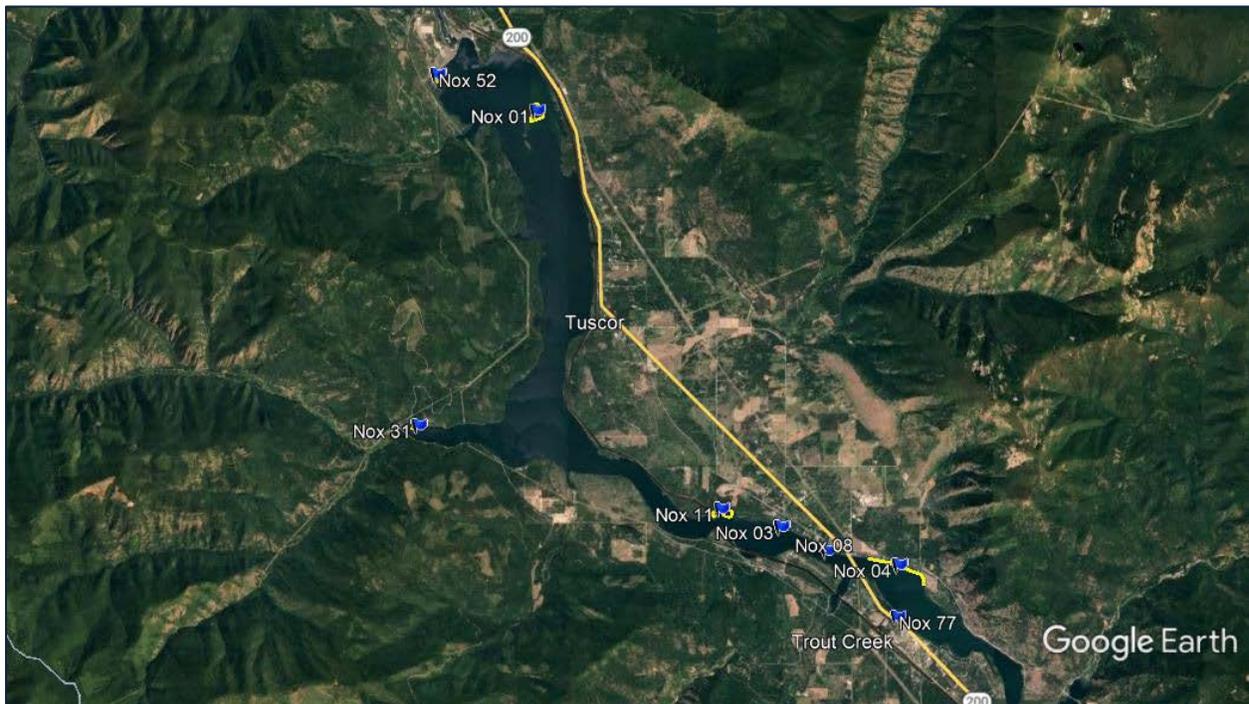


**NOXON RAPIDS RESERVOIR  
SANDERS COUNTY, MONTANA**

**2022 Aquatic Invasive Species (AIS)  
Aquatic Pesticide Application Report (APAR)**



Prepared By:  
**CLEAN LAKES INC.**

[www.cleanlake.com](http://www.cleanlake.com)

P. O. Box 3548  
Coeur d'Alene, Idaho 83814

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

September 2022

**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 discrete areas of Noxon Rapids Reservoir in August 2022. 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 # MTG870011), 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 2022 Aquatic Invasive Species Aquatic Pesticide Application Plan (APAP)<sup>1</sup>.

**SCOPE OF WORK:** The scope of work was for the application of aquatic herbicides for the control of Eurasian watermilfoil (EWM) in a total of 48.85 acres within previously identified and demarcated areas of Noxon Rapids Reservoir.

**PRE-TREATMENT SURVEYS:** In July 2022 Craig McLane (Montana Fish, Wildlife and Parks (MTFWP)) carried out visual and point intercept surveys in areas where nuisance growths of aquatic invasive species (AIS) were identified in previous surveys. On July 22, 2022, CLI received the 2022 treatment GIS polygons and survey points from Craig McLane. CLI developed a budgetary plan on July 25, 2022 with a final plan approved that day. A treatment day was established for the week of August 1, 2022.

**SUMMARY OF ACRES TREATED:** The final plan consisted of treating 48.85 acres of EWM in Noxon Rapids Reservoir. Treatment plots were identified through GIS shapefiles and treatment plans at the direction of the county.

