June 2021 Parrot's Feather Report

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Somenos Marsh
WILDLIFE SOCIETY
Stewards of the S'amunu /Somenos Marsh Conservation Area

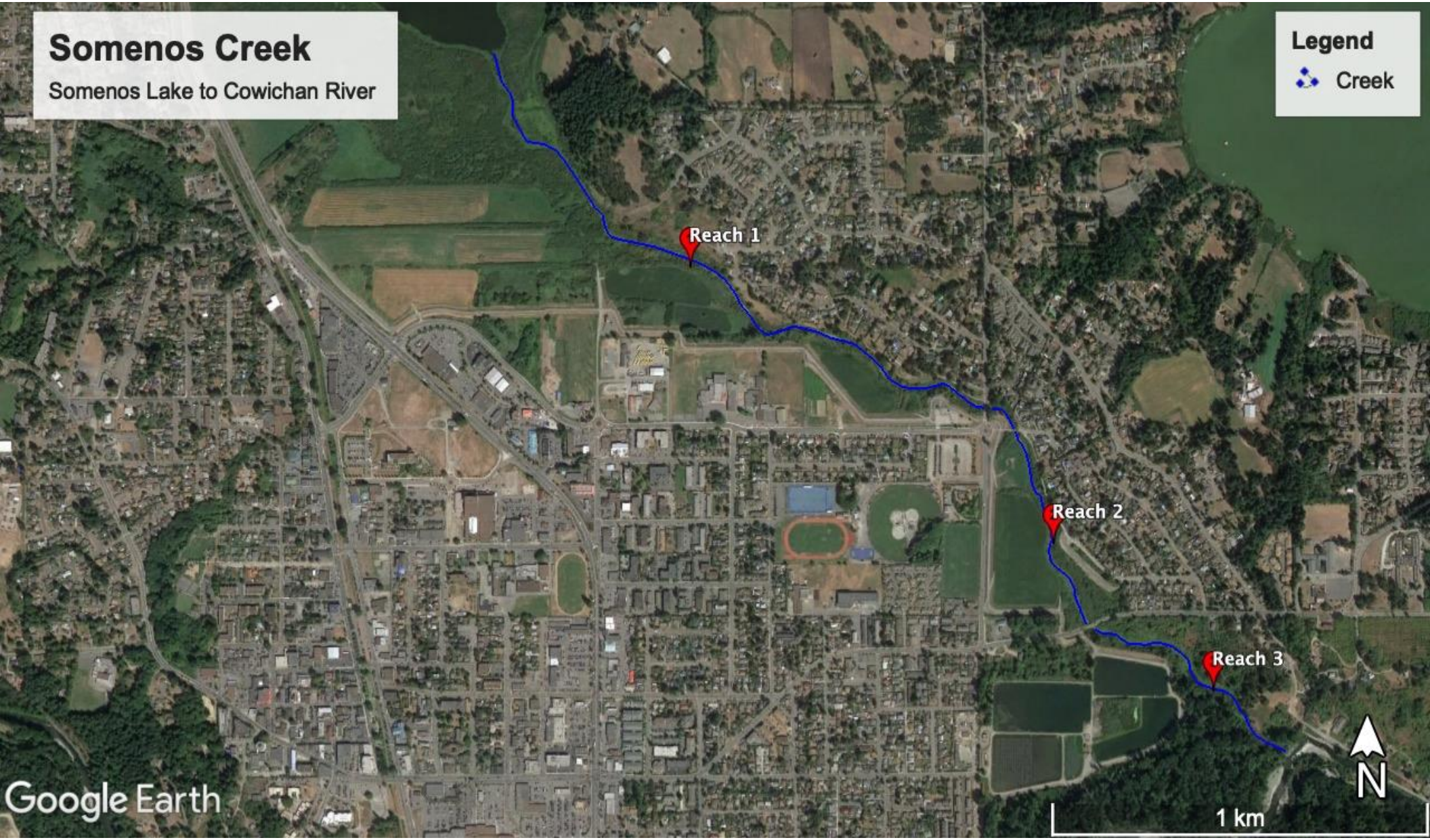

Figure 1: Somenos Creek. This creek is Somenos Lake's only drainage and runs from the South end of Somenos Lake to the Cowichan River.

