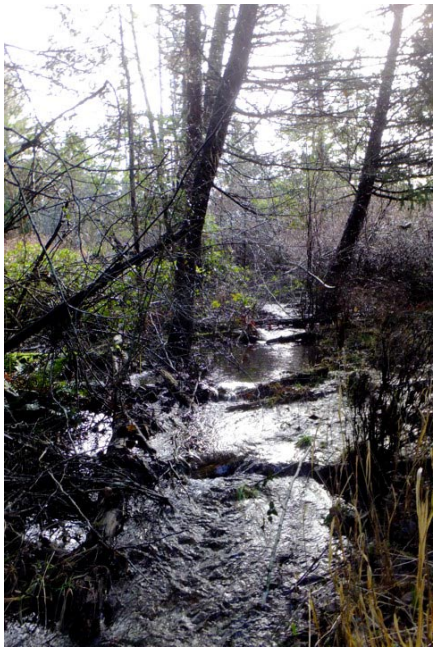
The delta has many dead or decaying trees that are good habitat for wildlife, especially cavity nesting for birds and maybe even ducks. Among old cedars that are more than a century old, there are mature Douglas firs and deciduous trees, including a veteran willow tree.

This is one of the best locations for bird watching, although, technically, it is outside the Coats Marsh RP and within the 707 CP (Coats Marsh East).

January 29, 2020 (day 1656, 1461+195): NanRG cum. 537.1 mm.

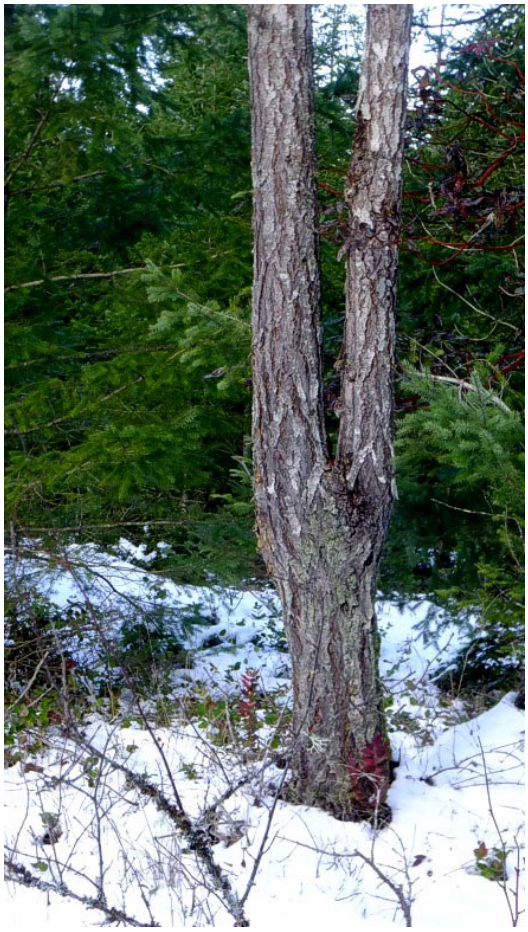
[1] weathered glacial flour rich in quartz and feldspars

Below: East Path Creek near where it crosses under Coats Drive after its steep descent from High Point Meadows and joins and leaves the SE Arm wetland, another often overlooked riparian area.



February 11, 2020 (day 1669, 1461+208): NanRG cum. 650.7 mm.

Gemel (inosculated) trees, trees that have self-grafted themselves together, are common in the park and the adjoining 707 CP though they're mostly a result of logging rather than any more-interesting natural process or cultural modification. Logging has created stumps from which two or more, equal-sized trees grow with a common root stock. Gemels with two trunks sharing the same base are what I call "tuning-fork" trees.



Older cedars often consist of a round of small trunks that have fused together to make one large tree, most often seen as discarded logs with rotten cores in former clear-cut areas of the park, but a few such trees have survived. They sometimes grow that way because, in the rainforest, cedar roots splay out rather than forming a deep central taproot and the shallowly-buried roots send up saplings of their own or recruit smaller saplings around them. Nursery stumps also encourage the growth of siblings in the same way.

I guess tuning fork-trees are monozygotic (identical twins) while the more usual sense of "gemels" is dizygotic (fraternal twins, trees rooted independently but conjoined higher up). I'm still looking for good examples.

February 16, 2020 (day 1674, 1461+213): NanRG cum. 652.4 mm.

