

Somenos Creek Parrot's Feather Report
August 2021



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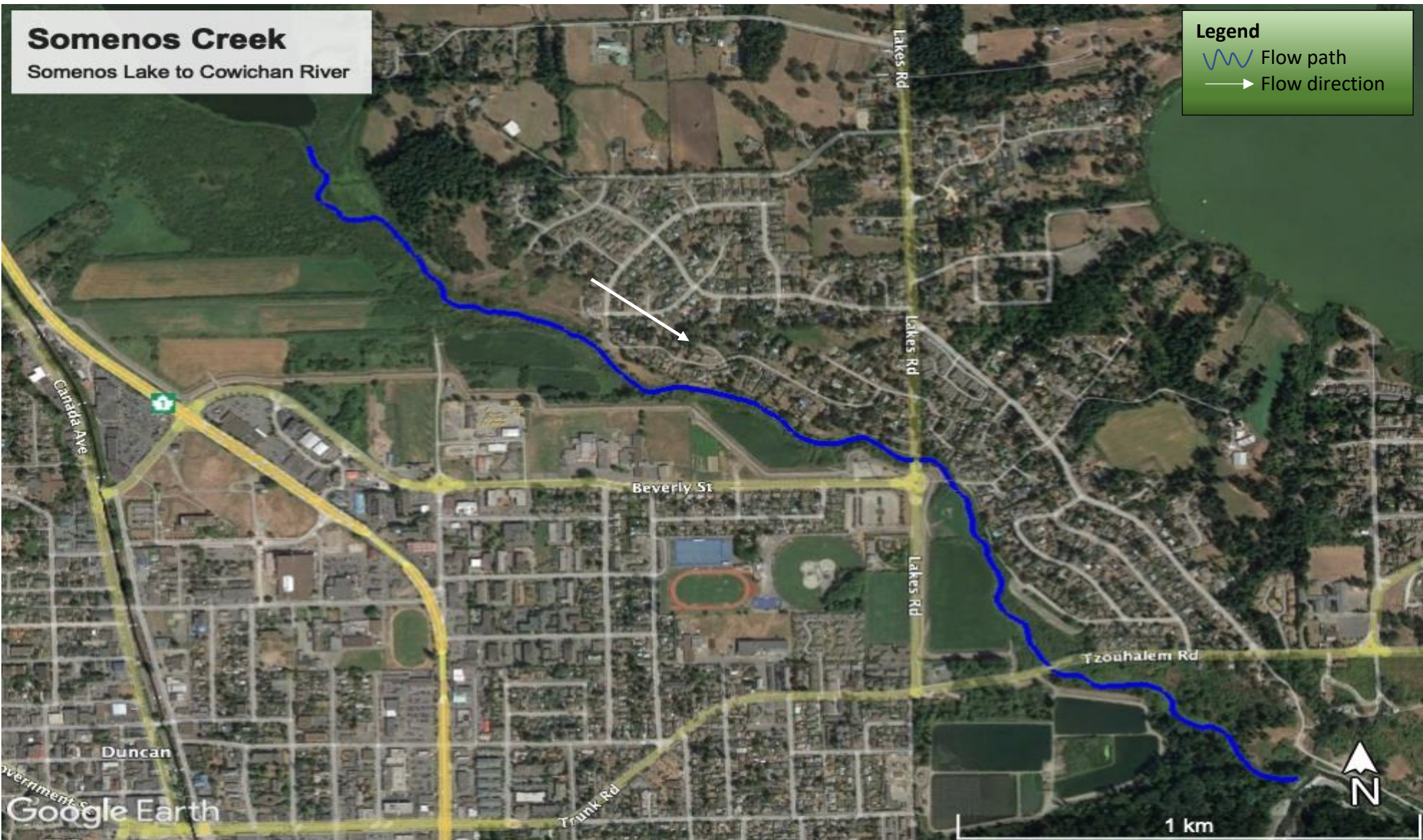


Figure 1: Somenos Creek path, the creek flows from the south end of Somenos Lake into the Cowichan River

Executive Summary

The parrot's feather (*Myriophyllum aquaticum*) growth season is winding down in Somenos Creek, with the invasive aquatic plant at peak growth, covering large swaths of the creek's surface. This survey was completed on August 30, 2021 and is considered the end of the parrot's feather growth season. Peak parrot's feather coverage is expected in August, at the end of the growth season.

