Lake Campbell and Lake Erie
2010 Aquatic Plant Control Program

Prepared By
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Project Overview

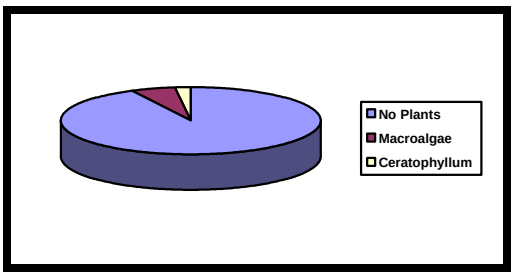
The following aquatic plant year end report consists of all activities undertaken within both lake systems during the year 2010. Activities included aquatic weed surveys and weed control activities. Both lake systems have a long history of noxious weed problems and have been treated over the last ten years on an annual basis to manage the problem. Eradication of the problematic species has not yet occurred even though a considerable amount of resources have been committed to both sites.

Survey Protocol

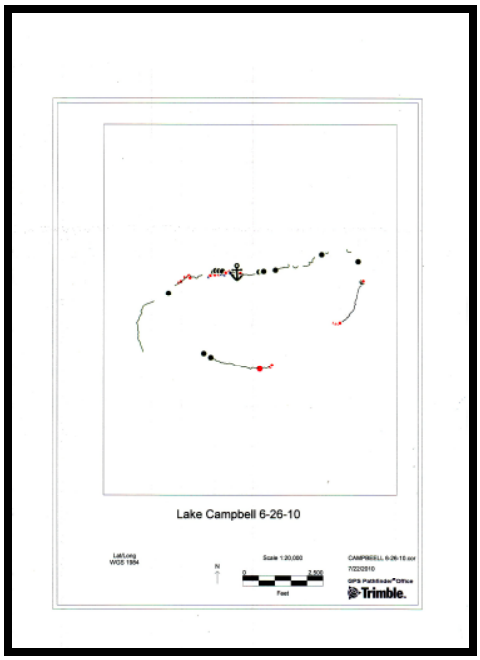
Survey techniques were typical of those identified throughout the industry as standard protocol. Survey protocol consisted of two techniques. June 26 data was assembled by collecting data while making visual observations from the water's surface from a gas powered boat. As observations were made, data was collected and stored on a Trimble Geo XT GPS system. Nuphar (spadderdock) and Nymphaea (fragrant water lily) infestation data was collected by a continuous data point line image when large infestations were present and single point when infestations were small. The July 9 & 10 survey utilized a bottom sampling rake that was tossed over the side of the boat and retrieved slowly. As the rake traveled across the lakebed, aquatic plants rooted to the bottom substrate would become entangled in the rake. The rake was then brought to the surface and into the boat. Plants attached to the rake were identified and the data was then collected. Each weed species identified was stored as a single data point. If no plants were present then the data point was identified as "no plants". Random lake transects were established at approximately equal distance around the lakes. Four sampling points were utilized along each transect and each transect line length averaged between 500 and 600 feet.

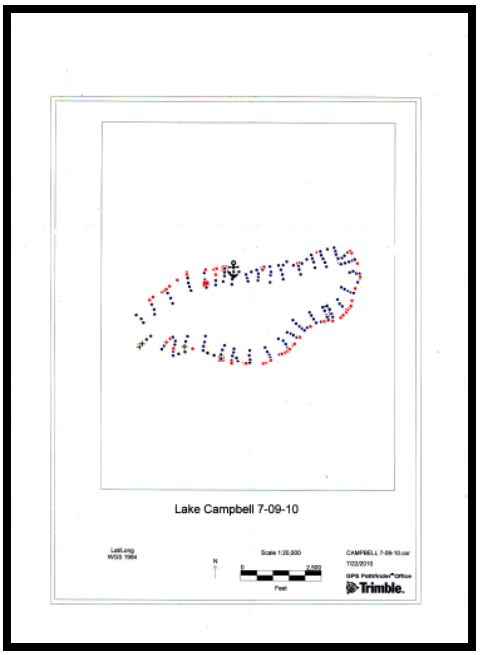
Lake Campbell Pre Treatment Survey Results

Lake Campbell was visited on June 26, 2010 with the macrophyte survey occurring on July 9, 2010. At the time of the survey, fragmented milfoil plants, milfoil root crowns and fully developed milfoil plants consisting of stems, roots and leaf structures were observed floating on the lake's surface. Thirty six transect lines were established resulting in 210 bottom rake data points. One hundred and thirty eight sampling points were void of plants (bare bottom), eight identified nitella, three Ceratophyllum (coontail) and one Najas. Milfoil was identified visually, noting plants that had surfaced and those plants that were recovered utilizing the rake tow. Sixty milfoil locations were recognized lake wide. Approximately 6,800 lineal feet of the lake's shoreline and numerous single point occurrences support robust Nuphar populations.

