

**Lake Campbell and Lake Erie
2020 Aquatic Plant
Control Program
LMD #3**



Prepared for:

Lake Erie & Campbell LMD #3
Skagit County Public Works
Mount Vernon, Washington

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Project Overview

This will be Northwest Aquatic Ecosystems' eleventh consecutive year providing services to the Lake Erie and Campbell waterways. Some components of the prior year reports have been incorporated into the 2020 report. Management objectives have always focused on noxious weed activities as such species have been targeted first to reduce their appearance lake-wide. Native plants (pondweeds & niad) pose similar recreational hazards as the noxious macrophytes within the Lake Erie system resulting in yearly partial control of these species when funding is available. Such native species are not yet prevalent within Lake Campbell. However, in recent years, native species have begun to exhibit encouraging signs of expansion lake-wide. Northwest Aquatic Ecosystems (NWAE) has learned over the years that Lake Erie requires at times only one early submersed weed treatment and during some years an additional late season application is required. Lake Campbell during the past years has shown an increase in the native plant community component of the lake's ecosystem but unfortunately the lake during 2020 exhibited a concerned expansion of milfoil that was noted during the fall 2019 survey. Funding for native weed control was reduced as a result of the expanded milfoil control required at Lake Campbell.

During the spring, Lake Campbell milfoil colonies were observed lake-wide along most of the shoreline areas. This explosive growth was not anticipated even though the 2019 surveys identified problematic milfoil present. In conjunction with the milfoil expansion noted at Lake Campbell, Lake Erie also exhibited a minor patch of milfoil residing within a small section of the northwest shoreline at one residential property.

Survey Protocol

Survey techniques for 2020 were identical to those utilized during prior surveys. The methodology is now an industry standard. Macrophyte data was collected utilizing wavelength specific transducers and bottom scanning equipment. Once collected, the SD card was uploaded via cloud based technology and the processing of the data was finalized. During the survey when milfoil plants were identified, their locations were noted along the transect line and their GPS coordinates were recorded. Each milfoil data point was identified by a red dot. The result is a color-coded map of the lake bottom identifying weed growth areas, plant densities and milfoil locations. 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 affords you the ability to view all plant growth along the boat's survey track. This new protocol avoids the possibility of missing plants between bottom survey data points.

Data is collected by a survey vehicle transecting the lake along the littoral zone. Boat tracks are designed to be approximately 100 feet apart. To ensure the efficacy of the survey, a bottom sampling rake was thrown from the boat at various locations lake-wide. The rake was then drawn across the lake bottom, brought to the surface and into the boat. Plants attached to the rake were identified and confirmed as being the same species as

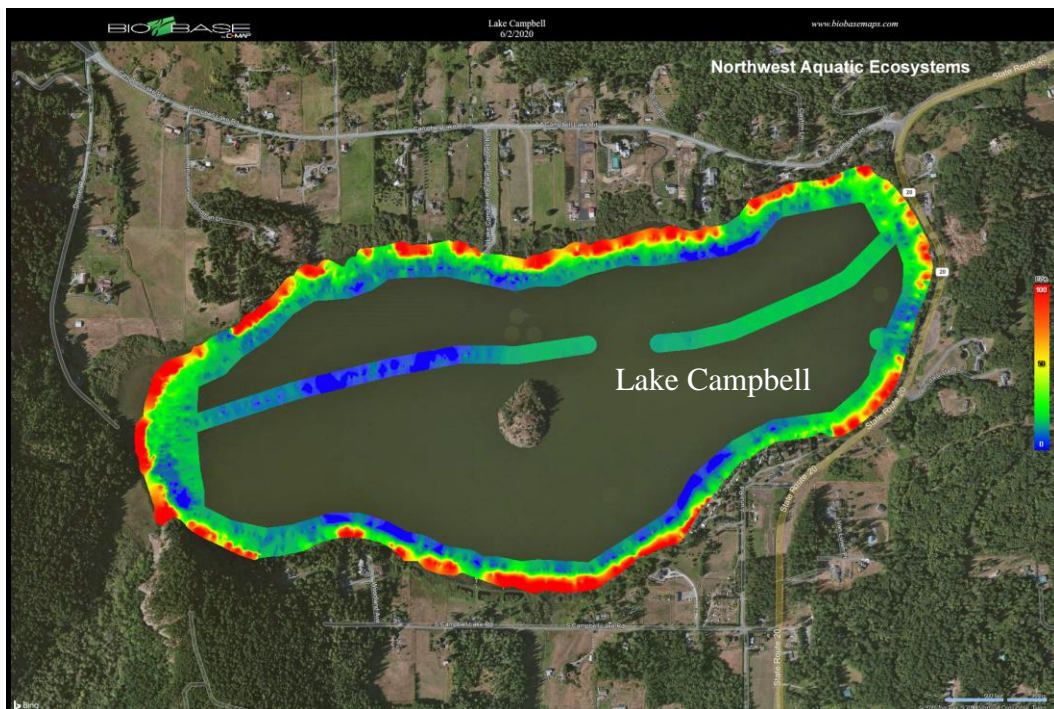
noted through the structure scan or visually through the water column. The system automatically calculates maps and stores the position of every data point.

