Griffy Lake 2024 Aquatic Vegetation Management Plan Update Monroe County, Indiana November, 2024



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Executive Summary

Griffy Lake is a 109-acre reservoir located within the 1,180-acre Griffy Lake Nature Preserve in Monroe County. The lake has a maximum depth of 31 feet and an average depth of 14 feet. Public access, in the form of a boat ramp, is in the southeast corner of the lake. The site is managed by Bloomington Parks and Recreation. Boating is limited to electric motors only. The lake has been colonized by invasive Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*). Invasive Brazilian elodea (*Egeria densa*) was documented in past surveys but was declared eradicated from the lake in 2009 following Indiana Department of Natural Resources (IDNR) funded herbicide applications. These invasive plants can produce dense mats that hinder recreational activities and impact the ecology of the reservoir.

Invasive vegetation management on the lake has consisted of milfoil weevil stocking in 2000-2002, a spot treatment with diquat herbicide for control of Brazilian elodea around the boat ramp in 2004, two fluridone treatments for eradication of Brazilian elodea in 2006-2007, and treatment of curly-leaf pondweed and Eurasian watermilfoil in 2008-2009. The lake was drawn down in 2012 and high use areas on the east end were dredged in 2013. Plant sampling and aquatic vegetation management plan updates have been completed regularly. Invasive plant management was not performed from 2010-2016. Spring and summer sampling in 2016 detected vegetation in 65% and 70% of the littoral zone. Eurasian watermilfoil was found at 18% and 22% of sample sites. Bloomington Parks received LARE grants for treatment of Eurasian watermilfoil, plant surveys, and plan updates from 2017 through 2019. The 2019 and 2020 treatments were competed using ProcellaCOR EC herbicide at 2-3 Prescription Dose Units (PDUs) per treatment acre-foot, resulting in significant reductions of Eurasian watermilfoil. Triclopyr was applied in 2021 followed by a draw down to perform several public access improvement projects and artificial habitat installation. No treatments were necessary in 2022-2023.

In 2024, Bloomington Parks received a maintenance level grant of \$5,000 for management of Eurasian watermilfoil from LARE. Eurasian watermilfoil was found growing in 14.7 acres of the lake during the spring survey. These areas were treated on May 17 with ProcellaCOR EC at 1-3 PDU per treatment acre-foot. Eurasian watermilfoil was not collected during the Summer Tier 2 survey. Coontail was the most abundant native plant and was found at 8% of the sites. Brittle naiad was the only invasive species documented and was present at 6 % of sites

A similar management plan is recommended for 2025, and to continue use of ProcellaCOR for a second year. It is important that the survey and treatment be completed in April or May of 2025. It is estimated that 10 or more acres of Eurasian watermilfoil may require treatment. A summer Tier 2 survey and two invasive surveys in spring and late summer should also be completed. This information can be used to update the management plan. The cost of the surveys, treatments, and plan update is estimated to be \$9,500. If a grant is received from LARE, the city will be responsible for covering 20% of these costs.



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1.0 Problem Statement and Management History

1.1 Problem Statement

In previous plans and updates that followed, additional species of concern were addressed but the primary species of concern for the last decade is the invasive Eurasian watermilfoil. Invasive curly-leaf pondweed is also present in Griffy Lake (Figure 1) and is closely monitored. Densely matted beds of these invasive species can create navigational and recreational use problems, especially in a lake where electric motors or self-propelled watercraft are commonly used. In addition, there is the potential that these species could displace native plants and interfere with fishing and other recreational activities. Dense monocultures of invasive vegetation may also have impacts on the fish population and water quality.



Figure 1. Illustrations Eurasian watermilfoil (a), and curly-leaf pondweed (b) (Illustrations provided by Applied Biochemist).

1.2 Goals and Objectives

An effective aquatic vegetation management plan needs to have clearly defined goals and objectives. The vegetation management goals for Indiana public lakes, which were created by IDNR, are as follows:

- Develop or maintain a stable, diverse aquatic plant community.
- Direct efforts to preventing and/or controlling the negative impacts of aquatic invasive species.
- Provide reasonable public recreational access while minimizing the negative impact on plants, fish, and wildlife resources.

In order to achieve these goals and measure the success of the actions, the plan needs to define some clear, achievable, and measurable management objectives. The following objectives have been created based on lake user input, past sampling data, and aquatic plant management best management practices:

- 1. Reduce and maintain Eurasian watermilfoil to below 10% frequency of occurrence.
- 2. Maintain plant coverage at 50% of littoral sites sites.
- 3. Improve native plant diversity to 6 native species collected in summer Tier 2 surveys and a native plant diversity index of 0.75.
- 4. Maintain adequate clearance from the boat ramp to the main lake.



