**AMENDMENT 1**

# Aquatic Plant Management Plan, Yahara River and Upper Mud Lake, Lower Rock River Basin, Dane County Wisconsin

**Approved by the Dane County Lakes and Watershed Commission on December 21, 2017 and by the Wisconsin Department of Natural Resources on April 13, 2018.**

Prepared by Dane County Land and Water Resources Department (LWRD) staff Sue Jones, Pete Jopke, Andrew Karleigh, John Reimer, and Michelle Richardson, with assistance from Susan Sandford.

Plant surveys were conducted by James Scharl of Wisconsin Lake & Pond Resources LLC and Dane County employees Pete Jopke and Andrew Karleigh in 2017. The Wisconsin Department of Natural Resources (WDNR) provided funding to LWRD to support this plan amendment.

## Introduction

This is the first amendment to the Aquatic Plant Management Plan prepared for the Yahara River including Upper Mud Lake. The initial plan was approved on April 10, 2014 by the Dane County Lakes and Watershed Commission and on March 27, 2014 by WDNR. The 2007 Lake Kegonsa Aquatic Plant Management Plan included Lower Mud Lake on the Yahara River, and therefore amendments to the Lake Kegonsa plan continue to include Lower Mud Lake. 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.

This plan encompasses the following sections of the Yahara River:

- Monona to Upper Mud (includes “Interlake”)
- Upper Mud
- Waubesa to Lower Mud
- Lower Mud to Kegonsa

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 WDNR.

## Plant Survey Methods and Results

Dane County contracted with Wisconsin Lake and Pond Resource LLC to conduct the aquatic plant community survey of the Yahara River – Monona to Upper Mud Lake during August of 2017. Dane County staff completed the surveys in the remaining sections:

Yahara River - Monona to Upper Mud Lake (surveyed 8/2/17)
Upper Mud Lake (surveyed 8/4/2017 and 8/07/2017)
Yahara River – Waubesa to Lower Mud Lake (surveyed 8/08/17)
Yahara River – Lower Mud Lake to Lake Kegonsa (surveyed 8/10/17)

Wisconsin Lake and Pond Resource LLC and Dane County staff followed the alternate plant sampling methods in the river that were approved by WDNR in 2011 and affirmed in 2017. For Upper Mud Lake, Dane County employees used current WDNR approved protocols and the point intercept method. Refer to the point intercept maps in the 2013 initial plan for sampling locations on Upper Mud Lake.

Tables 1 and 2 below indicate species present during the 2017 survey of the Yahara River and Upper Mud Lake, respectively. Figure 1 indicates Yahara River species richness from 2012 - 2017.

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 2017 Upper Mud Lake plant statistics. Appendix B includes 2017 Yahara River plant statistics. Appendix D includes maps of aquatic plant distributions for Upper Mud Lake and the Yahara River for 2017, by segment (Monona to Upper Mud, Waubesa to Lower Mud, and Lower Mud to Kegonsa).

Figures 1-3 indicate species richness for each section of the Yahara River, from 2012 to 2017.

**Table 1. Species present during 2017 aquatic plant survey – Yahara River**

| Genus | Species | Common Name | Category | Section (X = present) | | |
|---|---|---|---|---|---|---|
| | | | | Monona to Upper Mud | Waubesa to Lower Mud | Lower Mud to Kegonsa |
| *Algae* | *sp.* | Filamentous algae | Submersed | X | X | X |
| *Ceratophyllum* | *demersum* | Coontail | Submersed | X | X | X |
| *Chara* | *sp.* | Muskgrass | Submersed | X | X | X |
| *Elodea* | *canadensis* | Common waterweed | Submersed | X | X | X |
| *Heteranthera* | *dubia* | Water star-grass | Submersed | X | X | X |
| *Lemna* | *minor* | Small duckweed | Free-floating | X | X | |
| *Myriophyllum* | *spicatum* | Eurasian water-milfoil | Submersed - Invasive | X | X | X |
| *Najas* | *flexilis* | Slender naiad | Submersed | | | |
| *Nymphaea* | *odorata* | White water lily | Floating-leaf | X | X | X |
| *Potamogeton* | *crispus* | Curly-leaf pondweed | Invasive | X | X | |
| *Potamogeton* | *foliosus* | Leafy | Pondweed | | X | |
| *Potamogeton* | *richardsonii* | Clasping-leaf pondweed | Submersed | X | X | |
| *Potamogeton* | *zosteriformis* | Flat-stem pondweed | Submersed | X | | X |
| *Ranunculus* | *aquatilis* | White water crowfoot | Submersed | X | | |
| *Spirodela* | *polyrhiza* | Large duckweed | Free-floating | X | X | |
| *Stuckenia* | *pectinata* | Sago pondweed | Submersed | X | | X |
| *Vallisneria* | *americana* | Wild celery | Submersed | X | X | X |
| *Wolffia* | *columbiana* | Common watermeal | Free-floating | X | X | |

