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LAKE LASHAWAY MANAGEMENT PLAN: KEY TAKEAWAYS

Hydrology

Element	Value
Watershed Area	15,779 acres
Lake Area	278 acres
Lake Circumference	15,500 feet
Lake Volume	131,589,000 cubic feet
Detention time	37.2 days

- Surface runoff contributes 97.4% of total lake inflow
 - 70% of surface water flow is caused by wet weather
 - Groundwater likely unimportant to lake water quality
- Highest rates of groundwater in-seepage were on the eastern shoreline
 - Residential development (particularly septic systems) along Harrington Street and the eastern side of the lake likely have more impact on water quality

Water Quality Sampling and Modeling Results

Parameter	Units	Deep Hole		Inlet	Inlet Storm	Outlet
		Surface	Bottom			
Phosphorus, Dissolved	mg/L	0.004	0.018	0.029		0.013
Nitrogen, Nitrate	mg/L	< 0.02	< 0.05	0.02		< 0.02
Nitrogen, Total Kjeldahl	mg/L	0.40	0.46	0.53		0.46
Phosphorus, as P	mg/L	0.012	0.044	0.034	0.022	0.026
Total Suspended Solids	mg/L	< 5.0	< 5.0	< 5.0		< 5.0
pH	—	6.91	6.82	6.77		7.11
Color	Color Units	10	10	30		20
Turbidity	NTU	1.31	5.33	2.93		1.7
Secchi Depth	Feet	5.5	—	—	—	—
Flow	cfs	—	—	3.6	31.5	3.9

- Only 11% of watershed is developed, but contributes 62% of phosphorus pollution
- Phosphorus levels at the bottom of the lake, inlet, and outlet were high
 - Values >0.02 mg/L are undesirable
- As much as 87 kg/yr of phosphorus could be released from lake sediments during low oxygen conditions as occur during summer and winter stratification
- Secchi disk depth was low, indicating high levels of algae

Flora and Fauna

- Identified 17 aquatic plant species
 - Three are invasive: Fanwort (*Cabomba caroliniana*), Variable-leaf milfoil (*Myriophyllum heterophyllum*), Brittle naiad (*Najas minor*)

Taxonomic Group	Scientific Name	Common Name
Birds	<i>Anas platyrhynchos</i>	Mallard
	<i>Larus delawarensis</i>	Ring-billed gull
	<i>Spinus tristis</i>	American goldfinch
	<i>Branta canadensis</i>	Canada goose
Reptiles	<i>Megaceryle alcyon</i>	Belted King Fisher
Fish	<i>Chelydra serpentina</i>	Snapping Turtle
Invertebrates	<i>Lepomis sp.</i>	Sunfish
	<i>Pyganodon cataracta</i>	Eastern floater



NEXT STEPS: MAKING THE LAKE LASHAWAY MANAGEMENT PLAN A REALITY

Recommendations

- Phosphorus pollution will need to be reduced by 44 kg/yr (3.3%) to improve water quality
 - Would need to reduce phosphorus by 687 kg/yr (52%) to guarantee no problems
- Take action to control aquatic plant growth and further assess water quality impairments
 - Herbicide treatment with diquat
 - ~ \$10,000 to \$20,000 per treatment
- Develop a watershed-based plan to manage water quality using best management practices (BMPs)
 - Proper management of manure stock piles, feed lots, and other sources through use of retention ponds, covers, roofs, installation of stream buffer vegetation, drainage swales, and other basic BMPs
 - Goal of 604(b) grant project is to identify problem areas & design solutions
 - Educate residents about lawn and garden care, yard waste disposal, automotive cleaning and maintenance, and pavement deicing or sanding
 - LLCA would be ideal leader for educating watershed residents
 - Detention or infiltration basin
 - Potential MassDEP 604(b) grant for design and s.319 grant for construction
 - Increased street sweeping and catch basin cleaning
 - capital cost > \$200,000 and an operational cost of ~ \$35,000/year
 - Nutrient inactivation
 - Costs to design and permit an alum system for Lake Lashaway would be on the order of \$75,000 with equipment installation costs on the order of \$200,000
 - Annual operating costs would be ~ \$40,000 - \$80,000
- Long-term management should plan for future growth and development in the watershed
- Expect FY20 604(b) grant awards to be announced between July and September of 2019
 - If successful, ESS will conduct a watershed assessment and design solutions for pollution hot spots
 - Should consider whether one of the proposed solutions would be suitable for one of MassDEP's 319 grants in FY22 (apply spring of 2021)
 - If unsuccessful, request feedback from MassDEP and decide whether or not to modify the proposal and resubmit for FY21
 - Consider advancing some management goals in the interim



Field boat on Lake Lashaway for initial water quality and biological surveys on August 6, 2018.

