

The logo for AquaTechnex features the company name in a bold, sans-serif font. 'Aqua' is in blue and 'Technex' is in black. A thick, curved orange line arches over the text from the left side.

AquaTechnex

*"Advancing the Science
of Lake Management"*

A vertical photograph of a scenic landscape. In the foreground, a calm lake reflects the surrounding environment. A patch of bright green grass grows on a small island in the water. The middle ground is filled with a dense forest of tall, dark evergreen trees. In the background, a large, rugged mountain peak is covered in snow under a clear blue sky.

Lake McMurray 2006 Year End Report

Introduction and Project Overview

Lake McMurray is a 160 acre lake situated in the Water Resource Inventory Area 3 (WRIA 3). This zone is the lower Skagit County WRIA. The lake is in the headwaters of the Nookachamps Creek tributary to the Skagit River. McMurray has a mean depth of 29 feet and maximum depth of 52 feet, with a watershed of about 3.25 square miles draining into it. The shoreline is roughly 50% developed on its western and southern shorelines, with a majority of the eastern shoreline undeveloped forestland.

Awareness of the residents of Lake McMurray started up in the mid 1990's, when expanding populations of aquatic weeds began their take over of the littoral regions of the lake. Eurasian water milfoil is presumably thought to have been introduced via the public boat ramp. This invasive species will rapidly replace native aquatic plants and form dense colonies that impact a number of beneficial uses of a lake. This weed can also alter a number of water quality parameters critical to fish and wildlife. Knowing of a rising issue, the community approached Skagit Counties Lake Stewardship Program for assistance in addressing the issues at hand.

Skagit County went to work on the project, hiring consultants and county staff to collect all pertinent information towards an effective Integrated Aquatic Vegetation Management Plan (IAVMP) for McMurray. The plan was finalized in 1999 for review and distribution. The IAVMP described Eurasian water milfoil as the number one problem for the lake, noting that the current plant population has caused an excessive deterioration in the quality of the lake and its value to the community. As it was required by the State Department of Ecology to attain an IAVMP prior to grant application, the county was now ready to secure funding. The community used the IAVMP as the basis to also form a Lake Management District which was needed to acquire funds for implementation of proposed objectives listed in the IAVMP.

The first step the community took to aggressively attack the non-native Eurasian water milfoil was to perform a lake wide Sonar treatment in 2000. Sonar is a systemic herbicide that is non-selective and extremely effective on lake wide treatments. Sonar essentially robs the plants ability to produce chlorophyll and the plant essentially starves itself to point of mortality. This noxious weed dominated large areas of the littoral zone prior to the 2000 treatment. As the

plant goes through the life stages it tends to slowly 'weed out' native submersed aquatics and remain dominant towards the final stages of colonization. As it was seen to be beyond means of other management tools, the Sonar treatment was the best fit program at the time. The treatment was extremely successful and diver surveys over the next few years confirmed that this weed had been eradicated from the lake.

The Sonar treatment combined with a native plant takeover during the milfoil lifecycle left the littoral region sparse of aquatic life post treatment. During the years following a large scale Sonar treatment, native aquatic plants start to recover rapidly as they no longer have to compete with the milfoil for space, light, and nutrients. Present day Lake McMurray shows healthy stands of native aquatic species in most regions of the littoral zone. At some point, these plants may become a nuisance as well as you will see a shift to dominant native submersed plants that will thrive provided no competition.

Aquatechnex, LLC has been under contract with the Lake McMurray LMD and working with Skagit County on this project since the spring of 2000. The initial contract was to perform the Eurasian milfoil Sonar treatment, following up with extensive surveys every year after to look for any remaining milfoil plants. There were to be two diver surveys each year hunting for milfoil as well as mapping current stands of aquatic plants around the lake. A provision of the contract granted permission to remove any and all milfoil plants spotted in the surveys. Up until 2005 this task was performed. The summer of 2005 consisted of two surveys one being a full scale aquatic plant mapping survey. This consisted of submersed, emergent, and floating leaf plants. Later that summer a crew went out to visually survey for any milfoil that would have made its way towards the surface, nothing turned up.

