November 3, 2025

Winter Water Level Drawdowns – Lower Spring Lake

Information compiled by the Wisconsin Department of Natural Resources and the Jefferson County Land and Water Conservation Department

Winter water level drawdowns are used to manage Eurasian water milfoil (EWM), an invasive aquatic plant, because the exposed soil freezes resulting in killing of the plant. This document summarizes, to the best of our knowledge, what to expect from a winter drawdown on Lower Spring Lake.

After the summer full lake Point Intercept Survey is conducted, if findings show a 35-40% or greater Relative Frequency for EWM with majority of locations being a density of 2 or greater in (Map 1) displaying points affected by drawdown of navigational importance, a drawdown may be warranted or suggested to help with improvement through the means of a Winter Drawdown later that year. A Drawdown is not required if these parameters are met/exceeded. This begins the process for the means of a drawdown to be explored.

Winter 2019-2020 Drawdown Results

- Though the winter was a mild one, the drawdown was successful according to pre and post-drawdown plant surveys as well as anecdotal information related to sediment compaction.
- In the areas where the sediment was exposed during the winter, Eurasian water milfoil presence was reduced after the drawdown.
- When looking at the subset of plants in areas affected by a drawdown (55 points), Eurasian water milfoil made up 46% of the community in 2019 and 26% in 2020. This decrease is related to both the decrease of Eurasian water milfoil and the increase in native plant species that occupied a larger portion of the plant community.
- In 2021, a new native species was documented for the first time on the lake. The yellow pond lily is a Wisconsin special concern species. It provides good habitat for fish spawning, food for waterfowl, and habitat for aquatic insects.
- When winter weather is cold and dry, then larger EWM reductions and sediment compaction are anticipated.

Mechanics

- Village of Palmyra and the Lower Spring Lake Protection and Rehabilitation District (Lake District) would work with the Wisconsin Department of Natural Resources (WDNR) on the process for implementing a winter water level drawdown.
- Approval from the Village of Palmyra and the WDNR is needed prior to initiating a drawdown.
- The dam can draw down the water up to 3 feet 8 inches. Please see (Map 2) showing the approximate area where water would remain and where the lakebed would be exposed at the end of this document.
- The drawdown would start after Labor Day weekend at a maximum rate of 6 inches a day (3 to 4 inches per day with the chance of up to 5 inches during heavy rainfall can be expected).
- The 3-foot 8-inch reduction must be achieved by October 1 to ensure that the amphibians and turtles hibernate in the areas under the drawn-down water.
- Before and weekly during the entire drawdown, dissolved oxygen and clarity would be measured at deep hole location and downstream of the dams for each outlet (3) to ensure the

conditions don't cause a fish kill in the river. Given certain measurements, the drawdown rate may need to be reduced.
- Inlet stream near CTH 59, would be tested for dissolved oxygen and temperature every two weeks during entire drawdown.
- Lake would potentially achieve normal levels by the 1st weekend in May (fishing opener).
- The water level change in the fall and spring would take anywhere from 7.5 days to 28.9 days with a median of 15.8 days.

Benefits, Disadvantages, Unknowns

Aquatic Plants

- The extent of Eurasian water milfoil (EWM) control depends on winter conditions: a cold winter with little snow is ideal. The reduction will be less during a winter that is warm or has a lot of snow.
- Reductions of EWM could last 2-5 years. This improvement could be extended with other measures. In the best-case scenario, there would be reduced need for harvesting and chemical treatment.
- A drawdown is the only affordable tool to decrease Eurasian water milfoil in water depth of less than 3 feet. Chemical treatment is very expensive, and the harvester is not permitted to operate in these areas.
- Most winter drawdowns do not significantly reduce curly-leaf pondweed.
- If there are springs that continue to flow during the winter drawdown, then those areas will not have good EWM control.
- Dense stands of EWM could be reduced which would allow for better fish movement.
- Overall, drawdowns will improve native plant diversity. Plant surveys before and after would be done to document the impacts.
- A winter drawdown will benefit native aquatic plant species that predominately reproduce by seeds including 9 species that are found in the lake. (Water Stargrass, Slender Naiad, Variable Pondweed, Illinois Pondweed, Longleaf Pondweed, Flat-stem Pondweed, Sago Pondweed, Water Celery)
- A winter drawdown will initially decrease 3 native aquatic plants, but they will recover within a few years. (Muskgrass, Coontail, White Water Lily.)
- With a winter drawdown, it is not expected there would be terrestrial plants growing on the lake bed. But if they did, these plants would die off when the water levels are raised.
- Winter drawdowns can help to mimic a natural lake fluctuation to improve and increase the native aquatic plant community.
- Please note: no method has been shown to completely eradicate invasive aquatic plants.

Sediment

- Minor sediment compaction could occur during a cold and dry winter drawdown
- If there are areas where springs are located and continue to flow during the winter drawdown there will not be good sediment compaction.
- Sediment compaction that occurs will be permanent – the sediments do not re-expand with the return of the water.

- Most improvements in water depth from a winter drawdown occur due to cutting from the tributary river. There is a possibility that some sediment cut by the river will be deposited in the deep areas of the lake.
- Lakes that are created by dams on a river system will continue to have some sediment delivery every year.
- There may be some sediment deposition in the Scuppernong River downstream of the Lower Spring Lake dam.