Creek flows becoming much less everywhere after the January deluges and falls of snow. The originally-observed two springs discovered in January have stopped flowing, but the character of the SW one has changed. The SW spring location now shows a patch of silty-clay mud, the colour of dark chocolate, located a little below the originally observed hole, from which numerous small seepages are “boiling” up. The flow from the puddle they create, possibly around 10 litres/second in all, is in poorly-defined, trinkling watertracks leading from the forest into the reedy margin of the lake.

February 18, 2020 (day 1676, 1461+215): NanRG cum. 652.4 mm. Weir +314 mm WPB scale. Lots of duck and geese sounds from the lake.

February 21, 2020 (day 1679, 1461+218): NanRG cum. 652.4 mm.

East Path Creek almost dry, no flow, but SW Spring seepage patch still flowing, only slightly less than 5 days ago. Now I know exactly where it is, it seems amazing that it has been undiscovered for so long.

February 26, 2020 (day 1684, 1461+223): NanRG cum. 668.5 mm.

SW Spring seepage patch still flowing.

February 27, 2020 (day 1685, 1461+224): NanRG cum. 668.5 mm. Cistern +308 mm SCB.

February 28, 2020 (day 1686, 1461+225): NanRG cum. 673.8 mm.

Whispering in the canopy, like the hushed sound of surf on a distant seashore; but almost no wind down below, only occasional wafts to ruffle hair and bring a chill to the recently-trim-bearded cheek on the windward side of the face.

Heading for lowest February rainfall since 2008, 53% less than the 75-year average for the month. In January, it was 61% more than that month's average. This month, rain in showers, as often from the summery northwest as from the wintery southeast, average barometric pressure higher than it normally is in summer.

Another interesting difference is that while we are receiving rather less precipitation than average, Vancouver is receiving more. Currently, for January and February this year, they are +26% relative to their long-term average, while we are only +13% relative to ours. This is a continuation of the trend seen last year.

The weather is not normal any more.

March 6, 2020 (day 1693, 1461+232): NanRG cum. 678.4 mm.

East Path Creek dry; yet, SW Spring still running, tho' now only about 25% of its former volume. Little Creek running. Many ring-neckeds scattered over the lake. Canary Grass Meadow very soggy. Impossible to avoid getting a boot-full of water now and then. Greening up. No flowing water. Large flock of flickers.

March 15, 2020 (day 1702, 1461+241): NanRG cum. 681.8 mm.

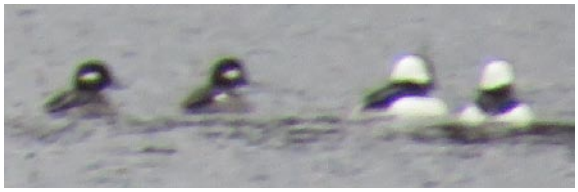
Dry weather continuing, cummulative is 25% below normal for the July 2019-to-July 2020 records. Long-term average NanRG for this date is 904 mm.

Twittering and chirping of mobs of small birds, as if in a playground, moving unseen through sunlit groves of spindly alders.

Robins, chickadees, hairy woodpeckers, nuthatches, and likely others abound.

WATER QUALITY TEST on SW Spring
Lake pH 7.6, Spec.EC 88µS/cm
Spring pH 7.6, Spec.EC 83µS/cm

The spring is subsurface runoff not groundwater. Still flowing but now just a drindle.



March 21, 2020 (day 1708, 1461+247): NanRG cum. 681.8 mm.

Buffleheads, ring-neckeds, and mallards on the lake. Many in interested-looking pairs including two Canada geese.

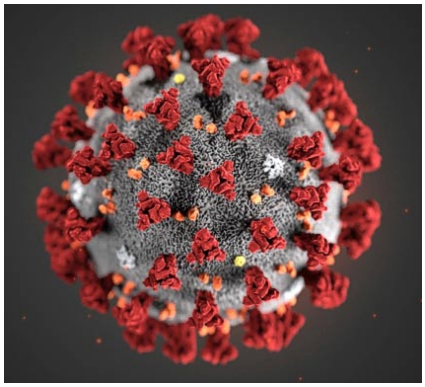
Although there are mallards around, they are not as common as they used to be. Often out-numbered by other wildfowl as they are today.

March 24, 2020 (day 1711, 1461+250): NanRG cum. 682.8 mm.

Vulture surveying the lake, and an eagle skulking at Stump Farm.

Although Canada geese are not welcome, they do trigger a great chorus of alarms whenever either of these big birds appears overhead.

Ruins overlooking Canary Grass Meadow.



