

Aquatic Plant Survey Results and Management Strategies and Aquatic Invasive Species Prevention Strategies for Lake Wausau in Marathon County, Wisconsin

December 2017



N. Turyk and C. Hamerla



Golden Sands
Resource Conservation
& Development Council, Inc.

This report was prepared by staff from Golden Sands RC&D, Inc. for the Lake Wausau Association and the Wisconsin Department of Natural Resources. Funding for the study and plan were provided through grants from the Wisconsin Department of Natural Resources and Lake Wausau Association.

Content

Aquatic Plant Survey Background	4
Aquatic Plant Survey Methods	4
Aquatic Plant Survey Results and Discussion	6
Rib River Section 2017 Native Aquatic Plant Survey Summary	7
Lake Wausau Section 2017 Aquatic Plant Survey Summary	10
Locations of Emergent, Submergent, and Floating-Leaf Plant Species	13
Aquatic Invasive Species (AIS) in Lake Wausau	14
Purple loosestrife	14
Eurasian watermilfoil (EWM)	14
Curly-leaf pondweed (CLP)	16
AIS Prevention and Monitoring Recommendations	18
Aquatic Plant Management Strategy Summary for Lake Wausau	20
Aquatic Invasive Species (AIS)	20
Prevention	20
Monitoring	20
EWM	20
Purple Loosestrife	20
Curly-leaf Pondweed (CLP) Management - Permit Required	20
Additional Aquatic Plant Management in Lake Wausau	21
References	25
Appendices:	26
Maps of Dominant Aquatic Plants in Lake Wausau	26
Chara mucronata	26
Elodea canadensis	27
Flatstem Pondweed	28
Vallisneria americana	29

Aquatic Plant Survey Background

Aquatic plants provide a myriad of benefits in Lake Wausau. Above and below the surface of the water, they provide habitat for a variety of organisms, including fish, turtles, frogs, dragonflies and other insects, zooplankton, and many other aquatic or semi-aquatic biota. Their seeds and leaves provide food for waterfowl, songbirds, turtles, and other organisms. During photosynthesis, aquatic plants produce oxygen, which is needed for respiration by many animals. Just like terrestrial plants, aquatic plants need nutrients (fertilizer) to grow. The competition that aquatic plants provide for nutrient use can help to prevent algae from becoming overly abundant. Nearer to shore and in shallow water, aquatic plants can act as baffles, dissipating the energy in waves, and hence, reducing shoreland erosion.

Aquatic plants exist in wet conditions, submergent types spend the majority or all of their growth below the water, floating types such as lily pads or duckweed have some or all of their growth on the water's surface, and emergent types are often rooted in water with much of their growth above the water. Examples of emergent species are cattails, bulrush, and wild rice.

Aquatic plants need sunlight to survive so they only grow in Lake Wausau as deep as the light can penetrate. Since Lake Wausau is stained brown from the adjacent wetlands, eight feet of water is the maximum depth that aquatic plants grow.

In some situations, aquatic plants can produce nuisance conditions for water quality, recreation or aesthetic issues. When this is the case, it is important to understand the aquatic plant community to determine the best ways to address problems without disturbing the balance of the aquatic ecosystem. These concepts were at the forefront during the development of this aquatic plant management plan (APM) for Lake Wausau.




Aquatic Plant Survey Methods

Aquatic plants surveys were conducted in Lake Wausau in 2012 and 2017 using the Wisconsin Dept. of Natural Resources (WDNR) point-intercept survey methods. Two surveys were conducted in each year; one focused on curly-leaf pondweed, CLP (*Potamogeton crispus*) early in the summer and the second characterized the full plant community. In 2017, the surveys were conducted between June 13 and June 28 and between August 24 and September 1. Because of the lifecycle of CLP, to characterize its abundance, the survey should be conducted in early summer, prior to senescence (decay).

The WDNR's point-intercept survey methodologies were used in all of the surveys. Survey points were generated by WDNR staff and to ensure a good representation of the aquatic plant community, the grid was re-oriented by WDNR biologists for maximum coverage. Different grid sizes were used to accommodate the variation in channel size within the flowage; a 45 m grid in the Rib River section and a 90 m grid in the Lake Wausau section (Figure 1). Points identified downstream of the dam were omitted from the survey. GPS units and field maps were used to navigate to the survey sites. At each site, rake heads affixed to extendable poles were lowered from the side of the boat to acquire depth measures, estimates of sediment type, and collect the aquatic plant samples.

The abundance of plants on the rakehead was estimated as 1-sparse, 2-half full, or 3-overflowing. For the full survey, plants were sorted by species and estimates of abundance were recorded. Visual observations of plants within the view of a site were noted. While conducting the survey, numerous sampling points were

inaccessible because their location was on land or in water with depths too shallow to navigate. In total, 684 sites were sampled during the CLP survey; 164 in the Rib River section and 520 in the Lake Wausau section. During the full survey, 134 sites were sampled in the Rib River section and 654 in the Lake Wausau section.

Rating	Coverage	Description
1		A few plants on rake head
2		Rake head is about 1/2 full Can easily see top of rake head
3		Overflowing Cannot see top of rake head

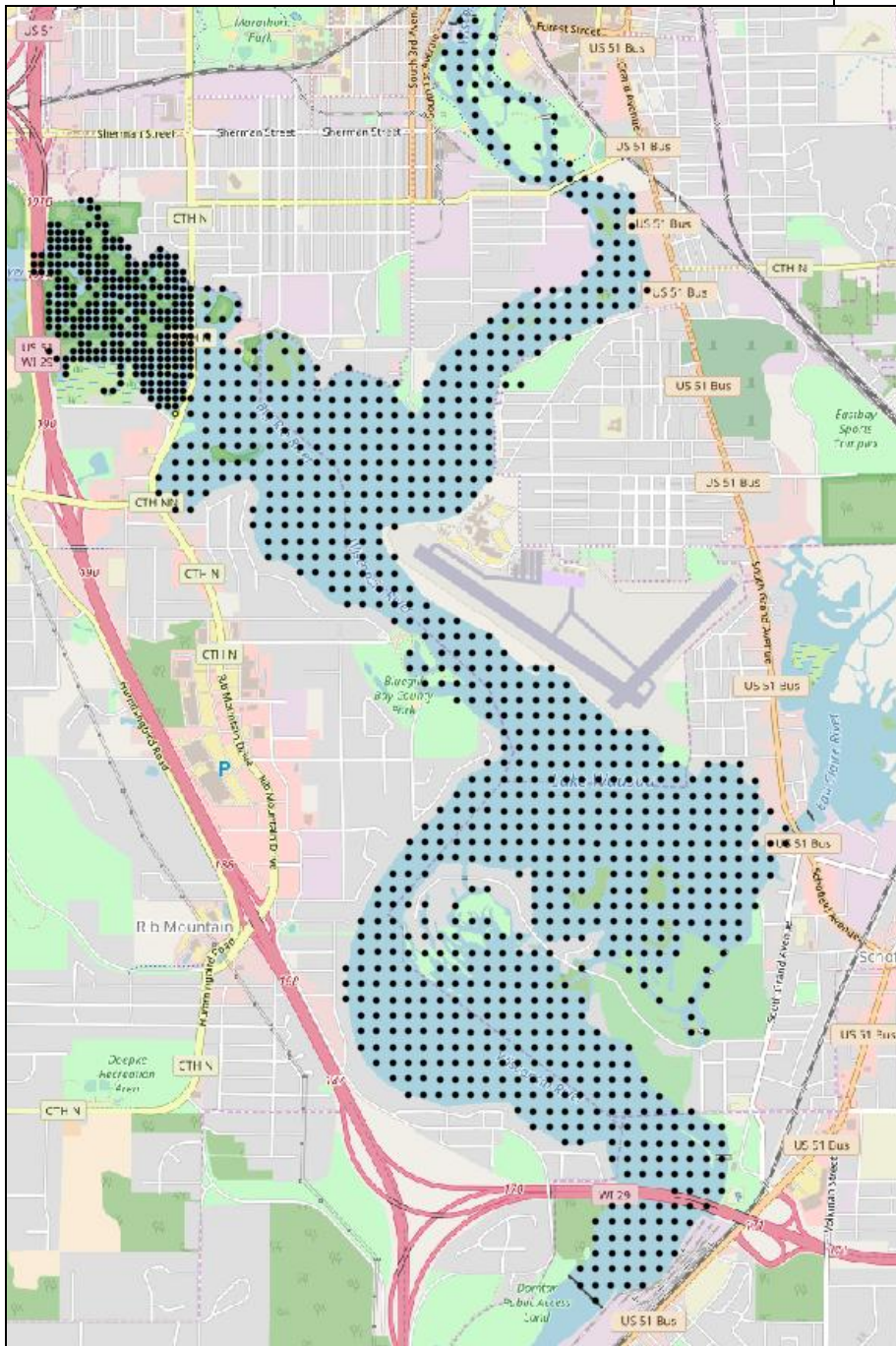


Figure 1. Display of grid points used in the Rib River section and Lake Wausau sections of the 2012 and 2017 aquatic plant surveys. For safety purposes, points displayed below Hwy 29 were omitted from the survey.

Aquatic Plant Survey Results and Discussion

Understanding the aquatic plant community and how it may be changing can help with the appreciation of the community and what it offers the aquatic ecosystem. This knowledge can also alert us to problems and how best to address them. The aquatic plant surveys conducted in 2012 and 2017 revealed that Lake Wausau is home to many unique species of aquatic plants as well as some potentially problematic invasive species.

The presence of aquatic plants is non-uniform across Lake Wausau. In many areas, especially where water depths are greater than 8 feet, few if any plants grow. The density of aquatic plant growth is also intermittent in the flowage. **Figure 2** shows the rake fullness for all of the vegetated sites in the 2017 Lake Wausau survey, which was based on the amount of plant material on the sampling rake head.

