# Phase Two Final Summary Report

***Lower and Upper Clam Lakes***
***Lake User Survey, Education Fair and CLP***
***Turion Sampling***

Siren, Wisconsin

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# Lake User Survey, Education Fair and CLP Turion Sampling
# Lower and Upper Clam Lakes

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Prepared for Clam Lakes Protection and Rehabilitation District

## 1.0 Introduction

The Clam Lakes Protection and Rehabilitation District (CLPRD) is sponsoring a four-phased project to complete a comprehensive lake management plan with and aquatic plant management emphasis for Lower and Upper Clam Lakes. The final deliverable will be a single lake management plan that includes methodologies, results, and management alternatives discussion with an implementation plan. Interim deliverable for each phase include a progress report with results, including maps, spreadsheets, and other data collected during the given phase.

## 2.0 Lake User Survey

A Lake User Survey was developed by Short Elliott Hendrickson Inc. (SEH®) in cooperation with the CLPRD and the Wisconsin Department of Natural Resources (WDNR). The purpose of the survey was to seek a better understanding of the many feelings and attitudes of lake residents and users related to their current plant management plan and possible alternatives, lake use, water quality, knowledge of aquatic invasive species, wild rice, and best management practices for lake protection.

Through late July and August 2009, several drafts of a Lake User Survey was subjected to WDNR and CLPRD review and modifications made until a final draft was approved by both. The resulting survey consisted of 12 pages, including a cover letter. Section headings included the following: residency, lake stewardship, lake use and lake issues, aquatic plant growth, aquatic invasive species, aquatic plant management alternatives, and community support (Appendix A). The cover letter promoted the completion of this survey as an opportunity for land owners and lake users to voice their concerns and opinions related to how the two lakes are and should be managed. Respondents to the survey could remain anonymous if they chose too, and all completed surveys were sent directly to SEH for evaluation. Members of the CLPRD Board were not given access to the survey responses until all results had been tabulated.

The survey was distributed to over 400 people through direct mailings, the CLPRD webpage, and placement at local businesses. In addition, several of the resorts on the lakes distributed the survey to their guests. More than 260 surveys were completed for a return rate around 65%. It is felt that property owners and lake users on both lakes and in the river are well represented. It is believed that the responses received accurately reflect the feelings, attitudes, and opinions of all lake users as well as their general level of knowledge and understanding of the issues facing the Clam Lakes.

All costs associated with distribution and return including printing, postage, stuffing of envelopes, and in person distribution were covered directly by the CLPRD. The following section includes a summary of the results obtained through the survey.

## 2.1 Survey Summary Results

More than 260 surveys were returned to SEH. Individual survey responses were tallied by SEH in a spread sheet format. This summary includes overall responses and a breakdown by lake for each section of the survey. A final summary highlight the most interesting and pertinent results to come out of the survey and a brief synopsis of how they might be used in developing the final Aquatic Plant/Lake Management Plan for the two lakes.

### 2.1.1 Section One – Residency

In this section of the survey, respondents were shown a map of the Clam Lakes and the Clam River inlet and outlet. They were asked to indicate whether they rented or owned property and where it was located. Nearly 70% of the respondents owned property on one of the lakes. Table 1 shows the residency breakdown of all respondents.

**Table 1**
**Residency Breakdown (# of Respondents)**

| Location | Total | Permanent | Seasonal | 2nd Home | Other |
|---|---|---|---|---|---|
| **Lower** | 75 | 14 | 30 | 12 | 19 |
| **Upper** | 106 | 20 | 43 | 20 | 25 |
| **Outlet** | 21 | 6 | 7 | 4 | 4 |
| **Inlet** | 3 | 1 | 0 | 0 | 2 |
| **Both Lakes** | 9 | 2 | 3 | 1 | 3 |
| **No Property** | 20 | NA | NA | NA | NA |

People years, based on the number of days there are people at a property and how many people, can be used to calculate septic system contributions to a given body of water. Based on 208 responses the average number of days a residence on the lakes has people in it is 116, the average number of people at a residence on the lake is 3.5. The average number of people years per residence on the Clam Lakes is 1.11.

### 2.1.2 Section Two – Lake Stewardship

In this section of the survey respondents were asked about best management practices that either are or could be installed around the lake to reduce surface water runoff from their properties. In addition they were asked about the type and condition of their septic systems. When asked about the use of a commercial fertilizer, the majority of respondents on both lakes (84% on Lower, 78% on Upper) stated they do not use fertilizer on their property. When asked if the respondent thought they had best management practices like shoreline buffers, shoreland restorations, and rain gardens in place already, 44% of respondents on both lakes stated that they did not. Of those that did, the most common BMP's were shoreline buffers, shoreland restorations, and native tree or flower plantings. Only one of the respondents had a rain garden in place.

When asked what BMP's hold interest for respondents, 16% of Lower Clam respondents and 24% of Upper Clam respondents said they were not interested in any BMP's. The top BMP's holding interest for respondents were shoreland restoration, native tree and flower plantings, shoreline buffers, and rain gardens were the top vote getters. A few people on Upper Clam were also interested in prairie restorations.

Finally, respondents were asked what would best motivate them to install a BMP on their property. Improving water quality in the lake or by their property, and providing better fish and wildlife habitat were the top vote getters. Tax rebates, financial assistance, and beautifying their property also received a number of votes, but not as many as the afore mentioned motivators.

Of the 261 surveys received, 218 respondents answered the question related to the type of septic system in place at their property. Of the properties with a septic system, 50% had holding tanks, 24% had conventional systems, and 19% had mound systems. Fourteen properties had no septic system, and 13 property owners were unsure of their system type. Respondents were asked when their systems were last inspected and pumped. Almost all respondents indicated that their septic systems had been inspected and pumped within the last ten years, with the bulk of these completed in the last five years. However, 18% of respondents were not sure when their systems were last inspected.

### 2.1.3 Section Three – Lake Use and Lake Issues

This section of the survey asked respondents to choose the activities that they most participate in while at the lake. Rest and relaxation, fishing, and pontoon boating are the top three activities on both lakes. Surprisingly, water-skiing and tubing came in as the 6th and 7th most participated in activity on Lower and Upper Clam Lake respectively. Swimming, wildlife viewing, and canoe/kayaking filled in the spaces. Boating seems to be a favorite lake use as 86% of respondents use watercraft on the water 1-2 times per month or more. Swimming is not as favorable as only 62% swim or wade in the lake during the same time frame. Almost 22% do not swim in the lakes at all.

It also asked what issues were of most concern on the lakes. Green water, poor fishing, too many carp, and too many weeds were by far the issues of most concern. Mid range concerns included introduction of new aquatic invasive species, low water levels in the lakes, floating vegetation left by harvesting, and uncontrolled or excessive water-skiing and use of personal watercraft.

Respondents were also asked to rate the overall water quality conditions in the lakes, and to comment on how the water quality has changed since they had been using the lakes. Tables 2 and 3 show the individual results for each lake.

**Table 2**
**Water Quality Ranking (% of Respondents)**

| Location | Excellent | Good | Fair | Poor | Very Poor |
|---|---|---|---|---|---|
| **Lower Clam** | 0 | 9 | 45 | 43 | 3 |
| **Upper Clam** | 2 | 17 | 46 | 30 | 6 |

**Table 3**
**Changes in Water Quality (% of Respondents)**

| Location | Better | Worse | Same | I don't Know |
|---|---|---|---|---|
| **Lower Clam** | 25 | 41 | 29 | 5 |
| **Upper Clam** | 26 | 37 | 28 | 9 |

While there appears to be some variation in the classification of the water quality between lakes, most think it is fair to poor, there is little variation in the changes. Even though the responses are fairly spread out, by lake they are almost the same.

The last question in this section asked if water quality had ever prevented the respondent from participating in common lake activities. Swimming and wading was most impacted by poor water quality, followed by fishing and enjoying the view.

### 2.1.4 Section Four – Aquatic Plant Growth

This section of the survey evaluates how lake users feel about aquatic plant growth in the lake. Due to the carp population and the apparent decline in not only wild rice, but aquatic plants in general these survey responses may have been different if asked for prior to 2008. Tables 4-6 show the responses to questions about plant growth and density from each lake.

**Table 4**
**Changes in Aquatic Plant Growth by Lake and Length of Residency (% of Respondents)**

| Location | Length of Residency (yrs) | Increase | Decrease | Same | I don't know |
|---|---|---|---|---|---|
| Lower | 0-9 | 18 | 46 | 29 | 7 |
| | 10-20 | 26 | 43 | 17 | 13 |
| | 21-35 | 0 | 56 | 33 | 11 |
| | 36-50+ | 67 | 33 | 0 | 0 |
| | | | | | |
| Upper | 0-9 | 11 | 55 | 21 | 13 |
| | 10-20 | 13 | 80 | 3 | 3 |
| | 21-35 | 9 | 78 | 13 | 0 |
| | 36-50+ | 0 | 100 | 0 | 0 |

**Table 5**
**Satisfaction with the Level of Aquatic Plant Growth (% of Respondents)**

| Location | Too Little | Too Much | Just Right |
|---|---|---|---|
| Lower | 17 | 53 | 10 |
| Upper | 18 | 51 | 18 |

**Table 6**
**Time Periods with Excessive Plant Growth (% of Respondents)**

| Location | Apr-Jun | July-Sept | Oct-Dec | All Season | Never | I don't Know |
|---|---|---|---|---|---|---|
| Lower | 52 | 27 | 0 | 8 | 3 | 10 |
| Upper | 25 | 38 | 0 | 7 | 12 | 18 |

When asked if respondents had made attempts to remove vegetation from their shoreline, 40% reported that they had. The majority of these efforts were directed toward physical removal of vegetation by hand pulling or raking. When asked who respondents thought should be responsible for managing aquatic plants in the Clam Lakes, the CLPRD, WDNR, and the individual land owner were the top three responses in order.

Table 7 shows what respondents said when asked if the level of algae growth had changed in the lakes in the time they had been in residence. It is broken down by lake and length of residency.

**Table 7**
**Changes in Algae Growth by Lake and Length of Residency (% of Respondents)**

| Location | Length of Residency (yrs) | Increase | Decrease | Same | I don't Know |
|---|---|---|---|---|---|
| **Lower** | 0-9 | 39 | 46 | 11 | 4 |
| | 10-20 | 39 | 30 | 9 | 22 |
| | 21-35 | 44 | 33 | 11 | 12 |
| | 36-50+ | 66 | 17 | 17 | 0 |
| | | | | | |
| **Upper** | 0-9 | 24 | 43 | 14 | 19 |
| | 10-20 | 37 | 44 | 11 | 7 |
| | 21-35 | 39 | 35 | 22 | 4 |
| | 36-50+ | 33 | 0 | 67 | 0 |

### 2.1.5 Section 5 – Aquatic Invasive Species in the Clam Lakes

This section of the survey asked specific questions about aquatic invasive species already in the Clam Lakes and ones that are not. The Clam Lakes currently have curly-leaf pondweed (CLP), common carp, and purple loosestrife. They do not have Eurasian water milfoil (EWM).

#### 2.1.5.1 Curly-leaf Pondweed

**Figure 1 – Curly-leaf Pondweed**

The CLPRD had been harvesting CLP for many years, yet surprisingly, not everyone was aware that it was in the system. The fact that not everyone is aware of CLP in the system may be a result of the effectiveness of the current control program or simply due to the fact that CLP is an early season aquatic plant that is mostly gone before the 4th of July holiday when lake use may pick up. Table 8 shows the responses by lake to questions related to the presence of CLP in the lake and the ability of lake users to identify it.

**Table 8**
**Curly-leaf Pondweed Responses by Lake (% of Respondents)**

| Question | Lower | | | Upper | | |
|---|---|---|---|---|---|---|
| | Yes | No | Unsure | Yes | No | Unsure |
| **Aware of CLP in lake** | 57 | 24 | 19 | 39 | 43 | 18 |
| **Able to ID CLP in lake** | 64 | 26 | 10 | 41 | 41 | 18 |

Only 30% of respondents from either lake knew some or a lot about the problems associated with CLP in a lake, though most considered it a moderate to large problem that needs to be addressed.

