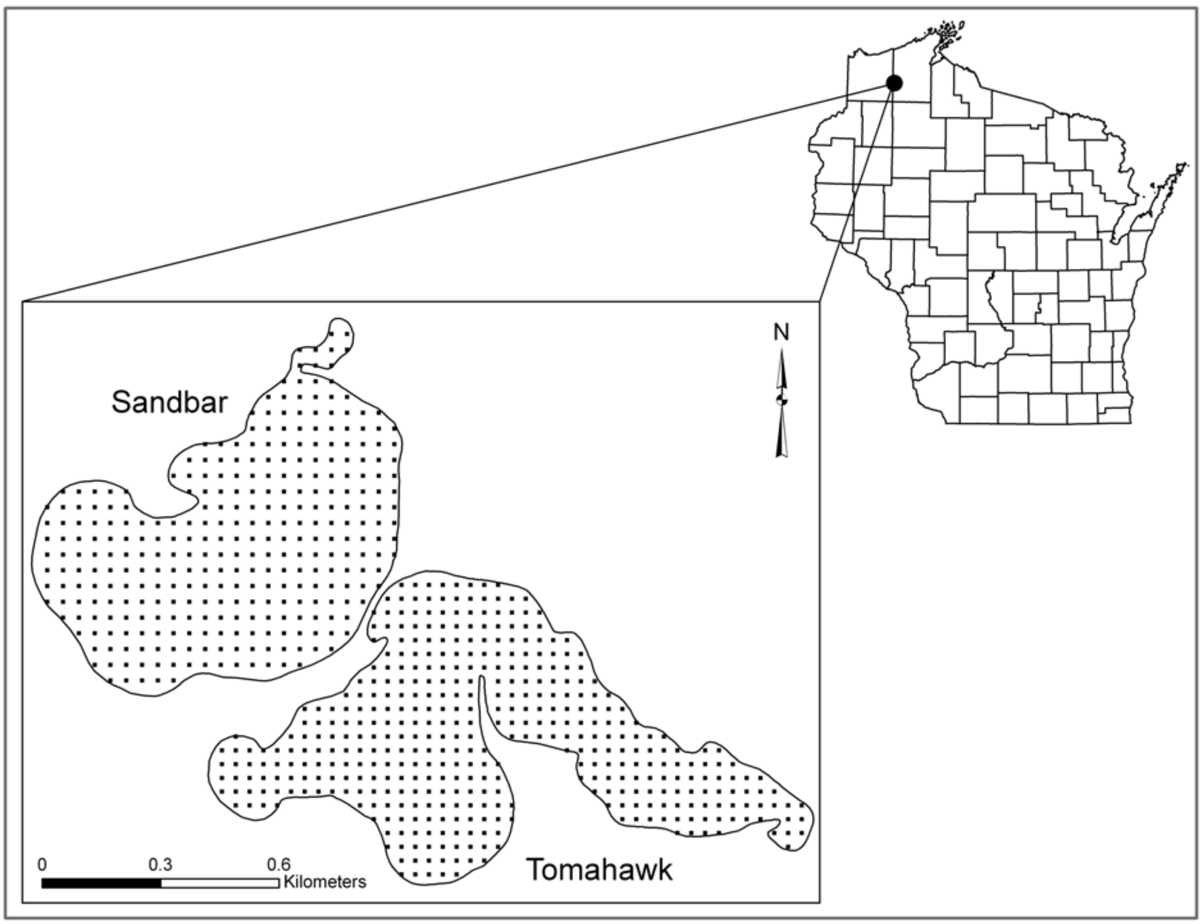
TOMAHAWK & SAND BAR LAKE
AQUATIC PLANT MANAGEMENT PLANS

Eurasian Watermilfoil Management & Control in Northern Clear-Water Systems



Tomahawk and Sand Bar Lake Aquatic Plant Management Plans
Bayfield County, WI
12 July 2010 (Draft)

Sponsored By:
Town of Barnes Eurasian Watermilfoil Committee, 2009 Wisconsin Lake Stewardship Award Winners

Committee Members:
Ingemar Ekstrom, Chairperson
Mitch McGee, Vice-chairperson
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GOAL STATEMENT

The goal of this overall Plan is to prevent the introduction and spread of aquatic invasive species in Tomahawk and Sand Bar Lakes while protecting the native aquatic plant community.

Specific goals include:

1. Ensure that Eurasian watermilfoil remains absent from Tomahawk Lake by continuing to monitor in order to detect it early and respond quickly should it reappear.
2. Eradicate Eurasian watermilfoil from the Sand Bar Lake for at least three years while minimizing impacts to native aquatic plants.
3. Educate the surrounding Barnes/Eau Claire Lakes community about aquatic invasive species and aquatic plant management.

BACKGROUND AND PURPOSE

Wisconsin Department of Natural Resources (WDNR) staff identified Eurasian watermilfoil (EWM, *Myriophyllum spicatum*) in Tomahawk Lake, Town of Barnes, Bayfield County, in August 2004, and it was confirmed in nearby Sand Bar Lake within weeks. Soon after, volunteers mobilized and created an aquatic invasive species (AIS) monitoring, education, and watercraft inspection plan that was presented to the Town of Barnes. The Town successfully received an AIS grant (AEPP-002-05) in spring 2005 to fund the plan, including: aquatic plant surveys on 27 area lakes (11 lakes surveyed with point-intercept method); watercraft inspections on area lakes with over 200 volunteers trained; custom signage at all public boat landings; and an education program. No additional lakes surveyed had EWM. Two particularly important outcomes of the 2005 project were the formation of the Barnes Eurasian Watermilfoil Committee (Committee), which was charged with continuing the lakewide monitoring and education program and the recommendation to use the two lakes for EWM control research.

For more information on the activities of the EWM Committee, including meeting minutes, grant proposals, and reports, please visit barnes-wi.com.

The Aquatic Plant Management Plans (Plans) for Tomahawk and Sand Bar Lakes continue the efforts of the Committee in partnership with the United States Army Corps of Engineers (Corps), WDNR, and Bayfield County Land and Water Conservation Department (LWCD). The Plans are part of a larger project that implements EWM control research from 2008-2011 on Tomahawk and Sand Bar Lakes and continues townwide watercraft inspection, all of which were funded by a WDNR Aquatic Invasive Species grant (ACEI-033-08) in fall 2007.

The WDNR committed to write the Plans as a part of the 2007 grant project with the understanding that ***Plan implementation would be the responsibility of the local community*****.** The purpose of these Plans is to provide lake information, including physical, chemical, and biological aspects; gather and understand lake user feedback to identify management goals and objectives; and integrate all this information to develop management alternatives with an implementation strategy into the future (2011-2015). As with any good plan of action, public participation and feedback will drive the chosen management strategy. Because the lakes are hydraulically connected and have similar characteristics, both plans are consolidated into a single document. Management will not necessarily be the same, though.

Public Participation

There has been substantial public information, education, and participation since the initial 2004 discovery of Eurasian watermilfoil in Tomahawk Lake. A timeline for public participation opportunities follows:

TABLE 1. Public information, education, and participation timeline. In addition the activities described below, the EWM Committee has met monthly except in winter since 2006, and Committee updates are a standing agenda item at the monthly Town board meetings.

Year	Date	Activity
2004	August	EWM discovered in Tomahawk and Sand Bar Lakes
	October	Town approves formation of EWM Ad-hoc Committee and to pursue a WDNR AIS grant
2005	Spring	Grant awarded, aquatic plant survey crew hired, watercraft inspectors trained
	October	EWM Project results shared at Bayfield County Lakes Forum annual meeting and Town of Barnes public meeting
2006	September	Town approves formation of standing EWM Committee
2007	June	Meeting with Tomahawk and Sand Bar property owners to present and vote (29 in favor and 3 opposed) on EWM Research Project
2008	July	EWM Committee Chair Ingemar Ekstrom presents Barnes AIS project to DNR Secretary and invited group of local citizens and agency staff
2009	June	EWM Research Project update meeting with Tomahawk and Sand Bar property owners
2010	June	EWM Research Project update and APM planning discussion with Tomahawk and Sand Bar property owners

LAKE INFORMATION

Tomahawk and Sand Bar Lakes are moderately sized oligo-mesotrophic seepage lakes located in the northwest sand plains that span the Town of Barnes, Bayfield County (Figure 1). Both lakes contain established Eurasian watermilfoil populations. These populations are relatively isolated with the next closest EWM waters being a distance of approximately 20 road miles.

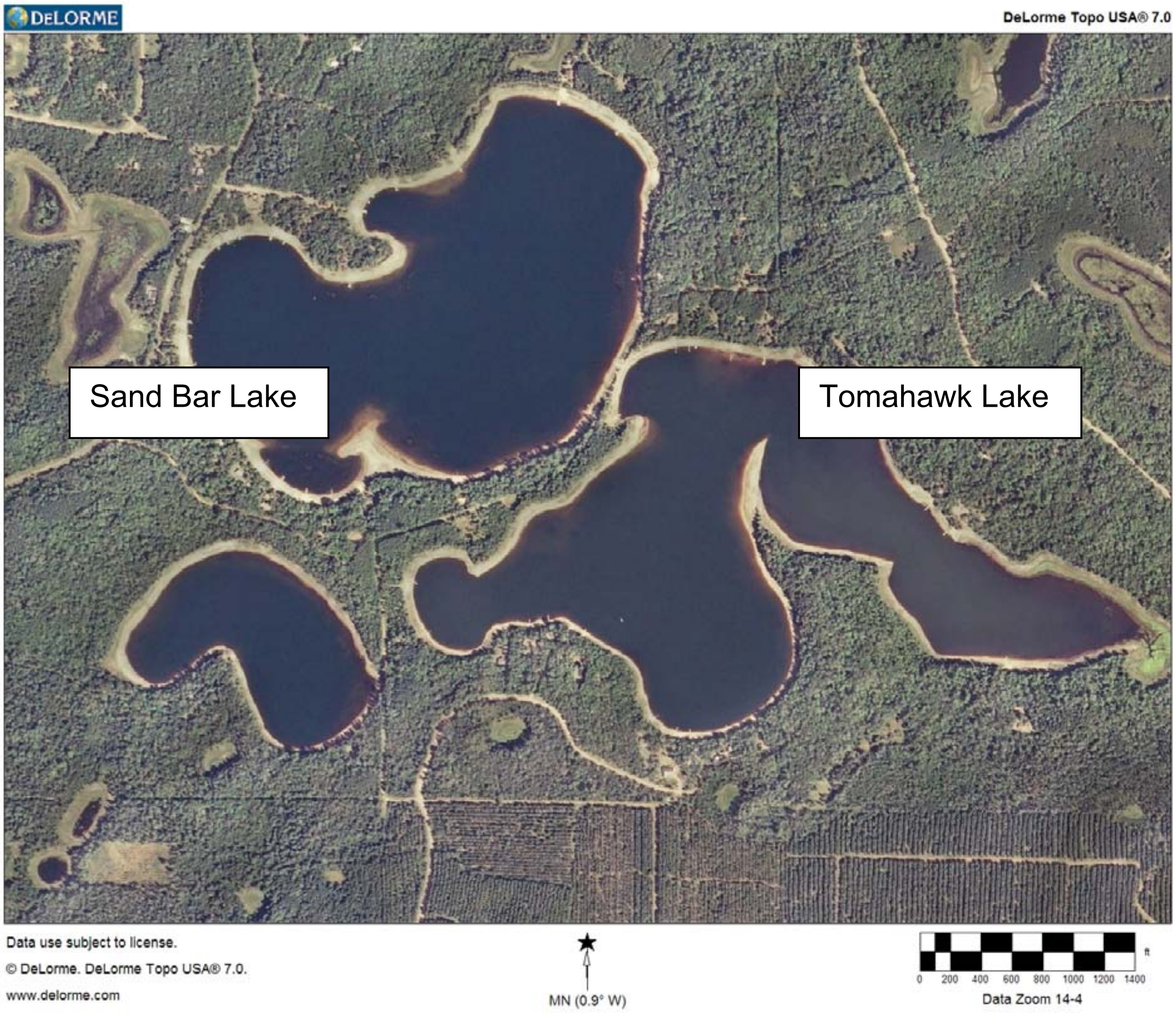


FIGURE 1. Tomahawk and Sand Bar Lakes, Town of Barnes, Bayfield County, Wisconsin.

The lakes are separated by a narrow sandbar in low-water years, but in the past the sandbar has been inundated to form one surface water system. Tomahawk Lake has an improved public access at the Town Park (Figure 2), which also includes skiing/hiking trails, a swimming beach, and picnic facilities. Sand Bar Lake is accessed by pulling watercraft over the sandbar from Tomahawk Lake.

FIGURE 2. Eurasian watermilfoil in Tomawhawk Lake, facing boat landing and Town Park. This photo was taken before the 2008 whole-lake treatment.

Physical Aspects & Watersheds

Tomahawk Lake (WBIC 2501700) and Sand Bar Lake are stratified seepage lakes. This means the lakes form distinct layers of differing water temperature and density during the summer, and they have no inlet or outlet. Instead, precipitation and groundwater are the main water sources. Tomahawk is irregularly shaped with a large littoral zone whereas Sand Bar is bowl-shaped with a narrow littoral zone.

Table 2 describes physical features, including surface area, maximum, and average depth, and water clarity as measured by secchi depth, which is a physical and chemical proxy. Secchi depth is further described in the Chemical Aspects section that follows. Northwest Wisconsin has experienced drought for over five years and currently has a 30+ inch precipitation deficit so the details provided in the table may not currently be accurate. For example, John Skogerboe estimated Tomahawk Lake surface area to be 111 acres and average depth 12 feet in 2008 (pers comm). The effect of drought and the resulting low water levels are important considerations when it comes to understanding the potential of EWM to expand in the lakes and choosing a management strategy.

