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August 20, 2013

Courte Oreilles Lakes Association
Hayward, Wisconsin 54843

Reference: 2013 Aquatic Plant Management Report for Lac Courte Oreilles

Dear Courte Oreilles Lakes Association Members:

The Courte Oreilles Lakes Association (COLA) is a group responsible for the management of Lac Courte Oreilles' aquatic invasive species (AIS), with the species of particular concern being *Potamogeton crispus* (curly-leaf pondweed – CLP) on Lac Courte Oreilles (Lake). Stantec Consulting Services, Incorporated (Stantec) was contacted by the District to provide a chemical herbicide treatment and an aquatic plant survey. Stantec furnished all labor, materials, tools and equipment necessary to perform all operations in connection with the chemical application of herbicides in select locations of the COLA. This report provides a summary of observations, conclusions and recommendations for the chemical treatment of AIS and nuisance aquatic plant growth from 2013 and for the upcoming 2014 season.

PROJECT SUMMARY

This Aquatic Plant Management Report was produced as part of the aquatic plant management activities for Lac Courte Oreilles and COLA. The goal of the project was to control stands of CLP aquatic plant growth, to encourage growth of native aquatic plants that are out competed by CLP, to help improve the health of the lake ecosystem by restoring native habitat, and to improve the recreational and aesthetic value of the Lake. The report reviews existing and historical data for the Lake and activities that were conducted during 2013.

BACKGROUND

Lac Courte Oreilles is a 5139 acre lake located in the Towns of Bass Lake and Sand Lake, Sawyer County, Wisconsin near the City of Hayward. Lac Courte Oreilles has a maximum depth of 90 feet and a mean depth of 33 feet. The Courte Oreilles Lakes Association is an active lake district that has been managing aquatic plants on the lake through surveys and chemical treatments. Curly-leaf pondweed, an AIS, has been treated on the Lake within the past few years.

2012 AQUATIC PLANT MANAGEMENT

COLA contracted Stantec for the 2013 chemical treatment of CLP. Stantec, on behalf of the COLA, was successfully issued a permit to chemically treat up to 56 acres of aquatic invasive species (CLP) for the 2013 season by the Wisconsin Department of Natural Resources (WDNR) as follows: 43 acres in Musky Bay, 7.3 acres in Barbertown Bay, and 2.79 acres in Stucky Bay. A copy of the permit is included in Attachment A.

Before treatments began, a pre-treatment survey was necessary to verify the presence of CLP within the proposed treatment areas outlined in the permit. The survey was completed as a full point-intercept aquatic plant survey in Musky Bay, Stucky Bay, and Barbertown Bay in on May 28, 2013. CLP was present in all locations, with the majority in Musky Bay. Full results are found in the following section.

Chemical treatment for CLP was completed on June 6, 2013. 29 acres were treated for CLP growth in Musky Bay, 5.38 acres in Barbertown Bay, and 2.0 acres in Stucky Bay for a total treatment amount of 36.38 acres. Due to increased impact to native, non-target aquatic plant species a new treatment regimen was created in 2013 by Stantec in conjunction with SePro and WDNR. In Musky Bay, Clearcast® (active ingredient imazamox) was applied at 250 parts per billion (ppb) within areas of active CLP growth mapped during the

2013 pre-treatment survey. This rate was chosen on expecting it to spread bay wide and subsequently dosed on a bay wide basis, assuming a total water volume of 873 acre feet of water, at 45 ppb. Clearcast® was also applied to areas of CLP in Barbertown Bay at a target rate of 300 ppb. In 2013, treatment areas in Stucky Bay CLP were expanded to include a private agricultural canal connected to the bay. In order to reduce agricultural watering restrictions from the treatment, a split approach was used. Within areas of CLP in Stucky Bay proper, granular Clearcast 2.7g® was applied at 250 ppb. Within the private Jonjack canal, liquid Aquathol K® was applied at 3.0 parts per million (ppm). In compliance with WDNR regulations, treatment records were completed and are included in Attachment B.

PRE & POST-TREATMENT FULL AQUATIC PLANT SURVEYS AND ANALYSIS

Prior to treatment, the aquatic plant community of all areas was surveyed on May 28, 2013 by Stantec, Inc. The survey was completed according to the point intercept sampling method described by Madsen (1999) and as outlined in the WDNR draft guidance entitled "Aquatic Plant Management in Wisconsin" (WDNR, 2005). This survey at all sample locations was repeated post-treatment on July 31 and August 1, 2013.

WDNR research staff determined the sampling point resolution in accordance with the WDNR guidance and provided a base map with the specified sample point locations. Within Musky Bay, the sample resolution was doubled from WDNR standards to a denser 55 meter grid with 394 pre-determined intercept points. Latitude and longitude coordinates and sample identifications were assigned to each intercept point on the grid. Geographic coordinates were uploaded into a global positioning system (GPS) receiver. The GPS unit was then used to navigate to intercept points. At each intercept point, plants were collected by tossing a specialized rake on a rope and dragging the rake along the bottom sediments. All collected plants were identified to the lowest practicable taxonomic level (e.g., typically genus or species) and recorded on field data sheets. Visual observations of aquatic plants were also recorded. Water depth and, when detectable, sediment types at each intercept point were also recorded on field data sheets.

The point intercept method was used to evaluate the existing emergent, submergent, floating-leaf, and free-floating aquatic plants. If a species was not collected at a specific point, the space on the datasheet was left blank. For the survey, the data for each sample point was entered into the WDNR "Worksheets" (i.e., a data-processing spreadsheet) to calculate the following statistics:

- **Taxonomic richness** - total number of taxa detected.
- **Maximum depth of plant growth**
- **Community frequency of occurrence** - number of intercept points where aquatic plants were detected divided by the number of intercept points shallower than the maximum depth of plant growth.
- **Mean intercept point taxonomic richness** - average number of taxa per intercept point.
- **Mean intercept point native taxonomic richness** - average number of native taxa per intercept point.
- **Taxonomic frequency of occurrence within vegetated areas** - number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points where vegetation was present.
- **Taxonomic frequency of occurrence at sites within the photic zone** - number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the total number of intercept points which are equal to or shallower than the maximum depth of plant growth.

- **Relative taxonomic frequency of occurrence** - number of intercept points where a particular taxon (e.g., genus, species, etc.) was detected divided by the sum of all species' occurrences).

- **Mean density** - sum of the density values for a particular species divided by the number of sampling sites.

- **Simpson Diversity Index (SDI)** - an indicator of aquatic plant community diversity. SDI is calculated by taking one minus the sum of the relative frequencies squared for each species present. Based upon the index of community diversity, the closer the SDI is to one, the greater the diversity within the population.

- **Floristic Quality Index (FQI) -** This method uses a predetermined Coefficient of Conservatism (C), which has been assigned to each native plant species in Wisconsin, based on that species' tolerance for disturbance. Non-native plants are not assigned conservatism coefficients. The aggregate conservatism of all the plants inhabiting a site determines its floristic quality. The mean C value for a given lake is the arithmetic mean of the coefficients of all native vascular plant species occurring on the entire site, without regard to dominance or frequency. The FQI value is the mean C times the square root of the total number of native species. This formula combines the conservatism of the species present with a measure of the species richness of the site.

AQUATIC PLANT ECOLOGY

Aquatic plants are vital to the health of a water body. Unfortunately, people all too often refer to rooted aquatic plants as "weeds" and ultimately wish to eradicate them. This type of attitude, and the misconceptions it breeds, must be overcome in order to properly manage a lake ecosystem. Rooted aquatic plants (macrophytes) are extremely important for the well-being of a lake community and possess many positive attributes. Despite their importance, aquatic macrophytes sometimes grow to nuisance levels that hamper recreational activities. This is especially prevalent in degraded ecosystems. The introduction of certain aquatic invasive species (AIS), such as CLP, often can exacerbate nuisance conditions, particularly when they successfully out-compete native vegetation and occupy large portions of a lake.

When "managing" aquatic plants, it is important to maintain a well-balanced, stable, and diverse aquatic plant community that contains high percentages of desirable native species. To be effective, aquatic plant management in most lakes must maintain a plant community that is robust, species rich, and diverse.

AQUATIC INVASIVE SPECIES

Aquatic Invasive Species (AIS) are aquatic plants and animals that have been introduced by human action to a location, area, or region where they did not previously exist. AIS often lack natural control mechanisms they may have had in their native ecosystem and may interfere with the native plant and animal interactions in their new "home". Some AIS have aggressive reproductive potential and contribute to a decline of a lake's ecology and interfere with recreational use of a lake. Common Wisconsin AIS include:

- Eurasian Watermilfoil
- Curly Leaf Pondweed
- Zebra Mussels
- Rusty Crayfish
- Spiny Water Flea
- Purple Loosestrife

PRE AND POST TREATMENT AQUATIC PLANT DATA ANALYSIS – MUSKY BAY

The pre-treatment survey was carried out May 28, 2013, and included sampling at the same 394 intercept points used for the 2013 post-treatment survey on June 31, 2013. The aquatic macrophyte community of

Musky Bay was very diverse each year. Table 1 lists the aquatic plant community statistics during the 2010 pre-treatment, 2011 - 2013 post-treatment, and historical 2007 aquatic plant surveys.

Table 1: Aquatic Plant Community Statistics, Musky Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2007	2010	2011	2012	2013
F.o.o. at sites shallower than maximum depth of plants	100	99.22	95.69	94.67	96.45
Simpson Diversity Index	0.84	0.85	0.75	0.69	0.82
Avergage number of all species per site	3.58	3.14	2.13	1.63	2.31
Average number of all species per vegetated site	3.58	3.16	2.23	1.72	2.39
Average Number of native species per site	3.54	2.91	2.11	1.62	2.2
Average Number of native species per vegetated site	3.54	2.93	2.22	1.71	2.29
Species Richness	29	25	26	23	26
Community FQI	35.03	29.82	30.86	29.46	31.02
Average Coefficient of Conservatism	6.74	6.22	6.42	6.43	6.33

In 2013, Aquatic vegetation was detected at 96.45 percent (%) of photic zone intercept points. A diverse plant community was sampled during the 2013 post-treatment survey. The Simpson Diversity Index value of the community was 0.82, taxonomic richness was 26 species, and there was an average of 2.31 species identified at points that were within the photic zone and an average of 2.39 species present at points with vegetation present. Nearly all aquatic plant community indices rebounded from 2012.

The most abundant aquatic plants identified during the 2013 aquatic plants survey were elodea (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), and white-stem pondweed (*Potamogeton praelongis*). Elodea and coontail were also the two most common sampled during the 2012 post-treatment survey. Appendix A displays the locations of all species sampled. Table 2 includes the abundance statistics for each species found during the surveys.

Table 2: Frequency of Occurrence of Aquatic Plant Species by Year, Musky Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2007** Survey		2010 Survey		2011 Survey		2012 Survey		2013 Survey	
Specie	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**
Curly-leaf pondweed	**48**	**1.34**	**22.86**	**1**	**0.76**	**1**	0.51	1	10.68	1.05
filamentous algae	2.99	1.5	---	---	1.52	1	---	---	---	---
coontail	45.52	1.3	61.56	1.1	52.54	1.01	20.3	1.06	39.09	1.11
Chara	1.49	1	1.04	1	4.31	1	4.06	1	6.6	1.04
elodea	90.3	1.2	90.31	1.5	88.32	1.12	83.76	1.46	79.95	1.23
needle spikerush	---	---	0.78	1	2.03	1	0.76	1	0.25	1
quillwort	1.49	1	---	---	0.25	1	---	---	---	---
water stargrass	---	---	---	---	0.25	1	2.03	1	1.78	1
small duckweed	---	---	0.26	1	0.25	1	0.76	1	0.25	1
forked duckweed	---	---	0.26	1	1.02	1	0.51	1	0.76	1
water marigold	1.49	1	10.91	1	6.85	1	2.03	1	0.25	1
watermoss	---	---	---	---	---	---	0.76	1	---	---
northern water-milfoil	5.22	1.29	5.57	1	4.06	1	2.28	1	14.47	1.09
dwarf water-milfoil	1.49	1	0.52	1	0.51	1	0.51	1	0.25	1
bushy pondweed	2.24	1	0.26	1	0.25	1	---	---	1.52	1.17
spatterdock	1.49	1	0.26	1	1.02	1	0.51	1	1.27	1
white water lily	0.75	1	1.4	1.3	4.06	1	4.57	1	9.64	1
pickerelweed	0.75	1	---	---	0.25	1	0.51	1	0.25	1
large-leaf pondweed	11.94	1	3.9	1	---	---	0.76	1	4.06	1
leafy pondweed	0.75	1	---	---	---	---	---	---	---	---
frie's pondweed	2.99	1	---	---	---	---	---	---	---	---
variable pondweed	2.99	1	1.04	1	---	---	---	---	0.51	1
illinois pondweed	2.99	1.25	---	---	0.25	1	---	---	0.51	1
white-stem pondweed	0.75	1	5.19	1.1	10.41	1	2.54	1	32.25	1.01
small pondweed	5.22	1	0.26	1	---	---	---	---	---	---
clasping-leaf pondweed	26.12	1.03	28.83	1.1	3.55	1	22.08	1.09	6.6	1
fern pondweed	93.28	1.75	15.58	1.1	12.69	1.12	2.28	1	---	---
flat-stem pondweed	29.1	1.1	9.61	1.1	2.03	1	---	---	2.54	1
stiff water crowfoot	6.72	1	14.14	1	1.52	1	1.02	1	0.25	1
grass-leaved arrowhead	0.75	1	---	---	---	---	---	---	---	---
arrowhead species	0.75	1	0.26	1	0.51	1	---	---	1.02	1.25
hard-stem bulrush	0.75	1	0.26	1	---	---	0.25	1	0.25	1
Large duckweed	---	---	0.52	1	---	---	---	---	---	---
floating-leaved bur-reed	0.75	1	---	---	---	---	---	---	---	---
narrow-leaved bur-reed	---	---	---	---	0.25	1	0.25	1	0.51	1
wild celery	18.66	1.24	33.51	1.1	13.71	1	9.64	1	14.47	1

To compare between years, statistical analysis completed using a Chi-square test with a 5% Type-I error rate. This error rate is standard in ecological studies and equals that there is a 5% chance of claiming statistically significant change when no real change occurred. Only those species that display a p-value of 0.05 or lower changed significantly population-wise between years. To calculate these values, the total number of sample locations each species was found at is compared between years. CLP data from 2007 was absent, so 2008 data was used in its place. The following table displays statistical changes, if any, for each species sampled in 2013 versus the 2007 full survey, 2010 pre-treatment, and 2011-2012 post-treatment surveys.