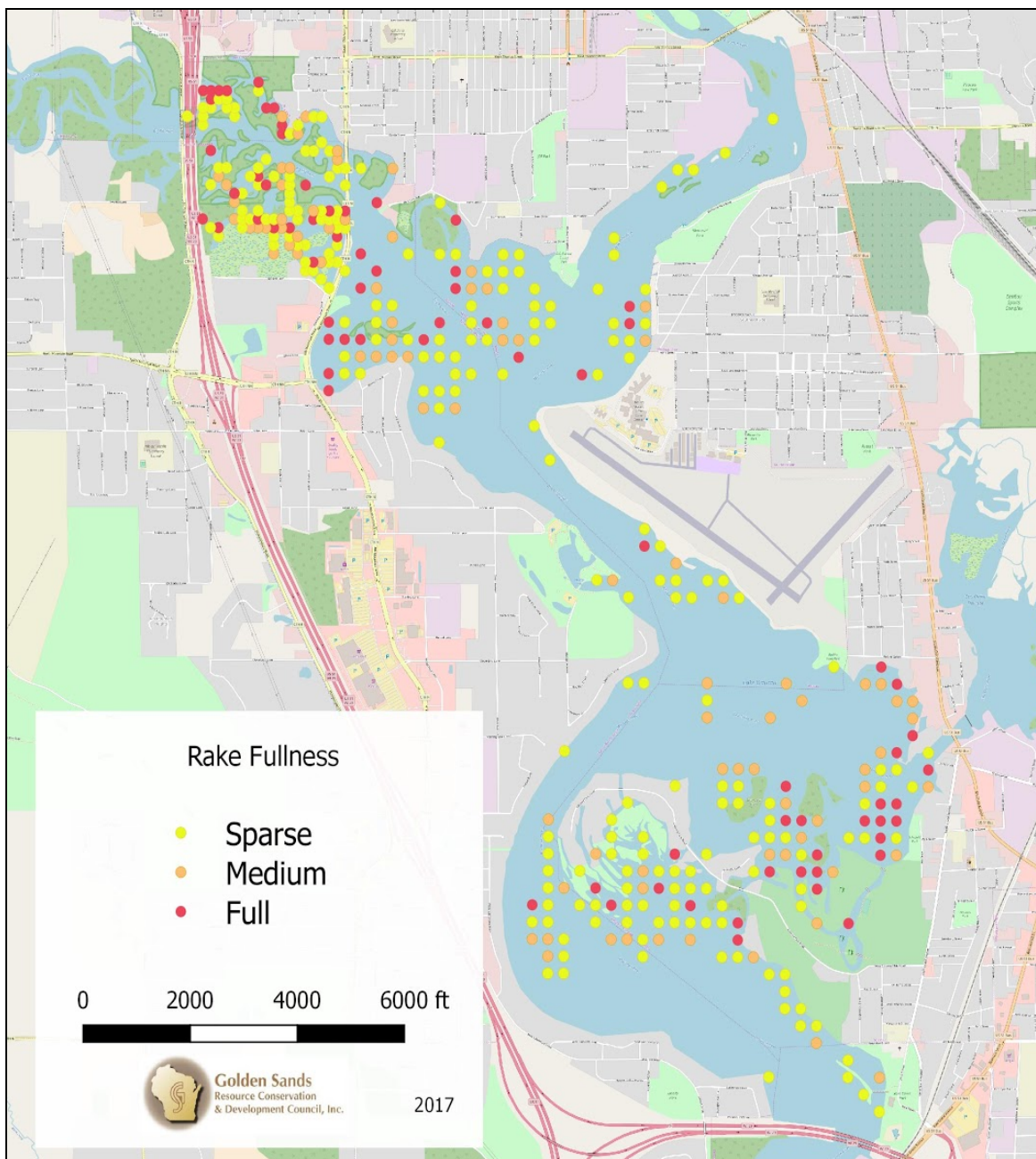


Figure 2 . Aquatic plant density in Lake Wausau during the summer 2017 aquatic plant survey.

Rib River Section 2017 Native Aquatic Plant Survey Summary

Of the 134 sites visited, 112 had vegetation present. The maximum depth that plants were found was six feet. In total, 38 native species of aquatic plants have been identified in surveys of the Rib River section; 29 species each in 2012 and 2017 (Table 1). The majority of species were submergent types typified by growth primarily below the waterline. Nine floating-leaf types of plants were found and five emergent species which included, needle spikerush, sedge, water horsetail, wild calla, and wild rice. Three aquatic invasive species (AIS) were found both years; CLP, Eurasian watermilfoil (EWM), and purple loosestrife.

The most frequently found aquatic plants in 2017 were common waterweed, chara, coontail, filamentous algae, duckweed, flat stem pondweed, arrowhead, small pondweed, and fern pondweed. Comparison of these species with their frequency found in the 2012 survey are displayed in Figure 3.

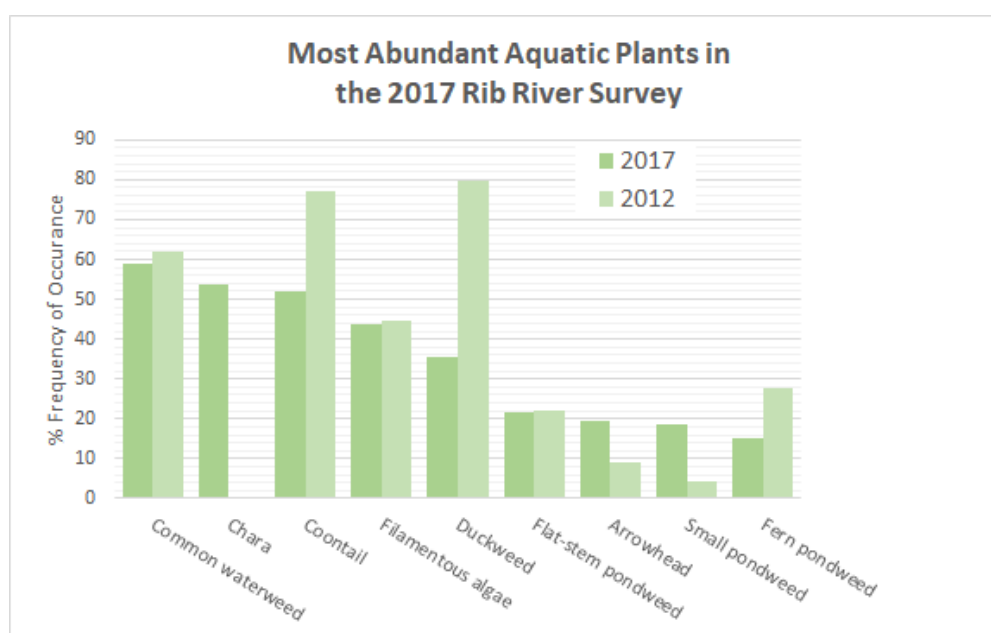
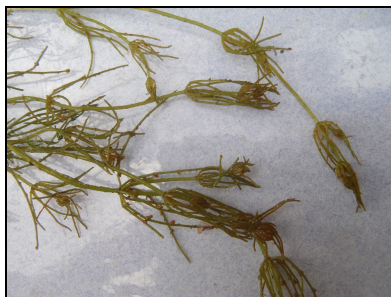


Figure 3. Species of abundant aquatic plants identified during the 2017 survey in the Rib River section.

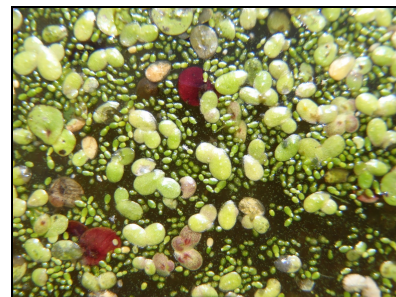
Common Waterweed



Chara



Duckweed



Simpson's Index of Diversity (SDI) indicates the diversity in a sample. It ranges from 0-1, with larger numbers indicating greater diversity. The SDI in the Rib River section was 0.90 in 2012 and in 0.93 in 2017, indicating good diversity. On average, there were nearly 5 species of plants per site.

A coefficient of conservatism (C value) has been assigned to many species of Wisconsin's native aquatic plants. This number represents the species tolerance to disturbance; 1 represents high tolerance and 10 low tolerance. C values in the Rib River section ranged from 3-10. Two very high quality species had values of 10, spiny hornwort (2012) and Vasey's pondweed (2017). Management options that create different conditions or include the use of chemicals should be avoided in the areas where sensitive species are found.

Table 1 . Aquatic plant species identified during the surveys conducted in the Rib River section of Lake Wausau, summers of 2012 and 2017.

Aquatic Plant Species in the Rib River Survey Section of Lake Wausau, Marathon County, Wisconsin					
Common Name	Scientific Name	C Value	Emergent (E) Submergent (S) Floating Leaf (F)	2012	2017
Needle spikerush	<i>Eleocharis acicularis</i>	5	E		X
Sedge	<i>Carex</i> sp.		E		X
Water horsetail	<i>Equisetum fluviatile</i>	7	E		X
Wild calla	<i>Calla palustris</i>	9	E		X
Wild rice	<i>Zizania</i> sp.	8	E	X	X
Common watermeal	<i>Wolffia columbiana</i>	5	F	X	X
Forked duckweed	<i>Lemna trisulca</i>	6	F	X	X
Large duckweed	<i>Spirodela polyrhiza</i>	5	F	X	X
Northern watermeal	<i>Wolffia borealis</i>	6	F	X	X
Slender riccia	<i>Riccia fluitans</i>	7	F	X	
Small duckweed	<i>Lemna minor</i>	4	F	X	X
Spatterdock	<i>Nuphar variegata</i>	6	F	X	X
Turion Duckweed	<i>Lemna turionifera</i>		F		X
White water lily	<i>Nymphaea odorata</i>	6	F	X	X
Clasping-leaf pondweed	<i>Potamogeton richardsonii</i>	5	S	X	X
Common bladderwort	<i>Utricularia vulgaris</i>	7	S	X	
Common waterweed	<i>Elodea canadensis</i>	3	S	X	X
Coontail	<i>Ceratophyllum demersum</i>	3	S	X	X
Fern pondweed	<i>Potamogeton robbinsii</i>	8	S	X	X
Filamentous algae			S	X	X
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	6	S	X	X
Floating-leaf pondweed	<i>Potamogeton natans</i>	5	S	X	X

