DRAFT AMENDMENT 3
Aquatic Plant Management Plan, Lake Kegonsa , Dane County Wisconsin

Approved by the Wisconsin Department of Natural Resources on _____

Prepared by Dane County Land and Water Resources Department (LWRD) Pete Jopke with assistance from David Rowe, Kris Marchioni, and Michelle Richardson.

Plant surveys were conducted by James Scharl of Wisconsin Lake and Pond Resource LLC on July 18 and 19th 2024.

Introduction

This is the third amendment to the Aquatic Plant Management Plan, Lake Kegonsa and Lower Mud Lake, Lower Rock River Basin, Dane County Wisconsin, published in January 2007 by the Dane County Office of Lakes and Watersheds. The 2007 plan was approved by the Wisconsin Department of Natural Resources on March 17, 2007 and by the Dane County Lakes and Watershed Commission on April 12, 2007. The first amendment to the 2007 plan was approved by the Wisconsin Department of Natural Resources on March 27, 2014 and the second amendment was approved on January 30, 2018. Aquatic Plant Management Plans are required under NR 109.04(d), Wisconsin Administrative Code, to guide mechanical harvesting activities and the effective management of aquatic plants in water bodies.

Please note that the Yahara River between Monona and Upper Mud Lake, Waubesa to Lower Mud Lake, and Lower Mud Lake to Lake Kegonsa is addressed in the 2017 Yahara River and Upper Mud Lake Aquatic Plant Management Plan amendment. While point intercept data was collected in 2024, the collection points only involved the centerline or thalweg of the channel and are not discussed and not reported in this amendment.

This plan is prepared in support of Dane County's permit for its mechanical aquatic plant harvesting program, operated in accordance with NR 109 Wisconsin Administrative Code. Individuals and groups that propose herbicide treatments of aquatic plants in Dane County waters would need to go through a separate planning and permitting process with the Wisconsin Department of Natural Resources.

Recent Plant Survey Methods and Results

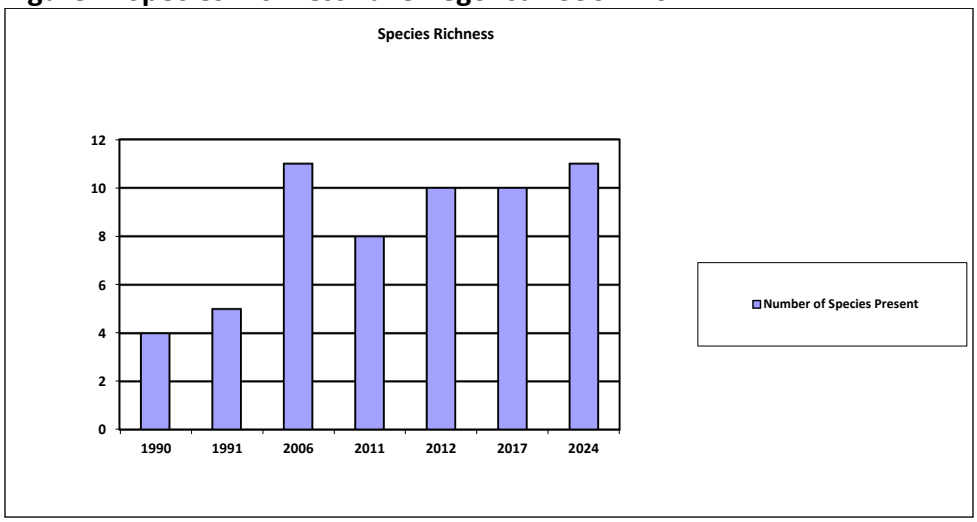
Plant surveys were performed James Scharl of Wisconsin Lake and Pond Resource LLC on July 18th and 19th 2024. Current Wisconsin DNR approved protocols and the point intercept method was used. Refer to the point intercept maps in the 2007 plan for the sampling locations for Lake Kegonsa survey.

Table 1 below indicates species present in Lake Kegonsa during the 2024 survey, and Figure 1. indicates species richness from 1990-2024.