Fish

- Fishery will be closed during the timeframe of drawdown to help reduce the otherwise vulnerable angler harvest of Fish in isolated pools of deep water, along with safety aspect for the expectation of thinner ice coverage. -
- The drawdown will concentrate both predator and prey fish species in a smaller volume of water allowing for more predatory forage.
- There should be more dissolved oxygen (DO) in the water with a drawdown due to the river continuing to provide DO to less water volume and increased turnover of water flow through the system.
- The drawdown could temporarily impact the spawning habitat for early-spring spawning fish species such as northern pike as the lake's wetland fringe will be in a dewatered state.
- Pre and post-fish surveys to assess potential and actual impact to the fishery are recommended.
- If there is an impact to the fishery, it should naturally rebound as the native plant community re-establishes post-drawdown.
- The Lion's Club and/or Lake District will work to restock the lake with northern pike in the following fall after a winter drawdown if electrofishing survey shows negative impact on fishery and WDNR fish biologist recommends.

Mussels

- Prior to the drawdown, (WDNR Mussel Expert) will help identify mussel beds in Lower Spring Lake. Lake district staff and other volunteers will help rescue/relocate mussels following a timeline recommended by WDNR Staff. Drone flights may be used to help monitor the reduction in water levels and guide the mussel relocation.

Western Side Channel Needs (near Mill Road)

- Fish present are expected to move downstream during drawdown efforts with less water entering the stream section. Although not required, it is recommended to move any trapped fish near the outflow pipe as water will remain in a small pool but lack oxygen for the fish.
- A mussel relocation is required from all areas of temporary or permanent instream impacts that is suitable habitat for listed mussel species.
- Relocation plan for mussels would be submitted and executed by either the district with help from mussel expert or executed by permitted Malacologist.
- Relocation plan will follow conservation measures listed in the Broad Incidental Take Permit for Common Activities as provided for under s. 29.604 Wis. Stats.
- Relocation plan must occur before water temperatures in stream get below 40 °F.

Recreation

- The WDNR will close the fishing season for all species during the timeframe of the drawdown. This requires the WDNR to arrange and conduct an informal meeting to address the proposed closure of fishing, publish a public notice in the state newspaper, post pertinent information at access points to the lake, accept and review written public comments and contact constituent groups and provide for other reasonable notice to the public.
- The annual Lions Club Fisheree will be canceled during the drawdown due to fishing being closed along with unsafe access and expected thinner than average ice conditions.
- Driving a motor vehicle (including golf carts, ATVs, snowmobiles, and riding lawnmowers) on the exposed bed of the lake is prohibited except for a few limited exceptions. Therefore, there will be no motor vehicles allowed on the ice during a drawdown.
- Any reductions in EWM and/or Coontail will result in improved navigation.

Safety

- The ice depth on the drawn-down lake will likely be less than a normal year. This is due to the fact that the river's flow will impact the depth of ice. People venturing onto the ice should be extra careful especially areas near any soft springs.

Costs

- Winter drawdown is an inexpensive tool for controlling EWM.
- Application fee of $500 is required for a temporary water drawdown permit through the WDNR.
- The Village of Palmyra Department of Public Works must spend additional time and effort to monitor the gradual lowering and raising of the water level.
- Income from the Lions Club Fisheree and any local tourism dollars associated with that event would not be realized the year of the drawdown.
- Relocation plan costs $100 for submittal without permitted malacologist or no-cost if submittal with permitted malacologist.

