

# Lake Campbell and Lake Erie 2022 Aquatic Plant Control Program LMD #3

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Prepared for:

Lake Campbell & Lake Erie LMD #3  
Skagit County Public Works  
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## **Project Overview**

This will be Northwest Aquatic Ecosystem's thirteenth consecutive year providing services to the Lake Erie and Campbell waterways. Some components of the prior year reports have been incorporated into the 2022 report as we have done in the past. Management objectives have always focused on noxious weed activities as such species typically receive priority consideration. Native plants (pondweeds & naiad) pose similar recreational hazards as the noxious macrophytes within Lake Erie and severely impact lake use during summer months. Native species are not yet prevalent within Lake Campbell. However, recent surveys of Lake Campbell have shown an increase in native species and exhibit encouraging signs of expansion lake-wide. Northwest Aquatic Ecosystems (NWAE) has learned over the years that at times Lake Erie requires only one early submersed weed treatment and during some years an additional late season application is required.

During 2022 additional resources were directed at Lake Campbell in an effort to concentrate on the spread of milfoil throughout the shoreline areas of the lake. This increased effort at Lake Campbell permitted only one native weed and milfoil control event to occur at Lake Erie. Perhaps the most devastating season long event that plagued Lake Campbell was a severe blue green algae bloom that basically shut down recreational lake use for most of the summer. The bloom and the extent of the bloom opened new dialogue amongst property owners concerned about how to address the algae issue for the 2023 season.



Water clarity at the time of our early June survey at Lake Erie was very good while clarity at Lake Campbell was poor. A heavy bloom was in progress. What was apparent was that whatever efforts were taken to increase outflow, they appeared to be successful as water levels seemed to be normal. Docks that had been historically submerged at this time of the year were floating on the surface.

## **Survey Protocol**

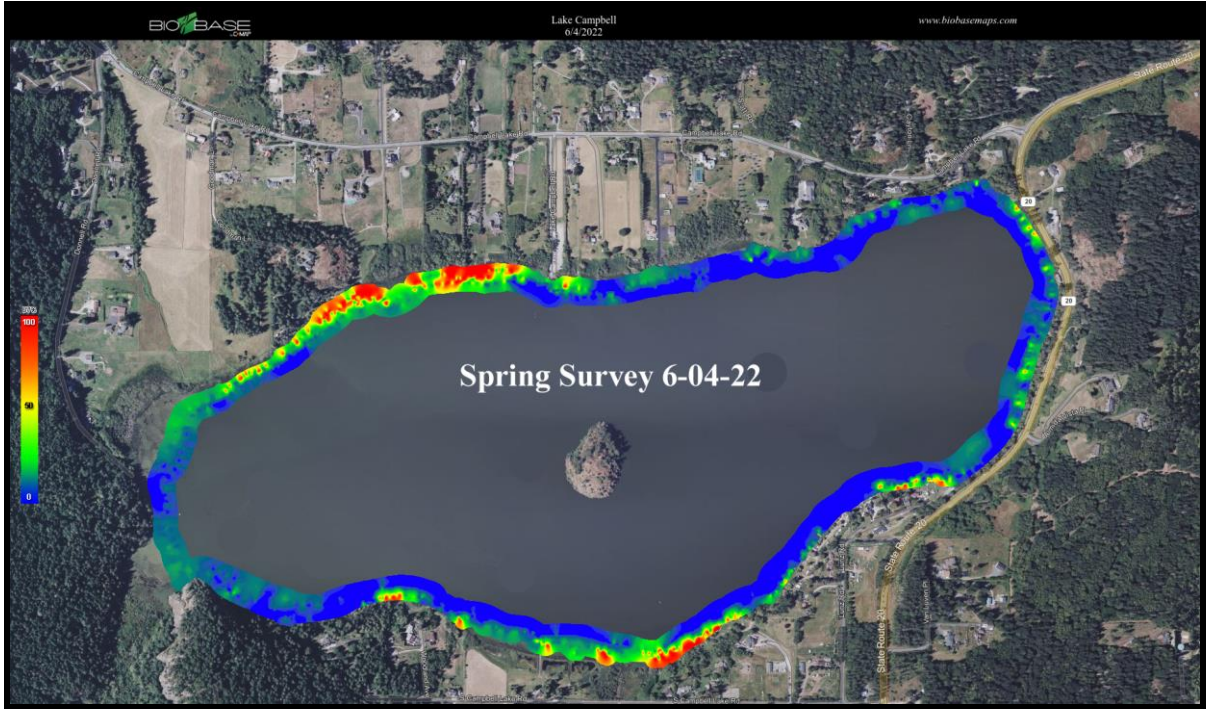
Survey techniques for 2022 were identical to those utilized during prior surveys. Our methodology is an industry standard. Macrophyte data was collected utilizing wavelength specific transducers in conjunction with scanning equipment. Once collected, the data was uploaded via cloud-based technology and the processing of the information 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 away from each other. 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 depths and stores the position of every data point collected.

