

TOMAHAWK & SANDBAR LAKES EURASIAN WATERMILFOIL RESEARCH PROJECT: Management & Control in Northern Clear-Water Systems

PROJECT AREA

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

TABLE 1. Physical and limnological characteristics (15 Jul – 15 Sep) of Tomahawk and Sand Bar Lakes, Bayfield County. (Citizen Lake Monitoring Network & WDNR data)

	TOMAHAWK	SAND BAR
SIZE (acres)	134	118
MAX, AVERAGE DEPTH (feet)	42, 13	49, 25
SECCHI DEPTH (feet)	12.2	17.8
TOTAL PHOSPHOROUS (ug/L)	13	11.5
CHL a (ug/L)	3.25	1.72
ALKALINITY (ppm)	~30	~31
AQUATIC PLANT SPECIES RICHNESS (including visuals)	28	Collected July 2007

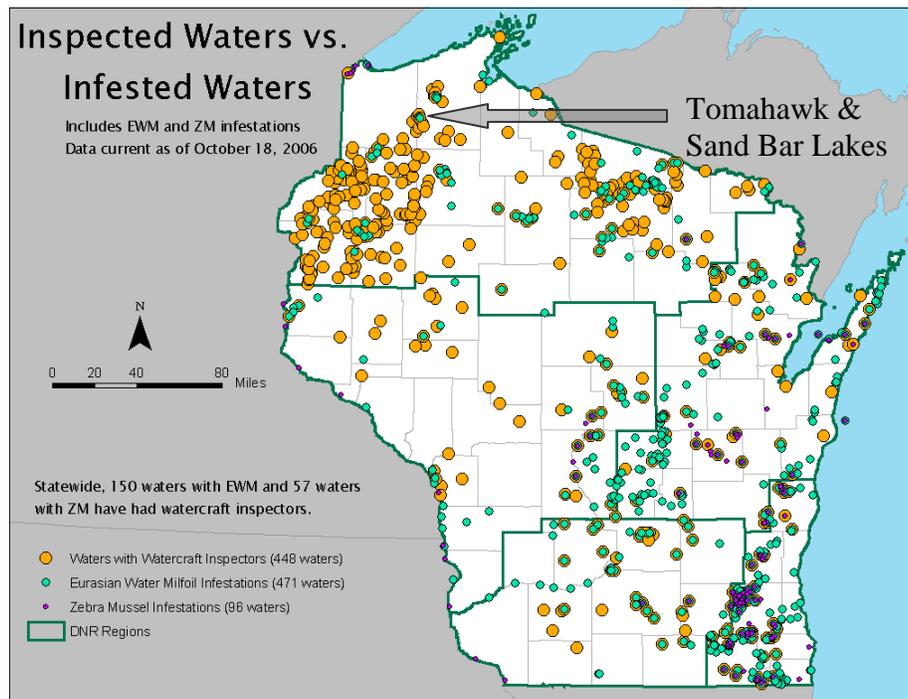


FIGURE 1. Location of Tomahawk and Sand Bar Lakes relative to other EWM lakes.

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 3), which also includes skiing/hiking trails, a swimming beach, and picnic facilities. Sand Bar Lake (Figure 4) is accessed by pulling watercraft over the sandbar from Tomahawk Lake.



FIGURE 2. Eurasian watermilfoil in Tomahawk Lake, facing boat landing and Town Park.



FIGURE 3. Eurasian watermilfoil in Sand Bar Lake.

PROJECT BACKGROUND AND PURPOSE

DNR identified EWM in Tomahawk Lake in August 2004, and it was confirmed in 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 in spring 2005 to fund the project, 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. One outcome of this project was the formation of the Barnes Eurasian Watermilfoil Committee, which was charged with continuing the lakewide monitoring and education program, as well as developing an action plan for Tomahawk and Sand Bar Lakes.

For more information on the Barnes Eurasian Watermilfoil Project or the activities of the EWM Committee, please visit barnes-wi.com.

These two lakes have been 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 management approach; and limited user conflict. The aquatic plant communities also seem to be similar. A difference between the two lakes is basin morphology; Tomahawk is irregularly shaped with a large littoral zone whereas Sand Bar is bowl-shaped with a narrow littoral zone.

The Tomahawk and Sand Bar Eurasian watermilfoil populations are relatively new and particularly isolated, and neither has been actively managed at a large-scale in the past. The lakes are located in a lake-rich part of Wisconsin with few other EWM infestations. These factors warrant an aggressive research approach that, depending on the results, may be applicable to similar lake types in similar situations and locations.

The lakes are also appealing research lakes because the Town of Barnes' accomplishments in the intervening years have proven that the community is taking a big-picture approach to managing the lakes in the context of 1) preventing the spread to surrounding lakes and 2) implementing a long-term and deliberate management control strategy within the EWM lakes. The Town is willing to make community sacrifices, such as limiting recreational use, in order to improve the likelihood of a successful management strategy. The Town's efforts to date and its big-picture approach improve the research partnership potential and may serve as a model for AIS/lake management.

