

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
AQUATIC INVASIVE SPECIES GRANT PROGRAM

Application Materials

***Big Sand Lake
Management Planning Project***

Prepared for the

***Big Sand Lake Property
Owners Association, Inc.***

February 1, 2014

Onterra, LLC
Lake Management Planning

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INTRODUCTION

Big Sand Lake, Vilas County, is a 1,408-acre drainage lake with a maximum depth of 42 feet and mean depth of approximately 21 feet (Map 1). Big Sand Lake flows into neighboring Long Lake which flows through the Deerskin River into Scattering Rice Lake of the Eagle River Chain of Lakes.

In 1990 the presence of EWM was verified by the Wisconsin Department of Natural Resources (WDNR), although it was suspected of inhabiting the system for years before this date. In 2006, the WDNR completed a point-intercept aquatic plant survey, locating EWM in numerous locations. This spawned the Big Sand Lake Property Owners Association (BSLPOA) to initiate the creation of a management plan for the system.

In 2008, the BSLPOA successfully applied for WDNR grant funds to initiated control measures outlined within their management plan. The funds were to cover the first of a five year program aimed at significantly reducing EWM within the lake. During the first year, a 130 acre herbicide treatment using liquid 2,4-D, largely an experimental approach within the region at this time, was conducted and appeared to be extremely successful.

The BSLPOA operated without grant funds in 2009, conducting a limited (70 acre) herbicide treatment. An EWM survey was completed later that summer by Ms. Barb Gajewski, showing that considerable amounts of EWM remain in the system (Map 2). A 115-acre treatment was completed in early spring 2010, targeting the majority of the colonized EWM within the system with a liquid formulation of 2,4-D. The 2010 treatment was considered a success by decreasing EWM frequency of occurrence in the lake by over 90%

To continue the success of reducing EWM on Big Sand Lake, a spot-treatment of remaining EWM colonies was proposed for 2011. Early that spring, approximately 12.6 acres of EWM was treated with a liquid formulation of 2,4-D at a concentration of 2.5 ppm a.e. The 2011 EWM treatment on Big Sand Lake was met with success; no EWM could be located within the 2011 treatment areas. The whole-lake point-intercept survey also showed that the 2010 large-scale treatment remained successful, with the lake-wide occurrence of EWM remaining very low.

In 2012, a final strategy treating 12.3 acres was approved by the BSLPOA and WDNR. Because the treatment areas were smaller than those treated in the past, the application of a liquid formulation of 2,4-D was completed at an increased concentration of 3.0 ppm a.e. While it was understood that eradication of EWM from Big Sand Lake was highly unlikely, those involved, including the association, WDNR, Onterra, and the applicator, were anticipating greater EWM impacts from the 2012 treatment strategy. A portion of the lack of success may be attributed to the exceptional growing conditions Wisconsin lakes experienced in 2012. An early ice-off, followed by a very warm summer provided ideal conditions for EWM (and native aquatic plant) growth. These conditions are believed to be what helped EWM rebound in numerous other areas of the lake to levels not seen in years. The 2012 peak-biomass survey results indicated that numerous areas within the Big Sand Lake littoral zone contained EWM, either as single plants, clumps, or in a colonized form. While EWM again occupied much of Big Sand's littoral, the density of these occurrences were much less than seen prior to first treatments

Within the 2012 treatment report created that fall, Onterra recommended that the BSLPOA hold off on treatments of EWM in 2013 and instead, remap the EWM to discover if it was expanding rapidly in density and/or area. If the EWM was found to be expanding significantly, the BSLPOA would move towards a whole-lake treatment in 2014.

In early August 2013, Onterra field crews visited Big Sand Lake to complete that year's EWM Peak-Biomass Survey and remap the occurrences of EWM. Compared with the results of the 2012 survey, only an additional 4 acres of EWM were mapped and the densities were similar between years. The results of the two surveys, including a chart indicating acreage and density comparisons between 2012 and 2013 can be found on Map 2. Based upon these findings, Onterra recommended that the BSLPOA once again forgo treatment on Big Sand Lake for continued monitoring. The association agreed with Onterra's recommendation and is proceeding on that course.

In the 2012 annual treatment report, Onterra also recommended that the association consider updating their lake management plan to assure that the group is doing everything it can to protect the lake and maintain its eligibility for AIS control funds through the WDNR grant programs. The project proposed here would complete an updated and expanded management plan for Big Sand Lake.

Big Sand Lake is a highly sought after location amongst recreationists and anglers. As defined by NR 1.91(4d), Big Sand Lake exceeds minimum public boating access by having more than one access site with a total of more than 29 car-trailer parking spaces. The large public access site is capable of handling up to 49 car-trailers at a time. Big Sand Lake contains multiple resorts, including the Big Sand Lake Club.

The lake is also frequented by many transient boaters during the numerous fishing tournaments that are held on the system, including several large tournaments that span over a number of lakes in the area (National Championship Musky Open Tournament, Annual Musky Marathon, and the Annual Chamber Musky Classic).

PROJECT GOALS

The scope of work described outlines a project and study design that approaches the lake from more of an ecosystem perspective than managing its plants, fisheries, or water quality alone. The scope outlines assessments of the lake's plants, watershed, shoreline condition, and water quality. It also describes the integration of available fisheries information, past aquatic plant and water quality assessments, an intensive stakeholder participation component, and the continued monitoring of EWM within the lake. The study components would provide the baseline data required to assess the lake ecosystem's condition, while the stakeholder participation portion would shed light on the expectations and needs of the lake users. The combination of these components and communications with WDNR specialists would allow a long-term and implementable plan to be created for Big Sand Lake.

The work required to develop the plan would rely on partnerships between the WDNR, the BSLPOA, and local municipalities as applicable.

Overall, the scope of work detailed in this proposal would provide the BSLPOA with the information bulleted below. Data and information contained in the earlier management plan for Big Sand Lake would be used for comparisons where applicable.

- Review of the drainage area definition (watershed) for the lake.
- The potential point-sources of pollution that may be affecting the lake.
- The areas of the lake's watershed that may be supplying excessive amounts of sediment and nutrients.
- A determination of plant community diversity for the lake and how the lake's diversity compares with other lakes in the region and state.
- An identification and location of important plant communities (emergent, submergent, floating-leaf) within the lake and an indication of the dominant species within those communities.
- The identification and location of any rare or threatened plant species within the lake.
- A determination of where exotic plant species (e.g., Eurasian water milfoil, curly-leaf pondweed, purple loosestrife) occur in and around the lake.
- A summary and analysis of specific chemicals found in the lake, how these concentrations compare with other lakes in the region, and what these concentrations indicate concerning the health of the Big Sand Lake ecosystem.
- A determination of the limiting nutrient controlling plant growth within the lake.
- The trophic state (e.g., oligotrophic, mesotrophic, eutrophic) of the lake.
- Analysis of aquatic plant management and protection alternatives.
- A summary of recent historic fisheries data, biological information relating to specific fish species, and how it applies to the management plan.
- A listing of management options that may be utilized to protect and enhance the important and sensitive areas of the lake.
- The steps that could be taken to help improve the lake, such as work in the watershed (e.g., agricultural best management practices), shoreland restoration opportunities, in-lake native plant introductions, etc.
- The funding sources available to assist in the implementation of the pertinent management and protection options that are outlined in the lake management plan.
- An assessment of the shoreline condition and occurrence of course woody habitat.

PROJECT SCOPE

Stakeholder Participation

Stakeholder participation is a very important element in any environmental planning exercise. It is important not only from the perspective of informing participants and stakeholders about the project, but also from the standpoint of enhancing their understanding of natural ecosystems and their value to a healthy environment. If participants do not understand the value of the natural ecosystem, they will not strive to protect or enhance it.

This component of the management planning effort is intended to create an exchange of information between Onterra and the lake stakeholders, including those that own property on the lake and those that enjoy the lake through its public access. The exchange of information would flow bidirectionally between the lake stakeholders and Onterra staff. Onterra would provide information and guidance to help stakeholders understand the ecosystem more fully and to prepare them for the development of realistic goals and objectives concerning the management of their lake. The stakeholders would provide information pertaining to their use of the lake and their management expectations. In the end, this information would be combined to create a long-term and implementable lake management plan.