Executive Summary

The parrot's feather (*Myriophyllum aquaticum*) season is well underway in Somenos Creek, with the invasive aquatic plant already covering large swaths of the creek's surface. Cumulatively, between the three reaches of Somenos Creek, we currently have an overall parrot's feather coverage percentage of 68%. This can be broken down more specifically into 63% cover in reach 1, 78% cover in reach 2, and 71% cover in reach 3. This survey was completed in the month of June, or what may still be considered as "early" season for parrot's feather growth. Peak parrot's feather coverage is expected to be observed in August, at the end of the growth season and just before the fall rains and subsequent heavy water flows in the creek and breakup of the parrot's feather mats. In the last 2 years, 2019 and 2020, August parrot's feather coverage was surveyed at 69% and 84%, respectively (Roger, 2020).

The fact that we are already observing close to peak 2019 numbers in June of 2021 points to this year's August coverage potentially being very high. It will be interesting to see how the coverage changes in the coming months, especially since there was lots of parrot's feather growth observed below the surface of the water. During this survey, only parrot's feather that had breached the surface of the water was counted within the coverage percentage.

The Somenos Marsh Wildlife Society (SMWS) will repeat this survey every month for reaches 1 and 2 until the fall floods and subsequent parrot's feather breakup (reaches 1 and 2 are located within the Municipality of North Cowichan, or MNC). The Society will also survey reach 3 (Cowichan Tribes Land) again during peak season, in August and once again once high-water season begins in October. Results from all surveys will be compared in a "Summer 2021 Parrot's Feather Report".

Introduction

The Somenos Marsh Wildlife Society (SMWS), has been tasked by the Municipality of North Cowichan to assess, monitor, and control the spread of parrot's feather (*Myriophyllum aquaticum*) on Somenos Creek. Somenos Creek is the lone outflow of Somenos Lake, it exits the South end of the lake and drains South, emptying into the Cowichan River. Parrot's feather is an invasive aquatic species that originates in South America (Invasive Species Council of BC, 2019). While only introduced into the Somenos Creek within the last 10 years, the plant already dominates the system, with peak coverages being observed at over 80%. Parrot's feather is important to assess and monitor because it has many deleterious impacts on the water which it invades:

1. Alters timelines for salmon migration by affecting water quality parameters such as dissolved oxygen concentration

2. Impacts waterflow through the physical clogging of the creek system, especially around culverts and bridges

3. Outcompetes native aquatic vegetation and reduces waterway biodiversity

It is imperative that this plant is understood within the context of this specific system in order to create an eradication and/or management plan moving forward.

Methods

Five staff members of the SMWS were tasked with performing this survey. The survey was performed both in kayaks on the water and through observations from the streambank. The streambank observations were necessitated due to the coverage of parrot's feather on the creek being absolute in certain areas, making paddling through it impossible.

The abundance of Parrot's Feather was determined by visual inspection and the percentage was recorded based length and width of channel. Channel widths were measured and averaged for area calculations using a combination of Google Earth Pro and Gaia GPS. As the SMWS staff travelled upstream from Tzouhalem Road to Somenos Lake, and downstream from Tzouhalem Road to Cowichan River, waypoints were taken (Gaia GPS Android app) when there was an obvious change in the amount of parrot's feather coverage observed. The survey was completed in the last week of June 2021.

For the purposes of this survey, Somenos Creek was split into three reaches. Reach 1: Somenos Lake to Lakes Road Footbridge (MNC). Reach 2: Lakes Road Footbridge to Tzouhalem Road (MNC). Reach 3: Tzouhalem Road to Cowichan River (Cowichan Tribes land).

Reach 2, Lakes Rd Footbridge to Tzouhalem Rd Bridge, was also surveyed via drone by an outside hire as part of creating our planting plan for that reach of the creek. The drone survey data will be included in appendix 2 at the end of the report.

Results

The surveyed stretch of Somenos Creek was divided into three reaches, the first being from Somenos Lake to the Lakes Road Footbridge, the second from the Lakes Road Footbridge to the Tzouhalem Road Bridge, and the third from the Tzouhalem Road Bridge to the Cowichan River. We'll refer to these sections as reaches 1, 2, and 3, respectively (Figure 1).

Reach 1

Somenos Lake to Lakes Road Footbridge

Figure 2: Reach 1 of Somenos Creek. This reach stretches from Somenos Lake to the Lakes Road Footbridge. Percentages refer to parrot's feather coverage as of late June 2021.