1.3. Plant Management History

The first documented effort to control invasive vegetation on Griffy Lake was a milfoil weevil stocking program which occurred from 2000-2002. The effort resulted in limited success as there was no conclusive evidence of any control from the weevils (Scribalio & Alix 2003). IDNR treated the boat launch area with contact herbicides in 2004 for control of Brazilian elodea. This treatment temporarily reduced growth in the area thus lowering the risk of spread to other lakes in the region. IDNR then funded an eradication effort in 2007 and 2008 where the whole lake was treated with low rates of fluridone. These treatments eradicated invasive Brazilian elodea. Invasive curly-leaf pondweed and Eurasian watermilfoil colonized many of the areas once dominated by Brazilian elodea. The Parks Department received LARE funding and completed selective treatment of Eurasian watermilfoil and curly-leaf pondweed in 2008 and 2009. These treatments controlled the targeted species in the treatment year, but, due to the abundance of curlyleaf pondweed reproductive structures and the presence of Eurasian watermilfoil in the watershed, these species returned the following seasons. The reservoir was drawn down nearly completely in 2012 - 2013 to allow for repairs to the dam. During this time, high use areas on the east end were dredged thus providing some relief of invasive plant growth when the lake began to refill in 2014. Drawdowns are used in some reservoir systems to expose sediments, roots, rhizomes, tubers, turions, seeds and other vegetative plant structures to desiccation and freezing events that help to reduce viability when the lake is refilled (Cooke et al. 2005, Hoyer and Canfield, 1997). Eurasian watermilfoil is especially susceptible to these type of control measures.

Treatments were not needed in 2022-2023. Eurasian watermilfoil was detected in the 2023 Tier 2 survey and a LARE grant was awarded in the amount of \$5,000 in 2024. 14.7 acres were mapped and treated in May (Figure 2, Table 2). Table 1 summarizes management of invasive species in Griffy Lake since the year 2000.



Year	Control Technique	Acres	Species Targeted
2000-2002	Milfoil weevils	n/a	Eurasian watermilfoil
2004	Diquat	2.0	Brazilian elodea
2006	Whole lake fluridone	109	Brazilian elodea
2007	Whole lake fluridone	109	Brazilian elodea
2008	endothall & triclopyr	15.7 (clp) 2.9 (ewm)	Curly-leaf pondweed & Eurasian watermilfoil
2009	endothall & triclopyr	17.8 (clp) 25.2 (EWM)	Curly-leaf pondweed & Eurasian watermilfoil
2017	2,4-D granular (Navigate)	28.6	Eurasian watermilfoil
2018	2,4-D granular (Navigate)	20.6	Eurasian watermilfoil
2019	Florpyrauxifen-benzyl (ProcellaCOR EC)	23.0	Eurasian watermilfoil
2020	Florpyrauxifen- benzyl (ProcellaCOR EC)	8.9	Eurasian watermilfoil
2021 2022	Triclopyr (Renovate 3) No Treatment	3.58 0	Eurasian Watermilfoil n/a
2023	No Treatment	0	n/a
2024	Florpyrauxifen- benzyl (ProcellaCOR EC)	14.7	Eurasian watermilfoil

Table 1. Griffy Lake vegetation management history.



Griffy Lake 2024 LARE treatment areas

Figure 2. Eurasian watermilfoil treatment areas, May 17, 2024.

	Avg					
Bed	Depth		Acre	ProcellaCOR EC	ProcellaCOR EC	ProcellaCOR EC
ID	(ft)	Acres	Feet	@ 1PDU	@ 2PDU	@3PDU
G1	3	1.21	3.63	3.63		
G2	4	5.92	23.68	23.68		
G3	3	0.31	0.93		1.86	
G4	4	3.73	14.92		29.84	
G5	4	2.12	8.48		16.96	
G6	4	0.24	0.96			2.88
G7	4	0.31	1.24			3.72
G8	4	0.1	0.4			1.20
G9	4	0.16	0.64		1.28	
G10	4	0.6	2.4		4.80	
		14.7	57.28	27.310	54.74	7.80

Table 2. Treatment area details for 2024 Eurasian watermilfoil treatment at Griffy Lake.

2.0 Aquatic Plant Community Characterization

Aquatic vegetation sampling must be completed to create an effective aquatic vegetation management plan. Sampling provides valuable data that allows managers to accomplish



several tasks: locate areas of nuisance and beneficial vegetation; monitor changes in abundance of native and invasive species; monitor and react to changes in the overall plant community; monitor the effectiveness of management techniques; and compare the plant communities to other populations. In 2024, invasive species mapping surveys were completed on April 25th and July 31st. A Tier 2 survey was completed in conjunction with the July 31st invasive mapping.

2.1 Methods

The Tier 2 survey helps meet the following objectives:

- 1. To document the distribution and abundance of submersed and floating-leaved aquatic vegetation.
- 2. To compare present distribution and abundance with past distribution and abundance within select areas.

Sample sites are selected based on a stratified random methodology. Once a site is reached the boat was slowed to a stop. A depth measurement is taken by dropping a two-headed standard sampling rake that is attached to a rope marked off in 1-foot increments. An additional ten feet of rope is released and the boat is reversed at minimum operating speed for a distance of ten feet. Once the rake is retrieved the individual plant abundance on the rake is scored with either a 0 (no plants retrieved), 1 (1-19% of rake teeth filled), 3 (20-99% of rake teeth filled), or 5 (100% of rake teeth filled) (IDNR 2018). Fifty sample sites were surveyed on Griffy Lake (Figure 3).





