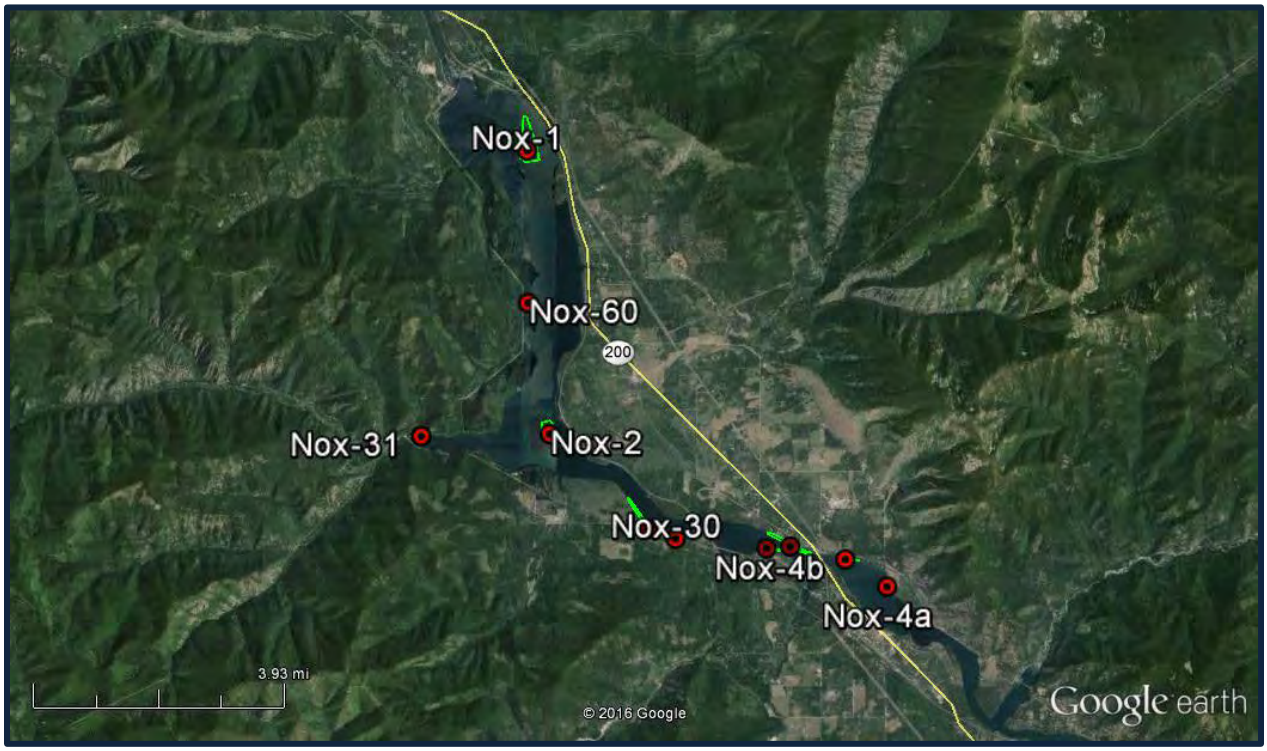
CLEAN LAKES INC.

# NOXON RAPIDS RESERVOIR
# SANDERS COUNTY, MONTANA

## 2016 Aquatic Invasive Species
## Aquatic Pesticide Application Report (APAR)




**Prepared By:**

CLEAN LAKES INC.

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**Prepared For:**
**Sanders County**
**1111 Main Street**
**Thompson Falls, MT 59873**

**October 2016**

**BACKGROUND INFORMATION:** Clean Lakes, Inc. (CLI) was contracted by Sanders County, Montana to provide aquatic herbicide applications for the control of Aquatic Invasive Species (AIS) within specific areas of Noxon Rapids Reservoir in 2016. Aquatic herbicide applications were conducted in compliance with the Montana Department of Environmental Quality, Montana Pollutant Discharge Elimination System (NPDES) Pesticide General Permit (PGP) for Pesticide Application (NOI Permit # MTG870000), as well as the Pesticide Discharge Management Plan (PDMP) developed as part of the PGP. The Permit related information is included in the Noxon Rapids Reservoir, Sanders County, Montana 2016 Aquatic Invasive Species Aquatic Pesticide Application Plan (APAP)[1].

**SCOPE OF WORK:** The scope of work was for the application of aquatic herbicides for the control of Eurasian watermilfoil (EWM) and Curly-leaf pondweed (CLP) in up to 200 acres within previously identified areas of Noxon Rapids Reservoir.

**PRE-TREATMENT SURVEYS:** Between June 27th and June 29th 2016, Erik Hansen (Hansen Environmental) carried out visual surveys of the 2015 Post Treatment sites and reported high levels of control. In addition, Hansen carried out visual surveys to identify and delineate areas of greater than 50% EWM density in areas larger than ½ acre in size, resulting in a total of 250 acres located within eleven (11) plots. Hansen followed up this visual survey with a point intercept survey of the eleven (11) infested plots based on a 45-meter grid pattern and a minimum of 2 sample points per acre during the weeks of July 4th and July 11th 2016. These summer surveys were used to develop the 2016 treatment plan to treat approximately 200 acres in Noxon Rapids Reservoir. Hansen Environmental provided the 2016 pre-treatment survey report on July 18th, 2016 (Report: 2016 Pre-Treatment Survey of Noxon and Cabinet Gorge Reservoirs). On July 29th, 2016 CLI received the final Proposed Herbicide Treatment Plan for controlling Eurasian watermilfoil (EWM) and hybrid watermilfoil (HWM) in Noxon Rapids Reservoir – July 2016, prepared by Dr. Kurt Getsinger. Hansen Environmental provided the final GIS Treatment shapefiles for the project on August 10th, 2016.

[1] NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA, 2016 AIS Aquatic Pesticide Application Plan (APAP)

**SUMMARY OF ACRES TREATED:** The final plan consisted of treating 199.2 acres of EWM in Noxon Rapids Reservoir. Treatment plots were identified through GIS files and treatment plans at the direction of the county.

**TREATMENT SCHEDULE:** The aquatic herbicide applications were performed on August 17th, 18th, and 23rd, 2016, as outlined in Table 1 below:

**Table 1: Treatment Plots, Dates and Times**

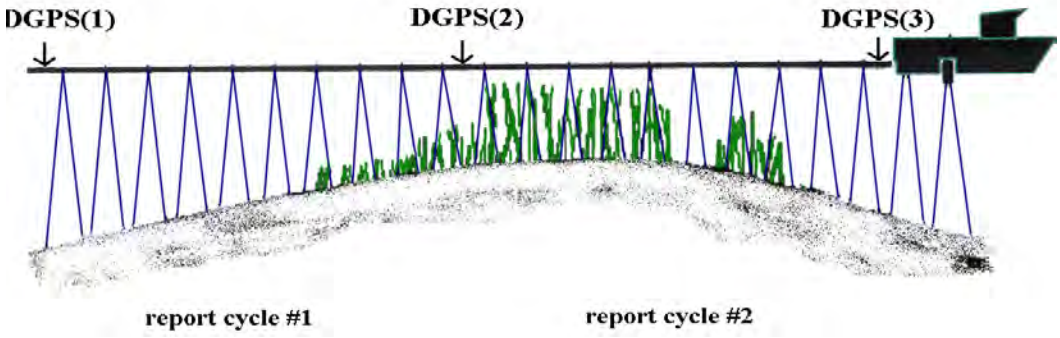
| 2016 Noxon Rapids Reservoir Treatment | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **Acreage** | **Mean Depth** | **Date** | **Start** | **Stop** | **Wind (mph)** | **Wind Direction** | **Sky** |
| **Nox-4a** | **2.2** | **5.0** | **8/17/2016** | **4:34 PM** | **4:53 PM** | **4.5** | **N** | **Partly Cloudy** |
| **Nox-4b** | **3.2** | **6.0** | **8/17/2016** | **5:05 PM** | **5:13 PM** | **7.0** | **N** | **Partly Cloudy** |
| **Nox-8** | **20.3** | **6.0** | **8/17/2016** | **2:30 PM** | **3:21 PM** | **3.8** | **N** | **Partly Cloudy** |
| **Nox-10** | **4.3** | **6.0** | **8/17/2016** | **5:34 PM** | **5:46 PM** | **10.2** | **N** | **Partly Cloudy** |
| **Nox-30** | **6.5** | **6.0** | **8/17/2016** | **6:11 PM** | **6:43 PM** | **6.2** | **N** | **Partly Cloudy** |
| **Nox-7** | **18.6** | **6.0** | **8/18/2016** | **11:34 PM** | **12:30 PM** | **2.0** | **W** | **Partly Cloudy** |
| **Nox-2** | **50.7** | **7.3** | **8/17/2016** | **1:18 PM** | **4:58 PM** | **3.0** | **N** | **Clear** |
| **Nox-31** | **4.6** | **6.0** | **8/17/2016** | **6:22 PM** | **6:33 PM** | **<1** | **N** | **Clear** |
| **Nox-60** | **3.3** | **5.0** | **8/18/2016** | **12:47 PM** | **12:59 PM** | **<1** | **W** | **Partly Cloudy** |
| **Nox-1** | **85.5** | **5.4** | **8/23/2016** | **11:57 AM** | **3:32 PM** | **4.8** | **S** | **Partly Cloudy** |
| **Total Noxon** | **199.2** | | | | | | | |

**EQUIPMENT USED:** Two of CLI's Littoral Zone Treatment vessels (LittLine®) were used to perform the aquatic herbicide applications. The herbicide applications were made to the lower portion of the water column to increase herbicide concentration and exposure time (CET) relationships for the control of the target species.

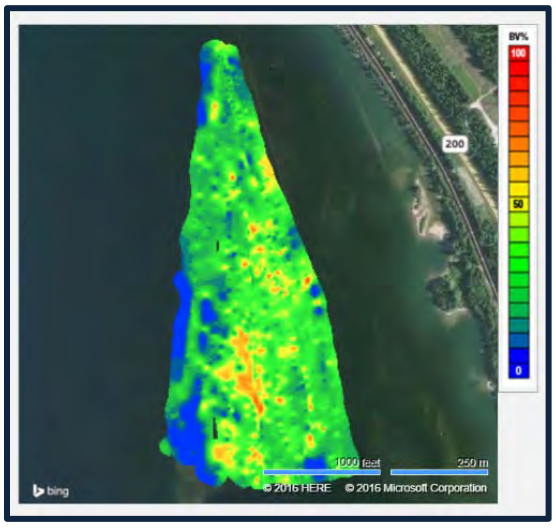
The AIS treatment area GIS shapefiles were loaded into the LittLine® computer system for vessel guidance and herbicide application data recording. The LittLine® can place herbicides at any depth within the water column (2 - 30 feet), as well as within the bottom 2 foot of the water column. Impacts from currents, wind and wave action are reduced in deep water applications through the use of the LittLine® application system when compared to conventional subsurface applications. The herbicide application in all of the plots was within the bottom portion of the water column.


The LittLine system's computerized rate controllers regulate the aquatic herbicide applications through preset treatment rates. When the vessel speeds up and or slows down, the rate controllers adjust the herbicide application rate to match the preset rate in gallons of product per acre.

A Digital Echosounder System with a Structure Scan Module was used to record data of the submerged aquatic vegetation (SAV) profile in the control plots during treatment and during the post treatment survey. Data was collected in both the .SLG (traditional sonar on HDS line) and the .SL2 (multi-channel structure scan) formats.




The sonar data collected was processed and analyzed for At Time of Treatment Submerged Aquatic Vegetation (SAV) in the treatment plots and at six (6) Weeks Post Treatment. Data was collected to compare At Time of Treatment to six (6) Week Post Treatment SAV coverage, height in the water column, and bio-volume to support post-treatment efficacy evaluations. An example of SAV conditions at the time of treatment for Plot Nox-1, Noxon Reservoir, is pictured to the right.



**AQUATIC HERBICIDES:** CLI provided the aquatic herbicides for the project that were delivered by IEDS of Spokane, WA in recyclable totes and 2.5 gallon containers. CLI provided the required support equipment for material handling (herbicide transfer) as well as support vehicles for the vessels assigned to the project. The aquatic herbicides were applied to areas of Noxon Rapids Reservoir for the control of Eurasian watermilfoil and Curly-leaf pondweed as outlined in the Site Data Tables below (Herbicide Label's and Material Safety Data Sheets (MSDS's) are included in the APAP).

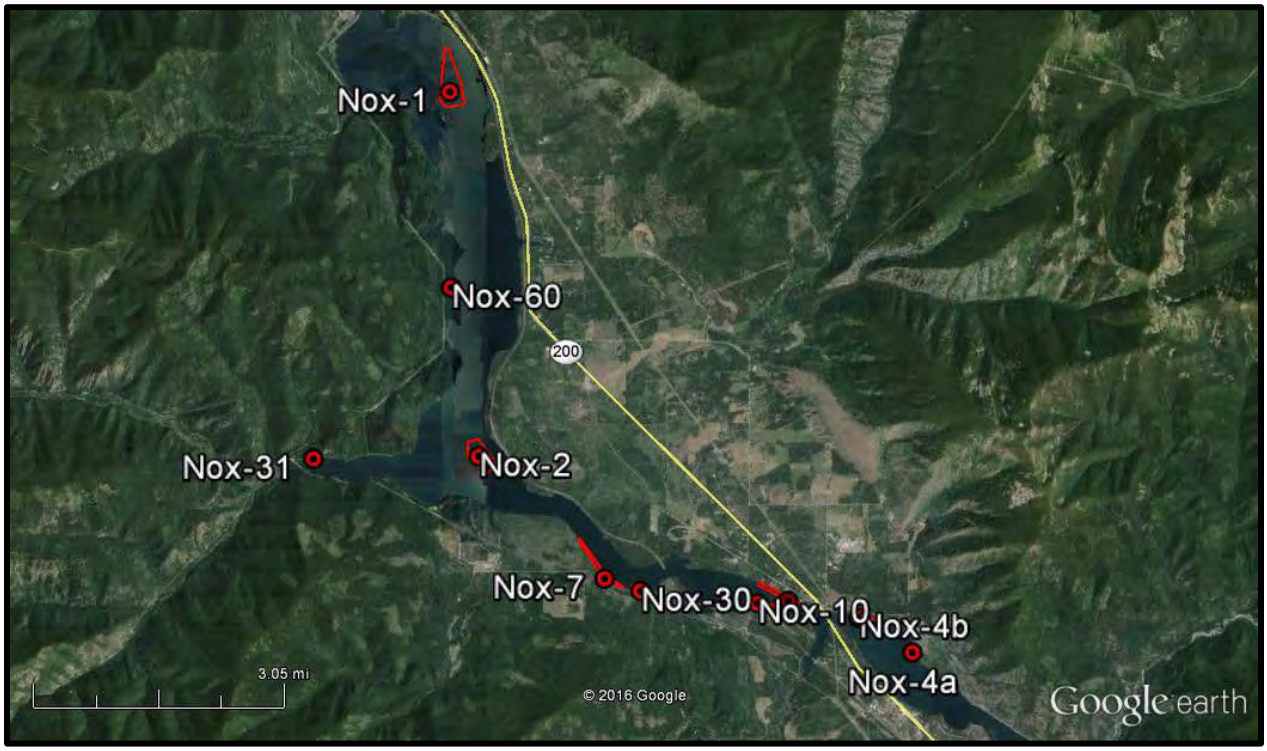
**PERMIT COMPLIANCE:** CLI supported the development of the Aquatic Pesticide Application Plan, and Sanders County provided the required permits and approvals for the herbicide treatments from the Montana Department of Environmental Quality. There were no adverse incidents to report. Herbicide equipment calibration occurred on August 16, 2016.