TABLE 2. Physical characteristics of Tomahawk and Sand Bar Lakes, Bayfield County. WDNR data)

	TOMAHAWK	SAND BAR
SIZE (acres)	134	118
MAX, AVERAGE DEPTH (feet)	42, 13	49, 25
SECCHI DEPTH (feet)	12.2	17.8

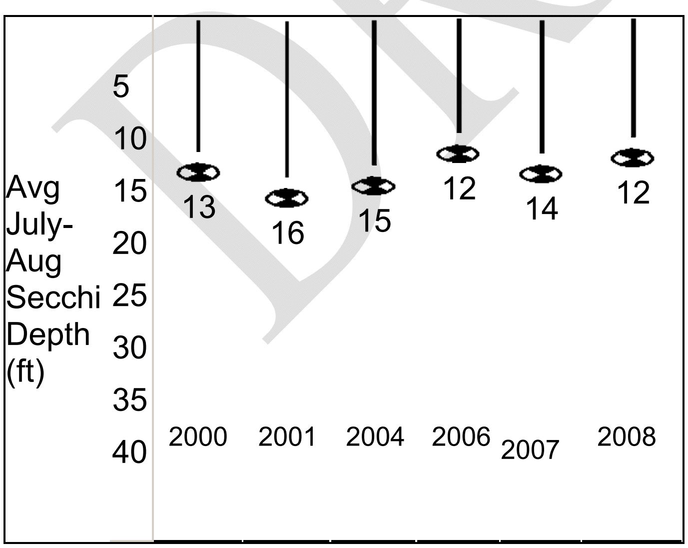
Since Tomahawk and Sand Bar Lakes sit high in the landscape, they have small watesheds. In other words, there is not a great deal of land area that drains runoff into the lakes. Thus, how property owners care for their homes, yards, and shorelines substantially affects the lake. As of 2010, many property owners on Sand Bar Lake in particular have cleared and raked large areas of shoreline. Bayfield County shoreland zoning provides for a thirty foot wide viewing and access corridor that may be raked. The areas on either side of this corridor should be left alone so that plants can grow and provide habitat while simultaneously reducing runoff pollution to the lake. Fine sediments that travel in runoff promote aquatic plant growth. Through time taller and more nuisance type plants grow and limit recreational enjoyment of the lakes.

Chemical Aspects & Water Quality

Both lakes are oligo-mesotrophic. This means they have moderate to low nutrient levels and thus only occasional algae blooms and little to moderate aquatic plant growth. With the exception of 2009, citizen lake monitoring volunteers have collected lake data annually since 2000 in Tomahawk Lake and 2001 in Sand Bar Lake. There is one data collection site at the deep hole on each lake.

Secchi Depth

Secchi depth measures water clarity. The Secchi depth is the depth at which the black and white Secchi disk is no longer visible when it is lowered into the water. The clearer the water, the great the secchi depth. The secchi readings for both lakes for every year monitored ranged from 12 – 21 feet, indicating good to very good water clarity. Sand Bar consistently had greater secchi measurements than Tomahawk. This is not surprising since Sand Bar Lake has a greater volume of water and less littoral zone, which is more conducive to clearer water.



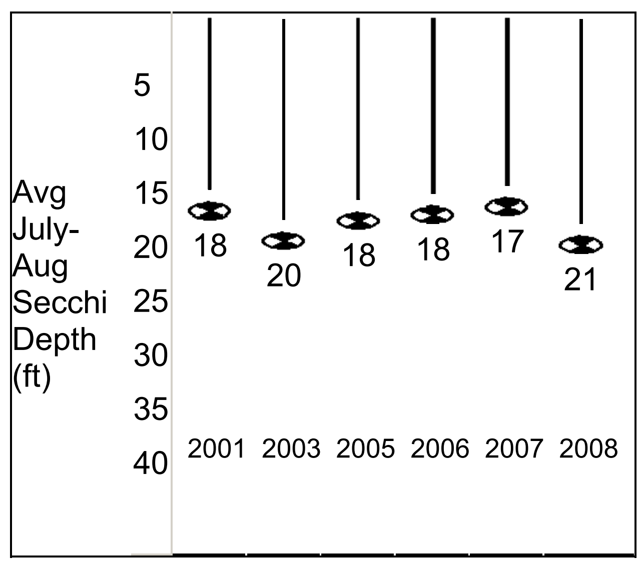
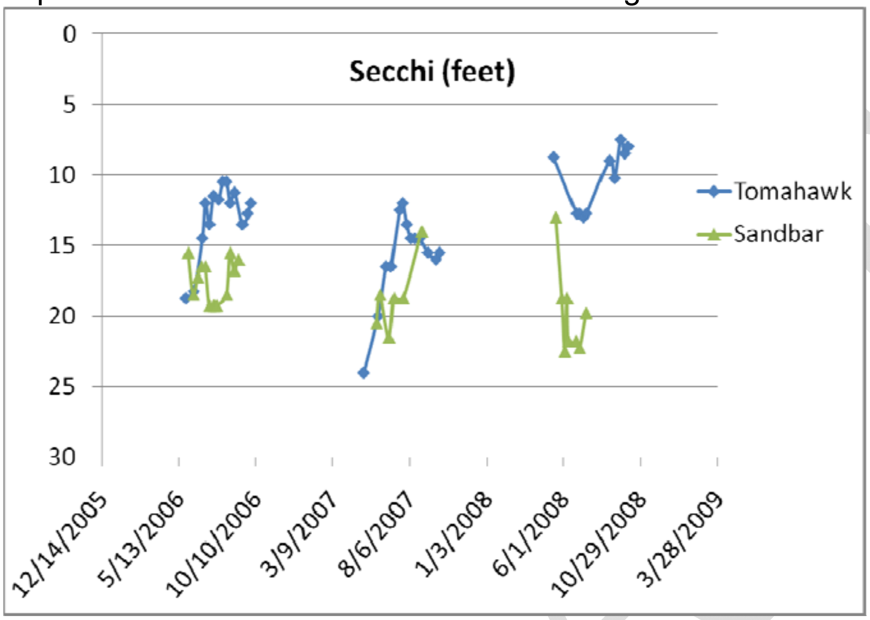


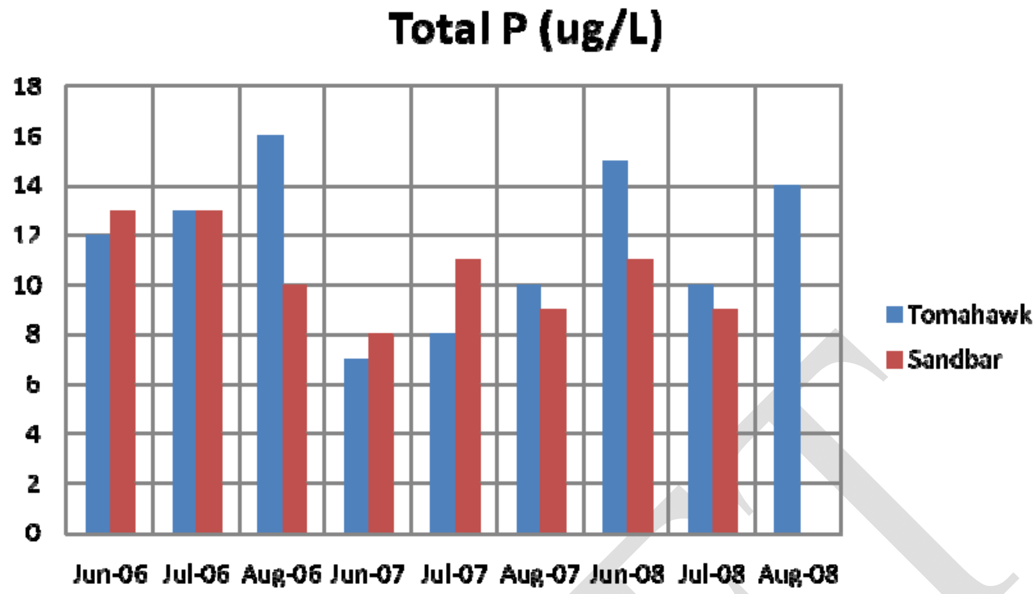
Figure 3. Tomahawk Lake (left) and Sand Bar Lake (right) past secchi averages in feet (July and August only).

Of note, is that the 2008 average summer secchi reading in Sand Bar Lake was the highest of the years monitored while Tomahawk tied for lowest summer average in that same year. Furthermore, the lowest secchi measurement (9 feet) in Tomahawk during the period of record occurred in 2008. This water clarity decline may be related to the die-off of aquatic plants after the 2008 whole-lake 2,4-D treatment and corresponding nutrient release in Tomahawk Lake. This aspect will be discussed further in the management section.



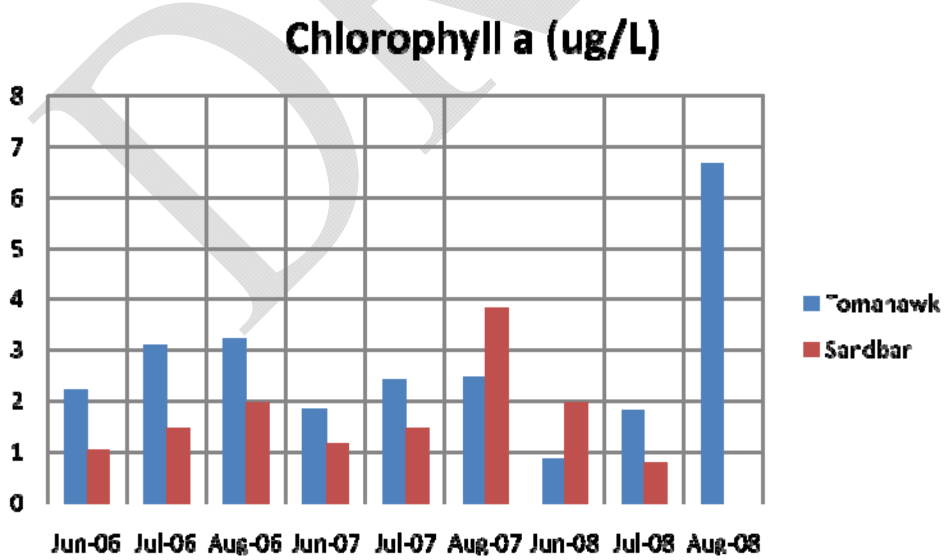
Phosphorus

Phosphorus promotes excessive aquatic plant growth and thus is a measurement of a lake's nutrient status. Twenty-five ug/L is the average total phosphorus (TP) concentration for natural lakes, and the threshold at which nuisance algae blooms typically appear. Every TP measurement taken to date in both lakes is below this threshold, and within the "good" to "very good" water quality range. From 2006 thru 2008, the Tomahawk average summer phosphorus ranged from 9 to14.5 ug/L with 2006 having the highest average and 2007 the lowest. During the same timeframe, Sand Bar ranged from 9 to 11.5 ug/L with 2008 the lowest and 2006 the highest. Tomahawk's June 2008 phosphorus increase along with the discrepancy in 2008 measurements between Tomahawk and Sand Bar Lakes further support that the whole-lake 2,4-D treatment contributed to a water quality decline in Tomahawk Lake.



Chlorophyll a

Chlorophyll a is a measurement of the green pigment in algae. Chlorophyll a measurements in both lakes were in the very good to excellent water quality range with the exception of isolated Tomahawk measurements in 2008. From 2006 thru 2008, the Tomahawk average chlorophyll a ranged from 2.45 to 4.25 ug/L with 2008 having the highest average and 2007 the lowest. During the same timeframe, Sand Bar ranged from 0.78 to 2.65 ug/L with 2008 the lowest and 2007 the highest. Again, the discrepancy in 2008 measurements between Tomahawk and Sand Bar Lakes indicate that the whole-lake 2,4-D treatment contributed to a water quality decline in Tomahawk Lake.



Trophic State Index (TSI)

Secchi depth readings, phosphorus concentrations, and chlorophyll measurements can each be used to calculate a Trophic State Index (TSI) for lakes. TSI values range from 0 – 110. Lakes with TSI values greater than 50 are considered eutrophic. Those with values in the 40 to 50 range are mesotrophic. Lakes with TSI values below 40 are considered oligotrophic.

Dissolved Oxygen

Other Chemical Parameters

Biological Aspects

Fisheries
Both lakes are managed primarily for largemouth bass, northern pike, and panfish. All of these species require aquatic plant habitat to thrive. Sand Bar Lake may have a remnant cisco, or lake herring, population that needs deepwater oxygen to thrive. Appendix A includes the most recent (2004) fisheries survey reports.

Aquatic Plants
The WDNR Integrated Science Services aquatic plant survey team completed annual point-intercept surveys on Tomahawk Lake since 2006 and Sand Bar Lake since 2007. Both lakes have moderately diverse aquatic plant communities, including visual observations, with 25 species in Tomahawk and 19 in Sand Bar during the 2007 pre-treatment year survey. Native pondweeds dominate the plant communities. Native milfoils were/are sparse, and Eurasian watermilfoil was the third and fourth, respectively, most frequently sampled aquatic plant in Tomahawk and Sand Bar Lakes. More aquatic plant detail may be found in the Management section of this Plan.

COMMUNITY INFORMATION

There are 43 land parcels on Tomahawk Lake, and 38 on Sand Bar, although a single property owner may own multiple parcels. Four parcels border both lakes.

The Barnes EWM Committee mailed 74 surveys (Appendix B) with 38, or 51.4%, returned. Sand Bar residents had a slightly higher return rate. Committee member Gus Gustafson compiled all the survey results, also in Appendix B. Key finds of the survey follow:

- Multiple-year eradication as the desired outcome (76%).
- The top control options were: large-scale (>10 acres) treatment (36.8%), and research project with 2,4-d (31.6%).
- Respondents (62%) were willing to sacrifice a decline in water clarity for EWM control.
- Seventy percent were willing to provide future financial support.