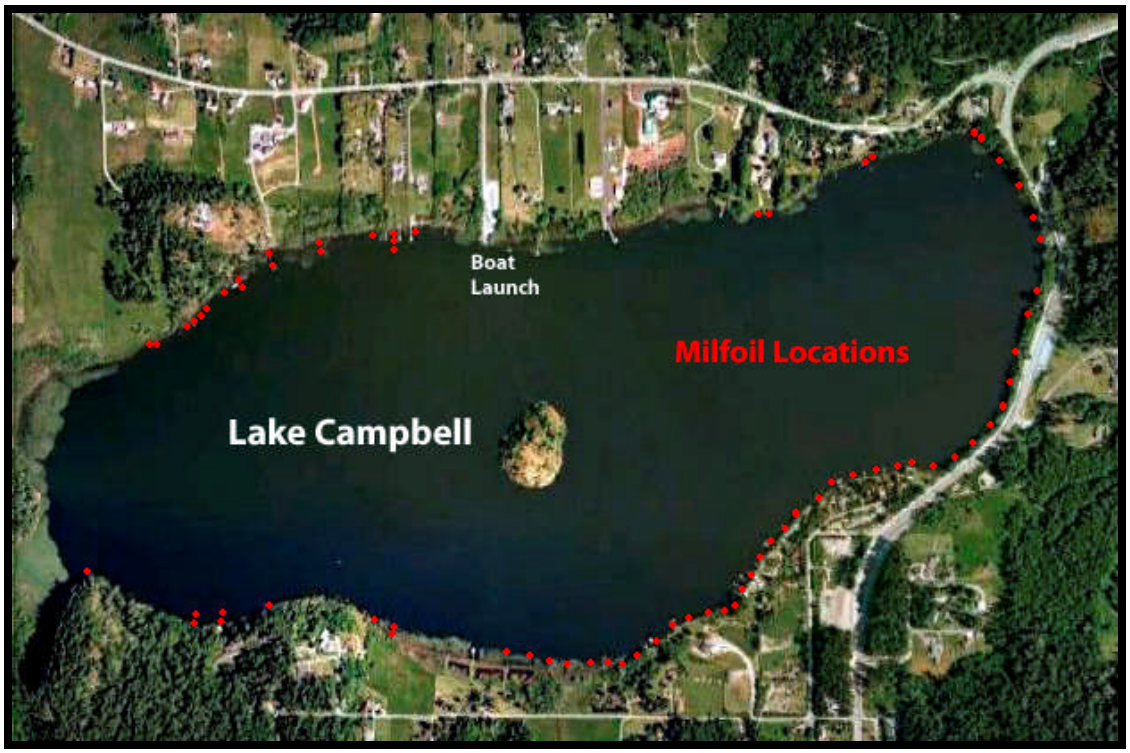


All of the macrophytes identified in the survey except for one Najas plant are not preferred by the grass carp. The absence of native plants and the large percentage of shallow lake bottom that supports no macrophyte or macro algae growth are uncharacteristic of shallow lake water systems. As noted in the 2009 spring survey report historical data on Campbell suggests that the lake has "a history of being negatively impacted by the excessive growth of aquatic plants." Virtually no native plants were present during the summer survey. The abundance of rooted and fragmented milfoil plants observed floating on the waters surface may be an early indicator that the current grass carp population is selectively avoiding this species and consuming all of the native plants as they emerge from the bottom sediments. Numerous schools of grass carp were noted during the survey and at times the fish could be felt hitting the bottom of the survey boat. The fish appear to be 24-30 inches in length and healthy. Grass carp may be attempting to consume the milfoil and then reject the food source by either dislodging the plants from the bottom or by breaking them off.





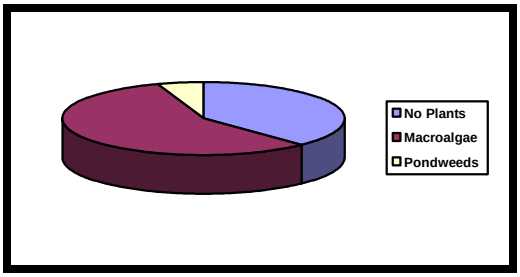
Milfoil plants are identified in the above raw data maps as red dots. Blue dots indicate no plants present. Two areas of concern are noted as being located along the northwestern shoreline (3,000 lineal feet) directly west of the boat launch (anchor) and the southeastern shoreline (6,300 lineal feet). Plants were all noted within 100 feet of the shoreline; generally in areas targeted during the 2009 campaign.



Spring Milfoil Locations

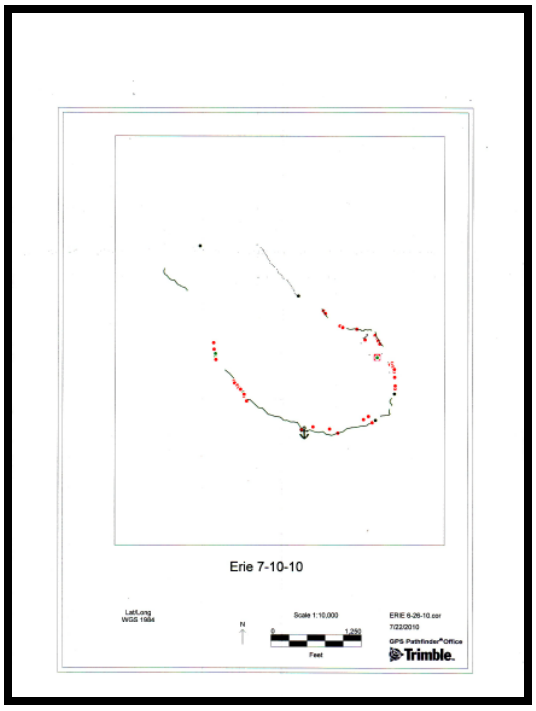
Lake Erie Pre Treatment Survey Results

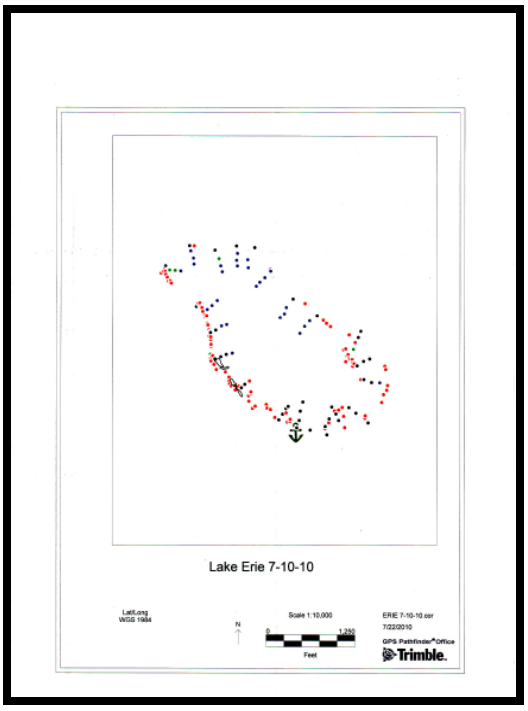
Lake Erie was inspected on June 26 and surveyed on July 10, 2010. As was noted during the Lake Campbell survey, fragmented milfoil plants, root crowns and fully developed milfoil plants were observed floating on the surface waters of Lake Erie. At the time of the survey Lake Erie was experiencing a planktonic algae bloom. Twenty transect lines were established resulting in seventy six bottom rake data points. Twenty nine sampling points identified having no plants present within the sampling grid, forty four identified Nitella and Chara, and five, pondweed. One of the pondweed sites located along the far western shoreline identified Potamogeton crispus as being present in the lake. This is the first time this species has been identified to be present in the Lake Erie system. Potamogeton crispus is another noxious plant species. Milfoil was identified visually, noting plants that had surfaced and also ones retrieved in the sampling rake. Eighty six milfoil data points were noted. These points consisted of either single or multiple plant communities. Approximately 3,100 lineal feet of the lake's shoreline and numerous single point occurrences support robust Nuphar populations. Macro algae had surfaced forming a surface mat along the mid section of the southern shoreline. This surface mat was approximately .39 acres in size.