This component, as described below, would also help the Onterra develop a better understanding of specific sociological needs within the association. For instance, if communication were lacking between the association board and its general membership a goal would be included within the management plan with specific actions addressing the deficiency. The need for specific or general educational initiatives would also be brought to light during this process so they too could be addressed within the management plan.

Further, during the planning process, current lake-related ordinances (at the county and town level) would be researched and discussed with the BSLPOA, county, and town. It is the experience of Onterra planners that lake residents often do not have a good understanding of ordinance specifics for their waterbody; therefore, the current ordinances would be discussed with the BSLPOA, as well as possible modifications to those ordinances or totally new ordinances that could be proposed to the town and/or county.

Planning Committee

Communication between Onterra staff and the lake group is essential to creating an effective and realistic management plan. To facilitate this interaction, Onterra asks that the association create a “Planning Committee” to act as the primary conduit of interaction between the association and Onterra.

The Planning Committee fills several roles within the management planning process, including:

- Development and distribution of the written stakeholder survey and tallying of its results.
- Meeting with Onterra staff, likely twice, to learn about the study results and assist in creating the framework of the implementation plan. As discussed below, the Planning Committee meetings are held during the week and can last 2-3 hours long.
- Reviewing and providing comments on the draft of the management plan.

The lake association is responsible for recruiting the committee members. Typically, the committee should include 8-10 members. Having a diverse group of people as the Planning Committee membership is important to transparency in the process and the development of a realistic and representative management plan; therefore, the committee should be made up of a cross-section of people from the lake. Limiting the recruitment of couples, more than one or two board members, and people of similar ages and area of the lake will assure the diverse group of people that would fulfill the committee. More information regarding the Planning Meetings can be found below.

Kick-off Meeting

Near the start of the project, a *Kick-off Meeting* would be held to inform stakeholders about the project and its goals. This meeting would also provide an excellent educational opportunity that would grant an introduction to important concepts in lake ecology, such as the value and importance of a diverse aquatic plant community and the benefits of maintaining natural buffer areas around a lake. The Kick-off Meeting would also provide an important forum allowing stakeholders to express their concerns and provide information about Big Sand Lake and its watershed to Onterra ecologists.

If convenient for the lake group and Planning Committee membership, a brief meeting between the Planning Committee and Onterra staff would be held either before or after the Kick-off Meeting. The meeting would include an introduction to Onterra's planning process and the members' role in that process. The base stakeholder survey would also be discussed and provided to the committee.

Stakeholder Survey

Comments and opinions would be solicited from Big Sand Lake stakeholders to gain important information regarding their understanding of the lake and thoughts on how it should be managed. The information would be collected through a written survey/comment form supplied to each member household by mail. This information would be critical to the development of a realistic management plan by supplying an indication of the needs of the stakeholders and their perspective on the management of the lake. It would be the responsibility of the Planning Committee to prepare the survey mailing and collect and summarize the results. Onterra would create the survey content and lead the interpretation of the results. Below is an outline of these activities:

1. Onterra distributes standard survey to planning committee
2. Planning committee develops additional questions and options to be included within the survey
3. Onterra updates survey and submits to WDNR for approval
4. WDNR approved survey is provided to planning committee
5. Planning committee prints survey, stuffs surveys in envelopes, and mails out surveys to distribution list they develop
6. Onterra provides customized Excel spreadsheet to the planning committee
7. Completed surveys are returned to planning committee and they tally results in provided electronic format
8. Excel spreadsheet of entered data is emailed to Onterra for analysis

Planning Meetings

Following the completion of data analysis, up to two meetings between Onterra and the Planning Committee would be conducted to facilitate the following:

- An in-depth knowledge of the conditions and ecological process within Big Sand Lake among the Planning Committee members.
- An understanding of suitable management alternatives for the lake and their possible outcomes.
- The development of realistic goals for the management of the lake.
- The creation of an *Implementation Plan* containing specific management actions that would guide the BSLPOA in meeting their management goals.

The first meeting would include a detailed presentation of the study results followed by the creation of a working-set of goals to base the implementation plan upon. The second meeting would be used to finalize the goals and formulate specific management actions that would allow the association to meet the management goals. The end-product of these meetings would be the Implementation Plan which would be included in the management plan for the lake. The final task of the Planning Committee would be to review the draft management plan/report and provide comments before it is finalized and presented to the association board of directors, general membership, and WDNR.

Wrap-up Meeting

At the conclusion of the project, Onterra would facilitate a *Wrap-up Meeting* to present the findings and recommendations of the study and corresponding management plan to the BSLPOA. The presentation would be in an easy-to-follow format that would explain the study results and the reasons as to why certain alternatives were selected for inclusion within the plan. It would also allow stakeholders to express concerns and ask specific questions about the Big Sand Lake ecosystem that could not be answered by Onterra ecologists before they were familiarized with the system.

Additional Public Information Forums

In addition to the meetings described above, public awareness of the project would be promoted by a news release to local newspapers by the association, by an informative article provided to the association members through a special mailing, and by providing a progress report approximately halfway through the study. The latter two documents would be provided to the association by Onterra. The initial news release would be used to inform stakeholders outside of the association membership that a management project is being conducted at the lake and that the association and WDNR are sponsoring and spearheading the project.

The special mailing is often used to notify the association members that a lake management project will be occurring on the lake and to inform them of the Kick-off Meeting. In some cases, the article contains an educational topic aimed at increasing the membership's general knowledge of lake stewardship or in some instances, for dispelling a specific myth or misunderstanding among the association members.

The project update would be in the form of a newsletter article or a special mailing and would contain information pertaining to what tasks had been completed as a part of the lake management project. Study results may be included in the update, but they would be limited to those that would not be counter-productive to the planning process.

Special Note on Meeting Schedule

As described above, stakeholder participation is an important aspect of a management planning project. Two types of meetings are outlined in the paragraphs above: those involving the general public (Kick-off and Wrap-up Meetings) and those involving a subcommittee of the association (planning meetings). In an effort to maximize attendance at the meetings involving the general public, Onterra suggests that those meetings be held on a Saturday. Onterra staff members enjoy spending their holiday weekends with their families just as our clients enjoy spending those same weekends with their families at the lake; therefore, Onterra cannot schedule meetings for holiday weekends. Further, not all meetings can be facilitated by Onterra's founder, Tim Hoyman, some meetings and other project aspects would be handled by Onterra's other well-trained and experienced staff members

Because the planning meetings involve a smaller group of people, we suggest that these meetings be held during a weekday afternoon or evening, preferably Monday – Thursday. Often, these meetings are held on a Thursday afternoon at a residence or other location on or near the lake.

Volunteer AIS Monitor Training

To conduct a successful volunteer-based AIS monitoring program, volunteers must be provided with up-to-date and accurate location data of the target species and control areas. For this project, due to the level of occurrence, EWM location data would be provided through regular surveys completed primarily by professionals. However, should a whole-lake EWM treatment be completed in the near future on Big Sand Lake, and assuming it would be as successful as earlier treatments using the same strategy, the level of EWM occurrence would be reduced to levels that volunteer monitoring, and possibly hand-harvesting, would be applicable. Therefore, within this proposed planning project, BSLPOA volunteers would be trained to utilize a grant-purchased GPS unit (Photo 1) in preparation for future use.

An additional benefit of the GPS unit purchase and training for this project would be the educational value of having BSLPOA members visiting the EWM colonies mapped by Onterra during the summer of 2013. This would raise their understanding of what the density designations mean on the maps Onterra produces and create more realistic expectations of control strategies.