2.1.5.2 Common Carp

**Figure 2 – Common Carp**

Contrary to the survey results related to CLP, almost every respondent (96%) was aware of the common carp in the system. Nearly 75% felt they knew some or a lot about the problems associated with the common carp. Nearly 97% of all respondents felt they would be able to identify carp in the lake if they saw them. After this line of questioning in the survey, respondents were asked if the carp population had changed since they have been residents on the lakes. A majority (62%) indicated that the population had increased, though 27% were unsure, and nearly 9% indicated the population had remained the same. Only 2% indicated the population had decreased. When asked if the population, in their opinion, had ever been as high as it was when the survey was distributed, 53% indicated it had not, 42% were unsure, and only 6% said it had been this high before. When those who responded that the population had been this high before were asked when last they remember the population being this high, most (54%) could not remember. Other estimates for when the carp population was as high as it is now were as follows: 1-5 yrs ago (13%), 6-10 yrs ago (13%), 11-15 yrs ago (3%), 16-20 yrs ago (7%), and more than 20 yrs ago (10%).

Few lake users have specifically targeted carp in their fishing operations ranging from hook and line fishing to spearing.

2.1.5.3 Eurasian Water Milfoil

**Figure 3 – Eurasian Water Milfoil**

EWM has not been identified in the Clam Lake system as of yet. Efforts have been made to look for it including the completion of point-intercept plant surveys and volunteer AIS monitoring efforts. Still, the system does have some risk of having EWM introduced. Survey respondents were asked if they knew how to identify EWM and if they knew anything about the problems it can cause in a lake. Nearly 52% of the survey respondents felt they knew some or a lot of EWM and the problems it can cause in a lake. Only 35% felt they could probably identify it in the lake if they saw it.

2.1.5.4 Other Aquatic Invasive Species

When asked what other aquatic invasive species the respondents had heard of before, zebra mussels were well known (91%), and purple loosestrife was moderately well known (40%). Rusty crayfish, freshwater jellyfish, spiny waterflea, and hydrilla were fairly well known with about 20% of respondents having heard of them before. Chinese and banded mystery snail and New Zealand mudsnails were for the most part, unheard of by respondents. At least two of these other aquatic invasive species are present in the Clam Lakes. Purple loosestrife is fairly abundant in the northeast bay of Lower Clam, and Chinese mystery snails have been identified throughout the system. The Burnett County Land and Water Conservation Department has been raising and releasing beetles that consume purple loosestrife for several years.

Figure 4 – Purple Loosestrife

Figure 5 – Chinese Mystery Snail

The final question in this section of the survey asked respondents if they would be wiling to participate in a training session to help identify these and other aquatic invasive species. More than 50% said they would probably be willing to participate, 31% were not interested.

### 2.1.6 Section 6 – Aquatic Plant Management

Currently CLP and other aquatic plant growth in the Clam Lakes is managed by removing large amounts of vegetation through large-scale mechanical harvesting. The majority of plant harvesting is completed in the months of May, June, and July. The CLPRD currently owns and operates three large harvesters for the purpose of aquatic plant removal. This section of the survey seeks to determine how respondents view the current aquatic plant management program and to find out what other aquatic plant management alternatives they might support. Table 9 shows the responses to questions related to the current large-scale harvesting program for both CLP and other aquatic plants. Responses are reported by lake.

**Table 9**
**Current Aquatic Plant Harvesting Program (HP) by Lake (% of Respondents)**

| Question | Lower | | | Upper | | |
|---|---|---|---|---|---|---|
| | Yes | No | Unsure | Yes | No | Unsure |
| **Aware of HP** | 89 | 3 | 8 | 88 | 8 | 4 |
| **Is CLP HP Necessary** | 89 | 1 | 10 | 81 | 7 | 12 |
| **Is CLP HP Effective** | 68 | 13 | 19 | 77 | 8 | 15 |
| **Is other plant HP Necessary** | 51 | 10 | 39 | 59 | 12 | 31 |
| **Is other plant HP Effective** | 50 | 10 | 40 | 63 | 12 | 24 |
| **Satisfied with Overall HP** | 70 | 14 | 16 | 67 | 19 | 13 |

Large-scale mechanical harvesting almost always leaves a lot of plant fragments called floaters that wash into shorelines after harvesting has been completed. When asked if this was a problem, 53% of respondents said it was a moderate to large problem, 31% said it was a small problem or no problem at all.

There are other common and readily applied aquatic plant management methods that could potentially be used in place of, or in cooperation with large-scale mechanical harvesting operations. Respondents were asked to indicate what two out of six alternatives to mechanical harvesting they would most support, assuming they were all safe and legal in Wisconsin. If respondents needed more information to make their decision, an opportunity for them to state this was provided. Many respondents chose the additional information answer, but of those who did pick two, large-scale (greater than 10 acres) herbicide application was most supported and biological control and small-scale herbicide applications were equally supported as a second alternative.

Several not so common aquatic plant management alternatives also exist including water level manipulation, dredging, and trophic food web manipulation. Respondents were askd which of these methods they would support. Many respondents wanted more information before making such choices, but those who did were most in support of lowering the lake level over the winter to kill aquatic plants. The CLPRD already completes a drawdown in the fall of the year, which might explain why more people support this option. There is a fair amount of support for dredging operations to reduce sediment and plant growth, but this option has little support by the state.

### 2.1.7 Section 7 – Community Support

Local, county, state, and federal resources can be tapped to help implement aquatic plant management recommendations for the Clam Lakes. However, in most cases some level of community or sponsor match is required to receive this support. Donations of volunteer time, services, materials, equipment, and cash from the community can all be used as match for asking for and receiving resources outside of the Lake District. This section of the survey asked respondents what they were willing to contribute toward helping to make this match. They were also asked about their level of satisfaction with the CLPRD and logistical questions aimed at helping the CLPRD improve attendance at its scheduled meetings, and its communication with members.

When asked the amount of volunteer time respondents would give to support certain Lake District activities nearly 55% said they would give at least a few hours a year. When asked about donations of equipment or services 36% said they might be willing. Another 40% said they would need to wait and see what might be needed before offering any services.

Overall, 61% of respondents were at least somewhat satisfied with the activities completed by the CLPRD. Another 12% were somewhat or completely unsatisfied with the activities completed by the CLPRD. Interestingly, 11% of respondents did not know there was a CLPRD. When asked what would increase member attendance at CLPRD meetings only a few things came out. The preferred time for meetings is weekend mornings, followed by weekend evenings. Having more speakers or presentations would also help. Somewhere around 20% of respondents were not interested in attending CLPRD meetings.

The CLPRD did not get favorable reviews for its communication with members. Only 25% of respondents rated it as good or excellent, compared to 44% who rated it as poor or non-existent. When asked how respondents keep up-to-date on Clam Lake happenings, personal observations, informed neighbors, Lake District mailings and annual meetings topped the list. A few respondents received their updates from the CLPRD website, but most (81%) had never visited it.

Survey respondents were not very willing to contribute more than they already do through the Lake District. Some would support fundraising activities more as a participant than as a sponsor. A few would be willing to provide cash donations as well.

As mentioned before, this survey was designed to be anonymous. However respondents could put their contact information at the end of the survey, if they chose to do so. Out of 261 surveys returned, 149 (57%) had addresses and/or emails attached.

### 2.1.8 Summary of Survey Comments

The survey contained three open ended questions that gave respondents an opportunity to comment on various topics. The first question (Section 6) asked for comments about aquatic plant management ideas that respondents may have, beyond what is in the survey. Several respondents wanted the harvesting program to be reduced, modified, or eliminated altogether. Concerns were voiced about the impact the harvesting has on fish spawning areas, small fish and other lake creatures being killed by harvesting, and not leaving enough "weeds" in the lake. There were a few comments related to keeping the harvesting program as it is such as "doing a great job", "seems to be working", and "we need the cutters".

Many respondents suggested that dredging either on a small or a large scale to remove muck that has built up in the bottom, and/or to remove plants roots would be beneficial. Some suggested that the annual drawdown should be evaluated as to its effect on the system. Some believe it to be beneficial, others believe it to be damaging.

A few respondents commented that the use of fertilizers and pesticides on lawns and in the agricultural areas of the larger watershed are negatively impacting the lake and more regulations pertaining to their use should be enforced.

One respondent suggested that WI allow the use of "weed rollers", mechanical devices attached to individual docks that remove vegetation and loose sediment and muck, like some other states do.

Finally, one respondent suggested that perhaps native plants in the lake should be restored by planting and cultivation.

The second opportunity for comment was provided in Section 7, and pertained to improvements in the official CLRPD website at www.clamlakeprd.com. While the CLPRD should be acknowledged and given kudos for even having a website, there are many things that survey respondents thought would improve it and/or make it more user friendly. It is worth mentioning again, that a large majority of lake residents have never visited the site.

Several respondents commented that the web site should do a better job of communicating an understanding of purpose and responsibility, not only for the Lake District as a whole, but for individual property owners and lake users. The web site should share observations about the lake, plans for the harvesting program, and provide more information about lake improvement activities that land owners can get involved with. Adding more pictures would improve the readability of the web site. More lake information should be added, including weather reports, lake conditions, fishing reports, etc. Currently, only minutes from past annual meetings are posted. Additional links to other local websites should be added to the CLPRD website, and the CLPRD website link should be included on other local websites.

Several respondents commented that they would like to see a place in the website to leave comments or ask questions. This of course would mean that the web guru in charge of the site would have to monitor it on a regular basis, and respond to questions and concerns. Finally, at least one respondent felt that a newsletter should be reinstated in either a paper or digital format, or both.

As was mentioned before, nearly 57% of the surveys returned included a mailing address and/or an email address. There now is a list of at least 80 email addresses from Lake District members and lake users that could be tapped into to start an email newsletter campaign. Several respondents commented that they do not use email or the computer, so a paper newsletter would need to be administered as well.

The last opportunity for survey respondents to comment came in the last question of the survey and pertained to further comment on any other issues or on issues already addressed. Most of these comments were about two issues, poor fishing and absence of aquatic vegetation and structure in the lake. Most believed that these had become an issue only in the last few years and provided many opinions of who or what is to blame. A fairly equal number of respondents blamed an increase in the carp population and the use of chemicals illegal or otherwise, by the WDNR (specifically in the cranberry bog upstream of Upper Clam Lake), individual landowners, or the Lake District. Several respondents commented that the CLPRD was intentionally trying to make the lake a recreational boaters (water-skiing, tubing, and personal watercraft) lake, instead of a fishing lake, as it had always been. There were several comments about the harvesting program; either not enough weeds were being harvested, or that too many were. There was a similar response to lake level. A few thought it was kept too high, and a few thought it was kept too low. Several comments made suggested that there should be better enforcement of lake and shoreline regulations. One respondent commented that more should be known about the operation of the dam, and another would like to see a community compost site established for lawn clippings, leaves, etc. Several respondents commented on the increase in bullhead populations and a decrease in panfish populations in the lake. Dogfish and lamprey were mentioned a couple of times as additional critters, like carp that should be addressed. Finally, one respondent commented that launch fees should be charged at the main landing to anyone who is not a property owner on the lake.

### 2.1.9 General Impressions of the Survey Responses

Bad fishing, lack of aquatic plants and lake structure, and poor water quality are the top concerns of survey respondents. That it is these three, is not surprising as they are all closely related. It is pretty clear from responses though, that these things have only become major issues of concern in the last 3-5 years. Many things seem to have happened in the last five years to raise these concerns including severe drought conditions, an increase in the carp population in the lake, loss of a good panfish fishery, reduction in aquatic vegetation and wild rice, and a decrease in water quality. With a reduction in good fishing it seems that many people believe that the lake is shifting to a recreational boating lake rather than a fishing lake, and that this shift is being driven by the CLPRD and/or the WDNR.

There are many misconceptions about what has been done to and in the Clam Lakes. Many believe that the WDNR killed all the weeds and the wild rice in the lake when an old cranberry bog was abandoned upstream, and herbicides were used to help clean it up. While there is a general knowledge of aquatic invasive species, like curly-leaf pondweed, little is known about the real problems they cause and the methods used to control them or keep the out of the lake. Related to curly-leaf pondweed, a surprising number of respondents were not

aware that this invasive species was in the lake, or that it was the main reason for the harvesting program in the first place.

The Lake District Harvesting Program is generally accepted, though not wholly supported, only because it has been done for so long. The original justifications for having an aquatic plant harvesting program seem to have been lost among the constituency, particularly in light of the more recent lack of vegetation in the lakes and the role respondents believe the harvesting program has had in that decline.

