



**AquaTechnex**

*"Advancing the Science  
of Lake Management"*



**Big Lake  
Lake Management District  
2006 Year End  
Report**

## **Introduction**

Big Lake is located 5 miles southeast of Mt. Vernon and about 25 miles south of Bellingham. At 520 acres it is one of the largest freshwater lakes in Skagit County. Big Lake has a mean depth of 14 feet with a maximum depth of 23 feet. The lake systems watershed covers 22 square miles. Big lake is fed by several inflows, the largest, Lake Creek, comes directly from Lake McMurray. Six additional unnamed tributaries are located along the western shore. Big Lake drains to the Skagit River via Nookachamps Creek.

The property owners at Big Lake have long been proactive in the management of this important water resource. In the mid 1990's, the community recognized the impact that an invasive aquatic weed, Brazilian Elodea, was having on the system. They banded together and implemented an Integrated Aquatic Vegetation Management Plan (IAVMP). The community also formed a Lake Management District (LMD) to provide dedicated funding for ongoing operations on the lake.

Aquatechnex has been involved with the community on this project since its conception. We were contracted by the community through Skagit County Public Works to develop the IAVMP. We also were selected to implement major portions of the program over the past number of years. Previously, the lake has been treated with Sonar Aquatic Herbicide to significantly reduce the amount of Brazilian Elodea present in the system, and yearly treatments with Reward Aquatic Herbicide to continue to focus on the problem.

This report will summarize work performed in 2006 for the District.

In the spring of 2006, the Skagit County Public Works Department determined that the type of contract entered into with Aquatechnex needed to be modified. That process took the majority of the spring and summer of 2006 to accomplish.

## **Contract Issues**

During the spring of 2007, the Skagit County Public Works Department made two determinations that impacted the work at Big Lake during the 2006 season. The first of these was a decision that the type of contract entered into with Aquatechnex was not consistent with County policy and criteria. As a result, the contract had to be cancelled and a new contract entered into that did meet those

criteria. In addition, it was determined that the LMD should pay for staff time and other costs incurred by the County in the management of the District. As such, the dollar amounts available for lake management activities also had to be reduced.

The contract issues were resolved by late summer, 2006. At that point, Aquatechnex began operations on the lake.

## **Mapping and Assessment**

Our first step was to mobilize a mapping team to the lake to determine current conditions. Our mapping team used a Lund 16 foot vessel equipped to perform this work. Aquatechnex biologists used a combination of mapping methods to quantify conditions in the lake.

Data collection was performed using the Washington Department of Ecology's aquatic plant sampling protocols and a Trimble GeoXT DGPS receiver and data logger. The GPS system was programmed with a data dictionary with the plant species we expected to find in Big Lake, as well as extra species placeholders in the event we discovered additional species present. This allows the biologist to rapidly and accurately record the exact sampling location and the species present at those locations.

The Ecology protocols call for the use of a rake sampler at a number of points throughout the littoral zone of the lake. We established a number of sampling sites along transects perpendicular to the shoreline. The vessel navigated to these transects and performed data collections. The two sided rake was tossed and retrieved bringing aquatic plants present at that location to the boat. These were noted and the species collected recorded in the GPS data logger by species.

Collecting this information at set points allows for the team to navigate back to those exact locations in subsequent years and perform the same collection. This allows for change detection and trend analysis over time.

In addition to using this quantitative method, we also noted the presence of various species between sampling points on a paper map for use in developing aquatic plant coverage maps.

Our mapping laboratory has upgraded to ArcGIS 9.2 software for the 2006 season. This software has a number of capabilities and ease of use not available in previous versions and allows us to work in a more seamless fashion with other data providers. The Skagit County Public Works Department provided a more recent aerial image of the lake to use as a backdrop layer for display of map conditions.

The aerial image provided by the County was used as the first layer in this year's mapping efforts. GIS software allows the user to display and analyze spatial data as it occurs in nature. The data collected in the Trimble unit were downloaded in the lab. Using Trimble's Pathfinder Software, this data was processed. Differential correction processing is a step that provides submeter accuracy for the points collected in the field. The export utility was then used to create ArcGIS shapefiles for export and use in the GIS system. The shapefiles for the aquatic plant survey points were brought into and displayed in ArcGIS. The dominant species at each sampling point was queried and displayed.

The attached map shows the conditions of the aquatic plant communities during the summer of 2006.