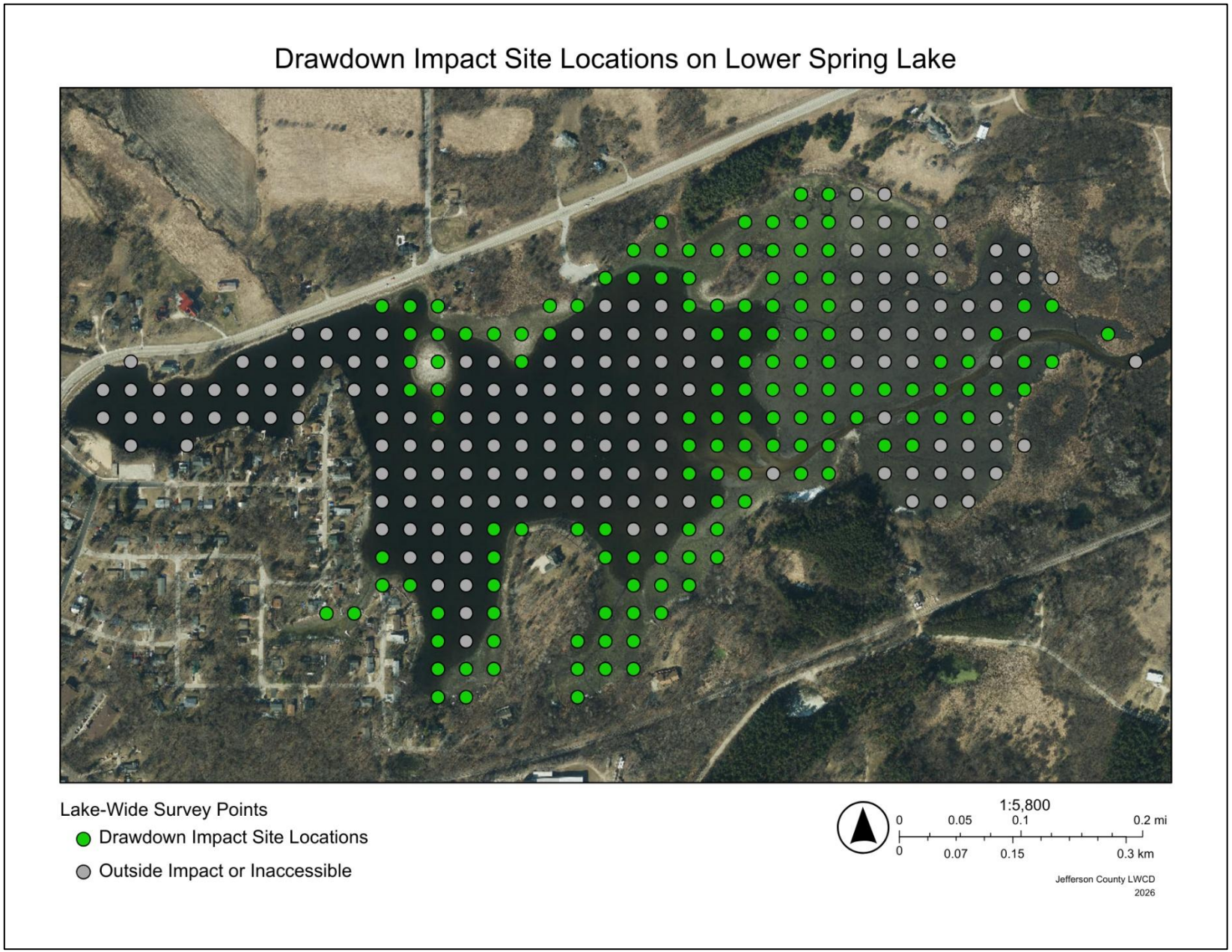
Miscellaneous

- Natural wood, stumps or rocks must not be disturbed or removed from the exposed lake bed.
- There is a possibility of odors from the drained areas in the fall; this is usually mild and short-lived due to drying and cooling temperatures.
- There is a potential for an algae bloom when the lake refills, but this could be tempered by the uptake of nutrients by the aquatic plants in the lake.

Other Factors

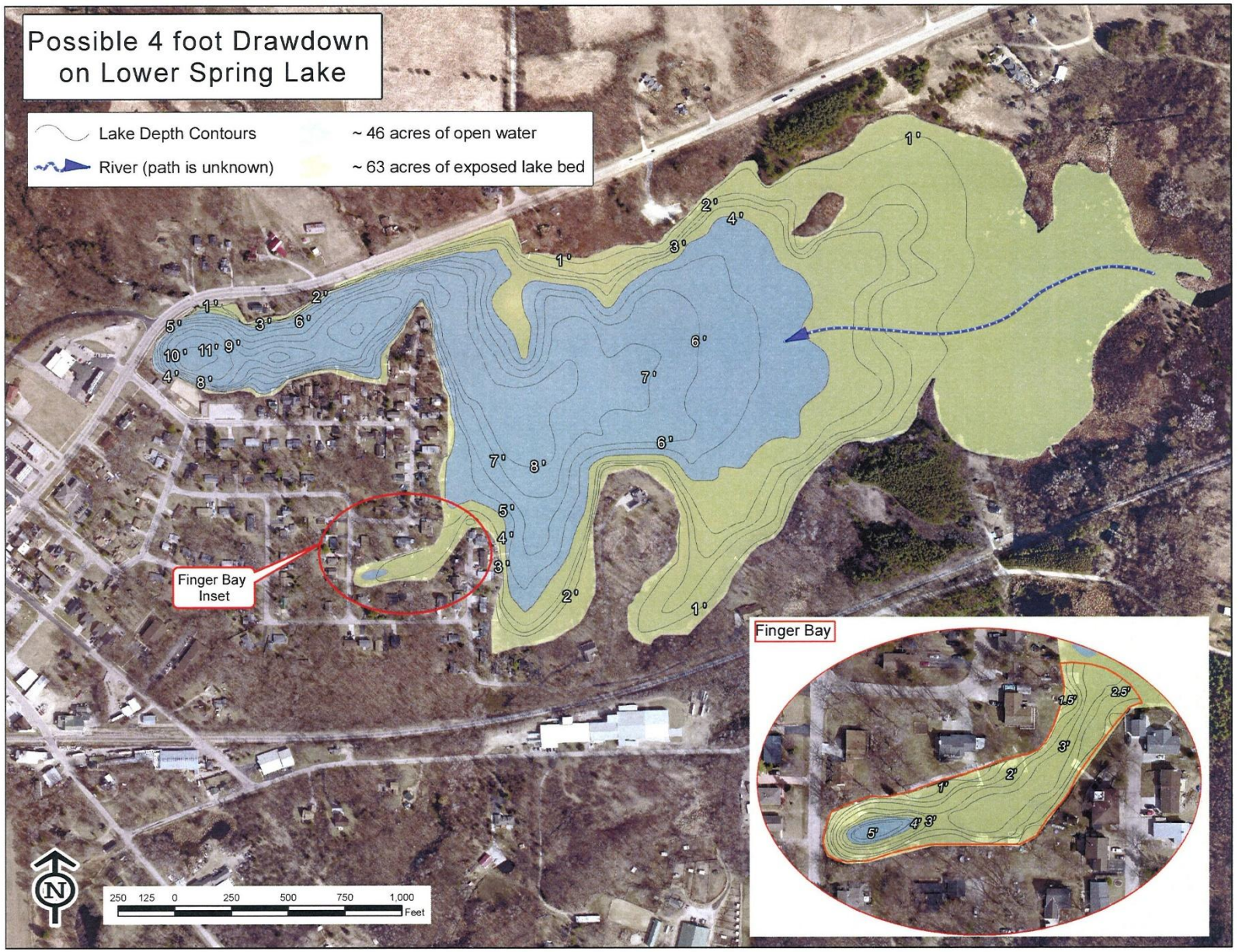
- The lake residents should not rake any plants out of the lake that are exposed after the drawdown.
- If landowners are thinking about implementing any projects in drawn-down areas or on their shoreline, then they MUST contact the appropriate zoning entity (Village of Palmyra, 262-495-8316; Jefferson County 920-674-7130) and the Wisconsin Department of Natural Resources (608-267-3125) to determine if any permits are needed prior to starting a project.
- A drawdown will be the best time to accomplish any dredging as long as there isn't any potential of contaminated sediments. Dredging requires lots of planning and a WDNR permit.