The increase in the carp population has been a very visible change in the lake in the last couple of years. While it is not known unequivocally, that carp may be the biggest factor in the recent decline of the lakes, many of the concerns voiced in the user survey reflect this anecdotal observation. Increased carp may be connected with a decrease in panfish populations. They may also be linked to a reduction in wild rice and other aquatic vegetation. Carp can be linked to increased turbidity (suspended material in the water column making it murky) and even increases in algae blooms that cause greening of the water through remixing of nutrients. When carp disturb bottom sediments foraging for food in the shallows and through their spawning activities, phosphorous previously locked in bottom sediments is released into the water column. This phosphorous is then available for algae growth. Increased algae growth can further reduce larger vegetated growth which can limit production and survival of newly spawned panfish and game fish species.

Based on the survey returns, many lake property owners and lake users are willing to volunteer time and donate services or money to help make improvements in the lakes. What they lack is the guidance to know how, when, where, and what can and needs to be done. In this capacity, the CLPRD needs to improve. There seems to be a general disconnect between the majority of those who are required to be a part of the Lake District and those within the Lake District who do most of the work. Better communication though meetings conducted by the Lake District, the CLPRD web page, newsletters, and local media coverage could improve this. The CLPRD does many positive things not reflected in this survey. The general constituency needs to be better informed as to what these are, and when they are completed. Future plans for communicating the changes in the aquatic plant management plan, how carp are going to be dealt with, and about other parts of lake management that will affect all property owners and users need to be developed.

### 2.1.10 Use of Survey Responses to Help Guide Changes in Lake Management

The responses given in this survey will be used when developing a new aquatic plant and lake management planning documents. The survey will act as a guide when developing education and information goals for the Lake District and its constituency. Questions raised through the survey will be addressed to the extent that they can be. Everyone affected by the lake management activities that are implemented needs to at least be aware and informed as to the why and how of these management decisions. A system will be put in place that allows land owners to ask questions and receive answers. While it is impossible to satisfy everyone, everyone needs to receive enough information to know what, where, when, and why the CLPRD does what it does.

## 3.0 Lake Fair

On August 29, 2009 the CLPRD held its first Lake Fair at the Moose Club at the intersection of Hwy 70 and 35. It was coupled with the 2009 Annual Meeting. Approximately 60 people were in attendance. The Annual Meeting ran from 10:00 a.m. to 11:30 a.m. and then lunch

was served. After which the Lake Fair officially started and went until 2:00 p.m. Lunch was sausage and wild rice soup, dinner salad, rolls, and Lemonade and was sponsored and prepared by SEH and the CLPRD. Prior to and during the annual meeting, lunch, and the Lake Fair display tables covering Loon Watch, Burnett County's Natural Shoreland Restoration Incentives, Wild Rice, Water Quality Testing, and the Lake User Survey were set up. In addition, a hands-on display was set up outside for folks to see and touch the different plants that were documented in the lakes, including CLP. EWM was on display as well as many of the look-a-likes for both EWM and CLP.

Three presentations were given during the Lake Fair. Peter David from the Great Lakes Indian Fish and Wildlife Commission gave a presentation on the ecology, history, harvest, and cultural significance of wild rice. John Haack, UWEX Basin Educator gave a presentation on Lakescaping for Wildlife which focused on shoreland improvements that lake shore owners could make to provide habitat for wildlife. Finally, Dave Blumer from SEH gave a presentation on common carp combining WDNR, Tribal Data, and research information related to the impact of carp in a body of water like the Clam Lakes.

There were many positive comments from those who attended. The Agenda for the 2009 Lake Fair and Annual Meeting is attached in Appendix B.

## 4.0 CLP Turion Sampling

On October 16, 2009 James Johnson from Freshwater Scientific Services (FSS) and Dave Blumer from SEH completed CLP turion sampling at 42 on Lower Clam and at 77 sites on Upper Clam. As expected, a large number of turions were found in Lower Clam Lake. The locations of heaviest deposition correlated well with the dense beds of CLP mapped by Endangered Resource Sciences. What was a little unexpected was the lack of turions found in Upper Clam Lake. Only a few locations had turions at all. In the past, the harvesting program for CLP was fairly extensive on both lakes. In recent years, Lower Clam Lake seems to have the largest issue with CLP. Completing the turion counts for sediment samples taken from Upper Clam took much less time than what had been budgeted for, primarily due to the lack of turions. The full report from FSS is included as Appendix C.

## 5.0 Wild Rice Seed Enumeration Sampling

Due to the lack of turions found in the sediment samples taken on Upper Clam Lake and the rather stark disappearance of wild rice in the lake, it was decided that FSS would come back and take some additional sediment samples to complete a count of the number of wild rice kernels present. Thirteen additional sites on Upper Clam were sampled on November 5, 2009. Wild rice seed counts were completed in these samples and in six sites from the October 16$^{th}$ survey. The suspicion was and continues to be that the current carp population is to blame for the decline/disappearance of wild rice in the system. The question to start answering with this impromptu seed enumeration was, are there any seeds left in the sediments to allow the rice to rebound. Ten additional sediment samples were taken from nearby Long Lake which is hydraulically connected to Upper Clam for comparison purposes. The findings in the 2009 seed count were disturbing. Absolutely no seeds (zero) were found in the sediments of Upper Clam Lake. Hundreds were found in each sample from Long Lake.

In addition to the sediment grabs, deep core samples to at least 30-cm were taken from five sites in Upper Clam Lake. Again, no actual wild rice kernels were counted. There were a lot of empty hulls, but zero kernels. The full FSS report is included as Appendix D.

As a result of the 2009 wild rice sampling, a small-scale grant was applied for by the CLPRD to do a more complete wild rice enumeration in the spring of 2010. This survey included sites on Upper Clam, Lower Clam, Long, Briggs, and the Clam River Flowage. Results from this enumeration will be reported at a different time.

## 6.0 Final Summary

Phase Two of this project produced a lot of lake information which will be used to help determine appropriate aquatic plant and lake management recommendations for the Clam Lakes. Data from all of the first three phases will be combined and used to complete a new Aquatic Plant Management Plan for the Clam Lakes in Phase Four. While CLP management is still an issue, other major issues have been added. Lack of vegetation in the two lakes at the current time has become the largest issue, due in part to the large increase in the carp population. Plant management recommendations will be dependent on what is decided to do about the current carp population. St. Croix Tribal Resources, the CLPRD, the WDNR, SEH, FSS, and the University of Minnesota are all combining their resources to help address the issues in the Clam Lakes.

DLB/ls

# Appendix A

Lake User Survey

SEH

September 22, 2009

RE: Clam Lakes Protection and Rehabilitation District
Lake User Survey

Dear Clam Lakes User:

The following "Lake User Survey" was constructed as just one part of a two year, four-phased aquatic plant and lake management project sponsored by the **Clam Lakes Protection and Rehabilitation District** and funded in part through the **Wisconsin Department of Natural Resources** Lake Management Planning Grant Program. The end goal of this project is to determine how best to manage the Clam Lakes resources to maintain or improve overall lake conditions pertaining to aquatic plants, water quality, fish and wildlife management, and the quality of lake user and shore land owner experience. Results from this survey will help determine lake uses and lake issues specific to the Clam Lakes. Results will also be used to help determine specific lake management recommendations to be developed for a new aquatic plant management plan for invasive species like curly-leaf pondweed and Eurasian water milfoil, and other plants to be implemented in 2011.

As Lake Users and Shore Land Owners, your input and participation are important to the overall success of this project. Your voices can be heard by attending Lake District meetings, talking to your board members, and by completing this survey. Mailings, newspaper articles, and the Lake District and other webpages are all ways the District hopes to keep you informed. Please take the time to complete this survey and return it by **October 24, 2009.** Completed surveys can be returned in the envelope provided, dropped off at **Big Mike's Sport Shop** on Hwy 70, emailed (with attachment) to dblumer@sehinc.com, faxed or mailed to SEH at the contact information below.

Additional copies of this survey can be downloaded at www.clamlakeprd.com or requested by contacting me by mail, email, or phone. Hard copies of the blank Lake User Survey can also be picked up at **Big Mike's Sport Shop** on Hwy 70.

Thank You for your time and interest!

Sincerely,

Dave Blumer

Dave Blumer
Project Consultant
Phone: 715.236.4028

**SECTION 1 – Residency**

**These first few questions will help to determine who is responding to this survey. The water body being referred to as the Clam Lakes in this survey is shown on the map below. It includes Clam Lake, Lower Clam Lake, the Clam River flowing into Clam Lake up to Lynch Bridge (referred to as the Clam River Inlet), and the Clam River flowing out of Lower Clam Lake down to the Dam (referred to as the Clam River Outlet).**

1. Do you own or rent property on the Clam Lakes or the Clam River? ***(check all that apply)***

___ I own property on the lake
___ I rent property on the lake
___ I own property on the river
___ I rent property on the river
___ no ***(skip to Section 3)***

2. The map at right shows Clam Lake and Lower Clam Lake. Please indicate which lake you own or rent property on.

___ Clam Lake and Lower Clam Lake
___ Lower Clam Lake (North of 70)
___ Clam Lake (South of 70)
___ Clam River Inlet
___ Clam River Outlet


3. What type of property do you have on the Clam Lakes? If you have more than one type of property, please report on only the property you have had the longest. ***(please select one)***

___ permanent residence
___ seasonal residence
___ less than seasonal dwelling
___ business
___ undeveloped land
___ second home
___ other ***(please specify)*** _____

4. How long have you had the property indicated in Question 3? ***(If less than 1 year, please write '1' in the space provided)***

I have had the property for _____ year(s).

5. During a 12-month period (Jan. 1 – Dec. 31) how many days are you, members of your family, or guests at the property indicated in Question 3? ***(please provide your best estimate in the space below)***

There are people at the property approximately _____ days a year.

6. On average, about how many people are at the property each time it is being used? _____

**SECTION 2 – Lake Stewardship**

**This section of the survey will provide information about the lake stewardship practices of lake property owners and renters.**

1. A commercial fertilizer is one purchased "over the counter" or applied by a professional landscaper. It does not include manure, mulch, or other organic substance. Is a commercial fertilizer used on any portion of your lake property at any time during the year?

___ yes, I apply it myself and I hire someone
___ yes, I hire someone to apply it
___ yes, I apply it myself
___ no ***(skip to Question 3)***

2. If a commercial fertilizer is used, is it a "phosphorous free" fertilizer?

___ yes ___ no ___ I don't know

3. Are any of the following water quality/landscaping practices currently in place at the property indicated in Section 1-Question 3? ***(check all that apply)***

___ Rain garden
___ Shoreline buffers
___ Water diversion
___ Native flower/tree planting
___ Natural shoreline restoration
___ Native prairie restoration
___ Other ***(please describe)*** _____
___ No water quality/landscaping practices have been used.

4. Which, if any, of the following water quality/landscaping practices hold potential interest for you? ***(check all that apply)***

___ Rain garden
___ Shoreline buffers
___ Water diversion
___ Native flower/tree planting
___ Natural shoreline restoration
___ Native prairie restoration
___ Other ***(please describe)*** _____
___ No water quality/landscaping practices are of interest to me

5. Which, if any, of the following outcomes would motivate you to install a water quality/landscaping practice on your property? ***(check all that apply)***

___ A. Increasing the natural beauty of my property
___ B. Improving the water quality of the Clam Lakes
___ C. Improving the water quality around my property's shoreline
___ D. Providing better habitat for fish
___ E. Providing better habitat for birds and wildlife
___ F. Setting an example for other lake residents
___ G. Less lawn mowing time
___ H. A property tax rebate
___ I. Financial assistance that pays a portion of the cost/installation
___ J. Technical assistance that would evaluate my property for water quality concerns
___ K. Technical assistance that would identify appropriate practices to install
___ L. Other ***(please describe)*** _____
___ M. I have no interest in installing a water quality/landscaping practice on my property***(skip to Question 7)***

6. Which **two** items from the above list would be the most influential in your decision to install a water quality/landscaping practice? ***(write the letters of the corresponding items in the spaces below)***

Items _____ and _____ would be the most influential.