**Table 2. Species present during 2017 aquatic plant survey – Upper Mud Lake**

| Genus | Species | Common Name | Category |
|---|---|---|---|
| *Algae* | *sp.* | Filamentous algae | Submersed |
| *Ceratophyllum* | *demersum* | Coontail | Submersed |
| *Chara* | *sp.* | Muskgrass | Submersed |
| *Elodea* | *canadensis* | Common waterweed | Submersed |
| *Heteranthera* | *dubia* | Water star-grass | Submersed |
| *Lemna* | *minor* | Small duckweed | Free-floating |
| *Lemna* | *trisulca* | Forked duckweed | Free-floating |
| *Myriophyllum* | *spicatum* | Eurasian water-milfoil | Invasive Submersed |
| *Nelumbo* | *lutea* | American lotus | Floating-leaf |
| *Nuphar* | *variegata* | Spatterdock | Floating-leaf |
| *Nymphaea* | *odorata* | White water lily | Floating-leaf |
| *Potamogeton* | *foliosus* | Leafy pondweed | Submersed |
| *Potamogeton* | *richardsonii* | Clasping-leaf pondweed | Submersed |
| *Potamogeton* | *zosteriformis* | Flat-stem pondweed | Submersed |
| *Spirodela* | *polyrhiza* | Large duckweed | Free-floating |
| *Stuckenia* | *pectinata* | Sago pondweed | Submersed |
| *Typha* | *sp.* | Cattail | Emergent |
| *Vallisneria* | *americana* | Wild celery | Submersed |
| *Wolffia* | *columbiana* | Common watermeal | Free-floating |

