Final Report

Tomahawk Lake AIS Grant - 2013 and 2014

Grant #ACEI – 130 – 13

In January of 2013, the Tomahawk Lake Association Incorporated (TLA) of Oneida County made application to the Wisconsin Department of Natural Resources for a two-year cost-sharing AIS control grant. The primary problem that was addressed within the grant application was the control and reduction of Aquatic Invasive Species (AIS), and more specifically Eurasian Water Milfoil in the Tomahawk Lake watershed. The grant application closely followed the recommendations spelled out in the Tomahawk Lake Comprehensive Lake Management Plan (CLMP) approved by the Wisconsin Department of Natural Resources in 2009.

Over the course of the two-year span of this grant, TLA in accordance with grant and permit requirements submitted to the Wisconsin Department of Natural Resources a large number of progress and final reports on the activities outlined within the grant. These reports are as follows:

1. Quarterly grant activity progress reports (8)
2. Annual aquatic plant management reports (2)
3. Annual hydraulic conveyor system harvesting reports (2)
4. annual submission of clean boats clean waters ramp education activities (2)

This final Grant report addresses the outcomes against the original goals outlined in the grant application rather than restating the activities which were reported in the reports noted above that have been previously submitted.

Project goals & outcomes:

The project goals as stated on page 9 of the grant application are noted below. Following each goal is an explanation of the progress against these goals:

1. **Control the growth and spread of EWM in the Tomahawk Lake watershed system.**

Perhaps the best way to evaluate progress against this goal is to look at a four-year time frame, beginning the year before the two-year grant period and including the year after the two-year grant period.

Spring Chemical treatments:

Treatment Year	2012	2013	2014	2015
Polygons	57	20	43	13
Acres	124	41	40.6	9.4
Ave. Acres/site	2.17	2.05	.94	.72

The trend is clearly downward in terms of acreage and number of sites. The average size per site fell from 2.17 acres per site in 2012 to .72 acres per site in 2015.
The overall trend of large areas of highly dense EWM within the watershed is being reduced in part due to a number of factors including the efficient use of chemical herbicides, including monitoring water temperatures and plant development to determine the optimum application moment. Also, weather related factors of shorter growing seasons, later springs, and cooler water temperatures over the course of the growing season no doubt played a role in the slower development of the EWM plant infestations affected.

Hydraulic Conveyor System (HCS) Harvesting:

Harvest Year	2012	2013	2014	2015
# of Sites	81	106	149	114
Drained Weight	17,699	20,311	20,679	24,765
Appx SQ. Feet	30,401	34,250	62,090	65,225

The HCS harvesting record for the same four year period tends to be affected by the number of weeks that harvesting takes place. In years where divers have to terminate operations in late August due to early school startups, the number of harvested sites fall adversely effecting total drained weight and approximate square feet harvested. In 2013 divers had

to return to the University system at the end of the third week in August. In 2014 the divers had graduated and were available to harvest through the second week in September. The number of sites jumped substantially as did the estimated square footage harvested. In 2014, while the number of sites increased their drained weight remained consistent with 2013, due primarily to the harvested sites being the last dance than in the previous year.

In both art chemical treatments as well as our HCS harvesting, the nature of the treated sites appears to be trending to last dance infestation levels with smaller spatial coverage.

2. **Incrementally reduce the total acreage of current EWM by 80% over the five-year CLMP plan.**

In the Tomahawk Lake associations initial comprehensive Lake management plan (CLMP) the goal of reducing the total acreage of current EWM by 80% over the five-year plan was established. The baseline level of EWM in 2007 (the baseline year) was 33.43 acres of EWM. Set against the baseline year the target level at the end of the five-year plan in 2012 was 6.68 acres. However the CLMP anticipated the likelihood of the spread of EWM within the watershed was high and as a result they included within the goal the following statement:
"This goal does not account for new spread of EW M throughout the Lake system. New areas colonized by EW M would add to the 33.43 acres used to calculate the 80% reduction the 80% reduction goal should be evaluated on a yearly basis."