Map 1. Points used to assess Eurasian Watermilfoil Frequency based on Impacts from Drawdown.



November 3, 2025

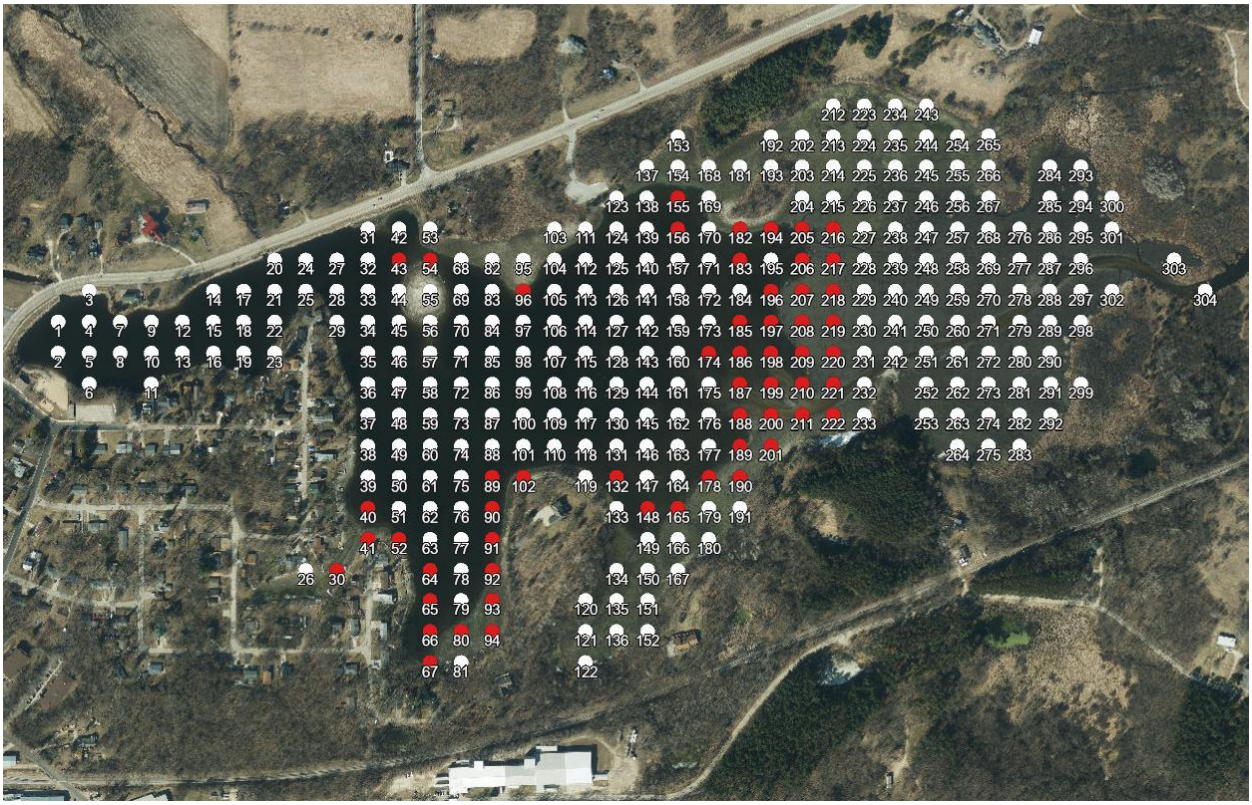
Map 2. Drawdown Impacted Area for Lower Spring Lake



Aquatic Plant Community
(Relative Frequency of Occurrence)
in Lower Spring Lake 2018 – 2025

