

October 23, 2020

John Westerling, Director  
Department of Public Works  
PO Box 209  
Hopkinton, MA 01748

**RE: Summary of 2020 Lake Maspenock Aquatic Vegetation Surveys**

Dear Director Westerling,

This letter provides a summary of the results and data from the Lake Maspenock aquatic vegetation surveys conducted on June 13 and September 18, 2020. This information documents the present status of the aquatic vegetation community in Lake Maspenock (the “Lake”) in 2020. These data and analyses provide information and insight into growth patterns seen during this growing season and provide input to the deliberations of the Lake Maspenock Citizens Input Group (the “CIG”) in determining the location and scope for potential lake management activities in the upcoming year.

The aquatic vegetation surveys are conducted by the CIG and volunteers. These teams visit up to twelve established sampling stations twice a year (late spring and late summer) to monitor seasonal lake vegetation growth. Global position system (GPS) locations of the individual stations are recorded on a hand-held device. Table 1 provides a list of the standard sampling locations with their respective GPS locations for the September sampling<sup>1</sup>. Locations of the monitoring stations are shown on the map in Appendix A.

At each vegetation monitoring station, samplers followed protocol used for previous surveys (see Appendix B), with observations of total water depth, Secchi disk transparency (SDT) depth, weed species present, areal coverage via visual observations with an AquaScope viewer, and relative species density via replicate tosses of a “weed rake.” At many stations, it was not possible to estimate areal coverage on the bottom due to water column turbidity obscuring the bottom. Raw data and field notes were recorded on standardized forms and are provided in Appendix C (see attachment).

The June 2020 vegetation survey visited twelve survey locations including a new station established in the central area of the North Basin, adjacent to the seasonal waterski slalom course. Results of the June survey are provided in Table 2. Seven aquatic weed species were identified including bladderwort (*Utricularia* spp.), European naiad (*Najas* spp.), fanwort (*Cabomba carolinia*), largeleaf pondweed

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<sup>1</sup> The GPS locations, vegetation survey results, and raw data forms from the June 2020 sampling are available in a letter report to John Westerling dated June 24, 2020.

(*Potamogeton amplifolius*), tape-grass (*Valisneria americana*), variable milfoil (*Myriophyllum heterophyllum*) and waterweed (*Elodea canadensis*). Summary station conditions were color-coded according to the density key located at the bottom of the table.

In general, trace to sparse growth of naiad and tape-grass were noted at the uppermost margins of the North Basin (NB/EC and NB/CL). There was more vegetation at the North Basin central area (NB/C) with sparse to moderate patches of largeleaf pondweed. The remainder of the North Basin survey stations had sparse to trace growth, mostly of naiad and tape-grass. Aquatic vegetation growth was also trace to sparse in density in most of the South Basin survey stations. The exceptions to these trends were stations SB/SB and SB/EC.s, where growth reached moderate levels for some invasive species (fanwort, milfoil).

Results of the September 18, 2020 vegetation survey are provided in Table 3. We should note that this sampling date is a bit late in the season so that some seasonal senescence and decay of the weeds could have occurred, leading to an underestimate of recreational season biomass. Twelve locations were visited and observations made in the lake. The most common species were naiad (ten of 12 sampling locations) variable milfoil (7 of 12), and tape-grass (5 of 12). One difference between field observations in 2020 from 2019 was the reduced numbers of snail (tentatively identified as the non-indigenous species *Viviparus georgiana* or banded mystery snail) found in shallow shoreline areas. The reason(s) for this reduction is not known.

Aquatic vegetation density in the North Basin was noticeably greater than that observed during the June survey with all stations exhibiting at least moderate growth. Growth of several species reached dense levels at NB/EC, NB/C, and NB/NWI. The most prevalent weeds present included naiad, tape-grass, largeleaf pondweed, and milfoil. In contrast, aquatic vegetation was measured as trace to sparse at most stations in the Central and South Basins. No plants were observed at SB/WB and SB/WC. The most abundant and diverse vegetation growth in the lower half of the lake was found at SB/EC.s, which is a protected embayment with water depth and substrate conducive to plant growth.