**Figure 1. Species Richness Lake Monona to Upper Mud Lake 2012-2017**

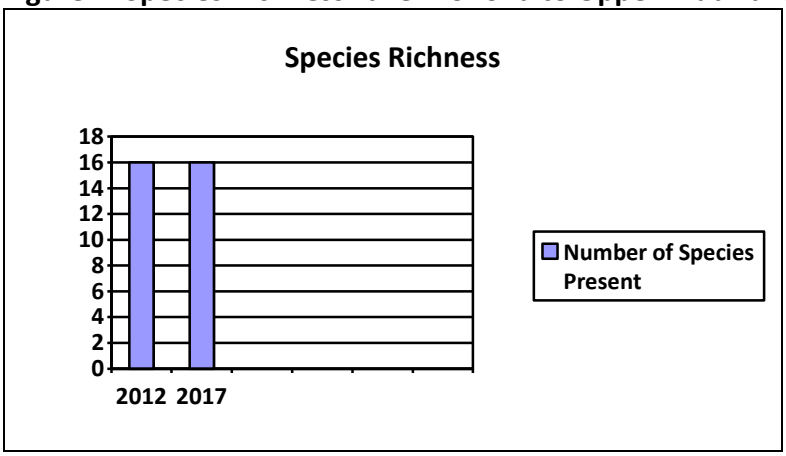


**Figure 2. Species Richness Lake Waubesa to Lower Mud Lake 2012 - 2017**

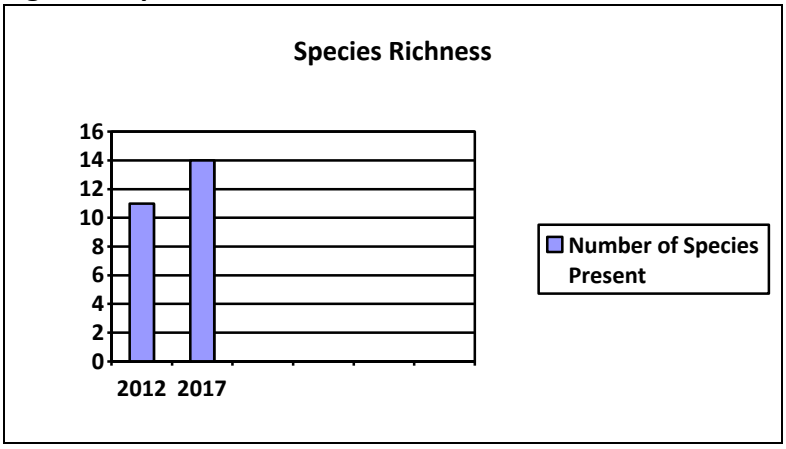
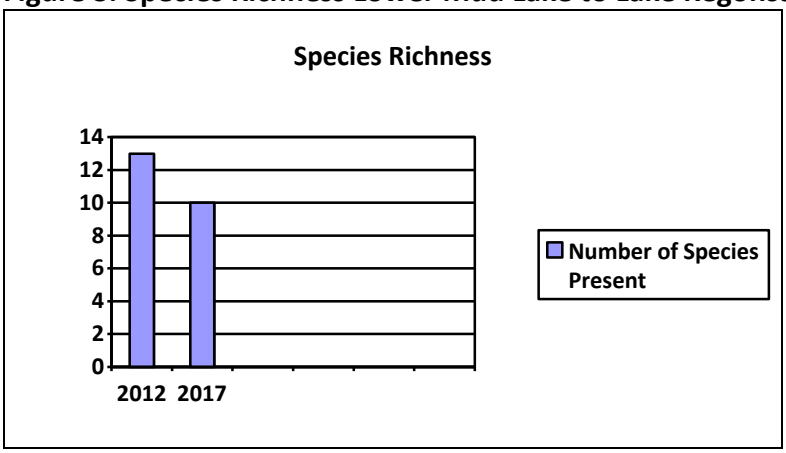



**Figure 3. Species Richness Lower Mud Lake to Lake Kegonsa 2012 - 2017**




**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 map here http://dnr.wi.gov/topic/landscapes/documents/StateMaps/Map_S1_ELs.pdf), 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 3 in Appendix A and the end of Table 6 in Appendix B). 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.

Simpson's Diversity Index is used to quantify the biodiversity of a habitat, and takes into account the number of species present, as well as the abundance of each species.

**Upper Mud Lake**

2012 survey results

Upper Mud Lake had a diverse, densely vegetated community to the point of limiting navigational access in areas during the 2012 survey. Sixteen species were found to a maximum depth of 18 feet across a majority of the littoral zone (the shallow part of a lake where most of the rooted plants are found). No historical data exists for Upper Mud Lake.

The aquatic plant community of Upper Mud Lake was surveyed on July 16, 2012, using the point intercept method. Maximum depth of plants was 18 feet, frequency of occurrence at photic zone was 88.8%, and 16 species were sampled. FQI and average C were 18.58 and 5.15, respectively. These values can be used to gauge the health of the lake, and show a stable, healthy plant community with good diversity for a highly-used lake in southern Wisconsin.

A diverse aquatic plant community was present during the 2012 survey. In total, 16 species were surveyed and evenly distributed throughout the lake with a Simpson Diversity Index of 0.86. Aquatic plant growth was dense throughout much of the lake with coontail, Eurasian water-milfoil (EWM), and filamentous algae being the most prevalent plant species sampled. Curly-leaf pondweed was also sampled, but may not be accurately represented from this survey due to its life cycle and tendency to die-back by mid-summer. A healthy mix of native aquatic plants was found throughout much of the lake as well and were represented in various community types: free-floating, submersed, and floating-leaf. Though no emergent aquatic plants were directly sampled, they were visually observed and present along a majority of the shoreline outside of the sample grid and were dominated by cattail.