## **Lake Campbell & Lake Erie Pre-Treatment Survey Results**

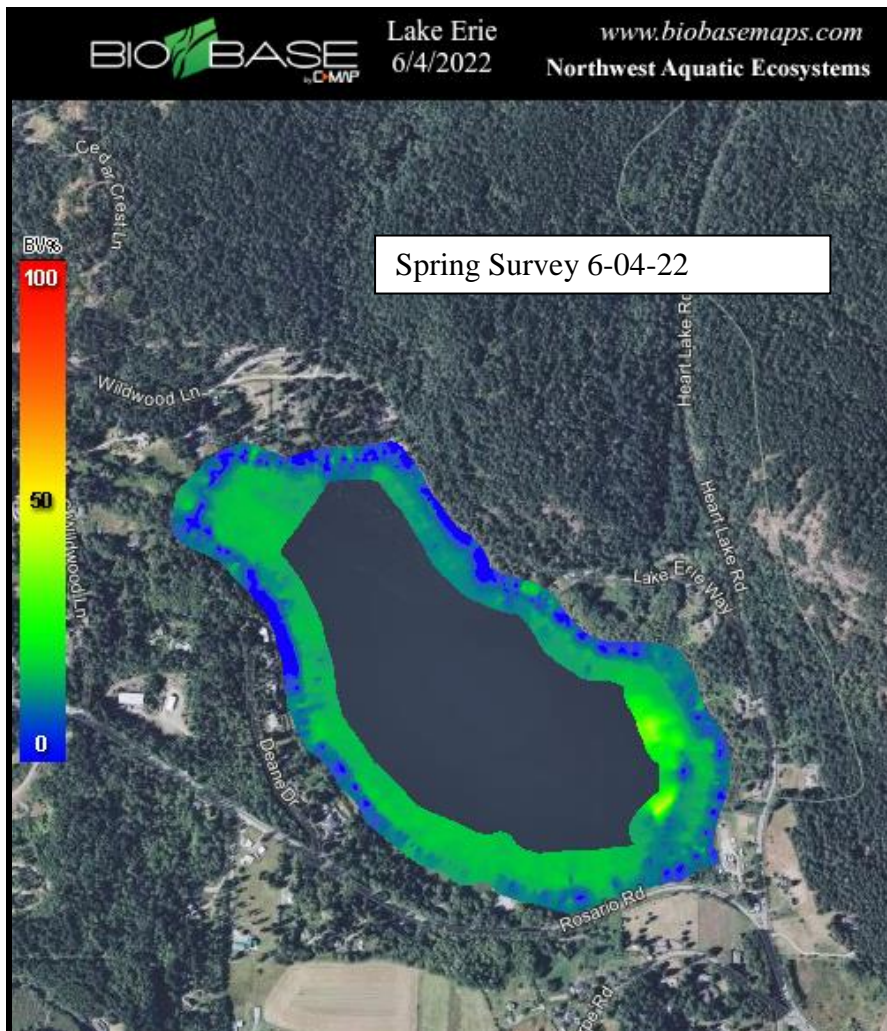
### **Lake Campbell**

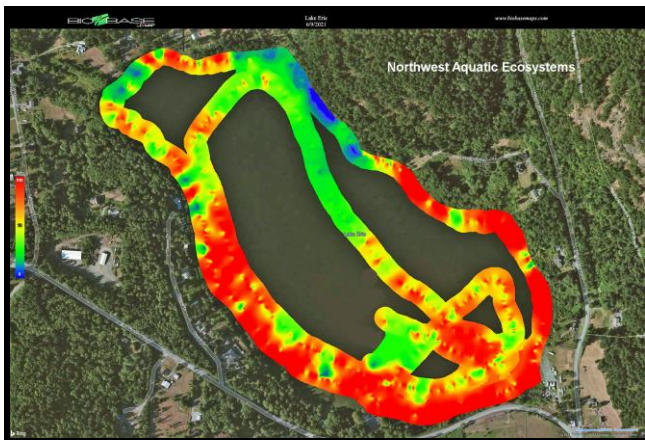
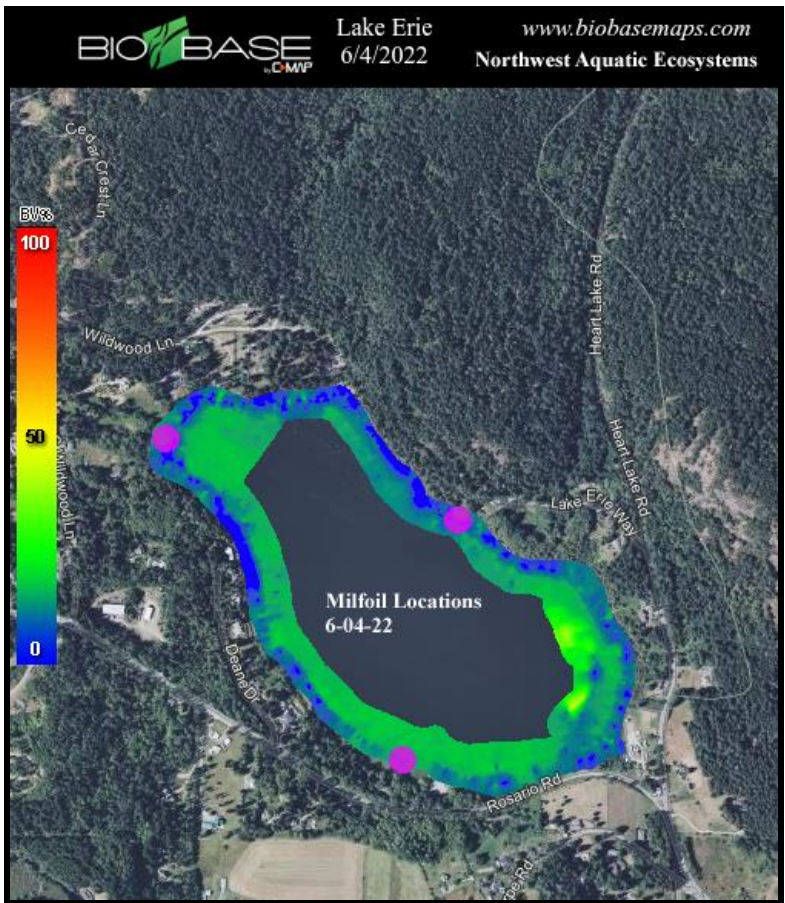
Lake Campbell and Erie were both surveyed on June 04, 2022, within 5 days of last year's 2021 survey (06-09-21). Historically, all surveys have been conducted within the early June survey window. Lake Campbell exhibited reduced milfoil growth as a result of the 2021 treatments. However, two shoreline areas still supported limited plant growth. Plant growth historically has only been identified within approximately 250 feet of the shoreline and the 7 foot contour line. Much of the vegetation noted was bottom growing filamentous algae and thin leaf pondweeds. The extensive milfoil growth noted during 2020 and treated during 2020, appeared to have declined and noticeably decreased growth to only a few shoreline areas lake-wide. Milfoil growth had already surfaced and was detectible along the lake's surface. Milfoil detected west of the public boat launch has historically been a shoreline area that has had seasonal milfoil related issues. Poor water clarity as a result of the algae bloom that was in progress restricted viability to about only 3 feet.