Common Name	Scientific Name	C Value	Emergent (E) Submergent (S) Floating Leaf (F)	2012	2017
Large-leaf pondweed	Potamogeton amplifolius	7	S	X	X
Leafy pondweed	Potamogeton foliosus	6	S		X
Long-leaf pondweed	Potamogeton nodosus	7	S	X	
Muskgrasses	Chara	7	S	X	
Muskgrass	Chara mucronata	7	S		X
Nitella	Nitella	7	S	X	
Ribbon-leaf pondweed	Potamogeton epihydrus	8	S	X	X
Slender naiad	Najas flexilis	6	S	X	X
Small bladderwort	Utricularia minor	10	S	X	
Small pondweed	Potamogeton pusillus	7	S	X	X
Spiny hornwort	Ceratophyllum echinatum	10	S	X	
Spiral-fruited pondweed	Potamogeton spirillus	8	S		X
Stiff pondweed	Potamogeton strictifolius	8	S	X	
Vasey's pondweed	Potamogeton vaseyi	10	S		X
Water marigold	Bidens beckii	8	S	X	
Water star-grass	Heteranthera dubia	6	S	X	X
AQUATIC INVASIVE SPECIES (AIS)					
Curly-leaf pondweed (CLP)	Potamogeton crispus		S	X	X
Eurasian watermilfoil (EWM)	Myriophyllum spicatum		S	X	X
Purple loosestrife	Lythrum salicaria		E	X	X

Lake Wausau Section 2017 Aquatic Plant Survey Summary

Of the 654 sites visited in this section, 264 had vegetation present. Aquatic plants were found growing in depths of up to 8 feet of water. In total, 37 native species of plants were identified in the Lake Wausau survey area. Each year, 28 native aquatic plant species were found (Table 2). Most species were submergent. Nine floating-leaf types of plants were found including six tiny duckweed-like species two larger water lily-like plants and one floating liverwort. Two native emergent species were noted, pickerelweed and a bur-reed. Three AIS were identified during both survey years, CLP, EWM, and purple loosestrife.

The aquatic plants found with the greatest frequency in 2017 included wild celery, common waterweed, coontail, muskgrass, filamentous algae, water star-grass, small pondweed, and white water lily. The percent of sites these plants were found at are displayed in Figure 4 for 2017 and 2012.

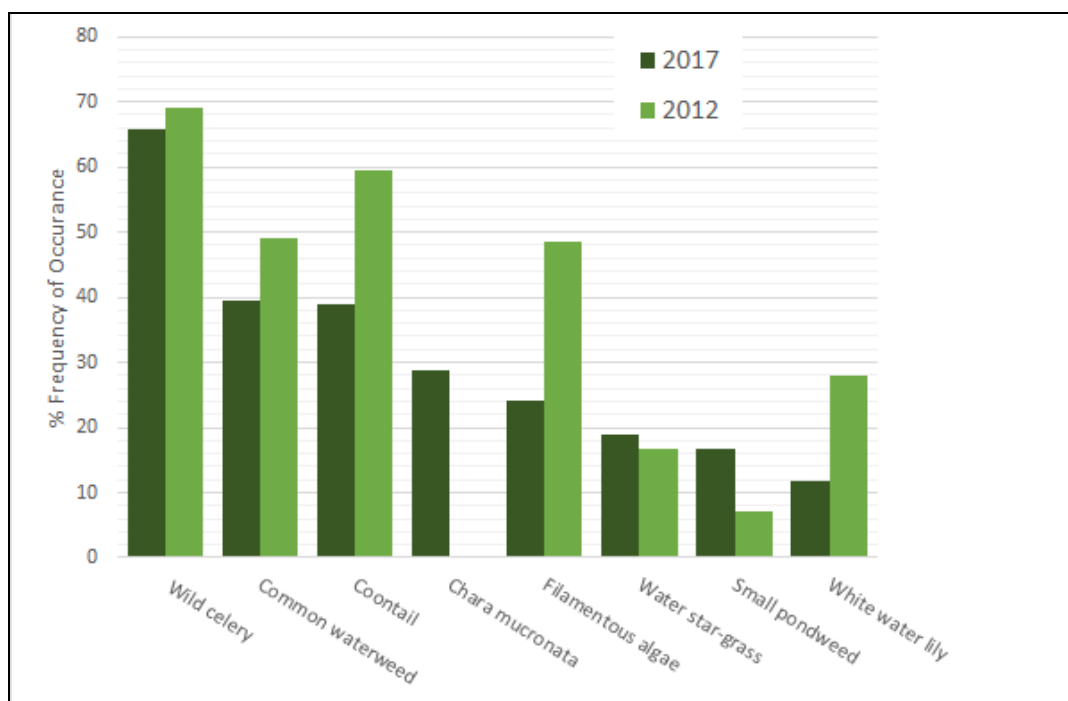
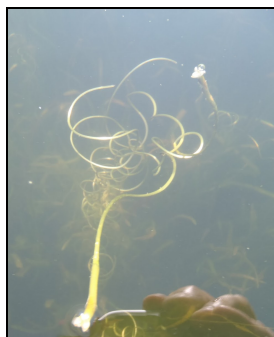


Figure 4. Species of abundant aquatic plants identified during the 2017 survey in the Lake Wausau section.

Wild Celery



Common Waterweed



Coontail



Similar to the Rib River section, the SDI in the Lake Wausau section was 0.90 in 2017 and 0.93 in 2012, indicating good diversity. On average, three species were present per site. The C Values of plants in the Lake Wausau section ranged from 3 to 10. Two high quality species had values of 10, spiny hornwort (2012) and Oaks' pondweed (2012) and one had a C value of 9, creeping bladderwort (2012). Management options that create different conditions or include the use of chemicals should be avoided in the areas where these sensitive species are found.

Table 2. Aquatic plant species identified during the surveys conducted in the Lake Wausau section of Lake Wausau in the summers of 2012 and 2017.

Aquatic Plant Species in the Lake Wausau Survey Section of Lake Wausau, Marathon County, Wisconsin					
Common Name	Scientific Name	C Value	Emergent (E) Submergent (S) Floating Leaf (F)	2012	2017
Pickerelweed	<i>Pontederia cordata</i>	8	E		X
Short-stemmed bur-reed	<i>Sparganium emersum</i>	8	E		X
Common watermeal	<i>Wolffia columbiana</i>	5	F	X	X
Forked duckweed	<i>Lemna trisulca</i>	6	F		X
Large duckweed	<i>Spirodela polyrhiza</i>	5	F	X	X
Northern watermeal	<i>Wolffia borealis</i>	6	F	X	X
Slender riccia	<i>Riccia fluitans</i>	7	F		X
Small duckweed	<i>Lemna minor</i>	4	F	X	X
Spatterdock	<i>Nuphar variegata</i>	6	F	X	X
Turion duckweed	<i>Lemna turionifera</i>		F		X
White water lily	<i>Nymphaea odorata</i>	6	F	X	X
Clasping-leaf pondweed	<i>Potamogeton richardsonii</i>	5	S	X	X
Common bladderwort	<i>Utricularia vulgaris</i>	7	S		X
Common waterweed	<i>Elodea canadensis</i>	3	S	X	X
Coontail	<i>Ceratophyllum demersum</i>	3	S	X	X
Creeping bladderwort	<i>Utricularia gibba</i>	9	S	X	
Fern pondweed	<i>Potamogeton robbinsii</i>	8	S	X	X
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	6	S	X	X
Floating-leaf pondweed	<i>Potamogeton natans</i>	5	S	X	X
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	7	S	X	X
Leafy pondweed	<i>Potamogeton foliosus</i>	6	S		X
Long-leaf pondweed	<i>Potamogeton nodosus</i>	7	S	X	X
Muskgrasses	<i>Chara</i>	7	S	X	X
Muskgrass	<i>Chara braunii</i>	7	S		X
Muskgrass	<i>Chara mucronata</i>	7	S		X

Common Name	Scientific Name	C Value	Emergent (E) Submergent (S) Floating Leaf (F)	2012	2017
Nitella	Nitella	7	S	X	
Northern water-milfoil	Myriophyllum sibiricum	6	S	X	
Oakes' pondweed	Potamogeton oakesianus	10	S	X	
Ribbon-leaf pondweed	Potamogeton epihydrus	8	S	X	
Slender naiad	Najas flexilis	6	S	X	X
Slender waterweed	Elodea nuttallii	7	S	X	
Small pondweed	Potamogeton pusillus	7	S	X	X
Spiny hornwort	Ceratophyllum echinatum	10	S	X	
Stiff pondweed	Potamogeton strictifolius	8	S	X	
Variable pondweed	Potamogeton gramineus	7	S	X	
Water star-grass	Heteranthera dubia	6	S	X	X
Wild celery	Vallisneria americana	6	S	X	X
AQUATIC INVASIVE SPECIES (AIS)					
Curly-leaf pondweed	Potamogeton crispus		S	X	X
Eurasian water milfoil	Myriophyllum spicatum		S	X	X
Purple loosestrife	Lythrum salicaria		E	X	X

Locations of Emergent, Submergent, and Floating-Leaf Plant Species

While all aquatic plants provide the structure that makes up the majority of habitat within Lake Wausau, different types of aquatic plants provide habitat for different animals or parts of their life cycles. The location of the plants also plays a role in the types of animals that utilize the habitat they provide. Young fish, frogs, and birds generally use shallow habitat that is often found near shore. Except when predating on smaller fish, larger fish typically hide amongst aquatic plants and woody structure in the cooler, deeper water. Large floating-leaf species provide cooler water near shore during warm periods of the summer. Emergent species also flourish in shallow water and provide excellent habitat for the base of the food chain, including attached forms of algae and zooplankton. These foods attract young fish, aquatic forms of insects, and their predators such as juvenile and small fish species. The types of aquatic plants found during the 2017 survey are shown in Figure 5.