Table 1. Species present during 2024 aquatic plant survey – Lake Kegonsa

Genus	Species	Common Name	Category
Algae	*sp.*	Filamentous algae	Submersed
Ceratophyllum	*demersum*	Coontail	Submersed
Chara	*sp.*	Muskgrass	Submersed
Elodea	*canadensis*	Common waterweed	Submersed
Herteranthera	*dubia*	Water star-grass	Submersed
Myriophyllum	*spicatum*	Eurasian water-milfoil	Submersed - Invasive
Potamogeton	*foliosus*	Leafy pondweed	Submersed
Potamogeton	*richardsonii*	Clasping-leaf pondweed	Submersed
Stuckenia	*pectinata*	Sago pondweed	Submersed
Vallisneria	*americana*	Wild celery	Submersed
Lemna	*Minor*	Small Duckweed	Floating
Lemna	*Trisculca*	Forked duckweed	Floating

Figure 1. Species Richness Lake Kegonsa 1990 – 2024



Species richness is a count of the total number of different plant species found in a lake. Generally, the better the water quality the higher the species richness count.

Appendix A includes Lake Kegonsa plant statistics from the 2024 point intercept survey. Appendix B includes mapped plant distributions for Lake Kegonsa.

Discussion of historical plant community changes

Definition of terms used in this section:

Maximum depth of plant growth is the deepest depth at which plants were found in the lake. This is a function of water clarity. The clearer the water, the better the light penetration and

presumably the deeper plants are able to grow. Not all plants grow in deep water some may prefer the shallower parts of the lake, but with clearer water the opportunity to grow deeper is available. Oligotrophic lakes (very clear water lakes) will have some plants growing in waters deeper than 20 feet. Hypereutrophic lakes (the opposite of oligotrophic) are characterized by excessive algal blooms and turbid poor water quality and clarity. Rooted plants are few, and restricted to either unusual weather conditions or very shallow water where light can penetrate. Plant diversity is usually restricted to species that can tolerate poor water clarities.

Frequency of occurrence is calculated by taking the total number of times a species is sampled divided by the total number of points at which depth was less than or equal to the maximum depth of plant growth.

The photic zone is the area where light penetrates enough to support plant growth.

The Floristic Quality Index (FQI) is a metric that evaluates the closeness of the flora in a lake to that of an undisturbed condition. The higher a FQI value, the closer that plant community is to an undisturbed ecosystem. Just for reference, compare a lake's numbers to the statewide average (24) or ecoregion average (20)(lakes also within the Southeast Glacial Plans ecoregion - see info here https://dnr-wisconsin.shinyapps.io/AquaticPlantExplorer/, calculated from a subset of approximately 250 lakes across Wisconsin.

Coefficients of conservatism (C) range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a landscape relatively unaltered from what is believed to be a pre-settlement condition (see the end of Table 4 in Appendix A). The lower numbers indicate more of a disturbed ecosystem, while the higher numbers indicate a community more like one that would have been found before human settlement.

Lake Kegonsa

Previous survey results

In 2006 the species abundance was 11. Coontail and EWM were the two most abundant species during this survey. In 2011, species diversity decreased to eight, Horned pondweed was the most prevalent species found with EWM and coontail following.

Over the 2006 and 2011 sampling periods, the Floristic Quality Index (FQI) decreased while the average coefficient of conservatism (C) increased. FQI evaluates the closeness of the flora to an undisturbed ecosystem. The higher the FQI the closer that plant community composition is to an undisturbed ecosystem. C values range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a landscape relatively unaltered from a pre-settlement condition. Lower numbers indicate more of a disturbed ecosystem while higher values indicate a community more likely to have been found pre-settlement. The FQI and average C were in 2006 were 14.33 and 4.78. However, the FQI fell during the 2011 survey to 12.66 and average C rose to 5.17. These values can be used to gauge the health of the lake. Though the FQI fell during 2011, the increased average C shows a stable plant community with limited diversity.