MANAGEMENT

From initial discovery in 2004 until spring of 2008, no large-scale management occurred on either lake. Property owners managed the Eurasian watermilfoil at small scales by hand-raking or using SCUBA gear to remove EWM. The lakes were considered ideal research lakes (i.e. demonstration project with a treatment and reference lake) since the discovery of EWM for the following reasons: similar size, water chemistry, watersheds/land use; and fisheries; relatively isolated EWM lakes that warrant an innovative and aggressive management approach; limited user conflict; and strong local, state, and federal partnerships to ensure a collaborative and comprehensive project.

2007-2011 Research Project
A WDNR Aquatic Invasive Species Research and Demonstration Project grant (ACEI-033-08) provided $75,000 to the Town of Barnes in fall 2007 to implement a 4-year herbicide research project on Tomahawk Lake and continue the townwide watercraft inspection program.

Goals and Methods
The goals of the research project were to 1) significantly reduce the area infested with Eurasian watermilfoil; and 2) protect the native aquatic plant community density and diversity in Tomahawk Lake. Sand Bar Lake would serve as a no-treatment reference Lake. The treatment approach involved a whole-lake dose of 2,4-D applied to Tomahawk Lake in spring. Spring herbicide treatments are more effective at reducing aquatic invasive plant populations because exotic species are more sensitive to herbicides when biomass is minimal; sensitive native species are still dormant; and there is minimal initial microbial degradation of the herbicide (i.e. the lakes are less productive at that time of year, and thus bacteria that break down herbicides are not as active).

The herbicide treatment approach, designed by John Skogerboe of the Corps in conjunction with WDNR and the Committee, involved applying a low dose of 2,4-D to all of Tomahawk Lake in early spring 2008 when water temperatures approached 60 degrees F. The low 2,4-D dose was 0.5 mg/L, which is ¼ of the standard, label-recommended dose. This dose was selected based on previous tank and demonstration projects from which a relationship developed between 2,4-D concentration and exposure time and the corresponding control of Eurasian watermilfoil (Figure 3). Depending on 2008 results, follow-up maintenance treatments would occur in 2009-2011. Herbicide residuals were monitored before and after the 2008 treatment, and aquatic plants and water quality would be monitored on both lakes from 2007-2011.

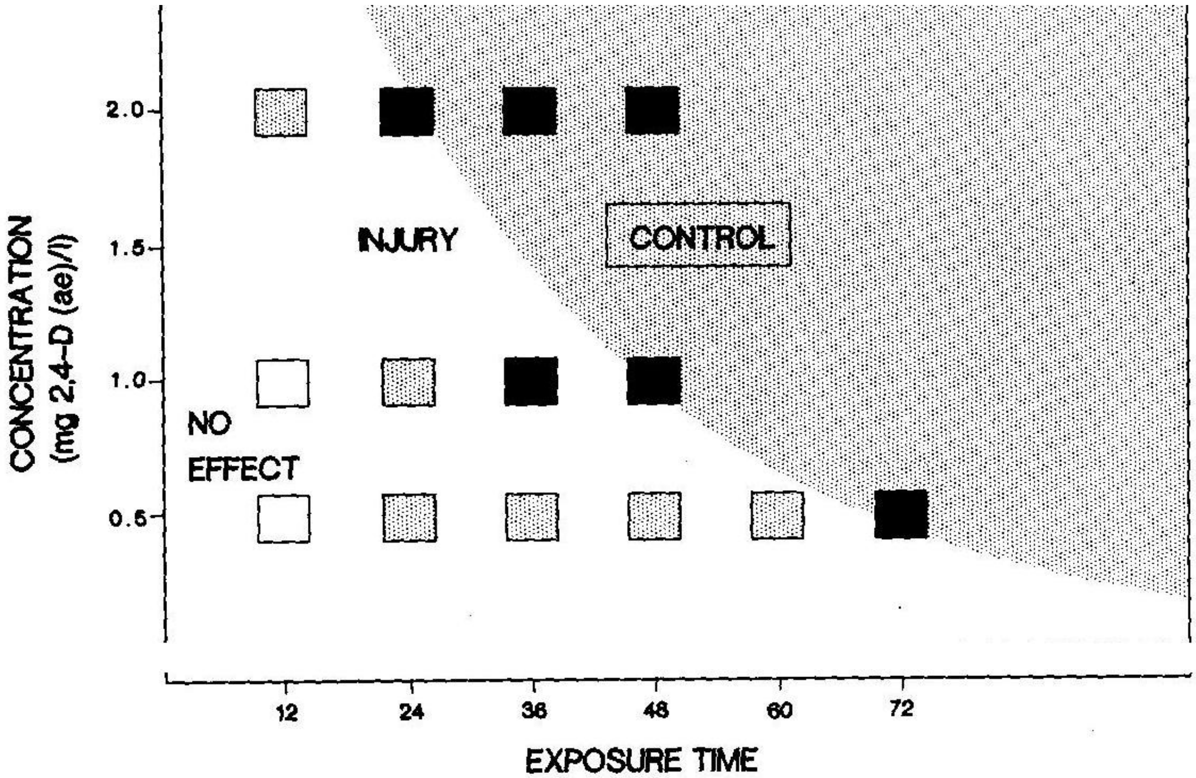


Figure 3. 2,4-D concentration/exposure time relationship and the resultant control of Eurasian watermilfoil.

Results

2,4-D Herbicide Residuals

A licensed herbicide application company treated Tomahawk Lake at the prescribed 0.5 mg/L application rate on 20 May 2008. Local volunteers collected herbicide residual samples from multiple sites in both lakes, as well as drinking water wells up to 5.5 months post-treatment. 2,4-D was not detectable in Sand Bar Lake nor the well samples. It was detectable in Tomahawk Lake, however, until the last monitoring event in October, approximately 160 days after treatment and more than twice as long as the Exposure Time horizontal axis in Figure 3. This was a much longer exposure time than predicted based on previous research.

Water Quality

2008 secchi, total phosphorus, and chlorophyll a measurements all indicate a water quality decline in Tomahawk Lake. Sand Bar Lake, however, did not indicate a decline that year and instead had the best summer averages for each parameter. The water quality decline in the treatment lake and improvement in the reference lake indicate that the herbicide treatment did impact water quality. Unfortunately, water quality data were not collected in 2009 so it's difficult to know whether the decline was temporary or not. Monitoring will continue in 2010 and provide a better picture of the duration and intensity of water quality changes from the treatment in Tomahawk Lake.

Aquatic Plants

As of October 2009, seventeen months post-treatment, Corps and WDNR research scientists as well as local property owners have not observed EWM in Tomahawk Lake. Native aquatic plants, however, have also been reduced. The biomass, or the amount of living material, (Figure 4), frequency of occurrence, and species richness of natives (Figure 5) decreased after the herbicide treatment. The reductions in native aquatic plant biomass, frequency of occurrence, and species richness were unexpected impacts of the whole-lake 2,4-D treatment. Even more unexpected was that pondweed, which are monocots and typically not susceptible to 2,4-D, frequencies of occurrence decreased.

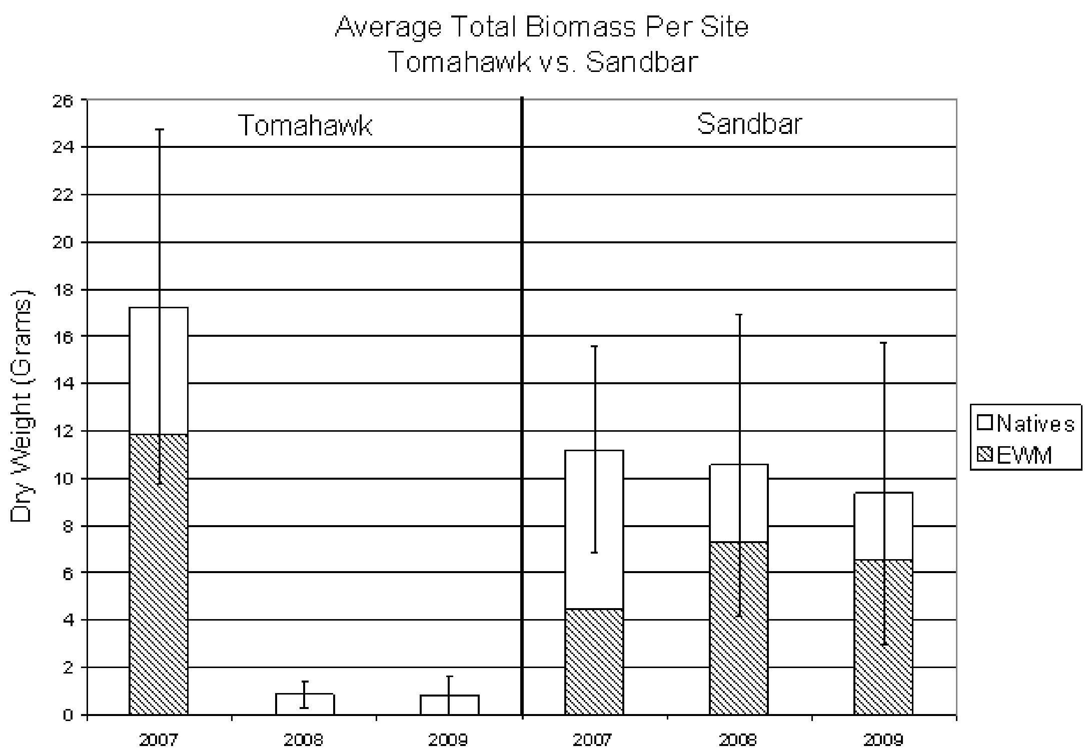


Figure 4. Average aquatic plant biomass (grams dry weight) from randomly distributed sites on both Tomahawk (2,4-D treatment) and Sandbar (reference) Lakes.

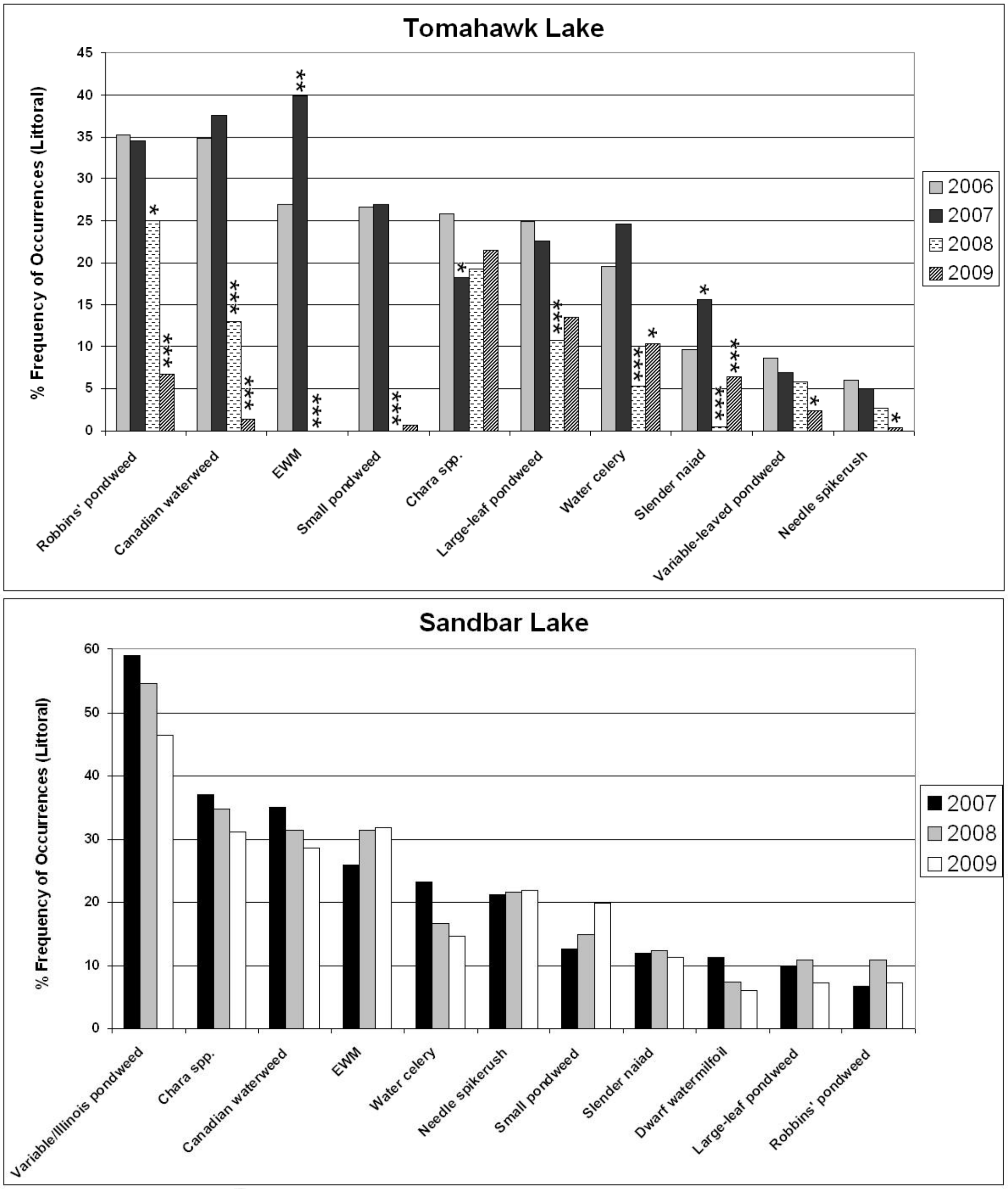


Figure 5. *Top:* Littoral percent frequency of occurrences of aquatic plant species on Tomahawk Lake. Pre-treatment years (2006 and 2007) are solid colors while post-treatment years (2008 and 2009) are dashed. Significant differences between consecutive years are indicated by: (***) $p < 0.001$, (**) $p < 0.01$, (*) $p < 0.05$. *Bottom:* Littoral percent frequency of occurrences of macrophyte species on Sand Bar Lake. No significant changes in the aquatic macrophyte community were observed.