7. What type of septic system do you have on your property? ***(select all that apply)***

___ Mound System ___ Holding Tank ___ Other ___ Unsure
___ At-Grade System ___ Conventional System ___ None ***(skip to Section 3)***

8. How many years ago was your septic system last inspected? ***(please provide your best recall)***

___ 1-5 years ___ 6-10 years ___ 11+ years ___ Never ___ Not Sure

9. When was your septic system last 'pumped' or 'sewered'? ***(please provide your best recall)***

___ 1-5 years ___ 6-10 years ___ 11+ years ___ Never ___ Not Sure

**SECTION 3 – Lake Use & Lake Issues**

**This section of the survey will help to determine what lake uses and lake issues are specific to the Clam Lakes.**

1. From the list below, check all activities on the Clam Lakes that you and/or your family participate in.

___ A. fishing from the shore ___ F. ice fishing ___ J. wildlife viewing
___ B. fishing from a boat ___ G. speed boating ___ K. rest/relaxation
___ C. pontoon boating ___ H. jet skiing ___ L. water skiing/tubing
___ D. canoe/kayak/paddle boat ___ I. sailing ___ M. other (please list) _____
___ E. swimming/wading ___ I don't participate in activities on the lake ***(skip to Question 3)***

2. Which 3 activities from the above list do you or members of your family participate in most often on the Clam Lakes? ***(write the letter of the corresponding activities in the spaces below)***

I (We) participate in _____ most often, _____ second most often, and _____ third most often.

3. Below are numerous issues that may negatively affect your use of the Clam Lakes. From the list below, please mark all of the issues that are of concern to you.

___ A. poor quality fishing ___ K. too much weed growth
___ B. too much public use ___ L. overdevelopment of the shoreline
___ C. not enough weed growth ___ M. "icky" or "green" water
___ D. poorly maintained boat access ___ N. too much shoreline lighting
___ E. low water level in the lakes ___ O. high water level in the lakes
___ F. foul or offensive odor ___ P. floating vegetation
___ G. too many rough fish (carp) ___ Q. nuisance wildlife (please specify) _____
___ H. excessive or uncontrolled water skiing or use of personal watercraft
___ I. introduction of undesirable aquatic plants and animals (invasive species)
___ J. there are no issues affecting my use of the lakes ***(skip to Question 5)***

4. Which **two** issues from the above list are of the most concern to you? ***(write the letters of the corresponding issues in the spaces below)***

I am most concerned about issues _____ and _____ .

5. During the open-water (no ice) season, how frequently do you, your family, or guests use a boat or other watercraft on the lakes?

___ never ___ 1 or 2 times/month ___ several times/week
___ 1 or 2 times/season ___ 3 or 4 times/month ___ daily

6. During the open-water (no ice) season, how frequently are you, your family, or guests swimming or wading in the lakes?

___ never ___ 1 or 2 times/month ___ several times/week
___ 1 or 2 times/season ___ 3 or 4 times/month ___ daily

7. In the time that you have owned or rented property on the Clam Lakes, would you say lake water quality (nice & clear vs. icky & green) has:

___ gotten better ___ gotten worse ___ remained the same ___ I don't know

8. In your opinion, the water quality in the Clam Lakes is:

___ excellent ___ good ___ fair ___ poor ___ very poor

9. How often, if at all, has water quality in the Clam Lakes kept you, your family, or your guests from using the lakes for any of the following activities? If you, your family, or guests have no interest in the activity, please mark 'N/A'.

| | Never | Rarely | Sometimes | Often | N/A |
|---|---|---|---|---|---|
| fishing | ☐ | ☐ | ☐ | ☐ | ☐ |
| water skiing or tubing | ☐ | ☐ | ☐ | ☐ | ☐ |
| swimming/wading | ☐ | ☐ | ☐ | ☐ | ☐ |
| snorkeling/scuba diving | ☐ | ☐ | ☐ | ☐ | ☐ |
| motorized boating | ☐ | ☐ | ☐ | ☐ | ☐ |
| non-motorized boating | ☐ | ☐ | ☐ | ☐ | ☐ |
| jet skiing | ☐ | ☐ | ☐ | ☐ | ☐ |
| enjoying the "view" | ☐ | ☐ | ☐ | ☐ | ☐ |

## SECTION 4 – Aquatic Plant Growth

**Aquatic plants (rooted and floating) are an important part of any healthy lake system. However, excessive aquatic plant growth can sometimes interfere with or prevent certain lake activities and even impact water quality. Too little plant growth can also negatively affect a lake. This section of the survey evaluates how lake users feel about the aquatic plant growth in the Clam Lakes.**

1. In the time that you have owned or rented property on the Clam Lakes, would you say the amount of aquatic plant growth has:

___ increased ___ decreased ___ stayed the same ___ unsure

2. Thinking about aquatic plant growth in the Clam Lakes, would you say there is too little, too much, or about the right amount of aquatic plant growth?

___ definitely too little
___ probably too little
___ just the right amount
___ probably too much
___ definitely too much

3. How often, if at all, has aquatic plant growth in the Clam Lakes kept you, your family, or your guests from using the lakes for any of the following activities? If you, your family, or guests have no interest in the activity, please mark 'N/A'.

| | Never | Rarely | Sometimes | Often | N/A |
|---|---|---|---|---|---|
| fishing | ☐ | ☐ | ☐ | ☐ | ☐ |
| water skiing or tubing | ☐ | ☐ | ☐ | ☐ | ☐ |
| swimming/wading | ☐ | ☐ | ☐ | ☐ | ☐ |
| snorkeling/scuba diving | ☐ | ☐ | ☐ | ☐ | ☐ |
| motorized boating | ☐ | ☐ | ☐ | ☐ | ☐ |
| non-motorized boating | ☐ | ☐ | ☐ | ☐ | ☐ |
| jet skiing | ☐ | ☐ | ☐ | ☐ | ☐ |
| enjoying the "view" | ☐ | ☐ | ☐ | ☐ | ☐ |

4. At what time period during the year do you consider the aquatic plant growth in the Clam Lakes to be **excessive**?

___ April – June
___ July - September
___ October - December
___ I don't know
___ aquatic plant growth is excessive all season
___ aquatic plant growth is never excessive

5. At what time period during the year do you consider the aquatic plant growth in the Clam Lakes to be **too little**?

___ April – June
___ July - September
___ October - December
___ I don't know
___ aquatic plant growth is minimal all season
___ aquatic plant growth is never minimal

6. Have you made any attempts to remove or control aquatic plants in the Clam Lakes by your shore property? ***(check one)***

___ yes, I did some myself and I hired someone
___ yes, I did some myself
___ yes, I hired someone
___ no ***(skip to Question 8)***
___ I do not own or rent lake shore property ***(skip to Question 8)***

7. Which of the following method(s) have you used to remove or control aquatic plants in the Clam Lakes by your shore property? ***(please check all that apply)***

___ Physical removal by hand-pulling or raking
___ Personal application of a chemical herbicide with a permit
___ Personal application of a chemical herbicide without a permit
___ Professional application of a chemical herbicide
___ Physical removal aided by a boat, ATV, lawn-mower, or similar machine
___ Other (please specify) _____

8. Who do you feel should be responsible for managing aquatic plant growth in the Clam Lakes? ***(check all that apply)***

___ Local township government
___ County government
___ Wisconsin DNR
___ Clam Lake Protection & Rehabilitation District
___ The land owner
___ "Mother Nature" (no management)
___ I don't know
___ Other (please specify) _____

9. Since you have owned or rented your property on the Clam Lakes, would you say the amount of algae growth (both the small green particles suspended in the water and the longer, green slimy stuff attached to rocks, docks, and other plants) has:

___ increased ___ stayed the same ___ decreased ___ I don't know

**SECTION 5 – Aquatic Invasive Species in the Clam Lakes**

**This section of the survey seeks to determine how much lake users know about aquatic invasive species. Aquatic invasive species are plants and animals that are foreign to the Clam Lakes and do not belong there.**

**Curly-leaf pondweed (CLP)**

Curly-leaf pondweed has been documented in the Clam Lakes. CLP creates early season (May, June) nuisance conditions in the Clam Lakes by forming dense beds of vegetation that interfere with many lake uses.

1. Before responding to this survey, did you know that curly-leaf pondweed is present in the Clam Lakes?

___ yes ___ no ___ I have heard about it before, but did not know for sure

2. How much do you know about CLP and the problems it can cause in a lake?

___ a lot ___ some ___ very little ___ just what I have read here

3. Do you think you would recognize CLP in the lakes if you saw it?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

4. How much of a problem, if at all, do you consider CLP growth in the Clam Lakes to be?

___ large problem ___ moderate problem ___ unsure ___ small problem ___ no problem

**Common Carp**

Carp are considered an aquatic invasive species in the Clam Lakes even though they have been present for many years. In small numbers they have little impact on a lake. In large numbers they can cause tremendous damage to a lake.

5. Before responding to this survey, did you know that carp are present in the Clam Lakes?

___ yes ___ no ___ I have heard about it before, but did not know for sure

6. How much do you know about carp and the problems they can cause in a lake?

___ a lot ___ some ___ very little ___ just what I have read here

7. Do you think you would recognize carp in the lakes if you saw them?

___ definitely yes
___ probably yes
___ unsure ***(go to EWM introduction below)***
___ probably not ***(go to EWM introduction below)***
___ definitely not ***(go to EWM introduction below)***

8. Since you have owned or rented property on the Clam Lakes, would you say the number of carp in the lake has:

___ increased
___ decreased ***(go to EWM intro below)***
___ stayed the same ***(go to EWM intro below)***
___ I don't know ***(go to EWM intro below)***

Increasing numbers of carp in a lake may be cyclical, meaning the number of carp increase for a short period of time (1-5 yrs) and then decrease again on a somewhat regular basis, **or**, some significant change in the lake could lead to an increase in carp population that remains high for a longer period of time (5 plus yrs). Please answer the following questions based on the time you have owned or rented property on the lakes.

9. The number of carp in the Clam Lakes has:

___ been this high before ___ has never been as high as it is now ***(skip to Question 11)***
___ I don't know ***(skip to Question 11)***

10. When was the last time you remember the carp population in the Clam Lakes being as high as it is now?

___ 1-5 yrs ago ___ 11-15 yrs ago ___ more than 20 yrs ago
___ 6-10 yrs ago ___ 16-20 yrs ago ___ I don't remember, they just were

11. Have you, members of your family, or guests used any of the following methods to remove carp form the lakes? ***(check all that apply)***

___ fishing ___ spearing ___ other (***Please explain)*** _____
___ bow fishing ___ netting ___ No, we have not specifically tried to remove carp

**<u>Eurasian Watermilfoil (EWM)</u>**

Eurasian watermilfoil has not yet been found in the Clam Lakes but it is a possible threat in the future. In some lakes EWM becomes just another "weed". In other lakes it can form dense beds of vegetation present all season that can interfere with many lake uses.

12. How much do you know about EWM and the problems it can cause in a lake?

___ a lot ___ some ___ very little ___ just what I have read here

13. Do you think you would recognize EWM in the lakes if you saw it?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

**Other Aquatic Invasive Species**

None of the following aquatic invasive species are known to be in Clam Lakes. However, at some point any of them could be accidentally introduced into the lakes, or may be there already but not formally identified.

14. Please check all of the following aquatic invasive species that you have heard of before.

| | | |
|---|---|---|
| ___ zebra mussels | ___ rusty crayfish | ___ spiny waterflea |
| ___ Chinese mystery snail | ___ banded mystery snail | ___ hydrilla |
| ___ New Zealand mudsnail | ___ freshwater jellyfish | ___ purple loosestrife |

15. Would you be willing to take part in a training session to help you identify aquatic invasive species in the lakes?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

**SECTION 6 – Aquatic Plant Management**

**Aquatic plants in a lake can be managed in many different ways. In most cases management is ongoing and long-term. Sometimes no management may be the best option.**

**Harvesting**

Currently curly-leaf pondweed and other aquatic plant growth in the Clam Lakes is managed by removing large amounts of vegetation through large-scale mechanical harvesting. The majority of plant harvesting occurs in the months of May, June, and July. Currently two large harvesters are owned and operated by the Lake District for the purpose of aquatic plant removal.

1. Before responding to this survey, did you know that the Lake District provides support for large-scale harvesting of CLP and other aquatic plants in the Clam Lakes?

___ yes ___ no ___ I have heard about it before, but did not know for sure

2. Do you think large-scale harvesting of CLP in the Clam Lakes is necessary?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

3. Do you think large-scale harvesting has effectively controlled excessive CLP growth in the lakes in May - July?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

4. Do you think large-scale harvesting of other aquatic plants in the Clam Lakes is necessary?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

5. Do you think large-scale harvesting has effectively controlled other aquatic plant growth in the lakes throughout the summer months?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

6. How big of a problem are floating or washed up plant fragments that are left behind by the aquatic plant harvesters on your shoreline?