During the 2006 and 2011 surveys, 11.0 and 8.0 species were identified, respectively. The higher the species richness the better, and generally the better water quality results in higher species numbers. When WDNR sampled the lake in 2012, it documented that species richness went back up to 10. Though maximum depth of plant growth decreased from 9.0 feet to 8.0 feet, the amount of photic zone inhabited by plants decreased from 45.48% to 58.87% in 2011. Horned pondweed saw the biggest increase in abundance from 4.2% relative frequency to 35.1% while EWM decreased slightly. Flat-stem pondweed is a new species found during the 2011 survey while curly-leaf pondweed, which was not found in 2006, was again present. Filamentous algae, small duckweed, leafy pondweed, clasping-leaf pondweed, and sago pondweed were not identified in 2011 but were found in 2006. While these species were likely present during each survey, due to the relatively low frequency of occurrence and the dynamic nature of aquatic ecosystems their abundance may have changed slightly between the two surveys. The presence or absence of these species should continue to be monitored on future surveys.

In the August 2017 survey, species diversity was again 10 species, with wild celery and coontail the most prevalent species. The maximum depth to plants increased to 12 feet. The FQI increased to 13.79 and the mean C fell to 4.88; still indicating a stable plant community.

In the 2017 survey, filamentous algae, clasping-leaf pondweed, leafy pondweed, and sago pondweed were all found. Horned pondweed was not found during the survey but this could be due to the delicate nature of the plant as well as the timing of the survey as it was seen by the Plant Scout and Wisconsin DNR staff earlier in the growing season.

2024 survey results

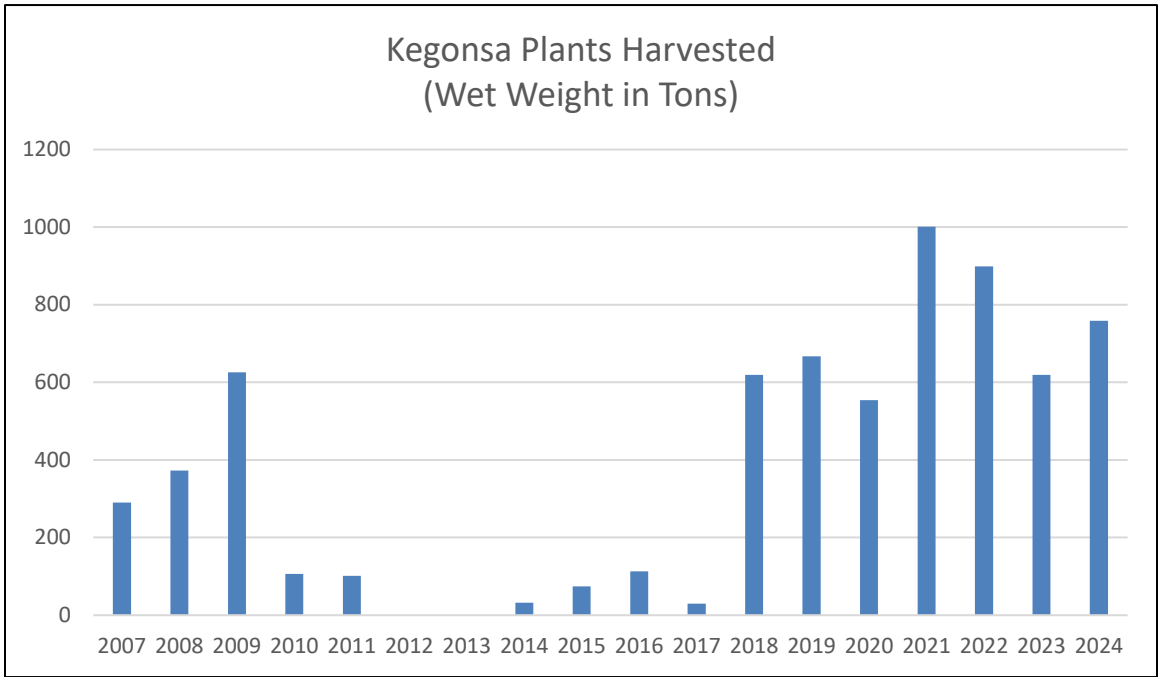
The 2024 survey found 11 different species of plants. Chara was most dominant species at 53.52% of vegetated survey sites and 39.86 in areas shallower than maximum depth of plants. Coontail was present in 37.92% of the vegetated sites with wild celery 27.52%. Frequency of occurrence in the photic zones sites increased to 74.49% from 42.82% in 2017 with the maximum depth of plants at 12.5 feet. The FQI increased to 15.49 from 13.78 in 2017 and the Mean C was was relatively the same at 4.9. These values can be used to gauge the health of the lake and potentially show an increasingly healthy aquatic plant community.