**TREATMENT SCHEDULE:** The aquatic herbicide applications were performed on Thursday, August 4, 2022, by CLI staff Thomas McNabb as outlined in Table 1 below:

---

<sup>1</sup> NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA, 2022 AIS Aquatic Pesticide Application Plan (APAP)

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

2022 Noxon-Cabinet Reservoirs Treatment Plan										
Plot Number	Acreage (Ac)	Mean Depth (ft)	Date	Start	Stop	Applicator	Wind (mph)	Wind from Direction	Sky	Water Temp (F)
NOX-04	5.90	5.9	8/4/2022	1:56 PM	2:07 PM	Thomas McNabb	8	W	Pt Cloudy	76.30
NOX-08	0.90	4.6	8/4/2022	2:12 PM	2:15 PM	Thomas McNabb	12	W	Pt Cloudy	76.30
NOX-11	15.90	5.7	8/4/2022	12:01 PM	12:32 PM	Thomas McNabb	3	W	Pt Cloudy	76.40
NOX-31	2.50	6	8/4/2022	2:45 PM	2:52 PM	Thomas McNabb	8	W	Pt Cloudy	76.20
NOX-77	0.40	6	8/4/2022	4:14 PM	4:17 PM	Thomas McNabb	7	W	Pt Cloudy	76.50
<b>Subtotal</b>	<b>25.60</b>									
NOX-01	18.75	5.5	8/4/2022	5:16 PM	5:45 PM	Thomas McNabb	6	W	Pt Cloudy	76.50
NOX-03	1.70	6	8/4/2022	2:22 PM	2:25 PM	Thomas McNabb	8	W	Pt Cloudy	76.60
NOX-52	2.80	6	8/4/2022	5:01 PM	5:09 PM	Thomas McNabb	6	W	Pt Cloudy	76.70
<b>Subtotal</b>	<b>23.25</b>									
<b>TOTAL</b>	<b>48.85</b>									

**EQUIPMENT USED:** A CLI Littoral Zone Treatment vessel (LittLine®) was used to perform the aquatic herbicide applications on August 4, 2022. 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 application vessel was inspected on August 4, 2022 at the Clark Fork, Idaho Aquatic Invasive Species inspection station prior to entering Montana.



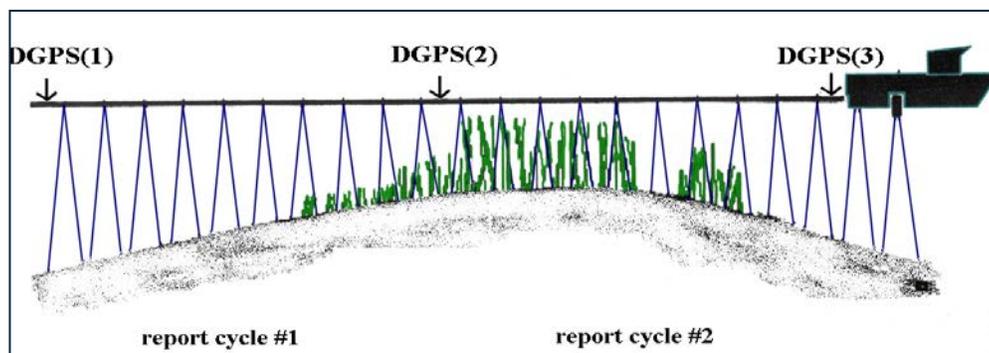
The AIS treatment area GIS shapefiles were loaded into the LittLine® GPS system for vessel guidance and herbicide application data recording. The LittLine® can place herbicides at any depth within the water column (2 - 30 feet), as well as within the bottom 2 foot of the water



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.

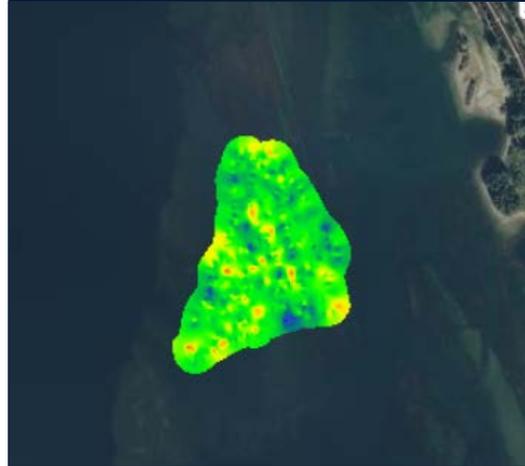
The LittLine system's computerized rate controllers regulate the aquatic herbicide applications through preset treatment rates.

A Digital Echosounder System with a Structure Scan Module (Lowrance model) 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.