Work in 2006 was delayed by the County due to a need to re-issue the contracts for all County LMD projects. The contract and work were approved to start in July and the work authorized to begin was the annual survey of the lake for Eurasian Milfoil and other noxious aquatic weeds.

Survey and Mapping Methods

The sole intention of the 2006 mapping project was to build additional data to the 2005 maps and locate any milfoil in the system. With this in mind, a

crew was assembled to the lake and proceeded as follows with both surveying and mapping protocol.

The survey team used a Trimble Geo XT hand held differential global positioning system device (DGPS) and data logger to support the collection of sample points. Prior to going into the field a data dictionary was loaded to the device. The crew used last years dictionary for McMurray and consisted up the following drop down menus:

Elodea

Fragrant Water Lily

No Plant Zone

Pot 1-4 (Pondweed species)

Eurasian water milfoil

Coontail

Note (any additional species.) Recorded as note and data recorded in boat.

Default feature settings were established for each feature on the Trimble Geo XT. The logging interval was set for one second. This function directs the receiver to collect a GPS signal at one-second intervals. The accuracy default was set for 'code'. The default minimum number of positions collected for each feature was set for 10. Display symbols and colors were also selected and set. The data dictionary (file name Lake McMurray.ddf) was then transferred to the Trimble using a docking station and the Pathfinder Data Transfer Utility. An image of Lake McMurray was also transferred using the prior utility to provide a visual reference of the survey teams location on the lake. The coordinate system used for this geographic site was UTM Zone 10 North and the Datum was NAD 1983 Conus.

The survey took place on August 19, 2006. Aquatechnex biologists traveled to the lake, launched the mapping vessel and prepared for survey operations. The Trimble was initialized and the Terrasync software used for data collection was opened. The native plant survey commenced as follows;

At each survey point, the crew used a sampling rake and methodology developed by the Washington Department of Ecology to collect plant samples (Parsons, 2001). The Trimble unit has a built in Windows CE operating system and when combined with the Terra Sync software, allows display of the background aerial image and the location of the unit geographically referenced to the collection point. The boat operator utilized these tools to navigate from

site to site. At each sample station, a double sided rake was thrown 15-20 feet from the boat on both sides attached to a 50 ft. rope. Each time the rake was brought aboard, all species present were noted into the Trimble. Using the menu selection, the survey team recorded each species attribute as it was identified. The final step was a quick visual run between sampling sites to ensure most of the littoral zone was covered during the survey. Any outliers were noted and stored.

Post survey results were then transferred to a desktop computer for displaying of the data to the end user. The trimble sits in a cradle and is connected through a USB cord. Once hooked up, the desktop recognizes the field unit and a rover file is transferred into Pathfinder software for data correction. Differential correction takes place to create sub meter accuracy of individual points. This is done by contacting a base station for the correction file. A common one that we use in this region of Washington is based out of Thurston County. Using an export feature from Pathfinder, the files were converted into shapefiles and were then available to be brought into Arc View for analysis and mapping.

Results and Discussion

Lake McMurray has sustained yet another year without the presence of Eurasian water milfoil! This is the sixth consecutive year of no milfoil and is something that the LMD should be extremely proud of. Proper knowledge and efforts by the state to create awareness of aquatic hitchhiking has done its part thus far. It is still of utmost priority to continue efforts in locating the noxious weed should it find a way back into the Lake McMurray system. In conclusion to this, it should remain a top priority for the district and county to continue efforts towards a milfoil free Lake McMurray.