Though similar aquatic plant communities were present during each survey, there were still limited changes in species composition between the four surveys. Coontail and chara continue to increase. Number of plant species has increased by two and the maximum depth of plants was up to 12.5 feet from 12 in 2017. Chara showed the largest increase within the plant community from 2017. Conversely, wild celery showed a slight decline from previous surveys. Given the presence or absence of any species should not be a cause for concern as plant communities do vary over time and sampling points may not detect every species present in a given waterbody.

Harvesting Aquatic Plant Management Records

Figure 2 summarizes Dane County's mechanical harvesting operations in Lake Kegonsa since 2007. Aquatic plants were harvested in Lower Mud Lake during the 2017 harvesting season to increase water flow. Chemical treatments have never been conducted in Lower Mud Lake. According to Wisconsin DNR, the last permit granted for herbicide use on Lake Kegonsa was in 2003.

Figure 2: Historical Lake Kegonsa aquatic plant harvesting records



Public input opportunities

Presentations on both Lake Waubesa and Lake Kegonsa amendments were held on December 2, 2024. The complete draft plans can be viewed on the webpage: https://lwrd.danecounty.gov/what-we-do/lake-management/aquatic-plant-management Public comment will be solicited until January 31, 2025.

Aquatic Plant Management in Dane County

The overall goal of Dane County's mechanical harvesting program is to cut and harvest Eurasian water-milfoil and other nuisance over abundant vegetation to help provide for reasonable use of the lakes for boating, fishing and swimming, while preserving the health and balance of the lake ecosystem. During periods of high water, harvesting of plants in the Yahara River between lakes Waubesa and Kegonsa becomes the highest priority to reduce the extent and duration of flooding.

Aquatic plant growth varies from lake to lake and year to year. Dane County staff evaluate plant growth conditions and recommend appropriate harvesting in response, within the limits of the plan harvesting priority areas and DNR permit. In times of heavy plant growth, local residents often advocate for additional harvesting in their areas, harvesting longer into the season (into the fall), or dedicating a harvester for a particular waterbody. County managers balance staff and harvesting equipment resources and priorities with needs and ecological conditions countywide. Local groups or individuals have the option of contracting with the county for additional harvesting and special event harvesting, within the boundaries of the permit and pending staff and equipment availability.

Dane County holds annual training sessions for new and returning harvester operators before the harvesting season begins. In that training, permanent and seasonal staff receive instruction on many topics including aquatic invasive species prevention protocols, plant identification, and communications. The Lakes Management Supervisor oversees the day-to-day operations of the staff, directed by the Lakes crew leader who is informed of plant conditions and harvesting needs by the Plant Scout. Particular concerns with a water body; deep versus shallow harvesting; collection of plant fragments from harvesters, plant self -fragmentation, and boat propellers etc. are all considered in plan implementation.

Working closely with the Wisconsin Department of Natural Resources, the Dane County Land and Water Resources Department has developed harvesting priority maps that are included in many of the aquatic plant management plans and referred to in DNR harvesting permits issued to Dane County. Not every area that is identified for potential harvesting on the map will be harvested in any given harvesting season if there is little to no plant growth, because attention to higher priority areas does not permit it, or due to budget constraints. Harvester operators are instructed not to cut and remove plants outside of harvesting priority areas identified on these maps, unless authorized by their supervisor in consultation with the Wisconsin Department of Natural Resources.

Harvesting machines are designed to cut, collect and remove plant fragments. Machine operators do not cut and harvest aquatic plants in water less than three feet in depth except where it's permitted and approved by the Wisconsin Department of Natural Resources.

Limits of the equipment, staff, and budget mean that plant harvesting for aesthetics, collection of wind-blown plant fragments due to boat propeller action, and the removal of plants that release from the sediment and float free in the fall cannot generally be accomplished. However, Dane County helps clean up plant materials at beaches and other public access points, even when the plant material is not associated with harvesting operations. Program managers also do their best to accommodate special requests for collection of naturally-occurring windblown and boat motor chopped plant fragments near private shorelines, as time and budget permit, and in consultation with Wisconsin DNR. Occasionally this collection of plant fragments occurs in waters less than three feet deep. The Dane County Lake Management Operations Manual provides instructions to harvesting machine operators about plant fragment collection.