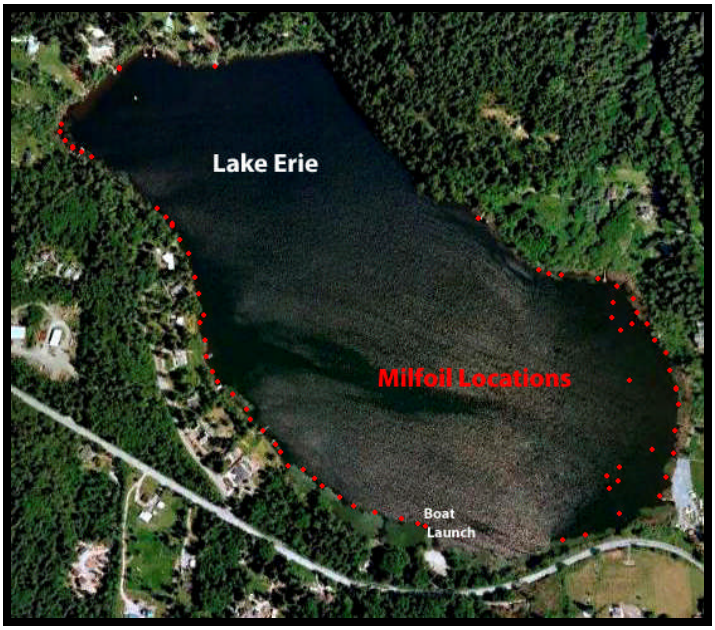
As with the Campbell survey, Lake Erie was also absent of any noticeable native macrophytes occupying the littoral lake bottom zone. Surprisingly no Najas was identified in any of the rake samples collected. This is in sharp contrast to the 2009 survey that identified "native pondweeds species making up a portion of the plant community but the Najas and Chara dominate most of the bottom."

Once again it would appear that the grass carp in Erie are behaving similarly to what was observed at Lake Campbell. Selectively utilizing the native species as a food source and avoiding the targeted milfoil.





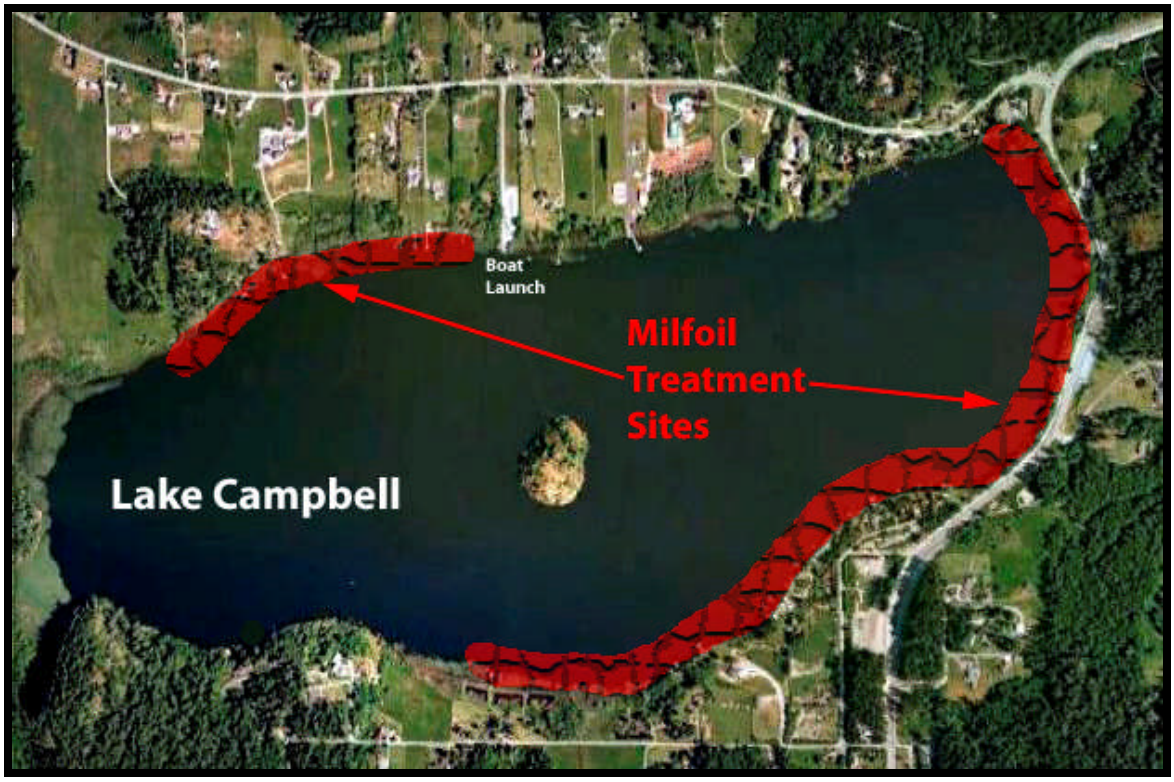
Milfoil plants are identified in the above raw data maps as red dots. Blue dots indicate no plants being present. There are two major areas of concern. One is a 15 acre section of the far southeastern shoreline; the other consists of 2,600 feet of shoreline along the southwest shoreline. Plants located along the southwest shoreline infestation are all within 100 feet of the shoreline. Plants within the southeastern lake lobe however extend outward some 500 feet from the shoreline. Surfacing macro algae comprise an area of .39 acres.