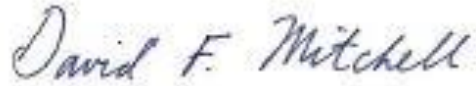
Overall, the 2020 surveys are consistent with the seasonal pattern of a general increase of aquatic weeds, particularly in the North Basin. In the South Basin, the amount of vegetative growth is less, presumably due to the greater water depth and less hospitable substrate found in many locations. Comparison of the results of the 2020 to the 2019 surveys clearly indicated that the density and biomass of the aquatic vegetation community has increased, particularly in the North Basin. Tape-grass appears to have increased in density and occurrence in the North Basin. Another difference noted between field observations in 2020 from 2019 was the reduced numbers of snail (tentatively identified as the non-indigenous species *Viviparus georgiana* or banded mystery snail) found in shallow shoreline areas. The reason(s) for this reduction is not known.

As has been discussed in previous annual aquatic vegetation survey reports, the influence of the effective deep seasonal drawdown (i.e., 8-foot water level drop) conducted in winter 2016 diminishes over time and there was limited benefit from the annual 5-foot drawdown conducted in winter 2020. Current approval of a deep drawdown in winter 2021 allows an opportunity to re-evaluate the effectiveness of this lake management tool to reduce excessive weed growth in the North Basin and lessen seasonal recreational impacts. As always, continued monitoring of the aquatic vegetation twice over the growing season will provide the best indicator of the degree of weed control achieved by a drawdown.

The CIG may wish to review survey methods and locations to potentially streamline the monitoring process, particularly if it chooses to conduct a recommended five-year plan review of the Lake Maspenock Aquatic Vegetation Control and Management Plan (November 2016) as well as consider whether new or additional management approaches are warranted.

Please review this letter and accompanying data and let me know if you have any questions or need further clarification.




Sincerely,

A handwritten signature in cursive script that reads "David F. Mitchell". The ink is dark and the handwriting is fluid and legible.

David F. Mitchell, Ph.D., CLM

<b>Table 1. Lake Maspenock Aquatic Vegetation Monitoring Stations - September 2020</b>			
<b>Code</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Station General Description</b>
NB/EC	N 42° 12' 025"	W 71° 33' 017"	North Basin; East Cove / West Main St.
NB/CL	N 42° 12' 017"	W 71° 33' 030"	North Basin; West Main St. Cartop Launch
NB/C	N 42° 12' 011"	W 71° 33' 018"	North Basin; central location near slalom course
NB/WB	N 42° 12' 003"	W 71° 33' 036"	North Basin; West Bank / cove
NB/NWI	N 42° 12' 025"	W 71° 33' 017"	North Basin; north of Woody Island
B/WI	N 42° 11' 056"	W 71° 33' 015"	Cove between Sandy Beach and Woody Island
NSI	N 42° 11' 009"	W 71° 33' 021"	North of Sandy Island
SB/SB	N 42° 11' 047"	W 71° 33' 018"	South Basin; South Bank. Sandy Island
SB/WB	N 42° 11' 036"	W 71° 33' 023"	South Basin; West Bank, dead tree.
SB/EC.n	N 42° 11' 011"	W 71° 33' 018"	South Basin; East Cove, north of rock pile
SB/EC.s	N 42° 11' 011"	W 71° 33' 021"	South Basin; East Cove, south of rock pile
SB/WC	N 42° 11' 006"	W 71° 33' 017"	South Basin; West Cove
SB/Dam	N 42° 11' 027"	W 71° 33' 036"	South Basin; north of dam