Table 3: Statistical Significance of Specie between Sampling Events, Musky Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2013 vs 2012			2013 vs 2011			2013 vs 2010			2013 vs 2007		
Specie	**+ / -**	**P-Value**	**significance**	**+ / -**	**P-value**	**significance**	**+ / -**	**P-value**	**significance**	**+ / -**	**P-value**	**significance**
Curly-leaf pondweed	+	5.4E-10	***	+	2.1E-09	***	-	1E-05	***	-	2.21745E-11	***
filamentous algae	---	---	---	-	0.01394	*	---	---	---	-	0.0001169	***
coontail	+	8E-09	***	-	0.00015	***	-	3.3E-09	***	-	0.144079711	n.s.
Chara	+	0.112768	n.s.	+	0.158085	n.s.	+	4.2E-05	***	+	0.055659264	n.s.
needle spikerush	-	0.316079	n.s.	-	0.01894	*	-	0.316079	n.s.	+	0.559398427	n.s.
elodea	-	0.165607	n.s.	-	0.00129	**	-	0.00376	**	-	0.006366428	**
water stargrass	-	0.79433	n.s.	+	0.03299	*	+	0.00787	**	+	0.12035484	n.s.
quillwort	---	---	---	-	0.317003	n.s.	---	---	---	-	0.002896887	**
small duckweed	-	0.316079	n.s.	no change	1	n.s.	no change	1	n.s.	+	0.559398427	n.s.
forked duckweed	+	0.653692	n.s.	-	0.704202	n.s.	+	0.316079	n.s.	+	0.311068205	n.s.
Water marigold	-	0.01894	*	-	5.6E-07	***	-	1.3E-10	***	-	0.022068237	*
Watermoss	-	0.082678	n.s.	---	---	---	---	---	---	no change	#DIV/0!	#DIV/0!
northern water-milfoil	+	6.7E-10	***	+	4.7E-07	***	+	0.00719	**	+	0.102001073	n.s.
dwarf water-milfoil	-	0.562959	n.s.	-	0.562959	n.s.	-	0.562959	n.s.	-	0.099355231	n.s.
bushy pondweed	+	0.01394	*	+	0.05766	n.s.	+	0.05766	n.s.	-	0.580195234	n.s.
spatterdock	+	0.254718	n.s.	+	0.737434	n.s.	+	0.101162	n.s.	-	0.845077697	n.s.
white water lily	+	0.00555	**	+	0.00192	**	+	7E-08	***	+	0.061561464	n.s.
pickerelweed	-	0.562959	n.s.	no change	1	n.s.	+	0.317003	n.s.	-	0.422758509	n.s.
large-leaf pondweed	+	0.00254	**	+	5.3E-05	***	+	0.854605	n.s.	-	4.93401E-08	***
leafy pondweed	---	---	---	---	---	---	---	---	---	-	0.08609691	n.s.
frie's pondweed	---	---	---	---	---	---	---	---	---	-	0.000576312	***
variable pondweed	+	0.156772	n.s.	+	0.156772	n.s.	-	0.412431	n.s.	-	0.01942391	*
illinois pondweed	+	0.156772	n.s.	+	0.562959	n.s.	+	0.156772	n.s.	-	0.004825828	**
white-stem pondweed	+	2.4E-29	***	+	8.4E-15	***	+	9.5E-24	***	+	4.00332E-12	***
small pondweed	---	---	---	---	---	---	-	0.317003	n.s.	-	4.38645E-08	***
clasping-leaf pondweed	-	5.6E-10	***	+	0.051482	n.s.	-	1.4E-15	***	-	6.47915E-16	***
fern pondweed	-	0.00255	**	-	2.7E-13	***	-	7.7E-16	***	-	7.8374E-108	***
flat-stem pondweed	+	0.00146	**	+	0.633446	n.s.	-	4.9E-05	***	-	8.0692E-23	***
stiff water crowfoot	-	0.178329	n.s.	-	0.05766	n.s.	-	1E-16	***	-	2.12773E-06	***
grass-leaved arrowhead	---	---	---	---	---	---	---	---	---	-	0.01511549	*
arrowhead species	+	0.04495	*	+	0.412431	n.s.	+	0.178329	n.s.	+	0.781246063	n.s.
hard-stem bulrush	no change	1	n.s.	no change	1	n.s.	no change	1	n.s.	-	0.422758509	n.s.
floating-leaved bur-reed	---	---	---	---	---	---	---	---	---	-	0.01511549	*
narrow-leaved bur-reed	+	0.562959	n.s.	+	0.156772	n.s.	+	0.156772	n.s.	+	0.408627867	n.s.
large duckweed	---	---	---	---	---	---	-	0.156772	n.s.	no change	#DIV/0!	#DIV/0!
wild celery	+	0.03765	*	+	0.758687	n.s.	-	1.5E-09	***	-	0.00388278	**

Reduction of CLP, the main goal of the treatments, was successful across all years prior to 2013, which saw an increase in CLP remaining after treatment within Musky Bay. From historically high levels in 2010 (90+ acres) to a 98.4% reduction after treatment in 2011, CLP was reduced drastically. These treatments were with a targeted baywide dose of approximately 700 PPB with the contact herbicide endothall as active ingredient. The 2013 post-treatment survey showed CLP to be present at 27.94 acres (29 acres pre-treatment) resulting in an over-all reduction of 3.7%. However, most of the CLP present was outside of direct treatment areas, which saw a 76% reduction. Of the remaining CLP, a majority was visibly affected by the Clearcast® treatment showing symptoms of impact including; reduced or eliminated turion count, reduced turion size (if present), and a dense, compact growth.

Native species restoration and limiting non-target impact is also an important goal of all AIS management. Though successful, CLP control within Musky Bay was not without impact to non-target native species, which peaked in 2012. 2013 saw rebound in numerous species and community indices. Between 2013 and 2012 three species declined significantly (compared to six in 2012 from 2011). The following is a breakdown of these three species with additional comments:

a. **Clasping-leaf pondweed** – Decreased from all years except 2011. This species has been wildly variably across all years, increasing one year then decreasing the next, and appears to be inversely related to white-stem pondweed abundance (when one decreases, the other increases and vice-versa).
b. **Water marigold** – Had a significant decrease from across all years, especially from its high in 2010, but is only slightly down from 2007 levels. This specie may be on a natural down cycle since 2010 along with potential impact from treatments.
c. **Fern pondweed** – Significant decrease across all comparison years, especially 2007 to 2013 when no plants were found. Though the largest decrease was from 2007 to 2010 (before whole-bay treatments began), all treatments likely had effect on it since with greatest impact coming from 2011 to 2012. Lack of presence during 2013 is a concern.

From 2007 to 2013, 16 species declined significantly from baseline levels. The following is a breakdown of these species not touched on above:

a. **Curly-leaf pondweed** –statistical decrease despite increasing from 2012. Definitely a result of all management action. 2013 treatment may have increased impact not shown until 2014 pre-treatment survey due to turion and overall growth symptoms noticed.
b. **Common waterweed** – Appears to be on a yearly downward trend that is likely due to treatments.
c. **Quillwort** - This specie has a very limited area in Musky Bay where it can grow (shallow, sand bottom areas) and was only found in 2 spots in 2007, 0 in 2010, 1 in 2011, and 0 in 2012 and 2013. Was also reduced significantly in 2007 v 2010 with no large-scale treatment taking place.
d. Large-leaf pondweed – Experienced a significant decline from 2007 to 2010 without any large-scale treatment taking place. Decline continued into 2011 when species wasn't sampled. Large-leaf pondweed was again found during the 2012 survey and increased significantly from 2012 to 2013.
e. **Frie's pondweed** – Frie's pondweed has never been prevalent in Musky Bay & wasn't found in any survey since 2007, including 2010 with no large-scale treatment taking place between the 2007 and 2010 surveys.
f. **Variable Pondweed** – Significant decrease from 2007 to 2013 but a slight increase from 2010 when large-scale treatment began. Initial large-scale treatment likely had effect on it as specie was not found in 2011 or 2012.
g. **Illinois Pondweed** – Has decreased significantly from 2007 to 2013 and was not found during the 2010 survey, before initial whole-bay treatment took place.
h. **Small Pondweed** – This species decreased significantly from 2007 to 2010 without a large-scale treatment, but only decreased slightly (not significant) from 2010 to 2013 and was not found during the 2011-2013 surveys.
i. **Flat-stem pondweed** – This species was significantly by original CLP management techniques to the point of not being found in 2012. Though it has decreased significantly from 2007, it has also increased significantly from 2012.
j. **Stiff water crowfoot** – After a significant increase from 2007 to 2010, this specie has experienced a significant downturn since treatments began. Monitoring for this specie will be done in 2014.
k. **Floating-leaf bur-reed** – Was only found at 1 point in 2007 and none in 2010 - 2013. It has a limited area where it can grow and is likely still present, just not at a sample point. Narrow-leaf bur-reed was found in 2013 and is a close relative.
l. **Wild celery** – This specie was surveyed at all-time highs in 2010 and has since dropped significantly from 2007 & 2010 levels to current, 2013 levels. However, it has shown positive response in 2013, increasing significantly from 2012.

Upon reviewing all the above data, it is our belief that the main concern for species decrease should be focused on the following high value species with some of the most substantial decreases over the last 3 years; stiff-water crowfoot, wild celery, flat-stem pondweed, and fern pondweed. In conjunction, the community as a whole was visibly affected from 2007 to 2012, but may be on the rebound in 2013. Simpson diversity decreased from 2007 to 2012 and the average number of species per point dropped by 52% (3.58 to 1.72). In 2013, however, both indices increased with Simpson Diversity Index returning to near pre-treatment levels. Though the average number of species per point is still below 2007, it increased by 34% from 2012 levels. While from 2012 to 2013, nine species increased significantly – coontail, northern water-milfoil, slender naiad / bushy pondweed, white water lily, large-leaf pondweed, white-stem pondweed, flat-stem pondweed (not found in 2012), arrowhead species, and wild celery.

PRE AND POST TREATMENT AQUATIC PLANT DATA ANALYSIS – STUCKY BAY

CLP is also present in within Stucky Bay. The pre-treatment survey to map existing CLP was completed in 2013 during the same time as the Musky Bay survey and 2.0 acres of CLP was found within Stucky for treatment in 2013. Following treatment in 2013, a post-treatment survey was completed on August 1, 2013 (excluding the Jonjack canal) that used the same established during 2011. The aquatic macrophyte community of Stucky Bay was incredibly diverse each year. Table 4 lists the aquatic plant community statistics during the 2011-2013 post-treatment aquatic plant surveys and 2010 baseline survey.

Table 4: Aquatic Plant Community Statistics, Stucky Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2010	2011	2012	2013
F.o.o. at sites shallower than maximum depth of plants	100	100	84.38	96.88
Simpson Diversity Index	0.91	0.88	0.84	0.91
Avergage number of all species per site	4.72	3.59	2.53	3.41
Average number of all species per vegetated site	4.72	3.63	3	3.52
Average Number of native species per site	4.69	3.56	2.41	3.31
Average Number of native species per vegetated site	4.69	3.49	2.85	3.42
Species Richness	20	21	13	20
Community FQI	27.3	27.07	20.78	24.98
Average Coefficient of Conservatism	6.26	6.21	6	5.89

In 2013, Aquatic vegetation was detected at 96.88% of photic zone intercept points. A diverse plant community was sampled during the 2013 post-treatment survey. The Simpson Diversity Index value of the community was 0.91, taxonomic richness was 20 species, and there was an average of 3.41 species identified at points that were within the photic zone and an average of 3.52 species present at points with vegetation present. Though the total species and SDI found in 2013 are comparable to past surveys, the FQI fell slightly compared to historical data, but rose from the 2012 low.

The most abundant aquatic plants identified during the 2013 aquatic plant survey were fern pondweed (*Potamogeton robbinsii*), coontail, wild celery (*Vallisneria americana*) and elodea. Fern pondweed and elodea were also the most and third most common plants sampled during the 2012 post-treatment survey. Appendix A displays the locations of all species sampled. Table 5 includes the abundance statistics for each species found during the surveys.