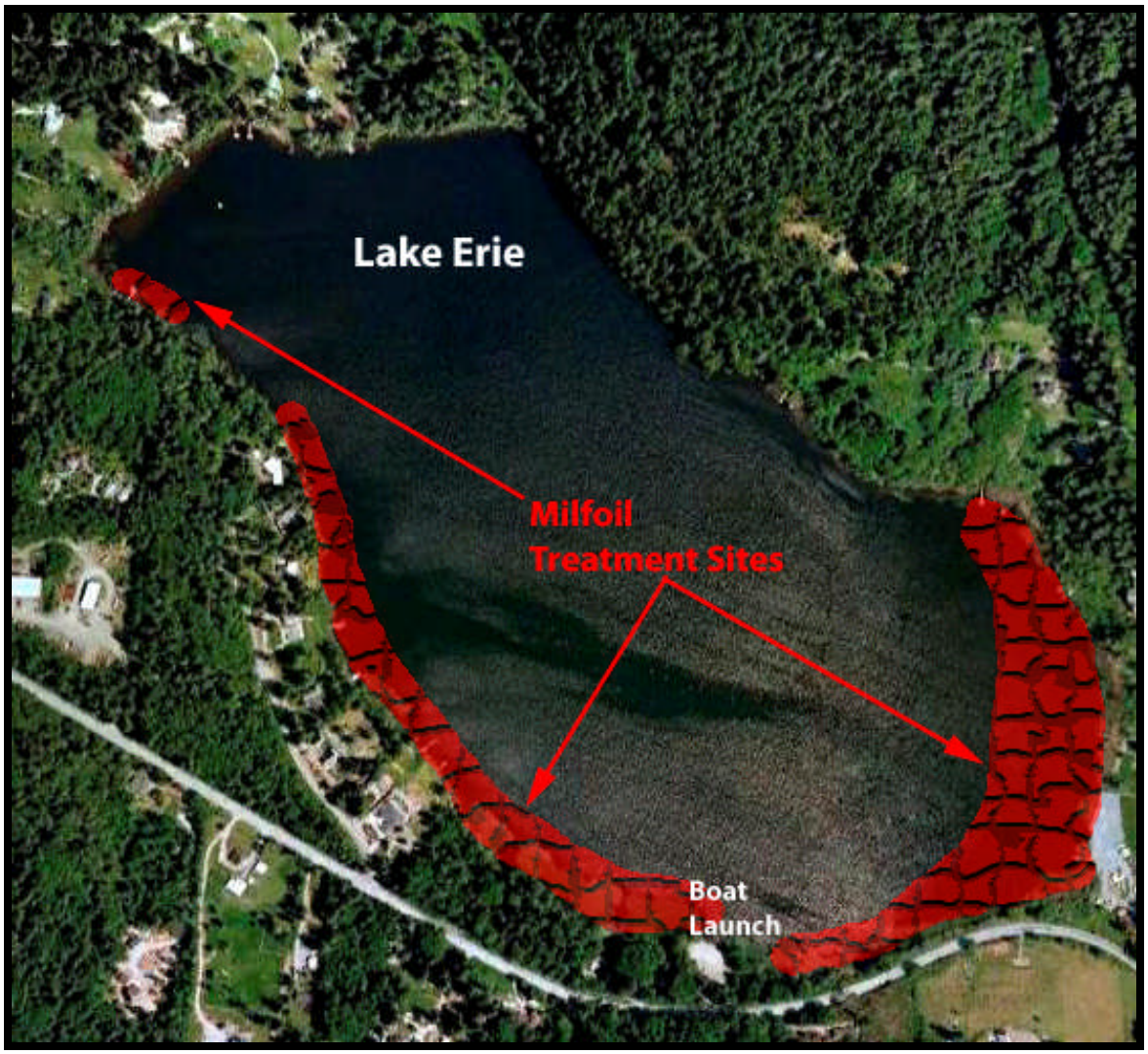
Spring Milfoil Locations

Proposed Treatment Plan Lake Campbell and Erie

Considering the potential diffusion of material outside the targeted plant zones, treatment within both lakes would entail a shoreline application of 2,4-D extending outward 100 feet. Application would be made utilizing weighted injection hoses mounted on the front of an Airgator Airboat. Material would be discharged at two points throughout the water column. One discharge point would be along the lake bottom and the second would occur approximately three feet below the waters surface. Total water column concentrations are targeted at a rate of 3 ppm. Milfoil is susceptible to concentrations of 1 ppm or greater if plant exposure to the herbicide is at or greater then 24 hours. By targeting a higher concentration as diffusion occurs, lethal concentrations should remain above the 1 ppm threshold in excess of 24 hours. Both sites encompass approximately 55 treatment acres. Spot applications would be made to smaller sites identified on the raw data Trimble map if deemed appropriate at the time of application. Similar treatment protocol will be utilized at both sites.