Code	Station General Description	Latitude	Longitude	Total	SDT	Aquatic Species Observed								Aquatic Vegetation Density	
				Depth (ft)	Depth (ft)	BW	EN	FW	LLP	Nit	RLP	TG	VMf	WW	Relative Density
NB/EC	North Basin: East Cove / West Main St.	N 42° 12' 25"	W 71° 33' 18"	4.0	4.0 (TB)	-	X	-	-	-	-	X	-	-	EN - trace to sparse; TG - trace.
NB/CL	North Basin: West Main St. Cartop Launch	N 42° 12' 17"	W 71° 33' 31"	6.5	6.0	-	-	X	X	-	-	-	X	-	LLP and VMf - trace to sparse; FW - trace.
NB/C (new station)	North Basin: central location near slalom course	N 42° 12' 11"	W 71° 33' 18"	8.0	5.0	X	X	-	X	-	-	X	X	-	LLP - sparse to moderate; BW, EN, TG and VMf - trace.
NB/WB	North Basin: West Bank	N 42° 12' 05"	W 71° 33' 36"	6.0	6.0 (TB)	X	X	-	X	-	-	-	-	-	BW, EN and LLP - trace.
NB/NWI	North Basin; north of Woody Island	N 42° 12' 00"	W 71° 33' 23"	4.0	4.0 (TB)	-	-	-	-	-	-	X	X	-	VMf and TG - trace.
B/WI	Cove between Sandy Beach and Woody Island	N 42° 11' 56"	W 71° 33' 16"	7.0	7.0 (TB)	-	X	-	-	-	-	X	-	-	EN and TG - trace.
NSI	North of Sandy Island	N 42° 11' 52"	W 71° 33' 16"	4.5	4.5 (TB)	-	X	-	-	-	-	-	-	-	EN - trace to sparse.
SB/SB	South Basin; South Bank, Sandy Island	N 42° 11' 48"	W 71° 33' 19"	9.5	7.0	-	-	X	X	-	-	-	X	-	LLP and VMf - moderate; FW - sparse.
SB/WB	South Basin; West Bank	N 42° 11' 37"	W 71° 33' 23"	11.5	9.0	-	X	-	-	-	-	-	X	-	EN - trace to sparse; VMf - trace.
SB/EC.n	South Basin; East Cove, north of rock pile	N 42° 11' 10"	W 71° 33' 11"	7.5	5.0	-	X	-	-	X	-	-	X	-	EN - trace to sparse; VMf and Nit - trace.
SB/EC.s	South Basin; East Cove, south of rock pile	N 42° 11' 10"	W 71° 33' 18"	8.0	8.0 (TB)	-	X	X	X	-	-	-	X	X	LLP and VMf - sparse to moderate; WW and EN - trace to sparse; FW - trace
SB/WC	South Basin; West Cove	N 42° 11' 10"	W 71° 33' 22"	15.0	9.0	-	X	-	-	-	-	-	-	-	EN - sparse.
SB/Dam	South Basin; north of dam	N 42° 10' 57"	W 71° 33' 21"	6.0	6.0 (TB)	-	X	-	X	-	-	-	-	-	LLP - moderate; EN - sparse.

Code	Common Name	Scientific Name	Indigenous?	Invasive?	Color Code for Relative Coverage
BW	Bladderwort spp.	<i>Utricularia spp.</i>	Yes	No	 = Little to no invasive species and/or trace to sparse cover
EN	European naiad	<i>Najas spp.</i>	No	Yes	
FW	Fanwort	<i>Cabomba carolinia</i>	No	Yes	
LLP	Largeleaf Pondweed	<i>Potamogeton amplifolius</i>	Yes	Opportunistic	
Nit	Nitella (macroalgae)	<i>Nitella spp.</i>	Yes	No	
RLP	Ribbonleaf Pondweed	<i>Potamogeton ephedrus</i>	Yes	No	 = Invasives co-dominant; moderate-heavy; some impacts
TG	Tape grass	<i>Valisnaria americana</i>	Yes	Opportunistic	
VMf	Variable milfoil	<i>Myriophyllum heterophyllum</i>	No	Yes	 = Invasives dominant, severe recreational impacts
WW	Waterweed	<i>Elodea canadensis</i>	Yes	No	