Conclusions

Tomahawk Lake

Goal 1 to significantly reduce the area infested with Eurasian watermilfoil was met, but Goal 2) to protect the native aquatic plant community density and diversity was not. Unexpected outcomes included: long herbicide residual times; a decline in water clarity; and decreased native aquatic plant biomass, species richness, and frequencies of occurrence in Tomahawk Lake. Because Tomahawk Lake has low productivity (i.e. is oligo-mesotrophic) and 2,4-D has never been used there, the bacteria that degrade the herbicide may not have been present or present in lesser amounts than in a more productive lake where 2,4-D is regularly used. Indeed the 2,4-D Conentration/Exposure Time relationship was developed from experiments in more productive systems.

Sand Bar Lake
Meanwhile, there were no significant changes in the aquatic plant community of Sand Bar Lake. While Eurasian watermilfoil frequency of occurrence increase from 2007 to 2009, the increase was not statistically significant. Furthermore, no 2,4-D was detected in Sand Bar Lake, and water clarity/quality did not decline in 2008.

Alternatives Analysis
Appendix C includes details on aquatic plant management alternatives including a description of each activity, whether a permit is needed and the pros and cons involved. Table X repeats those alternatives and provides comments for implementation on Tomahawk and Sand Bar Lakes.

ALTERNATIVE	**FURTHER DETAIL**	**COMMENTS**	
		Tomahawk	**Sand Bar**
No management	na	Community wants management.	
Mechanical control	Handpulling/raking	Control of recolonizing individual plants or small beds.	Small scale control around docks and use areas. Complimentary approach to large-scale management.
	Harvesting	Lakes and EWM abundance too small to justify harvesting and related expense.	
Biological control	EWM weevils	Bluegill populations probably too abundant for weevils to thrive. Lakes do not have vegetated shorelines needed for overwintering. There is no Nothern watermilfoil and thus native weevil populations are unlikely to be present making stocking particularly expensive even if other confounding factors didn't exist	
	Pathogens	Not currently approved for use in Wisconsin.	
	Allelopathy	Current low water and future water level fluctuations make intentional planting of native aquatic plants challenging.	
	Planting native plants	Current low water and future water level	

		fluctuations make intentional planting of native aquatic plants challenging.	
Physical control	Fabrics/bottom barriers	Unlikely to be permitted because of adverse effects on benthic community including native plants and animals. Not feasible for large-scale control.	
	Drawdown	Not an option in seepage lakes	
	Dredging	Cost-prohibitive and not grant eligible. May disturb potential EWM seedbank and thus promote recolonization.	Cost-prohibitive and not grant eligible.
	Dyes	Not feasible in the long-term.	
	Non-point source nutrient control	Complimentary approach to more direct, chosen management alternative.	
Chemical control	2,4-D	Control of recolonizing individual plants or small beds.	Large-scale or whole-lake control at low dose (i.e. <0.5 mg/L).
	Endothall	Kills native pondweeds, which are abundant in both lakes.	
	Diquat	Kills native plants that are abundant in both lakes.	
	Fluridone	Not feasible for absent or small EWM populations.	
	Glyphosate	Not intended for EWM control.	
	Triclopyr	Not feasible for absent or small EWM populations. Potentially cosh-probhitive.	Photodegradation of herbicide may be preferable to 2,4-D microbial degradation in clear, low nutrient lake. Potentially cost-prohibitive.
	Copper compounds	Not intended for EWM control. Unlikely to be permitted	

The alternatives analysis results in the following four potential management strategies: handpulling/raking, 2,4-D, fluridone, and triclopyr.

Handpulling/Raking

DNR allows, without permit, handpulling or raking aquatic plants in an area up to 30 feet wide along each property owner's shore unless the target plant is an aquatic invasive species (i.e. Eurasian watermilfoil or curlyleaf pondweed). In the case of AIS, there is no limit on the size of the removal area. Handpulling and raking tend to be self-limiting, though, and removing vast areas with these methods is not practical. Furthermore, the clear water promotes growth in deeper areas, which further limits the removal capacity from the shore or a boat;

SCUBA diving and handpulling could overcome the depth barrier, though. If the Sand Bar community desires to simply control nuisance growth around docks and other recreational use areas, handpulling and raking are reasonable management options. Depending on location and timing, handpulling and raking may also be practical solutions should single EWM plants recolonize Tomahawk Lake.

2,4-D
2,4-D is one of the most common systemic herbicides used both in terrestrial and aquatic environments today. There are at least 1500 2,4-d products registered for use with the U.S. Environmental Protection Agency. 2,4-d can be selective for EWM when used at the right time and dose. 2,4-d comes in granular and liquid forms with liquid being a better choice for large-scale or lakewide treatments, and granular more appropriate for treating individual beds to minimize herbicide drift. If not applied in at precise times and doses, however, 2,4-d can also kill native dicots, including native watermilfoils, lily pads, and watersheild that exist in both Tomahawk and Sand Bar Lakes. Lakewide treatment of Sand Bar Lakes with liquid 2,4-d is estimated to cost $10,000 - $20,000.

Fluridone
Fluridone is a non-selective systemic herbicide. It requires very long exposure times (e.g. > 3 months), but it may be effective at very low concentrations. Its common trade name is SONAR. It works best where the entire lake or flowage system can be managed, but not in spot treatments or high water exchange areas. Fluridone does not appear to have any long or short term adverse effects on fish or other aquatic invertebrates if label directions are followed. EPA tolerance for fluridone residues in fish is 0.5 ppm. Fluridone is approximately twice as expensive as 2,4-d.

Triclopyr
Triclopyr is a systemic herbicide, similar to 2,4-d, used for control of aquatic dicots. It common trade name is Garlon 3A or Renovate. Triclopyr photo-degrades quickly in an aquatic environment making its use most effective in systems with low water-exchange where contact with target plants can be maintained for longer periods of time, though not as long as Fluridone. Low concentrations of this herbicide can be effective for EWM control when exposure time reaches 48 to 72 hours (Netherland and Getsinger 1992). It does not appear to significantly affect pondweeds and coontail (Clayton & Clayton 2001). As of 2005, Triclopyr was not a registered herbicide and can only be used under an experimental use permit in the United States (Cooke et al. 2005). Triclpyr is approximately four to six times as expensive as 2,4-d.

Implementation Plans
The following Implementation Plans are a result of the lake user survey and June 5, 2010 meeting with Tomahawk and Sand Bar Lake property owners where it

was clear that residents preferred large-scale (i.e. lakewide) liquid 2,4-d treatment on Sand Bar Lake to build off the Tomahawk Lake success at controlling Eurasian watermilfoil. Because 2,4-d impacted native plants on Tomahawk, as well, however, the dose will be less on Sand Bar Lake.

TOMAHAWK LAKE GOAL:
Ensure that Eurasian watermilfoil remains absent from Tomahawk Lake by continuing to monitor in order to detect it early and respond quickly should it reappear.

Objectives:

- Monitor three times per year in spring, summer, and fall.
- Immediately manage any new EWM colony keeping total population, whether single or multiple beds, to less than one acre in size or 1% of the lake's surface area.

Management Strategy:
No management will occur unless EWM is discovered. Upon discovery, WDNR, the Army Corps, and local community will determine the best strategy with the intention to again eradicate the EWM population.

Implementation Details:

- Army Corps completes visual quick survey in spring and fall 2011-15
- WDNR completes whole-lake point-intercept survey for all species in summer 2011-15
- Volunteers continuously monitor for EWM and other AIS and follow the rapid response plan in Attachment D.
- Volunteers continue to collect Citizen Lake Monitoring Network and bi-weekly temperature/dissolved oxygen profiles.

SAND BAR LAKE GOAL:
Eradicate Eurasian watermilfoil from the lake for at least three years while minimizing impacts to native aquatic plants.

Objectives:

- Reduce total EWM population, whether single or multiple beds, to less than one acre in size or 1% of the lake's surface area.
- Do not decrease frequency of occurrence of native plants, particularly monocots that are less susceptible to 2,4-d damage/death.

Management Strategy:
Low-dose, lakewide spring liquid 2,4-d application.

Implementation Details:

- Corps determines lake volume for treatment in Spring 2011. Depending on 2010 stratification, the hypolimnetic area may not be included in the volume calculation.
- Town of Barnes bids herbicide application using treatment product and concentration recommended by Corps. .
- Treatment occurs when water temps approach 55◦F, or Corps determines EWM growth is optimal for treatment.
- Herbicide applicator applies 0.25-0.30 mg/L liquid 2,4-d (trade name DMA 4) to entire surface area of Sand Bar Lake. Final concentration will be determined after 2010 treatment season when other statewide research project results are better understood.
- Army Corps completes visual quick survey in spring and fall 2011-15
- WDNR completes whole-lake point-intercept survey for all species in summer 2011-15
- Volunteers continue to collect Citizen Lake Monitoring Network and bi-weekly temperature/dissolved oxygen profiles.
- If EWM still exists post-treatment, WDNR and Army Corps will work with the local community to determine the next management step. Timing, weather, location, and abundance will all drive the decision-making.
- Volunteers continuously monitor for EWM and other AIS and follow the rapid response plan in Attachment D should EWM reappear.

Well Testing

CBCW

FISHERIES INFORMATION SUMMARY

Tomahawk Lake - Bayfield County Year: 2004

Report by: Cordell H. Manz

General Lake Description

Tomahawk Lake is a landlocked, soft-water seepage lake of 134 acres and a maximum depth of 42 feet located in southwestern Bayfield County. The water is very clear with high transparency. Littoral substrates are almost entirely sand with muck also present in bay areas. The shoreline is firm upland consisting primarily of birch, oak, aspen, maple, and white, Norway and Jack pine. Native aquatic vegetation in Sand Bar Lake is moderate with species present including: wild celery, watershield, water smartweed, yellow water lily, *Elodea sp*., dwarf water milfoil, and bushy, large-leaf, fern, and variable-leaf pondweed. Dense areas of Eurasian water milfoil (*Myriophyllum spicatum*), an exotic species, were also discovered in Tomahawk Lake in 2004. The lake has a moderate amount of development with a town-owned public access and picnic area on the northeast shoreline. The lake is subject to wide fluctuations in water level. In years with high water, the narrow sandbar that divides Tomahawk Lake from Sand Bar Lake may be under water providing a navigable access to Sand Bar Lake.

Past Management

Fish species present in Tomahawk Lake include: northern pike, large- and smallmouth bass, cisco, walleye, bluegill, yellow perch, black crappie, green and pumpkinseed sunfish, hybrid sunfish, rock bass, yellow and brown bullhead, white sucker, bluntnose minnow, central mudminnow, johnny darter, and golden, common, and mimic shiners. Largemouth bass stocked in 1933 and 1938 are the only stocking events recorded for Tomahawk Lake, with the exception of 1,348,970 walleye fry that were stocked in 1935. A subsequent electrofishing survey in 1962 and a comprehensive fish inventory performed in 1972 using three gear types (electrofishing in May, fyke netting in July, and gill netting in October) found no walleye and it was concluded that basic management should be for largemouth bass and panfish, without further stocking. Survey work in 1972 indicated largemouth bass were the dominant gamefish followed by smallmouth bass and northern pike. Bluegill were the most abundant panfish species, followed by pumpkinseed sunfish and black crappie. Cisco were also common in 1972, collected during the gill netting portion of the survey. More recent management has included the adoption of a 26-inch minimum size and two/day bag limit for northern pike since 1995. In conjunction with this, a pre-regulation evaluation and a post-regulation evaluation for northern pike was conducted by sampling with fyke nets in the spring of 1995 and 1999. The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) also performed an electrofishing survey in October 1994 in response to concerns raised by the Property Owners Association, Inc., about possible fish declines in Tomahawk Lake.

Recent Fish Survey Results

In 2004, Tomahawk Lake was studied as part of the DNR's statewide baseline lake monitoring program. This program is designed to investigate the health of a lake's aquatic ecosystem by sampling its fish community. For Tomahawk Lake this was done by conducting one fall electrofishing circuit (targeting gamefish, panfish, and non-game fish species) and also summer mini-fyke netting (targeting juvenile and non-gamefish species). Analyses of results from periodic monitoring can be used to look for changes and/or trends in the fish community.

Fall Electrofishing. Electrofishing was conducted on October 10, 2004 on Tomahawk Lake. Gamefish were collected along the entire shoreline, whereas panfish and non-game species were collected within two half-mile index stations. A total of 426 fish of eleven different species were collected. Bluegill were the most abundant, with 259 captured made up 60.8% of the overall catch (Table 1). Most of the bluegill sampled were small, ranging from 2.5 – 6.5 inches in length (Fig. 1) and a mean size of 4.1 inches. Yellow perch were the second most abundant fish collected and made up 14.1% of the overall catch. Sixty were sampled, with an average size of 2.9 inches. The majority of yellow perch captured were young-of-the-year, with only twelve of sixty measured greater than three inches. Other panfish collected were nine pumpkinseed sunfish and five yellow bullheads.

Northern pike were the most abundant gamefish sampled, accounting for 5.6% of the total catch. A total of twenty-four were collected with a mean size of 19.5 inches. Size distribution of northern pike captured was relatively average (see Fig. 2), with only one fish that was over the legal size limit of 26 inches. Largemouth bass were the second most abundant gamefish with nine collected and an average size of 10.9 inches. One bass was sampled over the minimum length limit of 14.0 inches; however, this individual was 19.5 inches and indicates potential for large bass in Tomahawk Lake. One walleye (24.8 in.) was also caught. According to DNR records, this walleye is only the second sampled by fisheries personnel since they were initially stocked in 1935; the other being a 23.8 inch individual collected while fyke netting in the spring of 1999. The presence of these fish either represent a remnant self-sustaining walleye population, or fish that were stocked or transferred by private individuals into Tomahawk Lake. Non-game fish species collected while fall electrofishing included thirty-one mimic shiners, twenty-six bluntnose minnows, and one johnny darter and central mudminnow each.