Proposed Treatment Sites Lake Campbell



Proposed Treatment Sites Lake Erie

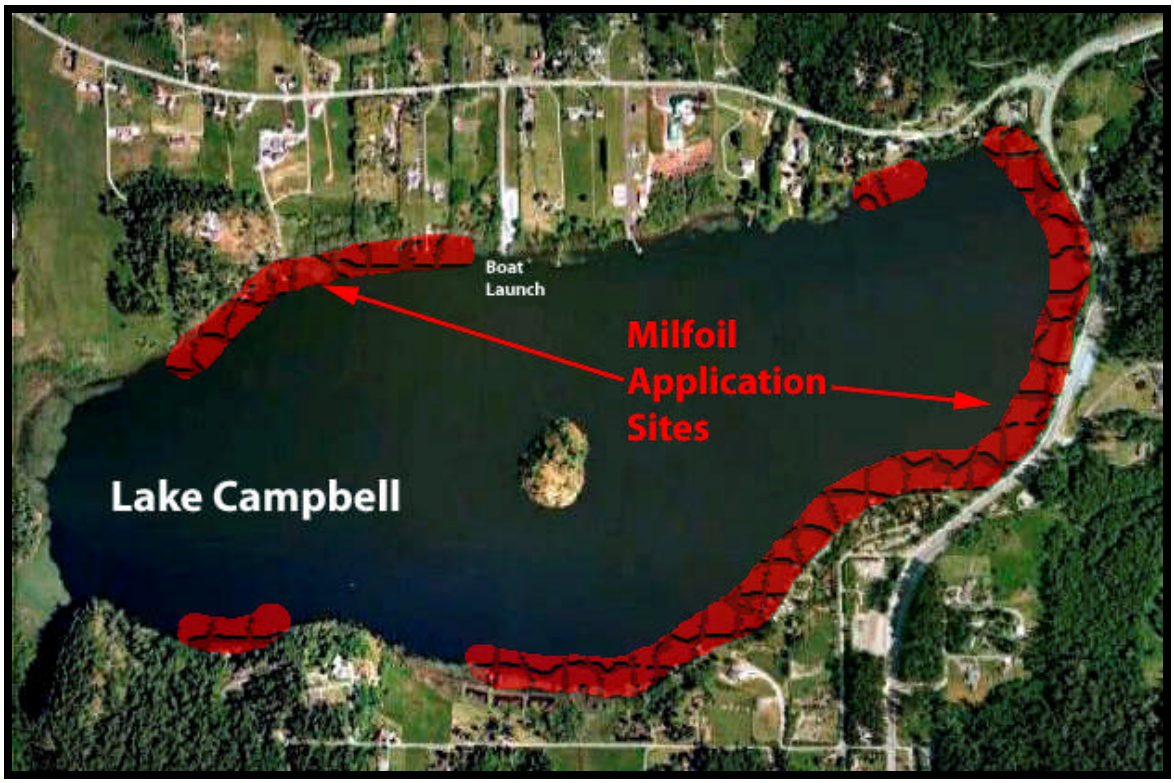
Macrophyte Control

Lake Campbell and Erie shorelines were posted on Sunday August 8, 2010 notifying residents of the upcoming treatment. Shorelines were posted utilizing a three-person crew. Lake Campbell was posted in the morning and Erie followed in the afternoon.

Lake Campbell August 9, 2010

Lake Campbell was treated on August 9. Two staging areas were utilized during the application process. One site was a private residence located just north of the boat launch, the other site was located along the mid eastern shoreline currently utilized by travel trailers. Material was stored in a locked 26 foot truck and transferred from the truck to the application boat. Once the boat tanks were filled the boat operator and licensed applicator proceeded to the treatment sites and dispersed the material. Material was dispersed utilizing an 18 foot Panther Airboat. The application boat was equipped with a weighted hose injection system that dispersed the material along the lake bottom and mid

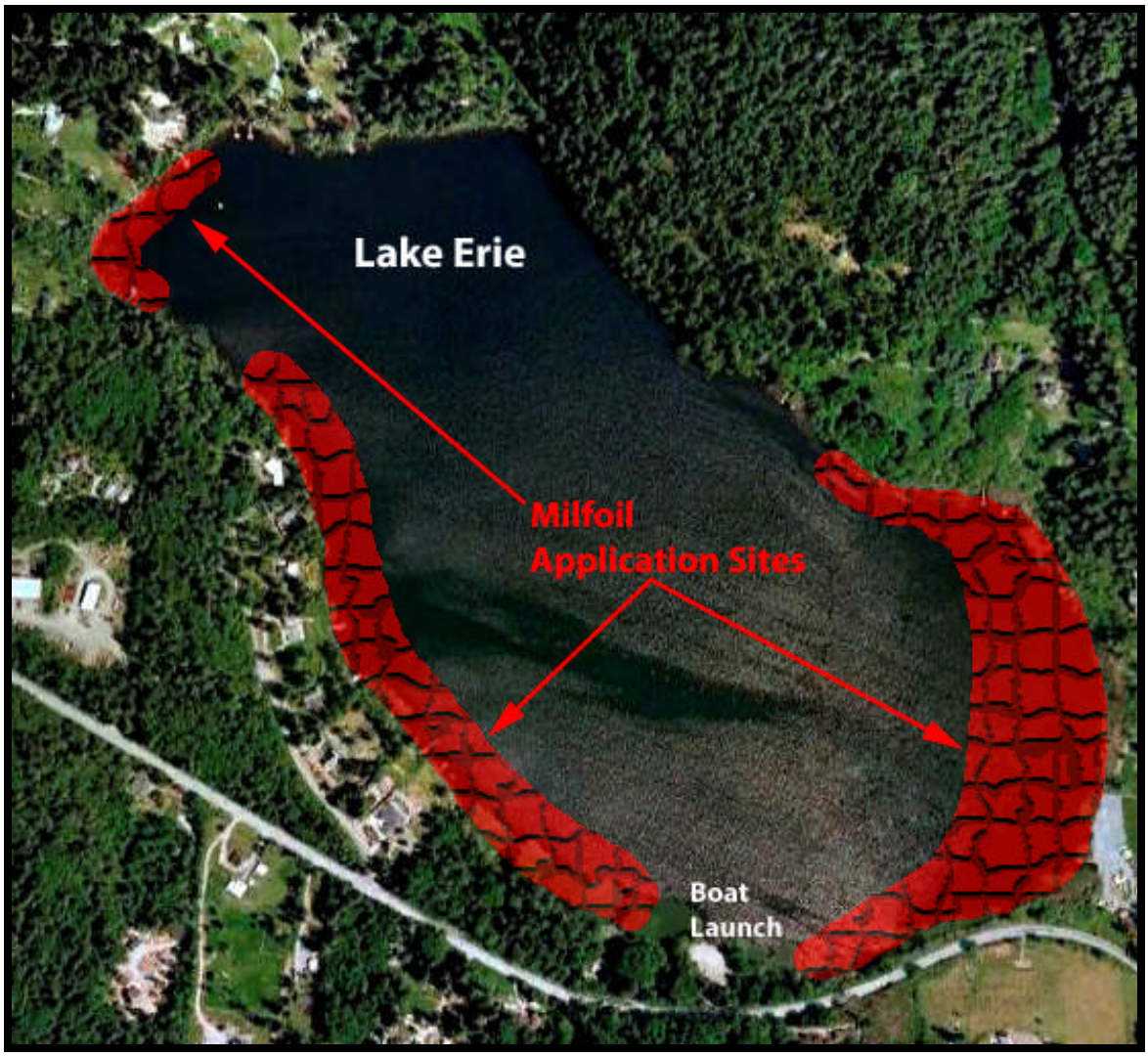
region of the water column. Hose depths were modified when appropriate. Thirty acres of the lake were treated with 300 gallons of material.