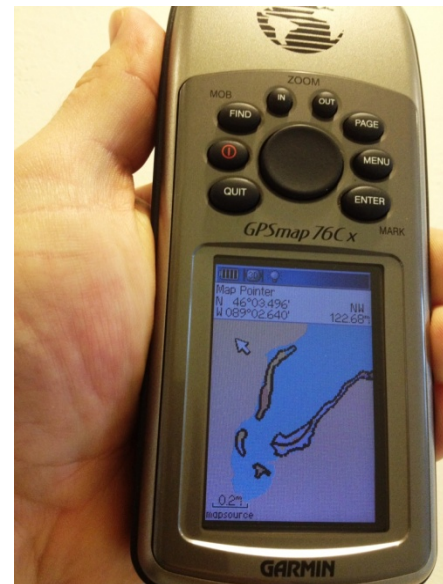


Photo 1. GPS unit with example basemap. Long Lake, Vilas County.

The BSLPOA would purchase a Garmin GPS Map78. This specific unit allows for Onterra staff to create and load alternate background maps (basemaps) for display during volunteer surveys. An example is shown in Photo 1 where EWM colonies of varying densities (colored polygons) along with herbicide treatment areas (black outlined-polygons) can be uploaded onto the lake group's GPS unit. For this project, the GPS basemap would be updated initially with the 2013 peak-biomass results and then again after the Early-Season AIS Survey.

Volunteers receiving training and conducting AIS surveillance monitoring would input all records into the online SWIMS database in accordance with CLMN protocols. The BSLPOA understands that this aspect needs to be completed in order to receive in-kind credit for these activities.

Clean Boats Clean Waters Inspections

During 2013, Big Sand Lake funded 200 hours of boat landing watercraft monitoring by paid inspectors through a WDNR Clean Boats Clean Waters Grant. The paid inspectors were part of a program managed by Ted Ritter, Vilas County Invasive Species Coordinator, that utilizes UW-Oshkosh students as interns during the summer months. The BSLPOA has obtained a second Clean Boats Clean Waters Grant to implement the same 200-hour program on Big Sand during 2014.

Shoreline Condition and Course Woody Habitat Assessment

Using a GPS data collector with sub-meter accuracy, the immediate shoreline of Big Sand Lake would be surveyed and classified based upon its potential to negatively impact the system due to shoreline development and other anthropogenic impacts. Examples of these negative impacts include shoreland areas that are maintained in an unnatural manner and impervious surfaces.

The resulting map would delineate the lake's shoreline, from the water's edge to approximately 35-feet shoreward, into one of five categories ranging from "Urbanized" to "Natural/Undeveloped". Ultimately, the information would be used to prioritize areas for restoration and protection that would likely have a benefit to the Big Sand Lake ecosystem.

During the shoreline condition assessment survey, all incidences of course woody debris extending at least 5 feet into the lake, in water depths exceeding 1 foot, and with trunk diameters exceeding 2 inches would be mapped and described based upon size and complexity. This type of structure is important habitat for fish and other aquatic organisms; therefore, this information would be useful in determining whether the lake management plan should include the enhancement of woody structure in the lake.

Watershed Definition and Phosphorus Load Modeling

The first step in this component would be an accurate delineation of the lake's watershed. GIS software would be used to generate a map of existing land cover types located within the watershed. The acreage of land currently attributed to each cover type would then be input into the Wisconsin Lake Model Suite (WiLMS) and a partitioning of watershed phosphorus loading, based on land cover type would be calculated. The sources of phosphorus loading for the watershed would also be graphically displayed using GIS software. During the watershed

definition process, site visits would be conducted and information collected from shoreland landowners to identify potential problem point-sources (e.g., agricultural drain tile inlets) and nonpoint sources of pollution and identify land use trends, as applicable.

Using WiLMS, a response model would be created by altering the land cover types found within the Big Sand Lake watershed to indicate different scenarios (e.g. agriculture lands converted to forests). This exercise would be useful in prioritizing conservation work conducted in the watershed and would lead to realistic goals for water quality preservation and possible improvement. These goals would be expressed using Wisconsin Trophic State Index values.

This component is useful in accomplishing three goals; 1) to help target specific areas for improvement within the lake's watershed, 2) to bring a better understanding to the lake stakeholders concerning how the lake's watershed plays a key role in its water quality regardless if problems exist or not within its watershed, and 3) to determine the need for more detailed study of the watershed and the lake's nutrient budget. Particular to point 3, if the watershed analysis and in-lake phosphorus levels do not compare reasonably well, this may be an indication that other sources of phosphorus are impacting the lake, such as internal loading, point-sources, and/or private septic systems, and that further study (outside the scope of this project) would be required to fully understand the nutrient dynamics within the lake.

Lake Water Quality

Water quality conditions would be monitored within Big Sand Lake in order to complete the following:

- Assist in identifying potential water quality problems within Big Sand Lake, such as elevated nutrient levels, anaerobic conditions, etc.
- Determine the trophic state of the lake using the Carlson Trophic State Index (TSI).
 - Historic data would also be used to calculate TSI values for long-term trend analysis. This analysis would be useful in determining realistic target values for maintaining or improving the lake's water quality through watershed or in-lake management actions.
- Determine the limiting nutrient.
- Supplement and calibrate watershed assessment modeling.

Members of the BSLPOA currently collect water quality data as a part of the Citizen's Lake Monitoring Network (CLMN). The trained volunteers would continue to collect samples using CLMN protocols, occurring once in spring and three times during the summer. These volunteers would also collect nitrogen samples (outside of CLMN) to be used in the planning process. In addition to the samples collected by BSLPOA members, professional water quality samples would be collected at subsurface (S) and near bottom (B) depths and would occur once in spring, summer, winter and fall. This would allow determinations of limiting nutrients and internal nutrient dynamics to be made. Although BSLPOA members would collect spring and July total phosphorus samples, and July chlorophyll-*a* samples, professionals would also collect samples to coincide with the bottom total phosphorus samples collected in those same months.

All samples requiring laboratory analysis would be processed through the Wisconsin State Laboratory of Hygiene (SLOH). The parameters to be measured, sample collection timing, designated collector, and cost coverage are contained in Table 1. Secchi disk transparency would also be included during each visit. During professionally collected samples temperature and dissolved oxygen profiles would be completed.

Table 1. Water Quality Sample Parameters and Timing

Parameter	Spring		June	July		August	Fall		Winter	
	S	B	S	S	B	S	S	B	S	B
Dissolved Phosphorus	●	●							●	●
Total Phosphorus	●◆	●	◆	●◆	●	◆	●	●	●	●
Total Kjeldahl Nitrogen	●	●	■	●		■			●	●
Nitrate-Nitrite Nitrogen	●	●	■	●		■			●	●
Ammonia Nitrogen	●	●	■	●		■			●	●
Chlorophyll- <i>a</i>	●		◆	●◆		◆	●			
True Color	●			●						
Hardness	●									
Total Suspended Solids	●	●					●	●		
Laboratory Conductivity	●	●		●	●					
Laboratory pH	●	●		●	●					
Total Alkalinity	●	●		●	●					
Calcium	●									

- ◆ indicates samples collected as a part of the Citizen Lake Monitoring Network.
- indicates samples collected by volunteers under proposed project.
- indicates samples collected by consultant under proposed project.

Aquatic Plant Surveys

Aquatic plants are very important because they are the foundation of the lake ecosystem; therefore a complete and accurate assessment of the aquatic plant community is vital in every lake management project. In order to fully assess the aquatic plants, three different types of surveys would be performed: an early season AIS survey, a point-intercept survey, and an aquatic plant community mapping survey. The early season AIS survey is aimed at locating exotics early in the growing season while curly-leaf pondweed is at its peak growth and Eurasian water milfoil is higher in the water column than most native plants. The point-intercept survey is a plot-based inventory intending to characterize the relative frequency of all plants, native and exotic, and is performed at the height of the growing season. The aquatic plant community mapping survey is completed following the comprehensive survey and provides a *snapshot* of the lake's emergent and floating-leaf communities.

Overall, this task would serve to provide an accurate characterization of the lake's macrophyte community. It would indicate what species were present and where they were located, and allow for comparisons with past and future surveys. It would also help to determine where and what types of aquatic plant control, protection, and enhancement methods would be appropriate for the lake.

