BIG LAKE, SKAGIT COUNTY 2011

1/12/2012

Big Lake – Year End Report 2011

Prepared by AquaTechnex, LLC.

Big Lake, Skagit County 2011

Introduction and Project Overview

Big Lake is located approximately 5 miles southeast of Mt. Vernon, Washington in Skagit County. The lake is 520 acres in size and is the largest lake within Skagit County. The average lake depth is 14 feet with the maximum being 23 feet. The Big Lake watershed drains 22 square miles and is fed by several inflows – the largest of which being Lake Creek flowing out of Lake McMurray which lies to the south.

The residents of Big Lake have been proactive in the management of the lake for some time. In the 1990's Brazilian Elodea (*Egeria densa*) was identified in the lake. This plant is on the state noxious weed list and can easily expand and negatively impact a water body. In response to the discovery, the community formed a Lake Management District and completed and Integrated Aquatic Vegetation Management Plan (IAVMP). The LMD allowed for the community to tax themselves for the management of this important resource and the funds are facilitated by Skagit County.

Eurasian Milfoil (*Myriopyllum spicatum*) has also been identified in Big Lake. This species of noxious weed is also on the state noxious weed list (Class B). It is a submerged plant which is known to grow to depths of 20 feet, will form dense mats along the surface of the lake and has been implicated in the drowning of several people in Washington State. Though it was identified in only a couple isolated locations in the lake, it is continually monitored and is treated aggressively wherever it is located.

AquaTechnex has been involved with the community on the management and care of Big Lake since the LMD was formed. Our team was involved in developing the IAVMP by

request of the County. Over the past several years we have been involved with the survey and treatment of Big Lake. This has included the use of Sonar herbicide to reduce the population of Brazilian Elodea in the lake as well as annual treatments to further reduce the impact of this plant, nuisance weed control, and monitoring for introductions of new noxious weed species.

Survey Methods

The objective of the annual survey is to determine the extent and coverage of the aquatic plant community in Big Lake and to identify the locations and densities of any aquatic plants currently on the state noxious weed list. The survey focuses on the littoral edge of the lake to map the extent of floating and submerged aquatic plants.

Our survey crew followed the protocol which has been in place for many years and has been successful in monitoring the plant community in Big Lake. We maintain a file set up in ArcGIS that includes all the previous years' information and sampling locations. This information is kept on a Panasonic Toughbook in the field which is linked to a sub-meter GPS receiver to display the location of the mapping vessel in real time. This method makes it very efficient to move from one sampling site to the next where data is collected from year to year.

The first survey attempt for Big Lake was completed on June 22nd. AquaTechnex biologists mobilized to the lakes to begin the season's work. To perform the survey, a 16 foot Lund mapping vessel equipped with ArcGIS mapping equipment including a Trimble ProXT GPS receiver and Panasonic Toughbook running Trimble GIS mapping software was mobilized to the lake.

Prior to arriving at Big Lake, past mapping efforts were reviewed in order to gain an understanding of previous plant community composition. This is important so more useful observations during the survey can be made as to shifts in plant communities. The survey team navigated the shoreline mapping surveying transects at regular intervals around the lakes noting the conditions present. At these points the species collected were noted, overall dominance was determined, along with the estimated percent of bottom covered. This data was entered into the database at each data collection point.

The survey team also noted the plant community characteristics throughout the lake as they moved from location to location. This field data was brought back to our offices, processed to increase accuracy and used to create maps and a summary report for the County and District which documented the current conditions and listed recommendations for control. From this survey data, a treatment map was generated based on where excessive plant growth was occurring and anywhere Eurasian Milfoil was found.

Survey Results

The following findings were noted during the aquatic plant survey in 2010:

- Eurasian Water Milfoil (*Myriophyllum spicatum*) was identified growing at the southern end of the lake and along the western shoreline.
- Native aquatic plant populations seem to be what could be considered "normal".
- Fragrant Water Lily (*Nymphaea odorata*) populations appear to be increasing in some locations and continue to expand along the southern end of the lake.
- Dominant species include Elodea (*Elodea canadensis*), Large-leaf pondweed (*Potamageton amplifolious*), Najas (*Najas sp.*), and Chara (plant-like macro algae).

Treatment Recommendations

The 2011 season was more "normal" in terms of the weather patterns experienced. Nuisance native plant growth seemed to be slightly less when compared to previous years. The Eurasian milfoil populations seemed to have expanded quite a bit from 2010. The locations of the milfoil in the lake fell into two basic situations – growing in a more "monoculture" situation with no direct homeowner impact and in a dense, mixed plant community along a heavily populated shoreline (west side). In addition to the nuisance plant treatments, all of the locations which were identified as containing EWM were slotted for treatment.

The recommendations provided to the County and District included a focus on management of nuisance submerged aquatic vegetation along portions of the shoreline

with specific attention given to those locations where the milfoil was found growing in dense native growth. It was recommended that the milfoil location at the south end be treated with a granular systemic herbicide – Renovate OTF. This product is designed to impact the entire plant root and all, resulting in its complete death. The nuisance zones are to be treated with a contact herbicide – diquat dibromide. There were several locations along the western shoreline where both dense native growth and Eurasian milfoil were present together. Our recommendation was to treat with a contact herbicide only in these situations. In order to control both the EWM and nuisance plants, the choice to use contact herbicides only was made in an effort to provide clearing of the plants from the area because an application made for milfoil only would not affect the native plants, and using both would have possibly diminished the results from any systemic applications.

The outflow on the north end of the lake was protected with a buffer zone extending outward which was not included in the treatment areas.