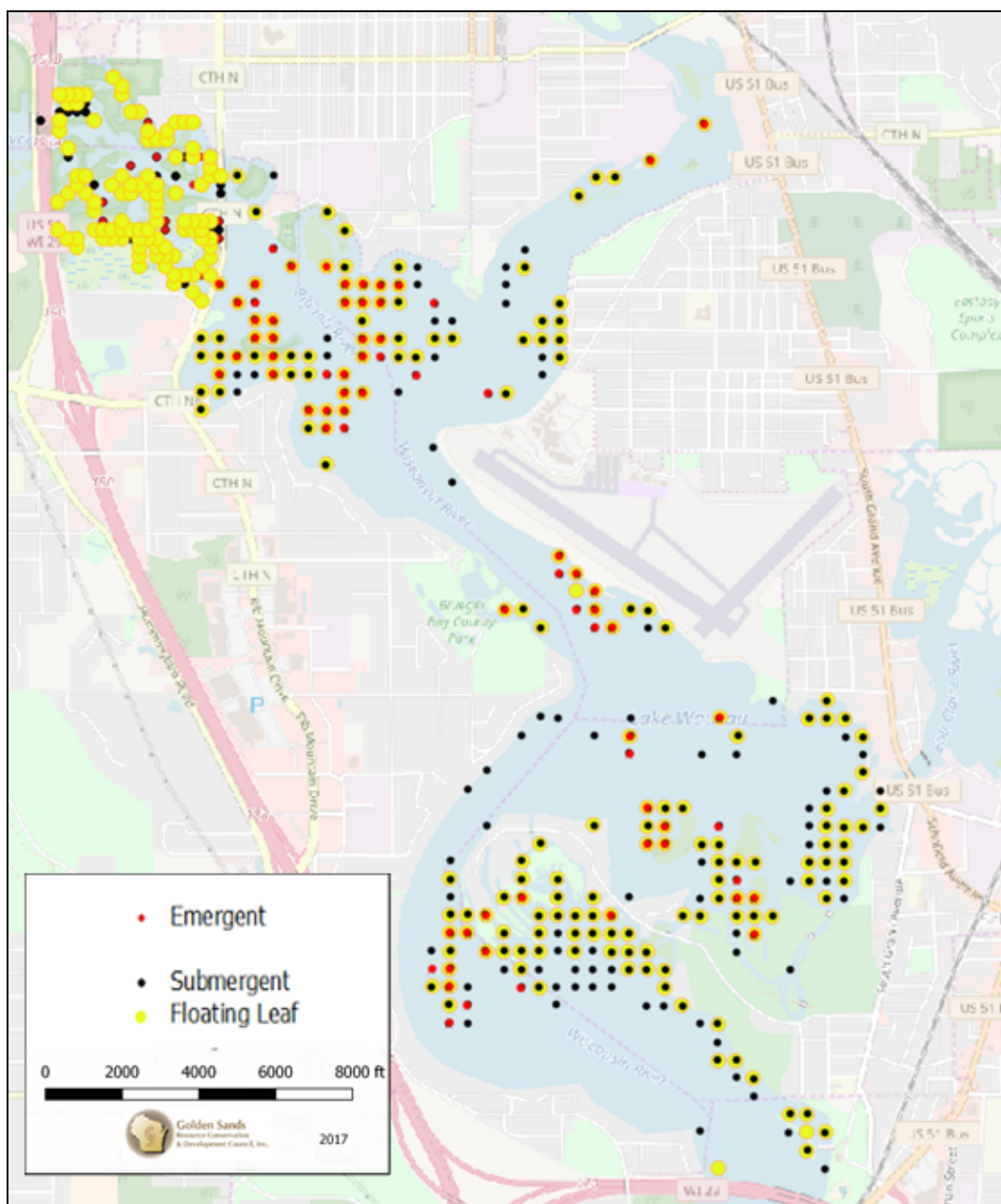


Figure 5. Location of submergent, emergent, and floating-leaf plants identified during the Lake Wausau aquatic plant survey conducted in summer 2017.

Aquatic Invasive Species (AIS) in Lake Wausau

Aquatic invasive species frequently hail from other continents, often in bilge water in ships entering the Great Lakes. In some cases, they are desirable horticultural species that grow in abundance in their new homes. They are frequently spread to Wisconsin lakes by boats, trailers, and other equipment moved from one lake to another. Three species of AIS were identified in Lake Wausau during the aquatic plant surveys; EWM (*Myriophyllum spicatum*), CLP (*Potamogeton crispus*), and purple loosestrife (*Lythrum salicaria*). All three species were scattered throughout the flowage.

The presence of these species suggests that increasing prevention efforts is warranted to prevent new AIS from becoming established in Lake Wausau. Typically, many flowages in Wisconsin provide conditions for AIS to flourish, making it critical to minimize the potential for AIS to enter Lake Wausau. If it does enter, early detection and quick response to a newcomer is essential. In addition, it is important for boats, trailers, and equipment leaving Lake Wausau to be checked for aquatic plant material, sediment, and animals, and any material be removed. To reduce duplicative efforts, annual countywide communication strategies about AIS prevention should be developed. This will help to control the spread to other water bodies. A general strategic plan for AIS prevention and monitoring for Marathon County can be found at <http://www.goldensandsrcd.org/our-work/water>. Strategies and options for Lake Wausau are outlined later in this document.



Purple loosestrife

Purple loosestrife inhabits wet shorelands around Lake Wausau. This perennial plant was originally brought to Wisconsin for use in flower beds and landscaping. Each plant produces thousands of seeds, having the ability to reproduce quickly and outcompete many native wetland species. Its purple steepled flower heads resemble other native species so it is important to learn the difference before taking steps to eliminate the plant.

Individual plants and their roots can be removed by hand. For larger populations, bio-control is frequently used in the management of purple loosestrife. Purple loosestrife beetles, *Galerucella*, can be collected from the wild or obtained through the WDNR. The starter populations of beetles are bred and released into the purple loosestrife population. Although the beetles do not kill the plants, they reduce flowering, seed production and overall height of the plants. The shorter plants allow native species to successfully compete for sunlight and nutrients. Domtar and other local efforts already conduct some purple loosestrife management on Lake Wausau but LWA could enhance these efforts. Training and assistance is available through the local AIS Coordinator or Golden Sands RC&D Council, Inc.

Eurasian watermilfoil (EWM)

EWM is likely the best known AIS in Wisconsin because it has become a nuisance in many lakes throughout the state. EWM is a perennial aquatic plant that grows up to the water surface to flower, become pollinated, and produce seeds. When it grows in dense stands, the plant parts at the surface can intertwine and become mats, making navigation difficult and making feeding by predatory fish nearly impossible. New EWM plants



can grow from seeds and fragments of the plant. Fragmentation can occur when plant parts are broken up by motor propellers, improper removal techniques, and by natural means in the fall.

Fortunately, the EWM in Lake Wausau has not been behaving aggressively and is quite sparse where it has been observed (Figure 6). EWM was noted at 15 sites in the Rib River section and 47 sites in the Lake Wausau section; the majority were visual observations.

It is important for lake users to learn to identify EWM so they can look for it in Lake Wausau and notify biologists if they suspect it is becoming more abundant. Other native, non-problematic species can be confused for EWM to those untrained. All users of Lake Wausau should check boats and other equipment and remove any fragments to reduce the chance of spread to other lakes and rivers.

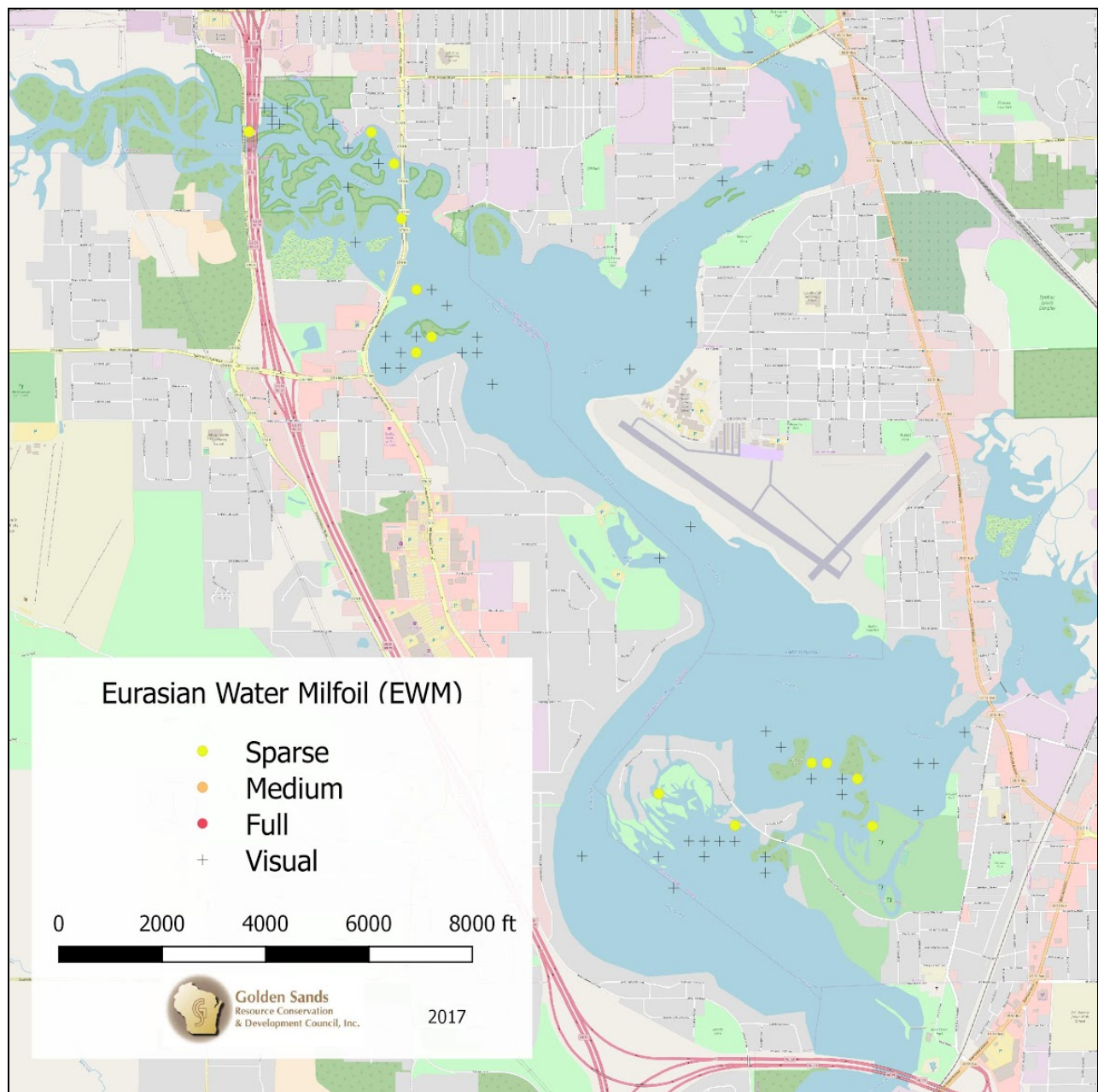
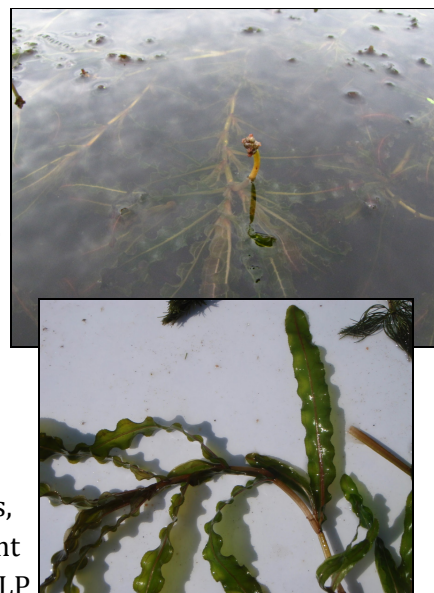