Griffy Lake Tier 2 Survey Points

Figure 3. Tier 2 sample sites.



2.2 Sampling Results

A Tier 2 survey was completed on July 31. Fifty sample sites, distributed through several 5-foot depth contours down to a depth of 20 feet, were included in the survey. Plants were present at 10 of the 50 sample sites. Coontail, brittle naiad, sago pondweed, and southern naiad were collected to a maximum depth of 7 feet. Coontail was collected at the highest percentage of sample sites (8%), brittle naiad (Figure 4), sago pondweed, and southern naiad each were present at 6%. Other species observed include primrose, pickerelweed, cattails, arrowhead, American pondweed, Hibiscus, and water willow. The results of the survey of can be found in Table 3.



Figure 4. Tier 2 sample sites where brittle naiad was collected, July 31, 2024.



Occurrence and At	oundanc	e of Submersed Aquatic Pla	ints in	Griffy La	ake (all d	lepths).				
County:	Monroe	Secchi (ft):	9.5	Ň	lean spe	cies/site:	0.26			
Date:	7/31/24	Sites with plants:	10	SE N	, /lean spec	cies/site:	0.08			
Littoral Depth (ft):	7.0	Sites with native plants:	10	Mean n	lean native species/site: 0.20					
Littoral Sites:	19.0	Number of species:	4	SE	Mean nat	ives/site:	0.06			
Total Sites:	50.0	Number of native species:	3		Species	diversitv:	0.75			
		Maximum species/site:	2	Native	species	diversity:	0.66			
					•	,				
		Frequency of Occurrence	Rake	e score fr	equency p	bersp.	Plant			
All Depths		riequency of eccurrence	•	4	•	-	Dominance			
Species			0	1	3	5				
Southern naiad		6.0	94.0	4.0	2.0	0.0	2.0			
Coontail		8.0	92.0	6.0	2.0	0.0	2.4			
Sago pondweed		6.0	94.0	6.0	0.0	0.0	1.2			
Brittle Naiad		6.0	94.0	2.0	4.0	0.0	2.8			
Filamentous Algae		2.0								
Other species observed: Wa	ater willow, pi	ckerelweed, Halberleaf hibiscus, America	n pondwee	ed, cattails, a	arrowhead, c	reeping water	primrose			
Occurrence and At	oundanc	e of Submersed Aquatic Pla	ints in	Griffy La	ake (0-5 f	t).				
County:	Monroe	Secchi (ft):	9.5	N	lean spe	cies/site:	0.64			
Date:	7/31/24	Sites with plants:	6	SE Mean species/site: 0.23						
Littoral Depth (ft):	7.0	Sites with native plants:	6	Mean n	ative spec	cies/site:	0.43			
Littoral Sites:	14.0	Number of species:	4	SE	Mean nat	ives/site:	0.14			
Total Sites:	14	Number of native species:	3		Species	diversity:	0.72			
		Maximum species/site:	2	Native	species	diversity:	0.61			
			Rake	e score fr	eauencvi	persp.	Plant			
Depth: 0 to 5 ft		Frequency of Occurrence			- 4		Dominance			
Species			0	1	3	5	Berninanoo			
Brittle Naiad		21.4	78.6	7.1	14.3	0.0	10.0			
Southern Naiad		21.4	78.6	14.3	7.1	0.0	7.1			
Coontail		14.3	85.7	14.3	0.0	0.0	2.9			
Sago pondweed		7.1	92.9	7.1	0.0	0.0	1.4			
Filamentous Algae		7.1	92.9	7.1	0.0	0.0	1.4			
Occurrence and Ak	oundanc	e of Submersed Aquatic Pla	ints in	Griffy La	ake (5-10	ft).				
County:	Monroe	Secchi (ft):	9.5	Ν	lean spe	cies/site:	0.29			
Date:	7/31/24	Sites with plants:	4	SE N	lean spe	cies/site:	0.13			
Littoral Depth (ft):	7.0	Sites with native plants:	4	Mean n	ative spec	cies/site:	0.29			
Littoral Sites:	5	Number of species:	2	SE	Mean nat	ives/site:	0.13			
Total Sites:	14	Number of native species:	2		Species	diversity:	0.50			
		Maximum species/site:	1	Native	species	diversity:	0.50			
Depth: 5 to 10 ft			Rake	score fr	equency p	bersp.	Plant			
Species Frequency of Occurrence			0	1	3	5	Dominance			
Coontail		14.3	85.7	7.1	7.1	0.0	5.7			
Sago pondweed		14.3	85.7	14.3	0.0	0.0	2.9			

Table 3. Griffy Lake Tier 2 Survey Results, July 31, 2024.

