

2017 Beaver Lake Aquatic Weed Control Program

Prepared for

**Beaver Lake LMD #4
Skagit County Public Works
Mount Vernon, Washington**

Prepared by

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Project Overview

This was Northwest Aquatic Eco-Systems' (NWAE) sixth year of providing aquatic weed control services for the Beaver Lake LMD #4. During our first contract year (2012) no applications were performed as concerns related to the proposed treatments were researched. Beaver Lake has been actively involved with a program to eradicate noxious aquatic macrophytes from the system. Targeted species include Eurasian watermilfoil and *Nymphaea odorata*. Native plant growth extends outward beyond the 15 foot contour line but plant density and range has decreased considerably over the last three years. There are no immediate shoreline residential homes. A vast majority of the shoreline is comprised of commercial use as pasture for grazing livestock. The lake supports limited swimming and recreational boating but does support a very healthy recreational fishery. Most all the lake use is associated with fishing activities. Macrophyte decline was first observed during 2014 and has continued through 2017. This reduction in macrophyte growth was noted by both the Washington State Department of Ecology and Northwest Aquatic Ecosystems. No apparent reason for the decline has been identified but the reduction is generally thought to have resulted from poor water clarity.

Some of the information provided in the 2017 report was included in our 2016 report. Current and past information is provided to give the reader the ability to understand the history of the program without requiring the review of all prior years' reports.

Beaver Lake is approximately 73 acres in size and is located outside of Mount Vernon just south of Clear Lake, one mile east of highway SR-9. The lake is open year round for fishing supporting a largemouth bass, black crappie, yellow perch, coho and cutthroat species fisheries.

During 2017, the Beaver Lake NPDES permit was updated by the Washington State Department of Ecology. The new permit requires that a wetland biologist survey the lake shoreline for the sensitive species *Carex comosa* (bristly sedge) at the beginning of any treatment year.

2017 was the first time our crew was required to call the Sheriff's department to a job site in an effort to ensure the safety of the employees. The team was threatened by a bass fisherman during a planned treatment event stating that he would blow our heads off and blow up the truck if we didn't cease operations immediately. The Sheriff arrived at the site and charges were filed against the citizen.



Survey Protocol

This year NWAEE again incorporated the new state of the art surveying equipment in an effort to produce a survey that could easily be understood by all reviewers. Prior to 2013, surveying consisted of manually retrieving weed samples from numerous locations lake-wide while observing growth through the water column. Although effective, this method only identifies the plants within the immediate area sampled. Past surveys employed a surface vehicle shadowing the weed bed borders and collecting data points corresponding to small or large occurrences of plants. If the lake bottom was void of plants, no data was stored. The survey boat typically spends the entire survey within the lakes littoral zone while completing the task. Data points are then assembled as a map layer, which are then incorporated, into the project file.

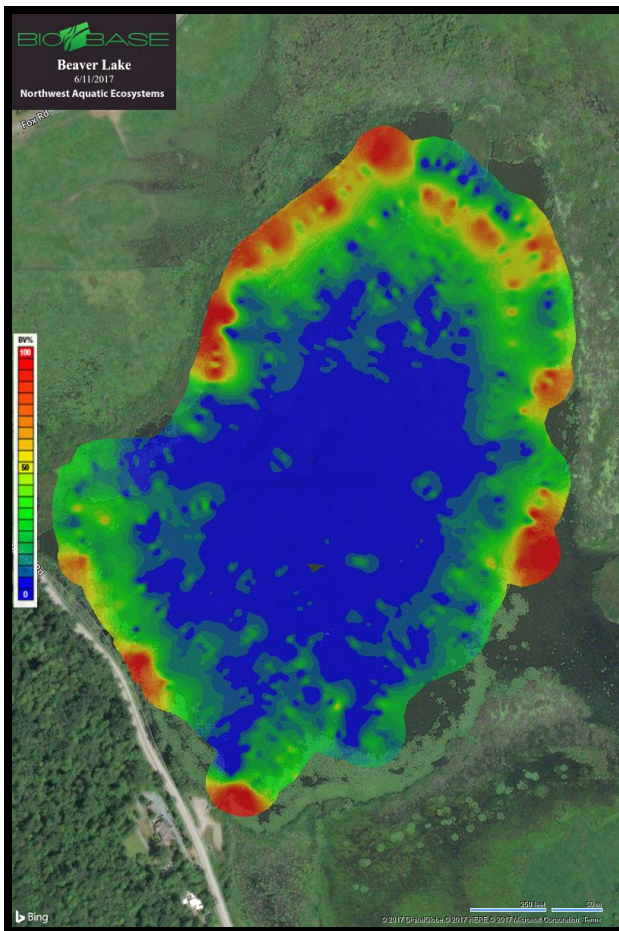
At the onset of 2013 and continuing annually, sonar data was collected utilizing specific transducers and bottom scanning equipment. Upon data collection, the SD card is uploaded via cloud based technology and the processing of the data is completed. The resulting product is a color-coded map of the lake bottom identifying weed growth areas and plant densities. Not only is a well-defined map produced but a sonar log of the survey is saved allowing a complete review and evaluation of the survey to occur in house. The sonar log allows the consultant the ability to view all plant growth along the boats survey track. When nonnative milfoil species were identified, a milfoil specific data point was added to the transect line.