Table 5: Frequency of Occurrence of Aquatic Plant Species by Year, Stucky Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2010 Survey		2011 Survey		2012 Survey		2013 Survey	
Specie	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**
Curly-leaf pondweed	**6.25**	**1.00**	**3.13**	**1.00**	12.5	1.00	9.38	1.00
Coontail	50	1.06	53.13	1.12	31.25	1.00	43.75	1.00
Muskgrass	---	---	9.38	1.00	6.25	1.00	3.13	1.00
Elodea	71.88	1.00	46.88	1.00	37.5	1.00	40.63	1.15
Water star-grass	3.13	1.00	3.13	1.00	3.13	1.00	3.13	1.00
Small duckweed	---	---	---	---	---	---	3.13	1.00
Forked duckweed	---	---	3.13	1.00	---	---	---	---
Water marigold	6.25	1.00	9.38	1.00	---	---	12.5	1.00
Common watermoss	---	---	3.13	1.00	---	---	---	---
Northern water-milfoil	28.13	1.00	9.38	1.00	12.5	1.00	---	---
Slender naiad	15.63	1.00	---	---	---	---	3.13	1.00
Spatterdock	6.25	1.00	6.25	1.00	6.25	1.00	9.38	1.00
White water lily	9.38	1.00	12.5	1.00	15.63	1.00	21.88	1.00
Pickerelweed	3.13	1.00	3.13	1.00	---	---	3.13	1.00
Large-leaf pondweed	25	1.00	---	---	---	---	---	---
Variable pondweed	3.13	1.00	---	---	---	---	---	---
Illinois pondweed	---	---	3.13	1.00	---	---	18.75	1.00
Floating-leaf pondweed	9.38	1.00	3.13	1.00	---	---	6.25	1.00
White-stem pondweed	6.25	1.00	6.25	1.00	3.13	1.00	15.63	1.20
Small pondweed	25	1.00	3.13	1.00	---	---	---	---
Clasping-leaf pondweed	28.13	1.00	43.75	1.00	46.88	1.00	21.88	1.00
Fern pondweed	75	1.63	81.25	1.58	68.75	1.14	53.13	1.00
Flat-stem pondweed	50	1.06	31.25	1.00	---	---	21.88	1.00
Stiff water crowfoot	9.38	1.00	3.13	1.00	3.13	1.00	---	---
Arrowhead species	---	---	---	---	---	---	6.25	1.00
Large duckweed	---	---	---	---	---	---	3.13	1.00
Wild celery	40.63	1.00	25	1.00	6.25	1.00	40.63	1.00

* - F.o.O = Frequency of Occurrence

To compare between years, statistical analysis completed using a Chi-square test with a 5% Type-I error rate. This error rate is standard in ecological studies and equals that there is a 5% chance of claiming statistically significant change when no real change occurred. Only those species that display a p-value of 0.05 or lower changed significantly population-wise between years. To calculate these values, the total number of sample locations each species was found at is compared between years. The following table displays statistical changes, if any, for each species sampled versus the 2010-2012 post-treatment surveys.

Table 6: Statistical Significance of Specie between Sampling Events, Stukey Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2013 vs 2012			2013 vs 2011			2013 vs 2010		
Specie	**+ / -**	**P-Value**	**significance**	**+ / -**	**P-Value**	**significance**	**+ / -**	**P-Value**	**significance**
Curly-leaf pondweed	-	0.688788	n.s.	+	0.301699582	n.s.	+	0.641374408	n.s.
Coontail	+	0.3017	n.s.	-	0.453034014	n.s.	-	0.616385598	n.s.
Muskgrass	-	0.554268	n.s.	-	0.301699582	n.s.	+	0.313499946	n.s.
Elodea	+	0.797793	n.s.	-	0.614294665	n.s.	-	**0.011743382**	*
Water star-grass	no change	1	n.s.	no change	1	n.s.	no change	1	n.s.
Small duckweed	+	0.3135	n.s.	+	0.313499946	n.s.	+	0.313499946	n.s.
Forked duckweed	---	---	---	-	0.313499946	n.s.	---	---	---
Water marigold	+	**0.03887**	*	+	0.688787592	n.s.	+	0.391063648	n.s.
Common watermoss	---	---	---	-	0.313499946	n.s.	---	---	---
Northern water-milfoil	-	**0.03887**	*	-	0.076041476	n.s.	-	**0.001211497**	**
Slender naiad	+	0.3135	n.s.	+	0.313499946	n.s.	-	0.08627557	n.s.
Spatterdock	+	0.641374	n.s.	+	0.641374408	n.s.	+	0.641374408	n.s.
White water lily	+	0.521839	n.s.	+	0.320233364	n.s.	+	0.168493468	n.s.
Pickerelweed	+	0.3135	n.s.	no change	1	n.s.	no change	1	n.s.
Large-leaf pondweed	---	---	---	---	---	---	-	**0.002496909**	**
Variable pondweed	---	---	---	---	---	---	-	0.313499946	n.s.
Illinois pondweed	+	**0.01008**	*	+	**0.045230478**	*	+	**0.010080079**	*
Floating-leaf pondweed	+	0.150763	n.s.	+	0.554267836	n.s.	-	0.641374408	n.s.
White-stem pondweed	+	0.086276	n.s.	+	0.229556214	n.s.	+	0.229556214	n.s.
Small pondweed	---	---	---	-	0.313499946	n.s.	-	**0.002496909**	**
Clasping-leaf pondweed	-	**0.03525**	*	-	0.062383054	n.s.	-	0.563702862	n.s.
Fern pondweed	-	0.200185	n.s.	-	**0.016574639**	*	-	0.068210917	n.s.
Flat-stem pondweed	+	**0.00506**	**	-	0.395848482	n.s.	-	**0.019045326**	*
Stiff water crowfoot	-	0.3135	n.s.	-	0.313499946	n.s.	-	0.076041476	n.s.
Arrowhead species	+	0.150763	n.s.	+	0.150762775	n.s.	+	0.150762775	n.s.
Large duckweed	+	0.3135	n.s.	+	0.313499946	n.s.	+	0.313499946	n.s.
wild celery	+	**0.00117**	**	+	0.183150631	n.s.	no change	1	n.s.

*, **, *** - Levels of significance.
n.s. - Change not significant
--- - Specie was not sampled in both comparison years

Two species present in 2012 were not sampled in 2013. However, of the two species absent only one declined statistically; northern water-milfoil, which was noted growing outside of the treatment area and common in other sample locations of the lake. The remaining species was not present at enough locations to trigger a statistical change and, due to annual variances and sampling methods are likely still present within the Bay. Additionally, six species absent from 2012, but found in previous surveys, were again present within Stucky Bay.

Reduction of CLP is the main goal of the project and this species saw a decrease from through 2013. New mapping of CLP found it extirpated from areas treated in 2013 with none remaining in pre-treatment areas. However, a new 1.15 acre bed of CLP was found just outside of the 2013 treated area and in slightly deeper water. The agricultural channel for the connected cranberry bogs was not surveyed at this time.

PRE AND POST TREATMENT AQUATIC PLANT DATA ANALYSIS – BARBERTOWN BAY

CLP is also present in within Barbertown Bay. The pre-treatment survey to map existing CLP was completed in 2013 during the same time as the Musky Bay survey and mapped 5.38 acres for treatment in 2013. Following this treatment, a post-treatment survey was completed on June 31, 2013 at the same 33 sample locations and was expanded by 14 points to include a new area of concern. The aquatic macrophyte community of Barbertown Bay was very diverse each year. Table 7 lists the aquatic plant community statistics during the 2011 - 2013 post-treatment aquatic plant surveys.

Table 7: Aquatic Plant Community Statistics, Barbertown Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2011	2012	2013
F.o.o. at sites shallower than maximum depth of plants	93.9	84.85	100
Simpson Diversity Index	0.93	0.91	0.91
Avergage number of all species per site	4.18	2.88	3.49
Average number of all species per vegetated site	4.45	3.39	3.49
Average Number of native species per site	3.73	2.61	3.38
Average Number of native species per vegetated site	4.13	3.07	3.38
Species Richness	26	20	24
Community FQI	28.14	26.38	29.21
Average Coefficient of Conservatism	6	6.05	6.23

In 2013, Aquatic vegetation was detected at 100% of photic zone intercept points. A diverse plant community was sampled during the 2013 post-treatment survey. The Simpson Diversity Index value of the community was 0.91, taxonomic richness was 24 species, and there was an average of 3.49 species identified at all sample points. Total species in 2013 increased from 2012 with the Simpson Diversity Index, FQI, and average coefficient of Conservatism remaining nearly constant, indicating a diverse and stable ecosystem within the Bay.

The most abundant aquatic plants identified during the 2013 aquatic plants survey were coontail, flat-stem pondweed, and common waterweed. Appendix A displays the locations of all species sampled. Table 8 includes the abundance statistics for each species found during the surveys.

Table 8: Frequency of Occurrence of Aquatic Plant Species by Year,Barbertown Bay - Lac Courte Oreilles, Sawyer County, Wisconsin

	2011 Survey		2012 Survey		2013 Survey	
Specie	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**	**% F.o.O.***	**Avg. Density**
Curly-leaf pondweed	**30.3**	**1.10**	**27.27**	**1.11**	**10.64**	**1.00**
Filamentous algae	15.15	1.00	---	---	---	---
Watersheild	6.06	1.00	6.06	1.00	6.38	1.00
Coontail	54.55	1.00	33.33	1.09	63.83	1.13
Muskgrass	12.12	1.00	6.06	1.00	6.38	1.00
Elodea	51.52	1.00	48.48	1.00	10.43	1.00
Water star-grass	12.12	1.25	18.18	1.33	12.77	1.00
Brown-fruited rush	6.06	1.00	---	---	---	---
Small duckweed	3.03	1.00	---	---	---	---
Forked duckweed	---	---	3.03	1.00	2.13	1.00
Common watermoss	6.06	1.00	---	---	---	---
Northern water-milfoil	30.3	1.10	15.15	1.00	34.04	1.13
Dwarf water-milfoil	---	---	---	---	4.26	1.00
Bushy pondweed	12.12	1.00	6.06	1.00	4.26	1.00
Spatterdock	6.06	1.00	12.12	1.00	8.51	1.00
White water lily	15.15	1.00	18.18	1.00	14.89	1.00
Large-leaf pondweed	3.03	1.00	---	---	4.26	1.00
Variable pondweed	6.06	1.00	3.03	1.00	2.13	1.00
Illinois pondweed	6.06	1.00	3.03	1.00	6.38	1.00
Floating-leaf pondweed	15.15	1.00	---	---	---	---
Small pondweed	3.03	1.00	---	---	---	---
White-stem pondweed	---	---	6.06	1.00	4.26	1.00
Clasping-leaf pondweed	15.15	1.00	15.15	1.00	36.17	1.00
Fern pondweed	39.39	1.62	33.33	1.18	19.15	1.11
Flat-stem pondweed	30.3	1.00	9.09	1.00	42.55	1.00
Stiff water crowfoot	24.24	1.00	18.18	1.33	4.26	1.00
Arrowhead species	---	---	---	---	4.26	1.00
Hard-stem bulrush	6.06	1.00	3.03	1.00	2.13	1.00
Common bur-reed	---	---	---	---	2.13	1.00
Bur-reed species	3.03	1.00	---	---	---	---
Wild celery	6.06	1.00	3.03	1.00	12.77	1.00

* - F.o.O = Frequency of Occurrence

Comparison between years was done using the same statistical analysis as with Musky and Stucky Bays. The following table displays statistical changes, if any, for each species sampled versus the 2011-2012 post-treatment surveys.

Table 9: Statistical Significance of Specie between Sampling Events, Barbertown Bay - Lac Courte Oreilles, Sawyer County, Wisconsin.

	2013 vs 2012			2013 vs 2011		
Specie	**+/-**	**P-Value**	**significance**	**+/-**	**P-Value**	**significance**
Curly-leaf pondweed	**-**	**0.0457021**	*****	**-**	**0.021844464**	*****
Filamentous algae	---	---	---	**-**	**0.005110404**	******
Watersheild	-	0.691394593	n.s.	-	0.691394593	n.s.
Coontail	**+**	**0.010104604**	*****	+	0.498203821	n.s.
Muskgrass	+	0.980988441	n.s.	-	0.347623515	n.s.
Elodea	-	0.40035253	n.s.	-	0.265881955	n.s.
Water star-grass	-	0.466949345	n.s.	+	0.972159503	n.s.
Brown-fruited rush	---	---	---	-	0.082558605	n.s.
Small duckweed	---	---	---	-	0.222592297	n.s.
Forked duckweed	-	0.781760145	n.s.	+	0.406307301	n.s.
Common watermoss	---	---	---	-	0.082558605	n.s.
Northern water-milfoil	+	0.068903089	n.s.	+	0.795398347	n.s.
Dwarf water-milfoil	+	0.237214595	n.s.	+	0.237214595	n.s.
Bushy pondweed	-	0.691394593	n.s.	-	0.174488998	n.s.
Spatterdock	-	0.563947626	n.s.	+	0.709644957	n.s.
White water lily	-	0.649965649	n.s.	-	0.929152838	n.s.
Large-leaf pondweed	+	0.237214595	n.s.	+	0.796383331	n.s.
Variable pondweed	-	0.781760145	n.s.	-	0.34667791	n.s.
Illinois pondweed	+	0.516743576	n.s.	+	0.980988441	n.s.
Floating-leaf pondweed	---	---	---	**-**	**0.005110404**	******
Small pondweed	---	---	---	-	0.222592297	n.s.
White-stem pondweed	-	0.691394593	n.s.	+	0.237214595	n.s.
Clasping-leaf pondweed	**+**	**0.04551551**	*****	**+**	**0.04551551**	*****
Fern pondweed	-	0.126546825	n.s.	**-**	**0.036575842**	*****
Flat-stem pondweed	**+**	**0.001439386**	******	+	0.309533387	n.s.
Stiff water crowfoot	**-**	**0.036047663**	*****	**-**	**0.006484932**	******
Hard-stem bulrush	-	0.781760145	n.s.	-	0.34667791	n.s.
Common bur-reed	+	0.406307301	n.s.	+	0.406307301	n.s.
Bur-reed species	---	---	---	-	0.222592297	n.s.
wild celery	+	0.138799911	n.s.	+	0.345980937	n.s.