**SERVICES PROVIDED BY CLI:** All manpower, materials, insurance, equipment and technical advice required to perform aquatic herbicide applications in the project areas. In addition, CLI hosted a webpage at http://www.cleanlake.com/2016noxonrapidsais.html to provide project related information to the public.

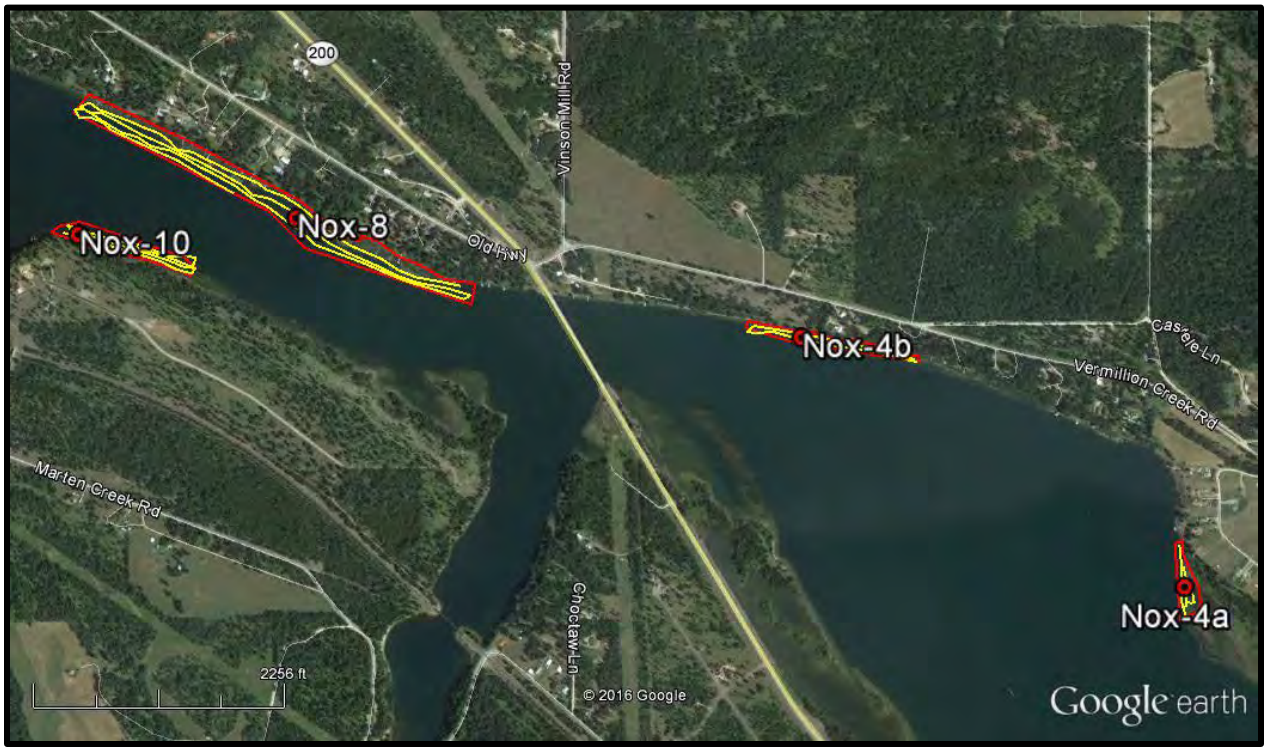
**SERVICES PROVIDED BY SANDERS COUNTY:** Sanders County provided the required permits, published legal notices in newspapers, provided notification to property owners, posting at public boat launch facilities, and provided the project area GIS shapefiles from the 2016 Pre Treatment Surveys that were used to generate the final 2016 Treatment Plan.

## TREATMENT AREA PLOT MAPS

### Overview of the 2016 Noxon Rapids Reservoir Treatment Plots

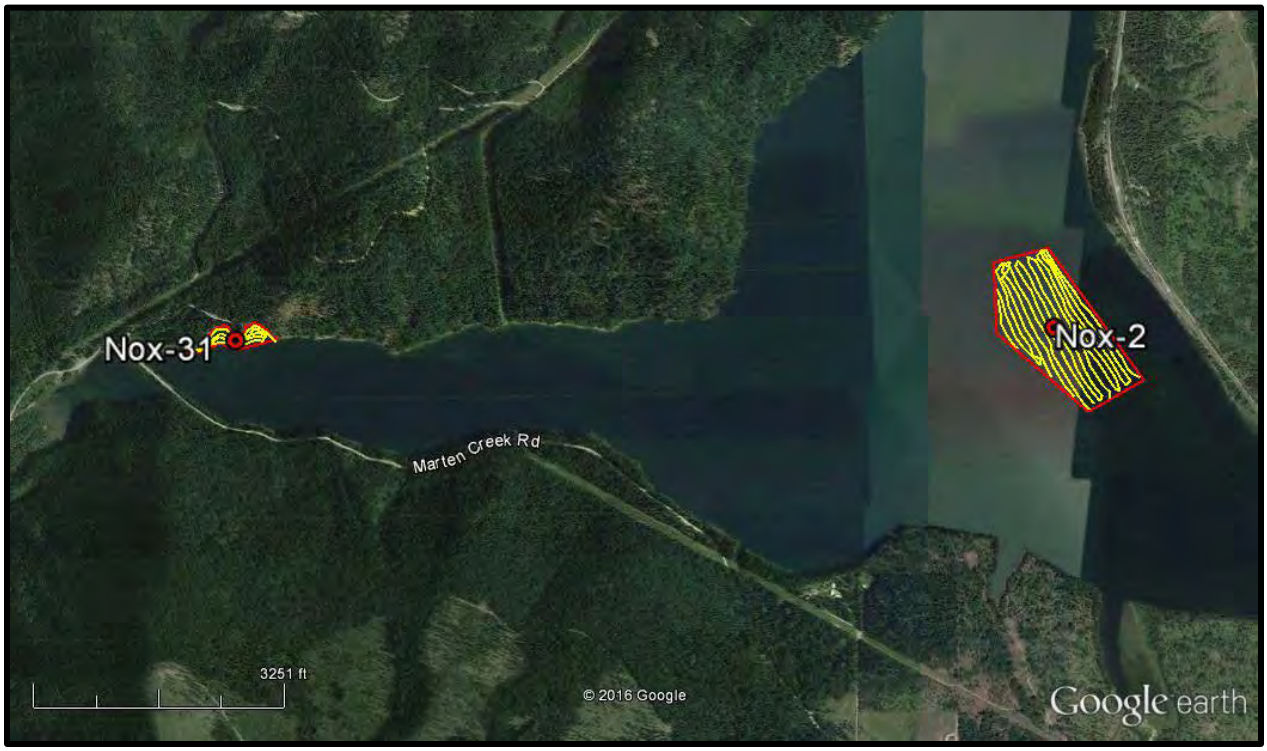


**Noxon Rapids Reservoir Plots Nox-4a, Nox-4b, Nox-8, Nox-10 & Treatment Tracks**




**Noxon Rapids Reservoir Plots Nox-30, Nox-7 & Treatment Tracks**

**Noxon Rapids Reservoir Plots Nox-31, Nox-2 & Treatment Tracks**




**Noxon Rapids Reservoir Plot Nox-60 & Treatment Tracks**

## Noxon Rapids Reservoir Plot Nox-1 & Treatment Tracks

## TREATMENT SITE DATA

Table 2: Noxon Rapids
Reservoir, Plot Treatment Site Data, Aquatic Herbicides Used:

| 2016 Noxon Rapids Reservoir Treatment | | | | | Triclopyr | | | Endothall | | | AquaStrike (Endothall/Diquat) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plot Number | Acreage | Mean Depth | Volume | Product | Rate ppm | Gal/ Aft | Gal Total Site | Rate ppm | Gal/ Aft | Gal Total Site | Rate ppm | Gal/ Aft | Gal Total Site |
| Nox-4a | 2.2 | 5.0 | 11 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 17.9 |
| Nox-4b | 3.2 | 6.0 | 19 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 31.2 |
| Nox-8 | 20.3 | 6.0 | 122 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 197.9 |
| Nox-10 | 4.3 | 6.0 | 26 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 41.9 |
| Nox-30 | 6.5 | 6.0 | 39 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 63.4 |
| Nox-7 | 18.6 | 6.0 | 112 | End/Tri | 1.00 | 0.905 | 101.0 | 2.0 | 1.28 | 142.8 | | | |
| Nox-2 | 50.7 | 7.3 | 371 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 602.8 |
| Nox-31 | 4.6 | 6.0 | 28 | AquaStrike | 0.00 | 0.000 | 0.0 | 0.0 | 0.00 | 0.0 | 1.8/0.36 | 1.63 | 44.9 |
| Nox-60 | 3.3 | 5.0 | 17 | End/Tri | 1.00 | 0.905 | 14.7 | 2.0 | 1.28 | 21.1 | | | |
| Nox-1 | 85.5 | 5.4 | 458 | End/Tri | 1.00 | 0.905 | 414.28 | 2.0 | 1.28 | 586.0 | | | |
| Total | 199.2 | | | | | | 530.0 | | | 750.0 | | | 1000.0 |

Table 2 Notes: The 2016 Treatment priority was based on treatment progressing in an upstream to downstream direction.

**POST TREATMENT SURVEYS:**

On August 22nd, 2016 treatment plots were visited by CLI staff and Dr. Kurt Getsinger, Jason Badger, and Tanner Mitchell where it was noted that EWM plants treated on August 17th and 18th, 2016 were showing herbicide treatment symptoms.

On October 5th, 2016, treatment plots were surveyed to evaluate Post Treatment Herbicide Injury, approximately 6 weeks post treatment. Estimates of the herbicide Injury Rank during the survey of the treatment plots were made by the participants that included Kim Bergstrom (AIS Task Force Coordinator), Nate Hall (Avista), Tanner Mitchell (Avista), Rep. Bob Brown, Commissioner Tony Cox (Sanders County), Susan Drumheller (AIS Task Force), Judson Shively (Sanders County Weed Supt.), Joe Vassios (United Phosphorus, Inc.), Craig Smith (United Phosphorus, Inc.), and Tom Moorhouse (Clean Lakes, Inc.).

The observations contained in this report are general six (6) week Post Treatment observations, and should not be used for control efficacy evaluations. In addition, it should be noted that a Post Treatment increase in Submerged Aquatic Vegetation (SAV) Percent Area Coverage, height in the water column, and bio-volume can result, and can be attributed to an increase in native vegetation in response to selectively controlling the target species. For instance, the picture to the right shows abundant growth of the submersed aquatic plant species know as Chara.

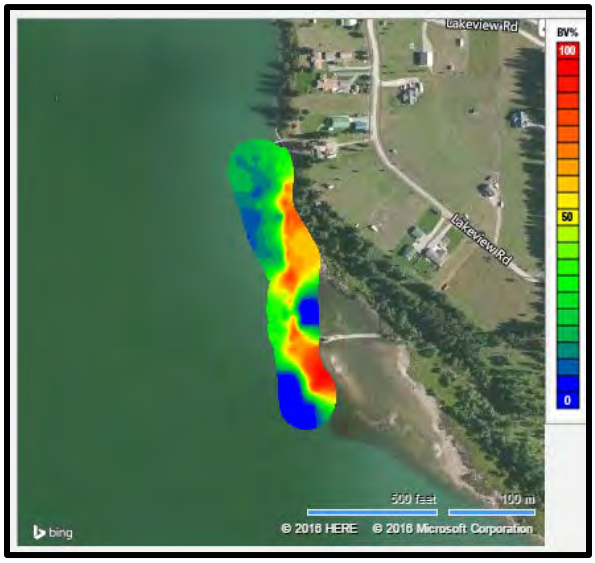
## Plot Percent SAV Cover and SAV Bio-Volume Present At Time of Application and Six (6) Weeks Post Treatment

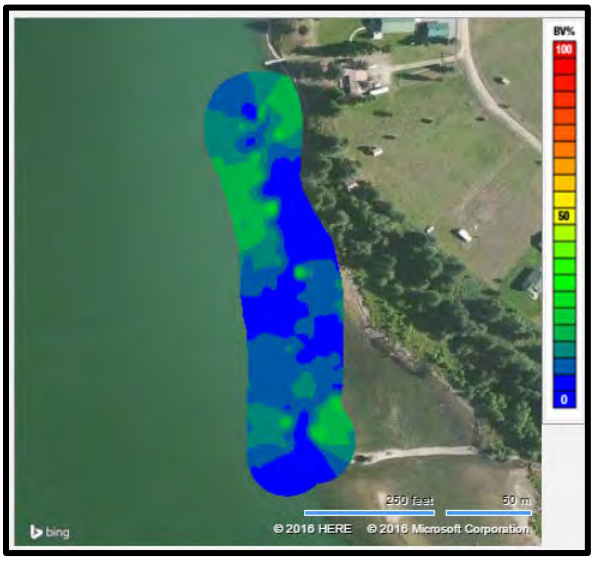
| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Plot Number | SAV % Cover | SAV % Bio-Volume | Date Data Collected Pre Treatment | SAV % Cover | SAV % Bio-Volume | Date Data Collected-Post Treatment | SAV % BV Change | Post Treatment EWM Injury Rank | Herbicides Used |
| Noxon Rapids | | | | | | | | | |
| Nox-4a | 87.5 | 38.1 | 8/17/2016 | 71.1 | 11.0 | 10/5/2016 | -71% | 95% +/- | AquaStrike |
| Nox-4b | 99.4 | 44.3 | 8/17/2016 | 58.3 | 15.4 | 10/5/2016 | -65% | 90% +/- | AquaStrike |
| Nox-8 | 90.1 | 48.0 | 8/17/2016 | 18.1 | 9.8 | 10/5/2016 | -80% | 95% +/- | AquaStrike |
| Nox-10 | 97.0 | 51.3 | 8/17/2016 | 7.7 | 9.1 | 10/5/2016 | -82% | 95% +/- | AquaStrike |
| Nox-30 | 94.0 | 41.9 | 8/17/2016 | 46.9 | 10.1 | 10/5/2016 | -76% | 95% +/- | AquaStrike |
| Nox-7 | 100.0 | 57.5 | 8/18/2016 | 73.9 | 16.6 | 10/5/2016 | -71% | 90% +/- | End/Tri |
| Nox-2 | 99.4 | 33.6 | 8/17/2016 | 55.9 | 13.2 | 10/5/2016 | -61% | 95% +/- | AquaStrike |
| Nox-31 | 99.9 | 44.2 | 8/17/2016 | 53.4 | 9.3 | 10/5/2016 | -79% | 95% +/- | AquaStrike |
| Nox-60 | 100.0 | 58.1 | 8/18/2016 | 90.6 | 22.0 | 10/5/2016 | -62% | 98% +/- | End/Tri |
| Nox-1 | 93.0 | 30.3 | 8/23/2016 | 93.8 | 24.8 | 10/4/2016 | -18% | 90% +/- | End/Tri |

- Notes:
  - Herbicides used End/Tri = Combination of Endothall and Triclopyr, AquaStrike is a formulation of endothall and diquat.