Current management practices are limited to aquatic plant harvesting within the navigational channel, when necessary. These practices have created a stable, healthy aquatic plant community in Upper Mud Lake and should be continued as necessary. If a better gauge of curly-leaf pondweed (CLP) presence is wanted, an early season survey should be completed before these invasive plants die back (early to mid-May).

**2017 survey results**

In 2017 the maximum depth to plants decreased to 16 feet, frequency of occurrence at photic zone was 89.01%, and 18 species were sampled. FQI and average C were 20.62 and 5, respectively.

In the 2017 survey the total number of species surveyed increased to 18, and the Simpson Diversity Index was 0.77. Aquatic plant growth was dense throughout much of the lake, with coontail being the most prevalent species found at 85.07% of the sites, EWM at 32.39%, and filamentous algae at 23.10%. During the 2017 survey no curly leaf pondweed was found. At one site very near the shoreline, cattail was found. This was the only emergent species sampled with the rake during 2017 sampling, but not the only emergent species observed within 20 feet of this and other sampling points.

**Yahara River**

The Yahara River from its outflow of Lake Monona to its entrance into Lake Kegonsa was surveyed and split into three distinct sections: Lake Monona to Upper Mud Lake, Lake Waubesa dam to Lower Mud Lake, and Lower Mud Lake to Lake Kegonsa. A similar aquatic plant community was found in all three sections. No historical data exists for any of these sections of the river. (Lower Mud Lake plant data is included in the 2007 Lake Kegonsa and Lower Mud Lake Aquatic Plant Management Plan, amended in 2017).

**2012 survey results**

The aquatic plant communities of the Yahara River were surveyed on July 17, 2012 from Lake Monona to Upper Mud Lake, July 19 from Lake Waubesa to Lower Mud Lake, and July 20 from Lower Mud Lake to Lake Kegonsa. Diverse and consistent aquatic plant communities were found in all study locations of the Yahara River. Nearly all sample points were vegetated, with 100% of locations vegetated from Lake Waubesa down to Lake Kegonsa, while the stretch from Lake Monona to Upper Mud Lake had 97.8% of the sites vegetated. Aquatic plant growth was thick in many areas and dominated mainly by wild celery and water star-grass, often in dense beds. Though EWM is present in all sections of the river, native species compromise a vast majority of the communities. During 2012, FQI was highest from Monona to Upper Mud Lakes at 18.58, but relatively constant at 17.49 from Lower Mud to Lake Kegonsa and 15.33 from Waubesa to Lower Mud Lakes. A stable, consistent aquatic plant community is also bolstered by an average coefficient range of 5.11 to 5.27, indicating similar communities within each section.

**2017 survey results**

The aquatic plant communities of the Yahara River were surveyed on August 2, 2017 from Lake Monona to Upper Mud Lake, August 8 from Lake Waubesa to Lower Mud Lake, and August 10 from Lower Mud Lake to Lake Kegonsa.

From Lake Monona to Upper Mud Lake, 85.4% of the sites were vegetated. Lake Waubesa to Lower Mud Lake had 97.22% of sites vegetated, and Lower Mud Lake to Lake Kegonsa had 92.86% of sites vegetated. Plant densities and occurrences were lower than prior sample years, which may be due to harvesting in the river to increase water flow.

EWM is present in all sections of the river with the highest concentration in the Monona to Upper Mud Lake section.

During 2017, FQI was highest again from Monona to Upper Mud Lakes at 18.58, Waubesa to Lower Mud Lake was 15.81, and Lower Mud Lake to Lake Kegonsa was 14.14. The mean C value for each section was 5.15, 5, and 5 respectively.

Recent Harvesting Aquatic Plant Management Records

Figure 4 summarizes Dane County's mechanical harvesting operations in the Yahara River since 2007. Figure 5 summarizes Dane County's mechanical harvesting operations in what is locally called "Interlake" (north of Upper Mud Lake, under US Highway 12 and 18) since 2007. Dane County's highest priority for harvesting during periods of high water and flooding is in the Yahara River, especially between lakes Waubesa and Kegonsa. The large harvesting totals indicated in 2008-2011 coincide with periods of intense precipitation events and high water. As far as Dane County Land and Water Resources understand, there have been no chemical treatments of aquatic plants by private entities in the Yahara River.