2.3 Plant Sampling Discussion

Table 4 compares results of all Tier 2 surveys completed since 2004. A complete data set, broken down by depth contour, can be found in the Appendix). There has been significant variation in the plant community over the past several years. A lot of the variability seen from 2004-2009 is likely attributed to the Brazilian elodea eradicating whole-lake Sonar treatments that occurred in 2006 and 2007. The native plant population predictably required a few years to recover from the eradication treatments. By the late



summer of 2009 the population was almost back to pre-treatment levels. No surveys nor treatments occurred from 2010-2015 primarily due to the lake being drawn down. Data collected in 2016 showed a sharp decrease in native diversity followed by improvement in 2017 and a large decline again in 2018 to zero in 2019. Results from the 2020 Summer Tier 2 survey suggest that the native species diversity (0.48) is closer to the 2017 findings. 2022-2023 surveys were conducted to monitor vegetation recovery post drawdown event and ultimate showed little impact to vegetation presence and coverage. The 2024 survey indicated only a slight decrease in overall diversity

Invasive species have been documented to impact native diversity. In 2021, Eurasian watermilfoil was observed at 2% of the sample sites during the Summer Tier 2 survey. The native submersed plant coontail, has been frequently observed to grow at extreme densities and was present in 36.0% of all sites, an increase from 6.0% in 2020. Many sample sites are hard, rocky shorelines where establishment of submersed aquatic vegetation is difficult. Very few areas in Griffy Lake may provide suitable substrate for growth of submersed vegetation. The best suited areas are on the east end of the lake, the shallow shelf west of the causeway, and north of the channel, as well as areas of coves that receive sufficient sunlight.



 Table 4. Griffy Lake Tier 2 Summer Survey Results 2004-2024

										G	iffy Lake											
Surveyor	AC	IDNR	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC	AC
Date	8/31/2004	7/11/2005	8/8/2006	8/21/2007	5/5/2008	7/8/2008	8/26/2008	5/7/2009	6/30/2009	8/18/2009	5/24/2016	8/18/2016	8/18/2017	7/31/2018	7/29/2019	8/3/2020	7/26/2021	5/26/2022	8/9/2022	4/18/2023	7/31/2023	7/31/2024
Total Sites	62	78	50	100	100	100	100	100	100	100	50	50	50	50	50	50	50	50	50	50	50	50
Littoral Sites	61	72	48	83	86	93	99	93	81	94	40	40	33	35	46	19	33	0	8	8	19	19
Sites with Plants	58	68	22	28	39	27	58	55	58	75	26	28	21	22	20	6	17	0	2	2	10	10
% Sites with plants	94%	87%	44%	28%	39%	27%	58%	55%	58%	75%	52%	56%	42%	44%	40%	12%	34%	0%	4%	4%	20%	20%
Sites with Native Plants	54	na	21	28	20	21	29	45	50	66	24	25	21	20	19	5	17	0	2	2	8	10
% sites with native plants	87%	na	42%	28%	20%	21%	29%	45%	50%	66%	48%	50%	42%	40%	38%	10%	34%	0%	4%	4%	16%	20%
Percent Littoral Coverage	95%	94%	46%	34%	45%	29%	59%	59%	72%	80%	65%	70%	64%	63%	43%	32%	52%	0%	25%	25%	53%	53%
Maximum Plant Depth	20.0	18.0	18.0	13.0	12.0	15.0	15.0	13.0	14.0	14.0	14.0	14.0	12.0	13.0	17.0	7.0	12.0	0.0	3.0	3.0	7.0	7.0
Secchi (ft)	10.0	7.5	5.5	10.0	9.0	10.0	12.0	16.0	11.0	12.0	7.0	8.0	14.5	5.5	4.5	5.5	8.0	4.0	11.8	8.0	11.0	9.5
Number of Species	10	11	4	1	3	5	7	9	9	10	7	5	8	4	2	3	5	0	2	2	5	4
Number of Native Species	6	7	3	1	2	3	5	7	6	7	5	3	6	2	1	2	3	0	1	2	3	3
Species Diversity	0.75	0.81	0.57	0.00	0.57	0.68	0.77	0.83	0.78	0.74	0.72	0.62	0.73	0.58	0.17	0.65	0.45	0.00	0.44	0.50	0.80	0.75
Native Species Diversity	0.32	0.64	0.43	0.00	0.31	0.63	0.76	0.74	0.71	0.64	0.61	0.14	0.56	0.23	0.00	0.48	0.28	0.00	0.00	0.50	0.67	0.66
Mean Native Species/Site	0.98	1.32	0.50	0.28	0.21	0.27	0.95	0.55	0.78	1.01	0.68	0.54	0.78	0.46	0.38	0.10	0.38	0.00	0.04	0.04	0.18	0.20
										FOO - Do	epth: All do	epths										
Eurasian Watermilfoil	54.8	69.9	0.0	0.0	0.0	2.0	1.0	16.0	2.0	1.0	18.0	22.0	10.0	8.0	4.0	0.0	2.0	0.0	0.0	0.0	6.0	0.0
Curly-leaf pondweed	3.2	16.4	0.0	0.0	23.0	0.0	0.0	12.0	1.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brittle naiad	21.0	17.8	0.0	0.0	0.0	10.0	54.0	0.0	35.0	40.0	0.0	18.0	12.0	12.0	0.0	4.0	4.0	0.0	2.0	0.0	4.0	6.0
Brazilian elodea	32.3	49.3	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coontail	80.6	72.6	38.0	0.0	0.0	0.0	0.0	4.0	12.0	18.0	40.0	50.0	36.0	40.0	38.0	6.0	32.0	0.0	0.0	2.0	6.0	8.0
Water stargrass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sago pondweed	8.1	8.2	0.0	0.0	0.0	3.0	9.0	2.0	3.0	7.0	10.0	2.0	2.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	6.0	6.0
Chara sp.	3.2	2.7	10.0	28.0	17.0	15.0	10.0	23.0	19.0	8.0	4.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slender naiad	3.2	15.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	8.0	0.0	4.0	0.0	0.0	4.0	2.0	0.0	0.0	0.0	0.0	0.0
Southern naiad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	35.0	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	6.0	6.0
Canada waterweed	0.0	0.0	0.0	0.0	0.0	1.0	0.0	4.0	6.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horned pondweed	0.0	0.0	2.0	0.0	4.0	3.0	1.0	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
Small pondweed	1.6	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flat-stemmed pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eel grass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Filamentous algae	4.8	na	na	na	na	na	na	na	na	na	30.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	14.0	0.0	2.0