Red, *la couleur du jour*. Actually, only one of these four pictures was also taken in Canary Grass Meadow, the red alder catkins (*right)*.

Image(*top left*) is an oft-seen-these-days cryogenic electron microscope picture of 2019-nCoV, the virus that causes COVID-19. The red is a false colouration of the spike protein(S-protein) that the viruses use to attach to and breach the membrane of cells within which they reproduce.

Although Douglas-fir trees are common everywhere on Gabriola, their flowers quickly lose their colour and go to seed and so are easily missed.

These soon-to-be cones were on a tree on the south-facing coastal bluffs east of False Narrows.

The what-looks-to-me-like-a pathogen that commonly afflicts the leaves of Oregon grape plants when stressed creates striking reds among all the greenery.

Is that a foot path? Is that an invasive species? Oh! is that just a sparrow?

March 31, 2020 (day 1718, 1461+257): NanRG cum. 697.3 mm. Rainfall in March has only been lower twice in the last 76 years, in 1965 and last year.

Our annual rainfall (YCD) so far this year is 12% below our average; yet, in Richmond (YVR) just across the water it is 2% above their average. The rain shadow we live in is having its way.

April 4, 2020 (day 1722, 1461+261): NanRG cum. 701.5 mm. Cistern +260 mm SCB. Weir +326 mm WPB scale.

Violet-green swallows are back, swooping and swerving over the water! Rufous hummingbird nearby. Pair of wood ducks. Only hope RDN, TNT, and GaLTT get to understand the need to keep disturbance in the RP down while these birds search for a tree cavity around the lake to nest in.

Coats Marsh Creek running but struggling.

April 8, 2020 (day 1726, 1461+265): NanRG cum. 701.5 mm.

Couple of firsts. An anglewing butterfly (*Polygonia satyrus*) showing interest in the stinging nettle patch at Stump Farm. First insect only if we neglect the midges in the sunbeams, the tiny white moths, and the numerous *hymenoptera*? skimming back and forth a few inches above bare ground at the farm site, all of whom have been around for more than a week. And at the edge of the woods, yellow violets (*V. sempervirens*), first only if we ignore the weedy riff-raff there; daisies, dandelions, dead-nettles, and mats of hairy bittercress.

April 10, 2020 (day 1728, 1461+267): NanRG cum. 701.5 mm.

Conspicuous shrubby tree in the marsh, in standing water, from a distance looking like it was in blossom. Turned out to be leafless and adorned with catkins. For Gabriola, an uncommon willow, Hooker's willow.

Coats Marsh Creek is ponding and no longer flowing.

You still need a bikers' bridge however to get over Little Creek which is still alive and cheerfully trinkling away.

Curious lack of wildflowers so far this year. No spring mushrooms either I'm told. No April showers?

April 16, 2020 (day 1734, 1461+273): NanRG cum. 701.5 mm.

Dryness becoming serious. At this time of year, the average cumulative precipitation since the previous late-July is around 1000 mm. We're a lot short of that this year.

Owl on the Ridgeway, barely interested enough to turn its head to see who's passing by.

Wildflower search in Coats Marsh East found almost nothing, one daphne-laurel (yellowing, hooray); a big-leaved sandwort, not easy to spot when not in flower; and a patch of unusual tiny white-flowered ~~bittercress that I have to assume were *Cardamine hirsuta* but doing a very credible imitation of their alpine relative *C. bellidifolia*~~

plants of the mustard family, genus and species unknown[see April 23]

And just a few hundred metres more along the Marsh Trail another "what's that?". Maybe woodland bittercress *Cardamine flexuosa*? If so, a European import, uncommon in BC.

April 17, 2020 (day 1735, 1461+274): NanRG cum. 706.6 mm.

Skunk cabbage, quite rare within the RP, maybe due to the loss of O- and A-horizons during past logging operations, who knows? These were in the

Stump Farm Number 1 Stream watercourse.

On the 2019-nCoV virus, red pom-pom theme, red spots on the flowers of Oregon grapes that are clearly being stressed by drought, these on the south-facing Foxglove Down

between Contemplation Hill and Witch Doctor (WT-5).

Hawk determinedly on its way off the slope being harangued by a raven.

April 20, 2020 (day 1738, 1461+277): Weir +271 mm WPB scale. NanRG cum. 706.6 mm.