**Figure 4. Historical Yahara River aquatic plant harvesting records**

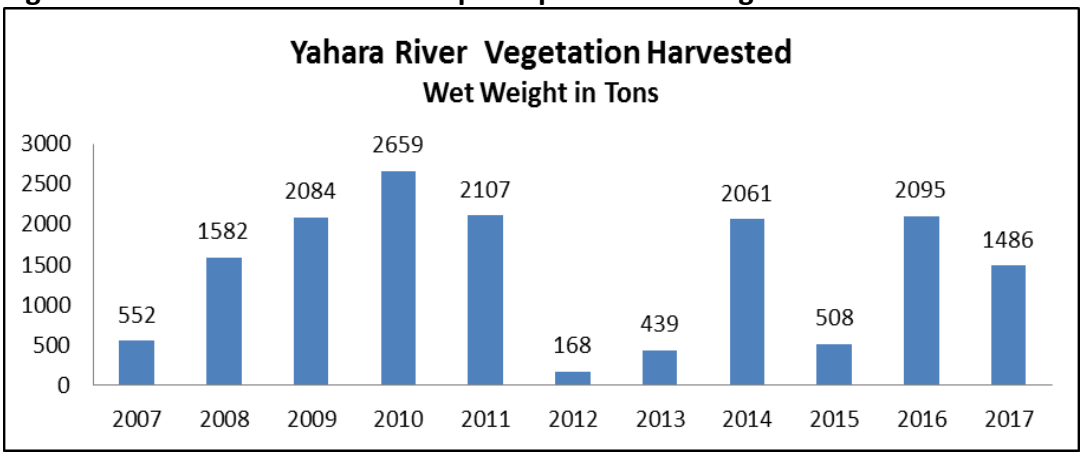
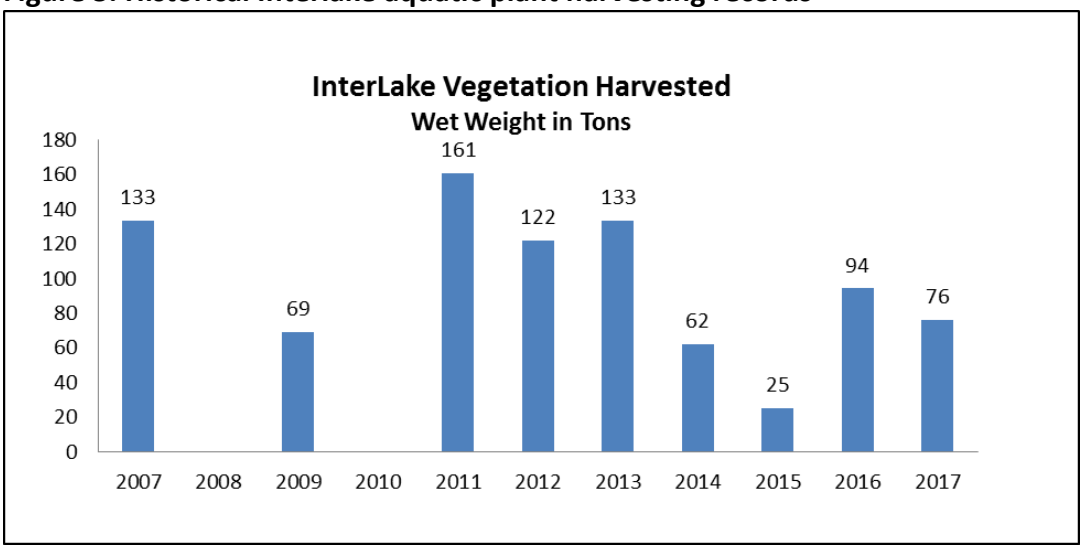


**Figure 5. Historical Interlake aquatic plant harvesting records**




**Public input opportunities**

Dane County Land and Water Resources Department (LWRD) staff developed an aquatic plant management online survey hosted on the Office of Lakes and Watersheds web page from May through August 2017. Staff promoted the survey via email, press release, social media, and through business –card-sized prompts handed out by harvester operators, Clean Boats Clean Waters staff, and other LWRD staff over the summer.