Application Sites

Lake Erie August 10, 2011

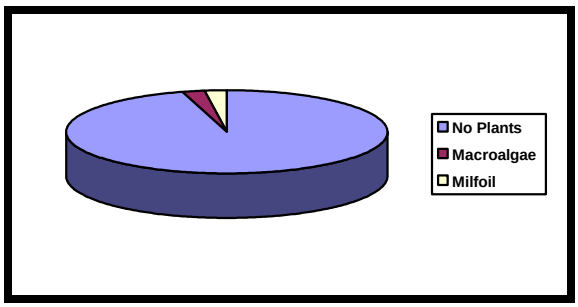
Lake Erie received treatment on August 10, 2010. The same procedures and application techniques utilized on Lake Campbell were also implemented on Lake Erie. Twenty five acres of the lake were treated with 250 gallons of material.

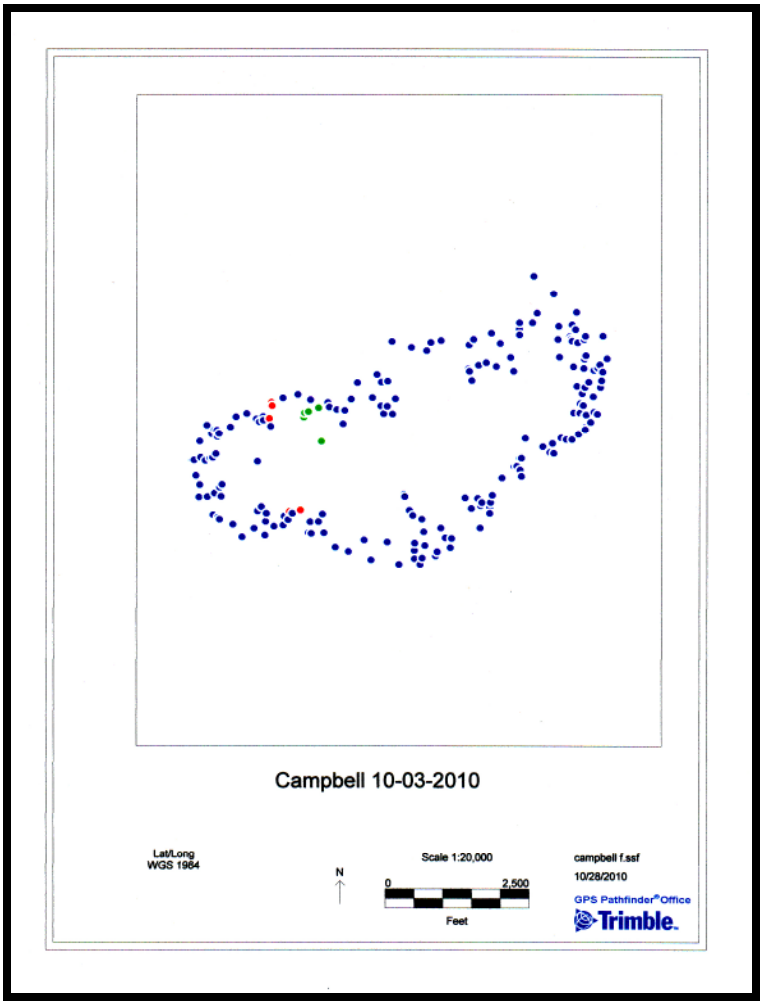


Application Sites

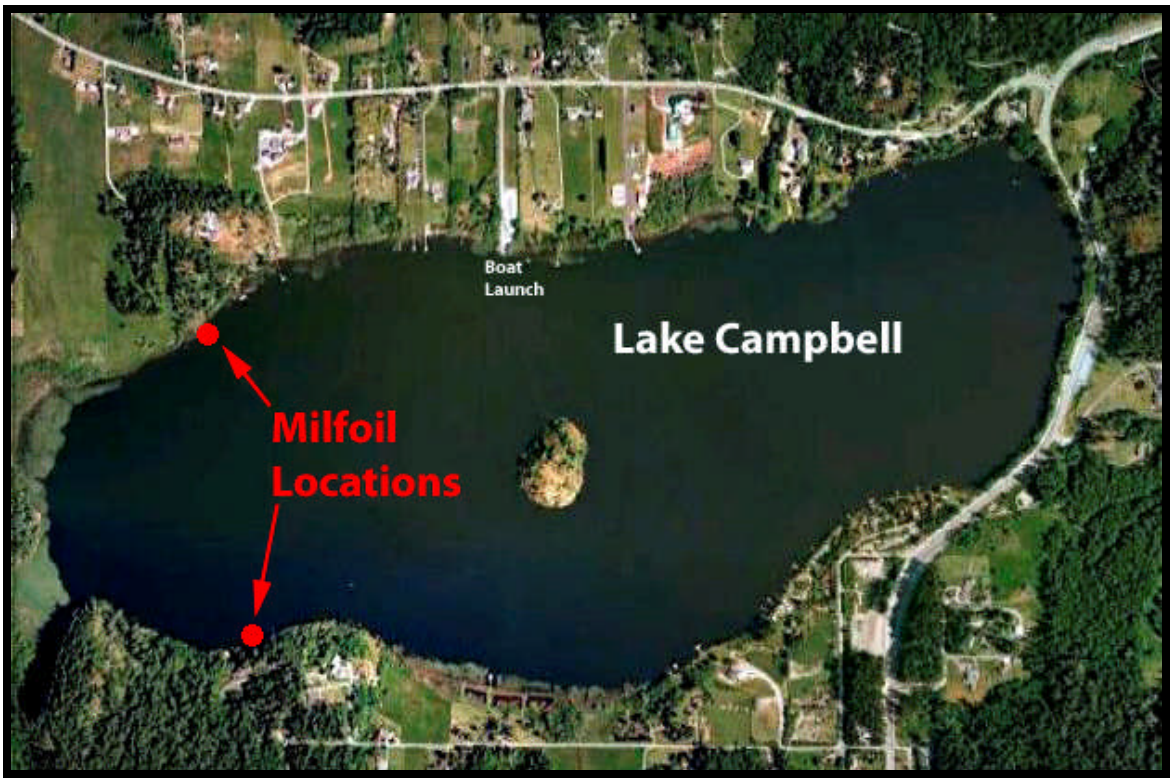
Lake Campbell Post Treatment Survey Results

Lake Campbell was surveyed on October 3, 2010, approximately 60 days post application. At the time of the survey no milfoil plants or fragments were noted floating on the waters surface or along the lake shoreline. Two hundred and seventeen rope tows were evaluated with only five data points exhibiting milfoil growth. All five locations occurred within two separate shoreline areas; both were approximately 100 feet in length. All five plants were within twenty-five feet of the shoreline. Two hundred and seven of the data points exhibited no growth and five sites contained nitella. Initial survey results appear to indicate that the treatment performed earlier in the year was successful in reducing the milfoil infestation. This survey also helps confirm the results of the earlier survey that indicated a lack of native vegetation throughout the entire system. The lake bottom remained virtually void of all macrophyte growth. Plants (Ceratophyllum and Potamogetons) identified during an earlier 1999 survey, as occurring in large patches or in sparse densities over large areas of the lake are no longer present.