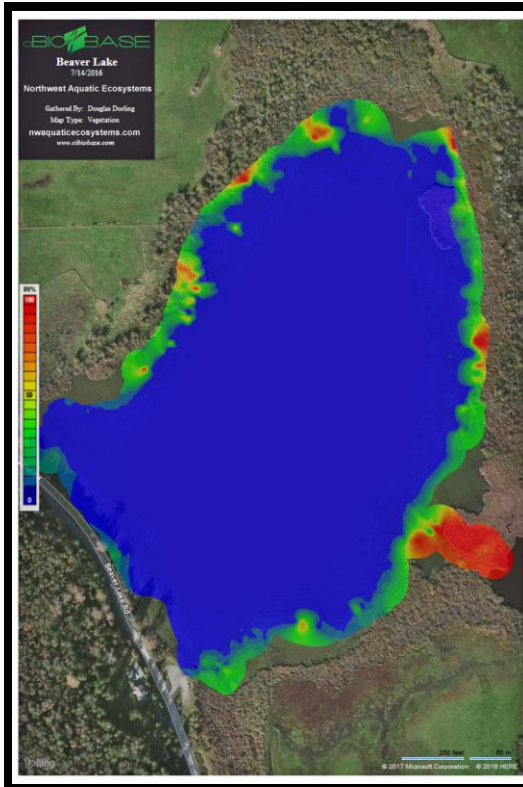
The survey boat started collecting data circling the immediate shore. Once the initial shoreline pass was completed, the boat moved outward approximately 50 to 100 feet for

each successive pass. The survey was completed once the entire 73 acre lake basin was transected. Before leaving the site, boat survey “tracks” were reviewed to ensure that the entire lake basin was surveyed and the integrity of the survey was recorded.

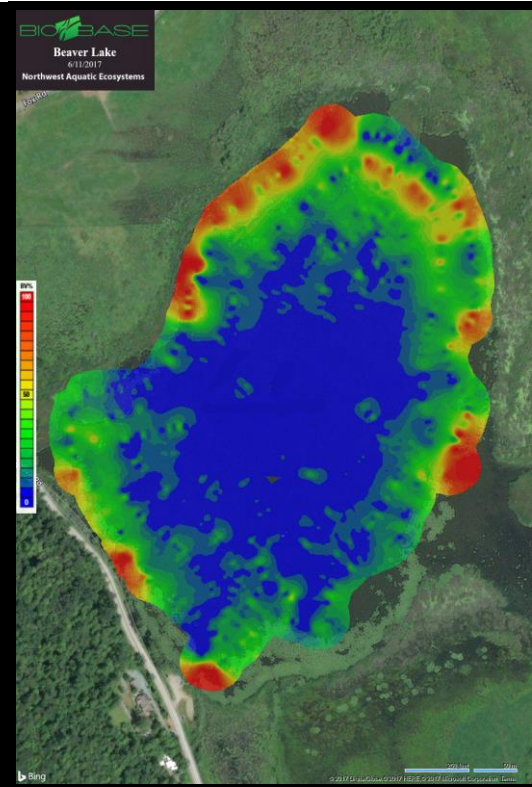
Beaver Lake Pre-Treatment Survey Results