3.0 Plant Management Discussion and Action Plan

For 2025 it is recommended that the city continue with a similar management approach which includes a spot treatment of Eurasian watermilfoil, monitoring of the plant population, and continued education of the lake users. ProcellaCOR, according to label restrictions, should not be used in the same area(s) more than two consecutive years in a row. ProcellaCOR was not used in 2022-2023 so it will be eligible for use again in 2025. Treatments in 2025 should be completed with ProcellaCOR EC at 1-3 PDU. The herbicide treatment should be completed between May and June of 2025. Treatment areas should be mapped out in April or early May with an invasive survey. It is estimated that the cost of this treatment will be \$6,500. Up to 10 acres may require treatment. This treatment will require permitting from IDNR. A copy of the permit will need to be signed and submitted along with a check for \$20.00. This should be completed in January, 2025 and is due before February 15, 2025.

In addition to the herbicide treatment, it is also recommended that invasive plant mapping be conducted in the late summer to assess the treatment effectiveness and changes to the overall submersed vegetation community. Sampling and plan updates will cost approximately \$3,000. LARE funding may be available for sampling and plan updates. A grant application will need to be signed and submitted prior to January 15, 2025.

The public needs to be made aware of the treatment. Posting of signage informing lake users of the treatment will be required. In addition, lake users need to be encouraged to keep new invasive plants out of the lake. At a minimum signage should be maintained at the launch sites to inform boaters of the need to clean off their equipment before entering or leaving the lake. A public meeting should be held in late summer to inform lake users of the treatment and sampling results, best management practices, and future plans.

This update has focused on management of vegetation. Vegetation issues and the overall water quality of Griffy Lake are impacted by what occurs in the watershed. It would benefit the longevity and health of Griffy Lake if Parks personnel continue their efforts to improve and maintain the reservoir's watershed.

The action plan is summarized below, and a budget estimate can be found in Table 5:

- 1. Complete treatment of invasive Eurasian watermilfoil with ProcellaCOR at 1-3 PDU. Treatment should be completed following a spring invasive survey.
- 2. Complete Tier 2 and invasive surveys in late summer to assess the effectiveness of the treatment and need for additional actions. In addition, this survey can also be used to monitor the spread of other, less problematic, invasive species like curly-leaf pondweed and brittle naiad. This information should be used to update the vegetation management plan each season.



- 3. Annually monitor depths within the dredged channel leading to the main lake, insuring there is adequate water depth for navigation. Consider budgeting for dredging this area every 10-15 years.
- 4. Educate lake users of the importance of cleaning boats before entering and leaving Griffy Lake with the use of signage and public meetings. Lake users and local stakeholders should also be reminded that it is not only environmentally irresponsible, but also illegal to dump aquaria and release fish from other locations into the lake. This information can be posted at access sites as well as mentioned at public meetings to increase awareness. Working with stakeholders upstream of Griffy Lake may also be an effective way to reduce Eurasian watermilfoil abundance and continual re-infestation in Griffy Lake and the watershed.
- 5. Continue to work to improve and maintain the Griffy Lake watershed. Potential improvements include periodic rough fish removal and /or planting plugs or sods of native submersed plants to Griffy Lake.