Table 1: Summary of Gamefish and Panfish Collected during 2004 Fall Electrofishing					
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**	**# ≥ 26 inches**	**# ≥ 34 inches**
Northern Pike	24	19.5	14.1 – 26.8	1	0
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**	**# ≥14 inches**	**# ≥ 18 inches**
Largemouth Bass	9	10.9	4.8 - 19.5	1	1
Walleye	1	24.8	24.8	1	1
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**	**# ≥ 7 inches**	**# ≥ 10 inches**
Bluegill	259	4.1	1.7 – 6.8	0	0
Pumpkinseed	9	4.5	3.2 – 6.9	0	0
Yellow Perch	60	2.9	2.2 – 5.5	0	0
Yellow Bullhead	5	8.6	8.0 – 9.6	5	0

Figure 1. Percent Length Distribution of Bluegill Collected during 2004 Fall Electrofishing on Tomahawk Lake.

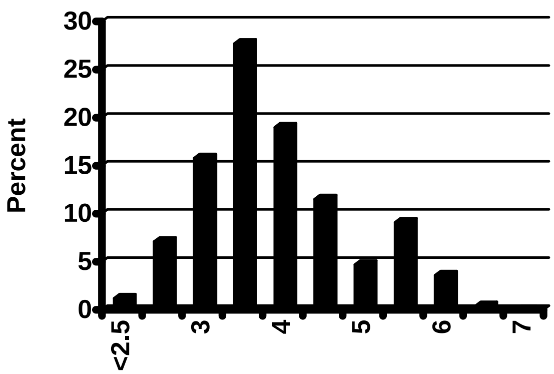
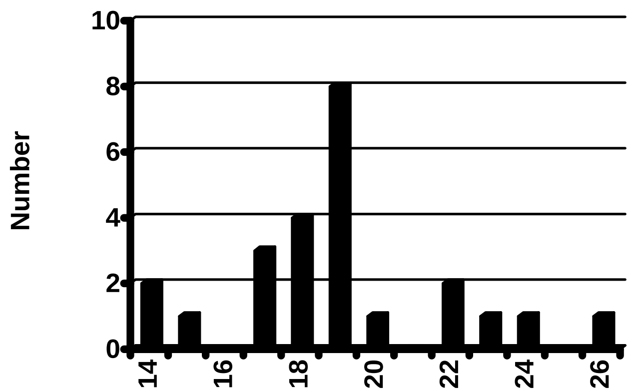


Figure 2. Length Distribution of Northern Pike Collected during 2004 Fall Electrofishing on Tomahawk Lake.



Mini-fyke netting. Mini-fyke netting conducted on August 25-26, 2004 resulted in capturing 651 fish. Excluding hybrids, five different species (see Table 2) were collected using a total of six nets set overnight for one day. Five hundred and ninety-six (91.6%) of these fish were either young-of-the-year or juvenile bluegill. Young-of-the-year largemouth bass were the second most abundant fish sampled, with thirty (4.6%) caught. Other fish captured were fourteen green sunfish, six pumpkinseed sunfish, two yellow perch, two bluegill X green sunfish hybrids, and one pumpkinseed X green sunfish hybrid.

Table 2: Summary of Fish Collected during 2004 Summer Mini-Fyke Netting (Six Nets Set 1 Day) for Tomahawk Lake.			
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**
Bluegill	596	1.8	0.9 – 4.6
Largemouth Bass	30	1.9	1.2 – 2.4
Yellow Perch	2	3.1	2.3 – 3.8
Green Sunfish	14	2.9	1.8 – 3.3
Pumpkinseed	6	3.1	2.3 – 3.8
Bluegill X Green Sunfish Hybrid	2	3.1	3.0 – 3.2
Pumpkinseed X Green Sunfish	1	3.0	3.0

Future Management

It is recommended that Tomahawk Lake continue to be managed for largemouth bass, northern pike, and panfish. No regulation changes are recommended at this time. Bag limits for Tomahawk Lake are as follows: two/day for northern pike, with a minimum size limit of 26 inches; five in total/day for bass, with a minimum size of 14 inches; 5/day for walleye, with a minimum size of 15 inches, and 25 in total for panfish with no size restrictions.

Results from fyke netting April 12-16, 1999 indicated that at that time Tomahawk Lake had a fairly balanced fish population providing a quality fishery for northern pike, largemouth bass, and panfish species. Fyke net sampling during the spring just after ice-out, when northern pike are spawning is a more effective method of evaluating northern pike populations than is fall electrofishing. Although only one northern pike was sampled in 2004 that was over the legal size of 26.0 inches, in 1999 a total of five were sampled over that size. In all, a total of seventy-three northern pike were sampled in 1999, the largest being 34.2 inches in length. Average size of northern pike sampled increased from 19.3 inches in 1995 (pre-regulation survey) to 19.9 inches in 1999 (post-regulation survey). The largest northern pike collected in 1995 was 26.4 inches.

Historically, largemouth bass have been the dominant game fish in Tomahawk Lake. Growth rates as indicated from previous surveys were above the average for these types of soft-water seepage lakes. The potential for larger-sized bass is still present, as demonstrated by capturing a 19.5 inch largemouth bass in 2004. Although only nine largemouth bass were collected in 2004, and only three were collected in both 1995 and 1999 surveys, these numbers probably do not accurately reflect true densities for bass, since the timing of these three surveys was not appropriate for assessing the bass population.

No black crappie were collected in 2004; however, 223 were sampled in 1999 with a size range of 4.6 – 12.2 inches, and a mean size of 8.4. Springtime fyke netting is also a more appropriate method for sampling black crappie than is fall electrofishing. Bluegill captured in 1999 were relatively average in size distribution (n = 37, 4.0 – 7.8 in.), and comparable in size to those sampled in 2004. Bluegill still provide the opportunity for harvest, as do other panfish species such as yellow perch, pumpkinseed and hybrid sunfishes also present. Hybrid sunfishes are most likely green sunfish crosses with pumpkinseed or bluegill sunfish.

The unfortunate discovery of Eurasian water milfoil in Tomahawk and Sand Bar Lake (Bayfield County) in 2004 probably represents the most important long-term management concern for these two lakes. Eurasian water milfoil can have the impact of greatly changing habitat by adversely altering its plant community. Its ability to spread rapidly by fragmentation and effectively block out sunlight needed for native plant growth often results in monotypic stands, and loss of native plants. Dense stands of Eurasian milfoil provide only a single habitat and threaten aquatic communities in several ways. For example, predator-prey relationships are disrupted by inhibiting larger fish from effectively preying on small fish and invertebrates. This disruption can eventually lead to changes in the overall structure of the fish community and have negative impacts on a lake's fishery. In addition, monotypic stands of Eurasian milfoil results in causing less diversity and numbers of invertebrates, reduces the number of nutrient-rich native plants available for waterfowl, and inhibits recreational uses like swimming, boating, and fishing. Nutrient cycling from sediments to the water column by Eurasian water milfoil may lead to deteriorating water quality and algae blooms of infested lakes.

The negative impacts associated with Eurasian water milfoil show the importance of developing a long-term management strategy that will 1) slow its spread within Tomahawk and Sand Bar Lake, while also protecting the native plant community, and 2) help stop its spread to other nearby lakes in Bayfield and Douglas County. Any plant removal within Tomahawk or Sand Bar Lake should be limited to Eurasian milfoil. It is a priority that native plant species be left intact with the objective of protecting and encouraging their growth. As a source of infestation for other lakes in proximity to Tomahawk and Sand Bar Lake, it is also crucial that steps are taken to educate lake users about stopping the spread of Eurasian milfoil and other exotic species to other lakes. Lake residents, local anglers, local township and county governments, local sports clubs, and lake associations should partner together with the goal of dealing with an issue that threatens overall water quality, habitat, and the dependent fishery. The harmful effects of Eurasian water milfoil or other exotic species crosses the interest of area anglers, boaters, and lakeshore owners alike. Any future actions or development on Tomahawk Lake and un-infested local lakes need to take the utmost precaution to safeguard valuable native plants as vital habitat needed to sustain the fishery resource.

For more information on Tomahawk Lake, contact:
Fisheries Biologist
Wisconsin DNR
6250 S. Ranger Road
Brule, WI 54820
Phone: (715) 372 – 8539 ext.121

FISHERIES INFORMATION SUMMARY

Sand Bar Lake - Bayfield County Year: 2004

Report by: Cordell H. Manz

General Lake Description

Sand Bar Lake is a landlocked soft-water seepage lake of 117 acres and a maximum depth of 51 feet. Littoral bottom types are almost entirely sand with muck also present. A firm shoreline is bordered primarily with upland conifer, with a few scattered areas of hardwoods. Native aquatic vegetation in Sand Bar Lake is moderate with species present including: wild celery, watershield, water smartweed, water lily, dwarf water milfoil, bulrush and pondweed species. Several dense beds of Eurasian water milfoil (*Myriophyllum spicatum*), an exotic species, were also discovered in Sand Bar Lake in 2004. The lake is moderately developed and has no public access; however, access is available by portaging over a narrow sandbar that runs between Tomahawk Lake and Sand Bar Lake – although this is privately owned as well. An intermittent channel connecting the two lakes at this same area is sometimes navigable when lake levels are sufficiently high.

Past Management

Historic management of Sand Bar Lake has been for bass, cisco, and panfish. More recent management has included the adoption of a 26-inch minimum size and two per day bag limit for northern pike in 1995. Fish stocking has been limited to five occasions; largemouth bass fingerlings were stocked in 1937, 1938, 1939 and 1949, and yellow perch fingerlings were also stocked in 1938. A comprehensive fish inventory done during 1972 using various gear types indicated that largemouth and smallmouth bass were the predominant gamefish, and bluegill and yellow perch were the most abundant panfish species. Cisco were also common, with some large northern pike also present. More recently, a pre-regulation evaluation and a post-regulation evaluation for northern pike were performed using fyke nets in the spring of 1995 and 1999 respectively. Fish species present in Sand Bar Lake include: northern pike, large- and smallmouth bass, cisco, bluegill, green and pumpkinseed sunfish, yellow perch, black crappie, rock bass, yellow bullhead, white sucker, redhorse, rainbow smelt, bluntnose minnow, and golden, mimic, and blacknose shiners.

Recent Fish Survey Results

In 2004, Sand Bar Lake was studied as part of the DNR's statewide baseline monitoring program. This program is designed to investigate the health of a lake's aquatic ecosystem by sampling its fish community. For Sandbar Lake this was to be done by conducting one fall electrofishing circuit (targeting gamefish, panfish, and non-game fish species) and late-summer mini-fyke netting (to target juvenile and non-gamefish species). Analyses of results from periodic monitoring can be used to look for changes and/or trends in the fish community.

Fall Electrofishing. There is no public boat landing on Sandbar Lake and we were unable to find adequate private access in order to launch the boomshocker; therefore sampling by electrofishing was not done in 2004.

Mini-fyke netting. Summer mini-fyke netting conducted on August 24 - 25 resulted in capturing 368 fish and ten different species, using a total of six nets set overnight for one day. Two hundred and forty-four (66.3%) of these fish were either young-of-the-year or juvenile bluegill. Mimic shiners and bluntnose minnow were the second and third most abundant fish sampled. With forty-eight (13.0%) and thirty-one (8.4%) captured respectively, they may represent two of the main forage species in Sand Bar Lake. Young-of-the-year largemouth bass were the fourth most abundant, with twenty-five (6.8%) collected in all. Other fish caught were: six green sunfish, five black crappie, four bluegill X green sunfish hybrids, two yellow perch, and one rock bass, yellow bullhead and blacknose shiner each.

Table 1: Summary of Fish Collected during 2004 Summer Mini-Fyke Netting (Six Nets Set 1 Day) for Sand Bar Lake.

Species	# Caught	Mean Size (In.)	Size Range (In.)
Bluegill	244	2.6	0.8 – 4.6
Largemouth Bass	25	1.6	1.1 – 2.1
Yellow Perch	2	3.3	2.3 – 4.2
Black Crappie	5	1.5	1.4 – 1.8
Rock Bass	1	2.3	2.3
Green Sunfish	6	2.7	1.5 – 3.6
Bluegill X Green Sunfish Hybrid	4	4.1	3.6 – 4.5
Yellow Bullhead	1	5.0	5.0
Bluntnose Minnow	31	1.7	1.2 – 3.1
Mimic Shiner	48	1.8	1.3 – 2.6
Blacknose Shiner	1	2.5	2.5

Future Management

Although it was unfortunate that we were unable to sample adult gamefish and panfish at this time, fyke netting results from April 12-16, 1999 indicated that Sand Bar Lake has a fairly balanced fish population providing a quality fishery for northern pike, largemouth bass, and panfish species. During the 1999 survey, northern pike and largemouth bass had good size structures with size ranges of 12.2 - 40.7 inches and 8.2 – 19.7 inches, respectively (Table 2). We were unable to compare northern pike data from 1995 (pre-regulation change) with data from 1999 (post-reg. change). Timing of 1995 sampling (May 3-5) occurred after northern pike had spawned and resulted in too small a sample size (n=12). Black crappie collected in 1999 exhibited better than average size structure and very good condition. Bluegill collected in 1999 were relatively average in size distribution, but still provide opportunity for harvest, as do pumpkinseed, rock bass, and hybrid sunfishes also present in Sand Bar Lake. Hybrid sunfishes are most likely green sunfish crosses with bluegill or pumpkinseed sunfish.