Cumulatively, in the three reaches of Somenos Creek, we currently have an overall parrot's feather coverage percentage of 73%, a 16% increase from the June survey. This can be broken down more specifically into 68% cover in Reach 1, and 96% in Reach 2 and 70% in reach 3.

The northernmost stretch of Reach 1 (234 m), near Somenos Lake has no parrot's feather present whatsoever. When this stretch is removed from the coverage measurement, the coverage of Reach 1 jumps from 68% to 82%. SMWS staff are currently investigating this phenomenon, since parrot's feather was previously observed at the mouth of the creek in years past. Future checks will include water quality (oxygen, phosphate, pH, depth) to see if it varies between this stretch and the rest of the creek. Other possibilities include suppression of its growth due to an algal bloom at the lake outlet and the possibility of smartweed, another aquatic plant present in Somenos Creek, that may be outcompeting parrot's feather.

The Somenos Marsh Wildlife Society (SMWS) will repeat this survey a final time once the fall rains begin, and the parrot's feather begins to break up for the winter season. Results from all surveys will be compared in a "Summer 2021 Parrot's Feather Report".

August also marked the completion of our experimental parrot's feather treatment installation for this year. This is year two of testing a technique that uses a rubberized pond liner to smother the parrot's feather. We hope to keep the liner in the experiment areas for a year or more, smothering both the above-water growth, and the plant's roots.

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. 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. May alter 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.

This is the third survey of the season and the second that covers Somenos Creek in its entirety, which refers to Reaches 1, 2, and 3. The next survey (all 3 reaches included) will be completed in October or November of 2021.

Methods

Four staff members of the SMWS were tasked with performing this survey. The survey was performed through observations from the streambank. The streambank-only survey method was 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 walked upstream from Tzouhalem Road to Somenos Lake, 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 on August 30, 2021.

For the purposes of this survey, Somenos Creek was split into two 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)

Results



Photo: an example of parrot's feather coverage on Somenos Creek in August 2021. Note that there is no visible (open) water in this part of the creek (Reach 1).



Figure 2: Parrot's feather coverage in reach 1 of Somenos Creek. Colour changes reflect changes in surface area coverage percentage.

Reach 1 has seen yet another month-over-month increase in parrot's feather coverage. The downstream end of the reach (bottom right of Figure 2) has much more variance in coverage than the upstream end. From the end of Trillium Way down to the Lakes Road Footbridge, the coverage percentage changes occur in increments of less than 100m, except for one 149m section. We observed much more homogenous coverage upstream of Trillium Way, with coverage percentages being consistent for at least 130m each. This corresponds with greater variance in canopy coverage downstream of Trillium Way and a more consistent lack of canopy coverage upstream of that landmark. This lends credence to the idea that shade can impede the growth of parrot's feather.

The parrot's feather coverage in Reach 1 has seen an increase of 15% since June, with the reach going from 53% to 68% covered. Of note, the uppermost 250m of Reach 1 has no parrot's feather whatsoever (Figure 2). As of now, the SMWS is not yet sure why this is the case, as parrot's feather has been observed in this part of the creek in previous years. In table one, we present the overall coverage percentage as two different numbers, one that includes this open section and one that does not. With this section not included we see the coverage jump from 68% to 82%.