Clearly in the years since the 2007 base year EWM has established new colonies of plants throughout the Tomahawk Lake watershed, and as a result the 80% goal has become somewhat less relevant. Total EWM acreage has fluctuated on a year-to-year basis, with a high of 124 acres in 57 polygons in 2012. 2013 and 2014 surveyed acreages fell to 40 acres plus or minus, and in 2015 total acreage was 9.4 acres. The trend has certainly gone in the right direction, but there are so many variables which

contribute to the growth and reduction of EWM acreage within the watershed that the 80% of original EWM infestation has become meaningless. The overall trend over the past four years has been positive in nature but the goals in which we measure success in the control of EWM acreage in the second Tomahawk Lake comprehensive Lake Management Plan will be more applicable to the growth characteristics of EWM in the watershed.

3. **Restore the native plant community in areas previously overwhelmed by EWM.**

Chemical treatments

The means of restoring the native plant community in areas previously overwhelmed by EWM is to remove the EWM and allow the native plant community to reestablish itself naturally. The Army Corps of Engineers study of herbicide efficiency has shown that the window of opportunity in which the herbicide is most effective is from application to 36 hours immediately following applications, when herbicide concentration is at its greatest. The timing of that application, when EWM plants are most receptive to the herbicide is critical to the ability of the plant take up the herbicide. We take water temperatures and sample EWM plants daily in the weeks prior to application, We apply herbicides when water temperatures are at or are approaching 60° at plant levels, and when the inner stems of the sample plants are bright green indicating the plant is ready to take up the herbicide. Both of these criteria need to be met in order to proceed with the application. We work hand-in-hand with our licensed herbicide applicator to make sure that the application is made at the appropriate time.

By following this procedure we believe we are applying the herbicide at the optimum time for EWM control but well before the native plant community will be negatively affected by the herbicide treatment.

The ability of the Hydraulic Conveyor System (HCS) to harvest only Eurasian water milfoil and yet leave the native plant community undisturbed rests solely on the diver's ability to recognize and harvest only the EWM plants.

An indication of the effectiveness of "micromanaging" the herbicide application date and time is demonstrated in the following chart, which compares the pre-and post-application reaction of the native plant community to the herbicide treatments. All of the noted sites lie within treated polygons, and the same site locations were sampled:

2013: 142 Vegetated Point Intercept Sites

	species richness	average natives / vegetated site
Pre-treatment	21	2.72/veg. site
Post-treatment	22	3.41/veg site

2014: 159 Vegetated Point Intercept Sites

	Species richness	average natives / vegetated site
Per-treatment	24	3.74 natives / vegetated site
Post-treatment	28	4.04 natives / vegetated site

? → WOULDN'T THIS BE 7% ?

In 2013 in 2014 our divers' by-catch evaluation was above 93% of the harvest. The 93% by catch level demonstrates that our divers ability to recognize and only pick Eurasian water milfoil is very high, and is among the best years performance.

4. **Maintain a volunteer- manned monitoring system (Sentinels) to target control activities.**

In 2013 and 2014, as in all years, TLA used its Sentinels AIS monitoring group to survey the entire watershed for AIS and specifically EWM twice during each summer season. The Sentinels organization is comprised of 17 two to three person teams who go to specified sectors within the watershed to identify and map AIS infestations. Each team spends 3 to 6

hours per sector traveling a predetermined search pattern from the shoreline to approximately 20 feet in depth throughout the sector. At each location where they find EWM plants they establish a waypoint on a small Garman data collector. At the end of the survey each team turns its data collector into TLA's mapper who transfers the waypoints onto a master map of the watershed. This map is then given to the TLA Executive Director who in turn loads it onto HCS onboard computer, and our scientific surveyor's computer for use in locating and evaluating the EWM locations.

Two surveys are done each summer, with the first one taking place on the last two weeks of June and the second one taking place the first two weeks of August. The Sentinel surveys are critical in TLA's ability to locate and deal with AIS infestation within the watershed. Membership on a Sentinel team has become a "badge of honor" for many of our Lake residents and many teams have been together for more than a decade. This is a highly successful means of locating and mapping AIS in our watershed.