Table 2: Summary of Gamefish and Panfish Collected during 1999 Spring Fyke Netting Survey

Species	# Caught	Mean Size (In.)	Size Range (In.)	# ≥ 26 inches	# ≥ 34 inches
Northern Pike	275	22.1	12.2 – 40.7	16	3
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**	**# ≥14 inches**	**# ≥ 18 inches**
Largemouth Bass	12	11.9	8.2 – 19.7	4	1
Species	**# Caught**	**Mean Size (In.)**	**Size Range (In.)**	**# ≥ 7 inches**	**# ≥ 10 inches**
Bluegill	128	5.1	3.5 – 8.5	9	0
Black Crappie	101	9.5	7.3 – 13.5	101	40
Pumpkinseed	10	6.6	4.8 – 7.8	4	0
Yellow Perch	8	4.4	2.0 – 5.6	0	0
Hybrid Sunfish	16	6.5	5.3 – 7.1	3	0
Yellow Bullhead	95	10.9	8.8 – 13.6	95	74

It is recommended that Sand Bar Lake continue to be managed for northern pike, largemouth bass, cisco, and panfish, with no regulation changes at this time. Bag limits are: two/day for northern pike, with a minimum size limit of 26 inches; five in total/day for bass and a minimum size of 14 inches; and 25 total/day for panfish, with no size restrictions.

The unfortunate discovery of Eurasian water milfoil in Sand Bar and Tomahawk Lake (Bayfield County) in 2004 probably represents the most important long-term management concern for these two lakes. Eurasian water milfoil can have the impact of greatly changing habitat by adversely altering its plant community. Its ability to spread rapidly by fragmentation and effectively block out sunlight needed for native plant growth often results in monotypic stands, and loss of native plants. Dense stands of Eurasian milfoil provide only a single habitat and threaten aquatic communities in several ways. For example, predator-prey relationships are disrupted by inhibiting larger fish from effectively preying on small fish and invertebrates. This disruption can eventually lead to changes in the overall structure of the fish community and have negative impacts on a lake's fishery. In addition, monotypic stands of Eurasian milfoil results in causing less diversity and numbers of invertebrates, reduces the number of nutrient-rich native plants available for waterfowl, and inhibits recreational uses like swimming, boating, and fishing. Nutrient cycling from sediments to the water column by Eurasian water milfoil may lead to deteriorating water quality and algae blooms of infested lakes.

The negative impacts associated with Eurasian water milfoil show the importance of developing a long-term management strategy that will 1) slow its spread within Sand Bar and Tomahawk Lake, while also protecting the native plant community, and 2) help stop its spread to other nearby lakes in Bayfield and Douglas County. Any plant removal within Sand Bar or Tomahawk Lake should be limited to Eurasian milfoil. It is a priority that native plant species be left intact with the objective of protecting and encouraging their growth. As a source of infestation for other lakes in proximity to Sand Bar and Tomahawk Lake, it is also crucial that steps are taken to educate lake users about stopping the spread of Eurasian milfoil and other exotic species to other lakes. Lake residents, local anglers, local township and county governments, local sports clubs, and lake associations should partner together with the goal of dealing with an issue that threatens overall water quality, habitat, and the dependent fishery. The harmful effects of Eurasian water milfoil or other exotic species crosses the interest of area anglers, boaters, and lakeshore owners alike. Any future actions or development on Sand Bar Lake and un-infested local lakes need to take the utmost precaution to safeguard valuable native plants as vital habitat needed to sustain the fishery resource.

For more information on Sand Bar Lake, contact:
Fisheries Biologist
Wisconsin DNR
6250 S. Ranger Road
Brule, WI 54820
Phone: (715) 372 – 8539 ext.121

<u>Tomahawk and Sand Bar Lakes User Survey</u>

Prepared by the Barnes Eurasian Watermilfoil Committee

May 4, 2010

Purpose:

Results from this survey will be used to develop aquatic plant management plans for Tomahawk and Sand Bar Lakes in Bayfield County. An aquatic plant management plan provides guidelines for what the best plant management practices currently are for a given lake based on current research, lake information, and stakeholder input. It also makes room for future changes in the management plan as conditions in and around the lake change. You are one of the stakeholders whose input is crucial to the development of this plan so please respond promptly.

The goals of this survey are as follows:

1. To determine how lake residents view the current status of aquatic (in-lake) plants in Tomahawk and/or Sand Bar Lakes.
2. To determine lake resident familiarity with Eurasian watermilfoil (EWM) in Tomahawk and/or Sand Bar Lakes.
3. To determine what EWM management techniques are most supported by lake residents.

Results of this survey will be published on the Barnes-wi.com website.

Please return this survey to: Town of Barnes
c/o Eurasian Watermilfoil Committee
3360 County Hwy N
Barnes, WI 54873

Or, bring it with you to Tomahawk/Sand Bar Project Update meeting on Saturday June 5, 2010 at the Barnes Town Hall.

Please return this survey by Saturday June 5, 2010.

Residency

1. Which lake(s) do you own property on?
___Tomahawk ___Sand Bar ___Both ___Neither

2. What type of property(s) do you own? (check all that apply)
___year-round ___seasonal

3. How long have you owned property on the lake(s)? ______years

Aquatic Plant Growth

Plants are an important part of any healthy lake system. Plants support fish and wildlife, provide oxygen to the water, protect shorelines from erosion, and help keep lake water clean and clear. However, sometimes excessive plant growth can interfere with or prevent certain lake uses. This section of the survey evaluates how lake residents feel about the plant growth in Tomahawk and/or Sand Bar Lakes.

4. Since you became a lake resident, the level of plant growth in the lake has: (check one)
___ increased ___ decreased ___ stayed the same ___ unsure

5. Have you ever taken steps to remove any plant or weed from the lake by your property? (check one)
___ yes ___ no ___ I have no plants by my property.

6. If you answered yes to Question 5, what have you done to remove plants or weeds from the lake by your property? (check all that apply)
- ___SCUBA removal
- ___ hand-pull or rake
- ___ apply chemical herbicide ____with permit ____without permit
- ___ use mechanical removal with boat and motor or other apparatus
- ___ other (please specify)_______________________________________

Eurasian Watermilfoil (EWM)

In 2004, Eurasian watermilfoil, an aquatic plant that does not belong in Tomahawk or Sand Bar Lakes, was found. In some lakes EWM becomes just another "weed". In other lakes it dominates the entire shallow area of the lake interfering with many lake uses, destroying once healthy habitat, and causing changes in water quality. Determining how EWM might impact a given lake is an important component of any long-term plan. It is important for lake residents to be knowledgeable about EWM so they can take part in developing the best management strategy for the lake.

7. Before reading the previous paragraph, did you know Eurasian watermilfoil was present in the lake? (check one)
___ yes ___ no

8. Can you distinguish EWM from other plants in the lake? (check one)
___ yes ___ no ___ I think so. ___Unsure

9. Since EWM was discovered in Tomahawk and Sand Bar Lakes (2004), which year presented the worst conditions related to EWM and your use of the lake?
_______ (year) ______ I don't know.

10. How big of a problem do you think EWM is in the lake? (check one)
___not a problem ___small ___moderate ___big ___I don't know.

Aquatic Plant Management and Control

Problem plants in a lake like EWM can be controlled and managed in many different ways. Sometimes no management is the best option. In most cases management is on-going and long-term. Knowing what control and management options are available for plants in a given lake is an important component of any long-term plan. Educating property owners about the benefits and drawbacks of each potential management and control option for their lake and then seeking their input is essential. This last section of the survey intends to determine property owner knowledge related to management options and which of those options are preferred.

11. Do you feel that some form of aquatic (in-lake) plant management is necessary to deal with EWM in the lake(s)? (check one)
___ yes ___ no ___ maybe ___ I don't know.

12. What would you consider to be an acceptable outcome for a EWM management plan for Tomahawk and/or Sand Bar Lake? (check one)

- ___EWM eradicated from the lake for multiple years
- ___EWM significantly reduced for at least one year
- ___nuisance levels of EWM controlled on a yearly basis
- ___other (please specify)____

13. Have you participated in discussions about EWM management options for the lake? (check one)
___yes ___no

14. Below are several methods that either by themselves or in combination with other methods could potentially be used to manage and control EWM in Tomahawk and/or Sand Bar Lakes. Please place a 1, 2, or 3 in order of preference by the three methods you would most accept for the lake(s). If you are unsure about these management options or you would not accept any of

these options, please check the appropriate blank. For more information on the management alternatives, please visit http://barnes-wi.com/page.cfm/369.

___ No management, leave the lake alone
___ Continued or increased hand-pulling and raking in shallow waters
___ Small-scale (<10 acres) individual or spot chemical treatment for nuisance control
___ Early season large-scale (>10 acres) chemical application to reduce abundance
___Research project using a common herbicide (2,4-D) to treat EWM at a large scale
___Research project using an herbicide (triclopyr or fluridone) that is not commonly used
___ I need additional information to make a decision.
___ I oppose all of the above options

15. Is there any alternative management and control option that you are aware of that is not listed above? (check one)

___ no ___ yes What is it? ______________________________

16. Would a decline in water clarity be an acceptable risk/cost for EWM control to you?

___ no ___ yes

17. Management and control of EWM in Tomahawk and/or Sand Bar Lakes will likely be on-going and long-term. Resource professionals are available to help make an approved plan successful, and local, county and state funding may be available to offset individual lake property owner investment. Would you be willing to help with future financial support?

___ no ___ yes

18. Continuous monitoring of aquatic plants, water quality, treatment results and other activities will be required for a successful project. How much time, if any, would you be willing to contribute to support these activities? (check all that apply)

___ no time ___ a few days a year
___ a few hours a year ___ longer periods of time

19. Do you have knowledge or interest in any of the following areas that you would be willing to help support lake management efforts? (check all that apply)

___ biology	___ water chemistry	___ aquatic plants
___ GPS	___ Arc View	___ water quality monitoring
___ publishing	___ web development	___ mapping
___ grant writing	___ entomology	___ herbicides
___ legal services	___ fisheries management	___ scuba diving

20. If you are interested in volunteering your time, how do you prefer to be contacted?

___ In person

___ By phone → Here is a number I can be reached at: ______________________

___ By email → Here is my email address: ________________________________

___ By regular mail → Here is my address:

____

____

____

___ I will contact you.

___ I am not willing to volunteer.

You have successfully completed this survey.

Thank you for your time and your answers!

Comments(optional):

____

____

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2010 SURVEY SUMMARY

Number of Surveys mailed	74	
Number of Surveys received	38	51.4%

84.2% of survey participants believe plant growth has increased.
73.7% of survey participants have taken steps to remove plants.
92.1% of survey participants know of EWM.
81.6% of survey participants can distinguish EWM.
86.8% of survey participants believe EWM is a big problem.
84.2% of survey participants believe management controls are necessary.
76.3% of survey participants believe multiple year eradication is a desirable outcome.

First Choice of Control (Top two)

36.8% of survey participants believe a large scale (< 10 acres) control is necessary.
31.6% of survey participants believe research project with 2,4-D is necessary.

Second Choice of Control (Top two)

28.9% of survey participants believe research project with 2,4-D is necessary.
23.7% of survey participants believe a large scale (< 10 acres) control is necessary.

- Property Owner Comments

- Sandbar Lake is nearly unusable because of the milfoil. The delay in treatment has not been good. All cost associated with treating Sandbar should be shared with Tomahawk as we were victims of the “reference lake” option.

- I am hoping that Sandbar Lake will soon return to a condition that we can once again our boat for our enjoyment along with our children and grandchildren, which is why we purchased the lakeshore property to begin with. I am also concerned that water quality will be adversely affected. In my opinion the agencies that are charged with the enforcement of water issues failed us, now the property owners of lakeshore are facing aquatic weed infestation that should have been prevented.

- In 2009, the milfoil exploded in abundance. Our shorelines out to approximately 15’ of water will soon become completely consumed with milfoil. This will render swimming and boating very difficult and undesirable. The sooner we can start treatment the better.

- I feel Sandbar should be taken care of – as good as Tomahawk. We on Sandbar said we would be a study lake – 5 years is long enough.

- The financial risk should be the state of Wisconsin’s responsibility! The DNR sells fishing licenses to anyone who has the money. I’m quite sure the EWM was introduced by outsiders (non residents). However the taxpayers have to bear the financial responsibilities of clean up (as usual)! The cost of fishing licenses should be raised to reflect the cost of lake clean up, since fisherman are so damned irresponsible!