Reach 1 had a total parrot's feather coverage of 63% (Table 1), this statistic does not include the Northernmost section of Somenos Creek before the presence of parrot's feather begins (mauve line, top left of figure 2). There are many variances in the coverage throughout this reach, varying from as little as 5%, to long stretches of near-complete coverage. As far as the assessment team could note, there were no specific features of this reach that could accurately predict where the parrot's feather coverage would be the thickest (water depth, crown cover, shade, creek width). Water quality was tested at the culvert entrance highlighted in Figure 2. This was because right at this culvert, there was no parrot's feather present, and this was also the only place where live Coho fry were observed in this reach of the creek. Water quality results are highlighted in Appendix 1.

Table 1: Parrot's Feather Coverage in Reach 1

Somenos Creek Reach: 1	length(m)	measured channel widths (m) - Google Earth, 2016				Area (m^2)	PF Area (m^2)	% PF in entire reach	Comments
85%	87.9	7.2	6.8	8		644.6	547.91		
5%	99.7	7.3	10.5	5.3		767.69	38.3845		
25%	25.9	7.9	5.5			173.53	43.3825		
75%	33.8	5.2	7.7	6.9		223.08	167.31		
40%	37.2	7.1	6.4	7.6		261.64	104.656		
20%	152	5.3	7.5	9.5	6.3	1086.8	217.36		
100%	44.1	7.6	7.1			324.135	324.135		
10%	78.9	7.1	5.7	8.6		562.82	56.282		Culvert with flowing water enters Somenos Creek
85%	37.4	9.2	7.1			304.81	259.0885		
10%	64.8	6	6.9			417.96	41.796		
20%	36.1	6.7	6.8			243.675	48.735		
100%	87	7.9	9.7	9.8		794.6	794.6		
5%	114	6.4	6.8	6.9		763.8	38.19		
95%	431	8.9	7.8	10.3	9.4	3922.1	3725.995		
80%	179	8.9	9.1	9.9		1664.7	1331.76		
50%	63.6	8	7.6	7.7		493.96	246.98		No PF between Somenos Lake and this point
Totals	1572.4					12649.9	7986.565	**63%**	

Reach 2

Lakes Road Footbridge to Tzouhalem Road Bridge

Figure 3: Reach 2 of Somenos Creek. This reach stretches from the Lakes Road Footbridge to the Tzouhalem Road Bridge. Percentages refer to parrot's feather coverage as of late June 2021.

In reach 2, the parrot's feather coverage totaled 78% (Table 2). It shows considerably less variation than the coverage in reach 1. However, coverage still drops to as low as 5% near the footbridge, and sees coverage peak at around 95% on longer, more open stretches. In this reach, there seems to be a bit more correlation between coverage and shade. The bottom stretch in Figure 3 is an area with very little, if any, streambank canopy coverage. The middle yellow stretch, showing a coverage of 70%, coincides with the one section of this reach that has a bit more canopy coverage. It is worth noting, however, that the canopy coverage even in this section is very limited, and most of the taller riparian trees are a fair distance from the creek, thus limiting their shading efficiency. It will be interesting to note changes in coverage during the July assessment and see if the coverage percentages still reflect differences in riparian vegetation.

Table 2: Parrot's Feather Coverage in Reach 2

Somenos Creek Reach: 2	length(m)	measured channel widths (m) - Google Earth, 2016				Area (m^2)	PF Area (m^2)	% PF in entire reach	Comments
95%	207	9.9	12.1	7.1	7.3	1883.7	1789.515		
50%	46.1	7.6	7.4	7.8		350.36	175.18		
95%	17.3	8.5	7.7			140.13	133.1235		
70%	173	6.1	7.7	8.4	8.3	1319.125	923.3875		
95%	43.3	7.2	8			329.08	312.626		
50%	54.7	6.1	8.7	7.6		408.4267	204.2133		
5%	21.8	5	3.8			95.92	4.796		
Totals	563.2					4526.742	3542.841	**78%**	

Reach 3

Tzouhalem Road Bridge to Cowichan River (Cowichan Tribes Land)

Figure 4: Reach 3 of Somenos Creek. This reach Stretches from Tzouhalem Road to the Cowichan River. Percentages refer to parrot's feather coverage as of late June 2021.