Table 1: Reach 1 Parrot's Feather Coverage; August 2021

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
50%	175	7.2	6.8	8		1283.333	641.6667		
95%	26.2	7.3	10.5	5.3		201.74	191.653		
100%	73.1	7.9	5.5			489.77	489.77		
95%	47.2	5.2	7.7	6.9		311.52	295.944		
30%	81	7.1	6.4	7.6		569.7	170.91		
75%	21.1	5.3	7.5	9.5	6.3	150.865	113.1488		
100%	42.3	7.6	7.1			310.905	310.905		
75%	66.5	7.1	5.7	8.6		474.3667	355.775		
50%	35.8	9.2	7.1			291.77	145.885		
95%	15.2	7	6.9			105.64	100.358		
90%	32.2	6.7	6.8			217.35	195.615		
100%	149	7.9	8.8	9.1		1281.4	1281.4		
10%	32.6	7.1	6.8	6.9		226.0267	22.60267	Culvert outflow (no water 08/21)	
95%	46.8	8.9	7.8	10.3	9.4	425.88	404.586		
30%	76.6	8.9	9.1	9.3		697.06	209.118		
100%	240	8.8	8.4	10.2		2192	2192		
95%	130	9	9.1	8.6		1157	1099.15		
100%	165	8.7	8.8	9.2		1468.5	1468.5	PF competition with smartweed	
0%	250	8.2	10.1	9.9		2350	0	Last 250m leading up to the lake	
Totals	1705.6					14204.83	9688.987	68%	
						11854.83	9688.987	82%	PF% without the vacant last 250m included



Figure 3: Parrot's feather coverage in reach 2 of Somenos Creek. Colour changes reflect changes in surface area coverage percentage.

As with reach 1, reach 2 has also seen a month-over-month increase in parrot's feather coverage throughout the summer. Reach 2 also owns the unfortunate distinction of being the reach with the greatest infestation in Somenos Creek. Since June, reach 2 has seen an increase in parrot's feather coverage of 18%, from 78% to 96%. As such, there is very little visible water present in this reach of the creek.

Sticking with the theme of canopy coverage, this is the reach with the least overall shade and the highest coverage percentage of parrot's feather. This matches our anecdotal observations made throughout the survey season that points to the necessity of streamside tree planting with regards to parrot's feather control. When compared to reach 1, this reach demonstrates much more consistent coverage, with the downstream 94% of the reach varies by only 15 (Table 2).

The near-complete coverage of reach 2 has resulted in some concerns with possible flooding at certain pinch points (Tzouhalem Road Bridge, Chesterfield Creek Tributary). The thickness of the parrot's feather mats in this area is over 50cm in places and we are unsure how these mats are going to react to

the higher water flows of fall and winter. A report about these concerns has been completed and submitted for review to the Municipality of North Cowichan.

Table 2: Reach 2 Parrot’s Feather Coverage; August 2021

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
100%	246	9.9	12.1	7.1	7.3	2238.6	2238.6		
95%	31	7.6	7.4	7.8		235.6	223.82		
100%	91.8	8.5	7.7			743.58	743.58		
95%	68.4	6.1	7.7	8.4	8.3	521.55	495.4725		
85%	32.4	7.2	8			246.24	209.304		
95%	29.9	6.1	8.7	7.6		223.2533	212.0907		
85%	33	5	3.8	4.4		145.2	123.42		
45%	31	5	3.8			136.4	61.38		
Totals	563.5					4490.423	4307.667	96%	