Broom bash begins, though broom up here not yet in flower. Little sign of the usual candyflowers (*Claytonia sibirica*) or slender toothworts (*Cardamine nuttallii*) either despite them being out at the south end of the island. Red-flowering currant in the ponding of

Stump Farm Number 2 Stream. Just 4-5 mm of rain has brought out the calypso orchids, a compelling reason (hello GaLTT/RDN/TNT) for keeping bikers off the narrow mossy Weir Trails where they flourish.

The beavers are building a new hydrogeological feature at the weir. For several years there has been an accumulation of flood debris there, but the beavers are engineering the obstruction into a formal dam using mud as mortar.

There is still water draining from the leveller but the creek at the Marsh Trail culvert is dry. See Table Note 11 in File 673u.

April 23, 2020 (day 1741, 1461+280): NanRG cum. 730.8 mm.

It’s been raining.

Candyflowers everywhere among the alders. Loud assertive noises from pied-billed grebes, red-winged blackbirds, varied thrushes perhaps (disyllabic calls), and more.

On the red pom-pom 2019-nCoV theme, a familiar flower on a familiar trail (Mainline Trail in the 707 CP), but are there more of these with red tips this year than usual....?

On the identity of those tiny Brassicaceae (mustard family) plants, what we used to call Cruciferae, April 16, been studying them and getting quite fond of them but making little progress in identifying them despite hours of sleep-depriving Googling. Early rejects, much easier for local experts than for me, were *Cardamine bellidifolia (*alpine bittercress), *Idahoa scapigera* (pepperpod), *Cochlearia* sp.(scurvy-grass), *Draba* sp.(Whitlow-grass)...often some

characteristics fitted, but never all of them. Doesn't help when field guides describe one species in detail and then casually go on to mention that there are 30+ more of them. *Hornungia procumbens* (oval purse) became one hot favourite, but suspiciously I consulted E-flora BC experts and found (thank you Frank Lomer) what may be the best bet since it is known to grow in the area, depauperate *Teesdalia nudicaulis* (shepherd's cress). For the record, this is how I saw it:

> Coats Marsh East, CDF zone, 110m AMSL, crowded in moss on rock, 4-7 cm high, April, tap root, uncommon. Fls 3-4 mm across, 4 white petals, 6 yellow stamens, 6-8 fls in terminal clusters. Stems no lvs, slightly hairy, more so near the base. Basal lvs rosette with 2-3 mm petioles, fleshy, most circular,4 mm dia, entire, less often with deep ear-like lobes at the base, sparsely hairy especially round the edges, turning reddish-purple with age. Fruit a silicle, green with brown-purple

patch, central vein, shallow mustard-spoon shape, slightly notched tip.

April 25, 2020 (day 1743, 1461+282): NanRG cum. 732.9 mm.

Western buttercups, strawberries (*Fragaria virginiana*), spotted coralroot, and early blue violets.

Mushrooms appearing after the rain, *Amanita pantherina*, turkey tails,

false morels, actually dark brown but appearing coal-black to the eye (*Gyromitra esculenta*), and other smaller stuff.

I'm finding it much easier to cut back the broom that is not yet in flower. I don't get distracted by individual plants that'll be showing an unusual bronze colour or having vivid red-lips. In death, they all look the same.

April 30, 2020 (day 1748, 1461+287): NanRG cum. 737.9 mm.

Speedwell (*Veronica arvensis*). You only see them when you sit down for a while and then notice them growing beside you.

Spots of rain from looming clouds with dark undersides; yet, not numerous enough to fill the sky, nor cause me to pull on the hood of my jacket, nor yet to close up the daisies.

Rain this month 35% below normal, and for the calendar year down 15%.

May 4, 2020 (day 1752, 1461+291): NanRG cum. 743.8 mm.

The ducks have ducklings so I'm not going to the lake too often.

RDN have an engineer looking at the baffle, beaver dam, and pond leveller, I suspect at the direction of lawyers, but I'd hope with the idea of coming up with a water management plan that takes into consideration ecological needs and a schedule for replacing the baffle, which is made of wood and will eventually rot out.

Meanwhile, May flowers. *"Die liebe Erde allüberall, Blüht auf im Lenz und grünt aufs neu*!" [Mahler's Song of the Earth]. Arbutus; dogwood; small blue butterflies never resting, always flitting hither and yon (*Celastrina echo*); devil's matchstick (*Pilophorus acicularis*) and a couple of other lichens on sandstone. Nothing rare, but so good to see them.

The Dog Drink Sidetrack that leads down to Canary Grass Meadow, a hidden-away micro-wetland as it always was.