There is a common misperception that excessive external nutrients carried into lakes in runoff from the watershed causes macrophyte (large aquatic plant) problems. In fact, external nutrient loading usually produces algal blooms that shade and reduce macrophyte biomass. Attempts to control biomass by controlling nutrients in the water column are unproductive, according to G. Dennis Cooke and others in the third edition of Restoration and Management of Lakes and Reservoirs (2005). This is because rooted macrophytes, such as the nuisance Eurasian water-milfoil, usually get their phosphorus and nitrogen directly from sediments. In the short-term, reduced phosphorus in the water column resulting from watershed controls may actually result in more macrophyte growth, because clearer water permits more light penetration that fosters plant growth.

It could take many years to reduce the historical nutrient additions to lake sediments, especially in agricultural areas. Much important work is underway in the Yahara River watershed to reduce watershed phosphorus loadings. in the long-term, scientists and managers hope that community efforts can reduce sediment phosphorus, thereby more directly affecting plant growth.

Fisheries

Anglers sometimes raise concerns over harvesting vegetation in late spring and early summer during the fish spawning period. Harvesting aquatic vegetation during this critical time impacts a small fraction of the available spawning habitat for any given species and we continue to monitor the fish populations closely for any impacts aquatic plant harvesting may have. Dane County works closely with WDNR Fisheries and there appears to be no negative impact on the fishery as a whole. The Yahara Chain of Lakes continue to provide excellent fishing opportunities of all sorts including panfish, walleye, northern pike, largemouth bass, and musky.

Invasive Species

Much of the focus of Dane County's mechanical harvesting program is to cut and harvest Eurasian water-milfoil and other invasive and nuisance plants to help provide for reasonable use of the lakes for boating, fishing and swimming.

Dane County staff will continue to take steps to ensure that its plant harvesting equipment is cleaned and disinfected before moving it to other waterbodies, and follow all other Wisconsin invasive species laws (see Appendix C) to prevent transport of invasive plants to other waterbodies.

The invasive species below are more recent arrivals to the Yahara chain of lakes. Dane County staff, along with recreational users, following cleaning and disinfecting protocols will help prevent the spread of these and other invasive plants and animals.

Spiny Waterfleas

In 2009 populations of spiny waterfleas (SWF) were verified by the Wisconsin DNR to be present in the Yahara chain of lakes. Spiny waterfleas are zooplankton that are native to Europe and Asia. Introduction of SWF into the Great Lakes by ballast water discharged from ocean going ships most likely occurred in the 1980's, and since then the spread to inland waters has continued.

The most likely method of introduction of SWF into the Yahara chain of lakes was by a boat, bilge water, or live well that had not been decontaminated. Research suggests that the SPF were introduced into Lake Mendota in the mid 1990's based upon sediment core samples where spines are present. By 2009 SWF were found in Lake Mendota at densities that are higher than any other waterbody in its native or invaded range. (Walsh 2016)

The SWF are carnivorous predators eating native herbivorous zooplankton. This loss of native zooplankton can have negative impacts on the lake ecology, impacting the zooplankton structure and distribution. This loss of native zooplankton can also affect fish populations that rely on the zooplankton as a food source. Small fish try to prey upon SWF but their spines make them difficult to swallow. The loss of zooplankton can also increase the number of phytoplankton, leading to greater turbidity, degraded plant health and reduced maximum depth where plants grow. As a result, we see greater algal blooms and more impacts on people using the water.

One of the impacts to anglers is that SWF clog fishing rod eyelets and accumulate on fishing lines.

Zebra Mussels

In 2011 in Lake Mendota a population of zebra mussels was verified by the Wisconsin DNR. Additionally in 2016 a population of zebra mussels was verified by the Wisconsin DNR in Lake Monona. Zebra mussels are native to Europe and Asia. The zebra mussel is a small bottom dwelling clam that spread through microscopic larvae called veligers. The zebra mussels were introduced into the Great Lakes in the 1980's most likely through the ballast water from ocean going ships, and since then zebra mussels have been spread to other inland waters.