## PRE AND POST TREATMENT SUBMERSED AQUATIC VEGETATION (SAV) DATA, SAV PERCENT COVER, AND BIO-VOLUME DATA SETS

### Plot Nox-4a: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Plot Number | SAV % Cover | SAV % Bio-Volume | Date Data Collected Pre Treatment | SAV % Cover | SAV % Bio-Volume | Date Data Collected-Post Treatment | SAV % BV Change | Post Treatment EWM Injury Rank | Herbicides Used |
| Noxon Rapids | | | | | | | | | |
| Nox-4a | 87.5 | 38.1 | 8/17/2016 | 71.1 | 11.0 | 10/5/2016 | -71% | 95% +/- | AquaStrike |

**Observations/Notes Nox-4a:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

## Plot Nox-4a: At Time of Treatment (August 17, 2016)

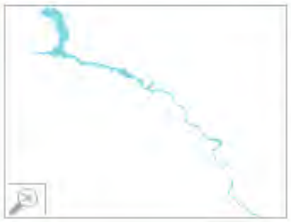
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 8/24/2016 5:54:15 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/17/2016 10:33:38 PM (UTC)

**Average Water Temperature**
24.44° C (76° F)

**Location**
Start: 47.84879684, -115.58869171
End: 47.84884372, -115.58840179

**Survey Size**
Area: 2.49 ha (6.14 acres)
Percent: 0.08% of waterbody
Volume: 102,581.30 cu. m (83.16 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

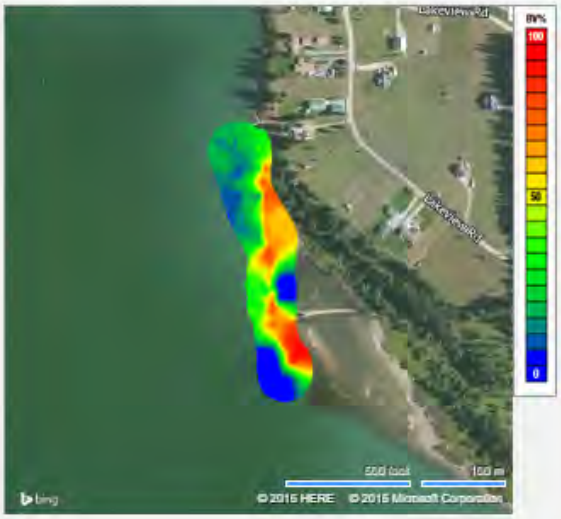
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 92.7% | 53.8% | ±26.4% | 49.9% | ±29.1% | 0.81-11.42 m | 3.12 m | 1.1 km | 1,836 |
| | Grid | 87.5% | 38.1% | ±23.9% | 33.3% | ±25.7% | 0.03-11.62 m | 4.06 m | - | 655 |

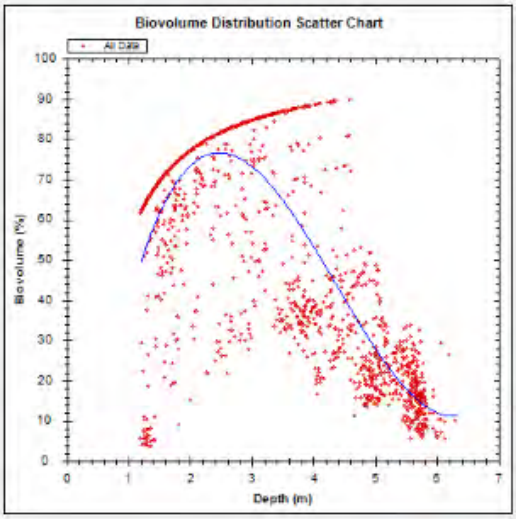
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 99.8% | 65.9% | ±20.7% | 65.8% | ±20.9% | 0.84-5.44 m | 2.95 m | 227.07 m | 422 |
| | Grid | 97.3% | 46.4% | ±19.7% | 45.2% | ±20.8% | 0.03-5.78 m | 2.72 m | - | 338 |
| 2 | Point | 100% | 51.8% | ±19.5% | 51.8% | ±19.5% | 0.81-1.95 m | 0.93 m | 50.55 m | 12 |
| | Grid | 77.7% | 37.1% | ±17.6% | 28.8% | ±21.9% | 0.26-5.56 m | 1.9 m | - | 94 |
| 3 | Point | 90.5% | 49.8% | ±27% | 45.1% | ±29.5% | 0.82-11.42 m | 3.32 m | 823.58 m | 1,402 |
| | Grid | 87.4% | 38.1% | ±24% | 33.3% | ±25.8% | 0.03-11.62 m | 4.05 m | - | 649 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-4a: ~ Six (6) Weeks Post Treatment (October 5, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Waterbody Size: 3,241.50 ha *(8,009.90 acres)*

Generated: 10/8/2016 3:34:26 PM (UTC)

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 3:08:09 PM (UTC)

**Average Water Temperature**
15.2° C (59.36° F)

**Location**
Start: 47.84700012, -115.58839417
End: 47.84693527, -115.58860018

**Survey Size**
Area: 1.44 ha (3.55 acres)
Percent: 0.04% of waterbody
Volume: 53,908.30 cu. m (43.70 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

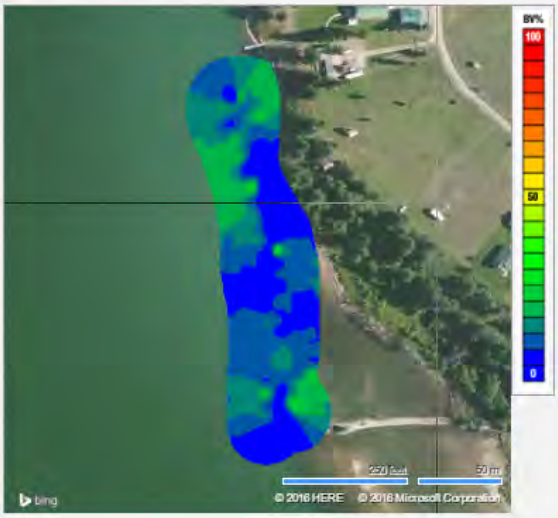
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

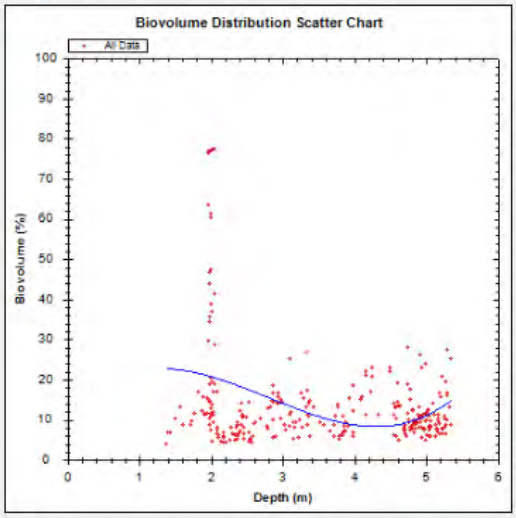
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 61.1% | 14.9% | ±14.4% | 9.1% | ±13.4% | 1.38-5.62 m | 3.44 m | 445.32 m | 460 |
| | Grid | 71.1% | 11% | ±4.4% | 7.8% | ±6.2% | 0.04-6.54 m | 3.49 m | - | 492 |

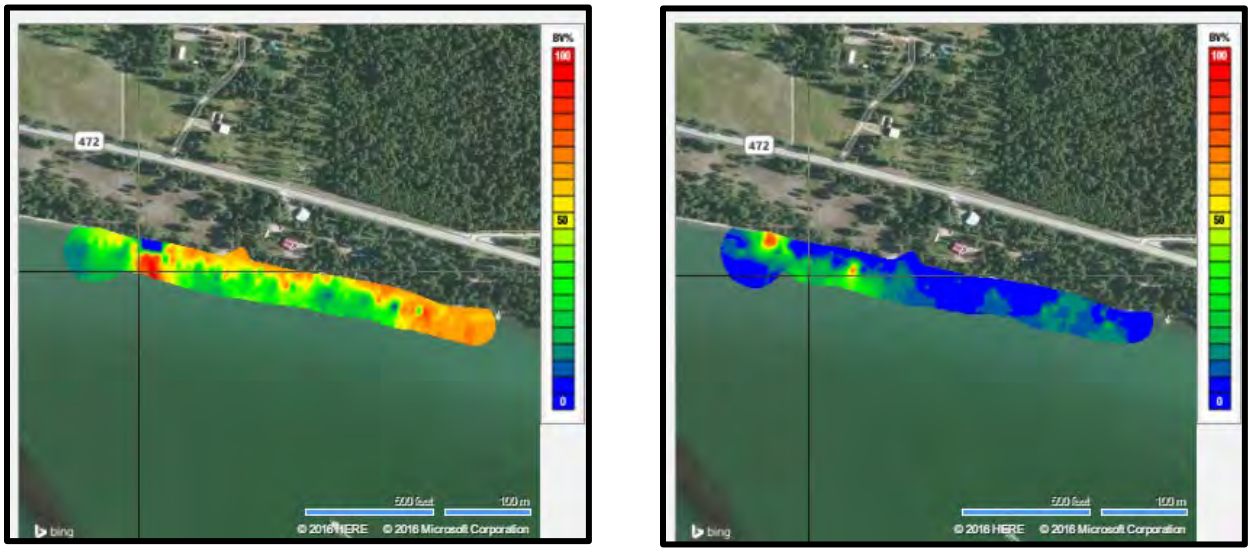
**Vegetation Biovolume Heat Map**




**Biovolume Distribution Scatter Chart**



**Plot Nox-4b: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-4b** | **99.4** | **44.3** | **8/17/2016** | **58.3** | **15.4** | **10/5/2016** | **-65%** | **90% +/-** | **AquaStrike** |

**Observations/Notes Nox-4b:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 90%.

## Plot Nox-4b: At Time of Treatment (August 17, 2016)

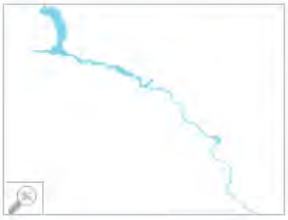
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Waterbody Size: 3,241.50 ha (8,009.90 acres)

Generated: 8/24/2016 4:33:06 PM (UTC)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/17/2016 11:05:35 PM (UTC)

**Average Water Temperature**
24.55° C (76.19° F)

**Location**
Start: 47.8532486, -115.59861755
End: 47.85314178, -115.59811401

**Survey Size**
Area: 2.55 ha (6.30 acres)
Percent: 0.08% of waterbody
Volume: 61,510.10 cu. m (49.87 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

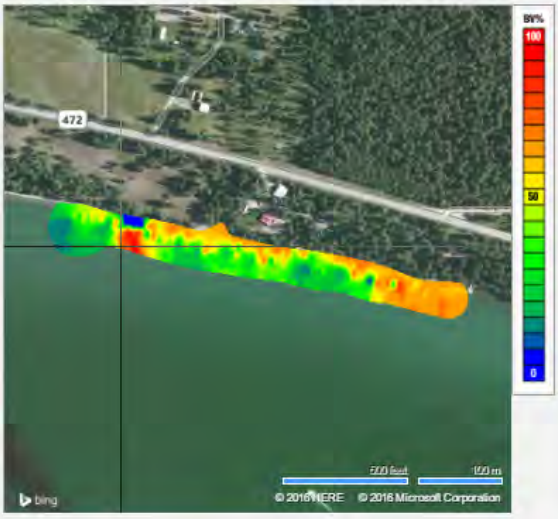
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: McCormack, Ian
Comments: Quick QC Pass

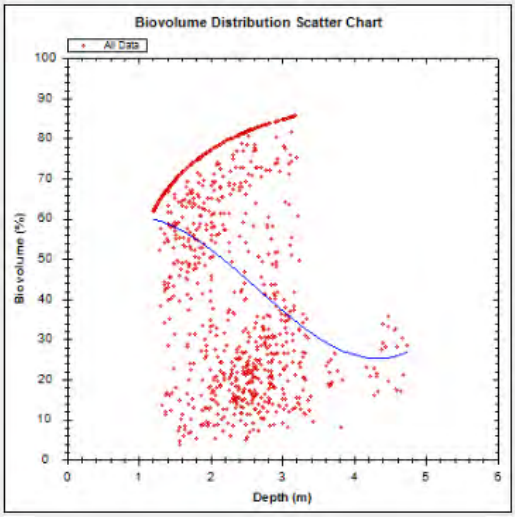
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 94.3% | 48.9% | ±24.7% | 46.1% | ±26.5% | 0.82-6.89 m | 2.08 m | 977.17 m | 1,139 |
| | Grid | 99.4% | 44.3% | ±19.9% | 44% | ±20.2% | 0.04-6.61 m | 2.21 m | - | 675 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-4b: ~ Six (6) Weeks Post Treatment (October 5, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:39:04 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 3:15:11 PM (UTC)

**Average Water Temperature**
15.56° C (60.01° F)

**Location**
Start: 47.85322952, -115.59832001
End: 47.85321808, -115.59841919

**Survey Size**
Area: 2.62 ha (6.47 acres)
Percent: 0.08% of waterbody
Volume: 83,728.60 cu. m (67.88 acre ft)

**Settings**

| | |
|---|---|
| Track Buffer: | 25 m |
| Grid Cell Size: | 5 m |
| Min. BV Detect: | 5% |
| Min. Veg Depth Detect: | 0.73152 m |

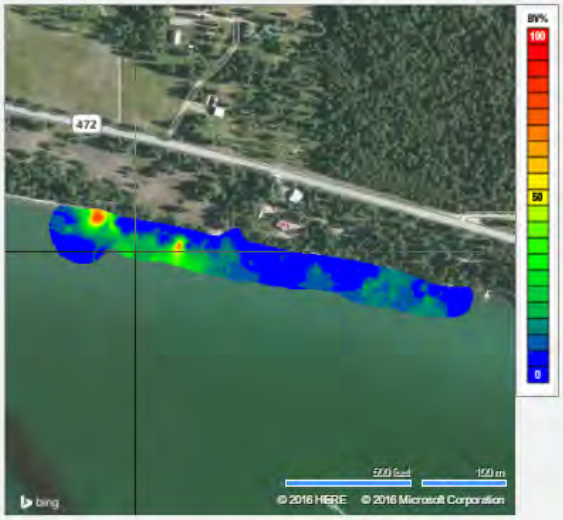
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

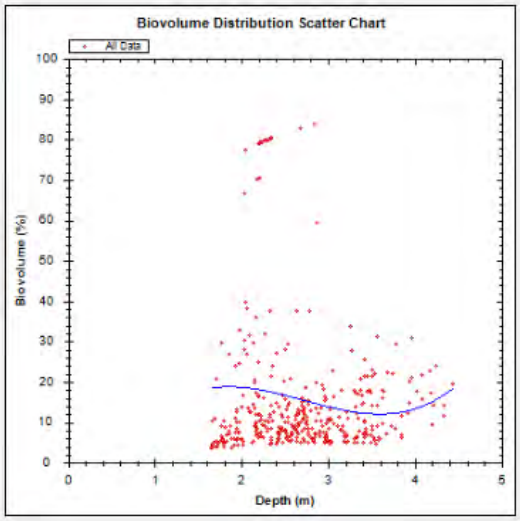
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 49.3% | 17% | ±18.3% | 8.4% | ±15.4% | 1.59-8.14 m | 2.75 m | 1.06 km | 738 |
| | Grid | 58.3% | 15.4% | ±12.2% | 9% | ±12% | 0.06-8.07 m | 2.99 m | - | 732 |