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
No Management	N	Do not actively manage plants	Minimizing disturbance can protect native species that provide habitat for aquatic fauna; protecting natives may limit spread of invasive species; aquatic plants reduce shoreline erosion and may improve water clarity	May allow small population of invasive plants to become larger, more difficult to control later
			No immediate financial cost	Excessive plant growth can hamper navigation and recreational lake use
			No system disturbance	May require modification of lake users' behavior and perception
			No unintended effects of chemicals	
			Permit not required	
Mechanical Control	May be required under NR 109	Plants reduced by mechanical means	Flexible control	Must be repeated, often more than once per season
		Wide range of techniques, from manual to highly mechanized	Can balance habitat and recreational needs	Can suspend sediments and increase turbidity and nutrient release
a. Handpulling/Manual raking	Y/N	SCUBA divers or snorkelers remove plants by hand or plants are removed with a rake	Little to no damage done to lake or to native plant species	Very labor intensive
		Works best in soft sediments	Can be highly selective	Needs to be carefully monitored
			Can be done by shoreline property owners without permits within an area <30 ft wide OR where selectively removing exotics	Roots, runners, and even fragments of some species, particularly Eurasian watermilfoil (EWM) will start new plants, so all of plant must be removed
			Can be very effective at removing problem plants, particularly following early detection of an invasive exotic species	Small-scale control only

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
b. Harvesting	Y	Plants are "mowed" at depths of 2-5 ft, collected with a conveyor and off-loaded onto shore	Immediate results	Not selective in species removed
		Harvest invasives only if invasive is already present throughout the lake	EWM removed before it has the opportunity to autofragment, which may create more fragments than created by harvesting	Fragments of vegetation can re-root
			Minimal impact to lake ecology	Can remove some small fish and reptiles from lake
			Harvested lanes through dense weed beds can increase growth and survival of some fish	Initial cost of harvester expensive
			Can remove some nutrients from lake	
Biological Control	Y	Living organisms (e.g. insects or fungi) eat or infect plants	Self-sustaining; organism will over-winter, resume eating its host the next year	Effectiveness will vary as control agent's population fluctates
			Lowers density of problem plant to allow growth of natives	Provides moderate control - complete control unlikely
				Control response may be slow
				Must have enough control agent to be effective
a. Weevils on EWM	Y	Native weevil prefers EWM to other native water-milfoil	Native to Wisconsin: weevil cannot "escape" and become a problem	Need to stock large numbers, even if some already present
			Selective control of target species	Need good habitat for overwintering on shore (leaf litter) associated with undeveloped shorelines
			Longer-term control with limited management	Bluegill populations decrease densities through predation

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
b.	Pathogens	Y	Fungal/bacterial/viral pathogen introduced to target species to induce mortalitiy	May be species specific	Largely experimental; effectiveness and longevity unknown
				May provide long-term control	Possible side effects not understood
				Few dangers to humans or animals	
c.	Allelopathy	Y	Aquatic plants release chemical compounds that inhibit other plants from growing	May provide long-term, maintenance-free control	Initial transplanting slow and labor-intensive
				Spikerushes (*Eleocharis* spp.) appear to inhibit Eurasian watermilfoil growth	Spikerushes native to WI, and have not effectively limited EWM growth
					Wave action along shore makes it difficult to establish plants; plants will not grow in deep or turbid water
d.	Planting native plants	Y	Diverse native plant community established to repel invasive species	Native plants provide food and habitat for aquatic fauna	Initial transplanting slow and labor-intensive
				Diverse native community may be "resistant" to invasive species	Nuisance invasive plants may outcompete plantings
				Supplements removal techniques	Largely experimental; few well-documented cases
					If transplants from external sources (another lake or nursury), may include additional invasive species or "hitchhikers"

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
Physical Control	Required under Ch. 30 / NR 107	Plants are reduced by altering variables that affect growth, such as water depth or light levels		
a. Fabrics/ Bottom Barriers	Y	Prevents light from getting to lake bottom	Reduces turbidity in soft-substrate areas	Eliminates all plants, including native plants important for a healthy lake ecosystem
			Useful for small areas	May inhibit spawning by some fish
				Need maintenance or will become covered in sediment and ineffective
				Gas accumulation under blankets can cause them to dislodge from the bottom
				Affects benthic invertebrates
				Anaerobic environment forms that can release excessive nutrients from sediment
b. Drawdown	Y, May require Environmental Assessment	Lake water lowered with siphon or water level control device; plants killed when sediment dries, compacts or freezes	Winter drawdown can be effective at restoration, provided drying and freezing occur. Sediment compaction is possible over winter	Plants with large seed bank or propagules that survive drawdown may become more abundant upon refilling
		Season or duration of drawdown can change effects	Summer drawdown can restore large portions of shoreline and shallow areas as well as provide sediment compaction	May impact attached wetlands and shallow wells near shore
			Emergent plant species often rebound near shore providing fish and wildlife habitat, sediment stabilization, and increased water quality	Species growing in deep water (e.g. EWM) that survive may increase, particularly if desirable native species are reduced
			Success demonstrated for reducing EWM, variable success for curly-leaf pondweed (CLP)	Can affect fish, particularly in shallow lakes if oxygen levels drop or if water levels are not restored before spring spawning
			Restores natural water fluctuation important for all aquatic ecosystems	Winter drawdawn must start in early fall or will kill hibernating reptiles and amphibians
				Navigation and use of lake is limited during drawdown

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
c.	Dredging	Y	Plants are removed along with sediment Most effective when soft sediments overlay harder substrate For extremely impacted systems Extensive planning required	Increases water depth Removes nutrient rich sediments Removes soft bottom sediments that may have high oxygen demand	Severe impact on lake ecosystem Increases turbidity and releases nutrients Exposed sediments may be recolonized by invasive species Sediment testing may be necessary Removes benthic organisms Dredged materials must be disposed of
d.	Dyes	Y	Colors water, reducing light and reducing plant and algal growth	Impairs plant growth without increasing turbidity Usually non-toxic, degrades naturally over a few weeks	Appropriate for very small water bodies Should not be used in pond or lake with outflow Impairs aesthetics Effects to microscopic organisms unknown
e.	Non-point source nutrient control	N	Runoff of nutrients from the watershed are reduced (e.g. by controlling construction erosion or reducing fertilizer use) thereby providing fewer nutrients available for plant growth	Attempts to correct source of problem, not treat symptoms Could improve water clarity and reduce occurrences of algal blooms Native plants may be able to better compete with invasive species in low-nutrient conditions	Results can take years to be evident due to internal recycling of already-present lake nutrients Requires landowner cooperation and regulation Improved water clarity may increase plant growth

Management Options for Aquatic Plants

Draft updated Oct 2006

Option	Permit Needed?	How it Works	PROS	CONS
Chemical Control	Y, Required under NR 107	Granules or liquid chemicals kill plants or cease plant growth; some chemicals used primarily for algae	Some flexibility for different situations	Possible toxicity to aquatic animals or humans, especially applicators
		Results usually within 10 days of treatment, but repeat treatments usually needed	Some can be selective if applied correctly	May kill desirable plant species, e.g. native water-milfoil or native pondweeds; maintaining healthy native plants important for lake ecology and minimizing spread of invasives
		Chemicals must be used in accordance with label guidelines and restrictions	Can be used for restoration activities	Treatment set-back requirements from potable water sources and/or drinking water use restrictions after application, usually based on concentration
				May cause severe drop in dissolved oxygen causing fish kill, depends on plant biomass killed, temperatures and lake size and shape
				Often controversial
a. 2,4-D	Y	Systemic[1] herbicide selective to broadleaf[2] plants that inhibits cell division in new tissue	Moderately to highly effective, especially on EWM	May cause oxygen depletion after plants die and decompose
		Applied as liquid or granules during early growth phase	Monocots, such as pondweeds (e.g. CLP) and many other native species not affected	May kill native dicots such as pond lilies and other submerged species (e.g. coontail)
			Can be selective depending on concentration and seasonal timing	Cannot be used in combination with copper herbicides (used for algae)
			Can be used in synergy with endotholl for early season CLP and EWM treatments	Toxic to fish
			Widely used aquatic herbicide	

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
b.	Endothall	Y	Broad-spectrum[3], contact[4] herbicide that inhibits protein synthesis	Especially effective on CLP and also effective on EWM	Kills many native pondweeds
			Applied as liquid or granules	May be effective in reducing reestablishment of CLP if reapplied several years in a row in early spring	Not as effective in dense plant beds; heavy vegetation requires multiple treatments
				Can be selective depending on concentration and seasonal timing	Not to be used in water supplies; post-treatment restriction on irrigation
				Can be combined with 2,4-D for early season CLP and EWM treatments, or with copper compounds	Toxic to aquatic fauna (to varying degrees)
				Limited off-site drift	
c.	Diquat	Y	Broad-spectrum, contact herbicide that disrupts cellular functioning	Mostly used for water-milfoil and duckweed	May impact non-target plants, especially native pondweeds, coontail, elodea, naiads
			Applied as liquid, can be combined with copper treatment	Rapid action	Toxic to aquatic invertebrates
				Limited direct toxicity on fish and other animals	Must be reapplied several years in a row
					Ineffective in muddy or cold water (<50°F)
d.	Fluridone	Y; special permit and Environmental Assessment may be required	Broad-spectrum, systemic herbicide that inhibits photosynthesis	Effective on EWM for 1 to 4 years with aggressive follow-up treatments	Affects non-target plants, particularly native milfoils, coontails, elodea, and naiads, even at low concentrations
			Must be applied during early growth stage	Some reduction in non-target effects can be achieved by lowering dosage	Requires long contact time at low doses: 60-90 days
			Available with a special permit only; chemical applications beyond 150 ft from shore not allowed under NR 107	Slow decomposition of plants may limit decreases in dissolved oxygen	Demonstrated herbicide resistance in hydrilla subjected to repeat treatments
			Applied at very low concentration at whole lake scale	Low toxicity to aquatic animals	In shallow eutrophic systems, may result in decreased water clarity
					Unknown effect of repeat whole-lake treatments on lake ecology

Management Options for Aquatic Plants

Draft updated Oct 2006

	Option	Permit Needed?	How it Works	PROS	CONS
e.	Glyphosate	Y	Broad-spectrum, systemic herbicide that disrupts enzyme formation and function	Effective on floating and emergent plants such as purple loosestrife	RoundUp is often incorrectly substituted for Rodeo - Associated surfactants of RoundUp believed to be toxic to reptiles and amphibians
			Usually used for purple loosestrife stems or cattails	Selective if carefully applied to individual plants	Cannot be used near potable water intakes
			Applied as liquid spray or painted on loosetrife stems	Non-toxic to most aquatic animals at recommended dosages	Ineffective in muddy water
				Effective control for 1-5 years	No control of submerged plants
f.	Triclopyr	Y	Systemic herbicide selective to broadleaf plants that disrupts enzyme function	Effective on many emergent and floating plants	Impacts may occur to some native plants at higher doses (e.g. coontail)
			Applied as liquid spray or liquid	More effective on dicots, such as purple loosestrife; may be more effective than glyphosate	May be toxic to sensitive invertebrates at higher concentrations
				Control of target plants occurs in 3-5 weeks	Retreatment opportunities may be limited due to maximum seasonal rate (2.5 ppm)
				Low toxicity to aquatic animals	Sensitive to UV light; sunlight can break herbicide down prematurely
				No recreational use restrictions following treatment	Relatively new management option for aquatic plants (since 2003)
g.	Copper compounds	Y	Broad-spectrum, systemic herbicide that prevents photosynthesis	Reduces algal growth and increases water clarity	Elemental copper accumulates and persists in sediments
			Used to control planktonic and filamentous algae	No recreational or agricultural restrictions on water use following treatment	Short-term results
			Wisconsin allows small-scale control only	Herbicidal action on hydrilla, an invasive plant not yet present in Wisconsin	Long-term effects of repeat treatments to benthic organisms unknown
					Toxic to invertebrates, trout and other fish, depending on the hardness of the water
					Clear water may increase plant growth

[1]Systemic herbicide - Must be absorbed by the plant and moved to the site of action. Often slower-acting than contact herbicides.

[2]Broadleaf herbicide - Affects only dicots, one of two groups of plants. Aquatic dicots include waterlilies, bladderworts, watermilfoils, and coontails.

[3]Broad-spectrum herbicide - Affects both monocots and dicots.

[4]Contact herbicide - Unable to move within the plant; kills only plant tissue it contacts directly.

Specific effects of herbicide treatments dependent on timing, dosage, duration of treatment, and location.

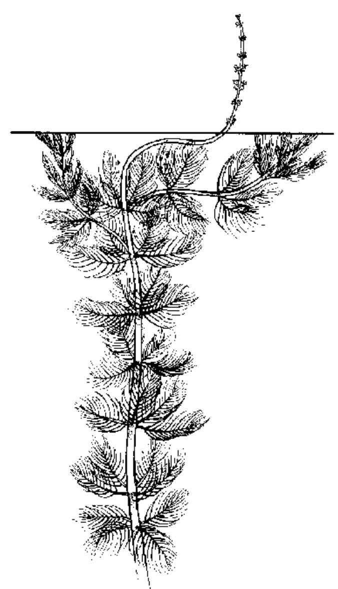
References to registered products are for your convenience and not intended as an endorsement or criticism of that product versus other similar products.

This document is intended to be a guide to available aquatic plant control techniques, and is not necessarily an exhaustive list.

Please contact your local Aquatic Plant Management Specialist when considering a permit.