Figure 6. Location and abundance of EWM in Lake Wausau during the summer 2017 survey.

Curly-leaf pondweed (CLP)

CLP is a non-native aquatic plant with a growth pattern that differs from native aquatic plants by growing below the ice during the winter, making it one of the first aquatic plants with full growth by June. In June, the plants senesce (dieback). For this reason, it does not typically impede recreation; however, it releases nutrients into the warmer water as the plant tissue dies. These nutrients often spur the growth of filamentous algae throughout the remainder of the summer. CLP propagates itself by two mechanisms. It produces buds called turions that can become situated in the lake sediment and develop into new plants. It also spreads by rhizomes (roots).



During the June survey, CLP was found at 140 sites; 120 in the Lake Wausau section and 20 in the Rib River section. While this may seem like a lot of sites, the average rake fullness was 1.2 (sparse). The majority of CLP plants or plant beds were sparse to moderate in density. Only five sites had dense growth. CLP plants occurred in water depths ranging from one to six feet, with the majority in two to four feet of water (Figure 7). Any harvesting activities should focus on the areas with the greatest density in areas that would result in water quality issues or nuisance to recreation.

CLP was also present during the survey conducted in the summer, but as would be expected, to a lesser extent. It was observed on 15 occasions in the Rib River section and 23 occurrences in the Lake Wausau section; most were visual observations (Figure 8).

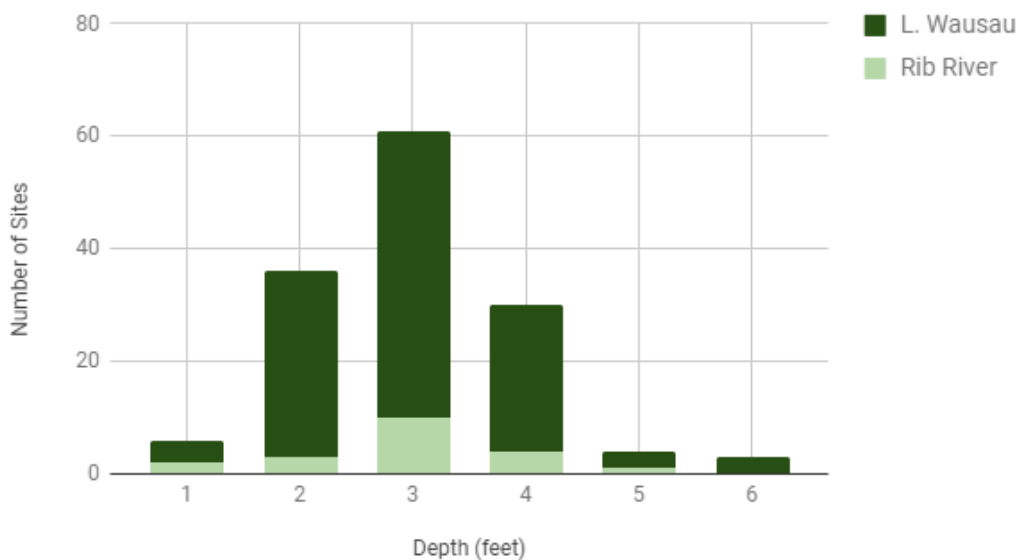


Figure 7. Depths of CLP in Lake Wausau. June 2017.

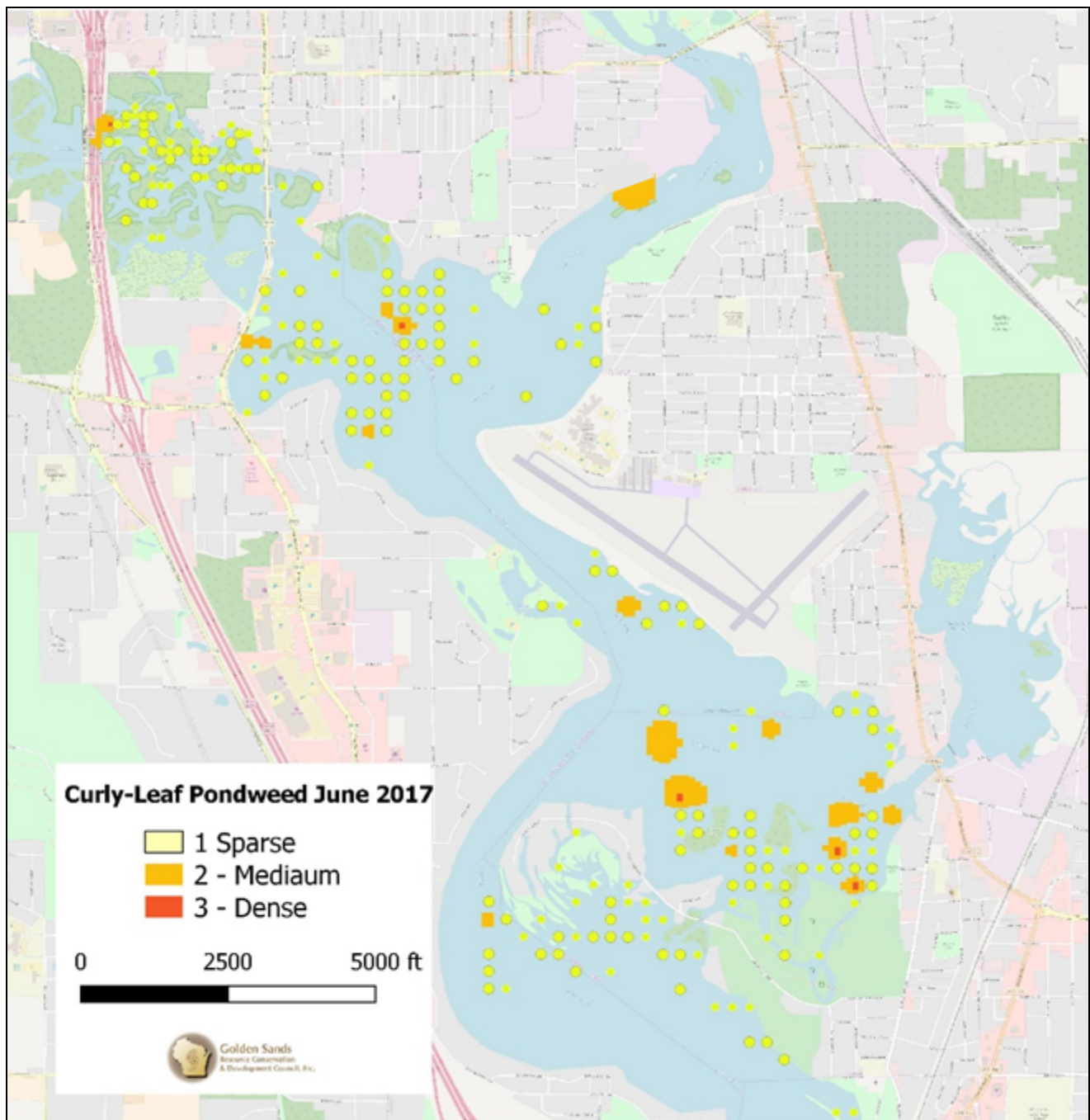


Figure 8 . Location and abundance of CLP in Lake Wausau during the June 2017 survey.

AIS Prevention and Monitoring Recommendations

Many approaches can be employed to prevent new AIS from entering and becoming established in Lake Wausau. Most of these efforts involve disseminating information about the potential problems associated with AIS and promoting good boat, trailer, and equipment hygiene. Waterfowl hunting and trapping are two other activities that should be considered when addressing AIS prevention in Lake Wausau. Like boats and trailers, equipment such as decoys, decoy anchors, traps, trap stakes and waders need to be inspected and cleaned before and after use in any waterbody. There are many people using Lake Wausau therefore, a variety of informational deployment should be employed. Ultimately, the diligence of the lake and river users will determine if new AIS are introduced into Lake Wausau.

To prevent the introduction of wetland and terrestrial AIS, property owners should be encouraged to use native species in landscaping and backyard ponds. Training for local landscapers is available through UWEX Lakes.

Boat launch conversations (Clean Boats Clean Waters, CBCW) are productive ways to engage boaters and inspect watercraft before they enter the lake. CBCW involves having a trained watercraft inspector at a boat landing during high traffic periods. Conversations with boaters often include laws associated with AIS and the prevention steps that boaters should employ when entering and leaving the lake. They also help to inspect watercraft for attached aquatic plants and animals. Lake Wausau has seven boat launches, which makes CBCW a good option. CBCW training is available through the local AIS Coordinator or Golden Sands RC&D Council, Inc.