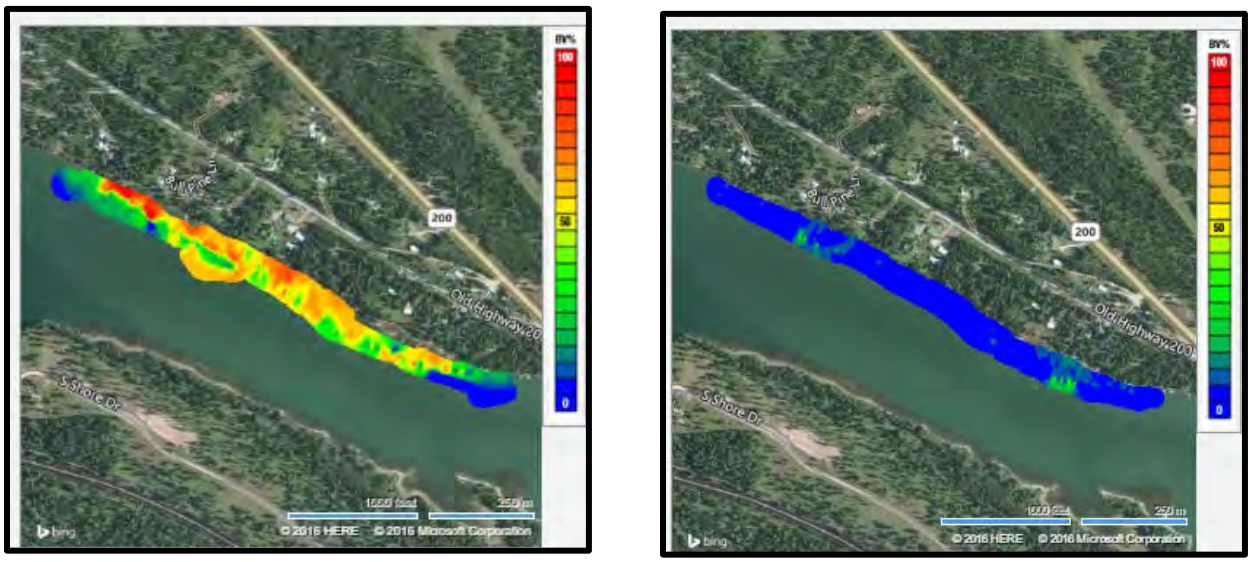
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



**Plot Nox-8: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-8** | **90.1** | **48.0** | **8/17/2016** | **18.1** | **9.8** | **10/5/2016** | **-80%** | **95% +/-** | **AquaStrike** |

**Observations/Notes Nox 8:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

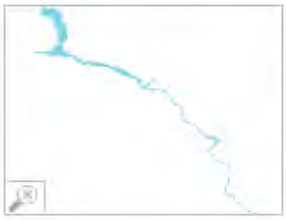
## Plot Nox-8: At Time of Treatment (August 17, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 9/24/2016 6:11:39 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/17/2016 8:30:47 PM (UTC)

**Average Water Temperature**
24.98° C (76.97° F)

**Location**
Start: 47.85902023, -115.62817383
End: 47.85749435, -115.6237793

**Survey Size**
Area: 10.72 ha (26.49 acres)
Percent: 0.33% of waterbody
Volume: 459,831.60 cu. m (372.79 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

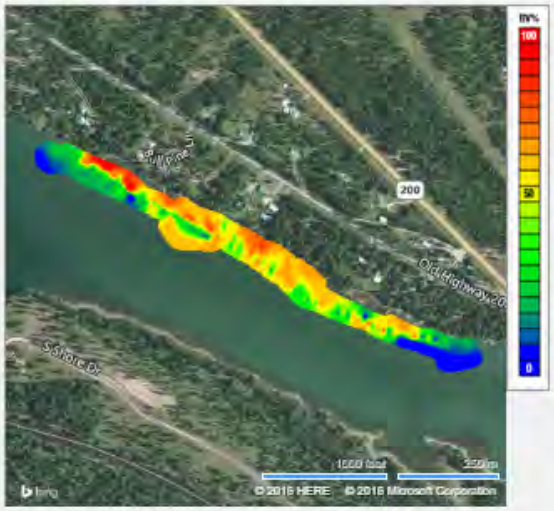
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 93.6% | 40.6% | ±23.8% | 38% | ±25.1% | 0.81-27.87 m | 3.57 m | 4.33 km | 1,994 |
| | Grid | 90.1% | 48% | ±21.1% | 43.3% | ±24.6% | 0-28.23 m | 4.35 m | - | 3,235 |

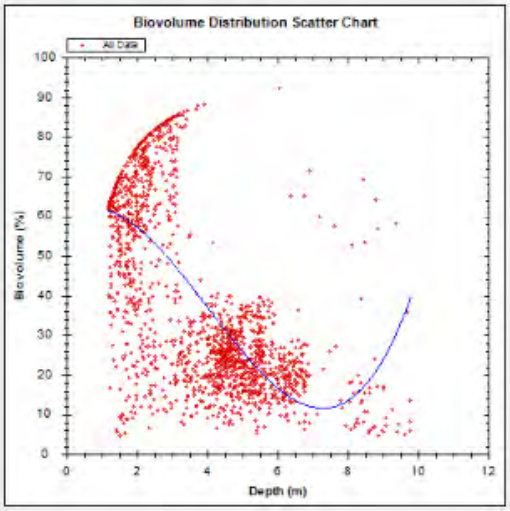
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 91.9% | 23.6% | ±7.5% | 21.7% | ±9.7% | 3.31-7.27 m | 5.08 m | 374.78 m | 616 |
| | Grid | 98.4% | 38.5% | ±20.6% | 37.9% | ±21% | 0.62-7.68 m | 3.43 m | - | 705 |
| 2 | Point | 94.3% | 48% | ±24.6% | 45.3% | ±26.4% | 0.81-27.87 m | 3.1 m | 3.95 km | 1,378 |
| | Grid | 90% | 48.5% | ±20.9% | 43.7% | ±24.6% | 0-28.23 m | 4.33 m | - | 3,184 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-8: ~ Six (6) Weeks Post Treatment (October 5, 2016)

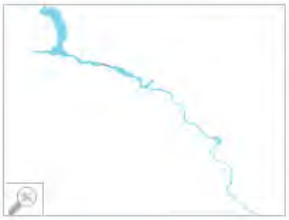
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:22:22 PM (UTC)

Waterbody Size: 3,241.50 ha *(8,009.90 acres)*

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 3:24:12 PM (UTC)

**Average Water Temperature**
15.92° C (60.65° F)

**Location**
Start: 47.85486603, -115.61456299
End: 47.85483551, -115.6149292

**Survey Size**
Area: 8.76 ha (21.64 acres)
Percent: 0.27% of waterbody
Volume: 372,916.10 cu. m (302.33 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

**Offset**
0.4572 m
No description

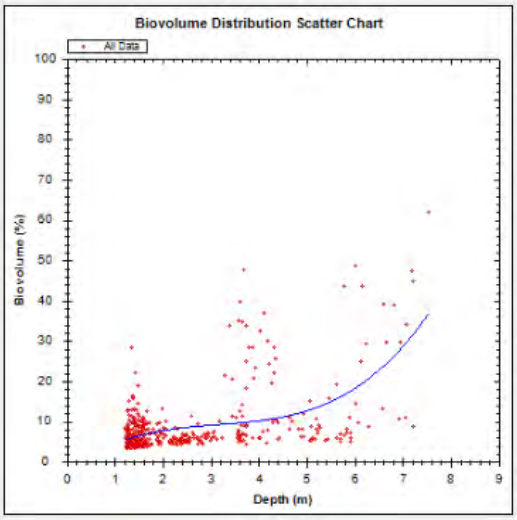
**Quality Control**
Reviewer: McCormack, Ian
Comments: False depths at the end of trip.

### Area of Interest Summary

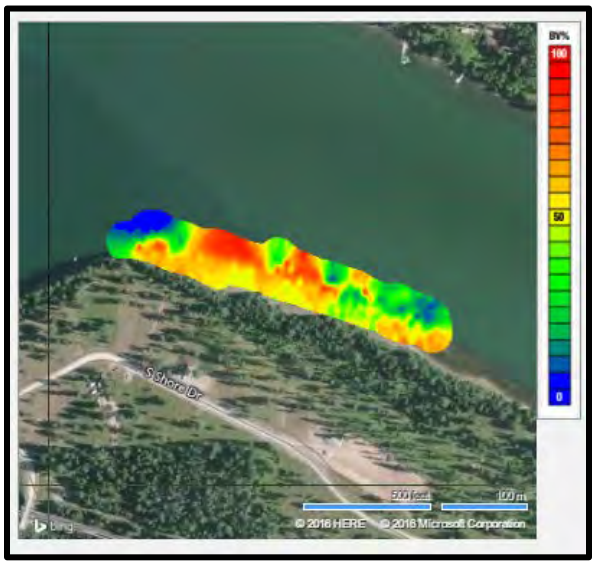
| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 20.5% | 10.4% | ±8.7% | 2.1% | ±5.8% | 1.11-27.43 m | 3.27 m | 2.57 km | 1,649 |
| | Grid | 18.1% | 9.8% | ±5.5% | 1.8% | ±4.4% | 0.01-29.63 m | 4 m | - | 2,759 |

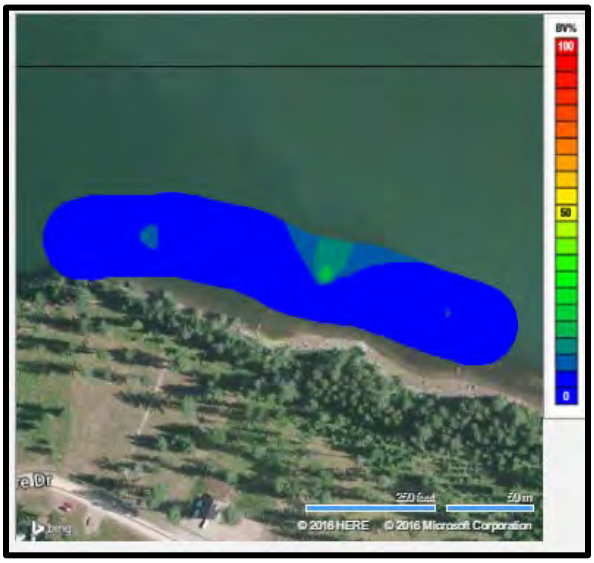
Vegetation Biovolume Heat Map


Biovolume Distribution Scatter Chart



**Plot Nox-10: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-10** | **97.0** | **51.3** | **8/17/2016** | **7.7** | **9.1** | **10/5/2016** | **-82%** | **95% +/-** | **AquaStrike** |

**Observations/Notes Nox-10:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

## Plot Nox-10: Pre Treatment (August 17, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 8/24/2016 4:31:22 PM (UTC)

**Waterbody Size:** 3,241.50 ha *(8,009.90 acres)*

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/17/2016 11:34:21 PM (UTC)

**Average Water Temperature**
24.73° C (76.52° F)

**Location**
Start: 47.8564415, -115.62987518
End: 47.85625076, -115.62733459

**Survey Size**
Area: 3.01 ha (7.45 acres)
Percent: 0.09% of waterbody
Volume: 71,583.90 cu. m (58.03 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

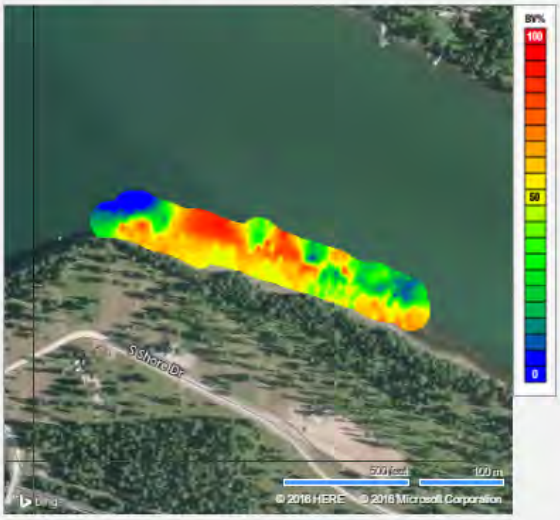
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: McCormack, Ian
Comments: False depths due to thick vegetation. - QQC

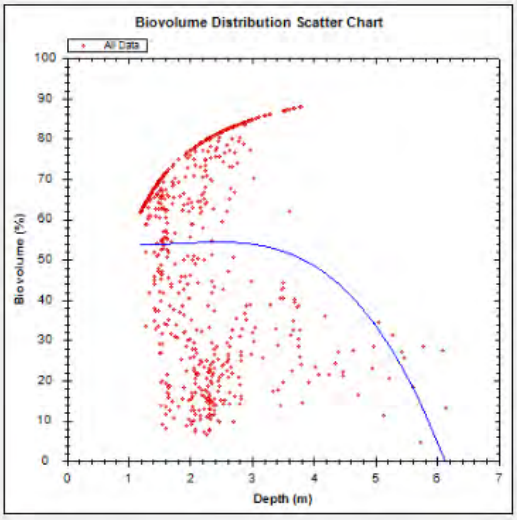
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 97.1% | 53.4% | ±24.9% | 51.8% | ±26.2% | 0.8-6.87 m | 1.93 m | 1.41 km | 723 |
| | Grid | 97% | 51.3% | ±20.2% | 49.8% | ±21.8% | 0.1-7.4 m | 2.36 m | - | 625 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-10: ~ Six (6) Weeks Post Treatment (October 5, 2016)

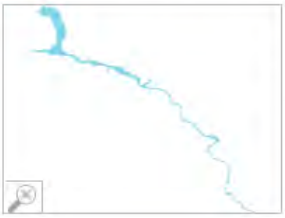
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:18:16 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 3:50:37 PM (UTC)

**Average Water Temperature**
16.09° C (60.95° F)

**Location**
Start: 47.85600281, -115.62664795
End: 47.8564682, -115.62986755

**Survey Size**
Area: 1.47 ha (3.63 acres)
Percent: 0.05% of waterbody
Volume: 58,783.60 cu. m (47.66 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

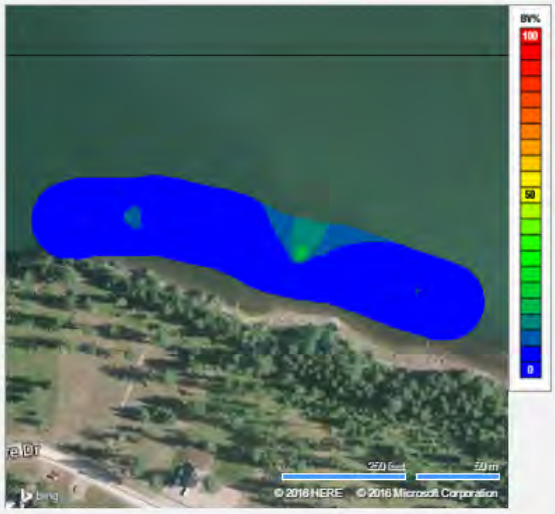
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