The purpose of this project is to utilize multiple partners to aggressively control Eurasian watermilfoil while promoting the native aquatic plant community in Tomahawk Lake and to prevent the spread to other lakes and rivers. Additionally, we will have a better understanding of the aquatic plant community and ecosystem responses and dynamics in

managed and unmanaged northern, clear-water systems that tend to have higher native plant species richness.

For more information on current understanding of Eurasian watermilfoil, its management, and the latest research, please see Asplund (2006) and WDNR Lakes and Aquatic Plant Management Staff (2006).

GOALS AND OBJECTIVES

A. Goal: understand large-scale EWM control in northern, clear-water lakes using a treatment (Tomahawk) and reference (Sand Bar) lake research design.

- 1. Objective:** using an early-season combination of liquid and granular 2,4-d, reduce the EWM presence and biomass as much as possible while restoring the native plant community in Tomahawk Lake.
- 2. Objective:** monitor the aquatic plant community response in Tomahawk Lake and the reference conditions in Sand Bar Lake.
- 3. Objective:** monitor the water quality and ecosystem response to the large-scale treatment. Monitoring parameters may include: water clarity, chlorophyll, total phosphorous, dissolved oxygen, temperature, herbicide residuals, zooplankton and macroinvertebrate communities, fisheries, and groundwater.
- 4. Objective:** evaluate alternative Eurasian watermilfoil controls, including weevils and SCUBA removal.

B. Goal: integrate sociological management for optimum Eurasian watermilfoil reduction/control in Tomahawk Lake.

- 1. Objective:** enact recreational use ordinances or an alternative use management approach to reduce EWM spread within and between lakes.
- 2. Objective:** continue the Town's existing information and education program, including comprehensive watercraft inspections.
- 3. Objective:** continue Town of Barnes Eurasian Watermilfoil Committee communication and project oversight.
- 4. Objective:** develop an Aquatic Plant Management Plan for both lakes.

6d. METHODS AND ACTIVITIES

The research design and methods are described in Skogerboe et al. (2007). The project duration is from 2007 to 2011, with active plant management occurring in 2008-2010 and pre- and post-data collection taking place in 2007 and 2011. Tomahawk Lake will be a large-scale herbicide application (i.e. treatment) lake, and Sand Bar will be the reference

lake with no or very limited (e.g. raking around dock areas) active management until 2011. In spring 2008, large-scale liquid and granular 2,4-d will be applied by a certified aquatic herbicide applicator. The following two years (2009 – 2010) will entail post-treatment monitoring with a range of management options depending on aquatic plant community response (i.e. adaptive management) in Tomahawk Lake only. Aquatic plants will be monitored in both lakes pre- and post-treatment annually during the active research (2008-2010) and once more as a follow-up in 2011. During the course of the research, Department staff will develop an Aquatic Plant Management Plan for the lakes. As of 2011 the local community will be responsible for implementing management activities in Tomahawk Lake, and Sand Bar may be actively managed at a large-scale.

Additional monitoring will be developed by the project management team in partnership with the Town of Barnes Eurasian Watermilfoil Committee prior to project implementation. For example, existing CLMN volunteers will collect TSI and secchi data on both lakes. Additionally, continuous dissolved oxygen recordings will be collected using a Hydrolab sonde or similar device. These data will be collected at least 3-4 weeks post-treatment to monitor any issues with DO depletion from decaying vegetation. Volunteers or Department staff will document the presence or absence of deceased fish. Zooplankton and macroinvertebrate “snapshots” may be collected pre- and post-treatment on both lakes to monitor any impacts on the biotic community. Groundwater samples from shallow monitoring wells around Tomahawk Lake may be collected to better understand the flow regime and potential risk of herbicide treatments to groundwater around sand country lakes.

PRODUCTS AND DELIVERABLES (partners responsible)

Aquatic Plant Management Plans for Tomahawk and Sand Bar Lakes. Although each lake and user group may have different goals, objectives, and management recommendations, the information will most likely be contained in one Plan. (Wisconsin DNR)

Interim annual data reports and final research report (U.S. Army Corps of Engineers and Wisconsin DNR)

Information and education tools, including brochures, presentations, or media articles developed during the project (all partners)

Herbicide Application Treatment Records (herbicide applicator)

DATA TO BE COLLECTED

Aquatic plant point-intercept and hydroacoustic surveys and biomass estimates for both lakes.

Citizen Lake Monitoring Network secchi, TSI, and dissolved oxygen data.

Continuous dissolved oxygen monitoring data.

Possible zooplankton and macroinvertebrate monitoring data and groundwater quality and flow data.

Clean Boats Clean Waters data as required on the CBCW watercraft inspection forms.