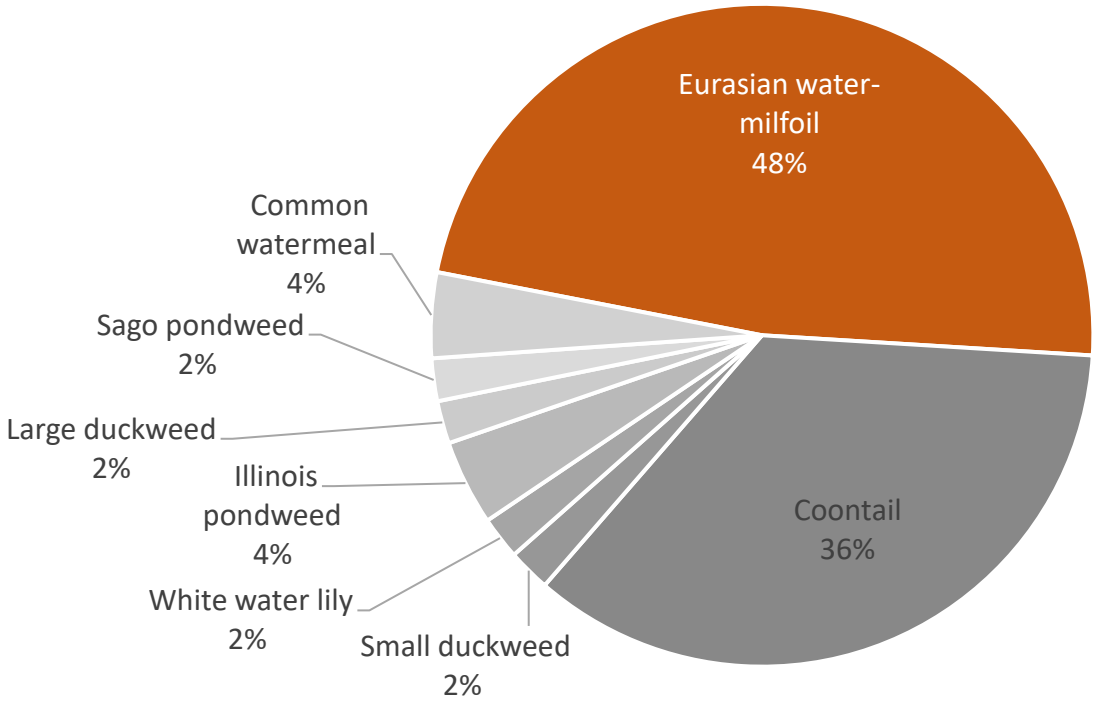
Notes on Data:

- All surveys were performed in the month of July.
- There was a total of 55 points selected throughout the lake to compare data between years. The points selected were chosen as they were likely to be in the drawn-down area.
- Coontail, a native aquatic plant, has caused navigational issues in Lower Spring Lake because it exhibits invasive growth characteristics.
- The overall density in Eurasian Watermilfoil has steadily declined over time since 2018.