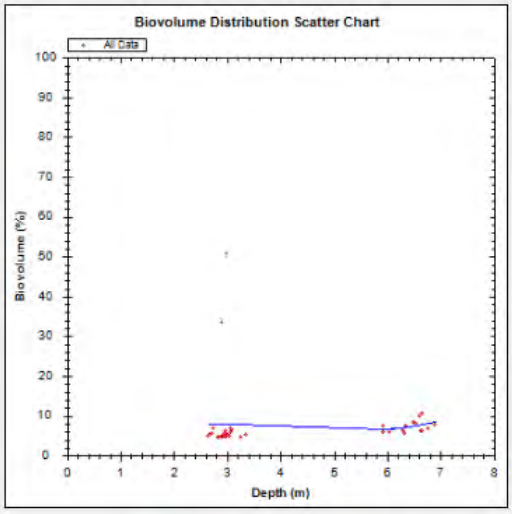
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 17.8% | 8.4% | ±8.4% | 1.5% | ±4.8% | 2.65-7.12 m | 4.09 m | 264.8 m | 208 |
| | Grid | 7.7% | 9.1% | ±3.5% | 0.7% | ±2.6% | 0.18-7.83 m | 4.02 m | - | 478 |

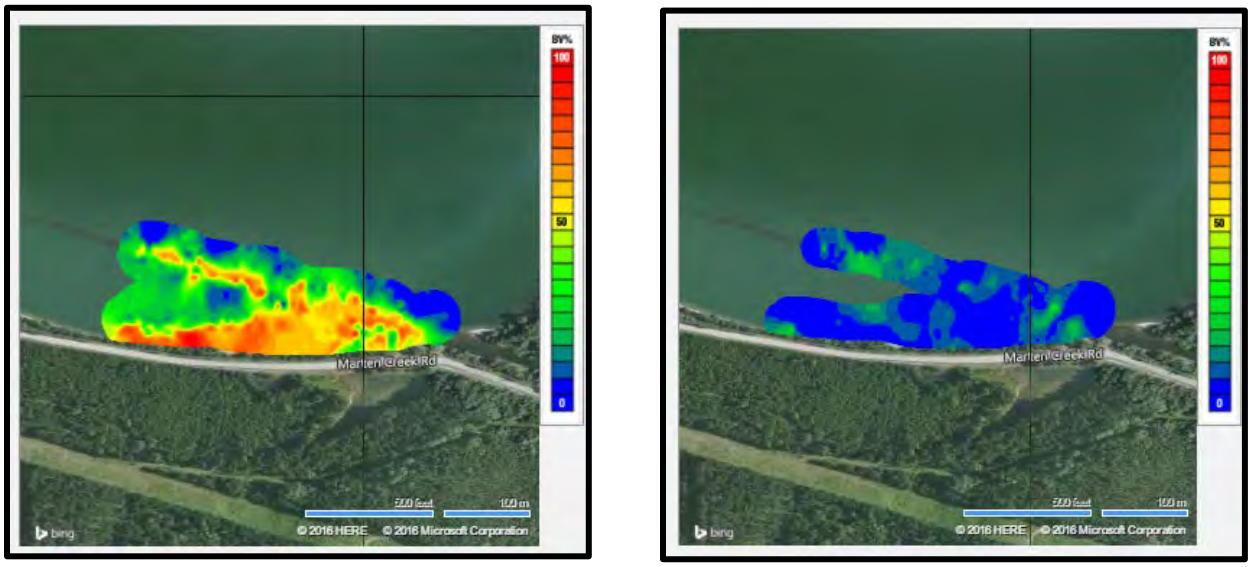
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



**Plot Nox-30: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-30** | **94.0** | **41.9** | **8/17/2016** | **46.9** | **10.1** | **10/5/2016** | **-76%** | **95% +/-** | **AquaStrike** |

**Observations/Notes Nox-10:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

## Plot Nox-30: Pre Treatment (August 17, 2016)

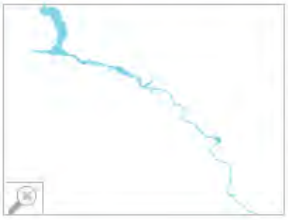
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 8/24/2016 4:35:56 PM (UTC)

**Waterbody Size:** 3,241.50 ha *(8,009.90 acres)*

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/18/2016 12:10:41 AM (UTC)

**Average Water Temperature**
25.46° C (77.82° F)

**Location**
Start: 47.85852432, -115.66217041
End: 47.85853577, -115.66123199

**Survey Size**
Area: 4.87 ha (12.02 acres)
Percent: 0.15% of waterbody
Volume: 174,804.40 cu. m (141.72 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

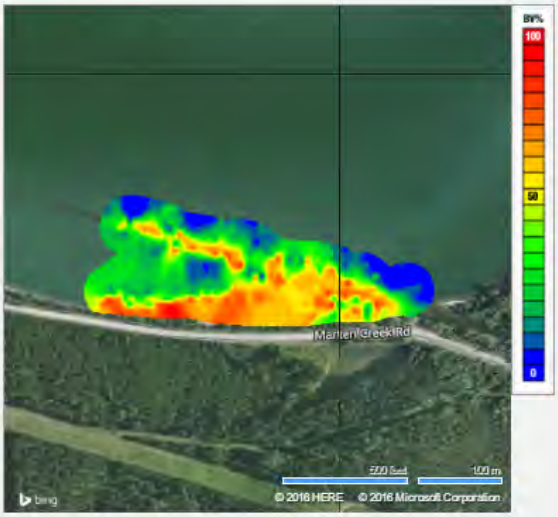
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: McCormack, Ian
Comments: False depths due to thick vegetation. - QQC

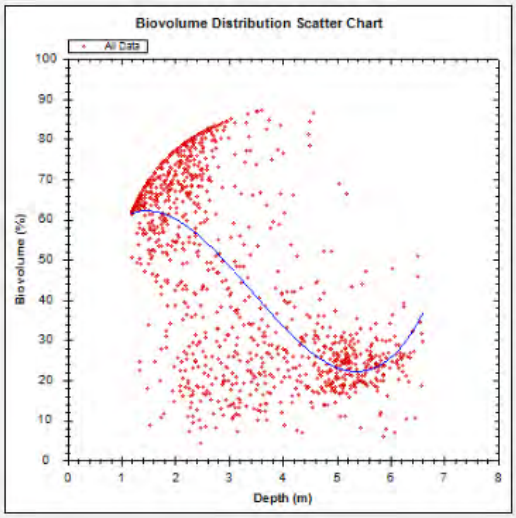
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 96.4% | 46.7% | ±23.4% | 45% | ±24.6% | 0.81-7.36 m | 2.44 m | 4.13 km | 1,234 |
| | Grid | 94% | 41.9% | ±22.2% | 39.4% | ±23.7% | 0.03-8.16 m | 3.58 m | - | 1,131 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-30: ~ Six (6) Weeks Post Treatment (October 5, 2016)

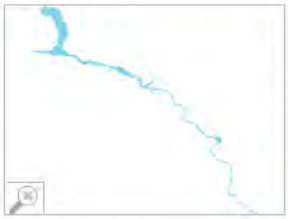
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Waterbody Size: 3,241.50 ha (8,009.90 acres)

Generated: 10/8/2016 3:56:53 PM (UTC)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 6:23:36 PM (UTC)

**Average Water Temperature**
16.21° C (61.18° F)

**Location**
Start: 47.85936356, -115.66207886
End: 47.85863113, -115.65801239

**Survey Size**
Area: 3.88 ha (9.58 acres)
Percent: 0.12% of waterbody
Volume: 124,940.60 cu. m (101.29 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

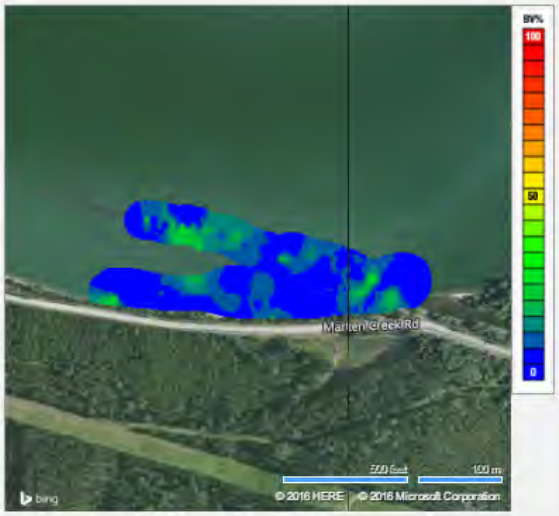
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

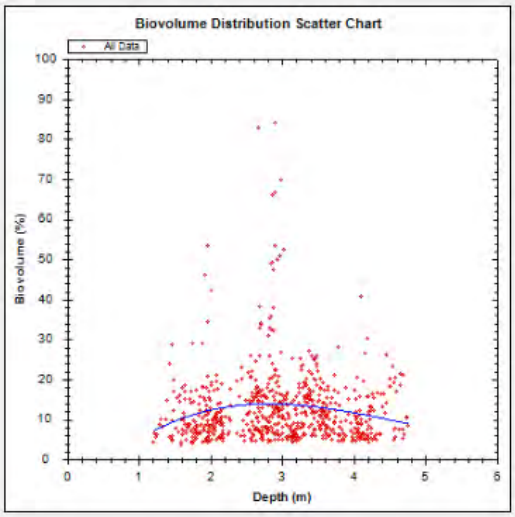
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 52.4% | 13.3% | ±9.3% | 7% | ±9.5% | 0.95-7.24 m | 3.09 m | 1.26 km | 1,272 |
| | Grid | 46.9% | 10.1% | ±4.5% | 4.8% | ±5.9% | 0.24-8.01 m | 3.22 m | - | 1,012 |

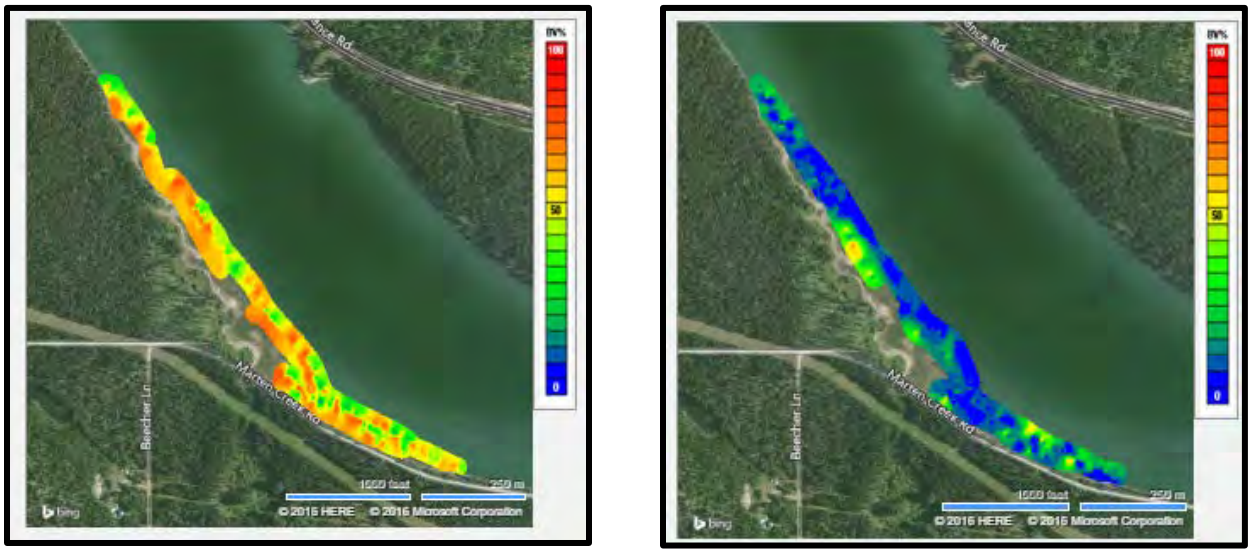
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



**Plot Nox-7: At Time of Treatment (August 18, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-7** | **100.0** | **57.5** | **8/18/2016** | **73.9** | **16.6** | **10/5/2016** | **-71%** | **90% +/-** | **End/Tri** |

**Observations/Notes Nox-7:** Treated with 1.0 ppm triclopyr, 2.0 ppm endothall, control visually estimated at +/- 90%.

## Plot Nox-7: Pre Treatment (August 18, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 4:39:30 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.90 acres)

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/18/2016 6:34:15 PM (UTC)

**Average Water Temperature**
24.55° C (76.18° F)

**Location**
Start: 47.85886002, -115.86441345
End: 47.86422729, -115.87310333

**Survey Size**
Area: 10.80 ha (26.69 acres)
Percent: 0.33% of waterbody
Volume: 188,700.40 cu. m (152.98 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

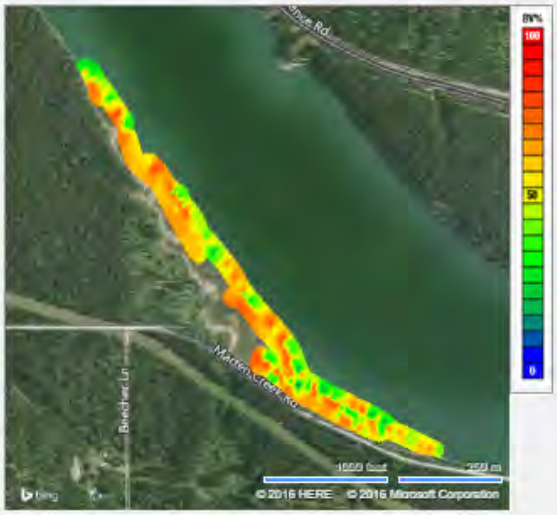
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 98.5% | 54.1% | ±21% | 53.3% | ±21.9% | 0.78-5.5 m | 1.91 m | 3.9 km | 1,579 |
| | Grid | 100% | 57.5% | ±12.1% | 57.5% | ±12.1% | 0.03-5.68 m | 1.71 m | - | 3,419 |

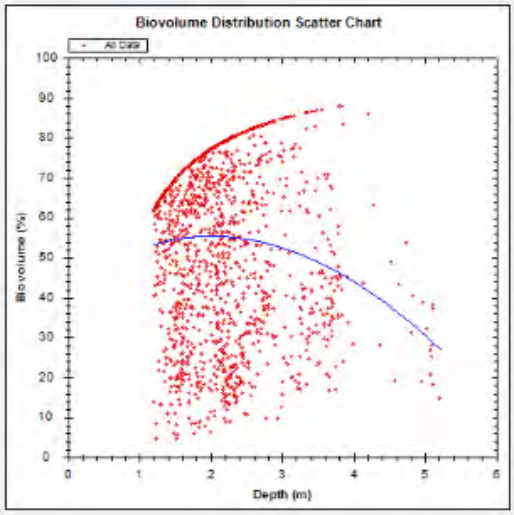
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 98.2% | 52.7% | ±22% | 51.7% | ±22.9% | 0.92-4.19 m | 2.14 m | 1.04 km | 1,007 |
| | Grid | 100% | 54.8% | ±12.3% | 54.8% | ±12.3% | 0.08-4.33 m | 1.93 m | - | 1,773 |
| 2 | Point | 99% | 56.6% | ±19.1% | 56% | ±19.8% | 0.78-5.5 m | 1.66 m | 2.86 km | 572 |
| | Grid | 100% | 58.4% | ±12.4% | 58.4% | ±12.4% | 0.03-5.68 m | 1.63 m | - | 2,853 |