Code	Station General Description	Latitude	Longitude	Total	SDT	Aquatic Species Observed										Aquatic Vegetation Density
				Depth (ft)	Depth (ft)	BW	EN	FW	LLP	Nit	RLP	TG	VMf	WW	Relative Density	
NB/EC	North Basin: East Cove / West Main St.	N 42° 12' 025"	W 71° 33' 017"	3.0	3.0 (TB)	-	X	-	-	-	-	X	-	-	EN and TG - dense.	
NB/CL	North Basin: West Main St. Cartop Launch	N 42° 12' 017"	W 71° 33' 030"	6.0	5.0	X	X	-	X	-	-	-	X	-	EN and VMf - moderate; LLP - sparse to moderate; BW - trace.	
NB/C (new station)	North Basin: central location near slalom course	N 42° 12' 011"	W 71° 33' 018"	5.6	5.6 (TB)	-	X	-	X	-	-	X	-	-	LLP - moderate; TG - sparse to dense; EN - trace to moderate.	
NB/WB	North Basin: West Bank	N 42° 12' 003"	W 71° 33' 036"	7.0	6.5 (TB)	-	X	X	X	-	-	-	X	-	EN and VMf - moderate; LLP - trace to sparse; FW - trace.	
NB/NWI	North Basin; north of Woody Island	N 42° 12' 025"	W 71° 33' 017"	3.2	3.2 (TB)	-	X	-	-	-	-	X	-	-	EN - dense; TP - moderate to dense	
B/WI	Cove between Sandy Beach and Woody Island	N 42° 11' 056"	W 71° 33' 015"	6.5	6.5 (TB)	-	X	-	-	-	-	X	X	-	EN and TG - moderate; VMf - trace.	
NSI	North of Sandy Island	N 42° 11' 009"	W 71° 33' 021"	3.0	2.5 (TB)	-	X	-	-	-	-	X	X	-	EN and TG - trace to moderate; VMf - trace.	
SB/SB	South Basin; South Bank, Sandy Island	N 42° 11' 047"	W 71° 33' 018"	10.0	8.0	-	X	X	-	-	-	-	X	-	EN and FW - trace to sparse.	
SB/WB	South Basin; West Bank	N 42° 11' 036"	W 71° 33' 023"	10.5	8.0	-	-	-	-	-	-	-	-	-	No plants observed or raked.	
SB/EC.n	South Basin; East Cove, north of rock pile	N 42° 11' 011"	W 71° 33' 018"	11.5	6.0	-	-	X	-	-	-	-	-	-	FW - trace.	
SB/EC.s	South Basin; East Cove, south of rock pile	N 42° 11' 011"	W 71° 33' 021"	5.5	5.5 (TB)	X	X	X	X	-	-	-	X	X	BW - moderate; LLP, FW, EN, VMf and WW - sparse to moderate.	
SB/WC	South Basin; West Cove	N 42° 11' 006"	W 71° 33' 017"	15.5	7.0	-	-	-	-	-	-	-	-	-	No plants observed or raked.	
SB/Dam	South Basin; north of dam	N 42° 11' 027"	W 71° 33' 036"	7.3	6.0 (TB)	-	X	-	-	-	-	-	X	-	VMf - sparse; EN - trace	

Code	Common Name	Scientific Name	Indigenous?	Invasive?	Color Code for Relative Coverage
BW	Bla dderwort spp.	<i>Utricularia spp.</i>	Yes	No	= Little to no invasive species and/or trace to sparse cover
EN	European naiad	<i>Najas spp.</i>	No	Yes	
FW	Fanwort	<i>Cabomba carolinia</i>	No	Yes	= Invasives present at low-moderate levels; moderate cover
LLP	Largeleaf Pondweed	<i>Potamogeton amplifolius</i>	Yes	Opportunistic	
Nit	Nitella (macroalgae)	<i>Nitella spp.</i>	Yes	No	= Invasives co-dominant; moderate-heavy; some impacts
RLP	Ribbonleaf Pondweed	<i>Potamogeton ephedrus</i>	Yes	No	
TG	Tape grass	<i>Valisnaria americana</i>	Yes	Opportunistic	= Invasives dominant, severe recreational impacts
VMf	Variable milfoil	<i>Myriophyllum heterophyllum</i>	No	Yes	
WW	Waterweed	<i>Elodea canadensis</i>	Yes	No	

## **APPENDIX A**

### **Locations of Lake Maspenock Aquatic Vegetation Survey Stations**





## APPENDIX B

### General Lake Maspenock Aquatic Vegetation Survey Sampling Protocol

1. Motor to sampling station on map using GPS and depth as guide. Note that sampling stations have been recoded, using Station Code sheet for correct abbreviations. This will be entered on the Monitoring form (one each per station).
2. On station, anchor boat and make final GPS coordinate and get total depth, enter station code on Monitoring Form as well as date and sampling crew.
3. If total depth > 10 ft, take a Secchi disk reading on “shady side” using aqua-viewer. The Secchi disk transparency depth is the average of the depth at which you lose sight of the disk and the depth at which you reacquire it.
4. Using aqua-viewer do two 1-minute assessment of bottom coverage; one from each side of boat. Estimate overall coverage, dominant weed species, and their individual coverage
5. Conduct first 35 ft first weed rake toss (make sure there is plenty of clearance and **make sure that someone is holding on the other end !**)
6. On the monitoring form, record overall density (see guide) and density of the dominant species retrieved.
7. Conduct replicate weed rake toss (in another direction from boat) and record observations. If the values are the same of a species (circle) the first data. Otherwise, fill in form.
8. If new plant species are found, place in Ziploc bags with water and place in cooler for later identification.
9. Add any additional relevant observations on station location on monitoring form.
10. Motor to next station and continue survey.

## **APPENDIX C**

### **Lake Maspenock Aquatic Vegetation Survey September 2020 – Raw Data Sheets**