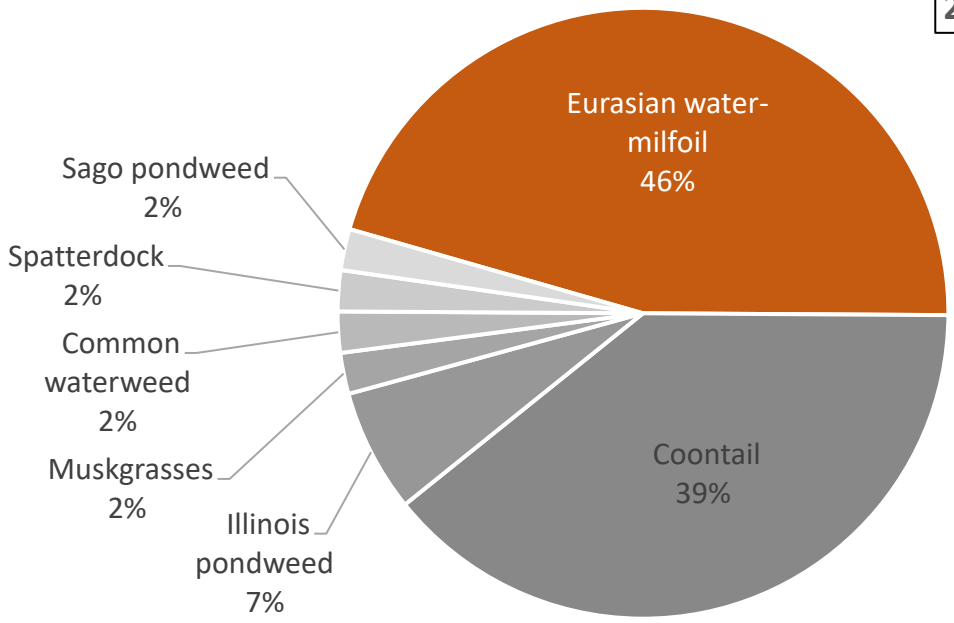


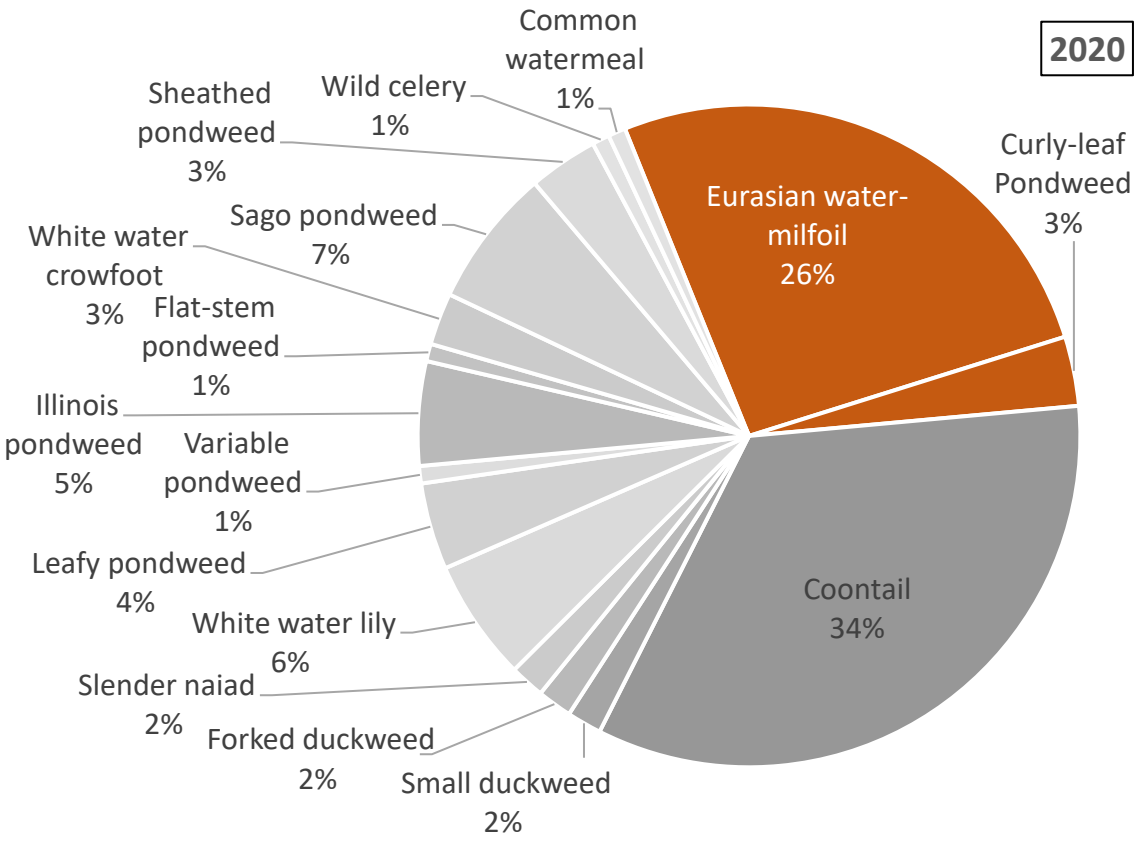
Red Dots Indicate Points being used in Data