			/ =0.00	
Plan Item	2025	2026	2027	2028
Invasive Species Treatment	\$6,500	\$7,000	\$6,750	\$6,000
Vegetation Sampling and Plan				
Update	\$3,000	\$3,000	\$3,000	\$3 <i>,</i> 000
Total Cost	\$9,500	\$10,000	\$9,750	\$9,000
City's Share if LARE Grant Awarded				
(20%)	\$1,900	\$2,000	\$1,950	\$1,800

Table 5. Estimated 4-Year vegetation management budget for Griffy Lake

In order to obtain and maintain funding for this project the City will have to complete a few tasks. The following tasks are listed chronologically below:

- Submit a completed LARE grant application by January 15, 2025.
- Submit a signed permit application with a \$20.00 check to IDNR by February 1, 2025. There is also an online submission portal that is now available
- If selected to receive a grant, submit bid request forms (provided by IDNR) to a minimum of 3 contractors by March 2025.
- Select a contractor by April 1, 2025.
- Submit contractor invoices to IDNR for 80% payment collection.



5.0 References Cited

- Aquatic Control, Inc. 2021. Griffy Lake Aquatic Vegetation Management Plan 2017-2021. Prepared for the City of Bloomington Parks & Recreation. Bloomington, IN.
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IDNR. 2018. Tier II Aquatic Vegetation Survey Protocol. IN Department of Natural Resources, Division of Fish and Wildlife

Scribalio, R.W., and M.S. Alix. 2003. Final Report on the Weevil Release Study for Indiana Lakes. Department of Botany and Plant Pathology. Purdue University. West Lafayette, IN.



										Gr	iffy Lake									
Surveyor	AC	IDNR	AC	AC	AC	AC	AC	AC	٨C	AC		AC	AC	AC	AC	AC	AC	AC	AC	AC
Date	8/31/2004	7/11/2005	8/8/2006	8/21/2007	5/5/2008	7/8/2008	8/26/2008	5/7/2000	6/30/2000	8/18/2000	5/24/2016	8/18/2016	8/18/2017	7/31/2018	7/20/2010	8/3/2020	7/26/2021	5/26/2022	8/0/2022	4/18/2023
Total Sites	62	78	50	100	100	100	100	100	100	100	50	50	50	50	50	50	50	50	50	50
Littoral Sites	61	70	48	83	86	93	99	93	81	94	40	40	33	35	46	19	33	0	8	8
Sites with Plants	58	68	22	28	39	27	58	55	58	75	26	28	21	22	20	6	17	0	2	2
% Sites with plants	94%	87%	44%	28%	39%	27%	58%	55%	58%	75%	52%	56%	42%	44%	40%	12%	34%	0%	4%	4%
Sites with Native Plants	54	na	21	28	20	21	29	45	50	66	24	25	21	20	19	5	17	0	2	2
% sites with native plants	87%	na	42%	28%	20%	21%	29%	45%	50%	66%	48%	50%	42%	40%	38%	10%	34%	0%	4%	4%
Percent Littoral Coverage	95%	94%	46%	34%	45%	29%	59%	59%	72%	80%	65%	70%	64%	63%	43%	32%	52%	0%	25%	25%
Maximum Plant Depth	20.0	18.0	18.0	13.0	12.0	15.0	15.0	13.0	14.0	14.0	14.0	14.0	12.0	13.0	17.0	7.0	12.0	0.0	3.0	3.0
Secchi (ft)	10.0	7.5	5.5	10.0	9.0	10.0	12.0	16.0	11.0	12.0	7.0	8.0	14.5	5.5	4.5	5.5	8.0	4.0	11.8	8.0
Number of Species	10	11	4	1	3	5	7	9	9	10	7	5	8	4	2	3	5	0	2	2
Number of Native Species	6	7	3	1	2	3	5	7	6	7	5	3	6	2	1	2	3	0	1	2
Species Diversity	0.75	0.81	0.57	0.00	0.57	0.68	0.77	0.83	0.78	0.74	0.72	0.62	0.73	0.58	0.17	0.65	0.45	0.00	0.44	0.50
Native Species Diversity	0.32	0.64	0.43	0.00	0.31	0.63	0.76	0.74	0.71	0.64	0.61	0.14	0.56	0.23	0.00	0.48	0.28	0.00	0.00	0.50
Mean Native Species/Site	0.98	1.32	0.50	0.28	0.21	0.27	0.95	0.55	0.78	1.01	0.68	0.54	0.78	0.46	0.38	0.10	0.38	0.00	0.04	0.04
	-									FOO - De	pth: All de	epths	-	-		-		-		
Eurasian Watermilfoil	54.8	69.9	0.0	0.0	0.0	2.0	1.0	16.0	2.0	1.0	18.0	22.0	10.0	8.0	4.0	0.0	2.0	0.0	0.0	0.0
Curly-leaf pondweed	3.2	16.4	0.0	0.0	23.0	0.0	0.0	12.0	1.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brittle naiad	21.0	17.8	0.0	0.0	0.0	10.0	54.0	0.0	35.0	40.0	0.0	18.0	12.0	12.0	0.0	4.0	4.0	0.0	2.0	0.0
Brazilian elodea	32.3	49.3	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coontail	80.6	72.6	38.0	0.0	0.0	0.0	0.0	4.0	12.0	18.0	40.0	50.0	36.0	40.0	38.0	6.0	32.0	0.0	0.0	2.0
Water stargrass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0
Sago pondweed	8.1	8.2	0.0	0.0	0.0	3.0	9.0	2.0	3.0	7.0	10.0	2.0	2.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0
Chara sp.	3.2	2.7	10.0	28.0	17.0	15.0	10.0	23.0	19.0	8.0	4.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slender naiad	3.2	15.1	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	8.0	0.0	4.0	0.0	0.0	4.0	2.0	0.0	0.0	0.0
Southern naiad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.0	35.0	56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
Canada waterweed	0.0	0.0	0.0	0.0	0.0	1.0	0.0	4.0	6.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horned pondweed	0.0	0.0	2.0	0.0	4.0	3.0	1.0	4.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Small pondweed	1.6	8.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flat-stemmed pondweed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eel grass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Filamentous algae	4.8	na	na	na	na	na	na	na	na	na	30.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	14.0
Francisco Westermilferil	96.4		0.0	0.0	0.0	0.0	0.0	21.4	0.0	FOO - 1	Septh: 0 to	5 ft	29.6	28.6	71	0.0	0.0	0.0	0.0	0.0
Curky loof pondwood	80.4 4.5	na	0.0	0.0	12.2	0.0	0.0	14.2	0.0	0.0	7.1	37.1	28.0	28.0	7.1	0.0	0.0	0.0	0.0	0.0
Drittle paired	4.5	na	0.0	0.0	0.0	17.6	82.0	0.0	61.1	4.0	7.1	42.0	25.7	25.7	0.0	14.2	7.1	0.0	7.1	0.0
Brazilian elodea	36.4	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coontail	68.2	na	21.4	0.0	0.0	0.0	0.0	0.0	5.6	16.0	64.3	85.7	71.4	71.4	71.4	7.1	71.4	0.0	0.0	7.1
Sago pondweed	9.1	na	0.0	0.0	0.0	5.9	11.4	3.6	5.6	12.0	35.7	7.1	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chara sp.	9.1	na	28.6	56.0	20.0	26.5	25.7	25.0	27.8	4.0	4.0	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Slender naiad	4.5	na	0.0	0.0	0.0	0.0	11.4	0.0	0.0	0.0	7.1	7.1	7.1	0.0	0.0	14.3	7.1	0.0	0.0	0.0
Southern naiad	0.0	na	0.0	0.0	0.0	0.0	0.0	14.3	66.7	76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0
Canada waterweed	0.0	na	0.0	0.0	0.0	2.9	0.0	14.7	27.8	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horned pondweed	0.0	na	0.0	0.0	13.3	8.8	2.9	14.3	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
Water stargrass	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.4	0.0	0.0	0.0	0.0	0.0	0.0
Small pondweed	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
American pondweed	4.5	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Illinois pondweed	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leafy pondweed	0.0	na	0.0	0.0	0.0	14.7	17.1	10.7	0.0	0.0	21.4	0.0	21.4	21.4	0.0	0.0	0.0	0.0	0.0	0.0
Flat-stemmed pondweed	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eel grass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	7.1	0.0	0.0	0.0	0.0	0.0	0.0
Filamentous algae	13.6	na	na	na	na	na	na	na	na	na	28.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.7