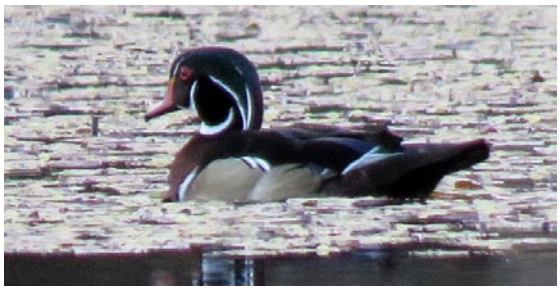
Broom bash completed at Stump Farm. Not aimed at eliminating it entirely from the burn-pile clearings, far from it, just keeping it in the corners out of harm's way.

These may be "waste ground" in some people's eyes, all thistles and stinging nettles, but the biodiversity of these greenswards is high; more dragonflies, butterflies, song birds, snakes, bats, and swallows than anywhere else in the park. And so what if most plants are imports, so am I.

May 12, 2020 (day 1760, 1461+299): NanRG cum. 750.7 mm.

Mallard ducklings, about ten following along behind a proud-looking but very wary mother. Lie down in the grass, ignore the stinging nettles, and move only your fingers on the camera buttons.

Wood duck. Pied-billed grebes are difficult; they move fast and submerge like submarines.



Pair of assertive geese, no goslings though.

The bright flush of new growth on the firs striking this year, *l'emeraude du printemps* someone I once read said they called it in Québec, but out here it's more like *l'olivine*.

Coralroot and venust vetch, flourishing fodder in pattering showers of rain.

May 18, 2020 (day 1766, 1461+305): NanRG cum. 774.5 mm.

Especially delightful blue-eyed Marys (*Collinsia parviflora*); they are rarely seen in the park. Not only that, they were growing alongside camas (*Camassia quamash*), also not a speciality in the park's forest.

Flaxflowers (*Leptosiphon bicolor*) small not-well-known flowers that are native, and yet, on sunny days, manage to rival the hop-clovers, black medics, and English daisies in that they make up for their smallness by their numbers in grassy-gravelly-mossy places; the trail sides and 4-foots.

These all along South Boulevard.

Strawberries are ripening and may is out; time already to cast a clout? For nearly half-a-million dollars, parts of the wetland in Coats Marsh East and a riparian area along East Path Creek are yours. What a deal ... but for whom?

May 23, 2020 (day 1771, 1461+310): NanRG cum. 777.8 mm.

Community volunteers have been taking on the task of clear-cutting the broom in the western burn-pile clearing. I can't help wondering if this is such a good idea.

By all means stop it spreading from its long-established enclaves along the Marsh Trail into the meadows, as has been done for many years, but these meadows are not native habitat; the grasses, wildflowers, and insects there are nearly all exotic species, "invaders" if you will just like the broom, and many enhance the biodiversity of the area by providing resources for birds, bats, voles, and mice not available in the surrounding Doug-fir forest.

So why not selectively manage the broom rather than clear-cutting it? I can think of several reasons.

An ecology is not uninteresting just because it is exotic, always provided of course that it is managed to maintain biodiversity. My species lists for the park would be seriously depleted if the burn-pile clearings were not there.

There are no underlying geological, pedological, or ecological reasons for the clearings' existence; in time, they will revert to forest. In the meantime, keeping the broom in check by destroying every last veteran plant will just provide additional habitat for the other exotic species that are there. The chemistry of the soil in these enclaves has been irrevocably changed to ensure that.

The broom provides an abundant flora resource for bees. The cutters must have noticed this. I'm not an expert, but it seems to me that many of the bees busy buzzing about have white rumps making it likely that they are western bumble bees (*Bombus occidentalis*), a blue-listed taxon, a native species of special concern in BC.

And in addition, the thickets of broom provide a natural barrier between the increasingly heavily-used Marsh Trail and the margins of the lake where human and dog disturbance if not checked in the wildfowl breeding season will seriously degrade the marsh as an ecological reserve. More effective than another notice not everyone will read; a natural good-looking fence providing habitat for an endangered species, what more can one want.

Two experts at disguise. An all-green lacewing with transparent wings (*Chrysoperla* spp.) and groundcones (*Boschniakia hookeri*).

The orange plant is actually in the Cox CP not Coats Marsh RP, but its picture is included here because the colour variations are not seen every day.

It’s curious that the groundcones and coralroots are more numerous than usual this year and readily seen along trails in the RP. Weather of course a possible factor, but could it be that human and dog traffic on the trails are keeping the deer away thereby preserving these fairly rare plants? Helping the native species makes a change from trails being just conduits for lawn weeds.