___ large problem ___ unsure if plant fragments are from harvester ___ small problem
___ moderate problem ___ I have no shoreline ___ no problem

7. Are you satisfied with the overall results of the current large-scale plant harvesting program that is being supported by the Lake District?

___ definitely yes ___ probably yes ___ unsure ___ probably not ___ definitely not

8. Please mark the one box that best completes the following statement: "I think the plant harvesters in the Clam Lakes remove _____."

____ just the right amount of aquatic plant growth from the lakes
____ too much aquatic plant growth from the lakes
____ too little aquatic plant growth from the lakes
____ unsure

**Other Common Aquatic Plant Management Methods**

It is possible that other plant management methods could be used in place of or in cooperation with the large-scale harvesting that is currently being used in the Clam Lakes. Please assume that any of the following management methods are safe and legal, and would only be used if approved by the State of Wisconsin. Total removal or eradication of CLP or other aquatic plants is not possible.

9. Please place a 1 and a 2 in order of preference by the two methods (other than harvesting) that you would most support to manage aquatic plants in the Clam Lakes. If you are unsure about these management methods, or would not accept any of them, please check the appropriate blank.

___ No management
___ Continued hand-pulling and raking in shallow waters
___ Increased hand-pulling and raking in shallow waters
___ Small-scale (less than 10 acres) chemical treatment for nuisance control
___ Large-scale (more than 10 acres) early season chemical treatment to reduce plant abundance
___ Biological control (using one live species to control another)
___ I am unsure and need additional information to make a decision
___ I would not accept any of these management alternatives

**Uncommon Aquatic Plant Management Methods**

The following aquatic plant management methods are not used as often to control aquatic plant growth in a lake, however, they can be effective under the right circumstances. These alternatives are much larger-scale and would cause greater disturbances to the lakes overall then those presented in Question 9.

10. Please place a 1 and a 2 in order of preference by the two methods shown on the following page that you would most accept for the Clam Lakes. If you are unsure about these management methods, or would not accept any of them, please check the appropriate blank.

___ Lower the lake levels by several feet in the fall to expose aquatic plant beds to drying out and freezing temperatures. (This would likely have to be repeated every 3-5 years to be effective long term. The lake levels would be brought back up again the following spring or early summer.)
___ Whole-lake, or very large-scale (150 acres or more) chemical treatment to greatly reduce CLP. (This would likely have to be completed several years in a row to be effective long term.)
___ Large-scale dredging (removing bottom sediments) by mechanical means, **with** drawdown (lower lake levels), to remove plant seeds, roots, and other growth structures.
___ Large-scale dredging (removing bottom sediments) by mechanical means, **without** drawdown (lower lake levels), to remove plant seeds, roots, and other growth structures.
___ Manipulation of the different biological levels of the Clam Lakes including the fishery, aquatic insects, microscopic critters, and the food structure that supports them.
___ I am unsure and need additional information to make a decision.
___ I would not accept any of these management alternatives.

11. If you have other suggestions for managing aquatic plants in the Clam Lakes, or have another outcome in mind, we would like to know about them. Please use the space below to describe.

_____

_____

**SECTION 7 –Community Support**

**Local, county, state, and federal resources will be tapped into to implement management recommendations for the Clam Lakes. However, community support including all lake users (be they lake property owners or renters or not), businesses, community or civic groups, and others will be asked to share the burden. Donations of volunteer time, services, materials, equipment, and cash will further help to implement and maintain management recommendations. The following questions will help to determine your willingness to support future projects involving the implementation of management recommendations.**

1. Volunteer time used for watercraft inspection at boat landings and monitoring of aquatic invasive species, wildlife, and water quality can be used as a direct source of match for state funding. How much time, if any, would you be willing to contribute to support these activities?

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

2. Service, material, and equipment needs are varied and somewhat unknown but could include boat use, construction, educational materials design, web services, legal services, building materials, plants and planting services, etc. Under the right circumstances, do you think you would be willing to provide assistance for any of these or other services and materials that may be necessary?

___ yes ___ no ___ maybe ___ I'll wait and see what is needed.

3. How satisfied are you with the lake management activities completed by the Clam Lakes Protection and Rehabilitation District (CLPRD) to date? ***(check one)***

___ Completely satisfied
___ Somewhat satisfied
___ This is the first I've heard of the CLPRD
___ Unsure, but I've heard of the CLPRD
___ Somewhat unsatisfied
___ Completely unsatisfied

4. What would increase your attendance at CLPRD meetings? ***(check all that apply)***

___ weekend morning meetings
___ weekday morning meetings
___ more speakers/presentations
___ lower CLPRD dues
___ more pressing issues
___ weekend evening meetings
___ weekday evening meetings
___ refreshments or meals
___ I'm not interested in CLPRD meetings
___ Other ***(please specify)***_____

5. How would you rate the communication you receive from the CLPRD regarding the water quality in the Clam Lakes?

___ Excellent ___ Good ___ Fair ___ Poor ___ Non-existent

6. What is the primary way you are being kept up-to-date regarding the water quality of the lakes?

___ CLPRD Annual Meetings ___ Mailings ___ WI – Dept. of Natural Resources
___ CLPRD Web-Site ___ Informed neighbors ___ I'm not being kept up to date
___ My own observations ___ Other _____

7. How would you rate the content of the CLPRD website?

___ Excellent ___ Good ___ Fair ___ Poor ___ I've never visited it

8. Please add any suggestions you may have to improve the value of the CLPRD website:

_____
_____

9. Financial support for current and future management activities is important. Please indicate in what ways, if any, you would be willing to provide financial support.

___ cash donations
___ increased property taxes for the CLPRD, affecting Clam Lake property owners only
___ fundraising efforts (raffles, bake sales, etc) as a consumer
___ fundraising efforts (raffles, bake sales, etc) as a participant
___ I do not wish to provide any additional financial support other than what I already contribute
___ other (please specify) _____

10. Please add any additional comments you might have regarding aquatic plant management or related topics in the Clam Lakes (optional):

_____
_____

**Congratulations! You have successfully completed this survey. Thank you for your time and your answers! Providing your contact information is optional, but if you wish to, please do!**

Name: _____
Address: _____
City, State, and zip code: _____
Phone number: _____
Email address: _____

# Appendix B

2009 Lake Fair and Annual Meeting Agenda

**Clam Lakes Protection and Rehabilitation District Annual Meeting/Lake Fair Agenda**

1) **Date:** Saturday August 29, 2009

2) **Time:**
   i) Lake District Meeting – 10:00 – 11:30am

   ii) Lunch – 11:30 – 12:30 (provided by the Lake District and SEH) Sausage and Wild Rice Soup, Garden Salad, Dinner Rolls, and Lemonade

   iii) Lake Fair – 12:30-2:00pm

3) **Location:** The Moose Club at intersection of Hwy 70 & 35 north of Siren

4) **Lake Fair Agenda:**

   i) **Speakers:**
      (a) **12:30 pm** – John Haack, UW-Extension St. Croix Basin Educator

         1. Title: **Lakescaping for Wildlife**

      (b) **1:00 pm** – Dave Blumer, SEH Lakes Scientist

         1. Title: **Carp and their effects on the lakes.**

      (c) **1:30 pm** – Peter David, Great Lakes Indian Fish and Wildlife Commission

         1. Title: **Wild Rice: an overview of its ecology, history, harvest, and cultural significance**

   ii) **Displays: (open throughout the Lake District Meeting, Lunch, and the Lake Fair)**
      (a) Loon Watch
      (b) Aquatic Invasive Species
      (c) Native and non-native Aquatic Plants
      (d) Burnett County Shoreland Restoration Incentives
      (e) Wild Rice
      (f) Water Quality Testing
      (g) Lake User Survey (test run)

# Appendix C

2009 FSS Curly-leaf Pondweed Turion Survey Report

FRESHWATER
Scientific Services, LLC

www.fixmylake.com
18029 83rd Avenue North
Maple Grove, MN 55311
james@freshwatersci.com
(651) 336-8696

## Turion Survey Methodology

Using desktop GIS software and a random sample generator extension, I selected a random subset of the GPS locations previously established for point-intercept vegetation surveys on Upper and Lower Clam Lake. A total of 41 locations were selected for Lower Clam Lake, and 77 locations for Upper Clam Lake to provide data for calculating lake-wide turion density. An additional cluster of 16 locations were selected at the northern tip of Upper Clam Lake to provide a high-resolution assessment of turion densities within the area where surface matted curlyleaf growth was documented in 2009 (Berg 2009). These high-resolution data were not included in calculation of lake-wide turion density.

At each of the established sample locations, one sediment sample was collected using a petite-ponar sampler (basal area 225 $cm^2$) and site characteristics were recorded (water depth, sampled sediment depth, and sample characteristics: muck, sand, organic, plants). Upon retrieval, any material dangling outside of the closed sampler was removed and the sampler contents were emptied into a sifting bucket (1mm mesh) with graduated volume markings. Prior to sifting the sample, sampled sediment depth was estimated based upon the volume of sediment in the sifting bucket. The ponar consistently sampled the top 10 cm in the soft mucky sediments encountered in Upper and Lower Clam Lakes. Core samples collected by the University of Minnesota from Minnesota lakes in 2005 and 2006 indicated that 90 to 100% of deposited turions remained within the top 10 cm of lake sediments (Newman et al. 2006), so the observed ponar sample depths were likely sufficient to collect the majority of deposited curlyleaf pondweed turions.

Samples were sifted in the field using a 1mm mesh sifting bucket to remove fine particles and reduce the time required for sample processing. The contents remaining in the bucket after sifting were placed into a labeled plastic bag and stored in a cooler on ice until sorted. Each sample was processed manually to identify and enumerate turions in each sample. Only turions that included a portion of a central turion stem and retained their shape when lightly squeezed were included in the final turion count for each sample. Turions that did not meet these criteria were deemed to be inviable and consequently were not included in the final turion count. Turions from each sample were sorted by size (>1cm and <1cm in axial diameter) and counts for each category were recorded. Total turion counts from each sample were divided by the basal area of the ponar sampler (0.0225 $m^2$) to yield turion densities in turions/$m^2$. These data were then used to calculate lake-wide average turion density (weighted average for Upper Clam Lake as described above) and standard error.

Berg, M.S. 2009. Curly-leaf pondweed and bed mapping surveys: Upper and Lower Clam Lakes. *Unpublished report submitted to Clam Lakes Protection and Rehabilitation District and SEH Inc. by Endangered Resource Services, LLC.*

Newman, R. M., S. S. Roley, and J. A. Johnson. 2006. Continued assessment of curly-leaf pondweed turion distribution, viability, and longevity. University of Minnesota. *Unpublished report submitted to the Minnesota Department of Natural Resources, Division of Ecological Services.*