Town of Barnes

Eurasian Water-milfoil
Rapid Response Plan
2010 – 2015



Geographical Region Covered by this Plan

Douglas County | **Bayfield County**

Town of Highland

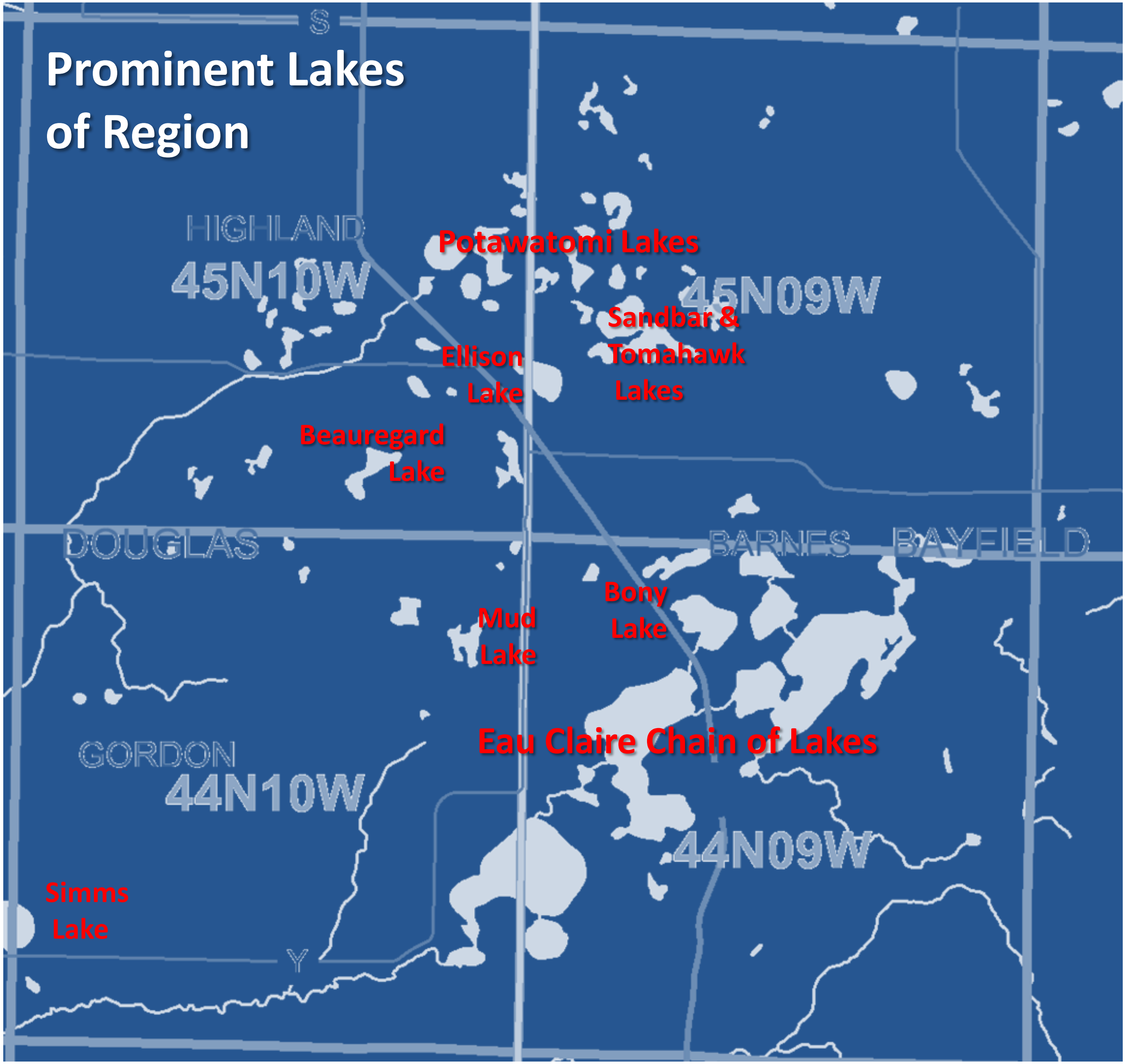
T 45 N
R 10 W

Town of Gordon

T 44 N
R 10 W

Town of Barnes

T 45, 44 N
R 9 W


Prominent Lakes of Region
S
HIGHLAND
45N10W
Potawatomi Lakes
45N09W
Sandbar & Tomahawk Lakes
Ellison Lake
Beauregard Lake
DOUGLAS
BARNES
BAYFIELD
Bony Lake
Mud Lake
Eau Claire Chain of Lakes
GORDON
44N10W
44N09W
Simms Lake
Y

1

Suspected Eurasian Water-milfoil (EWM) Found

~ notify ***Lee Wiesner*** who will coordinate ~ rapid response efforts

Meet with Finder

- Collect entire specimen including roots & stems
- Place in sealable bag
- Ice or refrigerate
- Complete label and send with sample *
- Attach lake map with location marked and GPS Coordinates recorded
- Submit sample to WDNR Spooner within 3 days

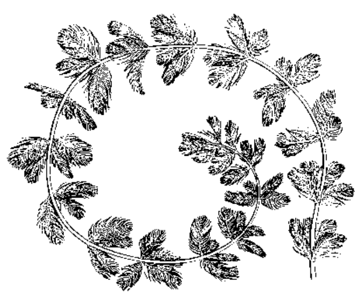
Notify WDNR Lakes Team

-WDNR decides need for lake visit

Notify Bayfield County AIS Coor/LWCD of suspect sample

Notify EWM Committee of suspect sample

**** use label included with this EDRR plan***



Barnes Rapid Response Coordinator
Lee Wiesner
715-795-3156

WDNR Lakes Team
Pamela Toshner (Spooner) ***or*** Frank Koshere (Superior)
715-635-4073 715-392-0807

EWM Committee
Ingemar Ekstrom
715-795-2183

Bayfield Co. Land & Water Conservation Dept/AIS Coor.
715-373-6167

2

WDNR Assesses Sample immediately

Sample confirmed as EWM

WDNR Vouchers Sample

Sample is NOT EWM

WDNR notifies ***Lee Wiesner*** 715-795-3156

- Notify Barnes EWM Committee, Town Chair(s), and Conservation Warden(s) of EWM

- Contact WDNR and AIS Coordinator for assistance

- Place notices at lake & a map of EWM on available sign; if buoys needed, submit form 8700-058 Waterway Marker Application and Permit

- IF EWM is < 5 acres or 5% of lake acreage, submit 8700-307 AIS Control Grant, Early Detection Rapid Response (have Town Chair sign premade Resolution for grant) and Form 3200-04 Chemical Aquatic Plant Control Application and Permit; submit to WDNR Spooner.

- If EWM is spotty , scattered, or few plants, consider SCUBA pulling, call Matt Berg, 715-689-3197 to consider job

- Return to regular monitoring
- Notify EWM Committee & Bayfield County

Barnes EWM Committee
Ingemar Ekstrom
715-795-2183

Barnes Town Chair
Lu Peet - 715-795-2784

Gordon Town Chair
John Cosgrove – 715-376-2693

Highland Town Chair
Sue Ann Bruce – 715-374-2886

WDNR Conservation Warden – Barnes area
Jill Schartner - 715-492-7419 (cell)

3

WDNR Assists with Choosing a Management Strategy

Infestation is a Localized Pioneer Colony (less than 5 acres or 5% of surface area)

- Conduct a visual survey of littoral zone to define perimeter and density of colony for application specs
- Identify any "at risk" areas (boat launch, outlet, culverts)
- WDNR gives verbal approval of grant and assigns start date—rapid response (grant) project begins – paperwork and signatures follow.
- Chemical control requires notification of property owners of this intention
- Contact an herbicide applicator—negotiate and draw up contract.
- Post shoreline on day of treatment (typically an applicator duty—appreciates assistance)
- Complete defined EWM treatment
- Complete post-treatment survey

Infestation is an Established Population (greater than 5 acres or 5% of surface area)

- Place EWM notice at landing and notify property owners of infestation and general location
- Hire a consultant to prepare and conduct a point-intercept aquatic plant survey to establish a baseline for an aquatic plant management plan (APMP)
- Submit APMP to WDNR 60 days prior to applying for a control grant
- WDNR approves APMP and recommends a treatment plan for the following spring
- Gather budget information and outline schedule of treatment events for a grant application
- Submit Form 8700-307 AIS Control Grant, Establish Infestation Control Project
- Initiate project after grant is awarded and paperwork signed

4

Post Treatment Follow-up

Localized Pioneer Colony
(less than 5 acres or 5% of surface area)

- Perform rake sampling of treated area and visual surveys monthly for at least one season after EWM is no longer detected
- Keep locations map and EWM notice on landing signs, and buoy markers (if used) in place until treated area is free of EWM for two seasons
- Continue monthly lake monitoring, education and inspection programs
- Develop an aquatic plant management plan

Established Population
(greater than 5 acres or 5% of surface area)

- Consultant conducts a post treatment plant survey in mid-July to mid August
- Compare results with pre-treatment survey
- WDNR assesses effectiveness of treatment and recommends next steps
- Keep locations map and EWM notice on landing signs, and buoy markers (if used) in place
- Continue monthly lake monitoring, education and inspection programs

Potential Forms / Permits / Websites

Form Title	Form Number
Chemical Aquatic Plant Control Application and Permit http://dnr.wi.gov/lakes/plants/forms/3200-004.pdf	3200-004
Worksheet for Large-Scale Chemical Aquatic Plant Treatment http://dnr.wi.gov/lakes/plants/forms/3200-004a.pdf	3200-4A
Aquatic Invasive Species (AIS) Control Grant Application http://dnr.wi.gov/org/caer/cfa/grants/Forms/8700307.pdf	8700-307
Waterway Marker Application and Permit http://dnr.wi.gov/waterways/permit_apps/Waterway_Marker_Application_Permit_Form_8700-058.pdf	8700-058
Aquatic Plant Management Herbicide Treatment Record http://dnr.wi.gov/lakes/plants/forms/3200-111.pdf	3200-011

Waterways and Wetland Permits
http://dnr.wi.gov/waterways/

Aquatic Plant Control
http://dnr.wi.gov/waterways/shoreline_habitat/aquatic_plant.html

Resolution for AIS Control Grants
http://dnr.wi.gov/org/caer/cfa/grants/Forms/AISResolution.pdf

Aquatic Plant Control Services

Endangered Resources Services, LLC
Matthew S. Berg – Research Biologist
572 North Day Road
Saint Croix Falls, WI 54024
715-338-7502 (cell)
715-483-2847 (office)

Lake Management, Inc.
10400 18th St. North
Marine on the St. Croix, MN 55407
Phone: 651-433-3283
FAX: 651-433-5316
Email: info@lakemanagementinc.com

Lake Restoration, Inc.
12425 Ironwood Circle
Rogers, MN 55374
Phone: 763-428-9777
Fax: 763-428-1543
Email: irmail@lakerestoration.com

Northern Aquatic Services, Inc.
1061 240th St
Dresser, WI 54009
Phone: 715-755-3507

Midwest Aqua Care
1001 Great Plains Blvd.
Chaska, MN 55318
Phone: 877-430-0143
Email: support@midwestaquacare.com

both

Bonestroo (Northern Environmental)
330 South 4th Avenue
Park Falls, WI 54552
Phone: 800-498-3913
Website: www.bonestroo.com
Email: info@bonestroo.com

Aquatic Plant Management Plan Consultants*

Harmony Environmental
516 Keller Ave. S.
Amery, WI 54001
Phone: 715-268-9992
Email: harmonyenv@amerytel.net

Onterra, LLC
135 S Broadway, Suite C
DePere, WI 54115
Phone: 920-338-8860
Website: www.onterra-eco.com
Email: thoyman@onterra-eco.com

SEH, Inc.
David Blumer, Research Biologist
422 3rd Street West, Suite 116
Ashland, WI 54806-1573
Phone: 715-682-9111
Website: http://www.sehinc.com

**** The APMP consultant should not be the same company that is providing the control (treatment) service***

CONTACTS

WDNR Spooner Lakes Team – Pamela Toshner or Kris Larsen , 715-635-4073/40

WDNR Aquatic Plant Management – Frank Koshere, 715 -392-0807

Barnes Town Board Chair – Lu Peet, 715-795-2784 or clerk@barnes-wi.com

Gordon Town Board Chair –John Cosgrove, 715-376-2693 (Town Hall)

Highland Town Board Chair – Sue Ann Bruce, 715-374-2886 (Town Hall)

Bayfield County AIS Coordinator/LWCD, 715-373-6167

Conservation Warden, Barnes – Jill Schartner, 715-739-6734 (office); 715-746-2744 (home); 715-492-7419 (cell)

Conservation Warden, Gordon – Lance Burns, 715-376-2299 (office)

Conservation Warden, Brule – Brad Biser, 715-372-8539 Ext.106 (office)

Conservation Warden, Regional Supervisor – Dave Oginski, 715-685-2929, (office)

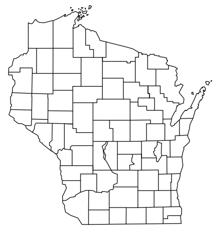
EWM Committee		**Email**
Ingemar Ekstrom	715-795-2183	ije@cheqnet.net
Lee Weisner**	715-795-3159	lwiesner@cheqnet.net
Dave Pease	715-795-2936	snopease@cheqnet.net
Gus Gustafson	715-795-3067	gcg@cheqnet.net
Glenda Mattila	715-795-3963	gmattila411@gmail.com
Barb Romstad	715- 795-2008	bromstad@cheqnet.net
Mitch McGee	715-795-2784	mmcgee@barnes-wi.com

*****rapid response coordinator - in his absence another coordinator is to be identified by the EWM Committee***

Labels for Plant Specimens

Project Name: Citizen Lake Monitoring Network

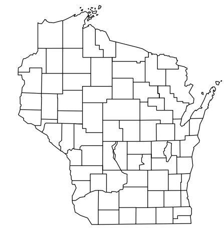
(Scientific Name & authority)



Common Name:
Lake Name:
Water Body ID code#:
County:
Collected by:
Date:
Depth:
Location:
Location and Habitat:

Project Name: Citizen Lake Monitoring Network

(Scientific Name & authority)



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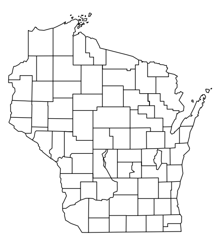

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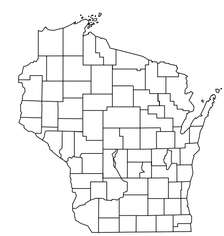

Common Name:
Lake Name:
Water Body ID code#:
County:
Collected by:
Date:
Depth:
Location:
Location and Habitat:

Appendix

Town of Barnes

Tomahawk Lake

Eurasian Water-milfoil Rapid Response Plan 2011 - 2015

TL

Suspected EWM Found

~ notify ***Gus Gustafson and /or Lee Wiesner*** ~
715-795-3067 *or* 715-795-3156
gcg@cheqnet.net *or* lwiesner@cheqnet.net

Notify USACE
John Skogerbooe
651-325-8181
skoger@gte.net

Notify WDNR – Pamela
715-635-4073
Pamela.toshner@wisconsin.gov

Notify EWM Committee
Glenda Mattila
715-795-3963

Notify AIS Coor/LWCD
715-373-6167
sstrzalkowska@bayfieldcounty.org

Collect Specimen

- Collect entire specimen including roots & stems
- Complete label *
- Attach lake map with location marked and GPS Coordinates recorded
- Send location information and visual assessment via email to skoger@gte and pamela.toshmer@wisconsin.gov
- Wait for direction from USACE and WDNR

**** use label included with this EDRR plan***