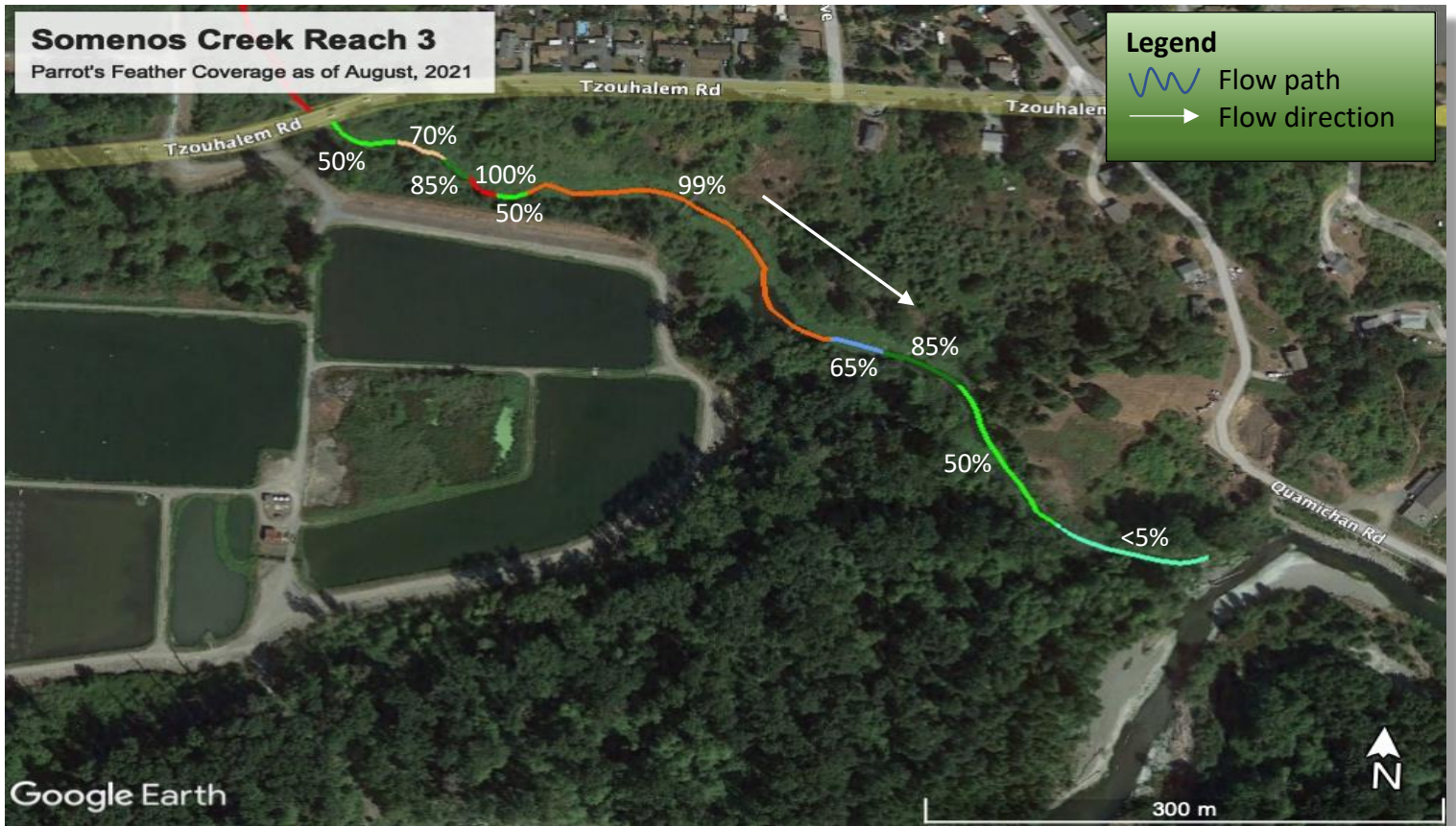


Figure 4: Parrot’s feather coverage in reach 3 of Somenos Creek. Colour changes reflect changes in surface area coverage percentage.

Reach 3 follows the trend set by the first two reaches through another substantial month-over-month increase in parrot's feather coverage. Similarly to reach 2, there is little consistent canopy coverage in this reach and that corresponds to a very dense covering of parrot's feather. From June to August, the coverage in reach 3 increased by 16% from 54% to 70% (Table 3).