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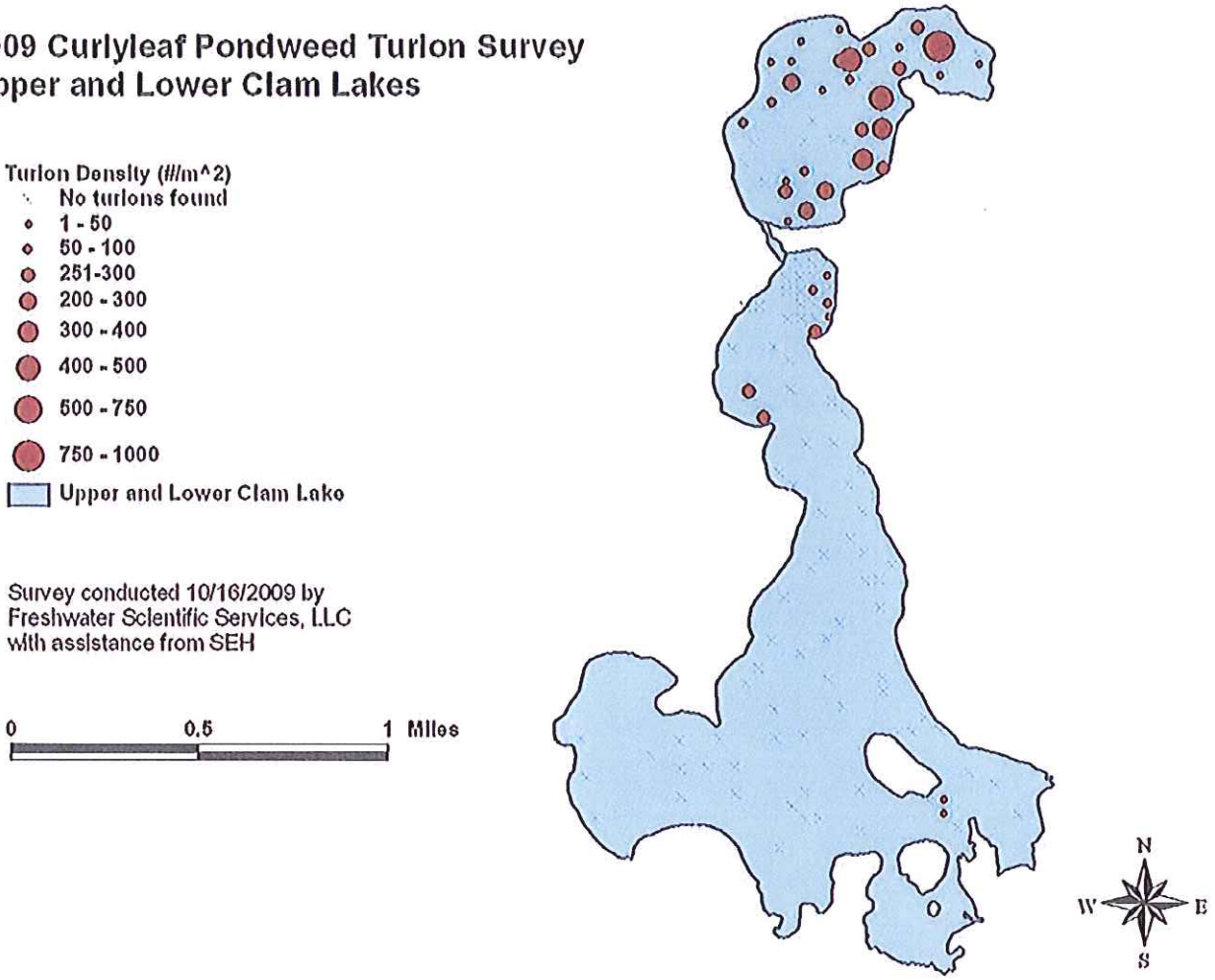
# 2009 Curlyleaf Pondweed Turion Survey
# Upper and Lower Clam Lakes




| | Samples | Max *Turions/m²* | Mean *Turions/m²* | Std Error |
|---|---|---|---|---|
| Upper Clam | 77 | 133 | 6 | 2.8 |
| Lower Clam | 42 | 933 | 126 | 27.9 |

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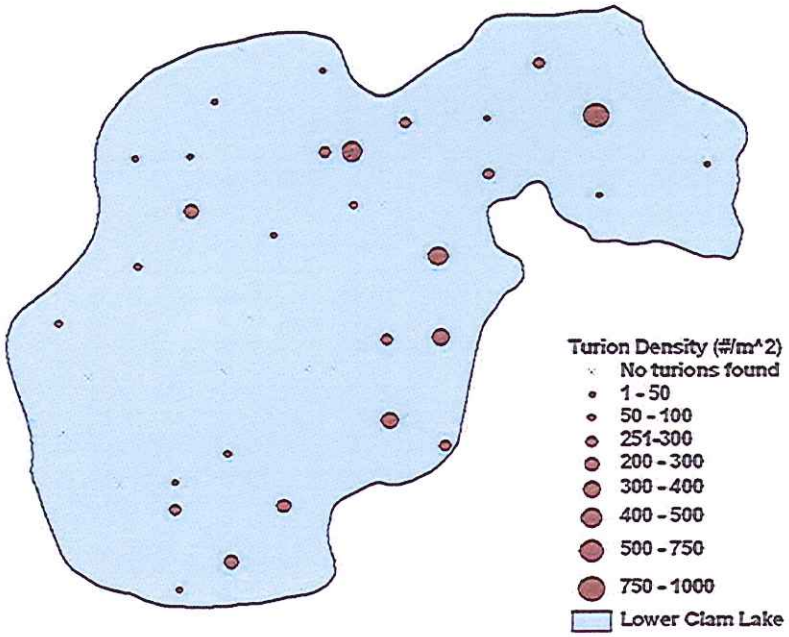
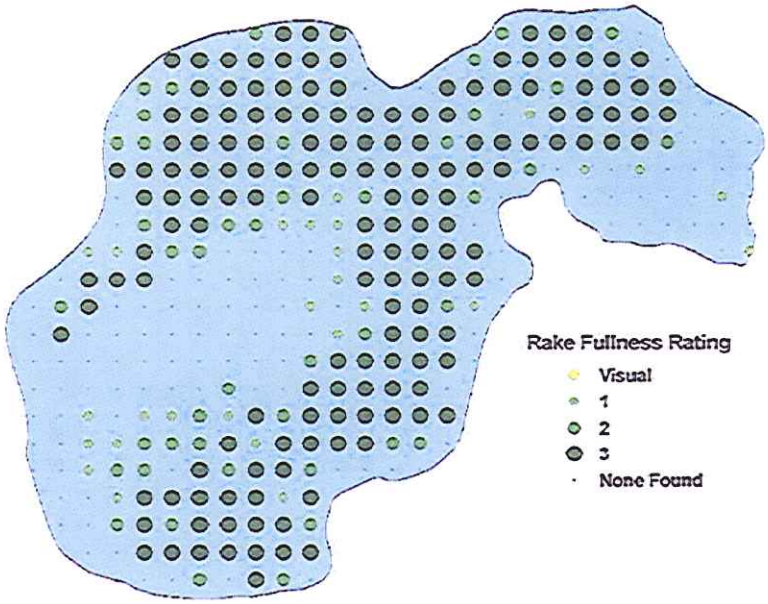
The 2009 distribution and density of curlyleaf pondweed turions in Upper and Lower Clam Lake generally reflected the curlyleaf pondweed growth densities reported in the 2009 report from *Endangered Resource Services, LLC*. These data provide a baseline for evaluating future changes in the density and extent of the curlyleaf pondweed infestation in the Clam Lakes. Based upon the results presented here, turion densities greater than 250/$m^2$ are likely to result in dense curlyleaf growth.

**2009 Curlyleaf Pondweed Turion Density**
**Lower Clam Lake**
***Conducted by Freshwater Scientific Services, LLC***




**2009 Curlyleaf Pondweed Growth Density**
**Lower Clam Lake**
***Conducted by Endangered Resource Services, LLC***




*2009 Clam Lakes Curlyleaf Pondweed Turion Survey*
*Freshwater Scientific Services, LLC – October 2009*

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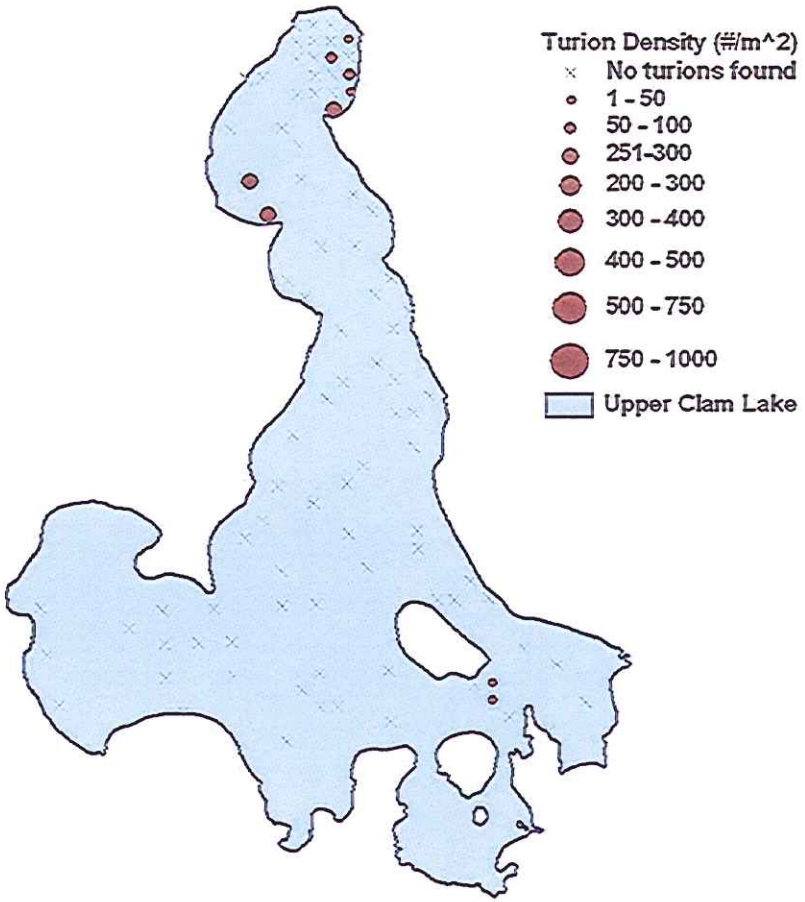
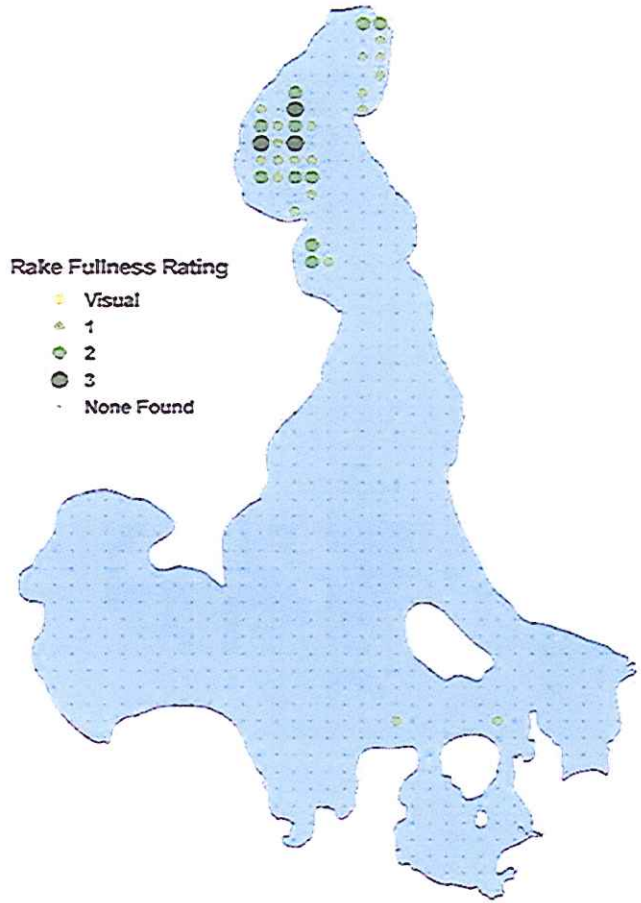
## 2009 Curlyleaf Pondweed Turion Density
## Upper Clam Lake
*Conducted by Freshwater Scientific Services, LLC*




## 2009 Curlyleaf Pondweed Growth Density
## Upper Clam Lake
*Conducted by Endangered Resource Services, LLC*




*2009 Clam Lakes Curlyleaf Pondweed Turion Survey*
*Freshwater Scientific Services, LLC – October 2009*