Social media, discussions with LWA members, newsletters, newspaper stories, tv news stories, youth outreach, and partnering with local sporting goods stores/bait shops are all good ways to interact with and inform the public about AIS. Additional productive partnerships may include the Wausau Chapter of WI Waterfowl Association, WI Trappers Association District 6, DC Everest Fishing Club, Central WI Water Walkers Water Ski Club and other clubs that appreciate and benefit from Lake Wausau. All these groups are important places to disseminate AIS information because of the number of people who can be reached and these activities serve as potential pathways for AIS. These groups can also participate in AIS management and monitoring.

Monitoring for AIS plays two important roles. Known AIS populations of EWM, CLP and purple loosestrife should be monitored periodically to track shifts in population densities and locations. These records will be useful in identifying whether existing management efforts are sufficient and during the review of management strategies.

Monitoring for new AIS provides an opportunity for the early detection of pioneer AIS populations, which can result in potentially eliminating the species from the lake or reduce the time and money needed to manage it should it become established in Lake Wausau. Lake Wausau attracts many people for multiple recreational opportunities. New AIS, such as water hyacinth, zebra mussels and starry stonewort can enter a lake by boat and trailer or by escaping local water and terrestrial gardens. Trained citizens can detect species early by knowing what to look for. Monitoring can be as simple as reporting observations during a leisurely kayak, boating or fishing excursion or can be an organized, planned event for targeted species. Riverine Early Detection (Project RED) surveys offer a simple, structured way to monitor for and record AIS in river systems. Project RED would be beneficial on the Rib River and Eau Claire River. Coordination of efforts and

Project RED, AIS and native plant identification trainings are all available through the local AIS Coordinator or Golden Sands RC&D Council, Inc.

The more people involved in monitoring activities, the more likely plants and animals that are out of place will be recognized. Suspected new AIS or species that seem unusual should be reported as soon as possible. Whenever possible it is important to collect a specimen, record the location of the observation (GPS points or other descriptions of the exact location) and include the approximate size of the population (one plant, ten foot by fifteen foot dense bed, lightly scattered throughout the bay, etc.). Pictures that are clear and show good detail can also aid in the confirmation of AIS. Species verification is available through the local AIS Coordinator, Golden Sands RC&D Council, Inc., the WDNR Aquatic Plant Biologist, or UWSP Herbarium.

When a species is confirmed to be AIS, a follow up survey should be completed to assess the extent of the population. If the confirmed species is a plant, the population should be mapped using a GPS and densities should be approximated. For animal species, a survey would be conducted to record general areas where the species is observed and population estimates. Survey design will depend upon the type of animal. In both cases the survey information will be used to determine what response strategies may appropriate. Follow up surveys are available through the local AIS Coordinator, Golden Sands RC&D Council, Inc., or the WDNR Aquatic Plant Biologist.

Aquatic Plant Management Strategy Summary for Lake Wausau

The following strategies have been developed during public meeting with Lake Wausau Association members and local partners, and professionals from Golden Sands RC&D, Inc., UW-Stevens Point, and the Wisconsin Dept. of Natural Resources. Details about these strategies can be found in the discussion section of this document.

Aquatic Invasive Species (AIS)

Prevention

Communication is essential to the prevention of AIS in Lake Wausau.

1. Ensure clear messaging exists at all points of access to Lake Wausau, Rib River, and Eau Claire River. Work with partners on the Wisconsin River upstream of Lake Wausau.
2. Coordinate efforts with partners and other lake/river groups in Marathon County to ensure community-wide messaging is being conducted efficiently.
3. Develop a Clean Boats/Clean Water program for Lake Wausau.
4. Communicate with Lake Wausau Association members about the importance of AIS prevention.
5. Involve youth in outreach efforts. Schools and clubs can be helpful in spreading consistent AIS messages in a locally-relevant way.

Monitoring

1. Provide annual opportunities to learn to identify AIS from native lookalikes. Involve people recreating in different areas of Lake Wausau and involve youth.
2. If new AIS is suspected, contact biologists for confirmation.
3. Work with biologists to develop a rapid response strategy to eradicate new AIS.
4. Inform lake users if new AIS is confirmed.

EWM

1. Learn to identify EWM and monitor its presence in Lake Wausau.
2. Contact biologists if EWM appears to be spreading.
3. Learn proper removal techniques to avoid fragmentation of plants.

Purple Loosestrife

1. Continue monitoring for purple loosestrife and record locations on maps.
2. Coordinate with Domtar's monitoring and management efforts.
3. Inform property owners about how to properly identify purple loosestrife and techniques that can be used to eradicate individual plants or small beds.

Curly-leaf Pondweed (CLP) Management - Permit Required

The purposes for the management of CLP Lake Wausau are to improve localized water quality conditions that result in summer algae blooms and filamentous algal growth. Mechanical harvesting been determined to be the best option for Lake Wausau because the harvested plants remove the plant tissue and associated nutrients from the flowage which helps to achieve the management goal. In addition, the flow of water in the flowage does not provide sufficient contact time for chemical treatments to be effective. The use of chemicals

would leave plant materials and associated nutrients in the flowage where they could enhance the growth of algae and aquatic plants, which does not result in achievement of the goal.

LWA has worked with staff from WDNR and UWSP to identify the locations where harvesting is most desirable. Because of the lifecycle of CLP, harvesting will achieve the greatest benefits if conducted when plants are at maximum growth, before senescence begins, which typically occurs in early June. Harvesting has been permitted at specified locations in the flowage that have water depths that are sufficient to prevent the disturbance of sediment by the harvesting equipment. Maps of the permitted locations are displayed in **Figures 9-11** and can be found on the WDNR Surface Water Data Viewer. A skimmer can be used to remove floating plant fragments. The nutrient-rich cut plant material should be disposed of on land and away from shorelands and wetlands.

Wild Rice may not be mechanically harvested. The operator of the harvester should watch for wild rice since its location varies from year-to-year in Lake Wausau.

A permit approved by biologists with the WDNR is required for harvesting activities. New permits will need to be issued for harvesting to occur in 2018. The permit period can be up to 5 years. So, in 2023 a new permit will need to be sought and prior to that in 2022, a new aquatic plant survey should be conducted to evaluate the status of the aquatic plant community and determine if any adjustments in strategies are necessary.

Additional Aquatic Plant Management in Lake Wausau

Floating aquatic plants and plant fragments can build up on the surface of the water due to winds or currents. Some of the plants in Lake Wausau that float either routinely or seasonally that may create a nuisance includes filamentous algae, coontail, water celery, and duckweed. Even outside of the areas identified for harvesting, these floating plants can be removed by skimming the surface of the water.

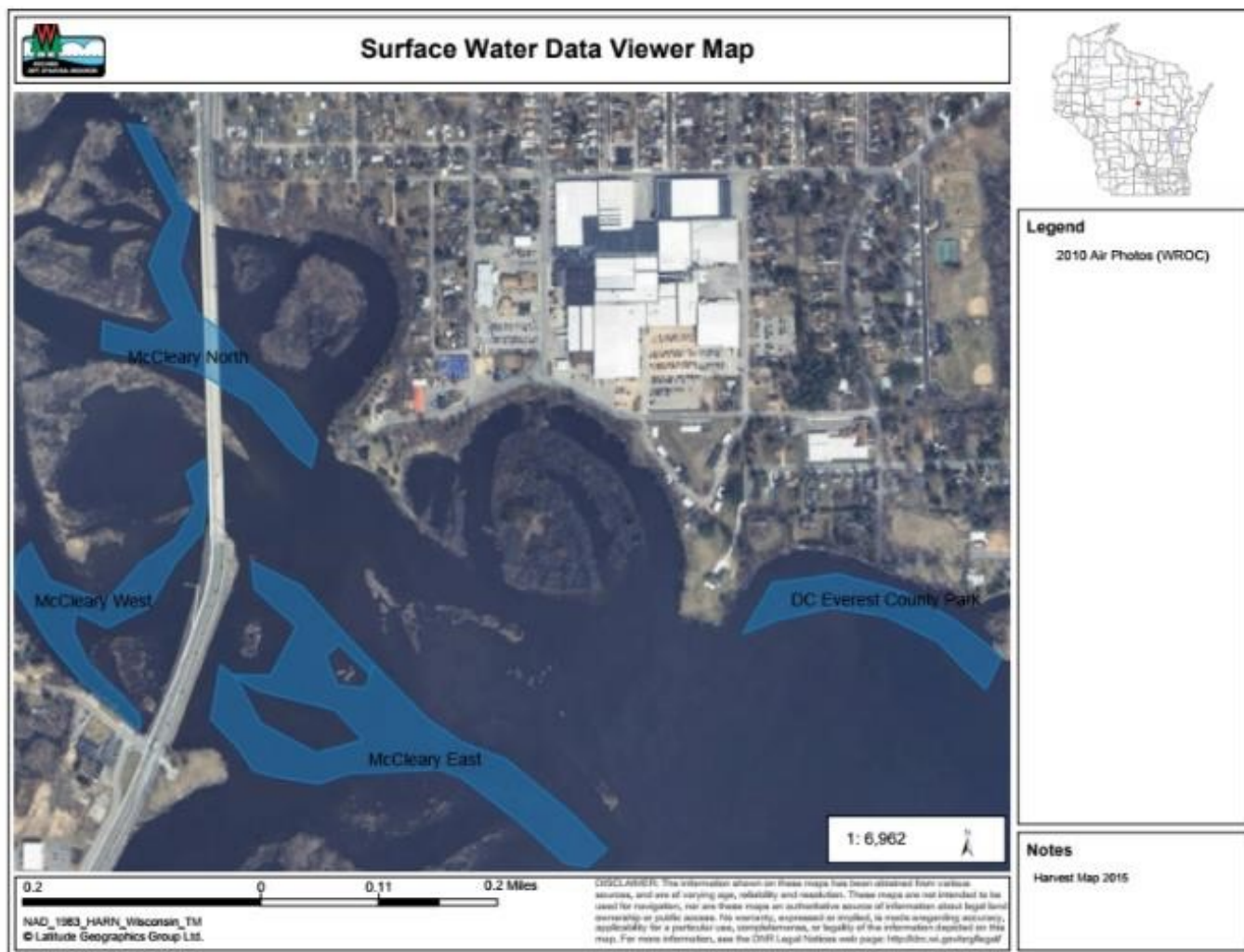


Figure 9. CLP harvesting areas near County Highway N in Lake Wausau.