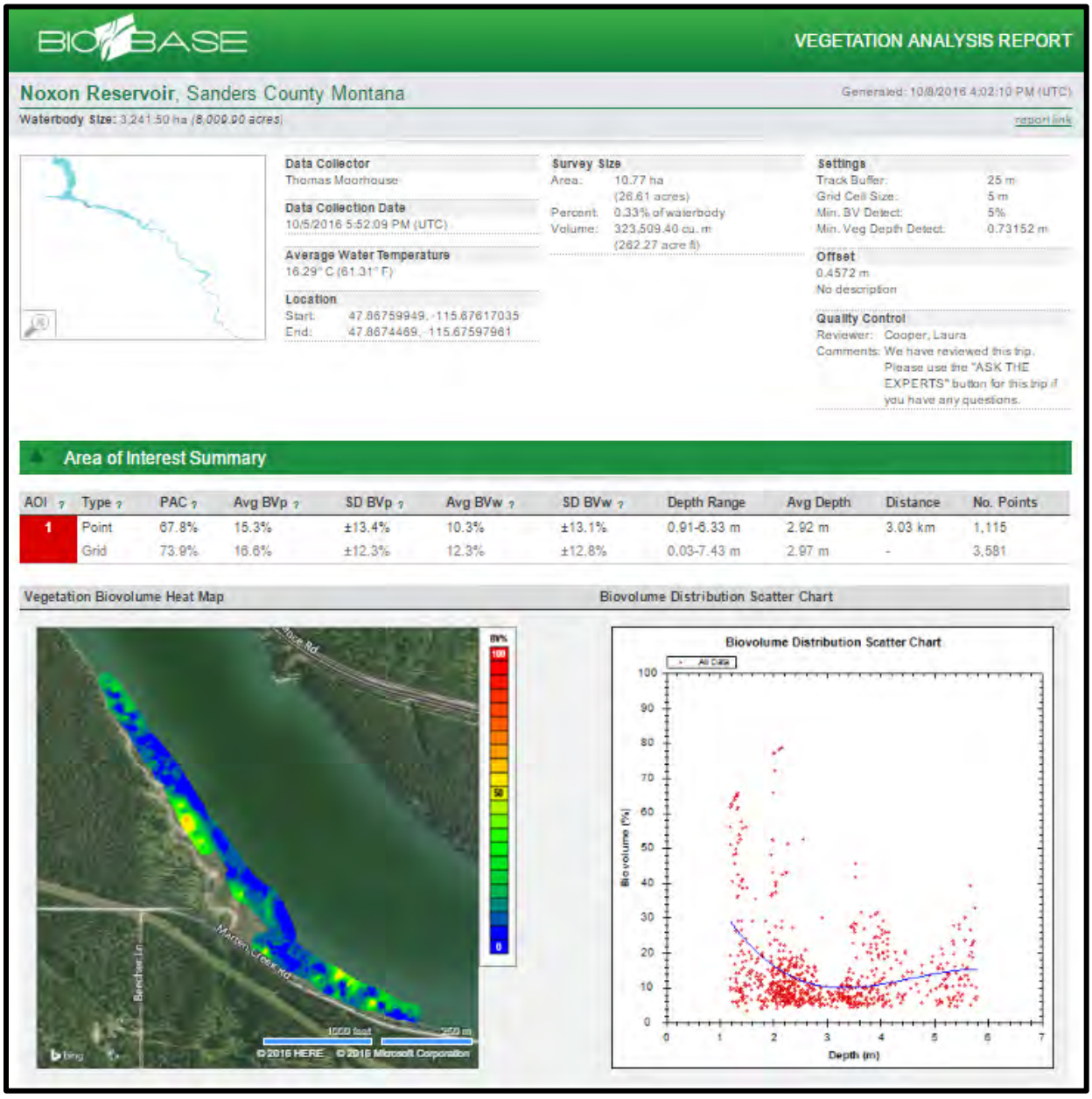
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-7: ~ Six (6) Weeks Post Treatment (October 5, 2016)



BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 10/8/2016 4:02:10 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.00 acres)

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 5:52:09 PM (UTC)

**Average Water Temperature**
16.29° C (61.31° F)

**Location**
Start: 47.86759949, -115.67617035
End: 47.8674469, -115.67597961

**Survey Size**
Area: 10.77 ha (26.61 acres)
Percent: 0.33% of waterbody
Volume: 323,509.40 cu. m (262.27 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

**Area of Interest Summary**

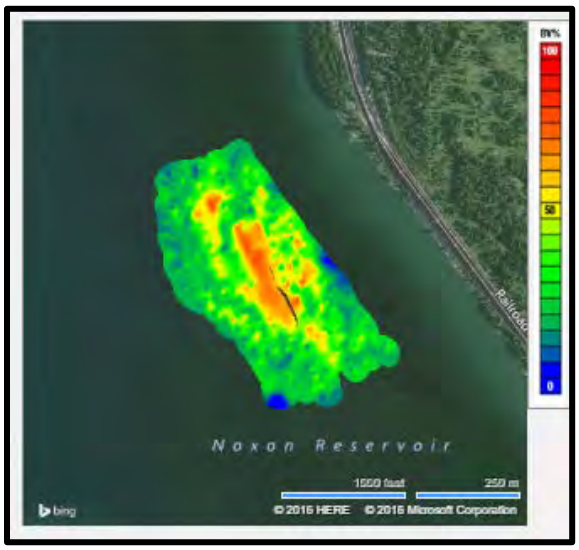
| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 67.8% | 15.3% | ±13.4% | 10.3% | ±13.1% | 0.91-6.33 m | 2.92 m | 3.03 km | 1,115 |
| | Grid | 73.9% | 16.6% | ±12.3% | 12.3% | ±12.8% | 0.03-7.43 m | 2.97 m | - | 3,581 |

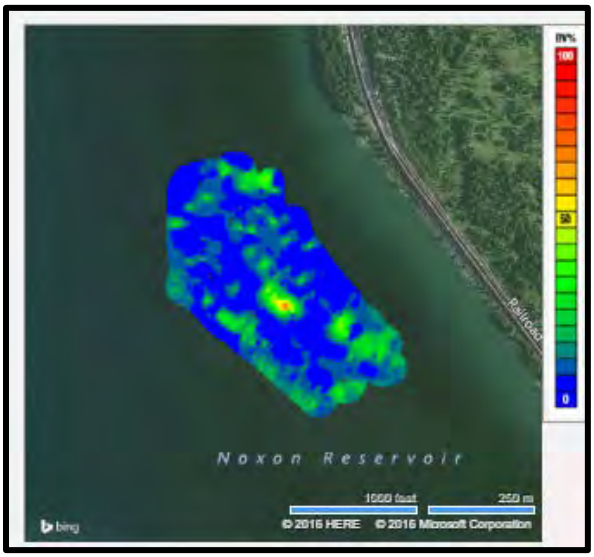
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart

**Plot Nox-2: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-2** | **99.4** | **33.6** | **8/17/2016** | **55.9** | **13.2** | **10/5/2016** | **-61%** | **95% +/-** | **AquaStrike** |

**Observations/Notes Nox-2:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

## Plot Nox-2: Pre Treatment (August 17, 2016)

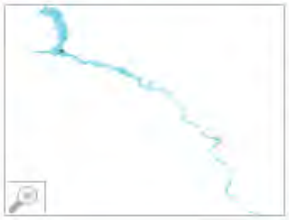
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/20/2016 7:43:23 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/17/2016 8:17:56 PM (UTC)

**Average Water Temperature**
23.6° C (74.48° F)

**Location**
Start: 47.8800354, -115.6995163
End: 47.87938309, -115.6995163

**Survey Size**
Area: 23.04 ha (56.93 acres)
Percent: 0.71% of waterbody
Volume: 679,108.20 cu. m (550.56 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

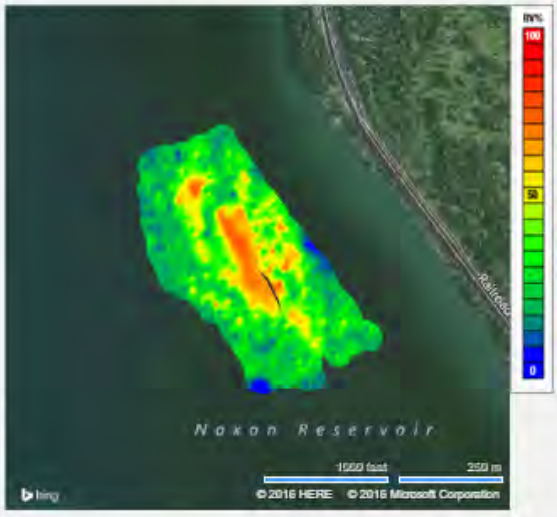
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 97.7% | 32.1% | ±18.7% | 31.4% | ±19.1% | 0.77-7.78 m | 2.79 m | 8.83 km | 3,938 |
| | Grid | 99.4% | 33.6% | ±16.5% | 33.3% | ±16.7% | 0.77-7.69 m | 2.79 m | - | 7,708 |

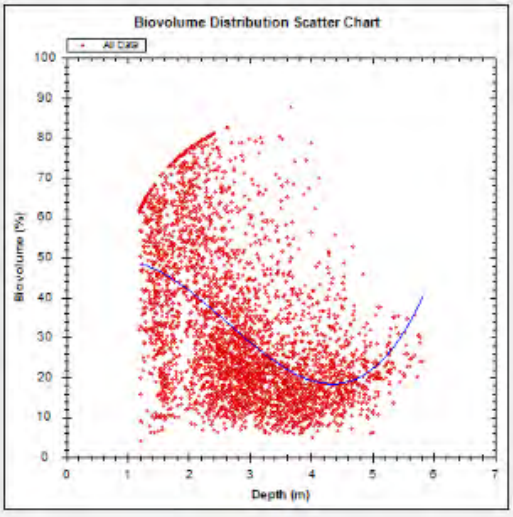
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 96.5% | 38.6% | ±20.7% | 37.3% | ±21.5% | 0.79-5.37 m | 2.09 m | 2.64 km | 875 |
| | Grid | 100% | 42.2% | ±18.3% | 42.2% | ±18.3% | 0.77-5.4 m | 2.04 m | - | 3,058 |
| 2 | Point | 98.3% | 34% | ±18.8% | 33.4% | ±19.1% | 0.87-5.09 m | 2.62 m | 2.93 km | 1,556 |
| | Grid | 99.8% | 32.9% | ±14.3% | 32.9% | ±14.3% | 0.89-4.99 m | 2.63 m | - | 2,668 |
| 3 | Point | 97.9% | 26.4% | ±15.6% | 25.8% | ±15.9% | 0.77-7.78 m | 3.45 m | 3.26 km | 1,507 |
| | Grid | 98.6% | 27.7% | ±12.9% | 27.4% | ±13.2% | 0.77-7.69 m | 3.4 m | - | 3,250 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-2: ~ Six (6) Weeks Post Treatment (October 5, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:35:55 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.90 acres)

report link

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 12:30:50 AM (UTC)

**Average Water Temperature**
16.68° C (62.03° F)

**Location**
Start: 47.8844986, -115.70463562
End: 47.88150024, -115.69893646

**Survey Size**
Area: 22.39 ha (55.33 acres)
Percent: 0.69% of waterbody
Volume: 865,974.00 cu. m (702.06 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

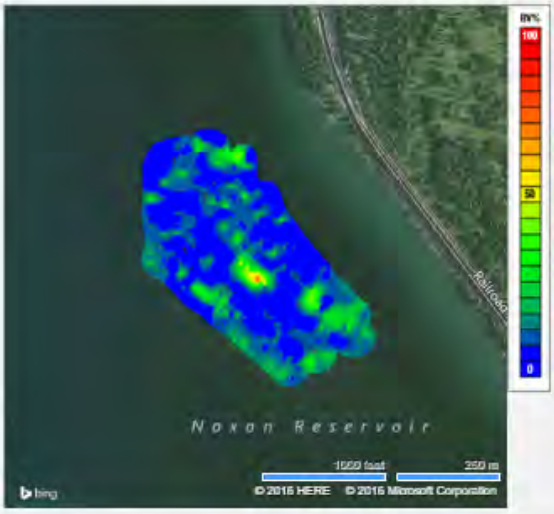
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

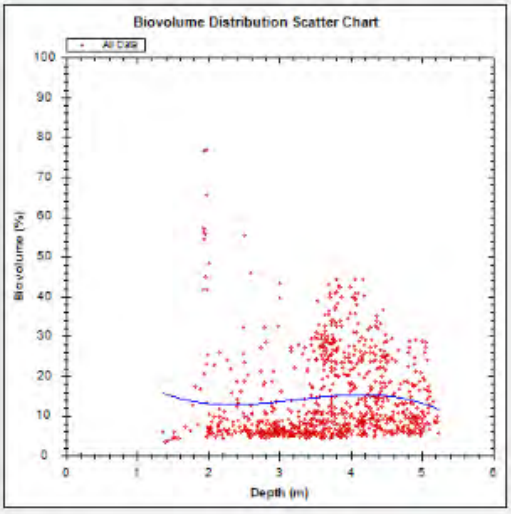
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 54.2% | 15% | ±11.5% | 8.1% | ±11.3% | 1.33-6.04 m | 3.78 m | 6.03 km | 1,669 |
| | Grid | 55.8% | 13.2% | ±8.7% | 7.4% | ±9.2% | 1.36-5.83 m | 3.72 m | - | 7,213 |

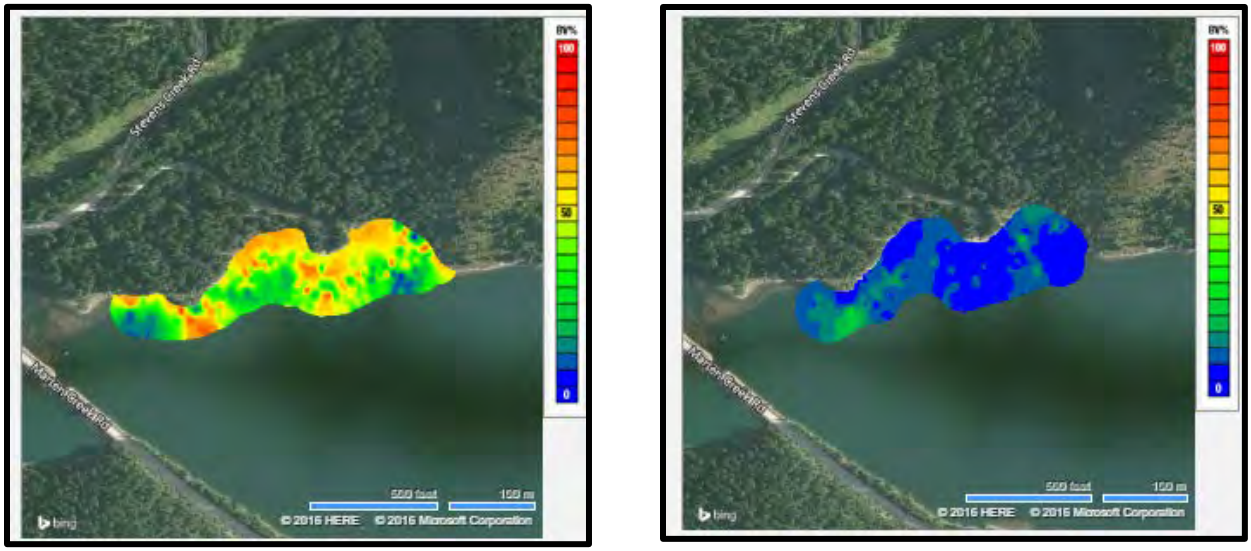
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



**Plot Nox-31: At Time of Treatment (August 17, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**



| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-31** | **99.9** | **44.2** | **8/17/2016** | **53.4** | **9.3** | **10/5/2016** | **-79%** | **95% +/-** | **AquaStrike** |

**Observations/Notes Nox-31:** Treated with AquaStrike (endothall at 1.8 ppm/diquat at 0.36 ppm), control visually estimated at +/- 95%.