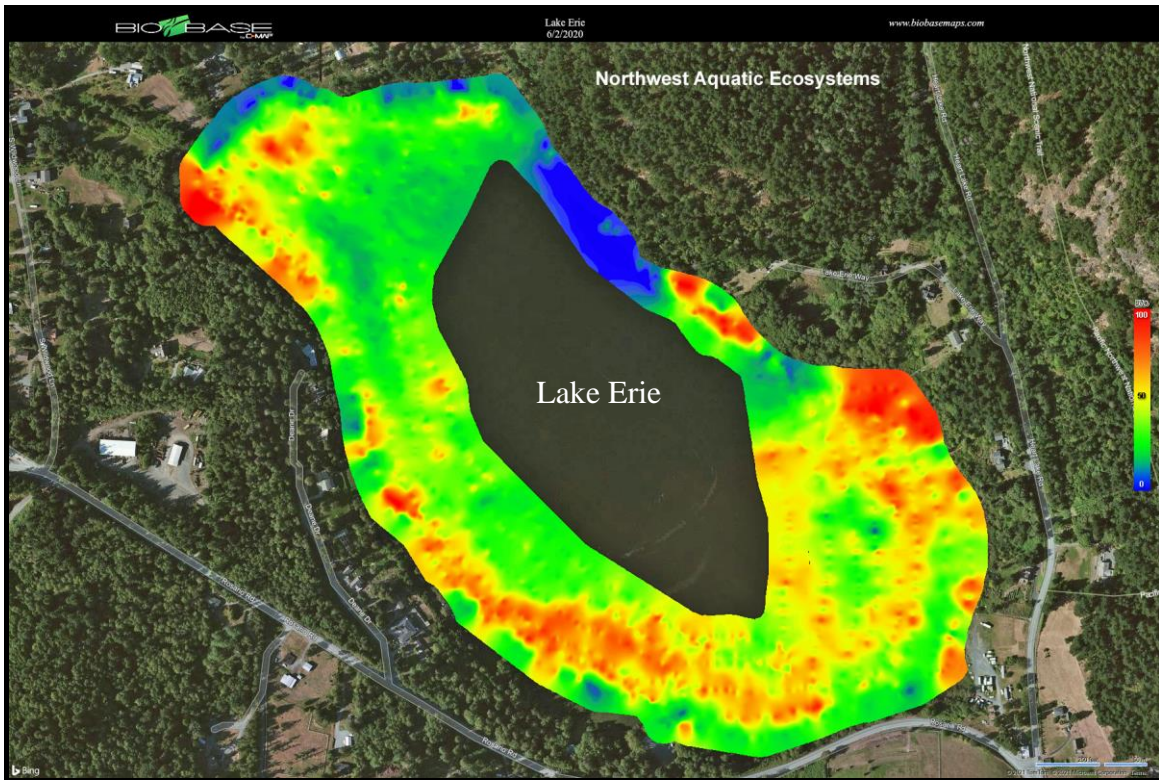
Lake Campbell Pre-Treatment Survey Results