5. **Professionally survey areas of EWM treated with herbicides or manually cleared of EWM on a year-to-year basis, to determine the effectiveness and refine the approaches taken to eradicate EWM.**

In the spring of 2009, the Board of Directors of the TLA voted to establish the position of Executive Director. From that date forward, the position of Executive Director has been responsible for the Tomahawk Lake association's aquatic invasive species control and reduction initiatives. All of the tasks involved in these initiatives, including monitoring efforts, planning and implementation of chemical and mechanical treatments, all surveying and mapping requirements, meeting all Wisconsin Department of natural resources requirements, permitting, reporting, and all other elements included in an effective aquatic invasive species control program. Included within these responsibilities is the completion of all required professional surveys, in accordance with Wisconsin Department of Natural Resources protocols for chemical and mechanical treatments. This is done each year by the Executive Director and reported to the WDNR per protocol guidelines and meeting all grant requirements. These protocols were

followed to the letter in both 2013 and 2014, and reported in the Aquatic Plant Management Reports for 2013 and 2014 which were submitted to the WDNR at the end of both years.

6. **Implement an education and inspection strategy to prevent re-infestation or exportation of AIS.**

The Tomahawk Lake Association has had an active and consistent Clean Boats Clean Waters program for well over a decade, and program guidelines have been followed consistently. In 2013 in 2014 clean boats clean waters data was collected in entered into the swims program as required. Inspection and education efforts four 2013 & 2014 are recapped below:

Year	boats inspected	people contacted	hours spent
2013	2,329	6,680	651
2014	2,547	10,864	910

Source: Swims generated reports.

The Tomahawk Lake Association has employed paid ramp attendants at the thoroughfare landing and at the Lake Tomahawk city ramps for several years. The ramp attendants work Friday afternoons, all day Saturday, and all day Sundays as well as on the three major summer holidays. The labor expense for these ramp attendants is shared by TLA and the state of Wisconsin to the cost-sharing grant program.

7. **Promote the restoration of shoreline areas to minimize conditions promoting AIS growth.**

In 2013 the planning process was initiated for purple loosestrife bio control program for the Tomahawk Lake watershed. This project was headed up by Dr. Noah Lottig of the UW – trout Lake station. Initial efforts included the construction and operation of the purple loosestrife beetle rearing facility at trout Lake station, preparing for planting in the spring of 2014.

THIS IS PL BIOCONTROL ↓ NOT SHORELINE RESTORATION → WERE THERE ANY SHORELINE RESTORATION EFFORTS?

In the late spring of 2014 Dr. Lottig and a small group of students planted a number of beetle carrying plants into the Tomahawk/Minocqua thoroughfare to the Southwest of the Mid lake road bridge. Over the course of the spring, high waters inundated the thoroughfare shoreline areas, and the plantings proved to be unsuccessful. For the remainder of the summer Dr. Lottig led a small group of volunteers in a "bag and clip" control effort in a number of shoreline areas within the Tomahawk Lake watershed.

Future areas of bio control with purple loosestrife beetles are being reevaluated currently

8. **Educate the Tomahawk Lake watershed community as well as transient users about AIS and the practices that minimize its dispersion and growth.**

Over the course of the grant period, TLA has held a number of educational events aimed at promoting good lake stewardship and AIS management.

April 2013 - TLA made a presentation at the Wisconsin Lakes Convention in Stevens Point to Wisconsin lake associations, on the HCS program. Approximately 40 Lake Associations asked for additional information following the workshop. In the 2013 and 2014 seasons, the following lake associations traveled to Tomahawk Lake to see the HCS in action:

August 2013 – Wisc. AIS coordinators and County Conservationists (sponsored by Oneida County Land & Waters)

June 2014 – Sand Lake Lake Association

July 2014 – Silver Lake Association

August 2014 – UW/Kemp research station

September 2014 – Legend Lakes Association

Additional presentations have been made to Tomahawk Lake Associations and friends of the lake:

July 2013 – Purple Loose Strife – Dr. Noah Lottig

July 2013 – Tomahawk Lake Wildlife – North Woods Wild Life Center

August 2013 – Woody Aquatic Habitat – Eric Engbretson

September 2013 – TLA activities presentations to Minocqua, Woodruff, Lake Tomahawk & Hazelhurst boards of supervisors (annual event)

July 2014 – Fishery Presentation – Dr. Noah Lottig

August 2014 – Lyme's Disease Presentation – Indian Shores

September 2014 – TLA activities presentation to Minocqua, Woodruff Lake Tomahawk and Hazelhurst board of supervisors.

These are the major outcomes of the efforts made to attain the identified goals outlined in the Tomahawk Lake AIS Grant 2013 & 2014.

Edward Greedy

Executive Director

The Tomahawk Lake Association, Inc.