The most likely method of introduction of zebra mussels into the Yahara chain of lakes was by a boat, bilge water, or live well that had not been decontaminated. The first observation of zebra mussels in the Yahara was in Lake Monona in 2001 when adults were found.

The zebra mussels are the only freshwater mollusk that can attach themselves to solid objects. They become prolific in many lakes and efficiently filter water, creating greater clarity, and altering the food web. There may be increased plant abundance, as well as bluegreen algae blooms. Zebra mussels affect shoreline residents, boat owners and swimmers when their shells

accumulate on hard surfaces, making them a hazard to grab or stand on. Adult females can produce one million eggs per year.

Chinese Mystery Snails

In 2012 these invasive snails were found in Lake Waubesa. In 2015 they were found in Stewart Lake, and in 2017 they were found in Lake Monona. These snails are native to eastern Asia and have been transported to the area for aquarium trade and possibly by in mud on boats or trailers. With a hard operculum (trap door that seals the shell) these snails can survive out of water for four weeks *(Unstad, K.M. and others. Management of Biological Invasions (2013) Volume 4, Issue 2: 123–127)*, making their transport to a new waterbody likely. The impacts of these snails are not very well-studied.

Recommended management

Based on staff review of the plant survey data and public input, Dane County recommends the management elements found in this section, which are largely unchanged from 2013.

Lake Kegonsa Goals

The goals for managing Lake Kegonsa aquatic plants are to: (1) sustain favorable recreational access in areas where aquatic plant densities become a nuisance, (2) respond to and harvest localized areas with invasive plants including CLP and EWM, and (3) continue to protect littoral zone habitat and plant communities on undeveloped shorelines . Floating-leaf plants that could be established include yellow water lily (*Nuphar variegatum*), white water lily (*Nymphaea odorata*), and American lotus (*Nelumbo lutea*). Undeveloped shoreline habitat is limited in Lake Kegonsa, however publicly owned shorelines and wetlands may provide opportunities for improving nearshore submersed and floating-leaf habitat.

These overarching aquatic plant management goals are coupled with the more specific goals of Dane County's mechanical harvesting program: to cut and harvest Eurasian water-milfoil and other nuisance vegetation to help provide for reasonable use of the lakes for boating, fishing and swimming, while preserving the health and balance of the lake ecosystem.

Lake Kegonsa Recommendations

1. Conduct mechanical harvesting in areas where over abundant nuisance plants significantly impair recreational use, as determined by the Dane County APM staff.
2. Critical Habitat Areas should include undeveloped portions of the lake including Fish Camp, Lake Kegonsa State Park and the Door Creek wetlands. (Designation of Critical Habitat Areas is a Wisconsin Department of Natural Resources decision.)
3. Dane County APM staff should document occurrences of high value native plants in regular scouting reports, including shoreline reference and GPS location. Dane County

staff should make an annual summary report of these occurrences available to the public.

4. Dane County mechanical harvesting crews should continue to take steps to prevent the spread of exotic invaders across Dane County lakes and streams. These steps include removing any visible plants, mud, debris, water, fish or animals from the machinery and thoroughly washing the equipment (see Appendix C).