Conditions in the lake remain much as in previous years. The levels of Brazilian Elodea are reduced and being kept in check. This plant is present around the southern basin of the lake and more sporadically in the northern basin of the lake. The majority of this species is in deeper water outside of the dock line with a few exceptions. The inshore areas are to a large degree colonized by the native pondweed *Potamogeton nodosus* or American Pondweed. This species while native can form dense mats that may impact water use locally. Deeper water areas in the north basin are colonized by *Potamogeton illinoensis* or Illinois Pondweed. This growth is not considered to be problematic at this point and provides good cover for fish and food for waterfowl.

The map created this year has a number of layers. The first layer is the aerial image background. We believe having a recent aerial image helps people view and understand the conditions relative to their location on the lake. The second layers are the sampling points along transect lines with the dominant plant present. This provides a visual reference to the distribution of plant species trends in the lake. The next layer shows the shapes of the plant communities in the lake. This information is used to calculate acreages and focus treatments. The last information layer present is the location of the outlet from the lake and the 400 foot buffer required by the WA Department of Ecology permit. This

# Big Lake 2006 Aquatic Plant Coverage

## Legend

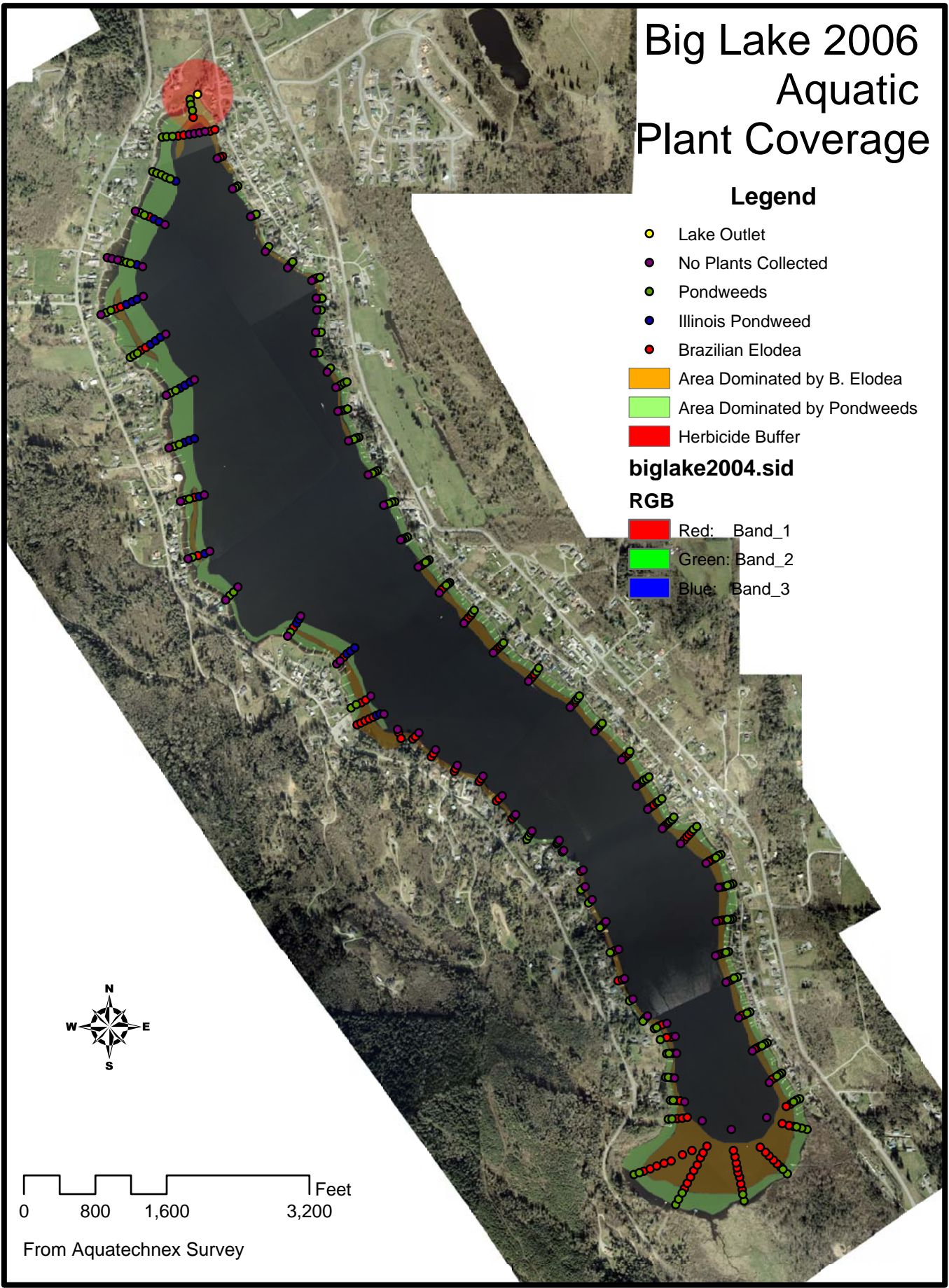
- Lake Outlet
- No Plants Collected
- Pondweeds
- Illinois Pondweed
- Brazilian Elodea

- Area Dominated by B. Elodea
- Area Dominated by Pondweeds
- Herbicide Buffer

**biglake2004.sid**

### RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3



0 800 1,600 3,200 Feet

From Aquatechnex Survey

displays the areas of the lake that aquatic herbicide use is not currently permitted.