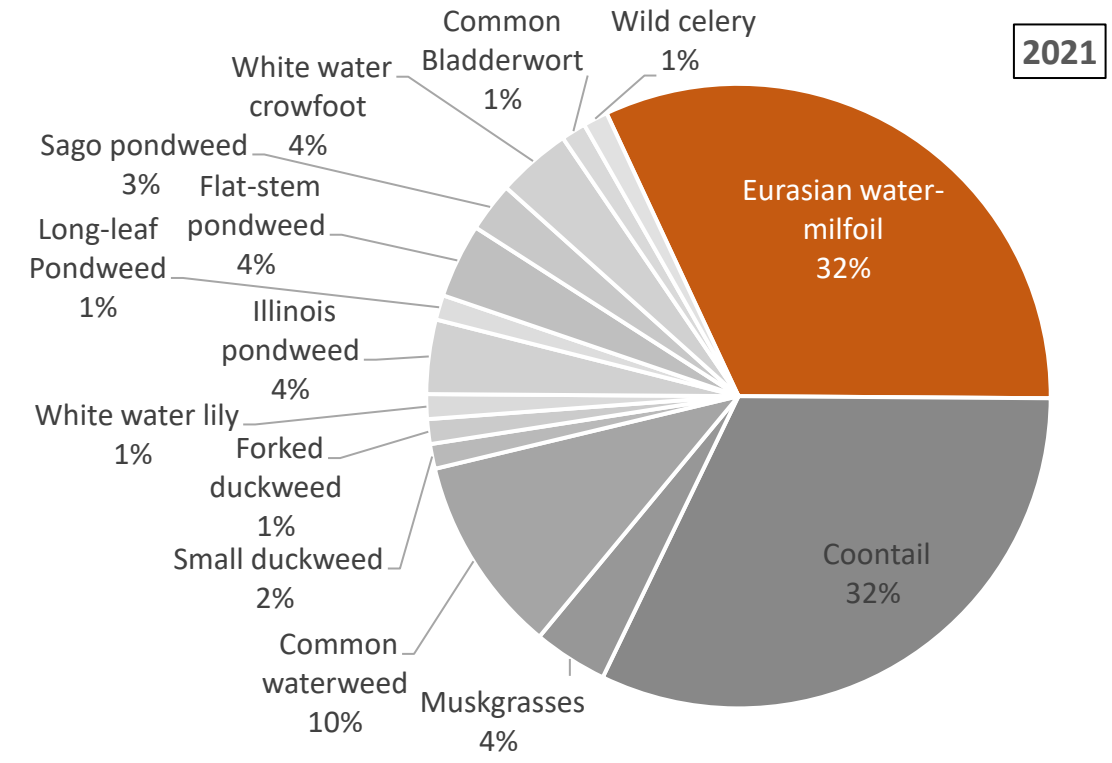
2018

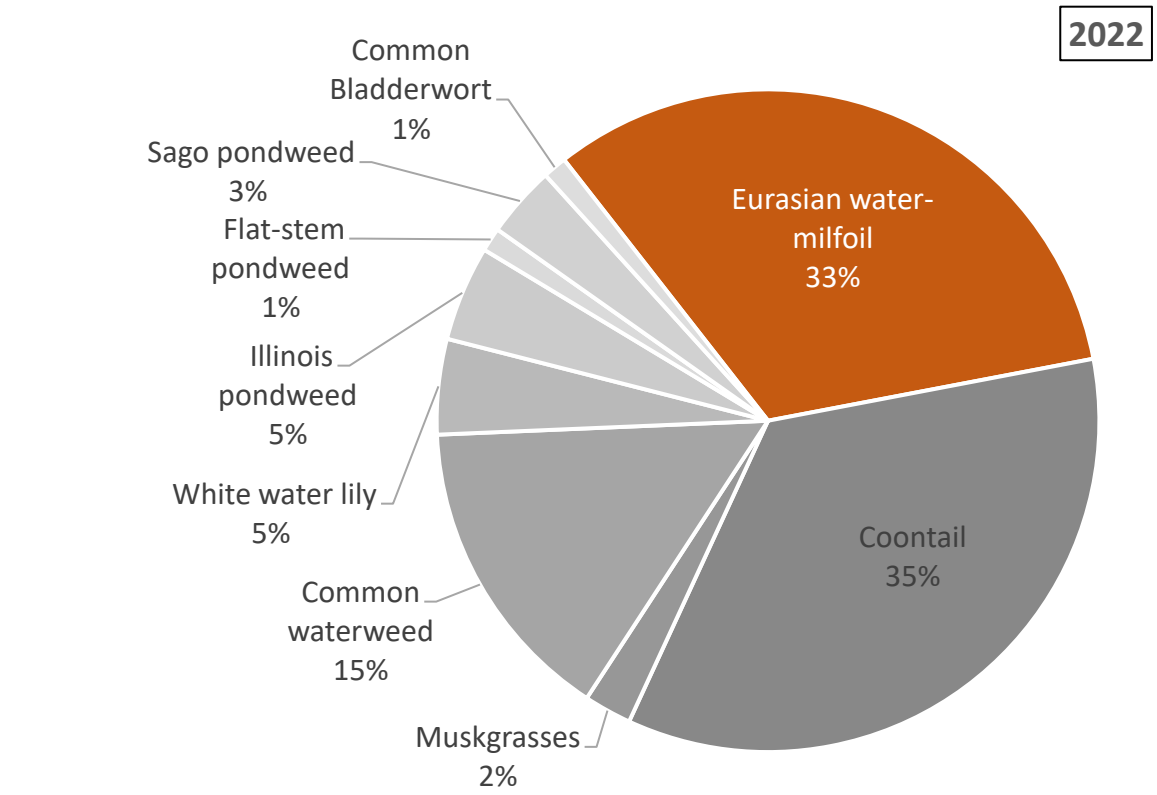

Eurasian water-milfoil 48%
Common watermeal 4%
Sago pondweed 2%
Large duckweed 2%
Illinois pondweed 4%
White water lily 2%
Small duckweed 2%
Coontail 36%

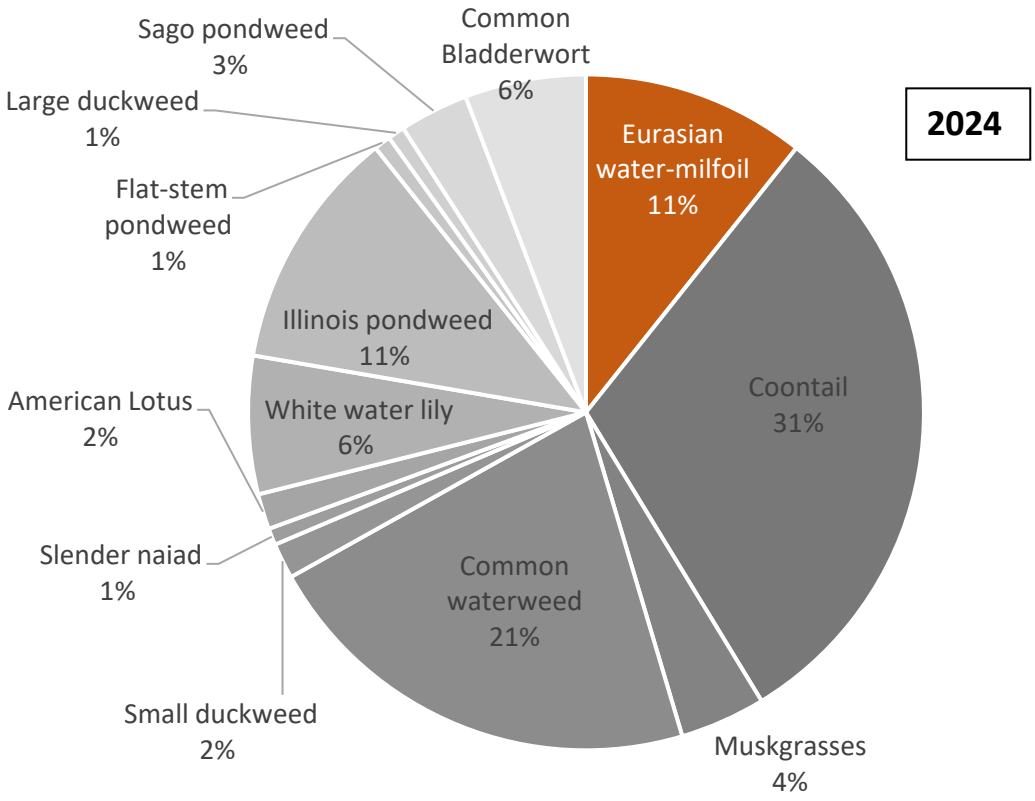
2019


Eurasian water-milfoil 46%
Sago pondweed 2%
Spatterdock 2%
Common waterweed 2%
Muskgrasses 2%
Illinois pondweed 7%
Coontail 39%