There were 165 responses to the online survey, and almost 80% of the respondents did not recommend any changes to the harvesting program priority goals and maps for each waterbody. More than 50% of the respondents reported areas that are difficult to navigate through related to aquatic plant growth, and identified specific locations where these difficulties have occurred from time to time.

Dane County Land and Water Resources Department staff held two public information meetings on October 2 (held at Dane County offices in southeast Madison) and 9 (held in Middleton), 2017. Although these meetings were well publicized through press releases, email, and social media, and were promoted by one television station, only a few people attended.

The complete draft plans were posted on the Office of Lakes and Watersheds web page in mid-November, with public comment solicited until December 8. No public comment was received on the Yahara River/Upper Mud plan. LWRD staff have made several clarifications to plan text based on DNR comments.

Dane County staff do not recommend any changes to the current harvesting priority maps as a result of the online survey responses, public information meeting comments, and draft plan public comment period. Dane County staff have noted the areas identified by survey respondents as difficult to navigate through, and the Plant Scout will monitor those locations

during upcoming seasons, and will evaluate whether additional harvesting in those locations is appropriate.

**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 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 employs a Plant Scout to 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 need to 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. Additional information about contract harvesting is available here: https://parks-lwrd.countyofdane.com/documents/pdf/contract_harvest_application.pdf.

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 directs the day-to-day operations of the staff, guided by the Stormwater Engineer 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 addressed in the supervision.

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 by the Wisconsin Department of Natural Resources in the Yahara River.

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 be 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 amount 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 2015 in Lake Mendota a population of zebra mussels was found by the UW Center for Limnology and 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 a few adult specimens were found.

The zebra mussels are the only freshwater mollusk that can attach themselves to solid objects. They become prolific in many lakes 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. They also encrust piers and boats, potentially damaging boat motors unless people take preventative steps. 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**

Dane County staff have reviewed the plant survey data and public input, and recommend the management elements found in this section, which are largely unchanged since 2013.

The goals of Dane County's mechanical harvesting program are to cut and harvest Eurasian water-milfoil and other invasives to help provide for reasonable use of the lakes for boating, fishing and swimming, while preserving the health and balance of the lake ecosystem.

Upper Mud Lake

1. Harvesting is not recommended because boat traffic maintains the channel. Upper Mud Lake wetland and aquatic plants provide water quality benefits to the downstream lakes.
2. The Dane County Plant Scout 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.

3. Dane County's 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.

Yahara River

1. As conditions warrant (e.g. during emergency high water and flood conditions), conduct large-scale mechanical harvesting of aquatic plants in Lower Mud Lake and in the river between Lower Mud Lake and Lake Kegonsa to increase flow. When cutting is performed, it should avoid mechanical hazard zones and designated or proposed Critical Habitat Areas under Wisconsin Administrative Codes
2. The Dane County Plant Scout 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.
3. Dane County's 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).