Early Season AIS Survey

Curly-leaf pondweed has a very unusual life cycle compared to our native plants and is at peak biomass within Wisconsin lakes during late spring/early summer. Further, Eurasian water milfoil, which begins growing much earlier than most Wisconsin native plants, is often easily spotted from the surface during early summer as it towers above other lake plants. Therefore, an inventory would be conducted on the lake during the early summer to map curly-leaf pondweed and Eurasian water milfoil occurrences within the lake. Please note that this would not be a transect- or plot-based survey, but instead, would consist of a meander survey of the lake to locate these species. If curly-leaf pondweed is found, the colonies would be mapped utilizing the submeter-accuracy GPS technology. A map depicting each colony's location and density (through color-gradients) would be created based upon the data collected in June. If Eurasian water milfoil is mapped during this survey, these sites would be reassessed and the plants remapped later in the summer when Eurasian water milfoil is most likely at its peak biomass.

Point-intercept Survey

A comprehensive survey of aquatic macrophytes is used to characterize the existing communities within the lake and includes inventories of emergent, submergent, and floating-leaved aquatic plants within the lake. The point-intercept method as described in Recommended Baseline Monitoring of Aquatic Plants in Wisconsin: Sampling Design, Field and Laboratory Procedures, Data Entry, and Analysis, and Applications (WDNR PUB-SS-1068 2010) would be used to complete this study. The survey would be completed with a point spacing of 80 meters, resulting in approximately 902 sample locations (Map 1).

These data, along with previously collected point-intercept data, would be analyzed by Onterra and used in the management plan. To characterize spatial distribution, *relative frequency of occurrence* would be calculated for each species found within the lake. In addition, the plant communities of the lake would be compared to those of other lakes in the ecoregion and the state using the Floristic Quality Assessment (FQA) procedures described in Nichols (1998). In general, the FQA evaluates the species found in a lake with those found in a natural, undisturbed system; indicating the health of the current plant community in the lake.

Native and Exotic Plant Community Mapping

The aquatic vegetation community types within the lake (e.g., emergent, submergent, and floating-leaved vegetation) would be mapped using the GPS technology described above, and would be based on dominant species (e.g., soft-stem bulrush, common arrowhead, large-leaf pondweed, etc.). In other words, the primary mapping unit would be the community type, but a secondary classification based on dominant species would be included on the vegetation maps. The final map would show the location of each vegetation type in the lake in relation to the lake's bathymetry. It is these communities that respond the quickest to ecological changes in the lake and the survey would provide a baseline understanding of the relative locations of these communities.

Furthermore, additional maps would indicate the areas of the lake inhabited by exotic/invasive species such as pale-yellow iris, giant reed grass, and purple loosestrife if these species are located.

Fisheries Data Integration

Summary of Baseline Data

Available historic fisheries data within the past decade from the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), and the WDNR would be compiled from Big Sand Lake. This would include information relating to fish stocking, creel surveys, comprehensive fish surveys, and spear harvest data. A list of the known fish species present in the lake along with general biological information pertaining to important fish species would be provided considering spawning habitat requirements, nursery areas, and food sources.

Integration within Management Plan

Although current fish data would not be collected, the compiled historic data along with the natural history information would be considered as it pertains to the management plan. As applicable, individual management actions within the implementation plan would be analyzed as they pertain to the health of the fish populations (e.g. timing of Eurasian water milfoil control practices, if discovered, to limit interference with spawning activities).

Professional *Dreissena* Mussel Monitoring

The WDNR samples over 100 waterbodies annually in search of larval and adult zebra and quagga mussels (both *Dreissena* sp.). Following discussions with the WDNR during the spring of 2006, Onterra purchased the necessary equipment and was trained by WDNR staff to sample lakes in search of these mussels. During each lake visit, the water column would be sampled at three sites using a 64-micron mesh plankton net in search of larval mussels (veligers). Mussel Monitoring would be completed once in June during the CLP survey and again in July or August during the community mapping survey. Samples would be preserved and packaged according to the methodology outlined in the 2005 WDNR publication, “*Dreissena* Mussel Monitoring Protocol.” Because ethyl alcohol is used in the preservation process, specific rules apply for shipment and arrangements have been made to hand-deliver samples to WDNR staff at the Northeast Region Headquarters in Green Bay where they would be responsible for shipment to the location of analysis. During these and other visits to the lake, Onterra would periodically search docks, piers, and other structures for adult forms of the mussels.

PROJECT DELIVERABLES

The final product for this project would be a single report that would include the methodologies and results of the tasks described above; a discussion concerning those results as they apply to the current health, rehabilitation, and protection of Big Sand Lake; and the full-color maps described in the Project Scope. Management, protection, enhancement alternatives and recommendations would be presented along with continued public education issues. Furthermore, recommendations for remedial actions and further study options (if needed) would be included expressly for Big Sand Lake and its drainage basin; including possible funding sources and an indication as to how Onterra could assist the BSLPOA in obtaining the funding required for future projects.

Upon finalization of the report and acceptance by the WDNR, 5 hard copies of the management plan would be provided to the BSLPOA. In addition, the BSLPOA, WDNR, and county would

receive two copies of the report, data, and maps on CD-ROM in Adobe's Portable Document Format (PDF).

TENTATIVE PROJECT SCHEDULE

Table 2 provides an approximate timeline for completion of the tasks. The schedule needs to be flexible to accommodate for weather, scheduling conflicts, etc., but it provides a general indication of the dates for completing the proposed components. The meeting times would be very flexible.

Table 2. Approximate Project Schedule for 2014 – 2015.

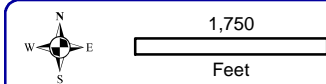
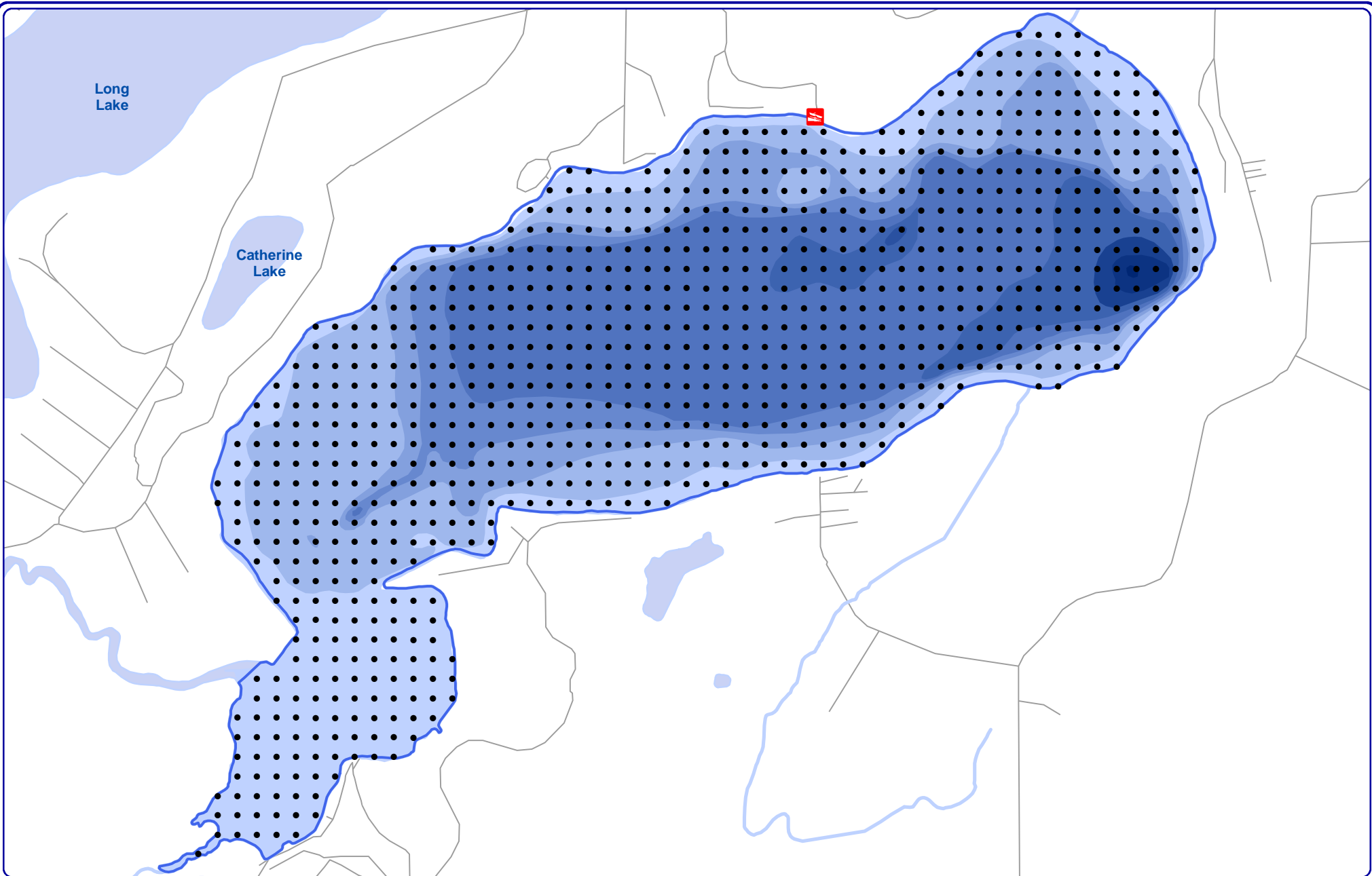
Task	2014												2015											
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S				
Water Quality Sample																								
Kick-off Meeting																								
Early-Season AIS Survey																								
Point-Intercept Plant Survey																								
Aquatic Plant Community Mapping																								
Project Update																								
Shoreland Condition Assessment																								
Data Analysis																								
Planning Comm. Meeting																								
Report – First Draft																								
Report – Final Draft																								
Wrap-up Meeting																								