6.1 Continued

Griffy Lake AVMP Update November 2024

November 2024	^												- 14 -					
										FOO - I	Depth: 5 to	10 ft						
Eurasian Watermilfoil	56.5	na	0.0	0.0	0.0	2.5	2.5	19.2	5.4	2.2	7.1	14.3	7.1	0.0	0.0	0.0	7.1	0.
Curly-leaf pondweed	4.3	na	0.0	0.0	30.6	0.0	0.0	13.5	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Brittle naiad	21.7	na	0.0	0.0	0.0	10.0	52.5	0.0	64.9	45.7	0.0	14.3	7.1	0.0	0.0	0.0	7.1	0.
Brazilian elodea	43.5	na	21.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
Coontail	91.3	na	57.1	0.0	0.0	0.0	0.0	5.8	24.3	13.0	50.0	64.3	42.9	50.0	42.9	14.3	35.7	0
Sago pondweed	13.0	na	0.0	0.0	0.0	2.5	10.0	1.9	5.4	8.7	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0
Chara sp.	0.0	na	0.0	37.1	22.4	15.0	0.0	23.1	21.6	13.0	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0
Slender naiad	4.3	na	0.0	0.0	0.0	0.0	12.5	0.0	0.0	0.0	21.4	0.0	7.1	0.0	0.0	0.0	0.0	0
Southern naiad	0.0	na	0.0	0.0	0.0	0.0	0.0	19.2	51.4	67.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Canada waterweed	0.0	na	0.0	0.0	0.0	0.0	0.0	1.9	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Horned pondweed	0.0	na	7.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Water stargrass	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Small pondweed	4.3	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Illinois pondweed	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Leafy pondweed	0.0	na	0.0	0.0	0.0	0.0	10.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Flat-stemmed pondweed	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Filamentous algae	0.0	na	na	na	na	na	na	na	na	na	14.3	0.0	0.0	0.0	0.0	7.1	0.0	0
										FOO - D	epth: 10 to	15 ft						
Eurasian Watermilfoil	20.0	na	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	0.0	8.3	0.0	0.0	0
Curly-leaf pondweed	0.0	na	0.0	0.0	26.7	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Brittle naiad	0.0	na	0.0	0.0	0.0	0.0	17.4	0.0	0.0	12.0	0.0	8.3	0.0	8.3	0.0	0.0	0.0	0
Brazilian elodea	20.0	na	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Coontail	80.0	na	50.0	0.0	0.0	0.0	0.0	6.3	5.3	32.0	33.3	33.3	16.7	25.0	16.7	0.0	8.3	0
Sago pondweed	0.0	na	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Chara sp.	0.0	na	8.3	3.2	0.0	0.0	4.3	25.0	15.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Slender naiad	0.0	na	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Southern naiad	0.0	na	0.0	0.0	0.0	0.0	0.0	0.0	10.5	24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Filamentous algae	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	0	(
								Sp	ecies Free	uency of (Occurrence	e - Depth: 1	5 to 20 ft					
Coontail	100.0	na	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0
Filamentous algae	0.0	na	na	na	na	na	na	na	na	na	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0