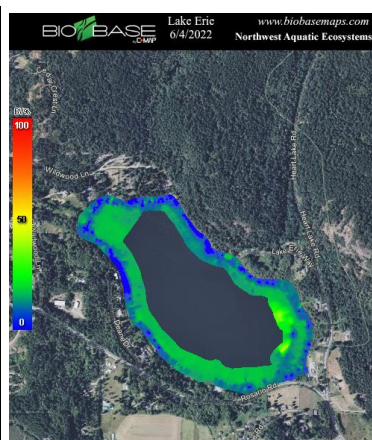
## Lake Erie

Lake Erie was experiencing an excessive quantity of filamentous algae growth along the bottom sediments. From a native macrophyte perspective this was the least amount of native plants observed lake-wide at this time of year then we have noted in the past.. There were no floating fragmented native plants or plants observed in the water column. Milfoil was noted but in sporadic single plant occurrences. Lack of native plant growth may be attributed to the dense filamentous algae growth along the bottom prohibiting light reaching the bottom sediments. Reduced native growth that was present consisted of thin stemmed pondweeds and naiad (najas). Both of these species have historically been present within the system with naiad being dominate one year and pondweeds the next. Typically, the spring survey involves entanglement issues with the boat motor's prop. During 2022 no such prop related issues occurred.





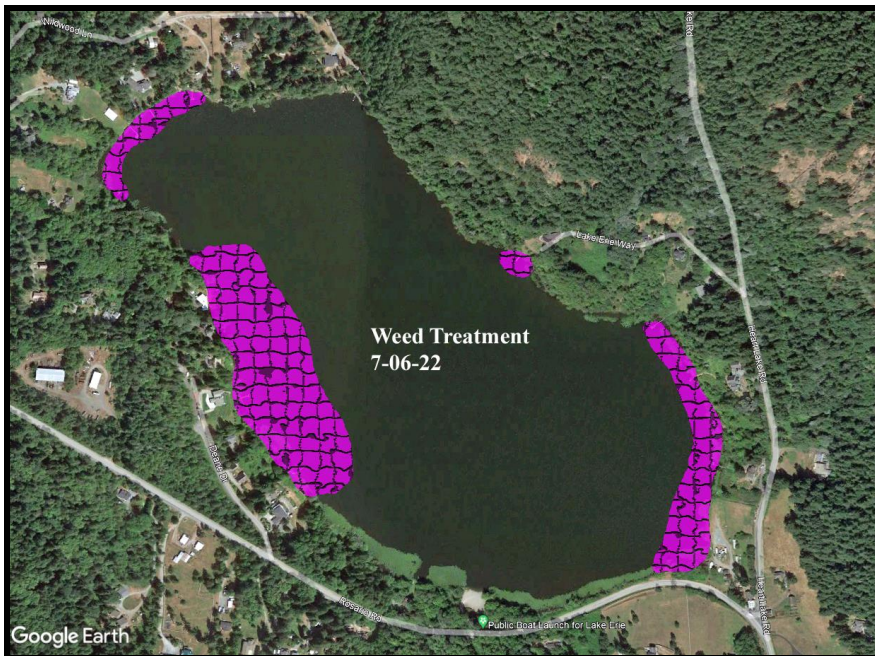
**Spring 2021**



**Spring 2022**

## Lake Erie Treatment July 06, 2022

Lake Erie was treated on July 6, 2022. Typically, the lake is treated earlier than July. However the lack of growth during the spring postponed the treatment a few weeks. Prior to treatment, a brief survey was conducted to ensure that the survey results generated earlier in the year were still representative of the lake's current condition. Much of the filamentous algae had started to die back and pondweed growth was starting to emerge from newly exposed bottom sediments. Approximately 35 acres of the lake were treated for pondweed growth. Diquat was applied using between 1.5 to 2 gallons per surface acre. The herbicide mixture was injected approximately two feet below the water's surface with the assistance of weighted drop hoses. The treatment boat was equipped with a GPS system that ensured the application vehicle remained within the boundaries of the treatment zone. All the residential and trailer park sites received treatment. Residential and the trailer park native weed treatment sites were decreased from past historical levels of 60 acres. 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.