*, **, *** - Levels of significance.
n.s. - Change not significant
--- - Specie was not sampled in both comparison years

All species present in 2012 were again sampled in 2013. Additionally, two new species (common bur-reed and dwarf water-milfoil) were sampled along with one historical species absent in 2012 (large-leaf pondweed). A reduction in stiff water crowfoot was noted in all bays sampled and can be attributed to annual variance while filamentous algae growth is highly dependent on current conditions and thrives on high nutrients and temperatures.

Reduction of CLP is the main goal of the project and this specie saw a decrease from 5.38 acres pre-treatment to 1.43 acres 2013 post-treatment. Though it was reduced within treated areas of Barbertown Bay itself, new mapping of CLP found it present in new locations north and west of the pre-treatment area in the bay, giving the acreage for proposed 2014 treatment to 1.43 acres.

MANAGEMENT HISTORY AND HERBICIDE RESIDUAL SAMPLING

Over the last 2 years residual sampling has occurred with both baywide treatments of Aquathol and Clearcast. These are two different types of herbicides with different modes of action; endothall being a contact herbicide it works more quickly and needs a lesser contact time (4 – 8 hours typically) but is not selective to the target species as it generally kills many of the plants it comes in contact with depending on dosing and contact time, and imazamox is a systemic herbicide which is absorbed by the plant through the photosynthesis process therefore requires a longer contact time (48 - 72 hours) for an effective treatment depending on concentrations, although the herbicide because of it's mode of action tends to be more specie selective, as well as working at much lower dosing rates.

Aquathol had been a very effective tool for CLP control but also had substantial secondary effects on the native plant community as outlined above and it's ability to disrupt turion production appears to be questionable for plants that did not completely succumb to the herbicide. Given these factors Clearcast was chosen in 2013, while the secondary effects of the herbicide appear positive; limited, deformed or no turion production on the plants sampled and substantial increases in native plant numbers, the physical treatment results relative to actual CLP control were less than desired or expected, with only minor decreases in overall CLP numbers in Musky Bay, though notably both Stucky and Barbertown experienced decreases in excess of 40% from pretreatment acreages.

The possibilities of why the results were not what was desired or anticipated, appears to lie to a certain extent within the residual sampling data, samples were collected by SePro and citizen volunteers 4 HAT, 1 DAT, 2 DAT, 7 DAT and 14 DAT. Overall residuals were below the target of 45 PPB on a baywide basis, the average 1 and 2 days after treatment (DAT) was about 35 PPB about 25% below the targeted concentration of 45 PPB, falling dramatically after that. The two previous years (2011 & 2012) as typical weather we have had fairly robust northwesterly winds keeping herbicide concentrations within the target zone for several days after treatment. In 2013 the winds were sustained out of the east for six days after treatment varying from 4 – 12 MPH with gusts to 20 MPH according to the national weather service archives for Hayward Wisconsin. This is likely one factor in the initial limited success of the imazamox application within Musky Bay, and the smaller more isolated bays such as Stucky and Barbertown being more protected would have seen less of an effect from easterly winds.

MANAGEMENT SUGGESTIONS

It is important that appropriate management actions continue on a yearly basis to ensure that nuisance invasive aquatic plant growth, in this case CLP does not reach unmanageable levels. While the level of physical plant control experienced in 2013 was not what was desired, there were increases in many of the native plant species in numbers and densities, additionally there appeared to be significant impacts to turion production, something not seen on previous endothall treatments. These impacts will likely not be fully realized until the spring pre-treatment survey in 2014. This was the case with the original treatment of

ClearCast in Stucky Bay in 2011 during the year of treatment the post-treatment results in 2011 appeared initially disappointing, the following spring of 2012 pre-treatment survey found little if any CLP in Stucky Bay to the extent that no treatment was needed in 2012, though some CLP was found later in the season near the Jonjak canal, it is believed this was likely contributed from the canal itself. There are essentially two basic schools of thought regarding invasive species management; simplistically one is to control the invasive at all costs, the other is augment the native plant community as true control of the invasive plant will likely never be achieved and the best defense is a robust healthy plant native plant community. We try to walk a line between both approaches in recommending management strategies.

For 2013 CLP growth was only slightly reduced from pre-treatment levels, but the overall trend is still positive with native plant numbers markedly increased over previous years, in particular in Musky Bay which had seen a decline over the previous two years. However, turions from the invasive plant are viable for many years within the lake bottom and can continue to provide a seed bank of CLP growth for that an extended period of time. The complete effect on turion production of the 2013 treatment will likely not be fully realized until the spring of 2014. Because of the historically high growth levels of the plant in Musky Bay, a large turions bank likely exists. To get a more accurate assessment of the amount of CLP growth from these turions a pre-treatment survey before any management action in 2014 is highly recommended in conjunction with a post-treatment survey approximately 30 days after treatment to assess potential impacts to the surrounding plant community.

Given the data from this year, as well as the last several years, we would recommend the following course of action with two different options depending on what is found during the 2014 spring pre-treatment survey;

Option A *– if the spring 2014 pre-treatment survey finds CLP numbers in Musky Bay at 20 acres or greater it would be our recommendation that liquid Aquathol (endothall) be used, dosed at approximately 500 - 600 PPB on a baywide basis or approximately 3.0 PPM in the treatment areas. We would recommend the continued use of ClearCast in both Stucky and Barbertown Bays granular product, if under 5 acres applied at 250 PPB, or liquid if greater than 5 acres applied at a similar or even slightly higher rate.*

Option B *– if the spring 2014 pre-treatment survey finds CLP numbers in Musky Bay at less than 20 acres it would be our recommendation that ClearCast (imazamox) be used again but dosed at a slightly higher baywide concentration with a target of 50 – 60 PPB. We would recommend the continued use of ClearCast in both Stucky and Barbertown Bays granular product, if less than 5 acres applied at 250 PPB, or liquid if greater than 5 acres applied at a similar or even slightly higher rate.*

Additionally we recommend continued pre and post treatment surveys and mapping of both CLP and native species. Though CLP has been extensively reduced from historical levels, complete extirpation of these AIS from the Lake is extremely unlikely. Current populations of AIS will fluctuate yearly and control actions should be altered accordingly. It is possible, if COLA is interested, as AIS populations come under control to a small and more manageable size, that COLA members can monitor the lake for historic and new AIS infestations and contract with a qualified consultant on as needed basis, as a cost saving measure.

Because of COLA's proactive approach in dealing with AIS, the current populations of CLP within the Lake are decreasing, improving the health and ecosystem on the system. However, the Lac Courte Oreilles Lakes Association should continue to be involved in some type of aquatic plant management program to help manage invasive aquatic plant growth of CLP. AIS are extremely opportunistic plants and can grow to nuisance levels in a very short period of time. Continued management should occur to ensure the health, aesthetic and recreational value of the lake is not degraded. This should occur through a two pronged approach of augmenting the native plant community while targeting reductions in the invasive plants.

The Lac Courte Oreilles Lakes Association must remain proactive in their approach. With COLA's continued commitment to ensuring the health, aesthetic and recreational values of Lac Courte Oreilles are preserved with active aquatic plant management; the quantity of exotic species such as CLP found on Lac Courte

Oreilles will be appropriately controlled. Stantec appreciates working for COLA this past treatment season and we look forward to working with you on future projects. Please feel free to contact us if you have any questions regarding the 2013 chemical treatment or with additional concerns.

Respectfully,
STANTEC CONSULTING SERVICES INC.

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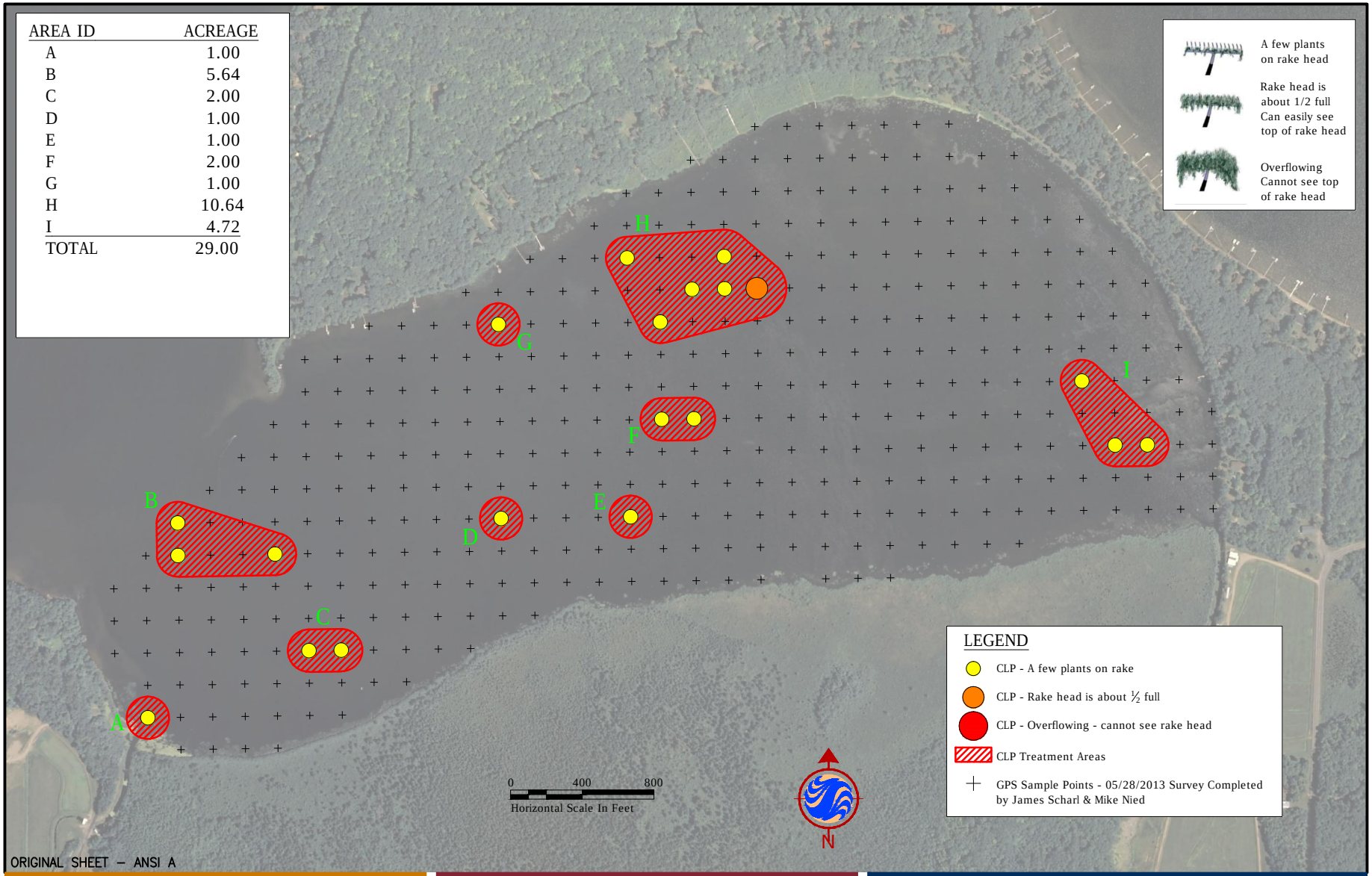
Attachments