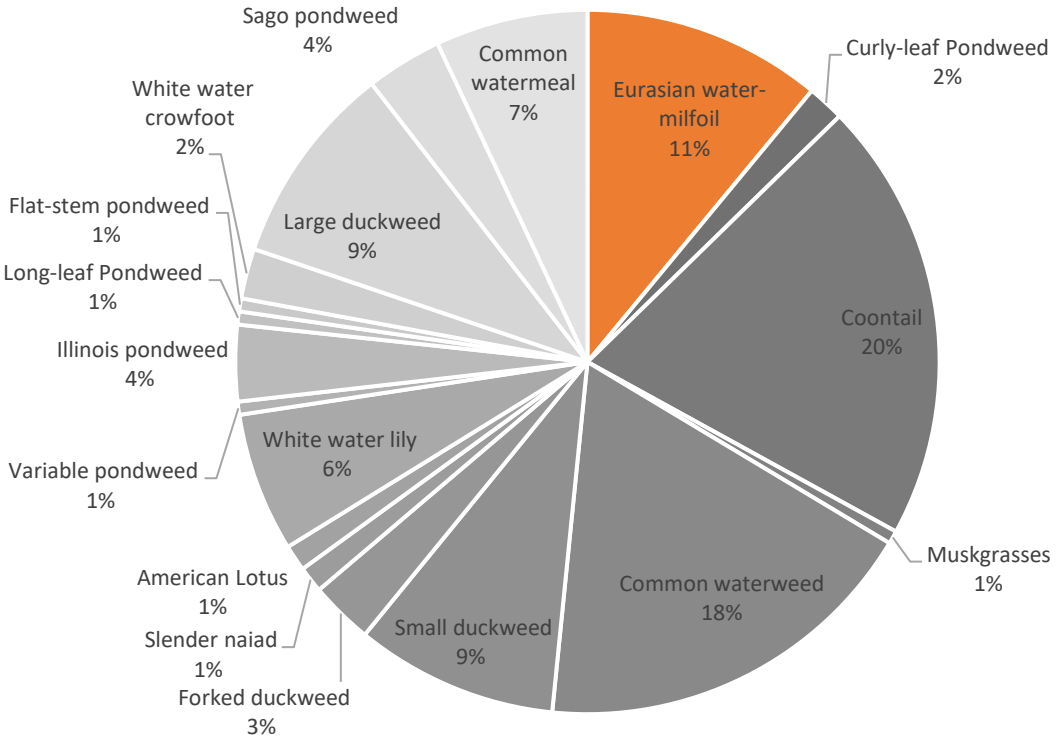

2020
Common watermeal 1%
Wild celery 1%
Sheathed pondweed 3%
Sago pondweed 7%
White water crowfoot 3%
Flat-stem pondweed 1%
Illinois pondweed 5%
Variable pondweed 1%
Leafy pondweed 4%
White water lily 6%
Slender naiad 2%
Forked duckweed 2%
Small duckweed 2%
Coontail 34%
Eurasian water-milfoil 26%
Curly-leaf Pondweed 3%


2021
Common Bladderwort 1%
Wild celery 1%
White water crowfoot 4%
Sago pondweed 3%
Flat-stem pondweed 4%
Long-leaf Pondweed 1%
Illinois pondweed 4%
White water lily 1%
Forked duckweed 1%
Small duckweed 2%
Common waterweed 10%
Muskgrasses 4%
Coontail 32%
Eurasian water-milfoil 32%


2022
Common Bladderwort 1%
Sago pondweed 3%
Flat-stem pondweed 1%
Illinois pondweed 5%
White water lily 5%
Common waterweed 15%
Muskgrasses 2%
Eurasian water-milfoil 33%
Coontail 35%


2024
Sago pondweed 3%
Common Bladderwort 6%
Large duckweed 1%
Flat-stem pondweed 1%
Illinois pondweed 11%
American Lotus 2%
White water lily 6%
Slender naiad 1%
Small duckweed 2%
Common waterweed 21%
Muskgrasses 4%
Eurasian water-milfoil 11%
Coontail 31%

2025


Eurasian water-milfoil 11%
Curly-leaf Pondweed 2%
Coontail 20%
Muskgrasses 1%
Common waterweed 18%
Small duckweed 9%
Forked duckweed 3%
Slender naiad 1%
American Lotus 1%
Variable pondweed 1%
White water lily 6%
Illinois pondweed 4%
Long-leaf Pondweed 1%
Flat-stem pondweed 1%
White water crowfoot 2%
Large duckweed 9%
Sago pondweed 4%
Common watermeal 7%

Plant Community Response to Chemical Treatment and Drawdown								
	2018	2019	2020	2021	2022	2023	2024	2025
Treatment(s) Applied	Finger Bay - 2, 4-D Near 17 piers - Diquat	Finger Bay - 2, 4-D Near 9 piers - Diquat	Drawdown None	Finger Bay - Endothall and 2,4-D Near piers - Diquat	Finger Bay & shoreline areas - Endothall and 2,4-D Beach - Diquat	Finger Bay & shoreline areas - Endothall and 2,4-D	Finger Bay & shoreline areas Willow St to Zinna Ave Diquat	Finger Bay & shoreline areas Willow St to Zinna Ave Diquat
Eurasian Water Milfoil (%)	47.9	45.7	26.3	32.1	32.6	-	10.7	11
Native Plants (coontail included) (%)	54.2	54.3	70.3	67.9	72.1	-	96.7	94.8
Native Plants (coontail not included) (%) *	18.8	15.2	44.9	35.9	37.2	-	66.1	74.4

* This row was added since coontail has invasive growth characteristics in Lower Spring Lake.