## Plot Nox-31: Pre Treatment (August 17, 2016)

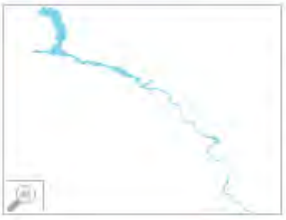
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:47:00 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.00 acres)

report link



**Data Collector**
Thomas McNabb

**Data Collection Date**
8/18/2016 1:22:28 AM (UTC)

**Average Water Temperature**
24.31° C (75.76° F)

**Location**
Start: 47.88180161, -115.74359894
End: 47.8819046, -115.74491119

**Survey Size**
Area: 2.94 ha (7.27 acres)
Percent: 0.09% of waterbody
Volume: 75,993.90 cu. m (61.61 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

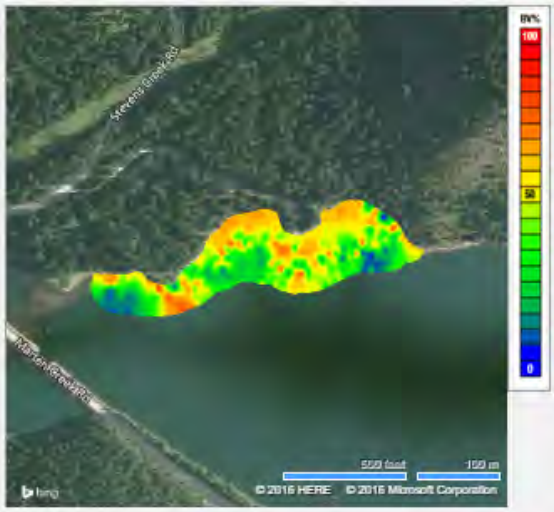
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: McCormack, Ian
Comments: False depths due to thick vegetation. - QQC

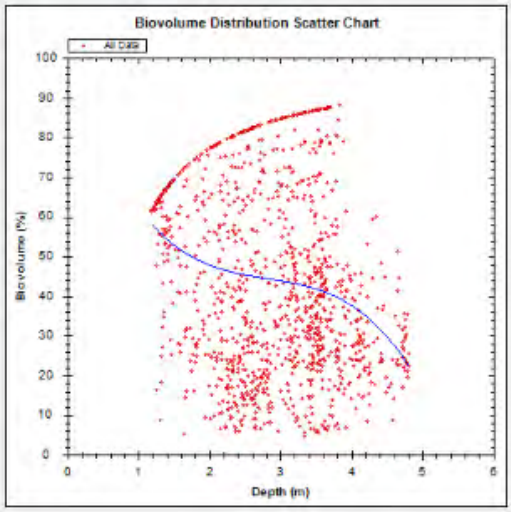
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 96.8% | 44.5% | ±23.3% | 43.1% | ±24.2% | 0.86-5.59 m | 2.64 m | 1.54 km | 1,244 |
| | Grid | 99.9% | 44.2% | ±16.8% | 44.1% | ±16.8% | 0-5.73 m | 2.43 m | - | 761 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-31: ~ Six (6) Weeks Post Treatment (October 5, 2016)

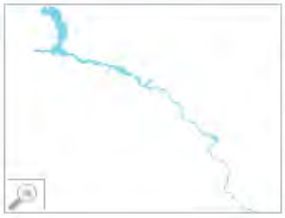
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/6/2016 3:31:00 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 1:10:32 AM (UTC)

**Average Water Temperature**
16.73° C (62.11° F)

**Location**
Start: 47.88189697, -115.74394989
End: 47.88148117, -115.74671936

**Survey Size**
Area: 3.04 ha (7.52 acres)
Percent: 0.09% of waterbody
Volume: 100,267.10 cu. m (81.29 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

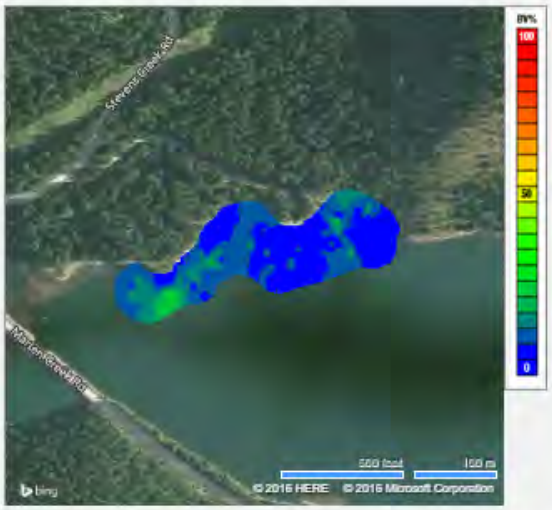
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

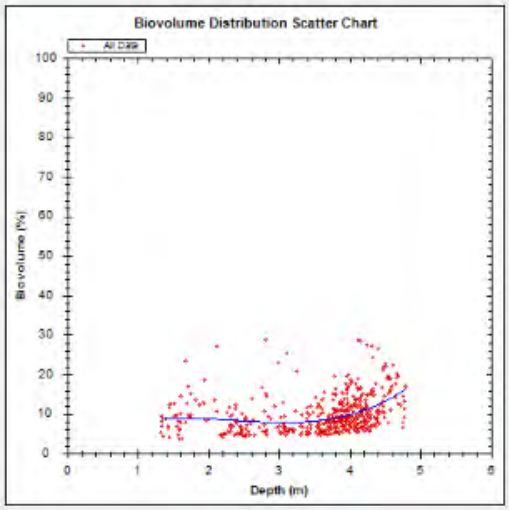
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 54.7% | 10.3% | ±4.5% | 5.6% | ±6.1% | 1.31-5.24 m | 3.53 m | 1.08 km | 867 |
| | Grid | 53.4% | 9.3% | ±3.7% | 5% | ±5.4% | 0.01-5.22 m | 3.15 m | - | 893 |

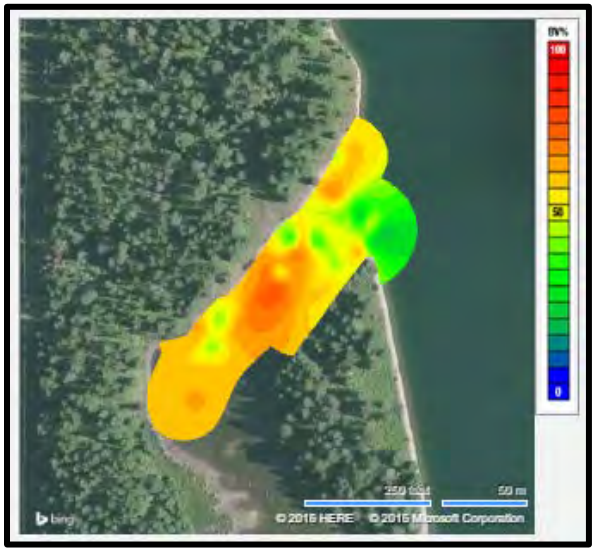
Vegetation Biovolume Heat Map

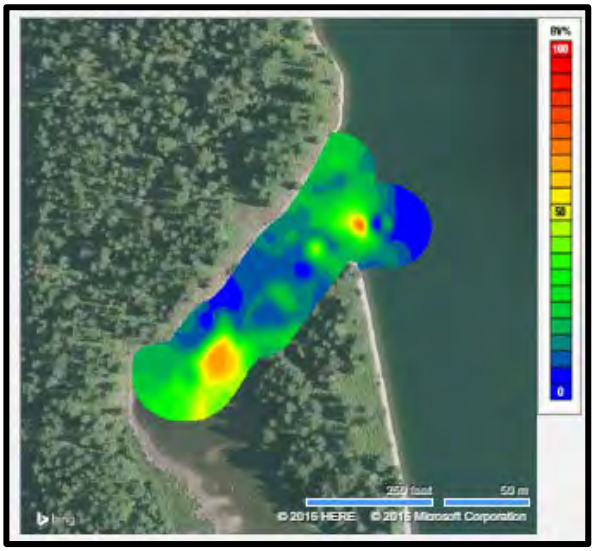



Biovolume Distribution Scatter Chart



**Plot Nox-60: At Time of Treatment (August 18, 2016 Left), ~ Six (6) Weeks Post (October 5, 2016 Right)**




| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-60** | **100.0** | **58.1** | **8/18/2016** | **90.6** | **22.0** | **10/5/2016** | **-62%** | **98% +/-** | **End/Tri** |

**Observations/Notes Nox-60:** Treated with 1.0 ppm triclopyr, 2.0 ppm endothall, control visually estimated at 98%.

## Plot Nox-60: Pre Treatment (August 18, 2016)

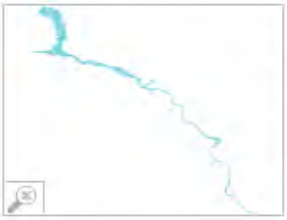
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 4:33:40 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/18/2016 7:47:44 PM (UTC)

**Average Water Temperature**
24.27°C (75.69°F)

**Location**
Start: 47.91277695, -115.70857239
End: 47.91119385, -115.70985413

**Survey Size**
Area: 1.43 ha (3.53 acres)
Percent: 0.04% of waterbody
Volume: 20,159.30 cu. m (16.34 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

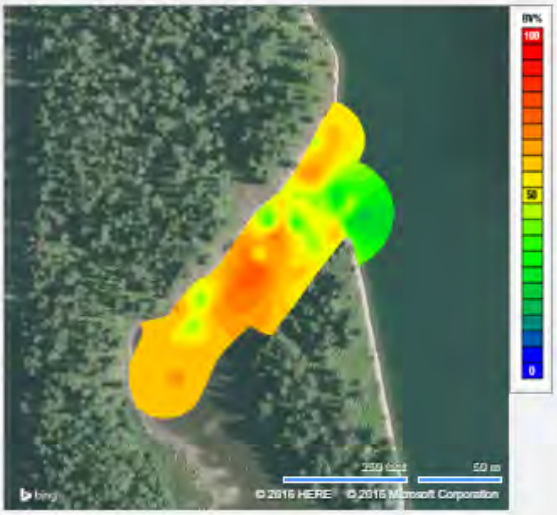
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 98.1% | 57.1% | ±19% | 56% | ±20.4% | 0.55-10.62 m | 1.44 m | 551.32 m | 366 |
| | Grid | 100% | 58.1% | ±10.7% | 58.1% | ±10.7% | 0.03-4.83 m | 1.3 m | - | 242 |

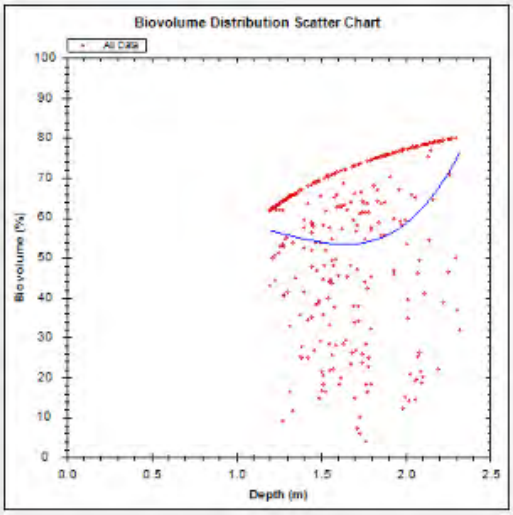
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 98.1% | 61.4% | ±15.8% | 60.2% | ±17.8% | 0.76-10.62 m | 1.47 m | 232.51 m | 154 |
| | Grid | 100% | 60.1% | ±8.6% | 60.1% | ±8.6% | 0.03-4.83 m | 1.37 m | - | 180 |
| 2 | Point | 98.1% | 54% | ±20.5% | 53% | ±21.6% | 0.55-3.09 m | 1.42 m | 318.81 m | 212 |
| | Grid | 100% | 58.1% | ±11.2% | 58.1% | ±11.2% | 0.03-4.83 m | 1.3 m | - | 222 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-60: ~ Six (6) Weeks Post Treatment (October 5, 2016)

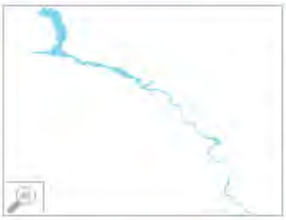
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 3:26:46 PM (UTC)

**Waterbody Size:** 3,241.50 ha (8,009.00 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/5/2016 12:23:07 AM (UTC)

**Average Water Temperature**
16.6° C (61.89° F)

**Location**
Start: 47.91267014, -115.70858002
End: 47.9123497, -115.70808411

**Survey Size**
Area: 1.25 ha (3.08 acres)
Percent: 0.04% of waterbody
Volume: 27,178.20 cu. m (22.03 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

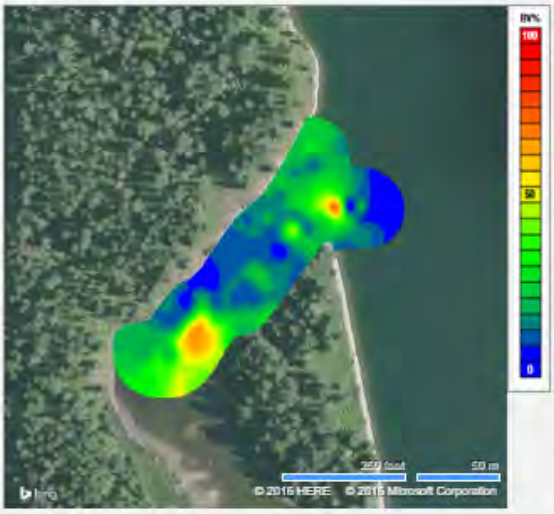
**Offset**
0.4572 m
No description

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

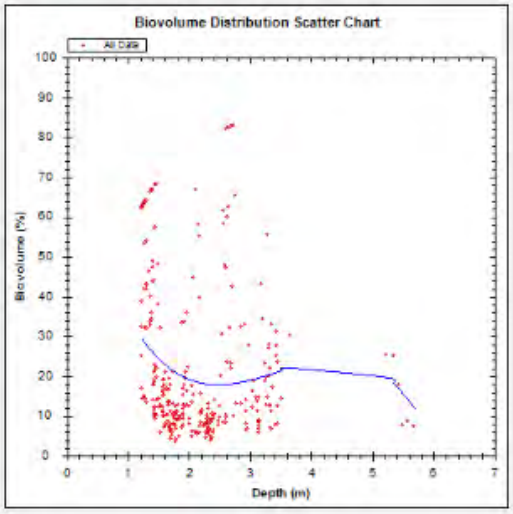
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 86.1% | 22.3% | ±19% | 19.2% | ±19.2% | 1.17-6.02 m | 2.31 m | 384.03 m | 352 |
| | Grid | 90.6% | 22% | ±14.8% | 20% | ±15.5% | 0.03-6.01 m | 2.1 m | - | 224 |