This reach is interesting because, similarly to reach 1, there is a long (128m) stretch at the downstream terminus that has very little (<5%) parrot's feather present. The beginning of this stretch is marked by the confluence of Somenos Creek and a tributary known as Fish Gut Alley. During the June survey, there was good water flow coming from the tributary and there was a clean divide where beyond this confluence, there was no parrot's feather present at all. As of August, the Fish Gut Alley flow has slowed, and the parrot's feather is now observed to be creeping down the creek. The coverage in this stretch is still minimal, however the presence is significant as there was none before. Further research must be done on this section of the creek, specifically the characteristics of the water coming out of Fish Gut Alley, as it seems to have properties that are able to limit the growth of parrot's feather. These characteristics can include physical and chemical measures such as the rate of flow, temperature, oxygen saturation, depth etc. With this in mind, if we are to ignore this section of the reach with regards to overall coverage, we see the coverage soar from 70% to 84% (Table 3), thus underlining how important the water coming in from this particular tributary is.

Reach 3 in its entirety runs through Cowichan Tribes Land. For purposes of this survey, assessors Adam Dewar and Gina Hoar were granted permission to access the creek through Tribes Land via Quamichan Road. The SMWS thanks Tim Kulchyski and Tracy Fleming along with all other representatives of Cowichan Tribes for allowing us access to perform this important work.

Table 3: Reach 3 Parrot’s Feather Coverage; August 2021

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
50%	43.8	8.77				384.126	192.063	under Tzouhalem road bridge	
70%	42	8.77	7.48			341.25	238.875		
85%	20.3	6.63	7.76			146.0585	124.1497		
100%	26.2	10.7	12.2			299.99	299.99		
50%	25	9.8				245	122.5	overhead pipeline crossing	
99%	242	22.3	21.1	23	15.6	4961	4911.39		
65%	32.3	24.9	12.2	10.7		514.6467	334.5203		
85%	65	17	8.6	10.5				unnamed tributary enters (less than 5% PF coverage)	
50%	120	9.75				1170	585		
5%	128	12.4	12	17.8		1800.533	90.02667		
Totals	744.6					9862.605	6898.515	70%	
						8062.071	6808.488	84%	PF% without mostly vacant last 128m included

Conclusion

The parrot’s feather infestation of Somenos Creek remains alarming, to say the least. To summarize our findings, the SMWS surveyors have noted substantial increases in coverage in all reaches through the summer.

Reach 1: **53%** (June) to **68%** (August)

Reach 2: **78%** (June) to **96%** (August)

Reach 3: **54%** (June) to **70%** (August)

Total: **57%** (June) to **73%** (August)

Overall, this summer, the creek in its entirety has seen a 16% expansion coverage from 57% to 73%.

Interestingly, this figure indicates a reduction in parrot’s feather coverage when compared to the results of the 2020 survey, also performed by the SMWS. In 2020, peak parrot’s feather coverage was recorded at 84% (Roger, 2020), 11% higher than this year’s peak. This decrease is entirely due to the fact that there is little to no parrot’s feather found at the upstream terminus (250m) and the downstream terminus (128m) of Somenos Creek. If we remove these stretches from the overall coverage tally, the percentage

jumps from 73% to 85%, which is in line with the coverages that were surveyed in 2020. In the future it is going to be critical to figure out what conditions are different in these sections of the creek and why those different conditions are leading to the recession of parrot's feather.

It has been wondered whether the upstream terminus of the creek is acting like an "extension of the lake" during low-flow season and perhaps the parrot's feather could be affected by the algal blooms experienced by the lake in the summer. This condition could have been exacerbated this year due to our extremely hot and dry summer along with the low water conditions that went along with it. Other factors that could affect the parrot's feather in this stretch of the creek could be water depth, groundwater upwelling influence, or the out-competing of parrot's feather by other aquatic plants. With regards to this last point, the far upstream area of the creek sports a huge amount of smartweed and pond lily. However, it has been observed elsewhere in the creek that parrot's feather and smartweed can grow together, so it is not clear that smartweed and parrot's feather experience direct competition. As noted above in the "Reach 1" section, there has been parrot's feather in this section before, so it will be interesting to see what the results of next year's surveys are. It's possible the unique weather conditions experienced this season had some influence and a return of parrot's feather to this area next summer is possible.