**Turion Survey Data Sheet**

Lake: Lower Clam Lake

Date: 10/16/2009

Analyst: James Johnson – Freshwater Sci. SeM.
David Blumer – SEH

| Site ID | Depth to Sed (m) | Substrate Description | Ponar Grab Sampled Sed Depth (cm) | Counted By (Initials) | Turions Large (>1cm) Unsprouted | Large Sprouted | Small (<1cm) Unsprouted | Small Sprouted | WR Turions TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| 86 | 1.6 | S M | 9 | JJ | 1 | | | 0 | 1 |
| 126 | 2.0 | M | 10 | | 3 | | 2 | 0 | 5 |
| 166 | 2.0 | M | 10 | | 5 | | 0 | 0 | 5 |
| 122 | 2.3 | M | 10 | | 2 | | | 0 | 0 |
| 82 | 2.3 | M | 10 | | 1 | | | 0 | 1 |
| 83 | 2.3 | M | 10 | | 3 | | 1 | | 4 |
| 113 | 2.3 | M | 10 | | | | | 0 | 0 |
| 13 | 2.5 | M | 10 | | | | | 0 | 0 |
| 7 | 1.0 | S | 5 | | | | | 0 | 0 |
| 22 | 2.3 | M | 10 | | | | | 0 | 0 |
| 9 | 1.7 | M | 10 | | 1 | | 1 | 0 | 2 |
| 54 | 2.2 | M | 10 | | | | 2 | 0 | 2 |
| 92 | 2.2 | M | 10 | | 6 | | | 0 | 6 |
| 90 | 2.1 | M | 10 | | 1 | | | 0 | 1 |
| 50 | 2.1 | M | 10 | | 1 | | | | 1 |
| 109 | 2.1 | M | 10 | | 1 | | | 0 | 1 |
| 128 | 1.6 | M | 10 | | | | | 0 | 0 |
| 192 | 1.7 | M | 10 | | 1 | | | 0 | 1 |
| 195 | 2.0 | M | 10 | | 2 | | 1 | 0 | 3 |
| 210 | 2.0 | M | 10 | | 9 | | 1 | | 10 |
| 212 | 2.1 | M | 10 | | 2 | | | 0 | 2 |
| 227 | 2.2 | M | 10 | | | | | 0 | 0 |
| 156 | 2.3 | M | 10 | | 1 | | | 0 | 1 |
| 138 | 2.6 | M | 10 | | | | | 0 | 0 |
| 119 | 2.5 | M | 10 | | | | | 0 | 0 |
| 182 | 2.4 | M | 10 | | | | | 0 | 0 |
| 203 | 2.3 | M | 10 | | | | | 0 | 0 |
| 232 | 2.2 | M | 10 | | 3 | | 1 | 0 | 4 |
| 235 | 2.1 | M | 10 | | 7 | | 1 | 0 | 8 |
| 267 | 1.1 | S | 6 | | 3 | | 1 | 0 | 4 |
| 263 | 2.1 | M | 10 | | 8 | | 1 | 0 | 9 |
| 260 | 2.1 | M | 10 | | 8 | | 2 | 0 | 11 |
| 239 | 2.0 | M | 10 | 1 | 4 | | | 0 | 4 |
| 285 | 1.9 | M | 10 | | 2 | | 1 | 0 | 3 |
| 283 | 2.1 | M | 10 | | 1 | | | 0 | 1 |
| 298 | 1.9 | M | 10 | | 4 | | | 0 | 4 |
| 318 | 2.0 | M | 10 | | | | | 0 | 0 |
| 313 | 1.8 | M | 10 | | 18 | | 3 | 0 | 21 |
| 316 | 1.1 | M (O) | 10 loose | | 1 | | | 0 | 1 |
| 341 | 1.0 | M (O) | 10 loose | | | | | 0 | 0 |
| 342 | 0.9 | M (O) | 10 | | 1 | | | 0 | 1 |
| 349 | 1.0 | M (O) | 10 | | | | | 0 | 0 |

Nuphar –
"
"
"

1 of 1

Started at north end.

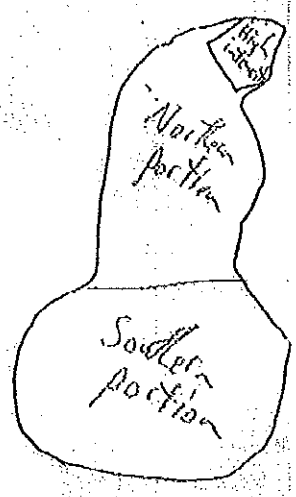
**Turion Survey Data Sheet**

Lake: Upper Clear Lake

Date: 10/16/2009

Analyst: J. Johnson / D. Blumer
Freshwater Scientific Services, LLC / SEH

| Site ID | Depth to Sed (m) | Substrate Description | Ponar Grab Sampled Sed Depth (cm) | Counted By (initials) | Turions Large (>1cm) Unsprouted | Large Sprouted | Small (<1cm) Unsprouted | Small Sprouted | WR Turions TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| START 283 | 1.5 | S | 5 | | | | | 0 | 0 |
| 284 | 2.5 | M | 10 | | | | | 0 | 0 |
| 285 | 2.3 | M | 10 | | | | | 0 | 0 |
| 287 | 2.2 | M | 10 | | | | | 0 | 0 |
| 331 | 2.0 | M | 10 | | | | | 0 | 0 |
| 330 | 2.0 | M | 10 | | | | | 0 | 0 |
| 329 | 1.8 | M | 10 | | | | | 0 | 0 |
| 328 | 2.1 | M | 10 | | | | | 0 | 0 |
| 327 | 2.5 | M | 10 | | | | | 0 | 0 |
| 374 | 1.8 | M | 10 | | | | | 0 | 0 |
| 416 | 1.0 | SM | 7 | | | | | 0 | 0 |
| 417 | 1.5 | M | 10 | | 1 | | | 0 | 1 |
| 375 | 1.8 | M | 10 | | | | | 0 | 0 |
| 376 | 1.9 | M | 10 | | | | 2 | 0 | 2 |
| 418 | 1.8 | M | 10 | | | | | 0 | 0 |
| 419 | 1.6 | M | 10 | | 2 | | | 0 | 2 |
| 377 | 1.8 | MO | 10 | | | | | 0 | 0 |
| 378 | 1.7 | M | 10 | | | | | 0 | 0 |
| 379 | 1.5 | MO | 10 | | 1 | | 2 | 0 | 3 |
| 420 | 1.1 | S | 7 | | | | 1 | 0 | 1 |
| 246 | 2.1 | M | 10 | | | | | 0 | 0 |
| 205 | 3.1 | M | 10 | | | | | 0 | 0 |
| 173 | 1.0 | S | 6 | | | | | 0 | 0 |
| 150 | 1.9 | M | 10 | | | | | 0 | 0 |
| 179 | 1.6 | M | 10 | | 1 | | 2 | 0 | 3 |
| 213 | 1.6 | M | 10 | | 3 | | | 0 | 3 |
| 292 | 2.1 | M | 10 | | | | | 0 | 0 |
| 290 | 2.2 | M | 10 | | | | | 0 | 0 |
| 422 | 0.8 | S | 6 | | | | | 0 | 0 |
| 456 | 0.8 | S | 6 | | | | | 0 | 0 |
| 425 | 2.2 | M | 10 | | | | | 0 | 0 |
| 390 | 2.1 | M | 10 | | | | | 0 | 0 |
| 255 | 1.4 | M | 10 | | | | | 0 | 0 |
| 299 | 1.1 | M | 10 | | | | | 0 | 0 |
| 461 | 2.5 | M | 10 | | | | | 0 | 0 |
| 490 | 0.9 | S | 5 | | | | | 0 | 0 |
| 520 | 0.8 | SM | 5 | 4 unknown | | | | 0 | 0 |
| 493 | 2.4 | M | 10 | | | | | 0 | 0 |
| 391 | 2.5 | M | 10 | | | | | 0 | 0 |
| 259 | 2.1 | M | 10 | | | | | 0 | 0 |
| 349 | 2.6 | M | 10 | | | | | 0 | 0 |
| 394 | 2.6 | M | 10 | | | | | 0 | 0 |
| 465 | 2.7 | M | 10 | | | | | 0 | 0 |
| 496 | 2.4 | M | 10 | | | | | 0 | 0 |
| 552 | 1.7 | SM | 6 | | | | | 0 | 0 |
| 526 | 2.3 | M | 10 | | | | | 0 | 0 |



Water Temp 44°F

**Turion Survey Data Sheet**

Lake: Upper Clam Lake

Analyst: James A. Johnson – Freshwater Sci. Serv.
David Blumer – SEH

Date: 10/16/2009

| Site ID | Depth to Sed (m) | Substrate Description | Ponar Grab Sampled Sed Depth (cm) | Counted By (initials) | Turions Large (>1cm) Unsprouted | Large Sprouted | Small (<1cm) Unsprouted | WR Small Sprouted | Turions TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| 498 | 2.4 | m | 9 | | | | | 0 | 0 |
| 528 | 2.2 | m | 10 | | | | | 0 | 0 |
| 438 | 2.6 | m | 10 | | | | | 0 | 0 |
| 400 | 2.7 | m | 10 | | | | | 0 | 0 |
| 308 | 2.7 | m | 10 | | | | | 0 | 0 |
| 219 | 2.3 | m | 10 | | | | | 0 | 0 |
| 187 | 2.2 | m | 10 | | | | | 0 | 0 |
| 158 | 2.1 | m | 10 | | | | | 0 | 0 |
| 403 | 2.7 | m | 10 | | | | | 0 | 0 |
| 533 | 2.3 | m | 10 | | | | | 0 | 0 |
| | | | | | | | | | |
| 534 | 2.3 | m | 10 | | | | | 0 | 0 |
| 564 | 1.9 | m | 10 | | | | | 0 | 0 |
| 578 | 1.7 | m | 10 | | | | | 0 | 0 |
| 589 | 1.8 | m o | 10 | | | | | 0 | 0 |
| 601 | 1.6 | m o | 10 | | | | | 0 | 0 |
| 631 | 1.1 | m o | 10 | | | | | 0/9 shells | 0 |
| 623 | 1.1 | m o | 10 | | | | | 0/11 shells | 0 |
| 607 | 1.4 | m o | 10 | | 1 | | | 0/6 shells | 1 |
| 606 | 1.2 | m o | 10 | | | | 1 | 0/1 shell | 1 |
| 593 | 1.0 | m o | 10 | | | | | 0 | 0 |
| 483 | 2.1 | m | 10 | | | | | 0 | 0 |
| 486 | 2.1 | m | 10 | | | | | 0 | 0 |
| 367 | 2.3 | m | 10 | | | | | 0 | 0 |
| 320 | 2.4 | m | 10 | | | | | 0 | 0 |
| 318 | 2.5 | m | 10 | | | | | 0 | 0 |
| 274 | 2.6 | m | 10 | | | | | 0 | 0 |
| 234 | 2.1 | m | 10 | | | | | 0 | 0 |
| 145 | 2.4 | m | 10 | | | | | 0 | 0 |
| 143 | 2.4 | m | 10 | | | | | 0 | 0 |
| 124 | 2.2 | m | 10 | | | | | 0 | 0 |
| 115 | 2.2 | m | 10 | | | | | 0 | 0 |
| 99 | 2.0 | m | 10 | | | | | 0 | 0 |
| 101 | 2.0 | m | 10 | | | | | 0 | 0 |
| 111 | 0.9 | s | 6 | | | | | 0 | 0 |
| 79 | 1.3 | m | 10 | | | | | 0 | 0 |
| 97 | 1.9 | m | 10 | | | | | 0 | 0 |
| 226 | 2.7 | m | 10 | | | | | 0 | 0 |
| 284 | 2.8 | m | 10 | | | | | 0 | 0 |
| 314 | 2.7 | m | 10 | | | | | 0 | 0 |
| 444 | 2.5 | m | 10 | | | | | 0 | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| WR1 | 1.0 | m o | 10 | 0/22 shells | WR4 | 0.8 | m/o | 10 | 0/8 shells |
| East WR2 | 0.9 | m o | 10 | 0/2 shells | WR5 | 0.9 | m/o | 10 | 0 |
| WR3 | 0.9 | m o | 10 | 0/2 shells | WR6 | 0.9 | m/o | 10 | 0/5 shells |

Northern portion (N=41)

Southern Portion of Lake N=30

Extra Samples for wildlife studies

2/2

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Scientific Services, LLC

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18029 83rd Avenue North
Maple Grove, MN 55311
james@freshwatersci.com
(651) 336-8696

October 30, 2009

SEH
Attn: David Blumer
Lakes Scientist
170 West Knapp Street, Suite B
Rice Lake, WI 54868-1350

Dear Mr. Bloomer,

I have enclosed my summary report and invoice for the turion surveys conducted on Upper and Lower Clam Lake on October 16, 2009. I have reduced the charge substantially from the amount indicated on my price quote to reflect the fact that very few turions were collected in Upper Clam Lake, thus requiring less sample processing time than anticipated. Please contact me at (651) 336-8696 if you have any questions regarding the enclosed materials. Thank you once again for allowing me to work with you on this project. I look forward to any future opportunities for collaboration with you and SEH.