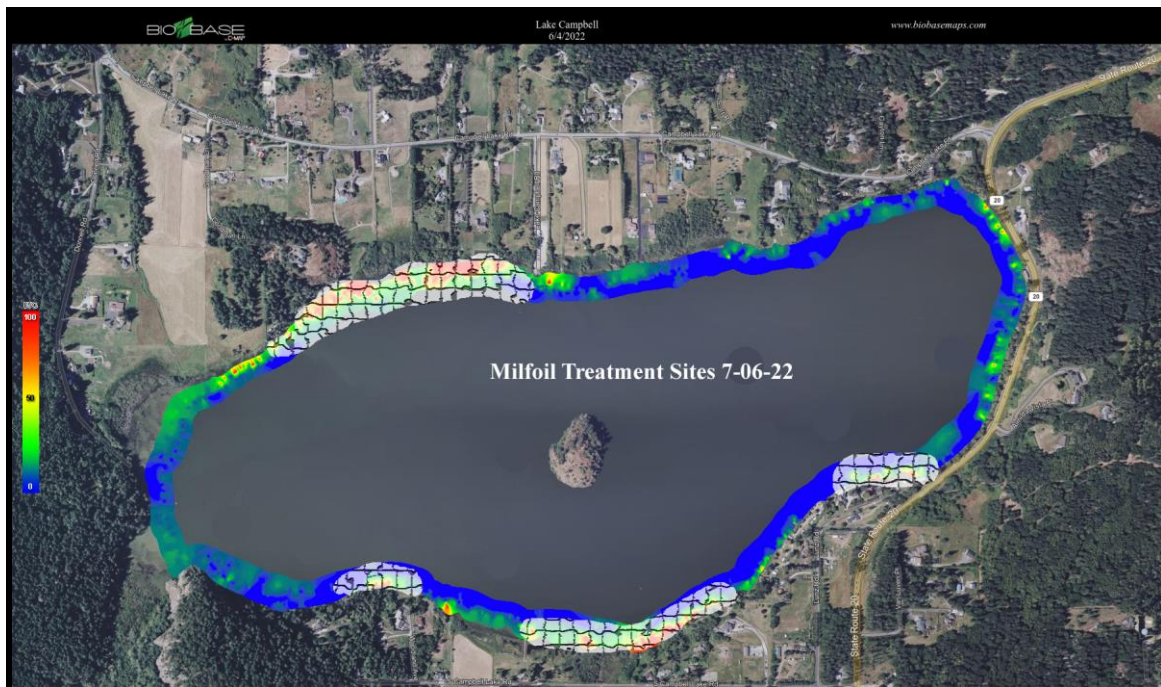
During 2021 Lake Erie received two treatments; one during June 30 and a secondary application on July 7 in comparison to only one treatment during 2022.

## Lake Campbell Treatment July 07, 2022

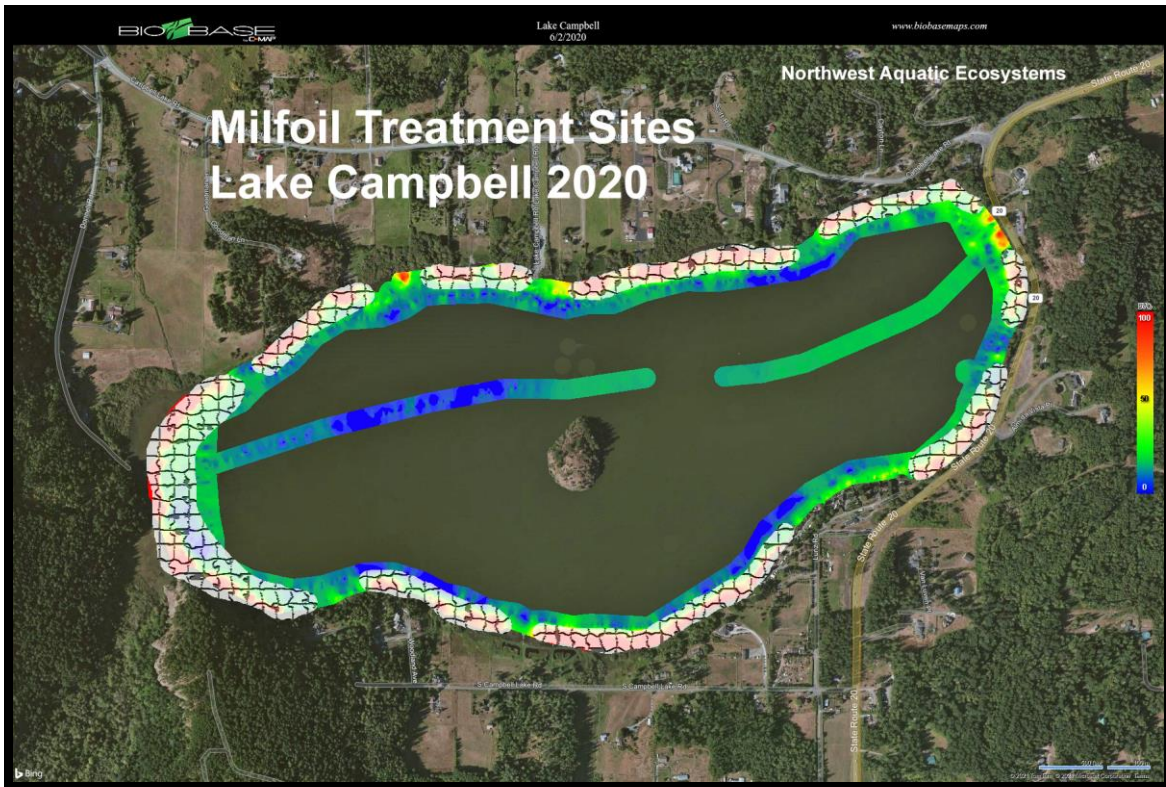
Lake Campbell was treated on 7-07-22. Only approximately 25 acres of the lake received treatment with Triclopyr for milfoil control. Plants within some of the targeted sites were sparse but consistent and did not allow for spot applications. Typically when small spot infestations are observed they can be treated individually. There was a considerable reduction in milfoil densities from our 2021 campaign. However, some areas targeted during 2021 were experiencing sparse inconsistent growth once again. The presence of milfoil at Lake Campbell and the mandated control of this species reduced treatment for native weed growth at 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 and unobstructed access to the lake.

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 the targeted milfoil was treated.

Once the milfoil component of the project was completed, shoreline areas were then sprayed for lily pad and purple loosestrife control. A 1% triclopyr tank mix with adjuvant was utilized.







### **Lake Campbell Lily Pad Treatment August 23, 2022**

Shoreline lily pads were targeted with a 1 % triclopyr solution for the second time. Prior to the spraying event, a brief survey of the lake was conducted in an effort to evaluate the progress of the prior milfoil treatment. Plants were responding with no noticeable milfoil observed on the water’s surface. The survey was difficult to perform as a result of the severe algae bloom that was still in progress throughout the lake.