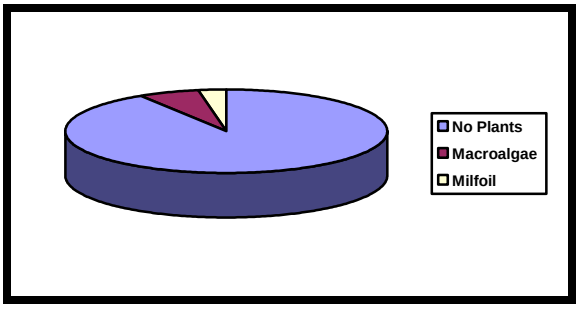


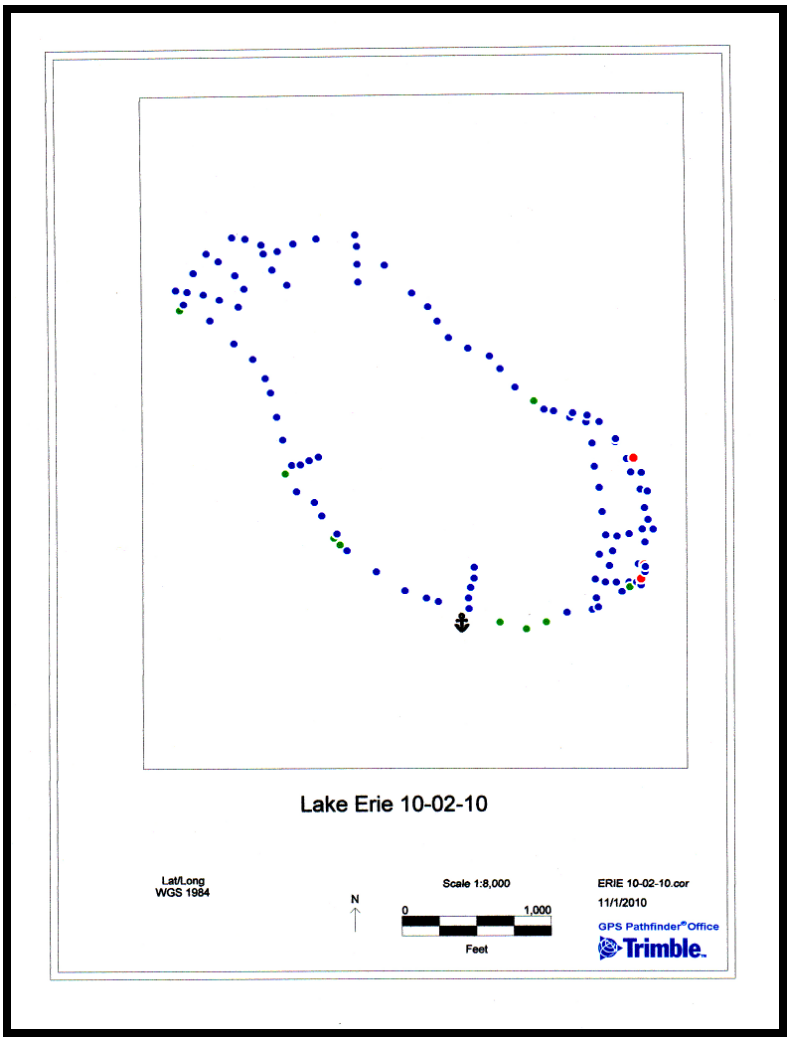
Post Treatment Survey
Red dots identify milfoil locations
Blue dots identify no macrophytes