FIGURES



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Project Information

Project Nubmer: 193701708

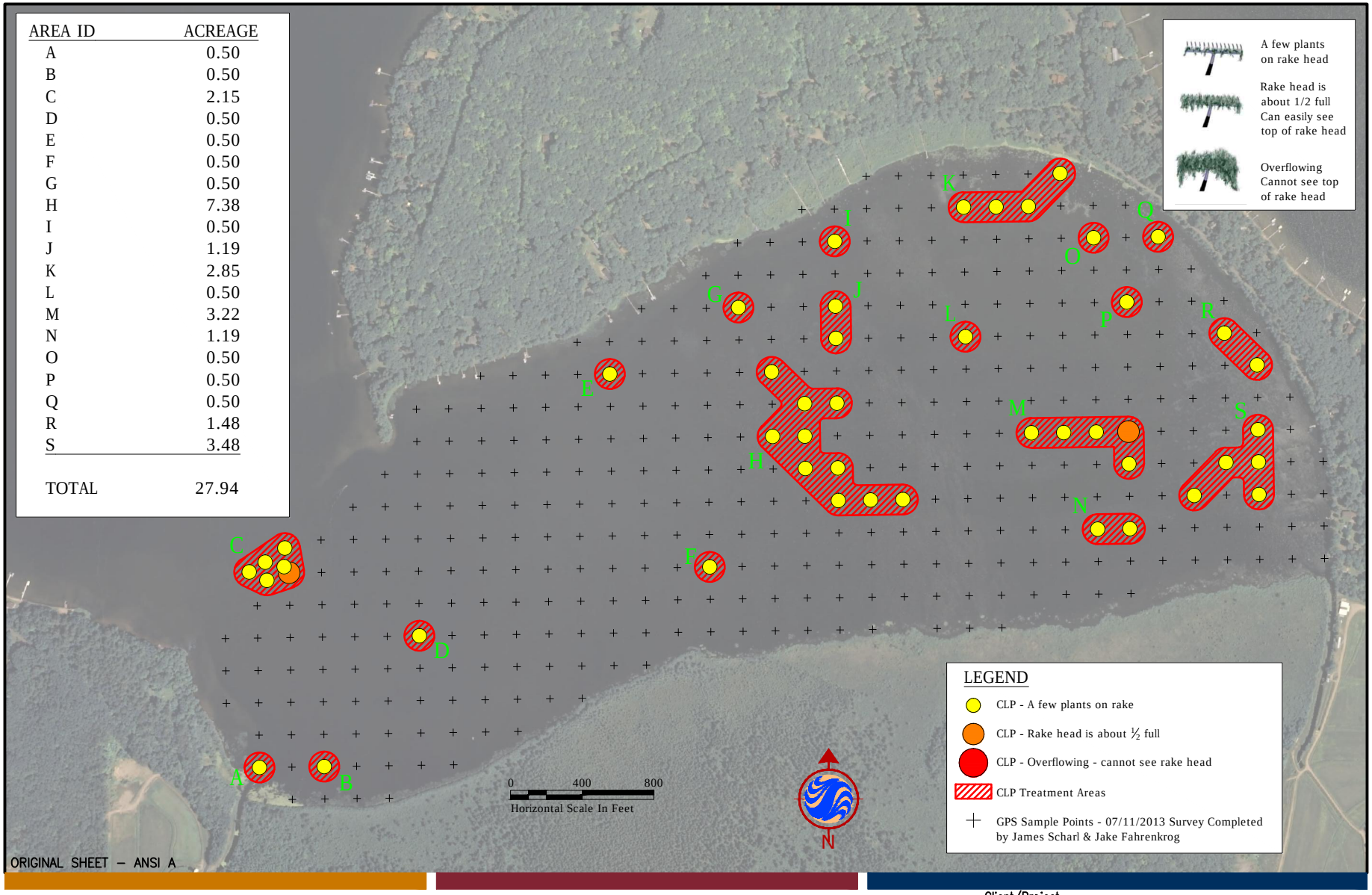
	Initials	Date
Prepared by	EJM	05/29/13
Peer Review by	JTS	05/29/13
Final Review by	MEK	05/30/13

Data Sources include: ESRI and Stantec
Image: NAIP 2010

Client/Project
LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.
1.0

Title
2013 PRETREATMENT SURVEY
MUSKY BAY



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Project Information

Project Nubmer: 193701708

	Initials	Date
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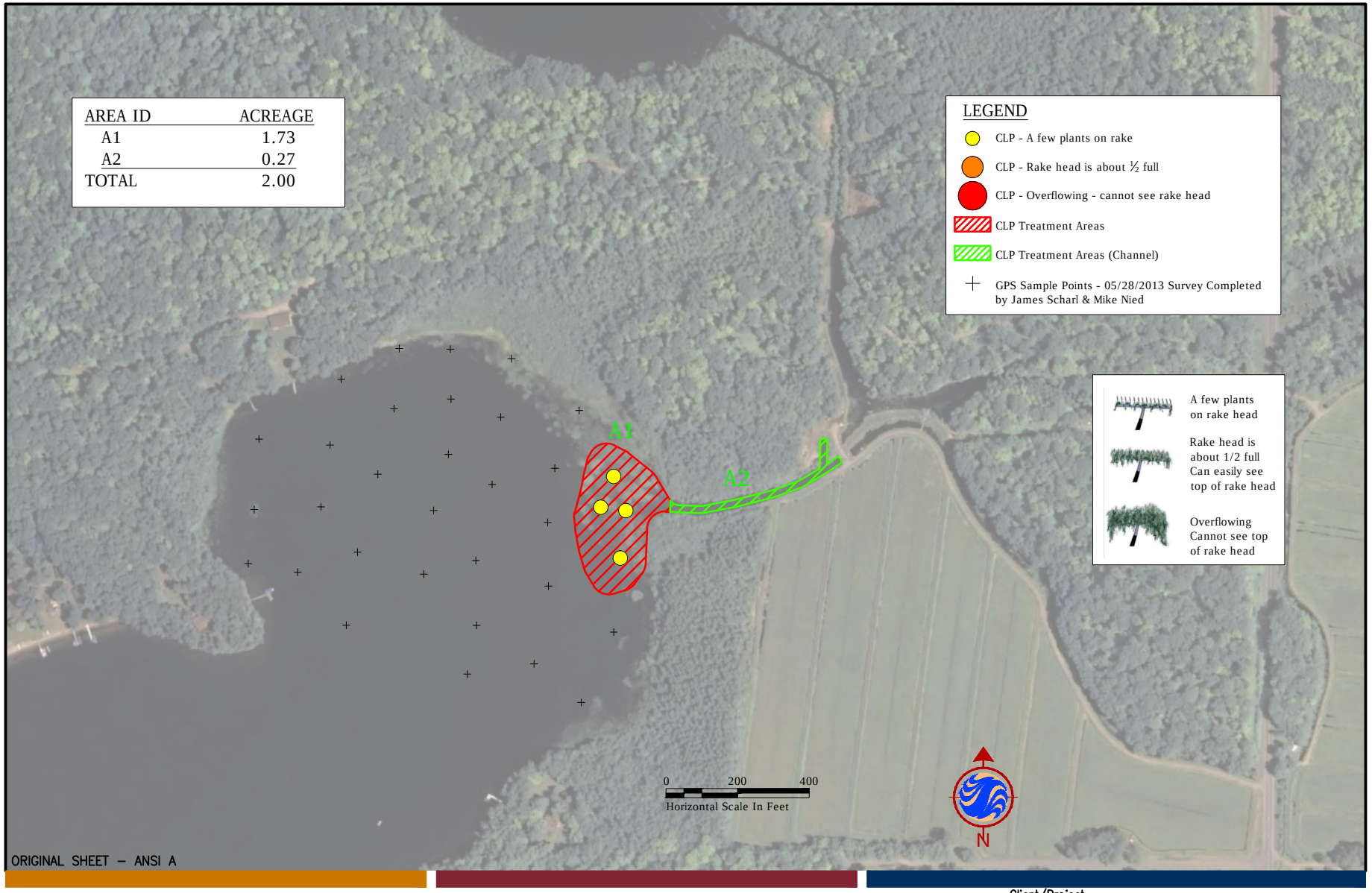
Peer Review by	JTS	07/18/13
Final Review by	MEK	07/19/13

Data Sources include: ESRI and Stantec
Image: NAIP 2010

Client/Project
LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.
1.0

Title
2013 POST-TREATMENT SURVEY
MUSKY BAY



Stantec
12075 Corporate Parkway
Suite 200
Mequon, WI 53092
Tel. (262) 241-4466
Fax. (262) 241-4901
www.stantec.com

Project Information

Project Nubmer: 193701708

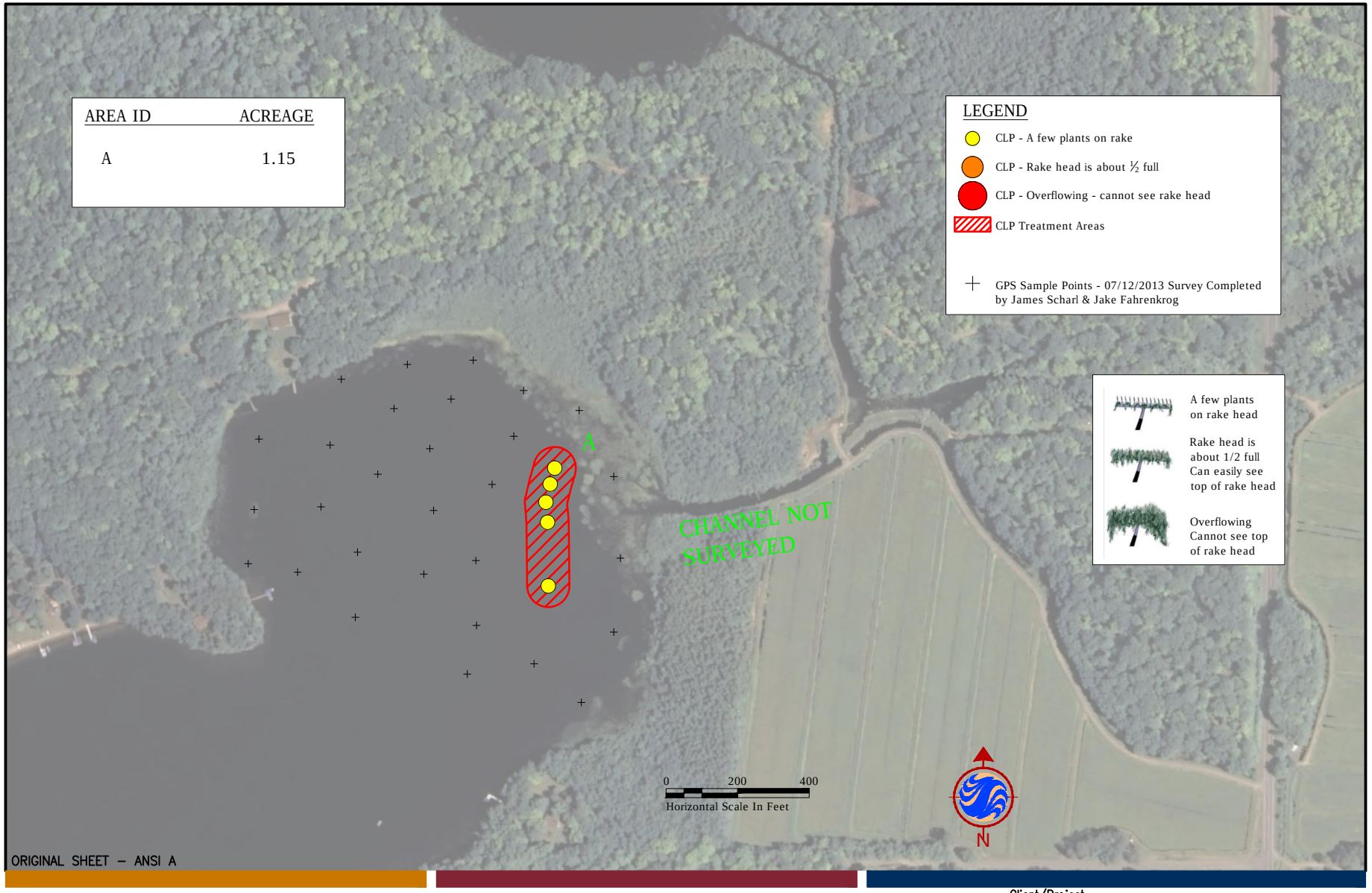
	Initials	Date
Prepared by	EJM	05/29/13
Peer Review by	JTS	05/29/13
Final Review by	MEK	05/30/13

Data Sources include: ESRI and Stantec
Image: NAIP 2010

Client/Project
LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.
1.0

Title
2013 PRETREATMENT SURVEY STUCKY BAY



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Final Review by	MEK	07/19/13

Data Sources include: ESRI and Stantec
Image: NAIP 2010

Client/Project
LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.
1.0

Title
2013 POST-TREATMENT SURVEY
STUCKY BAY

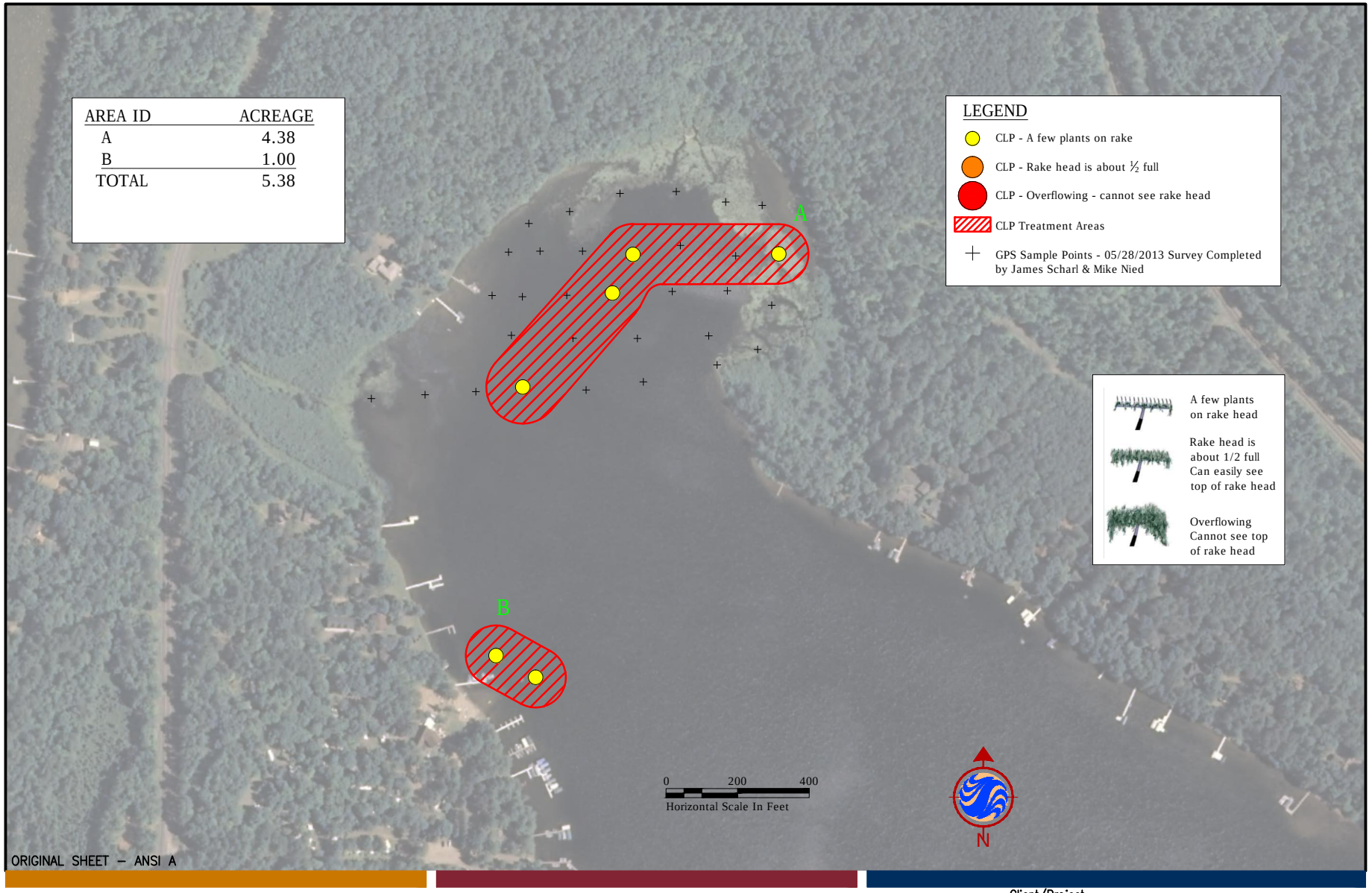

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Image: NAIP 2010

Client/Project

LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.