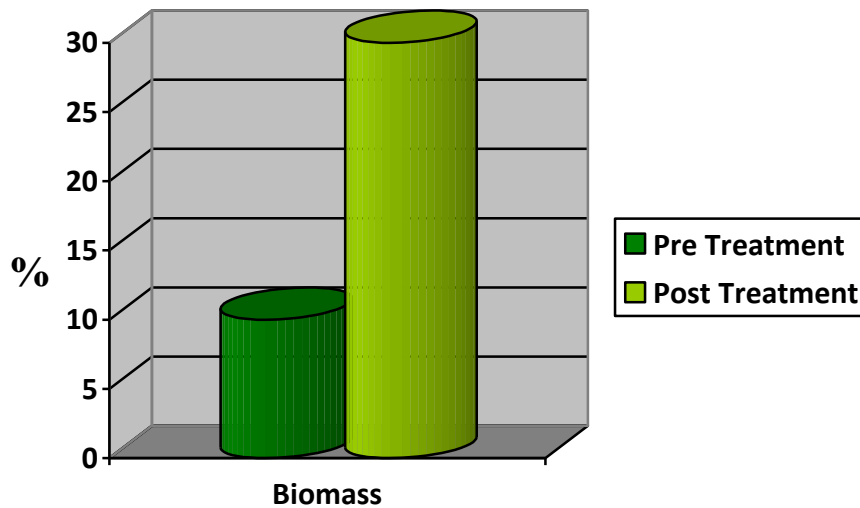
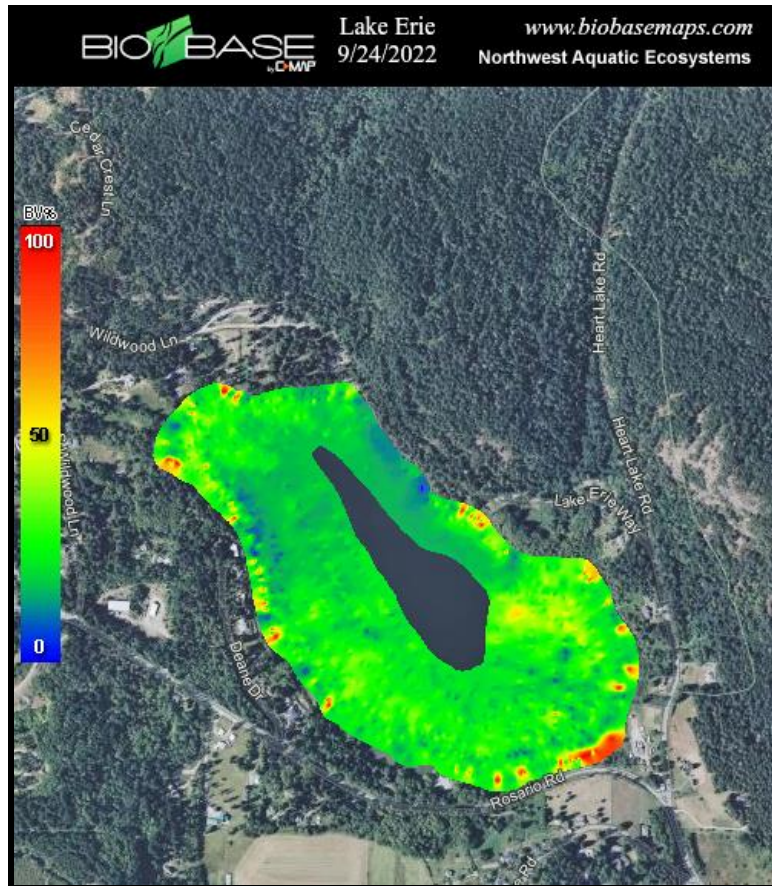
### **Lake Erie & Campbell Surveys September 23 & 24, 2022**

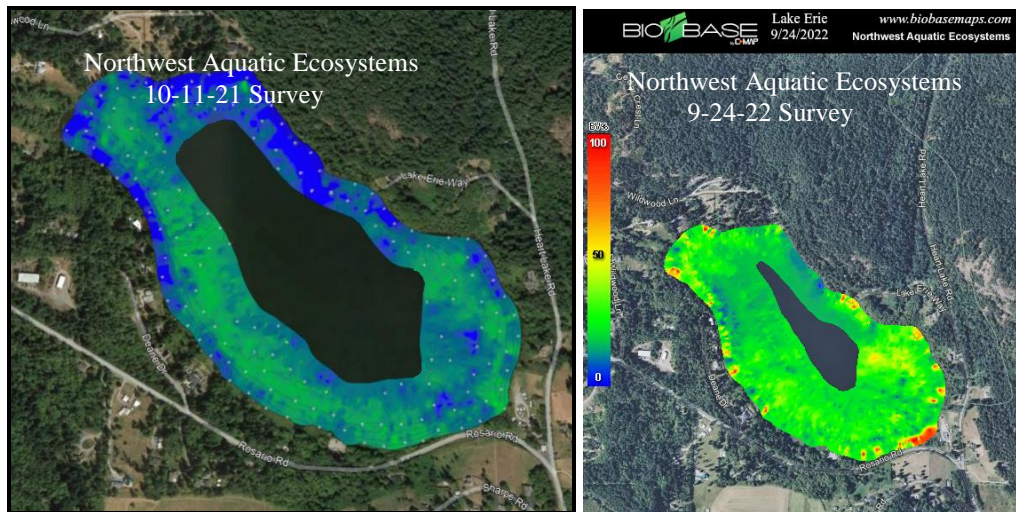
Lake Erie was surveyed on 9-24 and Lake Campbell was surveyed on 9-23 & 9-24.