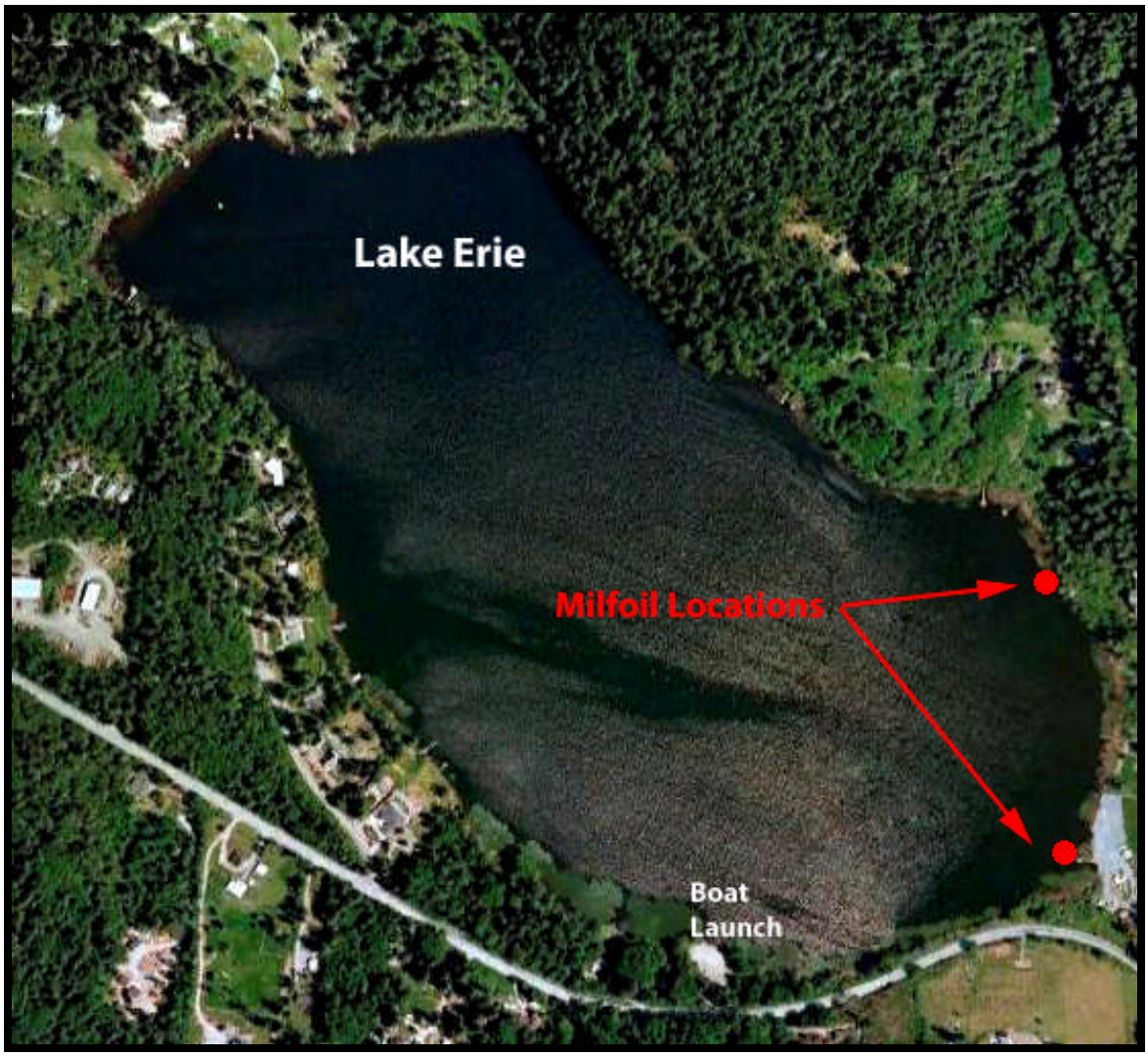
Lake Erie Post Treatment Survey Results

Survey results for Lake Erie were similar to those noted at Lake Campbell. No native submerged species were identified with much of the lake bottom void of any plant or macro algae. Only three sampling locations identified milfoil present. All three locations were within a small section of the southeastern lake shoreline. One hundred and thirteen data points were collected during the survey.





Post Treatment Survey
Red dots identify milfoil locations
Blue dots identify no macrophytes
Green dots identify macro algae



Recommendation For 2011

Post treatment surveys performed during 2010 identified reduced milfoil populations lake wide with current populations limited to specific lake locations. This is in contrast to the earlier spring survey that identified milfoil throughout 50% -75% of the lake shorelines. Northwest Aquatic EcoSystems recommendations for the 2011 season are as follows:

1. Early spring survey of both water bodies with special attention being given to those lake areas where milfoil was present during the fall of 2010.
2. Treatment of impacted lake areas for milfoil control during June and July with 2,4-D at maximum label rates.
3. Potential treatment of Lake Erie sites that are prone to macro algae problems.
4. Potential secondary treatment during the late summer of 2011 to those sites that still may be experiencing milfoil growth.
5. Application to floating leaf plants (Nuphar) that are presenting current or potential problems to residential properties.

Application Records

State of Washington
Department of Agriculture
Olympia, Washington 98504

PESTICIDE APPLICATION RECORD (Version 3)

NOTE: This form must be completed same day as the application and it must be retained for 7 years. (Ref. RCW 17.21)

1. **Date of Application-Year:** 2010 **Month:** August **Date:** 9 **Time:** 8:00

2. **Name of person for whom the pesticide was applied:** Tracy Alker
   Firm Name (if applicable): Skagit County Public Works
   Street Address: 1800 Continental Place Suite 100 **City:** Mount Vernon, WA 98273

3. **Licensed Applicator's Name (if different from #2 above):** Douglas Dorling
   Firm Name): Northwest Aquatic Eco-Systems
   4426 Bush Mountain Drive SW.
   Olympia, WA. 98512
   360-357-3285
   License # 375

4. **Name of person who applied the pesticide (if different than #3 above):**

   License No(s). if applicable:

5. **Application Crop or Site:** Lake Campbell

6. **Total Area Treated (acre, sq. ft., etc.):** 30 acres

7. **Was this application made as a result of a WSDA Permit ?** Yes

8. **Pesticide information (please list all information for each pesticide in the tank mix):**

a) Product Name Pesticide Applied	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied ppm
DMA 4 IVM	62719-3	300 gallons	10 gals/acre	3.0 – 4.0 ppm

9. Address or exact location of application NOTE: If the application made to one acre or more of Agricultural land, the field location must also be shown on the map on page two of this form. Campbell Lake

10. Date: 8-09-2010 **11. Name of person making application:** Douglas Dorling

12. License No: 375 **13. Apparatus License. Plate No.:** E-578

14. Start: 8:00 **Stop:** 6:00

15. Acres completed: 30

16. Wind Direction: SW **Wind Velocity:** 0-5

17. Temperature: 68

Location of Application (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only):
Township: T34N
Range: E OR W (please indicate) 1E

Section(s): 13
County: Skagit

PLEASE NOTE:
The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.

Not required

State of Washington
Department of Agriculture
Olympia, Washington 98504

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4426 Bush Mountain Drive SW.
Olympia, WA. 98512
360-357-3285

License # 375

4. **Name of person who applied the pesticide (if different than #3 above):**

License No(s). if applicable:

5. **Application Crop or Site:** Lake Erie

6. **Total Area Treated (acre, sq. ft., etc.):** 25 acres

7. **Was this application made as a result of a WSDA Permit ?** Yes

8. **Pesticide information (please list all information for each pesticide in the tank mix):**

a) Product Name Pesticide Applied	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied ppm
DMA 4 IVM	62719-3	250 gallons	10 gals/acre	3.0 – 4.0 ppm

9. Address or exact location of application NOTE: If the application made to one acre or more of Agricultural land, the field location must also be shown on the map on page two of this form. Lake Erie

10. Date: 8-10-2010 **11. Name of person making application:** Douglas Dorling

12. License No: 375 **13. Apparatus License. Plate No.:** E-578

14. Start: 8:00 **Stop:** 4:00

15. Acres completed : 25

16. Wind Direction: SW **Wind Velocity:** 0-5

17. Temperature: 68

Location of Application (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only):
Township: T34N
Range: E OR W (please indicate) 1E

Section(s): 11
County: Skagit

PLEASE NOTE:
The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.

Not required