***Potamogeton crispus* (Curly-leaf pondweed)**

The 2006 survey showed no signs of curly leaf pondweed this year as well. The 2005 survey showed two sites situated in the southeast corner of the lake right as the tree line gives way to developed property. This plant, should it establish itself, has a very unique growing habit worth mentioning. Curly leaf sprouts from turions formed by a previous generations plant in the late summer and fall. The majority of these sprouts then grow to about six inches in length and over

winter in an evergreen state. In the early spring, these plants grow rapidly to the surface much earlier than many of the native submersed plants. They then form multiple turions per plant and often drop from the water column adding these turions to the bank in the sediments to drive future growth. Over time, these plants form thick dense mats that impact beneficial uses of the lake and degrade water quality. The treatment strategy should be to target the plants and turions in the early summer time. If left alone, this dominant plant has tendencies to take over littoral space similar to milfoil growth patterns. As this plant is now on the state noxious weed list, it is of priority to document its existence in the lake and treat where necessary.

***Nymphaea odorata and Iris pseudacorus* (White Water Lily and Yellow Flag Iris)**

These two shoreline species are on the state noxious weed list. During the 2005 operations on the lake, the White Water Lily growth was targeted. The Yellow Flag Iris growth in the outlet channel was also targeted that year.

This year's survey and discussion with the homeowners indicates that the channel treatment has met the goal of reducing the impact of this weed on the outflow from the lake. There should be an ongoing evaluation on the need to perform this application. Yellow Flag Iris is a class C noxious weed, and while it is on the state's list, it is not mandatory to remove.

The survey found that the presence of White Water Lily growth was significantly reduced throughout the treatment areas on the lake. This should also be evaluated with respect to the need for additional treatments in 2007.

Native Plant Species

Native plant stands have not changed significantly over last year's observations. The dominant native submersed weeds in Lake McMurray remain as follows;

- ~ *Elodea Canadensis* – common elodea
- ~ *Potamogeton foliosus* – leafy pondweed
- ~ *Potamogeton nodosus* – longleaf pondweed

- ~ *Filamentous algae*
- ~ *Chara*
- ~ *Najas* – Southern Naiad
- ~ *Ceratophyllum demersum* - Coontail
- ~ *Nuphar polysepalum* – Spatterdock – Native Lily

There may be other species in the lake system. If present, these species are at low enough levels not to be detected by our survey methods. Most of these are likely less dominant and being driven out by the more dominant native species in the lake.

We did not observe areas where the density of these weeds was having a significant impact on water use by the lake's residents. Populations of problem elodea seem to have been reduced significantly along the west shoreline. This may be due to the aggressive use of the weed cutting equipment the community has available for residents around the lake.

Recommendations for 2007

Now that the contract has been set, we would recommend the aquatic plant survey take place in mid June this coming year. We have invested in a new mapping system that allows us to take ArcGIS into the field and edit map files real time. This will significantly improve the time between data collection and report creation. Doing the first survey in that time frame will allow us to make recommendations on the state of the problem growth in the lake so the County and LMD can make decisions regarding treatments if needed.

We are re-organizing our operations to assign a regional manager to each area we operate in. Curtis McMillan will be in charge of day to day operations on Skagit County Lakes during the 2007 with support from Terry McNabb. Curtis and his team will be working from our expanding Bellingham Office. This should lead to improved communications.

In addition to a winter meeting (if requested) to review the 2006 efforts, we would like to schedule the 2007 survey work so that County staff and/or LMD members can be present. We would also like to schedule a meeting with the LMD approximately one week after the survey work is performed to review the results and discuss any treatment recommendations that result from that survey.

The permit to apply aquatic herbicides for the lake has been secured from the Washington Department of Ecology. This permit is good for four more years. There is an annual fee required by Ecology. This fee period is their fiscal year from July 1st through June 30th. This fee has to be paid to them regardless of whether or not treatment takes place. The ecology fees have been paid by Aquatechnex and will be included in the year end billing for this current period. Ecology will be invoicing for the next period close to the July 1 date next summer.

If there are any questions regarding this report, please address them to Curtis McMillan.