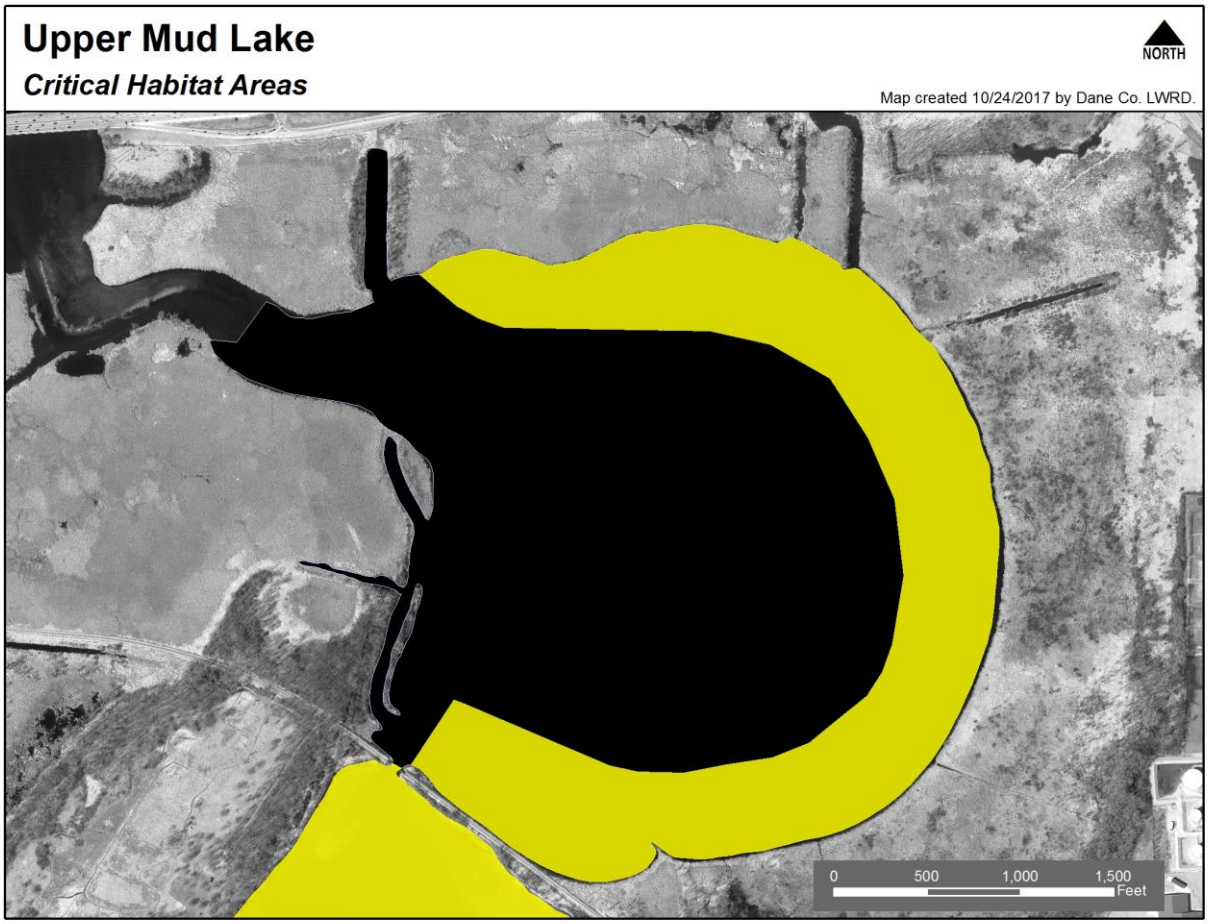
Proposed Critical Habitat Areas

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."

**Upper Mud Lake**

No changes are proposed for the Proposed Critical Habitat Areas map below (Figure 6) from 2013. Similar to Lower Mud Lake, Upper Mud has limited shoreline development and extensive emergent and floating-leaf plant communities along vast majorities of the shoreline with a main navigational access within the Yahara River channel.

**Figure 6. Proposed Critical Habitat Areas for Upper Mud Lake**




**Yahara River – Lake Monona to Upper Mud Lake**

No Critical Habitat Areas are currently designated for this portion of the Yahara River. This section of river has heavily developed shorelines and serves as a well-used boating thoroughfare from Lake Monona, through Upper Mud Lake, and to Lake Waubesa. In conjunction with this use, it currently receives mechanical aquatic plant harvesting to maintain access. With these issues in mind, Dane County does not recommend designating any sensitive areas within this portion of the Yahara River.