The near absence of parrot's feather in stretch by the downstream terminus of the creek is extremely interesting, as it seems to be directly influenced by water condition changes. As mentioned in the "Reach 3" section, the clear divide between parrot's feather presence and absence is marked by the confluence of Somenos Creek and a tributary known as Fish Gut Alley. In June, fish gut alley was running quite heavily, with lots of input into the creek. At this point the water entering the creek was noted to be deeper, clearer, colder, and moving with a much higher velocity. At the time of the June survey, there was no parrot's feather whatsoever below this confluence. By the time we re-surveyed the area in August, the flow from Fish Gut Alley had slowed substantially. Coincidentally, we are now observing parrot's feather below the confluence, where there was none before, so the water from Fish Gut Alley has a clear influence on the aquatic invader's ability to survive and spread. Through the winter and next season, the chemical and physical properties (flow velocity, depth, oxygen content, pH, temperature, dissolved solids, heavy metals etc.) of the water flowing from Fish Gut Alley should be assessed and compared to the water upstream in Somenos Creek in order to figure out what about this water is suppressing the parrot's feather.

Next summer will be year 4 of parrot's feather surveying performed by the SMWS. The continuation of these surveys is extremely important to be able to observe and follow trends with regards to this plant. Are the absences in the two stretches noted above a normal variant in growth? Are they a

result of unique and extreme weather patterns? Has the parrot's feather found a competitor? These questions may be answered in the coming years once more data is obtained, and observations performed.

Treatments; Current and Future

2021 marks the second year of experimental parrot's feather treatment using rubberized pond liner to smother the plant. The experiment resumed in July, after the fish window opened for work within the creek. Federal permission was applied for and granted for this work.

The method behind this treatment is to place sheets of pond liner on top of the creek in the summer in order to smother the above-water growth of parrot's feather. Once the top growth is killed and the water levels in the creek rise in the fall, the liner is sunk down to the bottom of the waterway and left for the winter, thus also smothering the rhizomes and roots. In theory, the killing of the leafy growth and rhizomes for a year or two should preclude parrot's feather from returning during the growth season following the treatment.

The sheets that were placed last year unfortunately were not able to stay completely submerged during flood season and had to be removed and re-set this summer. During the month of July 2021, the SMWS team and volunteers were able to remove all four (4) sheets that were placed during the summer of 2020. Upon removal the sheets were cleaned and repaired. Two (2) of the sheets were re-set into the creek in July, at 400 square feet each, this giving us an initial test area of 800ft². The two remaining sheets were successfully placed in August, giving us a total treatment area of 1600ft² for the year. All that's left to do to complete the treatment is to use cinder blocks and sandbags to sink the liner down to the creek floor in order to kill the parrot's feather roots throughout the winter. This final act will be performed in October, before the water levels rise to peak-season flows.

Another treatment the SMWS will be undertaking this fall is the planting of shade trees along the southwest side of Somenos Creek. Throughout October, the SWMS staff and volunteers will be planting around 300 trees along the banks of the creek in hopes of creating greater canopy coverage throughout and thus inhibiting ideal growing conditions down the road for parrot's feather. This is a longer-term treatment than something like a harvester or pond-liner smothering as it takes much more time for trees to establish and grow to the point where they will provide adequate shade. However, given enough time, this is a double-sided treatment as it will eventually shade the creek and create a healthier and more natural riparian area for the creek, thus restoring the natural function and ecosystem services traditionally provided by such a system.