#### **Lake Erie**

A dramatic increase in plant biomass was noted pre and post treatment. Pretreatment water column plant biomass volume was determined to be 10% while post treatment water column biomass recorded a threefold increase to 30%. Lake bottom sediments that were earlier covered with low growing filamentous algae species were now supporting pondweed growth that had breached the surface. As the algae growth died off, newly exposed bottom sediments quickly germinated pondweed associated plants. Floating

surface pondweed fragments were noted along most of the shoreline areas and collecting around dock pilings. This late seasonal increase is not uncommon to Lake Erie especially when the lake is only targeted once during the season for native plant growth. The shallow nature of the waterbody also promotes aggressive weed growth since light penetrates down to the entire bottom of the lake. Uncovered bottom sediments are susceptible to weed related issues.



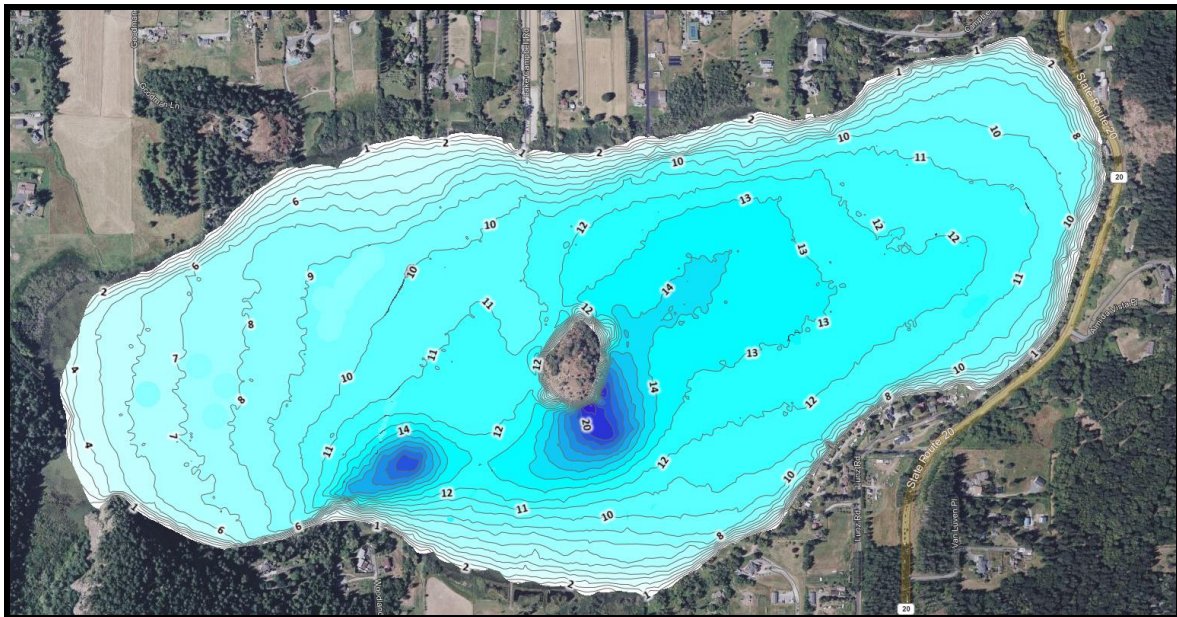
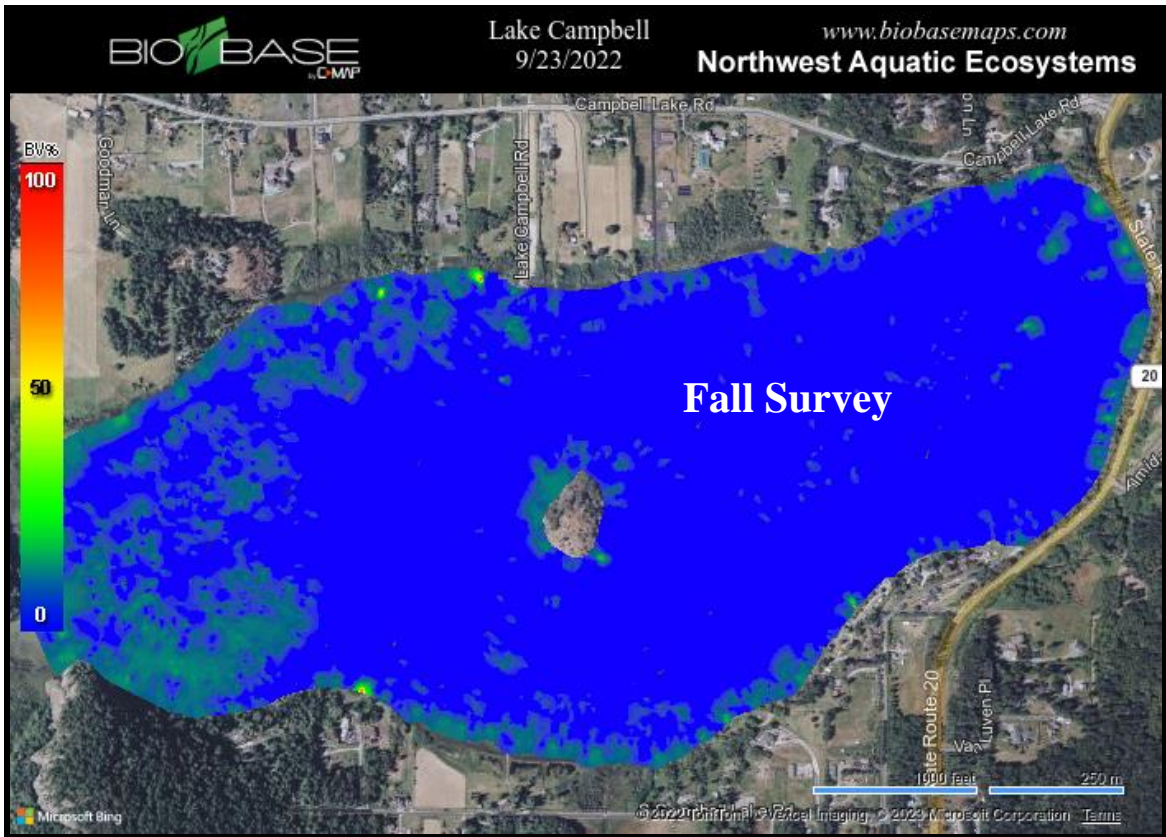