Lake Campbell and Erie were both surveyed on June 02, 2020, during the same time frame as last year's 2019 survey (06-04-19). Historically all surveys have been conducted within the early June survey window. Lake Campbell exhibited considerable milfoil growth along the lake's shoreline perimeter lake-wide. The fall 2019 Lake Campbell survey identified likely targeted sites for 2020 as a result of the growth identified during that survey. The extensiveness of the noted late growth requiring treatment exceeded the 2019 budget as a result of the native weed treatments undertaken at Lake Erie. It is unclear as to what factors resulted in the unusual heavy growth observed during the spring 2020 Lake Campbell survey.

Lake Erie supported typical lake-wide native weed growth similar to surveys conducted in the past. Native plant growth consisting of thin stemmed pondweeds and najas was light but still occupied most of the lake bottom, particularly areas that supported growth in prior years. Najas is still the dominant low growing species while thin leaf pondweed occupied the upper regions of the water column. No species had yet reached the water's surface. The 2020 survey did however identify new milfoil resurgence within the northwest corner of the lake. For many years, this section of the lake was left untreated as requested by the homeowner. Recently, this property changed ownership and now treatments are ongoing.

Macrophyte Survey 6-02-2020







Residential Lake Campbell Milfoil Pond Inspection

These pond sites are inspected every year for milfoil growth. If milfoil is identified, treatments are scheduled to coincide with the main lake body treatment. No milfoil was identified at either location. Numerous native species were identified.