Treatment Implementation

Before any chemical applications were completed, the NPDES permit requires notification of the public. This notice is distributed to all shoreline residents and businesses adjacent to the treatment areas. This notice was distributed on June 27th. Included on this notification was a link to a blog site set up specifically to convey information related to the treatments and other activities for those who have access to the internet. A copy of this notice is included at the end of this document.

On July 20th, AquaTechnex biologists mobilized to Big Lake and completed the required shoreline posting in order to perform the treatments. Due to the size and extent of the treatment area the public notice was distributed to the residents the day prior to the treatments taking place. Doing this allowed for the residents to have an additional window to utilize the lake for irrigation purposes prior to the water use restrictions being in place.

Our team returned on the 21st to perform the herbicide applications. The Eurasian Milfoil treatment zones were treated first. After this treatment was completed the treatment boat returned to the boat launch and was retooled with the appropriate equipment to

deliver the liquid herbicide. Applications to the pondweed treatment areas were then completed. A follow-up survey was performed three weeks post treatment and all treatment areas experienced excellent or total control of pondweeds.

A boat-mounted liquid injection system with weighted drop hoses was used to navigate the lake and treat the pondweeds on Big Lake. An eductor system was utilized to apply the granular herbicide to treat the Eurasian Milfoil at the south end.

Future Thoughts and Considerations

Eurasian Milfoil has expanded quite a bit in Big Lake in 2011. Though the population at the south end seems to be kept in check, expansion along the western shoreline has continued. Plants were found about midway along the west shoreline, south of the Fish and Wildlife operated boat launch. Because the EWM plants were treated with a contact herbicide in 2011 it can be assumed that these plants will be able to regrow from their root crowns and will be present in 2012. It is our recommendation that the 2011 survey map be utilized to create treatment maps for an early season application of systemic herbicides to these plants. This aggressive approach has been used by our firm in other lakes with very good success. The annual survey can be completed a few weeks after this application to assess the treatment as well as identify other locations in the lake which may require treatment.

There are additional noxious weeds present in Big Lake. They include Fragrant Water Lily as well as Yellow Flag Iris. Left alone, either of these aquatic plant species can crowd out native plant species growing adjacent to the infestations. Yellow Flag Iris is a shoreline species which grows in similar locations as cattail species. Fragrant Water Lily is a floating leaf plant that produces the common “lily pad” we are used to seeing. Though the expansion is generally slow, this plant species will crowd out native Nuphar plants and can easily block out access to the main lake from the shoreline. We would recommend that these species be mapped and monitored. If at all possible, a treatment program can be started to begin to put these invasive species in check.

AquaTechnex has continued our relationship with the Mapping Network in order to produce high quality bathymetry maps at a very reasonable cost for the lake groups we work with. This process involves collecting data from the lake and processing that

information to create extremely accurate lake maps. AquaTechnex biologists would travel to the lake with our bathymetry mapping vessel. This system links a Trimble GPS data logger with sub foot accuracy with a hydro acoustic depth sounding system with 0.2 cm accuracy. This system is calibrated to collect a GPS location and depth attribute every two seconds.

This process can be repeated at intervals that make sense to the community and the change of depths or sediment loading rate are then obvious and can be measured. These maps have value to lake managers to calculate exact water volume and to track sedimentation. They may also have value to lake residents to help them understand structure and habitat to increase their enjoyment while fishing. The current bathymetry map likely dates back to the 1960's. This mapping is something that is available and should be considered by the LMD.

Attached Documents

Copy of the Public Notice distributed to all shoreline residents.

Survey maps created for Big Lake.

Aquatic Herbicide Treatment
Business and Residential Notice

Distribution Date: June 27, 2011

Big Lake will be treated with Aquatic Herbicide. Treatments will take place on or about the week of July 18th, 2011 (weather dependent). Additional treatments will occur in two week intervals.

Product(s) planned for use: Renovate OTF* Granular (Active ingredient Triclopyr): Do not use treated water for irrigation until levels reach below 1 ppb which is generally 3-5 days post treatment. The Department of Ecology has established a 24-hour swimming advisory for this product. Reward (Active ingredient Diquat): Do not use treated water for irrigation of turf for 3 days, food crop irrigation for 5 days, no drinking for 3 days, no livestock or domestic animal (cats and/or dogs) watering for 1 day. Aquathol (active ingredient Dipotassium salt of endothol): Do not use water from the treated areas for watering livestock, for irrigation or domestic purposes for 14 days after the application; the Department of Ecology advises no swimming in the treated areas for 24 hours. ; 2,4-D: Do not use for irrigation until levels drop below 100ppb, no potable water use until levels are below 70 ppb, no additional use restrictions for fishing or other domestic uses, the Department of Ecology has established a 24-hour swimming advisory for this product within the treatment areas ; and AquaPro (active ingredient: Glyphosate) No restrictions on the use of water for irrigation, recreation or domestic purposes.

The location of the treatments will be the littoral zone of Big Lake.

Treated and potentially affected areas will be posted *the day of* application. The signs will describe any water use restrictions.

If you are withdrawing water for potable or domestic use, livestock watering or irrigation and have no alternative water source. Please contact the applicator Aquatechnex, LLC at 360-508-1276 to arrange an alternative water supply.

If you would like to request additional notification prior to treatment, or have further questions, please contact AquaTechnex using the information above. You may also visit our web site at www.aquatechnex.com, the customer service section/knowledge base for additional day of treatment information. Additional information and updates on water use restrictions related to this treatment can be found at:

http://biglakelmd.wordpress.com.

This herbicide treatment is regulated under a permit from the Washington Department of Ecology. Permit number WAG - 994113

Big Lake Survey Points 2011

Big Lake Milfoil 2011

Big Lake Treatments 2011