VOLUNTEER AND IN-KIND OPPORTUNITIES

Task/Item	Quantity	Cost/ Unit	In-kind Match
Planning Comm. – Stakeholder Survey	6 peop. x 6 hours = 36 hrs	\$12.00	\$432.00
Planning Comm. – Plan Development	6 peop. x 6 hours = 36 hrs	\$12.00	\$432.00
AIS Monitor Training	2 peop. x 4 hours = 8 hrs	\$12.00	\$96.00
Kick-off Mtg Attendance	40 peop. x 1.5 hours = 60 hrs	\$12.00	\$720.00
Wrap-up Mtg Attendance	40 peop. x 2 hours = 80 hrs	\$12.00	\$960.00
BSLPOA Grant Project Administration	2 peop. x 25 hours = 50 hrs	\$12.00	\$600.00
Total Estimated In-kind Match			\$3,240.00

PROJECT COST BREAKDOWN

	Cash Cost	Donated Value
Onterra Fees		
Project Setup & Administration	\$980.00	
Stakeholder Participation - Onterra-Facilitated	\$3,530.00	
Watershed Assessment	\$855.00	
Water Quality Assessment	\$2,630.00	
Fishery Data Compilation & Integration	\$845.00	
Shoreline & Course Woody Habitat Assessment	\$1,675.00	
Early-Season AIS Survey	\$3,540.00	
Point-Intercept Survey	\$4,080.00	
Aquatic Plant Community Mapping	\$2,445.00	
Data Analysis and Report/Plan Creation	\$4,585.00	
Onterra Printing & Shipping	\$300.00	
Travel (Lodging, Incidentals, & Mileage @ 0.58/mi)	\$2,225.00	
Professional Dreissena Mussel Monitoring		\$800.00
Other Fees		
State Laboratory of Hygiene Fees	\$1,234.07	
Stakeholder Survey Printing and Mailing Costs	\$900.00	
BSLPOA Project-Related Printing Costs	\$300.00	
Garmin GPSMap 78	\$300.00	
Volunteer & In-kind Match Opportunities		
Planning Comm. – Stakeholder Survey		\$432.00
Planning Comm. – Plan Development		\$432.00
AIS Monitor Training		\$96.00
Kick-off Mtg Attendance		\$720.00
Wrap-up Mtg Attendance		\$960.00
BSLPOA Grant Project Administration		\$600.00
<i>Subtotal</i>	<i>\$30,424.07</i>	<i>\$4,040.00</i>
Project Total	\$34,464.07	
AIS Education, Prevention, & Planning Grant Specifics		
WDNR Portion (75%)	\$25,848.05	
Local Match (25%)	\$8,616.02	






Onterra LLC
 Lake Management Planning
 815 Prosper Road
 De Pere, WI 54115
 920.338.8860
 www.onterra-eco.com

Sources:
 Roads and Hydro: WDNR
 Map Date: November 6, 2013
 Map1_BigSand_Location_proposal.mxd