Beaver Lake was surveyed on June 11, 2017. Macrophyte growth had increased from the 2016 survey. This was an encouraging sign since the survey was performed approximately one month earlier than 2016. The increased weed growth resulted in the inability of the survey boat to transverse the entire lake area as boat access was denied at several locations. Milfoil growth was sparse probably as a result of last season’s treatment. Fragrant water lily infestations were similar to those noted in the past with infestations identified within areas that had been historically treated. Native pondweeds dominated the survey throughout the littoral zone with both elodea, najas and ceratophyllum species exhibiting dominance in isolated locations within the northeastern section of the lake.

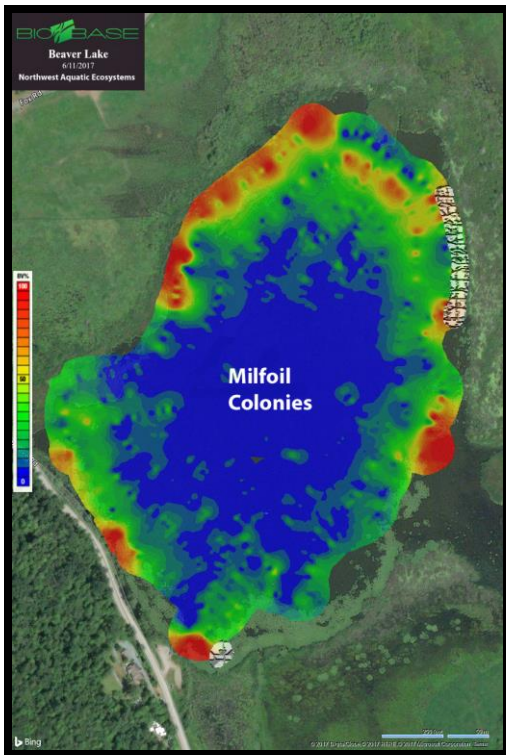




Spring 2016



Spring 2017



Treatment

Beaver Lake received treatment on August 16, 2017. The treatment was initiated then stopped and then continued later in the day after the Sheriff's department arrived. We were informed that since their marine unit had not yet arrived at the site they could not guarantee our safety if we decided to continue to work. After waiting for the marine unit to arrive, we decided to continue our work schedule but avoid the bass boat who the sheriff was unable to communicate with. They were not authorized to be in our boat or use our boat as a result of a Skagit County liability policy issue. NWAE completed the task at hand in those areas not being utilized by the bass fisherman. As we completed the task and were about to leave the site, the bass fisherman returned to the boat launch and was confronted by the sheriff. Approximately one acre of the lake was treated for milfoil control while lily pad treatments were less than ¼ acre. Products selected for use did not prohibit grazing cattle from drinking lake water during or following treatment. Distances of the proposed treatment sites from potential lake access points would likely result in no material drifting into potential grazing shoreline locations after considering dilution. Both glyphosate and 2,4-D were selected as the control agents.

Shoreline posting was conducted on the day of treatment. Posting consisted of two large signs secured at the boat launch. These signs were removed and NWAE returned to the site later in the day and replaced the signs that were torn down. There are no residential homes on the immediate shoreline. Material was offloaded and transferred into a single 25 gallon spray tank mounted on the application boat. Containers were triple rinsed on site and returned empty back into the truck.

Once the appropriate amount of material for submersed weed control was added to the 25 gallon tank, lake water was then added to fill the tank to the twenty five gallon level. The resulting mixture was then metered into the lake water via an injection manifold. Weighted hoses were used to place the material at the appropriate depth in the water column. Prior to treatment, a lake treatment map identifying treatment areas was downloaded into the onboard GPS system. The boat utilized the onboard GPS to identify treatment targeted sites. When floating plants were sprayed, the 25 gallon tank was filled with lake water, then herbicide and adjuvant were added directly into the tank. Once mixed, the application boat drove throughout the littoral zone identifying targeted plants and the spray mixture was discharged using a spray gun.

Milfoil plants were treated with Alligare 2,4-D Amine at a rate of 7.5 gallons per surface acre. Lily pads received a 1% solution of glyphosate sprayed directly onto the floating plant surfaces.