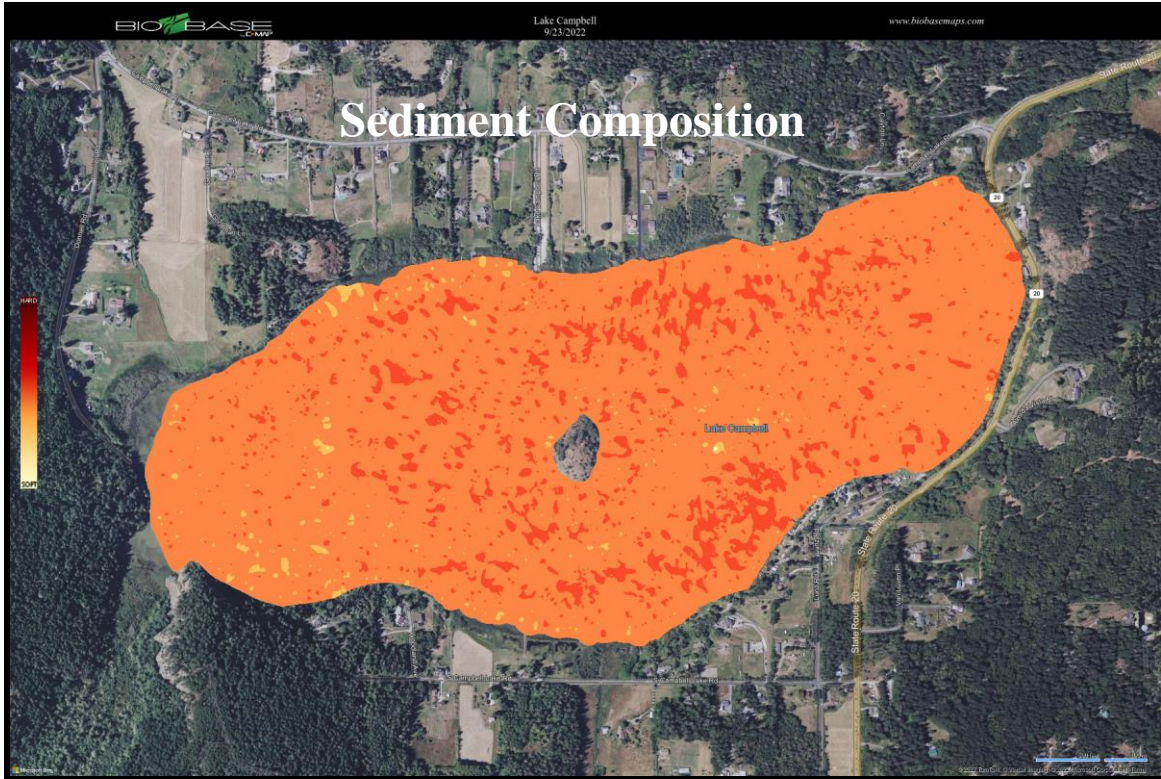
## Lake Campbell

The fall Lake Campbell survey identified a decline in vegetation even though materials that only target milfoil were used. No other species within the system should have been impacted. The algae bloom noted during our early June survey was still present resulting in a lake that was producing odors and a thick green scum. No recreational use of the lake was noted during our survey. The public boat launch, that typically supports many vehicles, was void of visitors. Poor water clarity throughout the summer was likely the cause for the reduction in native plant growth. This decline of native plant growth is unfortunate since the lake has been managed over the past ten years to increase native growth. Only recently have we documented such an increase. Those gains appear to have been lost as a result of the season long algae bloom that exhibited water clarity of less than 3 feet throughout the summer.

Typically, a survey is performed to identify the depth within a lake system where aquatic vegetation is growing. During a survey event when plants are no longer identified growing along the bottom the survey is terminated. The fall survey at Lake Campbell included a complete bathymetric mapping of the lake bottom and a sediment composition profile. The LMD is currently investigating options available to reduce nutrient levels within the lake and bathymetric data and sediment composition information could assist the current efforts by the LMD to research solutions and costs of reducing the nutrient levels within the lake.

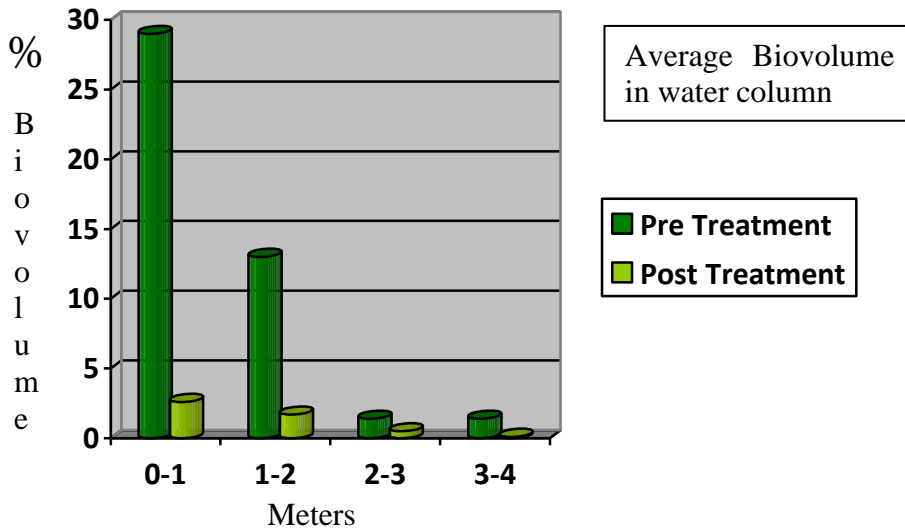
There was no milfoil detected during the fall survey. This result may be misleading as a result of the poor water clarity noted throughout the summer that reduced native plant growth and likely may have impacted any milfoil remaining after treatment.