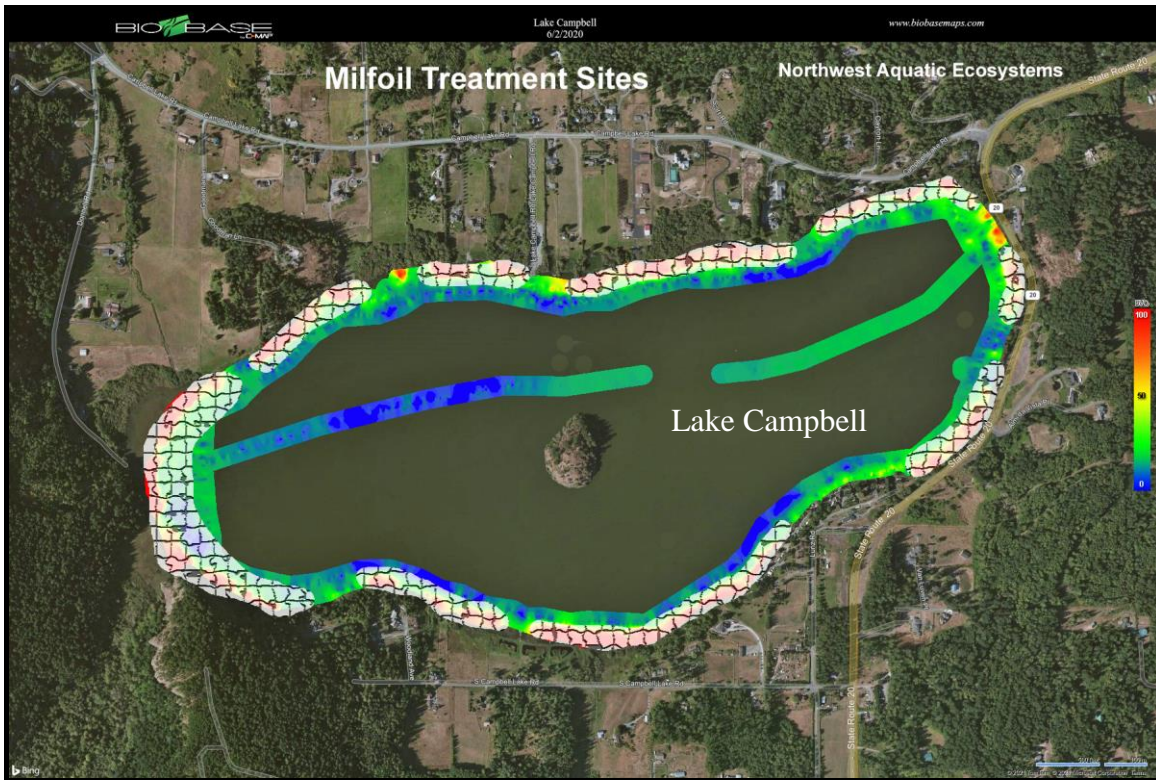


Lake Campbell Treatment

Lake Campbell was treated on 8-05-20 & 8-06-20. Our later treatment date was selected to ensure that all the milfoil had emerged from the bottom sediments. Past seasons, when early applications were made, only limited milfoil was documented while additional growth emerged just a few weeks following application. Past years have shown that early seasonal surveys typically did not represent the true degree of lake-wide milfoil growth. Historically, late seasonal growth has shown to be problematic and difficult to plan for because of the degree of native plant control required for Lake Erie. The site was posted on the day of treatment. In conjunction with the shoreline posting, the public boat launch was posted with two large signs. Posting at the boat launch was not necessary since the launch was under repair and closed. All postings stated what materials were planned for use and their water use restrictions. A private staging area just east of the public boat launch was employed during treatment. This is the same staging area NWAE has utilized since our involvement with the project several years ago. The site provides easy, safe unobstructed access to the lake. Three herbicides were applied during the application phase of the project. Submersed weeds were treated with triclopyr and diquat while lily pads and spatterdock were treated with a 1% solution of imazapyr. Approximately 81 acres of weeds received treatment.

Material was off loaded from a locked cargo truck and emptied into two 25 gallon spray tanks secured within the application boat. As the boat discharged the material, it was refilled at the staging area. The process continued until all the targeted milfoil sites were treated. Once completed, the boat's tanks were rinsed and filled with a 1% solution of imazapyr. This imazapyr mixture was then discharged targeting spatterdock and lily pad infestations. Boat related issues occurred late in the day on 8-05 and required treatment to extend into the morning of 8-06.

At the time of treatment milfoil growth was extremely heavy with surface mats visible lake-wide. NWAE was not expecting the explosion of growth observed on the day of treatment. Growth pattern did not reflect similar patterns noted during past yearly surveys.



Lake Campbell Milfoil Treatment Sites

Lake Erie Treatment July 08, 2020

Lake Erie was treated on July 08, 2020. Residential and the trailer park native weed treatment sites were reduced from previous years as a result of the increased milfoil treatment required at Lake Campbell. Fifteen acres of native weed control was performed along the residential shorelines and trailer park locations. One acre of milfoil was treated within the northeast quadrant of the lake. Milfoil in this area had already formed a surface mat and was difficult for the treatment boat to pass through. Milfoil was treated with triclopyr while native weeds received a diquat application. Targeted areas except for the milfoil site were nearly identical to the 2019 campaign. The public boat launch was posted with two large signs and the residential shorelines received smaller signs on the day of treatment. Postings noted the materials used and water use restrictions. The larger public access signs identified where the material was applied and what material was utilized. NWAEE staged the treatment from the public boat launch. Materials were injected directly over the targeted weed beds via a boom system designed to disperse the mixture vertically throughout the macrophyte column. The treatment boat was equipped with a GPS system that ensured the application vehicle remained within the boundaries of the treatment zone. Lake treatment consisted of the application of diquat at a one/two gallon per surface acre rate and triclopyr at a 7.5 gallon surface acre rate. All of the residential properties on the lake were targeted similar to 2019.