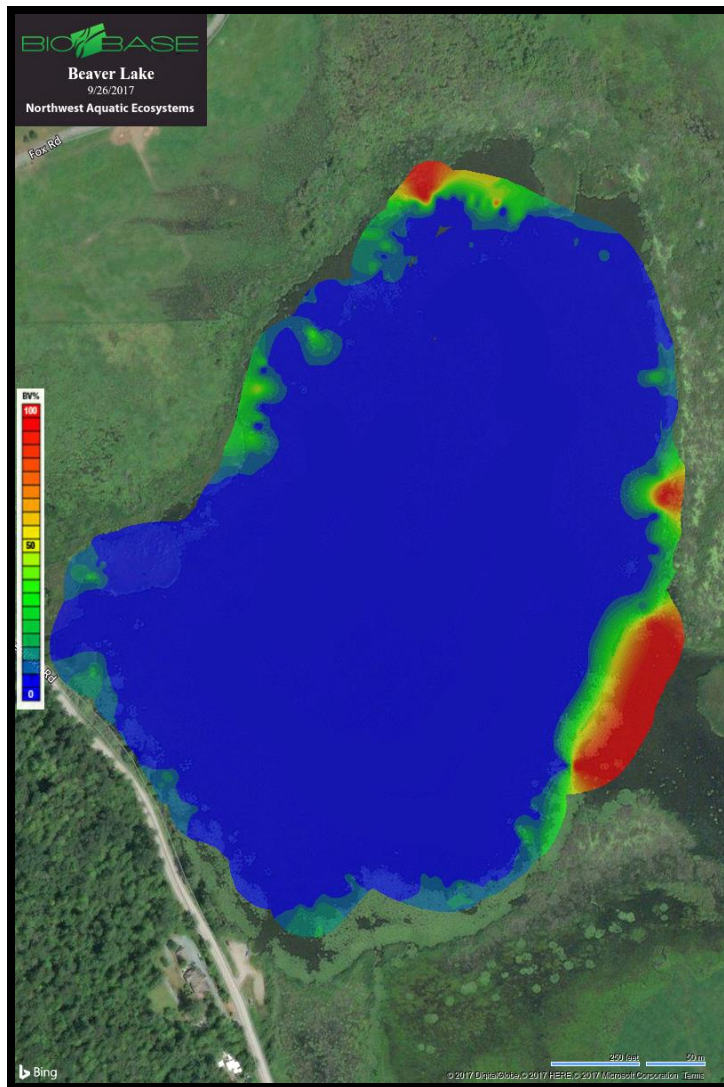
Signage posted at Public Access

Fall Survey

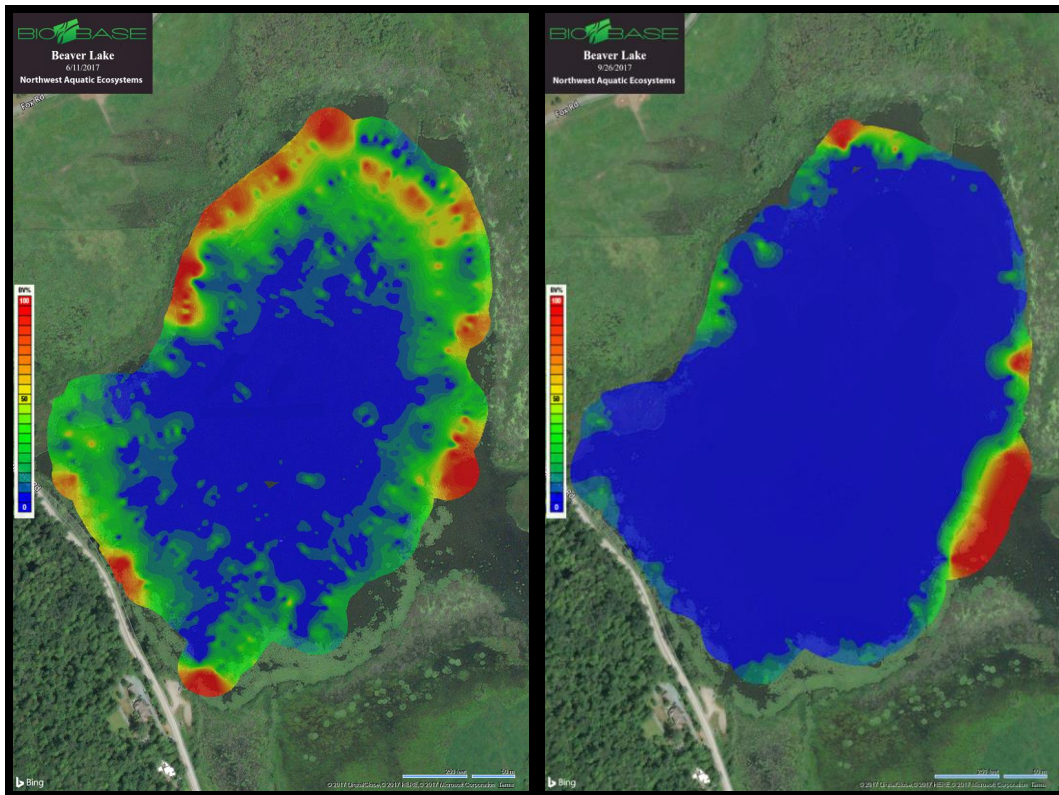
The fall survey was performed on September 26, 2017. Weed growth as noted in prior years once again experienced a considerable reduction in plant densities throughout the lake. At the time of the survey a severe algae bloom was in progress. NWAE is unsure as to when the bloom initiated or how long the bloom had been in progress prior to the survey. The reduced water clarity may have resulted in plant decline lake wide. No milfoil plants were noted. However, this task was difficult to complete because of the poor water clarity and access associated problems.



This reduction in native plant growth is unusual since the materials used to control milfoil is specific to the milfoil species only and has no impact to native plants. One can only conclude that this reduction is associated with some type of environmental condition that occurs regularly at Beaver Lake. Likely causes could be associated with poor water quality or a fungus/virus that is attacking the plant community.



September 2017



Spring 2017

Fall 2017

Recommendations

1. Permit guidelines that mandate leaving 50% of the shoreline untreated for native vegetation control should never pose a problem simply because no residential homes exist on the lake and the lake is mainly used for fishing purposes. Good fisheries often consist of lake waters that maintain a wide distribution and variety of macrophytes. All of the noxious species present in Beaver Lake can be targeted with materials that are specific only to those species. Any concern directed at dense native weed growth noted in prior years should no longer be a concern since natural occurrences over the past two years has substantially reduced such growth. The local fisherman and the Department of Fish and Wildlife could probably best evaluate native weed growth concerns as they may be raised by lake users. The LMD should avoid control alternatives targeting these species.