1.0

Title

2013 PRETREATMENT SURVEY BARBERTOWN BAY

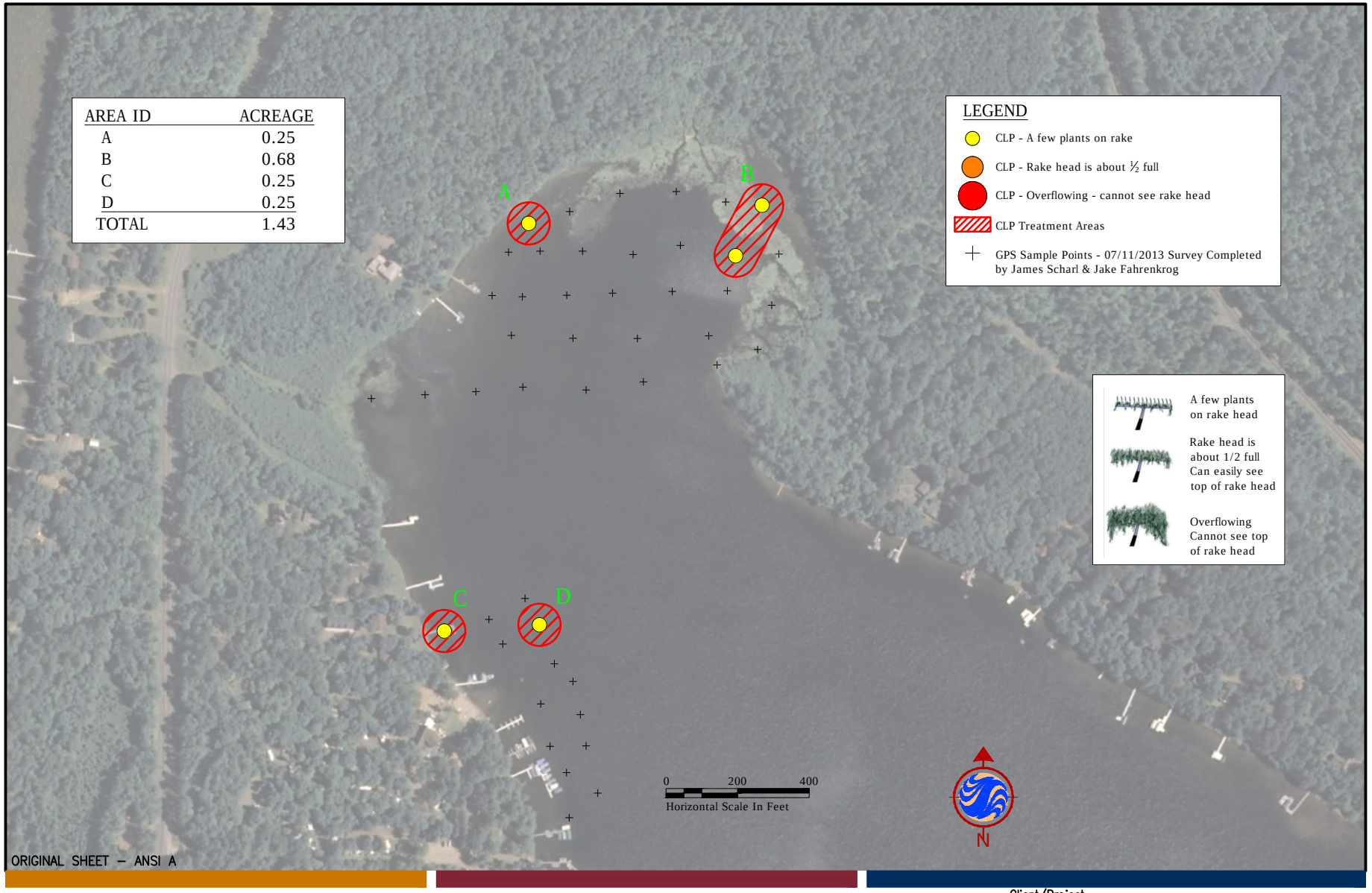

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Image: NAIP 2010

Client/Project
LAC COURTE OREILLES
SAWYER COUNTY
WISCONSIN

Figure No.
1.0

Title
2013 POST-TREATMENT SURVEY BARBERTOWN BAY

ATTACHMENT A

WDNR CHEMICAL AQUATIC PLANT CONTROL PERMIT

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott Walker, Governor
Cathy Stepp, Secretary
John Gozdzialski, Regional Director

Northern Region Headquarters
810 W. Maple Street
Spooner, Wisconsin 54801
Telephone 715-635-2101
FAX 715-635-4105
TTY 715-635-4001

May 9, 2013

Permit # NOR-12-58-1106

Lac Courte Oreilles Lakes Association
Steve Umland
15756W Victory Heights Circle
Stone Lake, WI 54017

Dear Mr. Umland:

Enclosed you will find your approved Aquatic Plant Management permit for chemical treatment on Lac Courte Oreilles in Sawyer County. Your application has been approved for the area described and may not be expanded. Details of the approved treatment area are as follows:

Township 39N Range 9E Sec. 10

Specific Project Description (as shown on application form).

1. Early season CLP control on 3 sites covering a maximum of 56 acres and performed while water temperatures are averaging less than 60 degrees F. Treatment after May 31 will be allowed only if it can be shown that CLP is still in an early growth form and not forming significant numbers of turions, and if native plants are not yet actively growing.
2. Disturbance of wild rice is prohibited.
3. Treatment is to be scheduled to avoid inclement weather/wind that would hinder efficacy.
4. All requirements for notification according to NR 107.07(3) must be satisfied prior to treatment. All riparian residents within 150 feet of a treated area must be properly notified per NR107.04(4).
5. Posting shall occur as specified in NR107.08(7). Signage must remain in place a minimum of one day and the full period specified on the chemical product label.
6. For clearcast applications, we are treating this as a Field Evaluation Use Permit following NR 107.10.
   A. The permit holder shall submit to the department a summary of treatment results at the end of the treatment season. The summary shall include:
   (a) Total chemical used and distribution pattern, including chemical trade name, formulation, percent active ingredient, and dosage rate in the treated water in parts per million of active ingredient and the herbicide concentration data collected in post treatment monitoring.
   (b) Description of treatment areas including the character and the extent of the nuisance present;
   (c) Effectiveness of the application and when applicable, a summary comparison of the results obtained from past experiments using the same chemical formulation;
   (d) Other pertinent information required by the department; include impacts on non-target species and residual monitoring results

(e) Conclusions and recommendations for future use.

7. Musky Bay, using Clearcast/imazamox, apply at a rate of 250 ppb to achieve a bay wide concentration of 45 ppb.
8. Barbertown treatment site shall be expanded to 5 acres to provide enough herbicide contact time to be effective.
9. Conduct herbicide concentration monitoring for Musky Bay and Barbertown. **No** herbicide monitoring allowed in the drainage ditch in Stukey Bay. Prior to treatment, provide to the Department a map indicating the locations of the herbicide concentration sampling points, along with their GPS coordinates.
10. Prior to treatment, provide to the Department a schedule for herbicide concentration monitoring and the names of those that will be collecting the samples.
11. Failure to provide to the Department the field use information will exclude the use of imazamox in the future.
12. Follow the DNR pre and post treatment plant monitoring protocols. Post treatment surveys typically completed during July or August. Prior to treatment, select a control site for plant monitoring. Provide this information to the Department.
13. Any treatment performed on private property, including in any farm drainage ditches as defined in s. 30.10(4)(c), Wis. Stats., connected to Lac Courte Oreilles, is authorized only with the prior written permission of the property owner. The property owner may specify his own restrictions regarding access and location of treatments.

The following conditions are put forth by the Jonjak Cranberry Farm, Inc. regarding the chemical treatment of CLP on private property in the man-made ditch that extends approximately 180 yards from Stukey Bay to the first water control structure maintained by JCF.

a. Two properly licensed chemical applicators working for a professional firm hired by COLA may chemically treat for CLP in this irrigation ditch from the entrance from Stukey Bay in, to the first water control structure.
b. Applicators must enter from Stukey Bay by boat and not set foot on land.
c. No access is granted beyond the 180 yard long ditch.
d. JCF must be notified48 hours in advance of the proposed application by email to ranjean2003@yahoo.com to ensure safeguards for existing water use. NR 107.05(3)(c) and NR107.08(1)
e. Will Stamper must be notified by phone 2 hours prior to treatment, phone number: (715) 415-0194 to ensure safeguards for existing water use. NR107.05(3)(c) and NR107.08(1)
f. Liquid Clearcast or liquid Aquathol K, are the only herbicides that may be used on this site at this time.
g. Permission to treat is given for one application only, on one day, in spring of 2013.
h. Access for herbicide concentration monitoring in the drainage ditch is not being authorized in this document.
i. Arrangements can be made after the treatment for the inspection of the results of treatment in that treatment area only. Post treatment site inspection can be scheduled by contacting Mark Sundeen, WDNR Water Resource Specialist at 715-635-4074 or Mark.Sundeen@wisconsin.gov .

Please note these selected permit conditions (refer to Section NR 107.08 for complete details):

1. Four-day advance notification of treatment is required unless exempted in Section VII of the application.
2. Treatment sites must be posted a minimum of one day or as specified in the use restrictions on the chemical label.

3. The Aquatic Plant Treatment Record must be submitted within 30 days after treatment or by October 1 if no treatment occurs.
4. "All equipment used for the project shall be de-contaminated following the most current protocols for invasive and exotic viruses and species prior to use and after use. All equipment that comes in contact with infested waters, including but not limited to tracked vehicles, barges, boats, silt or turbidity curtain, hoses, sheet pile and pumps, shall be thoroughly disinfected. To the extent practicable, equipment and gear used on infested waters should not be used on other non-infested waters". Note: The most current decontamination protocols can be found at the following website http://dnr.wi.gov/ under the topic "Waterway and Wetland Permits".

Thank you for complying with the provisions of Wis. Adm. Code NR 107 concerning the use of aquatic pesticides for plant management. Feel free to contact Mark Sundeen at the Spooner Service Center at 715/635-4074 or mark.sundeen@wisconsin.gov , for further information.

Sincerely,

Mark Sundeen

John Gozdzialski
Northern Region Director

Enc.

Date Mailed May 9-2013

Regarding the 2013 CLP project on Lac Courte Oreilles

In the interest of controlling curly leaf pondweed in the Big LCO watershed, I think it is best if all parties defuse legal issues so that control measures can be carried out by someone. IF the WDNR sees fit to issue an invasive species control permit to COLA, and makes this document an attachment to, and condition of, this permit, I hereby give the following permission: That two properly licensed individuals working for a professional firm hired by COLA may treat Jonjak Cranberry Farm, Inc.'s (JCF's) man-made irrigation ditch which connects to Stukey Bay, for control of pondweed, provided they approach it only by boat from Stukey Bay and do not set foot on land. This ditch is approximately 180 yards long and terminates in water control structures maintained by JCF.

No access is granted beyond the 180 yard long ditch in question.

JCF would have to be notified 48 hours in advance of the proposed application, as well as two hours before the application, so we may take the appropriate steps to safeguard our food crop. The 48 hour notice must be made by email to ranjean2003@yahoo.com. The 2 hour notice must be made by phone to (715) 415-0194, a cell phone in the name of Will Stamper.

If a compound other than Clearcast or a liquid formulation of Aquathol is to be used, it would have to be agreed to in writing in advance.

This permission is for one treatment only, on one day in the spring of 2013.

Arrangements can be made after the treatment for an inspection of results in that area of treatment only.