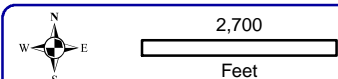
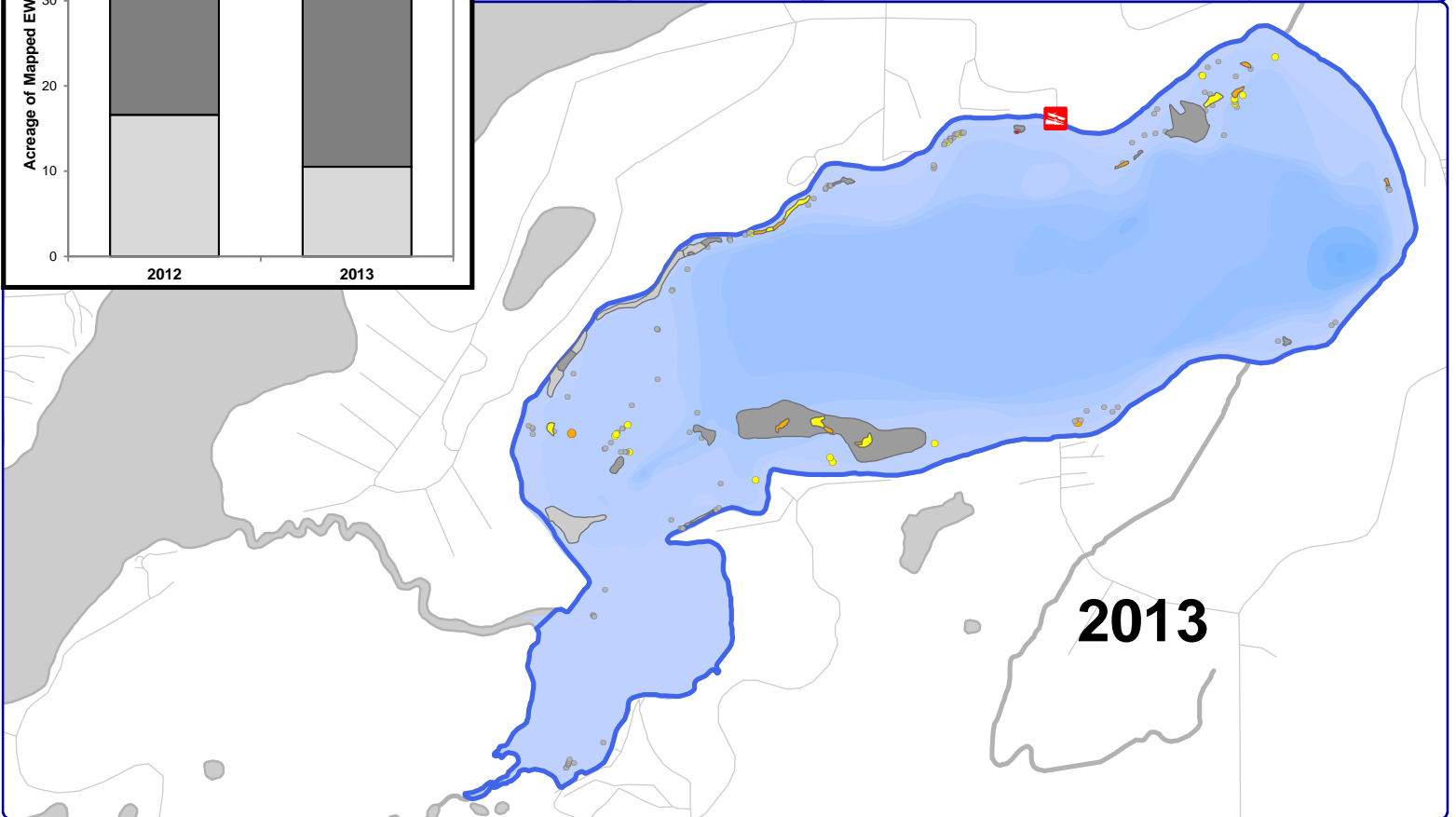
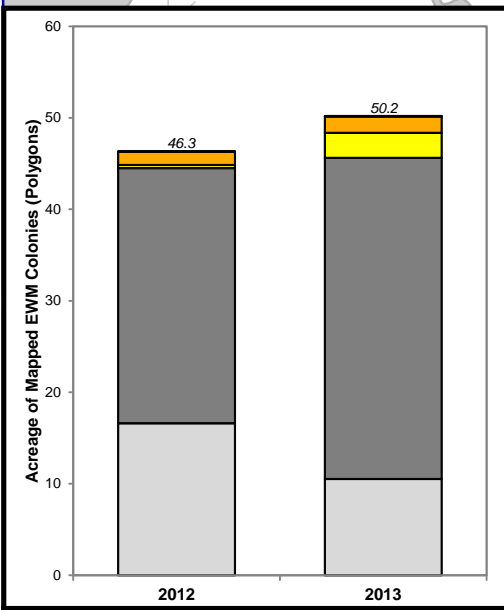
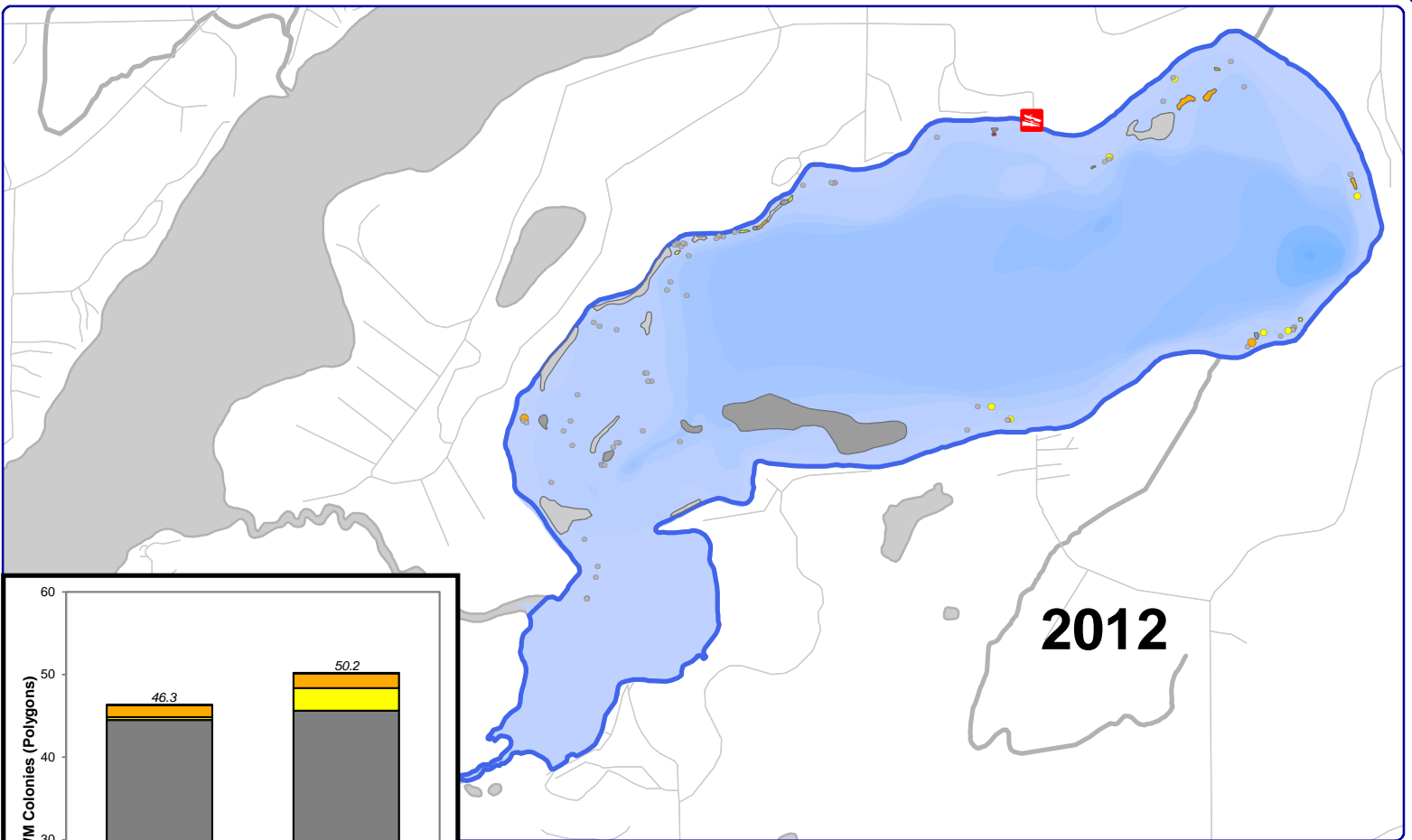


Project Location in Wisconsin

Legend

-  Big Sand Lake ~ 1,427 acres
WDNR Definition
-  Point-Intercept Survey Location
80-meter spacing, 902 total points
-  Public Boat Landing

Map 1
Big Sand Lake
 Vilas County, Wisconsin
**Project Location
 & Lake Boundaries**



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Sources:
 Roads and Hydro: WDNR
 Bathymetry: WDNR, digitized by Onterra
 Aquatic Plant Survey: Onterra, 2012-13
 Map Date: January 29, 2014
 Filename: BigSand_EWM_PB_2012-13.mxd



Project Location in Wisconsin

Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

Map 2
Big Sand Lake
 Vilas County, Wisconsin
2012 & 2013 EWM
Survey Results

Aquatic Invasive Species (AIS) Control Grant Application

Form 8700-307 (12/11)

Notice: Use of this form is required by the DNR for any application filed pursuant to ch. NR 198, Wis. Adm. Code. Personal information collected on this form, including such data as your name, address, phone number, etc., will be used for management and enforcement of DNR programs, and is not intended to be used for any other purpose. Information will be made accessible to requesters under Wisconsin's Open Records laws (s. 19.32-19.39, Wis. Stats.) and requirements.

Section I: Application Type

Check one:

- Education, Prevention & Planning
 Early Detection & Response
 Established Population Control

Legislative District Numbers		To determine your legislative district, go to http://165.189.139.210/WAML/ Type in complete address, next screen shows information
Senate	Assembly	
12	34	

Section II: Applicant Information

Applicant			Type of Eligible Lake or River Applicants			
Big Sand Lake Property Owners Association, Inc.			<input type="checkbox"/> County	<input type="checkbox"/> Tribe	<input type="checkbox"/> Other Gov't Unit	<input type="checkbox"/> Federal
Waterbody Name			<input type="checkbox"/> City	<input type="checkbox"/> Sanitary Dist.	<input type="checkbox"/> Nonprofit Org.	<input type="checkbox"/> State
Big Sand Lake			<input type="checkbox"/> Village	<input type="checkbox"/> Dist.	<input type="checkbox"/> College, School, etc.	<input type="checkbox"/> Other
Project County/Township/Section/Range			<input type="checkbox"/> Town	<input checked="" type="checkbox"/> Assoc.		
Vilas T41N R12E S09						
Authorized Representative Named by Resolution			Project Contact Name			
Robert Kelly			Tim Hoyman			
Authorized Representative Title			Project Contact Title			
Board Member			Aquatic Ecologist; Onterra, LLC			
Address			Address			
8411-F Crystal Springs Rd.			815 Prosper Road			
City	State	ZIP Code	City	State	ZIP Code	
Woodstock	IL	60098	De Pere	WI	54115	
Daytime Phone (area code)		Evening Phone (area code)		Daytime Phone (area code)		
(815) 338-3935				920.338.8860		
E-Mail Address			E-Mail Address			
ualcaptret@aol.com			thoyman@onterra-eco.com			