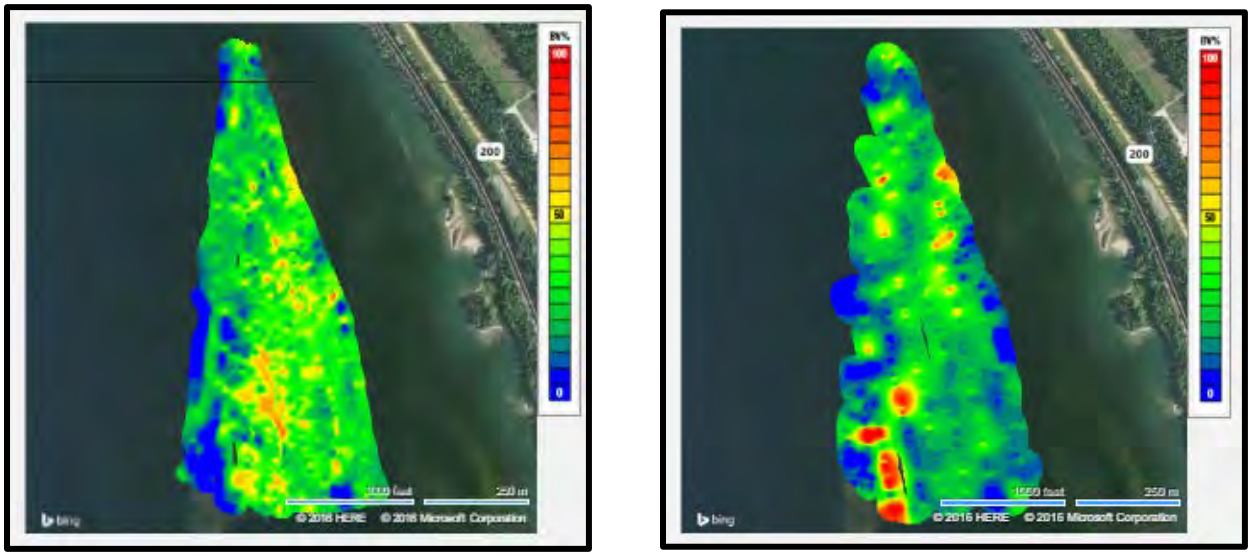
Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



**Plot Nox-1: At Time of Treatment (August 23, 2016 Left), ~ Six (6) Weeks Post (October 4, 2016 Right)**



| 2016 Noxon Rapids Reservoir's AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Plot Number** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected Pre Treatment** | **SAV % Cover** | **SAV % Bio-Volume** | **Date Data Collected-Post Treatment** | **SAV % BV Change** | **Post Treatment EWM Injury Rank** | **Herbicides Used** |
| **Noxon Rapids** | | | | | | | | | |
| **Nox-1** | **93.0** | **30.3** | **8/23/2016** | **93.8** | **24.8** | **10/4/2016** | **-18%** | **90% +/-** | **End/Tri** |

**Observations/Notes Nox-1:** Treated with 1.0 ppm triclopyr, 2.0 ppm endothall, control visually estimated at 90%.

## Plot Nox-1: Pre Treatment (August 23, 2016)

BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/8/2016 4:27:03 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)

report.pdf

**Data Collector**
Thomas Moorhouse

**Data Collection Date**
8/23/2016 6:57:56 PM (UTC)

**Average Water Temperature**
22.7° C (72.86° F)

**Location**
Start: 47.94436646, -115.71274567
End: 47.94834518, -115.71224976

**Survey Size**
Area: 38.29 ha (94.63 acres)
Percent: 1.18% of waterbody
Volume: 1,091,626.00 cu. m (885.09 acre ft)

**Settings**
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: See Individual Trips
Min. Veg Depth Detect: See Individual Trips

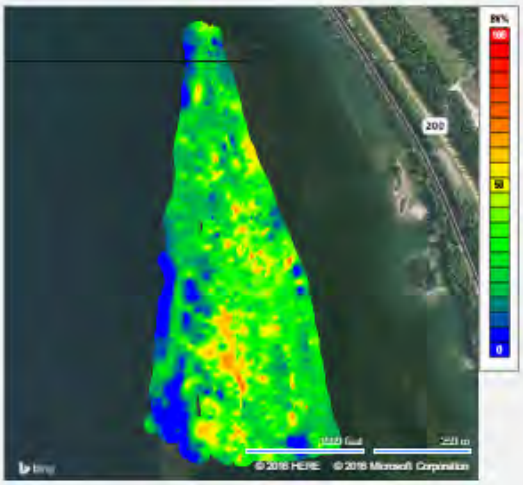
### Survey Summary

| | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| Full Survey | Point | 90.6% | 31.6% | ±18.6% | 28.6% | ±19.9% | 0.77-15.5 m | 2.59 m | 16.12 km | 11,012 |
| | Grid | 93% | 30.3% | ±13.4% | 28.1% | ±15% | 0.75-15.39 m | 2.66 m | - | 12,935 |

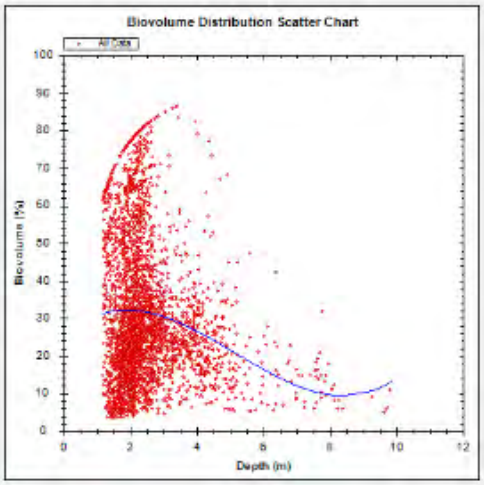
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 42.8% | 15.6% | ±10% | 6.7% | ±10.1% | 1.61-15.5 m | 7.47 m | 467.28 m | 556 |
| | Grid | 61.1% | 16.1% | ±7.3% | 9.8% | ±9.7% | 1.47-15.39 m | 6.61 m | - | 863 |
| 2 | Point | 85.9% | 34.3% | ±20.5% | 29.5% | ±22.5% | 0.81-4.4 m | 1.62 m | 3.11 km | 1,317 |
| | Grid | 93.1% | 34.3% | ±18% | 31.9% | ±17.7% | 0.75-3.26 m | 1.82 m | - | 3,275 |
| 3 | Point | 96.3% | 35.6% | ±21.6% | 34.3% | ±22.2% | 0.81-3.2 m | 1.94 m | 1.25 km | 1,505 |
| | Grid | 99.9% | 37.3% | ±13% | 37.3% | ±13.1% | 0.88-2.77 m | 1.9 m | - | 1,850 |
| 4 | Point | 87.3% | 24% | ±14.1% | 21% | ±15.4% | 0.88-10.16 m | 3.21 m | 3.4 km | 2,224 |
| | Grid | 84.9% | 22% | ±9.8% | 18.7% | ±12% | 0.9-15.14 m | 3.39 m | - | 3,853 |
| 5 | Point | 98.1% | 32.1% | ±18% | 31.5% | ±16.4% | 0.88-9.94 m | 2.5 m | 3.06 km | 1,711 |
| | Grid | 98.2% | 30.8% | ±11.6% | 30.3% | ±12.2% | 0.9-10.56 m | 2.63 m | - | 3,635 |
| 6 | Point | 99.1% | 36.9% | ±18.3% | 36.6% | ±18.6% | 1.23-4.22 m | 2.59 m | 614.02 m | 876 |
| | Grid | 99.3% | 36.3% | ±11.5% | 36.1% | ±11.9% | 0.9-7.31 m | 2.57 m | - | 1,125 |
| 7 | Point | 93.2% | 30.9% | ±18.3% | 28.8% | ±19.3% | 0.85-10.6 m | 2.56 m | 1.59 km | 1,653 |
| | Grid | 97.1% | 30% | ±12.8% | 29.1% | ±13.4% | 0.88-10.56 m | 2.63 m | - | 2,561 |
| 8 | Point | 96.9% | 36% | ±18.8% | 34.9% | ±19.6% | 0.77-8.11 m | 1.94 m | 2.62 km | 1,370 |
| | Grid | 99% | 36.8% | ±12.4% | 36.5% | ±12.9% | 0.85-10.5 m | 1.99 m | - | 3,106 |

Vegetation Biovolume Heat Map




Biovolume Distribution Scatter Chart



## Plot Nox-1: ~ Six (6) Weeks Post Treatment (October 4, 2016)

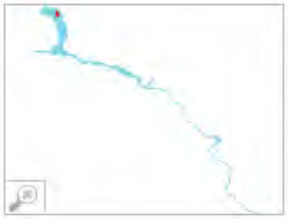
BIOBASE — VEGETATION ANALYSIS REPORT

**Noxon Reservoir**, Sanders County Montana

Generated: 10/6/2016 3:26:51 PM (UTC)

Waterbody Size: 3,241.50 ha (8,009.90 acres)

report link



**Data Collector**
Thomas Moorhouse

**Data Collection Date**
10/4/2016 11:31:03 PM (UTC)

**Average Water Temperature**
16.38° C (61.49° F)

**Location**
Start: 47.94418335, -115.70638275
End: 47.94621658, -115.71191406

**Survey Size**
Area: 40.45 ha (99.95 acres)
Percent: 1.25% of waterbody
Volume: 1,227,676.90 cu. m (995.29 acre ft)

**Settings**

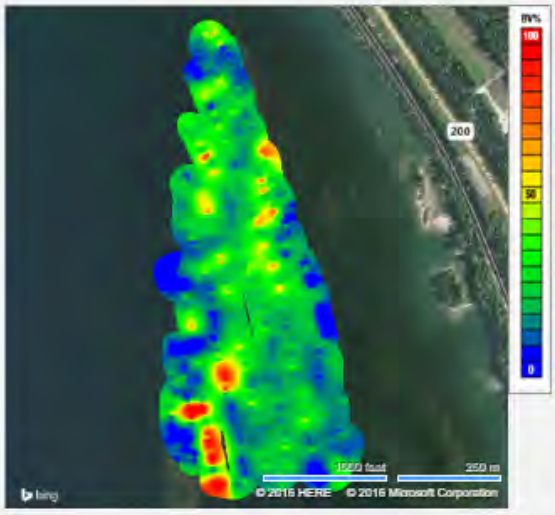
| | |
|---|---|
| Track Buffer: | 35 m |
| Grid Cell Size: | 7 m |
| Min. BV Detect: | 5% |
| Min. Veg Depth Detect: | 0.73152 m |

**Quality Control**
Reviewer: Cooper, Laura
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

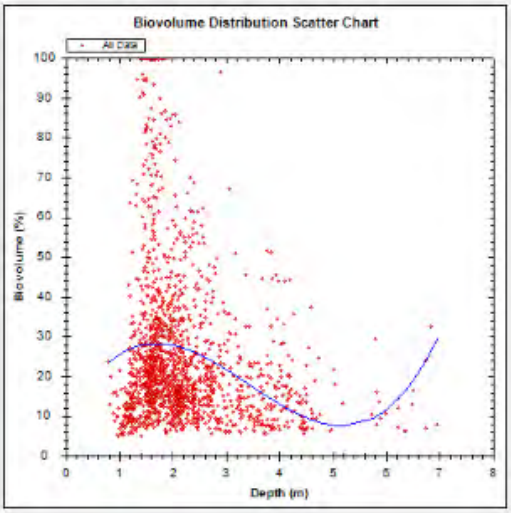
### Area of Interest Summary

| AOI | Type | PAC | Avg BVp | SD BVp | Avg BVw | SD BVw | Depth Range | Avg Depth | Distance | No. Points |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Point | 90% | 25.6% | ±20.4% | 23% | ±20.8% | 0.47-18.8 m | 2.49 m | 7.77 km | 1,859 |
| | Grid | 93.8% | 24.8% | ±15.9% | 23.2% | ±16.5% | 0.53-21.68 m | 2.77 m | - | 6,444 |

Vegetation Biovolume Heat Map

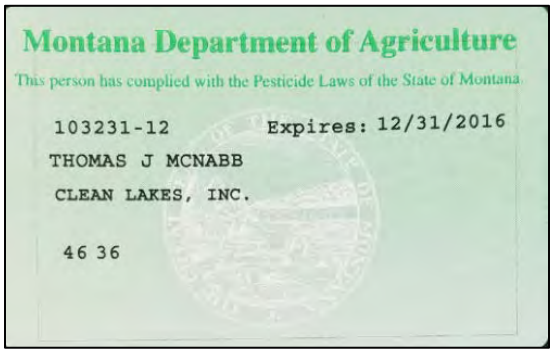



Biovolume Distribution Scatter Chart



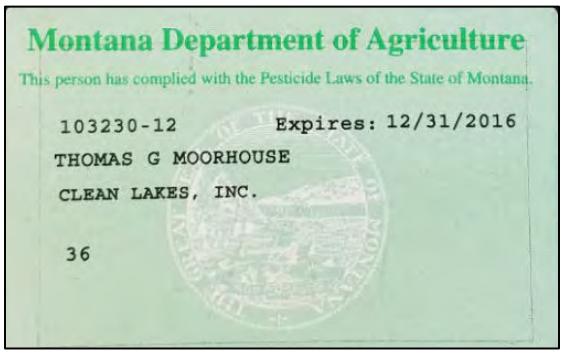
# LIST OF PROJECT PERSONNEL

**PROJECT DIRECTOR:**


Montana Department of Agriculture
This person has complied with the Pesticide Laws of the State of Montana.
103231-12 Expires: 12/31/2016
THOMAS J MCNABB
CLEAN LAKES, INC.
46 36

Thomas J. McNabb
Montana Licensed Applicator
Applicators License No. 103231-12
Cell Phone: 208-929-2748
Email: tmcnabb@cleanlake.com

**PROJECT MANAGER**


Montana Department of Agriculture
This person has complied with the Pesticide Laws of the State of Montana.
103230-12 Expires: 12/31/2016
THOMAS G MOORHOUSE
CLEAN LAKES, INC.
36

Thomas G. Moorhouse
Montana Licensed Applicator
Applicators License No. 103230-12
Cell Phone: 208-929-2757
Email: tmoorhouse@cleanlake.com

**SITE SAFETY AND HEALTH OFFICER:** Thomas G. Moorhouse
Cell Phone: 208-929-2757

**ALTERNATE SITE SAFETY OFFICER:** Thomas J. McNabb
Cell Phone: 208-929-2748

**EMERGENCY RESPONSE COORDINATOR:** Thomas J. McNabb
Cell Phone: 208-929-2748

**ALTERNATE EMERGENCY COORDINATOR**: Thomas G. Moorhouse
Cell Phone: 208-929-2757

**CLI SUPPORT STAFF:** Mike McPhee

**TASK FORCE COORDINATOR** Kim Bergstrom
Phone: 406-546-2447
Email: pinnacle@blackfoot.net

## END OF AQUATIC PESTICIDE APPLICATION REPORT