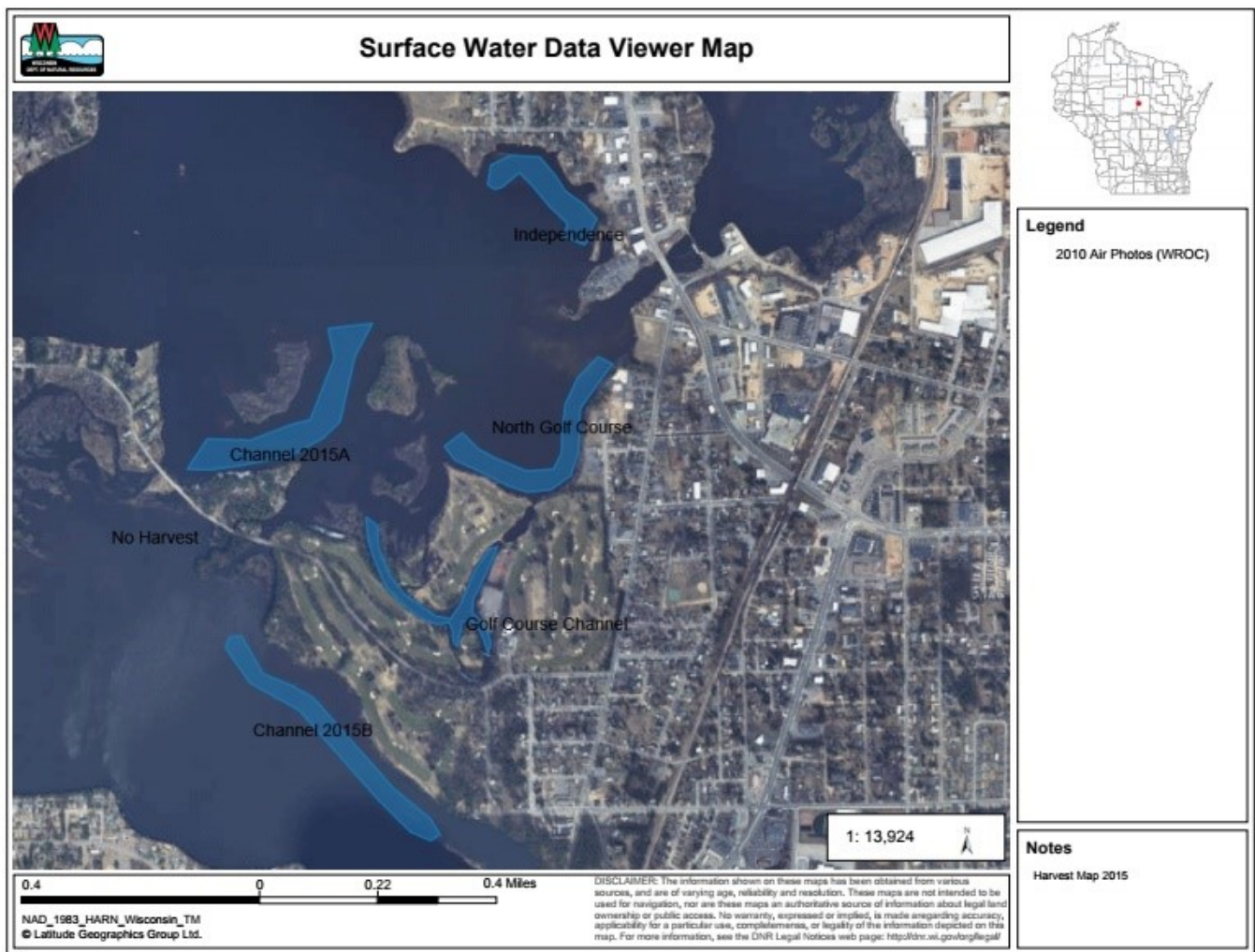


Figure 10. CLP harvesting areas near the islands Lake Wausau.

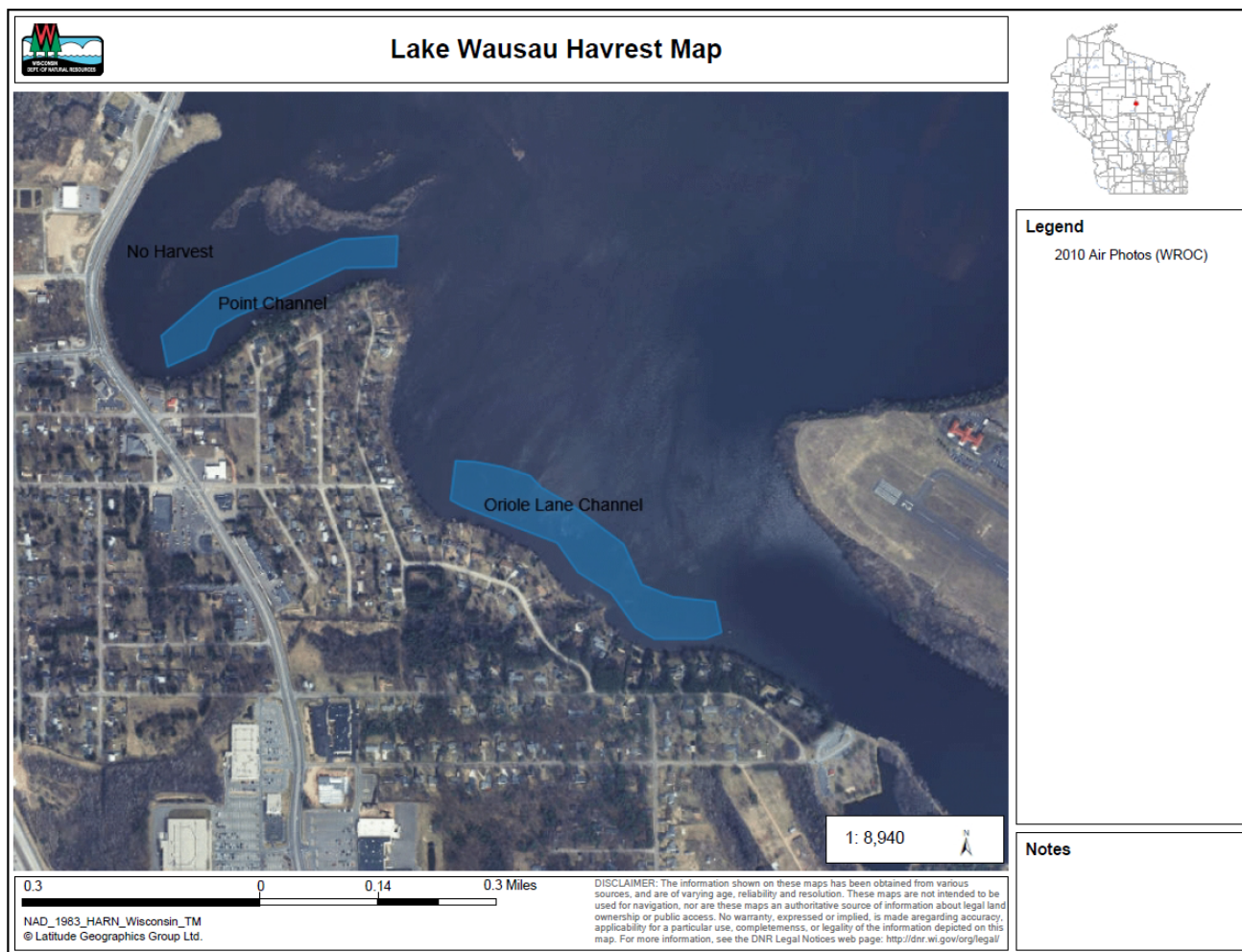


Figure 11. CLP harvesting areas on the western side of Lake Wausau.

References

Skawinski, P. and Marathon County Conservation, Planning, and Zoning. 2013. *Marathon County Aquatic Invasive Species Plan A guide for Proactive AIS Management* Golden Sands Resource Conservation & Development Council, Inc. Report to the Wisconsin Dept. Natural Resources.