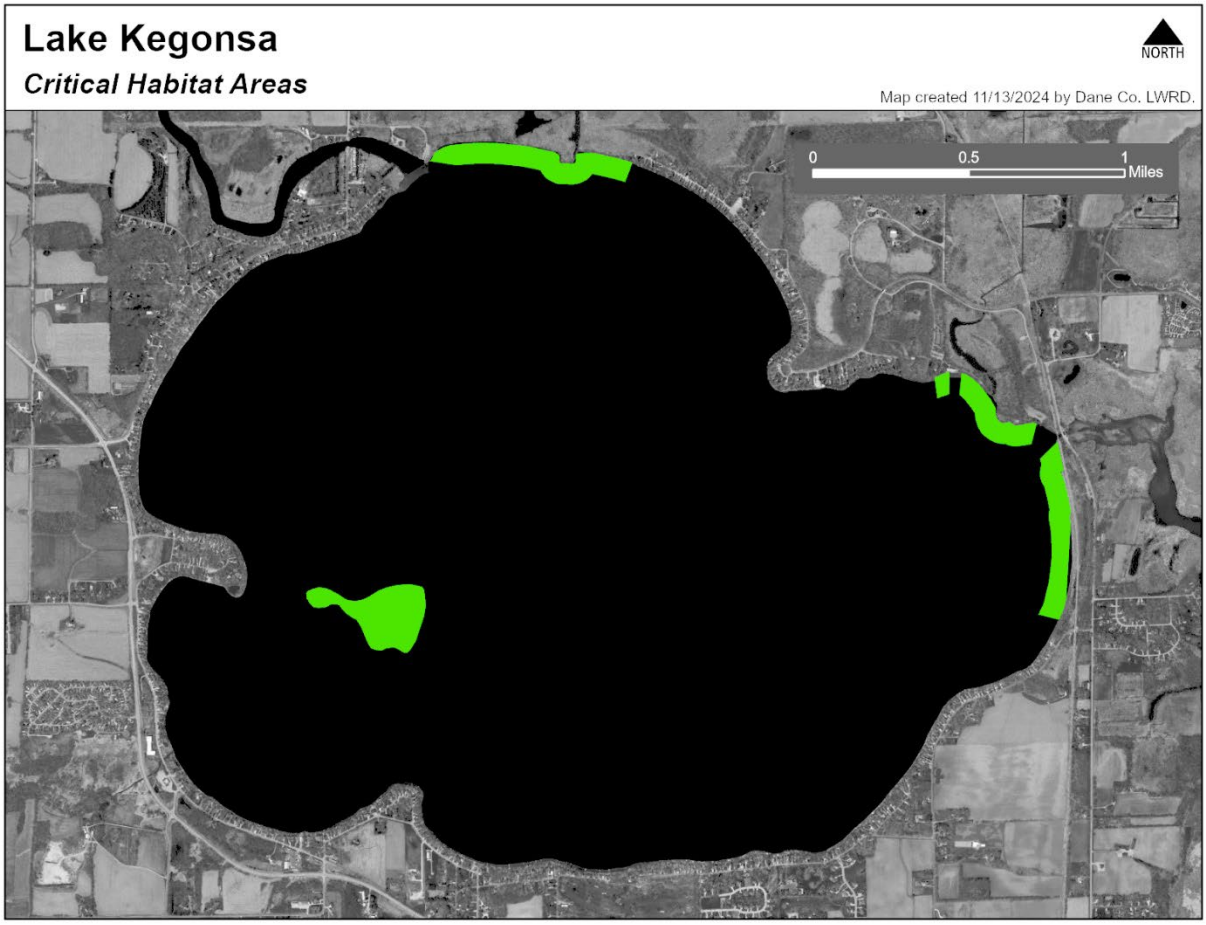
Proposed Critical Habitat Areas

The Dane County Land and Water Resources Department recognizes valuable habitat on Lake Kegonsa. While these areas have not gone through the formal Critical Habitat Designation under DNR,(NR1.06), these areas will not be harvested in order to protect those habitats deemed valuable for fish and aquatic life. Wisconsin DNR's website describes the importance of the DNR's designation of Critical Habitat Areas as follows: "Every waterbody has critical habitat - those areas that are most important to the overall health of the aquatic plants and animals. Remarkably, eighty percent of the plants and animals on the state's endangered and threatened species list spend all or part of their life cycle within the near shore zone. …….. Wisconsin law mandates special protections for these critical habitats. Critical Habitat Designation is a program that recognizes those areas and maps them so that everyone knows which areas are most vulnerable to impacts from human activity. A critical habitat designation assists waterfront owners by identifying these areas up front, so they can design their waterfront projects to protect habitat and ensure the long-term health of the lake they where they live."

Lake Kegonsa

No changes are proposed for the recommendations Dane County previously made for the Proposed Critical Habitat Area map below (Figure 3) from 2013.

Figure 3. Proposed Lake Kegonsa Critical Habitat Areas



Harvesting Priorities

The harvesting priorities map for Lake Kegonsa (Figure 4) shows areas that may be harvested. There are no changes to harvesting priorities from the 2013 amendment. Figure 5 is the harvesting priorities map for Lower Mud Lake. Any harvesting that occurs in Mud Lake is limited to the centerline of the channel which aids in maintaining flow during high water events. Additional background on harvesting priorities is found in the Lake Management Operations Manual and posted on the LWRD website (https://wred-lwrd.countyofdane.com/Aquatic-Plant-Management/Aquatic-Plant-Harvesting-Program). Annual training and daily supervision of harvester operators reinforce that plants should be harvested only from these approved areas, unless a variance from the plan has been approved by Wisconsin DNR. Actual effort is dictated based on plant conditions, as evaluated and reported by Dane CountyStaff.