Mail Check to: (if different from applicant)

Name and Title		Address	
Organization		City	State
		ZIP Code	

For DNR Use Only

Application Type	Date Received	Date Reviewed (AIS/LC/RC)	AIS/Lake/River Coordinator Approval/Date
Waterbody ID #	Adequate Public Access <input type="checkbox"/> Yes <input type="checkbox"/> No		Environmental Grants Specialist Approval / Date
Eligible Project <input type="checkbox"/> Yes <input type="checkbox"/> No	Eligible Applicant <input type="checkbox"/> Yes <input type="checkbox"/> No	Project Priority Rank	Research / Demo Project <input type="checkbox"/> Yes <input type="checkbox"/> No
Prior Grant Award(s) <input type="checkbox"/> Yes <input type="checkbox"/> No	Fiscal Year(s)	Amount Received to Date \$	Project Awarded <input type="checkbox"/> Yes <input type="checkbox"/> No

Section III: Project Information

Project Title Big Sand Lake Management Planning Project	Proposed Ending Date June 30, 2016
--	---------------------------------------

Other Management Units	Letter of Support	Other Management Units	Letter of Support
1. Vilas County (will be sent in separately)	<input checked="" type="checkbox"/>	4.	<input type="checkbox"/>
2. Town of Phelps (will be sent in separately)	<input checked="" type="checkbox"/>	5.	<input type="checkbox"/>
3.	<input type="checkbox"/>	6.	<input type="checkbox"/>

Section IV: Public Access

Number of Public Vehicle Trailer Parking Spaces Available at Public Access Sites 49

Number of Public Access Sites Including Boat Launches and Walk-ins 1 boat landing with ADA fishing pier, channel access from Long Lake.

Section V: Cost Estimate and Grant Request

**Section V must be completed or application will be returned.
Details in support of Section V are welcome.**

	Project Costs		
	Column 1 Cash Costs	Column 2 Donated Value	DNR Use Only
1. Salaries, wages and employee benefits			
2. Consulting services	\$27,690.00	\$800.00	
3. Purchased services: Herbicide Applications	\$900.00		
4. Other purchased services (specify) : WDNR Permit Fees	\$300.00		
5. Plant material: Includes installation –			
6. Supplies (specify):	\$300.00		
7. Depreciation on equipment			
8. Hourly equipment use charges			
9. State Lab of Hygiene (SLOH) Costs	\$1,234.07		
10. Non-SLOH Lab Costs			
11. Other (specify): Volunteer In-kind Labor		\$3,240.00	
12. Subtotals (Sum each column)	\$30,424.07	\$4,040.00	
13. Total Project Cost Estimate (sum of column 1 plus sum of column 2)	\$34,464.07		
14. State Share Requested (up to 75% of total costs may be requested)	\$25,848.05		

Subject to the following maximum grant amounts:

- Education, Prevention and Planning Projects—up to \$150,000
- Early Detection and Response Projects—up to \$20,000
- Established Infestation Control Projects—up to \$200,000

Use of Federal funding as match: (check box below if applicable)

We are using or planning to apply for Federal funds to be used as match.
If known, indicate source of funding:

Section VI: Attachments (check all that are included)

A. For all applicants: (Refer to instructions for applicability.)

- 1. Authorizing resolution
- 2. Letters of support
- 3. Map of project location and boundaries
- 4. Lake map with public access sites identified (per Section VI of this application and page 20 of the guidelines)
- 5. Itemized breakdown of expenses
- 6. For projects that entail sending samples to the State Laboratory of Hygiene (SLOH) only: a completed SLOH Projected Cost Form
- 7. Project scope/description:
 - a. Description of project area
 - b. Description of problem to be addressed by project
 - c. Discussion of project goal and objectives
 - d. Description of methods and activities
 - e. Description of project products or deliverables
 - f. Description of data to be collected, if applicable
 - g. Description of existing and proposed partnerships
 - h. Discussion of role of project in planning and/or management of lake
 - i. Timetable for implementation of key activities
 - j. Plan for sharing project results
 - k. Other information in support of project not described above

B. For applicants that are Lake Management Organizations (LMOs), River Management Organizations (RMOs) or Qualified Non-profit Organizations:

- 1. For first time applicant LMOs/RMOs only: A completed Form 8700-226 (Lake Association Organizational Application) or 8700-287 (River Management Organization Application)
- 2. For first time applicant Qualified Nonprofit Organizations only: Copy of IRS 501(c)(3) determination letter and copies of your Articles of Incorporation and Bylaws
- 3. List of national and/or statewide organizations with which you are affiliated
- 4. List of board members' names, including municipality and county of residence. Designate officers
- 5. Documentation of current financial status
- 6. Brochures, newsletters, annual reports or other information about your organization

C. Education, Prevention and Planning Projects: (No additional attachments required.)

D. Early Detection and Response Projects:

- 1. APM Permit

E. Established Infestation Control Projects:

- 1. Management Plan
- 2. APM Permit

Section VII: Certification

I certify that information on this application and all its attachments are true and correct and in conformity with applicable Wis. Statutes

Print/Type Name of Authorized Representative

Robert Kelly

Signature of Authorized Representative

Title of Authorized Representative

Board Member

Date Signed

LAKE/RIVER PLANNING GRANTS PROJECTED LAB COSTS

First Year FY 2014

Lake Name: Big Sand Lake
 Waterbody ID#: 1602600
 County: Vilas
 Applicant Name: Big Sand Lake Property Owners Association, Inc.
 Will the Lab be doing filtration for dissolved parameters? (Y/N) Y
 Will field tests be recorded on the Lab Slip? Y

Review Period:
 Application Period:

2013

2014

Test ID	Parameter	Samples/Month												Analyses/ Fiscal Year	Price/ Analysis	Annual Cost For Parameter		
		July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun					
NUTRIENTS																		
I530CLD	DISSOLVED REACTIVE P (ORTHO)													2		2	\$16.67	\$33.34
I520PLT	TOTAL PHOSPHORUS													2		2	\$23.60	\$47.20
I520PLD	TOTAL DISS PHOSPHORUS (AS P), (EPA 365.1)															0	\$23.60	\$0.00
I470DLT	TOTAL KJELDAHL NITROGEN												2	1	3	\$32.99	\$98.97	
I460MLD	NITRATE+NITRITE (AS N), DISS (EPA 353.2)												2	1	3	\$27.00	\$81.00	
I440NLD	AMMONIA-N, DISSOLVED												2	1	3	\$25.89	\$77.67	
OTHER WET CHEMISTRY																		
I305ALT	AUTOMATED CONDUCTIVITY, PH & ALKALINITY													2		2	\$22.00	\$44.00
I120ALT	ALKALINITY, GRAN TECHNIQUE															0	\$54.00	\$0.00
I240FLT	CHLORIDE															0	\$20.00	\$0.00
I251UNF	CHLOROPHYLL A, FLUORESCENCE, FIELD FILTERED															0	\$23.28	\$0.00
I251UNL	CHLOROPHYLL A, FLUORESCENCE LAB FILTERED													1		1	\$24.52	\$24.52
I290ALT	COLOR, TRUE, PT-CO													1		1	\$25.00	\$25.00
I340IR1	HARDNESS, CALCULATION METHOD (When Metals Done)													1		1	\$5.37	\$5.37
	HARDNESS, CALCULATION METHOD (When Metals not Done)															0	\$52.82	\$0.00
I600ELT	SULFATE (EPA 375.2)															0	\$26.00	\$0.00
I650JLT	SUSPENDED SOLIDS													2		2	\$18.80	\$37.60
I640ILD	TOTAL DISSOLVED SOLIDS, 180 C															0	\$17.13	\$0.00
I650JLV	TOTAL VOLATILE SOLIDS															0	\$10.03	\$0.00
I660NLT	TURBIDITY															0	\$10.00	\$0.00
I720BLT	FIELD TESTS (For each labslip with Field Testing Recorded)	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	\$3.00	\$9.00
TOTAL METALS																		
I230IR1	CALCIUM, TOTAL RECOVERABLE, ICP	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	\$13.00	\$13.00
I370IR1	IRON, TOTAL RECOVERABLE, ICP															0	\$13.00	\$0.00
I390IR1	MAGNESIUM, TOTAL RECOVERABLE, ICP															0	\$13.00	\$0.00
I400IR1	MANGANESE, TOTAL RECOVERABLE, ICP															0	\$13.00	\$0.00
I540IR1	POTASSIUM, TOTAL RECOVERABLE, ICP															0	\$13.00	\$0.00
I580IR1	SODIUM, TOTAL RECOVERABLE, ICP															0	\$13.00	\$0.00
I322IR1	DIGESTION, TOT. RECOV. LOW LEVEL, ICP + ICP SETUP	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	\$21.45	\$21.45
WATER BACTI																		
B152ALT	E COLI ENZYMATIC SUBTRATE QUANTITRAY MPN															0	\$37.00	\$0.00
B200ALT	Fecal Coliform (MFFCC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$37.00	\$0.00
												18	3 Grand Total =		\$518.12			