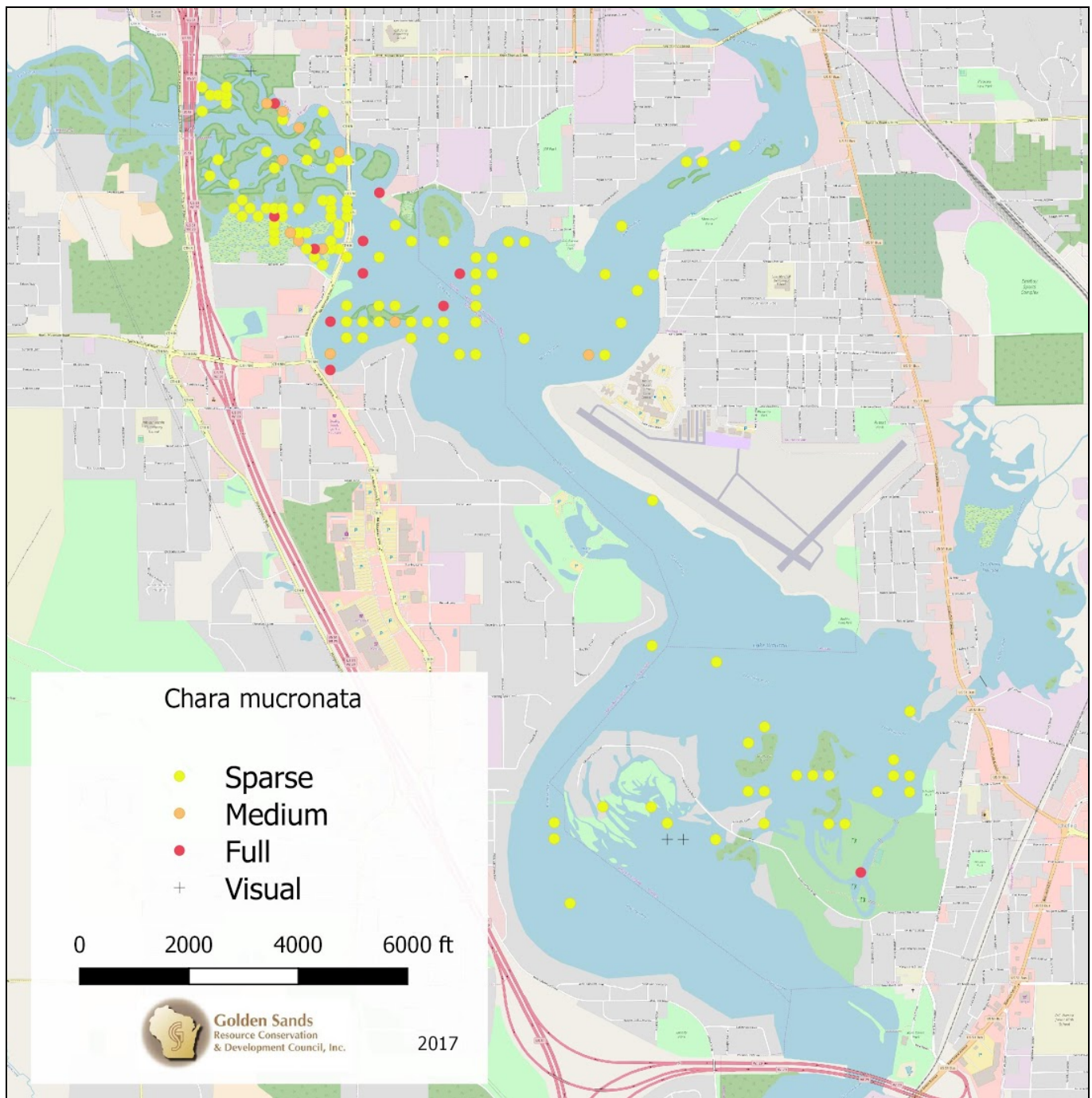
Turyk, N. R. Jaworski. 2012. *Aquatic Plant Survey of Lower Rib River and Lake Wausau, Marathon County, Wisconsin*. University of Wisconsin-Stevens Point, Center for Watershed Science and Education. Report to Wisconsin Dept. Natural Resources.

Wisconsin Dept. Natural Resources. (No date provided) *Aquatic Plant Management in Wisconsin*.
<https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/ecology/aquaticplants/default.aspx>

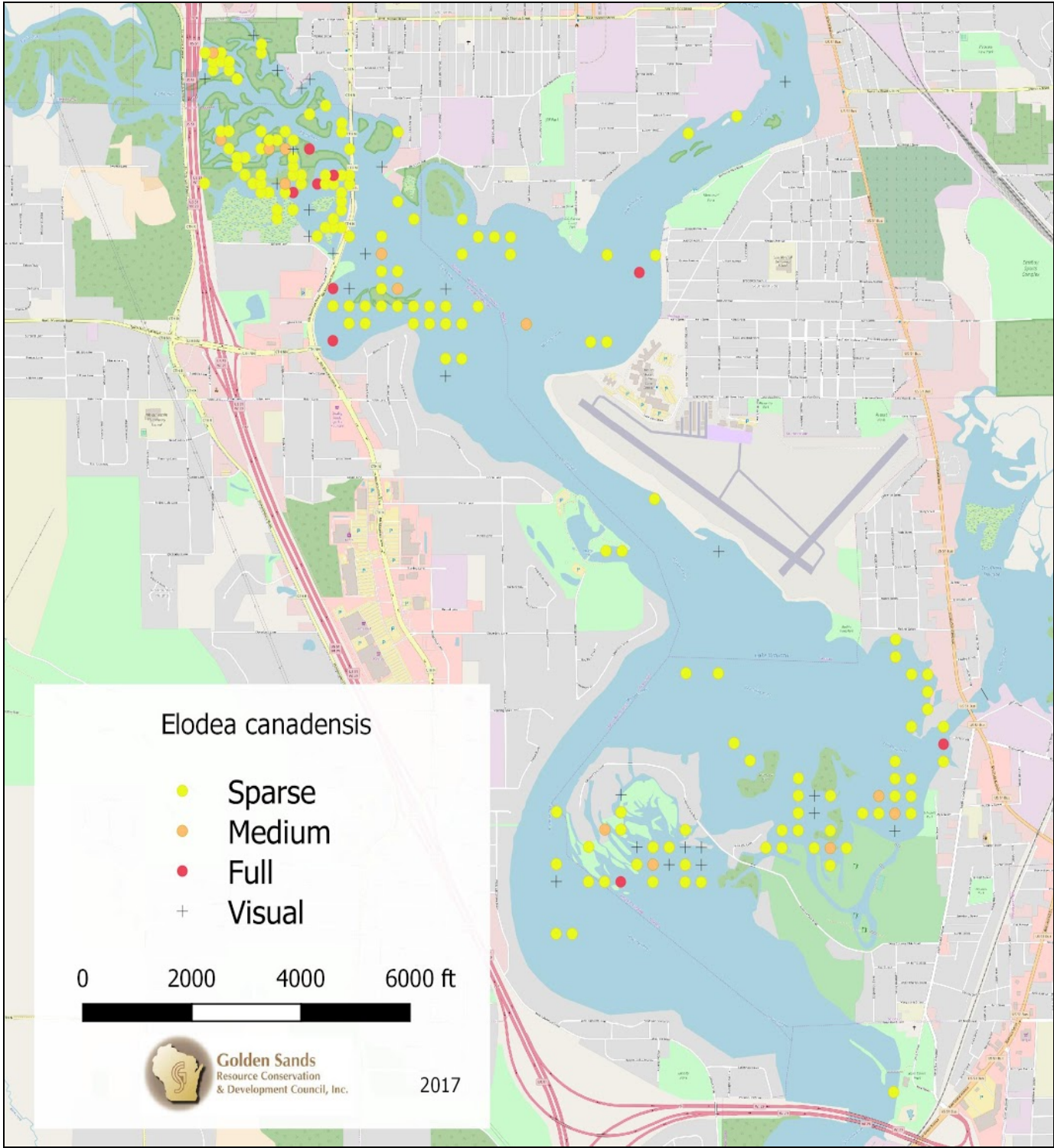
Appendices:

Maps of Dominant Aquatic Plants in Lake Wausau

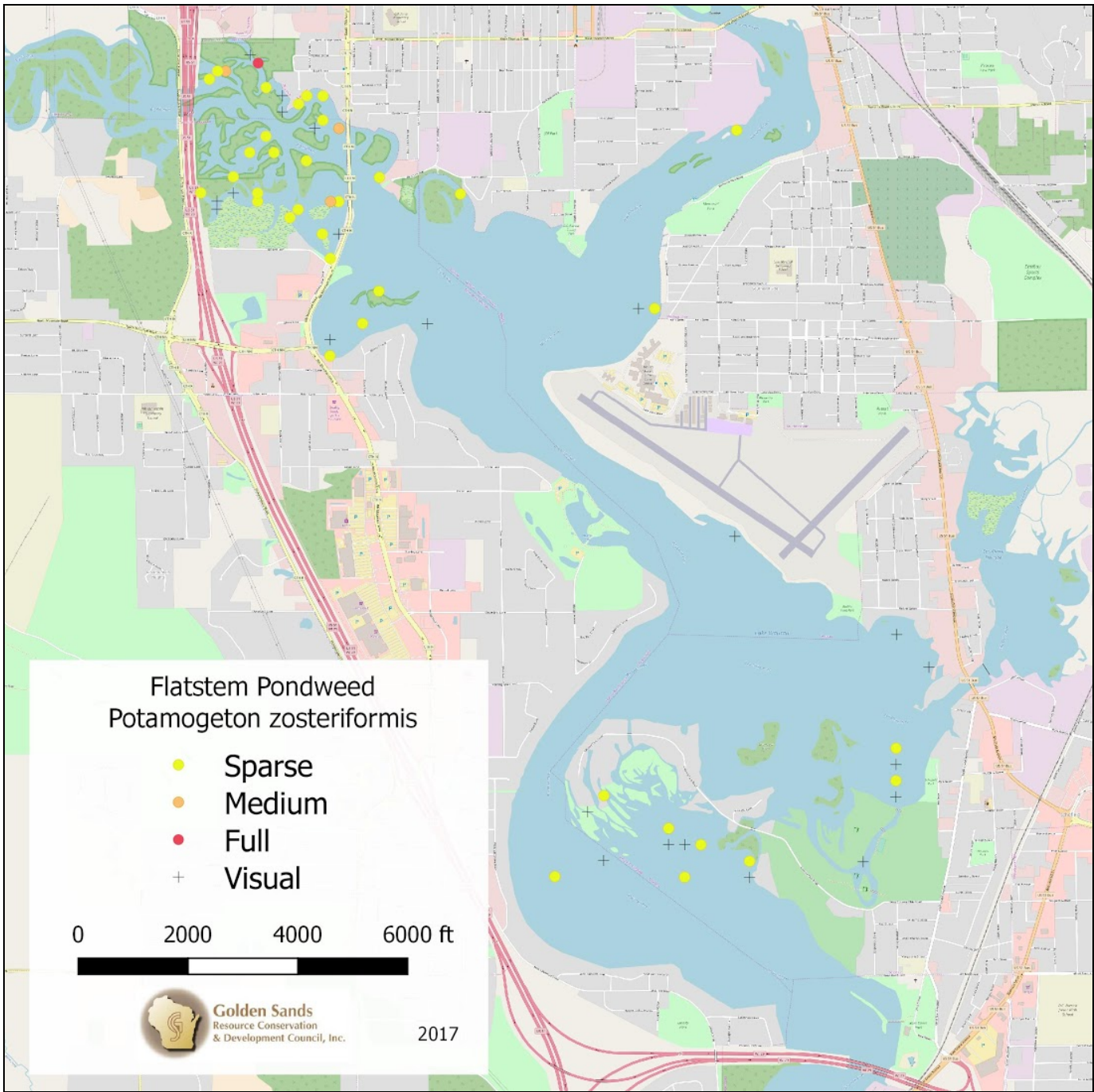
Chara mucronata



Elodea canadensis



Flatstem Pondweed



Vallisneria americana