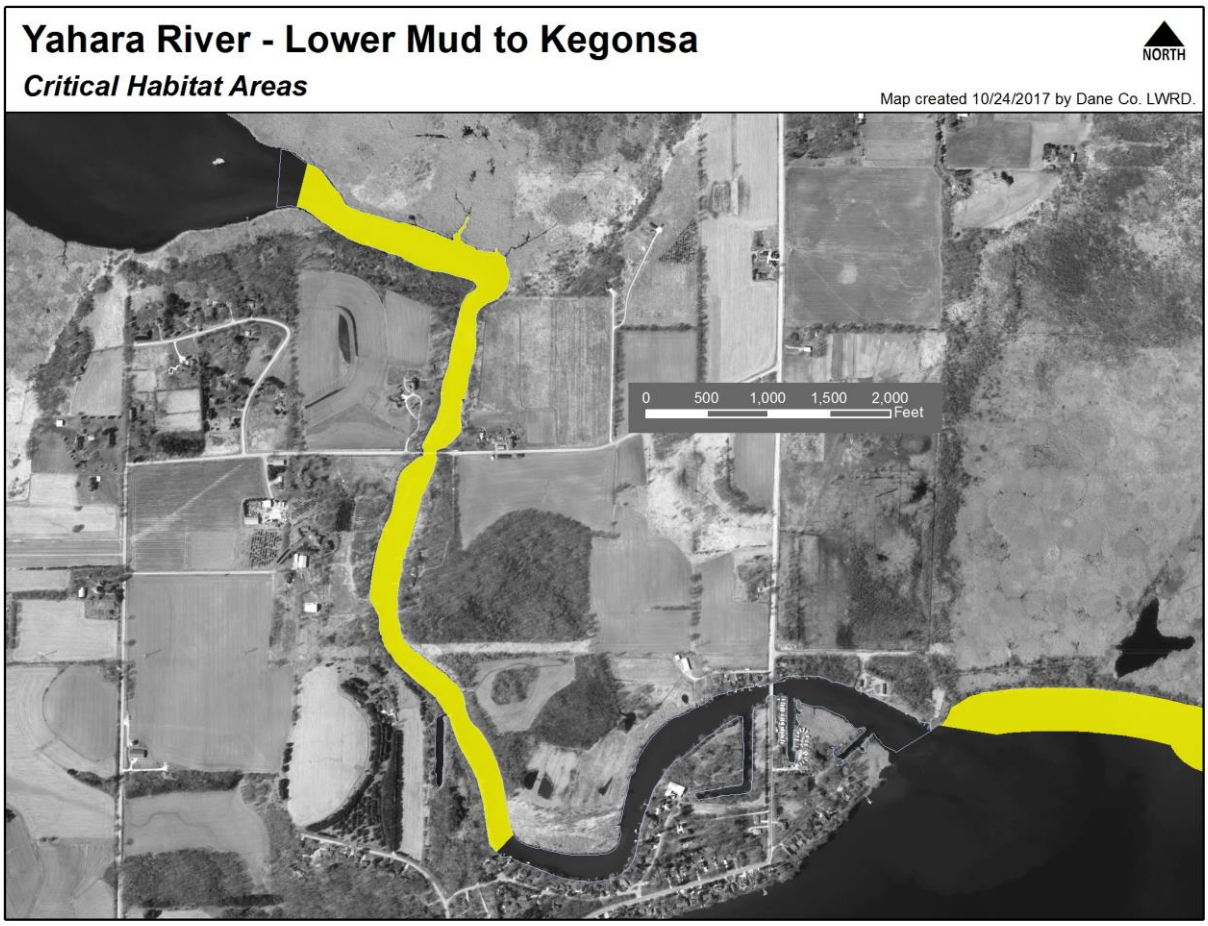
**Yahara River – Lake Waubesa to Lower Mud Lake**

No Critical Habitat Areas had previously been proposed for this portion of the Yahara River. This portion of the river typically has shallow water with a slow flow and shorelines that are moderately developed with some stretches of no development. Because of heavy aquatic plant growth and its shallow nature, recreational use is limited to smaller boats. Even without Critical Habitat Area designation, this section has remained stable and, as such, Dane County does not recommend any Critical Habitat Area designations within this portion of the Yahara River.

## Yahara River – Lower Mud Lake to Lake Kegonsa

No changes are recommended to the Critical Habitat Area proposed in 2013 from the outlet of Lower Mud Lake to one half mile upstream of the CTH-AB bridge (Figure 7). This section of river features limited development with many areas of rocky and submerged woody debris habitat while protecting water quality as it flows downstream.

**Figure 7. Proposed Critical Habitat Areas for Yahara River from Lower Mud Lake to Lake Kegonsa**




### Harvesting Priorities

Figure 8 shows the harvesting priorities from Lower Mud Lake to Lake Kegonsa. There are no changes proposed for this map from the 2013 plan amendment.

**Figure 8. Lower Mud Lake Harvesting Priorities**