<u>May 26, 2020</u> (day 1774, 1461+313): Weir +268 mm WPB scale. NanRG cum. 783.4 mm.

Another saprophytic plant I’ve trained my personal neural network to watch out for is candystick (*Allotropa virgata*), so far without success. My network training input has been examples seen in Cox CP.

These types of plant, which live on dead organic matter, are indicator plants for nitrogen-poor soils and their proliferation ties in with the surprising lack of skunk cabbage and thimbleberries in the RP; plants that need nitrogen-rich soil.

Amongst the “oddball” category of plants are aquatics with flowers so tiny that the plants, perhaps unjustly, miss being catalogued as “wildflowers” at all. Some flowers not having petals (being apetalous) doesn’t help either.

Two seen today at the marsh were what might be awlwort (*Subularia aquatica*) and water-starwort (*Callitriche* sp.) (see June 13), the latter a genus that is notoriously difficult to identify at the species level when not gone to seed.

The awlworts had no flowers yet, but were instead adorned with teeny rafts of palish-green duckweed (*Lemna minor*). The water-starworts, if

that's what they are, were still completely submerged growing up from the muddy bottom.

American brooklimes abundant in the shallow water there too.

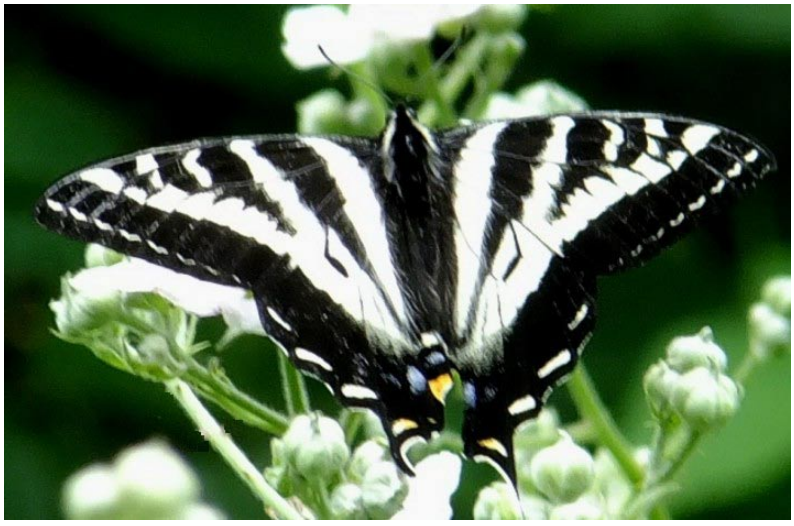
Mallards with ducklings dabbling unperturbed nearby. It helps to be down on your knees showing the same interest that they do in the botanical minutiae.

May 31, 2020 (day 1779, 1461+318): NanRG cum. 784.2 mm.

RDN have been inspecting the weir and beaver dam, mainly I think from the safety issue. Hope if this is so, a plan for the future of the wooden baffle will emerge that takes into account the necessity of maintaining the lake's winter water storage capacity so that it doesn't dry out at the end of summer. The beavers, being the good engineers that they are, have this all figured out.

Rain this month 5% above long-term average but so far this year, rain is 13% below average for the time of year, which is pretty normal given that the one-sigma variation is ±24%.

For my own dry-to-dry-season recording starting July 18, 2019, thus far, 26% below average, which is notably dry given that the one-sigma variation of this annual average is ±17%. We had a dry fall as well as this year's dry spring, January and now May being the exceptions.



June 11, 2020 (day 1790, 1461+329): NanRG cum. 814.9 mm. Pale swallowtail perfectly poised on the shubbery.

Broom has all gone and the bats have not returned this year.

June 13, 2020 (day 1792, 1461+331): NanRG cum. 832.5 mm.

ID problems.

The awlwort (May 26) has failed to flower as it should, I guess it could instead be submerged toad rush, *Juncus bufonius*.

Water-starwort (May 26) is more likely, but not definitely, Hampshire purslane, *Ludwigia palustris* (Frank Lomer). The leaves are showing red, no flowers yet.

July 1, 2020 (day 1810, 1461+349): NanRG cum. 848.4 mm. Weir +238 mm WPB scale. Cistern +235 mm SCB.

Rain in June 58% above long-term month's average, very welcomed by the plant life. Annual total still 8% below average for the time of year but that's pretty normal. ◊

Next file.

Previous file.