## **Submerged Aquatic Weed Control**

The aquatic herbicide permit program in Washington State has been in turmoil for the past few years as a result of lawsuits filed by environmental groups. This past summer saw the introduction of a new NPDES permit in Washington State. This permit is good for five years and has been secured for this project. There is a yearly fee that Ecology assesses for this permit of \$338.00 (currently).

This permit still has some problematic conditions in it. There are fish timing windows for example that limit what we can do in Big Lake specifically until July 15<sup>th</sup>. Reward can not be applied to target Brazilian Elodea until after that date. This herbicide does not impact fish and we have appealed this condition. We have a hearing on that matter in late March at the Pollution Control Hearings Board.

In addition, the US EPA issued guidance and a final rule this past month that NPDES permits are not required for the application of these products. We have attached this to the report for your review. We will be meeting with Ecology on December 21<sup>st</sup> to hear a presentation on how this affects their permit program. There is specific state law that requires Ecology to terminate the need for NPDES permits if EPA issues this type of ruling and they have. We will be updating the LMD's through Skagit County staff after this meeting.

While we did finalize the aquatic plant mapping on the lake late this summer, two conditions caused us to advise against treating submerged plants this year. The first of these is the reduction in the budget. The second issue was the late summer approval of the new contract. Reward is the product used for this work under the current program. This herbicide is a contact product; it controls the vegetation in the water column and provides seasonal results. Given the timing of the contract late in the summer allowing work to begin and the fact that results would not carry over or benefit the lake residents next year because of the mode of action of the herbicide, we thought it would be best to use those limited treatment dollars next summer.

## **White Water Lily Control**

There are a number of spots around the lake where *Nymphaea odorata* or Fragrant Water Lily are present. This plant is on the state noxious weed list and this plant can cause impacts on water use and habitat. We did recommend that a treatment be performed for this species and the LMD approved this effort.

Our team performed the required public notification to the lake shore residents 10 days prior to this application. The treatment was performed using Rodeo Aquatic Herbicide. This product has the active ingredient glyphosate and it translocates throughout the plant. Rodeo is applied as a liquid spray directly onto the lily pads. A surfactant is used to help the herbicide penetrate and move into the plant.

## **Thoughts for 2007**

We will communicate the results of the December 21<sup>st</sup> meeting with Ecology if there are issues that positively or negatively affect this project. The more important meeting in our mind will be the hearing we have on removing the timing windows for aquatic herbicides treatments. Aquatic herbicides affect the biology of these target plants and each product has an optimum performance window with respect to the life stage of the plant. The applications should be timed around those windows to get the maximum benefit of the product against the target weed. These fish timing windows delay treatment beyond the optimum performance window for Reward. While the herbicide still works, in some cases it might not work as well as it would have a bit earlier in the summer. Reward has no impact on fish, our contention is the timing window is arbitrary and not necessary and we hope to convince the Pollution Control Hearing Board of that in March.

We suggest doing the coming year's survey and mapping effort in early to mid June. We have upgraded our field mapping equipment so that we can take ArcGIS and your project files directly to the lake and amend them as conditions dictate. This will increase the turn around time on maps and recommendations. We would recommend that in addition to other meetings the LMD may want over the winter, that we develop recommendations for treatment and present those maps right after the survey effort for discussion and approval.

On approval of our treatment recommendations, we will organize to be on the water and make the appropriate applications as soon as permitted.

We have also re-organized our territories and assigned Curtis McMillan to by the Aquatic Biologists charged with the portion of Washington north of Seattle. This will provide the County and the LMD with one point of contact that is focused on fewer lakes. In past years, we have operated from three offices in this state and move crews and equipment back and forth as needed. This new regional effort will have teams based here that are responsible for a smaller territory and this should improve communications and work flow for your benefit. Terry McNabb will remain in an oversight capacity as well.

Questions about this report should be directed to Curt at 360-508-1276 or [cmcmillan@aquatechnex.com](mailto:cmcmillan@aquatechnex.com). Thank you for your consideration.