Figure 4. Lake Kegonsa harvesting priorities

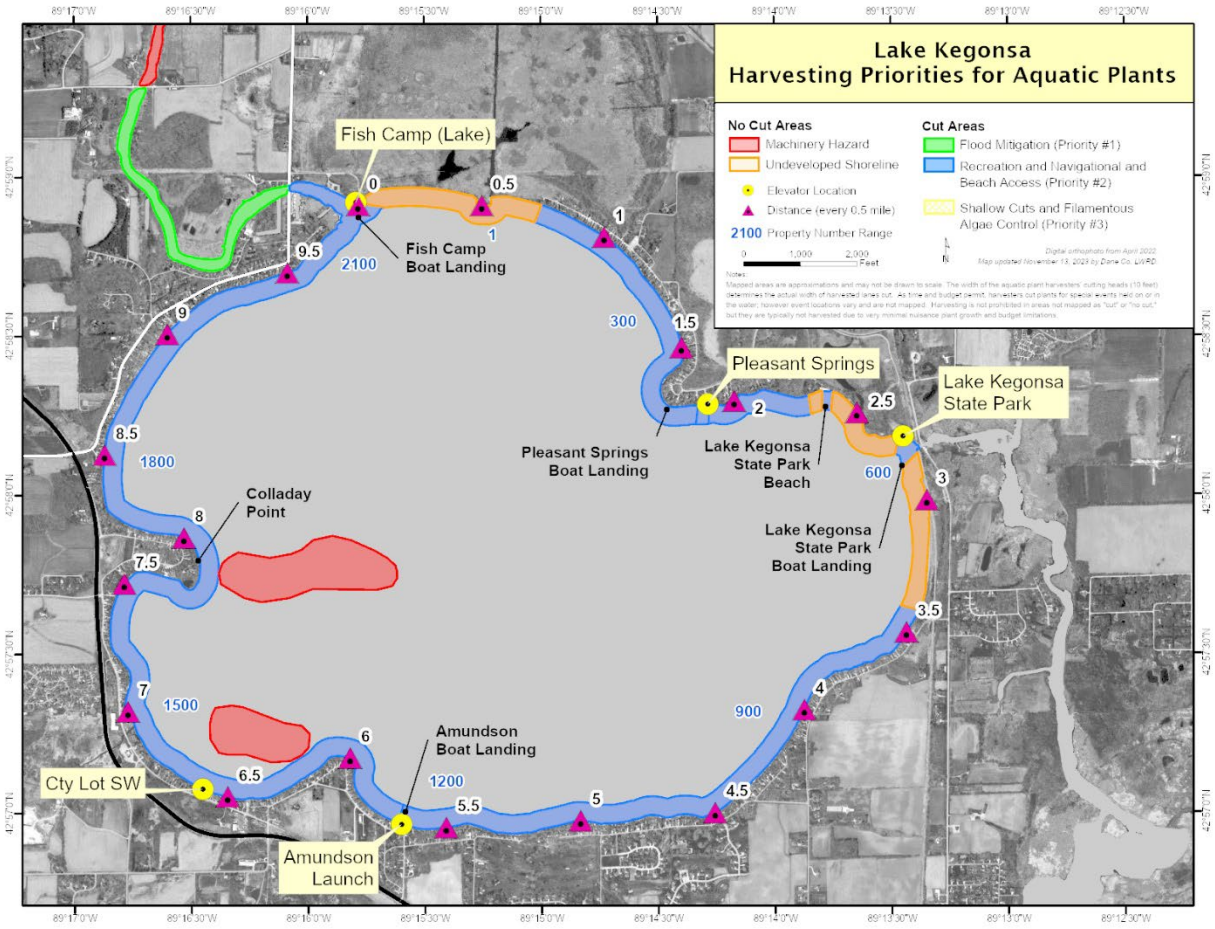


Figure 5. Lower Mud Lake Harvesting Priorities