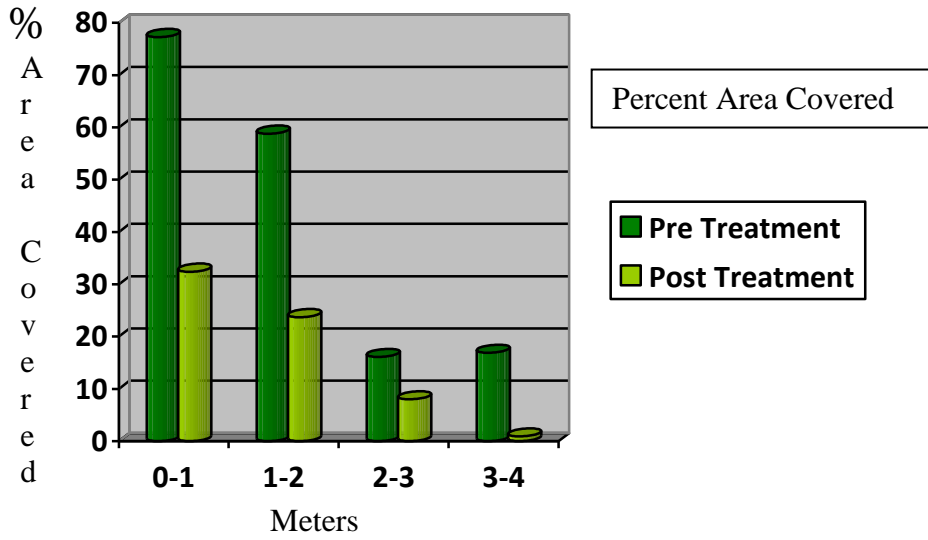
**BVw**

**Biovolume (All water):** Refers to the average percentage of the water column taken up by vegetation regardless of whether vegetation exists. In areas where no vegetation exists, a zero value is entered into the calculation, thus reducing the overall biovolume of the entire area covered by the survey.



### PAC

**Percent Area Covered:** Refers to the overall surface area that has vegetation growing.



## **Recommendations For 2023**

The greatest concern for Lake Campbell is whether or not the algae bloom that closed the lake down recreationally for 2022 will resurface during 2023. The LMD needs to seriously consider a long term solution to the algae bloom issue. Macrophyte growth can be controlled on a seasonal basis and hasn't posed the same lake closure type issues that the 2022 algae bloom resulted in. The solution will likely be a costly one. However, without intervention, residents and the surrounding community can likely expect the same outcome observed during the 2022 season. The severity and longevity of the blooms will likely vary on a year to year basis. 2022 may have been insight into future lake conditions. Lake Erie's late seasonal growth resulted in problematic weed related lake issues. When two weed treatments are performed each year, growth is virtually nonexistent at the close of the season. One yearly treatment typically results in surface weeds present at the close of the season. Native plant growth throughout Lake Erie, if left untreated, would result in reduced or no recreational opportunities to lakefront and local residents.

The shallow nature of Lake Erie and the permit requirements of allowing only 50% (55 acres) of the same lake areas to be treated over the five-year permit cycle provides a yearly seed bank to produce dense weed growth on a yearly basis. As non-treated areas mature seeds are consumed by waterfowl, dislodged through boat traffic and are deposited back within the entire lake. The cycle is never ending and provides only seasonal control.

NWAE also anticipates a need within the next few years to start addressing native plant growth within some of the residential shoreline areas of Lake Campbell. Native plant growth has slowly developed within some of the areas of the lake that are residential. The emergence of these native plants benefits the biology of the lake but unfortunately will eventually restrict lakeshore access and recreational use. With the reduction in native plant growth noted at Lake Campbell during 2022 this native weed control component may be delayed. Native plant issues have never been an issue or planned for at Lake Campbell. Future management plans and the funding of such plans focusing on native plant growth needs to be discussed.

## **Northwest Aquatic Eco-System's recommendations for the 2023 season:**

1. Late May, early June survey of both Lakes Erie and Campbell. In the past, this survey date and results directed where and how much funding would be allocated to the different components of the program. The spring survey does provide a very good baseline for Lake Erie but at times has been misleading when directed at Lake Campbell. The poor water clarity that likely reduced late seasonal growth at Lake Campbell may result in late spring milfoil growth from plants that were weak but still viable during the fall survey. In an effort to avoid the milfoil shortfalls noted for Lake Campbell in the past, the approach for 2023 budgeting should use the late summer fall survey of Lake Campbell as the baseline in evaluating milfoil growth.

Examine LMD budget excess and determine how much if any additional funding could be allocated for the 2023 treatment for native species at Lake Erie.

2. Treatment at Lake Campbell should be delayed until all anticipated milfoil colonies have emerged from their root crowns. Milfoil typically germinates early in the season. This does not appear to be the growth pattern in recent years for Lake Campbell.
3. Continue 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. Spatterdock and lily pad growth now appear to be in a maintenance mode. Loosestrife and iris will continue to be addressed as funding becomes available.
4. 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 have 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.
7. Material costs continue to increase and the pricing for these materials will likely not decrease. L&I prevailing wage for work performed within a boat has increased to \$54.00 per hour.
9. Discussions need to continue directed at nutrient related issues at Lake Campbell. Budgeting for this process needs to be specifically allocated through current LMD reserves. Such expenses would include additional county staff time in evaluating alternatives and pursuing state funding for any nutrient related reduction process agreed upon.
10. Secure the services of an environmental engineering firm to develop costs and options directed at reducing nutrient levels within the lake.