JCF is making this offer at the urging of WDNR personnel to find some middle ground. I am choosing to overlook some very inflammatory language and dubious claims included with COLA's application to the WDNR. WDNR personnel can verify I was not aware of the contents of that letter until after I suggested this offer could be made. Rather than coerce me to make this offer, the language in

that letter has me on the verge of not compromising. It is hoped this offer on our part will be accepted in the spirit in which it is given.

Randy Jonjak

Jonjak Cranberry Farm, Inc.

State of Wisconsin
Department of Natural Resources
Water Permit Central Intake - WT/3
PO Box 7185, Madison, WI 53707-7185
dnr.wi.gov

Chemical Aquatic Plant Control Application and Permit
Wisconsin Pollutant Discharge Elimination System (WPDES)
Pesticide Pollutant Permit Application

Form 3200-004 (R 11/11)

Notice: Use of this form is required by the Department for any application filed pursuant to s. 281.17(2), Wis. Stats., and Chapters NR 107, 200 and 205, Wis. Adm. Code. This permit application is required to request coverage for pollutant discharge into waters of the state. Personally identifiable information on this form may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

DNR Use Only	
ID Number: NDR-12-58-7106	Permit Expiration Date: 10-31-13
Waterbody #: 2390800	Fee Received: #1270

Section I – Applicant Information – Name of Permit Applicant. Also indicate names and addresses of all individuals, associations, communities or town sanitary districts sponsoring treatment. Attach additional sheets if necessary.

Home Address

Name	Street Address	City	State	ZIP Code
Lac Courte Oreilles Lakes Association c/o Steve Umland	15756W Victory Heights Circle	Stone Lake	WI	54876

Lake Address

Name	Street Address	City	State	ZIP Code
Lac Courte Oreilles Lakes Association	PO Box 702	Hayward	WI	54582

Phone Number (include area code): Primary: (715) 865-3166 Secondary: (612) 308-5572

Email Address: umlandstudios@centurytel.net

Section II – Aquatic Plant Control Location

Waterbody to be Treated (waterbody where treatment area is located): Lac Courte Oreilles

Lake Surface Area: 5039 acres

Estimated Surface Area that is 10 Feet or Less in Depth: 350 acres

County	Section	Township	Range	
Sawyer	06	39 N	08	☐ E ☐ W

Latitude: Longitude:

Is the waterbody a private pond? ☐ Yes ☒ No

Does the waterbody have public access? ☒ Yes ☐ No

Adjacent Riparian Property Owner Names (attach sheets if necessary)

1. All participants are riparian property owner's of LCO
2.
3.
4.
5.
6.
7.

Name of Lake Property Owners' Association Representative or Lake District Representative (if none, please indicate): Steve Umland - CLP representative for COLA

Name of Applicator or Firm: Stantec

Street or Route: 2841 Stanley St

City	State	ZIP Code
Stevens Point	WI	54481

County	Phone Number (include area code)
Portage	(715) 781-9976

Email Address: mark.kordus@stantec.com

Applicator Certification Number for Category 5 Aquatic Pesticide Application: 077803

Business Location License Number (if applicable): 93-020291-011079

Restricted Use Pesticide License Number (if applicable):

Area(s) Proposed for Control: (Note details in permit cover letter for final permitted sizes of treatment areas.)

	Treatment Length		Treatment Width			Estimated Acreage	Average Depth	
A.	Stucky Bay	ft. X	see map	ft. ÷ 43,560 ft.² =		2.9	4	ft.
B.	Stuckycanal	ft. X	see map	ft. ÷ 43,560 ft.² =		2.8	3	ft.
C.	Musky Bay	ft. X	see map	ft. ÷ 43,560 ft.² =		43	3.5	ft.
D.	Barbertown	ft. X	see map	ft. ÷ 43,560 ft.² =		7.3	4	ft.
E.		ft. X		ft. ÷ 43,560 ft.² =				ft.

Total Estimated Acres

Total from lines A - E: 56

Total from Attached Sheets: 0

Grand Total: 56*

If the estimated acreage is greater than 10 acres, or is greater than 10 percent of the estimated area 10 feet or less in depth in Section II, complete and attach Form 3200-004A, Large-Scale Treatment Worksheet. Private pond treatments are exempted from this requirement.

Is this area within or adjacent to a sensitive area designated by the Department of Natural Resources? ☐ Yes ☒ No

DNR Use: NHI Review? ☒ Yes ☐ No Describe:

Section III – Fees

1. s. NR 107.11(1), Wis. Adm. Code, lists the conditions under which the permit fee is limited to the $20 minimum charge.
2. s. NR 107.11(4), Wis. Adm. Code, lists the uses that are exempt from permit requirements.
3. s. NR 107.04(2), Wis. Adm. Code, provides for a refund of acreage fees if the permit is denied or if no treatment occurs.
4. Fee calculations:

Basic Permit Fee (non-refundable) . . . . . $ 20.00

If proposed treatment is over 0.25 acre, calculate acreage fee:
(round up to nearest whole acre, to maximum of 50 acres.)

50 acres X $25 per acre = $ 1250

If proposed treatment is ≤ 0.25 acre, acreage fee is $0.

Enter Acreage Fee (from above) 1250

Total Fee Enclosed . . . . . $ 1270

☒ **Site Map:** Attach a sketch or a printed map of lake indicating area and dimensions of each individual area where plant control is desired and flow of surface water outside treatment area. Also show location of property owners riparian to and adjacent to the treatment area. Attach a separate list of owners and corresponding treatment dimensions coded to the lake map, if necessary.

Section IV – Reasons for Aquatic Plant Control

Is this permit being requested in accordance with an approved Aquatic Plant Management Plan? ☒ Yes ☐ No

Treatment Type: ☒ Lake ☐ Pond ☐ Wetland ☐ Marina ☐ Other

Goal of Aquatic Plant Control:

- ☐ Reduce nuisance algae accumulation
- ☒ Maintain navigational channel for common use
- ☒ Maintain private access for boating
- ☒ Maintain private access for fishing
- ☒ Improve swimming
- ☐ Control of purple loosestrife
- ☒ Control of invasive exotics
- ☐ Other: _____

Nuisance Caused By:

- ☐ Algae
- ☐ Emergent water plants (majority of leaves and stems growing above water surface, e.g. cattails, bulrushes)
- ☐ Floating water plants (majority of leaves floating on water surface, e.g., waterlilies, duckweed)
- ☒ Submerged water plants (leaves and stems below water surface, flowering parts may be exposed, e.g., milfoil, coontail)
- ☐ Other: _____

List Target Plants

Curly-leaf pondweed

Note: Different plants require different chemicals for effective treatment. Do not purchase chemical before identifying plants.

*Acreage is approximate all areas will be resurveyed prior to 2013 treatment. The applicant is herby requesting as part of this permit issuance that the WDNR support these surveys on the navigable waters above the dams on Stucky Bay as shown on the attached maps

Section V – Chemical Control

Alternatives to Chemical Control:	Feasible?		If No, Why Not?
1. Mechanical harvesting	☐ Yes	☒ No	Spreads plant debris and cannot get into shallow waters
2. Hand pulling	☐ Yes	☒ No	Too large of areas
3. Hand raking	☐ Yes	☒ No	Too large of areas
4. Hand cutting	☐ Yes	☒ No	Too large of areas
5. Sediment screens/covers	☐ Yes	☒ No	Other potential ecological system damage
6. Dredging	☐ Yes	☒ No	Too costly
7. Lake drawdown	☐ Yes	☒ No	No ability to drawdown
8. Nutrient controls in watershed	☐ Yes	☒ No	Not a control option for immediate concerns
9. Other: _____	☐ Yes	☐ No	

Note: If proposed treatment involves multiple properties, consider feasibility of EACH alternative for EACH property owner.

If you checked yes to any of the alternatives listed above, please explain your decision to use chemical controls:

Section V – Chemical Control (continued)

Trade Name of Proposed Chemical(s)
Musky Bay only - ClearCast liquid calculated @ 45 ppb bay-wide (approx. 250 ppb or 2.3 gal/acre within treatment areas)
Stucky Bay and ~~canals~~ - Clearcast 2.7g @ 250 ppb (approx. 100 lbs/acre) Canal - Clearcast liquid or Aquathol
Barbertown Bay only - ClearCast liquid calculated @ 100 ppb bay-wide (approx. 300 ppb or 2.6 gal/acre within treatment areas)

Method of Application: Stantec's granular forced air blower & liquid sub-surface application systems

Will surface water outflow and/or overflow be controlled to prevent chemical loss? ☐ Yes ☒ No

Have the proposed chemicals been permitted in a prior year on the proposed site? ☒ All ☐ Some ☐ None

What were the results of the treatment?

Clearcast 2.7g was used in 2011 in Stucky & Barbertown Bays with good results, but the turion control in the year following treatment seemed to be much better than Super K, hence it appears to be a better long term choice in controlling turion production in future years

Note: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.

Section VI – Applicant Responsibilities and Certification

1. The applicant has prepared a detailed map which shows the length, width and average depth of each area proposed for the control of rooted vegetation and the surface area in acres or square feet for each proposed algae treatment.
2. The applicant understands that the Department of Natural Resources may require supervision of any aquatic plant management project involving chemicals. Under s. NR 107.07, Wis. Adm. Code, supervision may include inspection of the proposed treatment area, chemicals and application equipment before, during or after treatment. The applicant is required to notify the regional office 4 working days in advance of each anticipated treatment with the date, time, location and size of treatment unless the Department waives this requirement. Do you request the Department to waive the advance notification requirement? ☐ Yes ☒ No
3. The applicant agrees to comply with all terms or conditions of this permit, if issued, as well as all provisions of Chapter NR 107, Wis. Adm. Code. The required application fee is attached.
4. The applicant has provided a copy of the current application to any affected property owners' association, inland lake district and, in the case of chemical applications for rooted aquatic plants, to all owners of property riparian or adjacent to the treatment area. The applicant has also provided a copy of the current chemical fact sheet for the chemicals proposed for use to any affected property owner's association or inland lake district.

☐ Check if you are signing as Agent for Applicant.

I hereby certify that the above information is true and correct and that copies of this application have been provided to the appropriate parties named in Section II and that the conditions of the permit and pesticide use will be adhered to.

Signature of Applicant _____ Date Signed _____

All portions of this permit, map and accompanying cover letter must be in possession of the chemical applicator at time of treatment. During treatment all provisions of Chapter NR 107, specifically ss. NR 107.07 and NR 107.08, Wis. Adm. Code, must be complied with, as well as the specific conditions contained in the permit cover letter.

Section V – Chemical Control (continued)

Trade Name of Proposed Chemical(s)

[redacted]

Method of Application: Stantec's granular forced air blower & liquid sub-surface application systems

Will surface water outflow and/or overflow be controlled to prevent chemical loss? ☐ Yes ☒ No

Have the proposed chemicals been permitted in a prior year on the proposed site? ☒ All ☐ Some ☐ None

What were the results of the treatment?
Aquathol K was used in 2011 & 2012 on Musky Bay with excellent results

Aquathol Super K has been used statewide to selectively control CLP with good results.

Clearcast 2.7g was used in 2011 in Stucky & Barbertown Bays with good results, but the turion control in the year following treatment seemed to be much better than Super K, hence it appears to be a better long term choice in controlling turion production in future years

Note: Chemical fact sheets for aquatic pesticides used in Wisconsin are available from the Department of Natural Resources upon request.

Section VI – Applicant Responsibilities and Certification

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☐ Check if you are signing as Agent for Applicant.

I hereby certify that the above information is true and correct and that copies of this application have been provided to the appropriate parties named in Section II and that the conditions of the permit and pesticide use will be adhered to.

Signature of Applicant

Oct 4, 2012
Date Signed

All portions of this permit, map and accompanying cover letter must be in possession of the chemical applicator at time of treatment. During treatment all provisions of Chapter NR 107, specifically ss. NR 107.07 and NR 107.08, Wis. Adm. Code, must be complied with, as well as the specific conditions contained in the permit cover letter.

Section VII – WPDES Permit Request

Is WPDES coverage being requested? Refer to http://dnr.wi.gov/org/water/wm/ww/aquaticpesticides.htm for more information.

☐ Yes ☒ No If no, you do not need to complete this section.

Select which permit you are requesting:
☐ WI-0064556-1 Aquatic Plants, Algae & Bacteria
☐ WI-0064564-1 Aquatic Animals
☐ WI-0064581-1 Mosquitoes & other Flying Insects

Indicate WPDES permitee responsible for the pollutant discharge: ☐ Applicator ☒ Sponsor

Do you expect the pest control activity will result in a detectable pollutant discharge to waters of the state beyond the treatment area boundary or a pollutant residual in waters of the state after the treatment project is completed? ☐ Yes ☒ No

If yes, identify the pollutant(s): WPDES permit coverage issued in 2012 through 2016

Are you planning to incorporate integrated pest management principles, as specified in the WPDES permit, into your pest control activity to minimize any pollutant residual or pollutant discharge beyond the treatment area? ☒ Yes ☐ No

Type of WPDES coverage being requested: ☒ One Treatment Site ☐ Statewide Coverage

For informational purposes, select areas of WI for most of your aquatic treatments: ☒ NW ☐ NE ☐ SW ☐ SE

Is WPDES coverage being requested for more than 1 year?

☐ Yes ☒ No If yes, the permittee will remain in "active" WPDES status until a Notice of Termination is submitted.

I hereby certify that I am the authorized representative (as specified in Ch. NR 205.07(1)(g), Wis. Adm. Code) of the pest treatment activity which is the subject of this permit application. I certify that the information contained in this form and attachments is, to the best of my knowledge, true, accurate and complete.