EXISTING AND PROPOSED PARTNERSHIPS

Town of Barnes – grant applicant and project sponsor, EWM Committee project oversight, recreational use management

Tomahawk and Sand Bar Lake riparians – project support, volunteer monitoring, representatives on Town EWM Committee

Barnes/Eau Claire Lakes Property Owners Association – project support, volunteer monitoring, representatives on Town EWM Committee

Ashland, Bayfield, Douglas & Iron County Land Conservation Department – project support and planning, representative on Town EWM Committee

Wisconsin Department of Natural Resources – project support, aquatic plant monitoring and planning, research data analyses and reporting, advisers to Town EWM Committee

U.S. Army Corps of Engineers – project support and planning, aquatic plant monitoring, research data analyses and reporting

PLANNING AND/OR MANAGEMENT OF THE LAKE

The Town of Barnes and local volunteers have laid the groundwork for a rational and comprehensive approach to dealing with aquatic invasive species at a community level (vs. a single lake approach). As John Kudlas, the Town's former Eurasian Watermilfoil Project Coordinator says "Community problems require community solutions." This project combines the information and education efforts of local volunteers with the government leadership of the Town of Barnes to partner on a whole-lake scale research project to improve our understanding of Eurasian watermilfoil management. The results will be used to guide management in Sand Bar Lake and other clear-water seepage lakes with diverse aquatic plant communities. Furthermore, the project will result in Aquatic Plant Management Plans for the Tomahawk and Sand Bar Lakes.

TIMETABLE

What	Who	When
Implement CBCW program	Town of Barnes	Boating season 2007-2011
Adopt the research proposal (meeting minutes attached)	Tomahawk & Sand Bar property owners	3 June 2007
Collect baseline water quality information	Tomahawk & Sand Bar property owners	2006-2007
Collect baseline plant community information	WDNR & USACE	July 2007
Apply for AIS Established Infestation Control grant	Town of Barnes	By 1 August 2007
Submit chemical control permit application	Town of Barnes	August 2007
Public Notice herbicide treatment	Town of Barnes	Before spring 2008 treatment
Pre-treatment surveys	USACE	April 2008- April 2011
Large-scale early season 2,4-d application in Tomahawk Lake	USACE & licensed herbicide applicator	Spring 2008 and perhaps 2009 and 2010
Post-treatment surveys	WDNR, USACE & volunteers	July 2008- July 2011
Aquatic Plant Management Plan development	WDNR	2008-2010
Follow-up management in Tomahawk Lake	WDNR, USACE, licensed herbicide applicator and/or volunteers	2009-2010
Adopt & implement Aquatic Plant Management Plans	Tomahawk & Sand Bar property owners or Town of Barnes	2010-2011

PLAN FOR SHARING PROJECT RESULTS

Project updates and results will be shared monthly through the Town of Barnes Eurasian watermilfoil Committee, which reports to the Town Board, and regularly through the Department’s Lakes Team meetings and conference calls. Results will also be shared at various statewide and national meetings, such as: Midwest Aquatic Plant Management Society meetings, Wisconsin Lakes Convention, Northwest Lakes Conference, Minnesota and Wisconsin Aquatic Plant Management Partner Meeting. Local speakers have already shared the Town of Barnes AIS project at some of these meetings.

OTHER INFORMATION IN SUPPORT OF PROJECT

Asplund, Tim. *Aquatic Herbicides as a Restoration Tool: Summary of DNR/USACE meeting held on June 20, 2006*. WDNR Lakes Program, Madison, WI. (attached)

Barnes EWM Ad Hoc Committee. 2005. *Town of Barnes Eurasian Water Milfoil Project Final Report*. Barnes, WI. (available online at barnes-wi.com)

Skogerboe, John, Pamela Toshner, Tim Asplund, Jen Hauxwell, and Frank Koshere. 2007. **DRAFT** *Selective Control of Eurasian Watermilfoil on Tomahawk Lake, Bayfield County, WI Using Early Spring Applications of 2,4-D*. U.S. Army Corps of Engineers and Wisconsin Department of natural Resources Research Proposal. (attached)

WDNR. *Control of Eurasian Water Milfoil & Large Scale Aquatic Herbicide Use*. July 2006 WDNR Lakes & Aquatic Plant Management Staff. Madison, WI. (attached)

Town of Barnes Eurasian Watermilfoil Committee meeting minutes (10) (attached)

Tomahawk and Sand Bar Lake Property Owners Information 3 June 2007 meeting minutes (attached)

ITEMIZED EXPENSES (Estimates)

ACTIVITY	YEAR 1 (2008)		YEAR 2 (2009)		YEAR 3 (2010)		TOTAL\$
	Cash	In-kind	Cash	In-kind	Cash	In-kind	
Chemical application (herbicide purchase & service)	25,000		15,000		5,000		45,000
Aquatic plant monitoring (US Army Corps of Engineers & WDNR)		22,000		22,000		22,000	66,000
Groundwater & in-lake herbicide residual monitoring (private consultant, academic, or agency staff)	5,000		5,000		5,000		15,000
Water quality, weevil, SCUBA, etc. monitoring (volunteers)	1,000	1,000	1,000	1,000	1,000	1,000	6,000
CBCW Project*		Existing grant	10,000	11,000	10,000	11,000	42,000
TOTAL	31,000	23,000	31,000	34,000	21,000	34,000	174,000

Approximately \$83,000 cash costs and \$91,000 in-kind match. The AIS Established Infestation Control Grant will cover \$75,000 of the cash costs, leaving about \$7,000 in cash costs for the community.

It is advised to leave some wiggle room in the out-of-pocket cash costs should unexpected expenses occur.