Sincerely,

James A. Johnson
*Aquatic Ecologist*
*Freshwater Scientific Services, LLC*

# Appendix D

2009 FSS Wild Rice Seed Enumeration Study Report

FRESHWATER
Scientific Services, LLC

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james@freshwatersci.com
(651) 336-8696

## Wild Rice Seed Enumeration Methodology

Sample locations were selected randomly from areas with existing wild rice canes in Long Lake, and in areas with documented past wild rice growth in Upper Clam Lake (based upon 2005 aerial imagery). At each of the sample locations, one sediment sample was collected using a petite-ponar sampler (basal area 225 $cm^2$) and site characteristics were recorded (water depth, existing rice growth density, sampled sediment depth). Upon retrieval, any material dangling outside of the closed sampler was removed and the sampler contents were emptied into a sifting bucket (1mm mesh) with graduated volume markings. Sampled sediment depth was estimated based upon the volume of sediment in the sifting bucket. The ponar consistently sampled the top 10 cm in the soft mucky sediments encountered in Upper Clam Lake, and sank even deeper into Long Lake sediments (up to 0.5m into flocculent sediments, but still likely only contains seeds from the top 10-15 cm). Additional core samples (10.1 cm diameter) were collected at a subset of 5 locations in Upper Clam Lake, with subsequent sectioning of core strata (0-5cm, 5-10cm, 10-20cm, and 20-30cm).

Ponar samples and sectioned core strata samples were sifted using a 1mm mesh-lined bucket to remove fine particles and reduce the time required for sample processing. The contents remaining in the bucket after sifting were placed into a labeled plastic bag and stored in a cooler on ice until sorted. Each sample was processed manually to identify and enumerate wild rice seeds and empty seed hulls in each sample. Hulls that did not contain a hard base were considered empty. Total wild rice seed and hull counts from each sample were divided by the basal area of the ponar sampler (0.0225 $m^2$) or core sampler (0.008 $m^2$) to yield seed/hull densities in #/$m^2$. These data were then used to calculate average seed/hull densities and standard errors.

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(651) 336-8696

## Wild Rice Seed Enumeration Results

James A. Johnson - Freshwater Scientific Services, LLC
(assisted by David Blumer - SEH)

| Lake | Date | Site | Water Depth_m | Sample Type | Sediment Stratum | Growth | Seeds/m² | Empty Hulls/m² |
|---|---|---|---|---|---|---|---|---|
| Long Lake | 11/5/09 | 1 | 1.0 | Ponar | 0-10 cm | Light | 267 | 133 |
| Long Lake | 11/5/09 | 2 | 0.8 | Ponar | 0-10 cm | Dense | 311 | 356 |
| Long Lake | 11/5/09 | 3 | 1.1 | Ponar | 0-10 cm | Light | 178 | 311 |
| Long Lake | 11/5/09 | 4 | 0.9 | Ponar | 0-10 cm | Dense | 222 | 1244 |
| Long Lake | 11/5/09 | 5 | 1.1 | Ponar | 0-10 cm | Light | 44 | 267 |
| Long Lake | 11/5/09 | 7 | 1.1 | Ponar | 0-10 cm | Dense | 533 | 356 |
| Long Lake | 11/5/09 | 8 | 1.2 | Ponar | 0-10 cm | Dense | 178 | 133 |
| Long Lake | 11/5/09 | 9 | 1.0 | Ponar | 0-10 cm | Light | 267 | 444 |
| Long Lake | 11/5/09 | 10 | 1.4 | Ponar | 0-10 cm | Light | 178 | 44 |
| Long Lake | 11/5/09 | 11 | 1.2 | Ponar | 0-10 cm | Dense | 756 | 1378 |
| Upper Clam | 11/5/09 | 12 | 0.6 | Ponar | 0-10 cm | None | 0 | 222 |
| Upper Clam | 11/5/09 | 13 | 0.5 | Ponar | 0-10 cm | None | 0 | 178 |
| Upper Clam | 11/5/09 | 14 | 0.5 | Ponar | 0-10 cm | None | 0 | 44 |
| Upper Clam | 11/5/09 | 15 | 0.5 | Ponar | 0-10 cm | None | 0 | 222 |
| Upper Clam | 11/5/09 | 16 | 0.5 | Ponar | 0-10 cm | None | 0 | 89 |
| Upper Clam | 11/5/09 | 17 | 0.5 | Ponar | 0-10 cm | None | 0 | 444 |
| Upper Clam | 11/5/09 | 18 | 0.5 | Ponar | 0-10 cm | None | 0 | 89 |
| Upper Clam | 11/5/09 | 19 | 0.5 | Ponar | 0-10 cm | None | 0 | 178 |
| Upper Clam | 11/5/09 | 20 | 0.5 | Ponar | 0-10 cm | None | 0 | 311 |
| Upper Clam | 11/5/09 | 21 | 0.5 | Ponar | 0-10 cm | None | 0 | 444 |
| Upper Clam | 11/5/09 | 22 | 0.5 | Ponar | 0-10 cm | None | 0 | 311 |
| Upper Clam | 11/5/09 | 23 | 0.5 | Ponar | 0-10 cm | None | 0 | 178 |
| Upper Clam | 11/5/09 | 24 | 0.5 | Ponar | 0-10 cm | None | 0 | 444 |
| Upper Clam | 10/16/09 | WR1 | 1.0 | Ponar | 0-10 cm | None | 0 | 978 |
| Upper Clam | 10/16/09 | WR2 | 0.9 | Ponar | 0-10 cm | None | 0 | 89 |
| Upper Clam | 10/16/09 | WR3 | 0.9 | Ponar | 0-10 cm | None | 0 | 89 |
| Upper Clam | 10/16/09 | WR4 | 0.8 | Ponar | 0-10 cm | None | 0 | 356 |
| Upper Clam | 10/16/09 | WR5 | 0.9 | Ponar | 0-10 cm | None | 0 | 0 |
| Upper Clam | 10/16/09 | WR6 | 0.9 | Ponar | 0-10 cm | None | 0 | 222 |
| Upper Clam | 11/5/09 | 12 | 0.6 | Core | 0-5 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 12 | 0.6 | Core | 5-10 cm | None | 0 | 500 |
| Upper Clam | 11/5/09 | 12 | 0.6 | Core | 10-20 cm | None | 0 | 375 |
| Upper Clam | 11/5/09 | 12 | 0.6 | Core | 20-30 cm | None | 0 | 250 |
| Upper Clam | 11/5/09 | 14 | 0.5 | Core | 0-5 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 14 | 0.5 | Core | 5-10 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 14 | 0.5 | Core | 10-20 cm | None | 0 | 0 |
| Upper Clam | 11/5/09 | 18 | 0.5 | Core | 0-5 cm | None | 0 | 250 |
| Upper Clam | 11/5/09 | 18 | 0.5 | Core | 5-10 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 18 | 0.5 | Core | 10-20 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 21 | 0.5 | Core | 0-5 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 21 | 0.5 | Core | 5-10 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 21 | 0.5 | Core | 10-20 cm | None | 0 | 250 |
| Upper Clam | 11/5/09 | 21 | 0.5 | Core | 20-30 cm | None | 0 | 1375 |
| Upper Clam | 11/5/09 | 24 | 0.5 | Core | 0-5 cm | None | 0 | 125 |
| Upper Clam | 11/5/09 | 24 | 0.5 | Core | 5-10 cm | None | 0 | 500 |
| Upper Clam | 11/5/09 | 24 | 0.5 | Core | 10-20 cm | None | 0 | 1250 |
| Upper Clam | 11/5/09 | 24 | 0.5 | Core | 20-30 cm | None | 0 | 375 |

*2009 Upper Clam/Long Lake Wild Rice Seed Enumeration*
*Freshwater Scientific Services, LLC – November 2009*

FRESHWATER
Scientific Services, LLC

www.fixmylake.com
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(651) 336-8696

**Wild Rice Seeds**

**Long Lake (ponar samples)**

| | Wild Rice Growth Density | | |
|---|---|---|---|
| | **Light** | **Dense** | |
| **Avg** | 169 | 418 | Seeds/$m^2$ |
| **SE** | 35.6 | 100.0 | |

**Upper Clam Lake**
No seeds found in ponar or core samples

**Empty Wild Rice Seed Hulls**

**Long Lake**

| | | Growth Density | Avg # Empty Hulls /$m^2$ | SE |
|---|---|---|---|---|
| Ponar | 0-10 cm | Light | 240 | 69.7 |
| Ponar | 0-10 cm | Dense | 693 | 256.3 |

**Upper Clam Lake**

| | | Avg Empty Hulls | Avg # Empty Hulls /$m^2$ | SE |
|---|---|---|---|---|
| Ponar | 0-10 cm | 5.8 | 257 | 50.9 |
| Core | 0-5 cm | 1.2 | 150 | 25.0 |
| Core | 5-10 cm | 2.2 | 275 | 91.9 |
| Core | 10-20 cm | 3.2 | 400 | 221.5 |
| Core | 20-30 cm | 5.3 | 667 | 616.6 |

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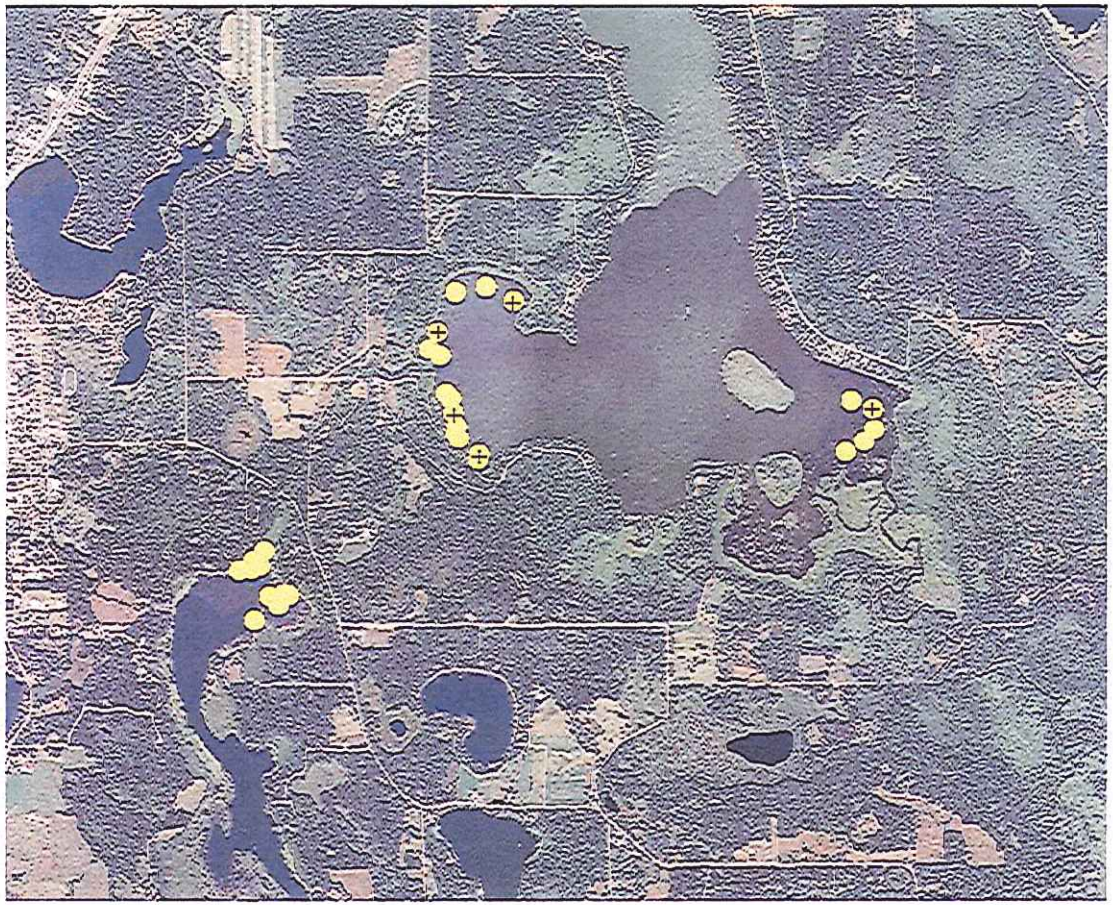
# 2009 Wild Rice Seed Enumeration
# Long Lake & Upper Clam Lake



2009 Wild Rice Sample Locations

\+ Core Sample Locations

N
W E
S

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November 10, 2009

SEH
Attn: David Blumer
Lakes Scientist
170 West Knapp Street, Suite B
Rice Lake, WI 54868-1350

Dear Mr. Blumer,

I have enclosed my summary of results and invoice for the wild rice surveys conducted on Long Lake and Upper Clam Lake on November 5, 2009. Please contact me at (651) 336-8696 if you have any questions regarding the enclosed materials. Thank you once again for allowing me to work with you on this project. I look forward to any future opportunities for collaboration with you and SEH.

Sincerely,

James A. Johnson
*Aquatic Ecologist*
*Freshwater Scientific Services, LLC*