2. There remains a need to continue the efforts to eradicate noxious species from the lake. Current milfoil plants are sparse and isolated but still inhabit the same lake areas as noted in the past. With the reduction of native plant growth lake-wide, areas once inhabited with native plants may soon become infested with milfoil. The shallow nature of the lake provides excellent habitat for this to occur rapidly. If high water levels prevent early season treatment then a late season application would appear to be in order. The amounts of material required to control the current

infestations still remains relatively small. Materials selected for use do not restrict grazing livestock from utilizing the lake water as a water supply during treatment.

3. Property owners and the LMD need to work together in an effort to ensure treatments occur and livestock is protected. Property owners need not simply adopt a “no treatment” philosophy without first considering the long term health of the lake. Property owners should coordinate pasture use with potential treatment schedules. At the very least, those shoreline areas where no livestock access is possible should be available for treatment.
4. Continue to evaluate property owners concerns and provide information that supports the position and the program format of the LMD. If research suggests that the LMD needs to reevaluate the program then such data should be reviewed.
5. Continue utilizing the new mapping technology. This technology provides an easily defined map that can be used as baseline data as lake conditions change. Past mapping was successful in documenting native weed population decline since 2014.
6. Coordinate an early wetland survey for the presence of *Carex comosa*. Once the survey is completed Ecology will need approximately 45 days to review the survey and comment. A consultant needs to be retained that is not associated with the project. Such a survey could cost between \$2,000.00 and \$5,000.00.



Carex comosa