Number of Inorganic Lab Slips (Machine Determined) 0 0 0 0 0 0 0 0 0 0 2 0 1 3 =Total Inorganic Lab Slips for Fiscal Year
 Number of Bacti Lab Slips (Machine Determined) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 =Total Bacti Lab Slips for Fiscal Year
 Number of Inorganic Lab Slips (from workplans)

LAKE/RIVER PLANNING GRANTS PROJECTED LAB COSTS

Second Year FY 2015

Lake Name: Big Sand Lake Big Sand Lake Review Period:
 Waterbody ID#: 1602600 2E+06 Application Period:
 County: Vilas Vilas
 Applicant Name: Big Sand Lake Property Owners Association, Inc. Big Sand Lake Property Owners Association, Inc.
 Will the Lab be doing filtration for dissolved parameters? (Y/N) Y 2014 2015
 Will field tests be recorded on the Lab Slip? Y

Parameter	Samples/Month												Analyses/ Fiscal Year	Price/ Analysis	Annual Cost For Parameter	
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun				
NUTRIENTS																
DISSOLVED REACTIVE P (ORTHO)								2						2	\$17.17	\$34.34
TOTAL PHOSPHORUS	2			2				2						6	\$24.31	\$145.85
TOTAL DISS PHOSPHORUS (AS P), (EPA 365.1)														0	\$24.31	\$0.00
TOTAL KJELDAHL NITROGEN	1	1						2						4	\$33.98	\$135.92
NITRATE+NITRITE (AS N), DISS (EPA 353.2)	1	1						2						4	\$27.81	\$111.24
AMMONIA-N, DISSOLVED	1	1						2						4	\$26.67	\$106.67
OTHER WET CHEMISTRY																
AUTOMATED CONDUCTIVITY, PH & ALKALINITY	2													2	\$22.66	\$45.32
ALKALINITY, GRAN TECHNIQUE														0	\$55.62	\$0.00
CHLORIDE														0	\$20.60	\$0.00
CHLOROPHYLL A, FLUORESCENCE, FIELD FILTERED														0	\$23.98	\$0.00
CHLOROPHYLL A, FLUORESCENCE LAB FILTERED	1			1										2	\$25.26	\$50.51
COLOR, TRUE, PT-CO	1													1	\$25.75	\$25.75
HARDNESS, CALCULATION METHOD (When Metals Done)														0	\$5.53	\$0.00
HARDNESS, CALCULATION METHOD (When Metals not Done)														0	\$54.40	\$0.00
SULFATE (EPA 375.2)														0	\$26.78	\$0.00
SUSPENDED SOLIDS				2										2	\$19.36	\$38.73
TOTAL DISSOLVED SOLIDS, 180 C														0	\$17.64	\$0.00
TOTAL VOLATILE SOLIDS														0	\$10.33	\$0.00
TURBIDITY														0	\$10.30	\$0.00
FIELD TESTS (For each labslip with Field Testing Recorded)	2	1	0	2	0	0	0	2	0	0	0	0	0	7	\$3.09	\$21.63
TOTAL METALS																
CALCIUM, TOTAL RECOVERABLE, ICP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$13.39	\$0.00
IRON, TOTAL RECOVERABLE, ICP														0	\$13.39	\$0.00
MAGNESIUM, TOTAL RECOVERABLE, ICP														0	\$13.39	\$0.00
MANGANESE, TOTAL RECOVERABLE, ICP														0	\$13.39	\$0.00
POTASSIUM, TOTAL RECOVERABLE, ICP														0	\$13.39	\$0.00
SODIUM, TOTAL RECOVERABLE, ICP														0	\$13.39	\$0.00
DIGESTION, TOT. RECOV. LOW LEVEL, ICP + ICP SETUP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$22.09	\$0.00
WATER BACTI																
E COLI ENZYMATIC SUBTRATE QUANTITRAY MPN														0	\$38.11	\$0.00
Fecal Coliform (MFFCC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$38.11	\$0.00
	9	3		5				10								\$715.95
	Grand Total =														\$715.95	

Number of Inorganic Lab Slips (Machine Determined) 2 1 0 2 0 0 0 0 2 0 0 0 0 7 =Total Inorganic Lab Slips for Fiscal Year
 Number of Bacti Lab Slips (Machine Determined) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 =Total Bacti Lab Slips for Fiscal Year
 Number of Inorganic Lab Slips (from workplans)

LAKE/RIVER PLANNING GRANTS PROJECTED LAB COSTS

Grand Total

Lake Name: Big Sand Lake
 Waterbody ID#:
 County: Vilas
 Applicant Name: Big Sand Lake Property Owners Association, Inc.

Review Period:
 1602600 Application Period:

Parameter	Analyses For Grant	Grant Cost For Parameter
NUTRIENTS		
DISSOLVED REACTIVE P (ORTHO)	4	\$67.68
TOTAL PHOSPHORUS	8	\$193.05
TOTAL DISS PHOSPHORUS (AS P), (EPA 365.1)	0	\$0.00
TOTAL KJELDAHL NITROGEN	7	\$234.89
NITRATE+NITRITE (AS N), DISS (EPA 353.2)	7	\$192.24
AMMONIA-N, DISSOLVED	7	\$184.34
OTHER WET CHEMISTRY		
AUTOMATED CONDUCTIVITY, PH & ALKALINITY	4	\$89.32
ALKALINITY, GRAN TECHNIQUE	0	\$0.00
CHLORIDE	0	\$0.00
CHLOROPHYLL A, FLUORESCENCE, FIELD FILTERED	0	\$0.00
CHLOROPHYLL A, FLUORESCENCE LAB FILTERED	3	\$75.03
COLOR, TRUE, PT-CO	2	\$50.75
HARDNESS, CALCULATION METHOD (When Metals Done)	1	\$5.37
HARDNESS, CALCULATION METHOD (When Metals not Done)	0	\$0.00
SULFATE (EPA 375.2)	0	\$0.00
SUSPENDED SOLIDS	4	\$76.33
TOTAL DISSOLVED SOLIDS, 180 C	0	\$0.00
TOTAL VOLATILE SOLIDS	0	\$0.00
TURBIDITY	0	\$0.00
FIELD TESTS (For each lab slip with Field Testing Recorded)	10	\$30.63
TOTAL METALS		
CALCIUM, TOTAL RECOVERABLE, ICP	1	\$13.00
IRON, TOTAL RECOVERABLE, ICP	0	\$0.00
MAGNESIUM, TOTAL RECOVERABLE, ICP	0	\$0.00
MANGANESE, TOTAL RECOVERABLE, ICP	0	\$0.00
POTASSIUM, TOTAL RECOVERABLE, ICP	0	\$0.00
SODIUM, TOTAL RECOVERABLE, ICP	0	\$0.00
DIGESTION, TOT. RECOV. LOW LEVEL, ICP + ICP SETUP	1	\$21.45
WATER BACTI		
E COLI ENZYMATIC SUBTRATE QUANTITRAY MPN	0	\$0.00
Fecal Coliform (MFFCC)	0	\$0.00
Grand Total =		\$1,234.07