Curtis McMillan

CSR Aquatechnex, LLC. phone # 1-360-508-1276

e-mail; cmcmillan@aquatechnex.com

Lake McMurray 2006 Survey

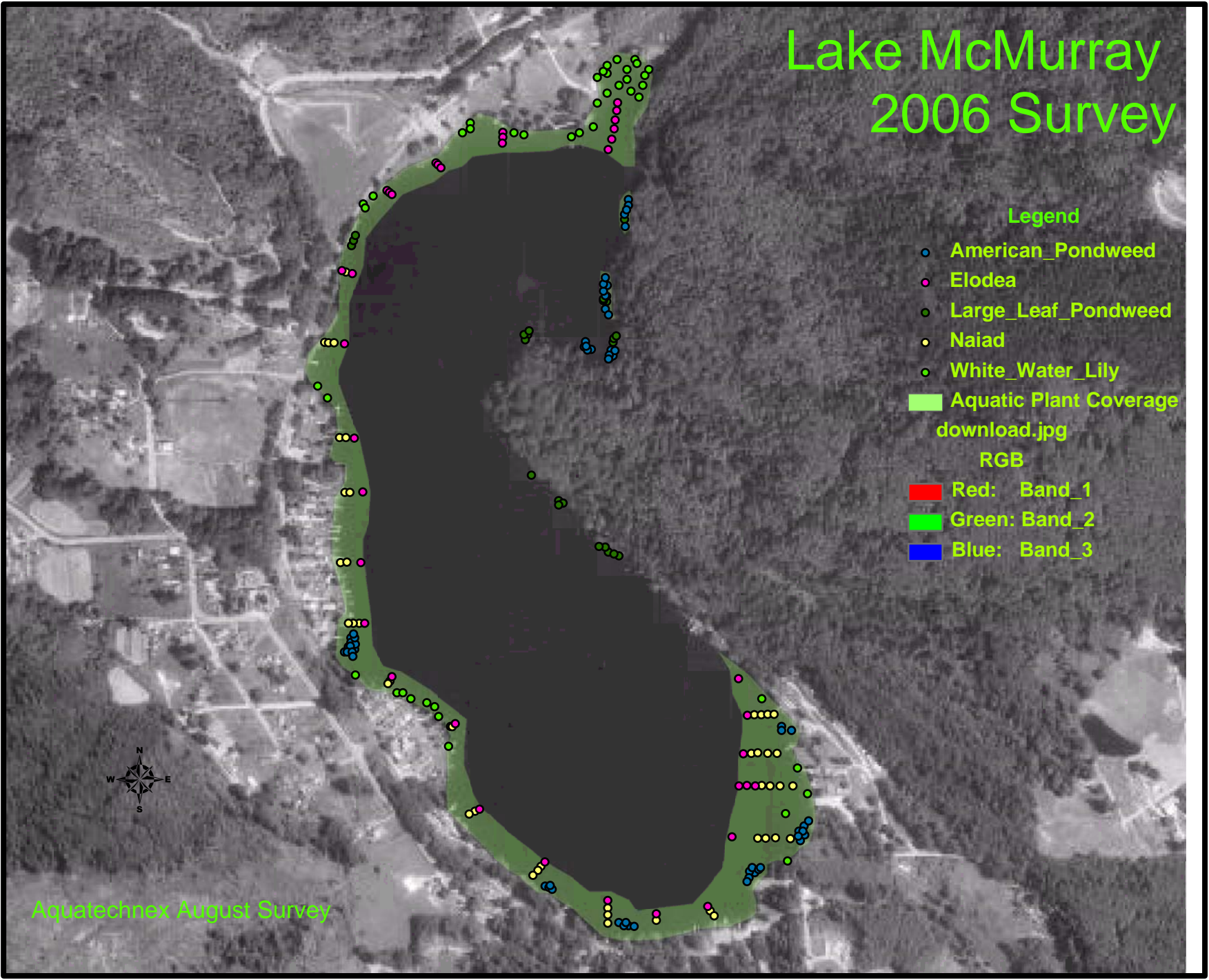
Legend

- American_Pondweed
- Elodea
- Large_Leaf_Pondweed
- Naiad
- White_Water_Lily

Aquatic Plant Coverage
download.jpg

RGB

- Red: Band_1
- Green: Band_2
- Blue: Band_3



Aquatechnex August Survey