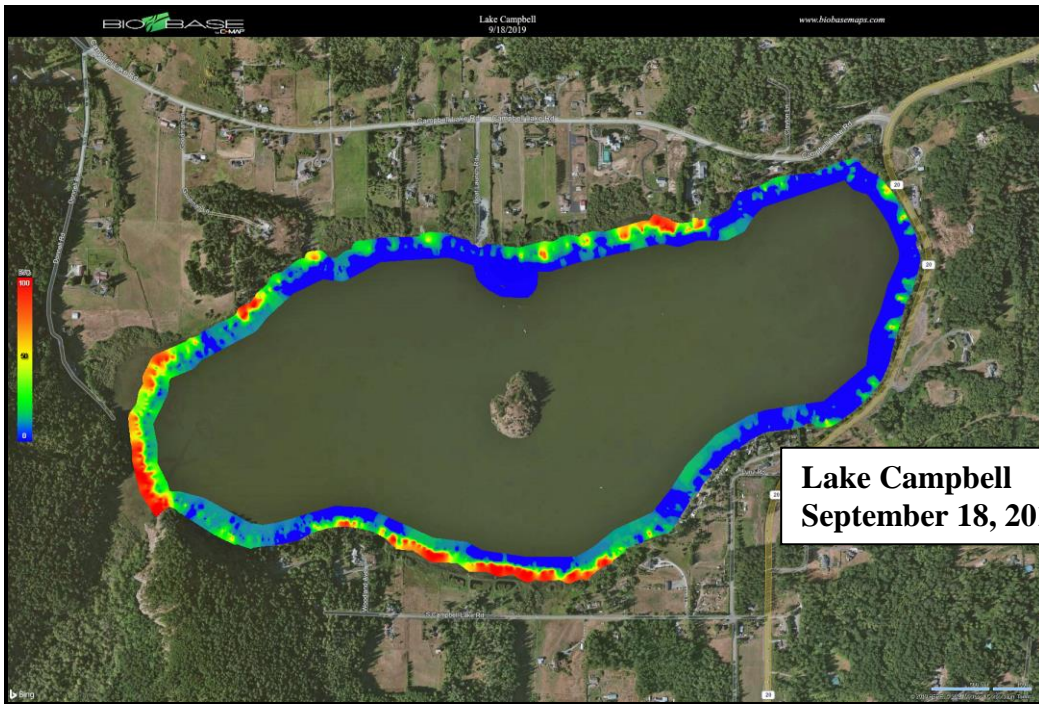
Lake Erie & Campbell Surveys September 30, 2020

Lake Erie and Campbell were both surveyed on September 30, 2020. Both systems were experiencing algae blooms when the survey was conducted. No milfoil plants were identified during the Lake Campbell survey either rooted to the bottom substrate or floating on the surface. NWAEC also had conversation with numerous property owners during the survey focusing on the efficacy of the treatment. All property owners were excited as to how effective the treatment was. Our crew reflected the same opinion. It was surprising to have not observed any milfoil growth post treatment considering the severity of the pretreatment infestation. One explanation may be that other environmental conditions were present that assisted in the control effort because native plants lake-wide were also reduced.