Griffy Lake AVMP Update November 2024 6.2 LARE Tier 2 Raw Data

				Southern	Brittle	Eurasian		sago	
WPT	Lat	Long	Depth	naiad	naiad	watermilfoil	coontail	pondweed	Fil.Alg
1	39.19714	-86.5113	3.0	3	1				Р
2	39.19698	-86.5129	3.0	1	3				
3	39.1974	-86.5139	3.0						
4	39.1984	-86.5137	7.0				1		
5	39.19919	-86.5145	6.0				3		
6	39.20008	-86.5149	6.0					1	
7	39.19976	-86.5156	7.0					1	
8	39.20013	-86.5162	9.0						
9	39.20066	-86.5177	13.0						
10	39.20137	-86.5187	14.0						
11	39.20195	-86.5195	16.0						
12	39.20258	-86.5196	12.0						
13	39.20292	-86.5185	2.0		3		1		
14	39.20307	-86.5197	12.0						
15	39.2038	-86.5208	16.0						
16	39.20438	-86.5212	11.0						
17	39.2051	-86.522	14.0						
18	39.20611	-86.5224	5.0						
19	39.20588	-86.5233	14.0						
20	39.20543	-86.5243	18.0						
21	39.2054	-86.5257	17.0						
22	39.20553	-86.5265	17.0						
23	39.20499	-86.5275	14.0						
24	39.20445	-86.5283	18.0						
25	39.20381	-86.5285	13.0						
26	39.20295	-86.5277	18.0						
27	39.2024	-86.5274	16.0						
28	39.20157	-86.5275	14.0						
29	39.20016	-86.5266	2.0						
30	39.20113	-86.5271	9.0						
31	39.20238	-86.5268	11.0						
32	39,20321	-86.5262	16.0						
33	39,20367	-86.5249	19.0						
34	39,20378	-86.5237	9.0						
35	39 20327	-86 5225	8.0						
36	39 20243	-86 5223	9.0						
37	39 20161	-86 5221	9.0						
38	39 20112	-86 5217	6.0						
39	39 20092	-86 5215	9.0						
40	39,20029	-86.5206	3.0						
41	39,19987	-86.5191	8.0						
42	39,19945	-86.5181	5.0						
43	39 19901	-86 5173	4.0						├───┤
ر ہ ۸۸	30 10017	-86 5150	5.0						
45	39 10276	-86 5162	9.0						
 	39 10720	-86 5152	3.0						
40 <u>4</u> 7	39 108/12	-86 515/	<u> </u>	1				1	
47 /12	39.19043	-86 51/0	4.0 5.0				1	1	
40 /0	39.19007	-86 513	3.0	1			T		
49 50	30 10636	-86 5110	3.0 11 0	T					
Observed	water wi	10W CLEEL	ing water	primrose cat	tails, arrow	vhead, hibiscus	American		L]
pondwee	d. Pickerel	weed		out			,		
Secchi: 9	.,								



Scientific Name	Common Name
Ceratophyllum demersum	coontail
Chara sp.	chara
Egeria densa	Brazilian elodea
Elodea canadensis	Canada waterweed
Heteranthera dubia	water stargrass
Hibiscus palustris	Hibiscus
Justicia americana	Water willow
Ludwigia peploides	Creeping water primrose
Myriophyllum spicatum	Eurasian watermilfoil
Najas flexillis	slender naiad
Najas guadalupensis	southern naiad
Najas minor	brittle naiad
Pontederia cordata	pickerelweed
Potamogeton crispus	curly-leaf pondweed
Potamogeton foliosus	leafy pondweed
Potamogeton nodosis	American pondweed
Potamogeton pusillus	small pondweed
Potamogeton zosteriformis	flat-stemmed pondweed
Stuckenia pectinata	sago pondweed
Typha sp.	cattail
Vallisneria americana	eel grass
Zannichellia palustris	horned pondweed