Reach 3 of Somenos Creek was determined to have a cumulative coverage of parrot's feather totalling 54%. However, below the tributary inflow that is shown near the bottom of figure 4, shows remarkable "parrot's feather resistance" (water quality info in appendix), with no parrot's feather present between the tributary and the confluence with the Cowichan River. If we were to include only areas with parrot's feather present, we have a reach coverage of 71% (both percentages are shown in Table 3). This reach showed no meaningful correlation between riparian changes and parrot's feather coverage percentages.

Table 3: Parrot's Feather Coverage in Reach 3

Somenos Creek Reach: 3	length(m)	measured channel widths (m) - Google Earth, 2016				Area (m^2)	PF Area (m^2)	% PF in entire reach	Comments
0%	13.4	8.77				117.518	0		under Tzouhalem road bridge
20%	41.4	8.77	7.48			336.375	67.275		
10%	61	6.63	7.76			438.895	43.8895		
75%	94.6	10.7	27.82			1821.996	1366.497		
25%	28.7	9.8				281.26	70.315		
100%	107	30.8	21.1	23	15.6	2420.875	2420.875		overhead pipeline crossing
95%	72	24.9	12.2	10.7		1147.2	1089.84		
10%	135	17	8.6	10.5					
5%	65.8	9.75				641.55	32.0775		
0%	128	12.4	23.8	17.8		2304	0		unnamed tributary enters Somenos Creek to Cowichan River
Totals	746.9					9509.669	5090.769	**54%**	
						7205.669	5090.769	**71%**	doesn't include 0%PF from Trib. To Cowichan R.

Appendix 1

Water quality results of interest

Water quality was tested in several areas of interest throughout this survey. In figure 2, a culvert that enters Somenos Creek from an adjacent neighbourhood is highlighted as the only area in Reach 1 where Coho fry were observed. We decided to test the water that was coming out of the culvert, and then compare that to where the water meets the creek (confluence), water in the creek's open channel, and water below the parrot's feather mat. The results are in the table below:

Somenos Creek Water Quality Comparison

Parameter	Culvert	Confluence	Open Channel	Under Mat
Temperature (^{0}C)	14.4	20.3	22.3	22.4
DO (mg/L) Dissolved Oxygen	10	5.09	2.44	2.71
TDS (mg/L) Total Dissolved Solids	196.6	137	104.66	104.65
SPC (µS) Specific Conductivity	303.6	216.7	161.4	161
pH	7.3	7.3	6.45	6.86

In this table, we see clear differences in water quality between the 4 different test zones. The culvert water is of good quality for fish habitat, but it's clear that it has limited influence and is quickly overwhelmed by the water in the creek. It's interesting to note that during the initial survey, there was a group of 30 or so Coho fry stranded in an area at the mouth of the culvert about 1.5x2m in size. This is where the "confluence" test was taken. In the time since the survey, those fish are no longer present – likely pointing to the fact that the water quality in that small area has diminished to the point of no longer being able to support fish life.

The open channel and under mat tests yielded very similar results. There was some discussion as to whether open channel water would have better oxygen exchange with the air, which would manifest in higher DO levels relative to the areas buried under parrot's feather. This doesn't seem to be the case and lends credence to the fact that parrot's feather likely has a strong influence on all aspects of waterways that it invades.

Appendix 2

Drone Survey Results of Reach 2 with images

Below are the results of the drone survey that was done as a part of the planting plan for the reach 2 riparian area. If we consider the numbers in the image below, versus the numbers that were assessed by the staff members from kayaks and the streambank, we find that there is only about a 3-4% error rate in our assessment methods, giving us confidence in the accuracy of our methods going forward.


Somenos Creek - Parrots Feather extent
June 16, 2021
Stream Coverage - 4753.9m^2
Parrots Feather* - 3887.5m^2 (81.8%)
Open Water - 866.4m^2 (18.2%)
*Parrots feather area also includes a few areas of water lily coverage <1%
WRC 2021-06-22
Aerial Imagery: WRC 2021-06-16
Basemap: Bing Aerial
BC Albers
0
25
50 m

Parrot’s feather drone imagery (Courtesy of Leh Smallshaw)

References

Invasive Species Council of BC. (2019, April). *Parrot's Feather; Myriophyllum aquaticum*. BC Invasives. https://bcinvasives.ca/wp-content/uploads/2021/01/Parrots-Feather_Factsheet_04_22_2019.pdf.

Roger, E. (2020). (rep.). *Parrot's Feather Annual Report, 2020*. Duncan, BC: Somenos Marsh Wildlife Society.