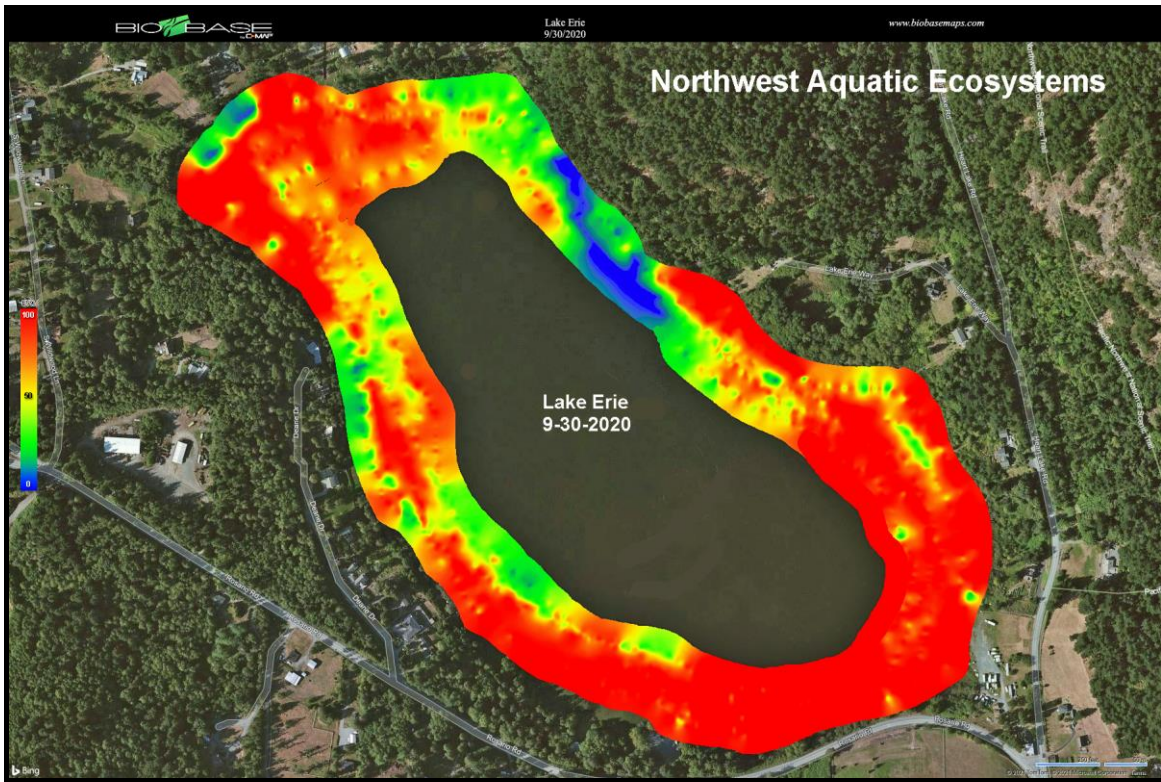
Our Lake Erie treatment was disappointing since a greater amount of milfoil was present post treatment than prior to initiating control activities. Expansion of milfoil resulted in an additional section of shoreline located along the southeastern area of the lake now harboring milfoil growth. Native plant growth was present; however, most of the plants identified during the survey were macro algae and not native submersed species. Our reduction in early seasonal treatment acreage from previous years was noticeable at the close of 2020.



Yearly Observed Density Changes



Lake Erie 2020



Recommendations For 2021

Both Lake Campbell and Erie experienced milfoil outbreaks during 2020. Lake Campbell responded exceptionally well to treatment while Lake Erie supported only moderate success. The upcoming 2021 season will need to focus on the progress Lake Campbell has enjoyed while Lake Erie will require additional attention. Milfoil once again will need to be the main focus at both waterbodies. Program resources will again need to be focused more on milfoil control within both Lake Campbell and Erie. No milfoil was noted within Lake Erie at the close of 2019. However, resurgence of the species during 2020 will require monitoring and treatment. Historically, Lake Erie has required some degree of native weed control on a year to year basis. Such treatment will need to continue but on a smaller scale until funding now required for milfoil control is once again available for a broader native plant control program.

Northwest Aquatic Eco-Systems recommendations for the 2021 season:

1. An aggressive early season milfoil survey directed at Lake Campbell in an effort to determine the extent of any remaining milfoil colonies resulting from the 2020 effort.
2. Early season milfoil survey of Lake Erie to document if any additional milfoil “hot spots” are present.
3. Establish a budget to determine what resources will be directed toward milfoil, noxious weed control and native plant control.
4. Minor targeted control of spatterdock at both lake sites to manage the encroachment of this species into the main basin and along residential shorelines. Control of the noxious species fragrant waterlily, purple loosestrife and yellow iris should continue lake-wide as the budget permits. Limited control of these species was conducted during 2020.
5. Treatment of the problematic Lake Erie native weeds will need to be assessed after the spring surveys in an effort to ensure that adequate budget resources are available to address any potential unexpected milfoil issues.
6. Continue use of the new survey technology. This technology and mapping has proven to provide a broad-based evaluation of the macrophyte communities. Yearly surveys are now capable of providing simple color coded maps reflecting yearly changes in plant densities. Current mapping technology is the industry standard.