Signature of Authorized Representative	Printed Name	Date Signed
	STEVEN L. UMLAND	OCT 4, 2012

Section VIII – Permit to Carry Out Chemical Treatment (Leave Blank – DNR Use Only)

The foregoing application is approved. Permission is hereby granted to the applicant to chemically treat the waters described in the application during the season of 2013.

Application fee received? ☒ Yes ☐ No

Advance notification of treatment required? ☒ Yes ☐ No

State of Wisconsin
Department of Natural Resources
For the Secretary

By Mark Sundeen
Regional Director or Designee

May 8, 2013
Date Signed

May 8, 2013
Date Mailed

Please Note:

If you believe that you have a right to challenge this decision, you should know that Wisconsin statutes and administrative rules establish time periods within which requests to review Department decisions must be filed.

For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis. Stats., you have 30 days after the decision is mailed or otherwise served by the Department, to file your petition with the appropriate circuit court and serve the petition on the Department. Such a petition for judicial review shall name the Department of Natural Resources as the respondent.

This notice is provided pursuant to s. 227.48(2), Wis. Stats.

To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the Department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. The filing of a request for a contested case hearing is not a prerequisite for judicial review and does not extend the 30-day period for filing a petition for judicial review.

State of Wisconsin
Department of Natural Resources

WORKSHEET FOR LARGE-SCALE
CHEMICAL AQUATIC PLANT TREATMENT
Form 3200-4A 3-89

NOTE: Completion of this form is required by the Department, pursuant to s. 144.025(2)(i), Wis. Stats., and Chapter NR 107, Wis. Adm. Code, once every five years for proposed treatments that would cover more than 10 acres on one lake, or more than 10 percent of that portion of the lake that is 10 feet or less in depth.

The purpose of this form is to identify the: (1) recreational needs of the property owners and visitors;
(2) value of the proposed treatment area to fish and wildlife;
(3) cause(s) of the excess plant growth problem; and
(4) short and long-term solutions to the problem.

Please furnish a detailed map(s) of the lake and its watershed. Indicate the watershed boundaries on the map. If you do not have a watershed map for the lake you wish to treat, your DNR lake management coordinator can help you locate or prepare one.

SECTION I. BACKGROUND

Name of Applicant
Lac Courte Oreilles Lake Association

Date Completed
9/7/12

Name of Lake
Lac Courte Oreilles

SECTION II. RECREATIONAL USES

Check those uses that apply and complete the information requested:

☐ 1. SWIMMING: Indicate on your lake map the portions of the proposed treatment area that are used for swimming.
What distance from shore is needed to provide adequate swimming space? _____ feet
What is the average depth at this distance? _____ feet

☐ 2. FISHING: Indicate on your lake map any fishing areas that are within the proposed treatment area.

☐ 3. HUNTING: Indicate on your lake map any hunting areas that are within or adjacent to the proposed treatment area.

☒ 4. BOATING/NAVIGATION: Indicate on your lake map where the following boating activities take place within the proposed treatment area:
Sailing ☐ Water skiing ☐ Fishing ☐
Pleasure boating ☐ Jet skiing ☐ Other all areas used for fishing/boating

☐ 5. AESTHETIC: Indicate on your lake map any wildlife or nature observation areas within the proposed treatment area.
Do you object to the aesthetic quality (appearance, odor) of the proposed treatment area? ☐ Yes ☐ No

☐ 6. OTHER: What other activities occur in the proposed treatment area?_____

SECTION III. FISH AND WILDLIFE VALUE

1. Fisheries: To maintain a quality fishery, a lake must provide good spawning, rearing and feeding habitat. Please indicate on your lake map the location of any quality fisheries habitat. (Contact your local DNR fish manager or your local fishing club for information about your lake's fishery.)
2. Wildlife: Indicate on your lake map any portions of the proposed treatment area or adjacent shoreline that are considered to be good wildlife habitat. (Constact your local DNR wildlife manager or your local wildlife or hunting club for additional information about the wildlife around (and in) your lake.)
3. Which organization(s) or individual(s) did you contact for your information?_____

SECTION IV. CAUSES OF THE PROBLEM

What are perceived to be the local or regional causes of the problem? (Check all those that apply.)

☒ A. Agricultural runoff (from barnyards or croplands) that contributes sediment, nutrients and/or bacteria to the lake.

☐ B. Urban runoff (from stormwater) that contributes sediment, nutrients and other pollutants to the lake.

☐ C. Sewage treatment or industrial discharges upstream of the lake.

☐ D. Possible faulty septic systems in the area around the lake.

☐ E. Runoff from fertilized lawns near the lake.

☒ F. Sediments contaminated with nutrients from past pollution activities.

☐ G. Naturally fertile - no known human sources of excessive sediment, nutrients or other pollutants.

☒ H. Other: cranberry bog surface water discharges to the lake

Please identify on your watershed map the locations of any land use practices that are perceived to be contributing to excess plant growth problems in the lake.

SECTION V. SOLUTIONS

Control of aquatic plant problems can be temporarily accomplished with short-term measures, but no strategy will be successful without long-term planning to address the source of the problem. A sound plant management program should combine both short-term and long-term control strategies.

1. What level of short-term control do you wish to achieve?

- ☐ Remove 100% of the plants in the treatment area.
- ☒ Remove 70-99% of the plants in the treatment area.
- ☐ Remove less than 70% of the plants in the treatment area.

2. Which plants do you wish to remove in the short-term?

- ☐ Remove all plant species.
- ☒ Remove specific plant species only. (Name(s) of species: curly-leaf pondweed)

3. How often will it be necessary to:

A. Chemically treat? 0 times per year for algae; 1 times per year for other plants

B. Mechanically harvest? 0 times per year

4. What long-term control alternatives have you begun to implement?

- ☒ Developed a lake plant management plan.
- ☒ Developed a lake protection plan.
- ☒ Formed a Lake District, Lake Association or other organization. (Name: COLA)
- ☒ Established a monitoring program for the lake.
- ☒ Contacted the Soil Conservation Service or Land Conservation Commission to identify land use controls that are needed in the watershed.
- ☐ Conducted a septic survey with the county sanitarian.
- ☒ Other: Conducting lake wide septic survey in 2013

Long-term planning can provide an organized approach to solving the problems that are affecting the water quality of your lake. Your DNR lake management coordinator, county extension agent, or regional planning commission can provide specific technical information and assistance.

SECTION VI. PUBLIC INVOLVEMENT

1. Before you conduct a large-scale chemical aquatic plant treatment, you are required to provide the public with formal notice of the planned treatment (s. NR 107.04(3), Wis. Adm. Code). Please attach evidence (e.g., newspaper clipping) that such notice has been made.

2. You are also required to conduct a public informational meeting on the proposed large-scale treatment if 5 or more individuals, organizations or local or special units of government request such a meeting within 5 days of the notice (s. NR 107.04(3), Wis. Adm. Code).

   Was a public informational meeting required for the proposed treatment? ☐ Yes ☐ No

   If yes, please attach evidence that such a meeting was held.

3. These public notice and public meeting provisions apply each year that a treatment is proposed.

NOTE: This form is to be updated once every 5 years to include new information. Modifications of the proposed treatment within the 5-year period also require re-submittal of this form if the location or target organisms are changed, or if the treatment area is expanded by more than 10 percent.

I hereby certify that the above information is true and correct and that copies of this application have been provided to the appropriate parties named in Section II of Form 3200-4, Application for Permit for Chemical Aquatic Plant Control.

Applicant's Signature

Please attach with map(s) to Form 3200-4, Application for Permit for Chemical Aquatic Plant Control.

ATTACHMENT B

AQUATIC PLANT MANAGEMENT HERBICIDE TREATMENT RECORDS

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Aquatic Plant Management Herbicide Treatment Record

Form 3200-111 (R 11/11)

Notice: Completion of this form is a condition of the permit and provides records required by WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22). The Department may not issue you future permits unless you complete and submit this form. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

Submit this form: **(1) immediately if any unusual circumstances occurred during treatment**
(2) as soon after treatment as possible, no later than 30 days
(3) by October 1 if no treatment occurred

Completion of this form along with the permit satisfies the requirements of WDNR (NR 107) and DATCP (ATCP 29.21 and 29.22).

General Permit Information

Permit Number	Waterbody Name (including ponds, e.g., Smith Pond)
NO-2013-64-662	Lac Courte Oreilles
County	**Permit Holder Name (Customer Name)**
Sawyer	Courte Oreilles Lakes Association

Permit Holder Address	City	State	ZIP Code
15756W Victory Heights Circle	Stone Lake	WI	54017

Treatment Information

Treatment Date (mm/dd/yyyy)	Starting Time (24 hr)	Ending Time (24 hr)	Water Temp (°C)	Ambient Air Temp (°C)
06/04/2013	7:30	14:00	14.44	15.56

Wind Speed (mph)	Wind Direction	Expected Duration of Chemical Residuals
5-10	E to SSE	~7days

Adverse Conditions Noted (i.e., dead fish, spawning fish, algae bloom, etc.)
No

If adverse conditions noted, indicate corrective actions taken

Onsite Supervision Present? (●) Yes ( ) No — If Yes, Supervisor Name: Mark Sundeen

Mixing and Loading Site Location (if other than business site or from prepackaged retail container or applied with equipment with a total capacity of not more than 5 gallons liquid or 50 pounds dry)
pre-packaged retail containers

Herbicide Treatment and Water Use Restrictions Signs Posted In Accordance With NR 107? (●) Yes ( ) No

Applicator shall provide each customer with a free copy of each pesticide label used (if requested)

Applicator Information

Individual or Business Name	Telephone Number
Stantec, Inc.	(715) 781-9976
Street Address	
209 Commerce Parkway	
City	**State** / **ZIP Code**
Cottage Grove	WI 53527

Individuals Making Pesticide Application:	Last Name	First	Certification #
	Scharl	James	77803
	Nied	Joseph (Mike)	89920

Name of Person Completing Form	Signature	Date Signed	DNR Use Only
James Scharl		6/10/13	Date Received

Sheet 2 of 2 Date: 06/10/2013

Aquatic Plant Management Herbicide Treatment Record

Form 3200-111 (R 11/11)

Treatment Site and Chemical Information (attach additional sheets if necessary)

Site No, Property Name, Address / Fire No	Treated Acreage	Permitted Acreage	Sensitive Area?	Latitude	Longitude	Herbicide Name: Clearcast EPA Reg No.: 241-437-67690 Amount Applied	Herbicide Name: Clearcast EPA Reg No.: 241-437-67690 Concentration (mg/l = ppm)	Herbicide Name: Aquathol K EPA Reg No.: 70506-176 Amount Applied	Herbicide Name: Aquathol K EPA Reg No.: 70506-176 Concentration (mg/l = ppm)	Herbicide Name: Clearcast 2.7g EPA Reg No.: 241-437-67690 Amount Applied	Herbicide Name: Clearcast 2.7g EPA Reg No.: 241-437-67690 Concentration (mg/l = ppm)
MUSKY BAY*			☐ Y								
A	1	1	☐ Y			2.5 gal	250 ppb				
B	5.64	5.64	☐ Y			25.5 gal	250 ppb				
C	2.0	2.0	☐ Y			7.5 gal	250 ppb				
D	1	1	☐ Y			3.7 gal	250 ppb				
E	1	1	☐ Y			3.7 gal	250 ppb				
F	2	2	☐ Y			7.4 gal	250 ppb				
G	1	1	☐ Y			3.7 gal	250 ppb				
H	10.64	10.64	☐ Y			39 gal	250 ppb				
I	4.72	4.7	☐ Y			13 gal	250 ppb				
BARBERTOWN BAY			☐ Y								
A	4.38	4.38	☐ Y			12.0 gal	300 ppb				
B	1.0	1.0	☐ Y			2 gal	300 ppb				
STUCKY BAY			☐ Y								
A2 - Jonjack channel	0.27	0.27	☐ Y					2.0 gal	3.0 ppm		
A1	1.73	1.73	☐ Y							200 lbs	250 ppb
			☐ Y								
*Bay-wide rate of 45 ppb			☐ Y								
			☐ Y								
			☐ Y								
			Totals			120 gal		2.0 gal		200 lbs	

Aquatics at Treatment Site: TS = Target Species SP = Species Present

TS	SP		Site(s)
☐	☐	Cattail	
☐	☐	Chara	
☐	☐	Coontail	
☒	☐	Curly-Leaf Pondweed	all CLP areas
☐	☐	Duckweed	
☐	☐	Elodea	
☐	☐	Eurasian/hybrid Milfoil	

TS	SP		Site(s)
☐	☐	Filamentous Algae	
☐	☐	Flat-Stem Pondweed	
☐	☐	Floating-Leaf Pondweed	
☐	☐	Illinois Pondweed	
☐	☐	Large-Leaf Pondweed	
☐	☐	Northern Milfoil	
☐	☐	Phragmites	

TS	SP		Site(s)
☐	☐	Planktonic Algae	
☐	☐	Purple Loosestrife	
☐	☐	Richardson Pondweed	
☐	☐	Robbins Pondweed	
☐	☐	Sago Pondweed	
☐	☐	Watershield	
☐	☐	White Water Lily	

TS	SP	Other Aquatics	Site(s)
☐	☐	White-Stem Pondweed	
☐	☐	Wild Celery	
☐	☐		
☐	☐		
☐	☐		
☐	☐		
☐	☐		