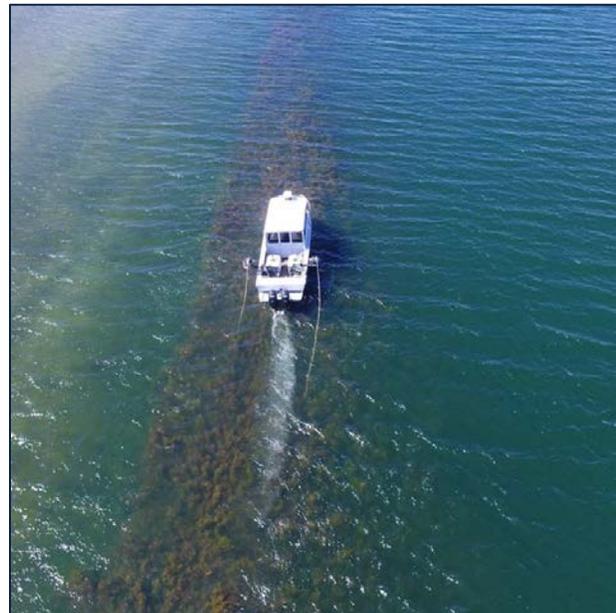


The sonar data collected was processed and analyzed for At Time of Treatment Submerged Aquatic Vegetation (SAV) in the treatment plots (August 4, 2022), and at six (6) Weeks Post Treatment (September 15, 2022). Data was collected to compare At Time of Treatment to six (6)

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 Time of Treatment for NOX-01, Noxon Reservoir, is pictured right.



**AQUATIC HERBICIDES** CLI provided the aquatic herbicides for the project. 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 the specified 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 Aquatic Pesticide Application Plan (APAP), provided previously). Provided in Table 2 is the Treatment Site Data outlining treatment information for each plot. Kim McMahon (Pinnacle Research) and Paul Kusnierz (Avista) were on site the day of treatment.



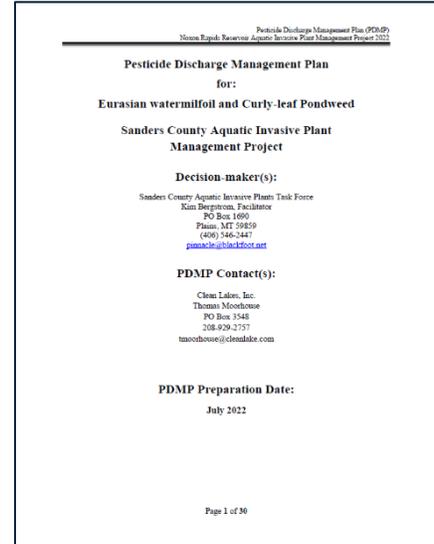


**TREATMENT SITE DATA**

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

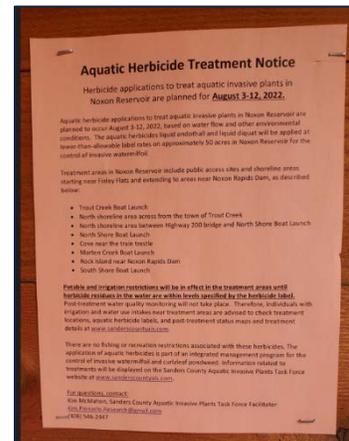
2022 Noxon-Cabinet Reservoirs Treatment Plan					Littora (Diquat)			Aquathol K (Endothal)		
Plot Number	Acreage (Ac)	Mean Depth (ft)	Volume (AF)	Product	Rate ppm	Gal/Ac ft	Gal Total Site	Rate ppm	Gal/Ac ft	Gal Total Site
NOX-04	5.90	5.9	34.81	End/Diq	0.37	0.5	17.4	1.8	1.16	40.2
NOX-08	0.90	4.6	4.14	End/Diq	0.37	0.5	2.1	1.8	1.16	4.8
NOX-11	15.90	5.7	90.63	End/Diq	0.37	0.5	45.2	1.8	1.16	104.7
NOX-31	2.50	6	15.00	End/Diq	0.37	0.5	7.5	1.8	1.16	17.3
NOX-77	0.40	6	2.40	End/Diq	0.37	0.5	1.2	1.8	1.16	2.8
<b>Subtotal</b>	<b>25.60</b>						<b>73.3</b>			<b>169.9</b>
NOX-01	18.75	5.5	103.13	End/Diq	0.37	0.5	51.5	1.8	1.16	119.2
NOX-03	1.70	6	10.20	End/Diq	0.37	0.5	5.1	1.8	1.16	11.8
NOX-52	2.80	6	16.80	End/Diq	0.37	0.5	8.4	1.8	1.16	19.4
<b>Subtotal</b>	<b>23.25</b>						<b>64.9</b>			<b>150.4</b>
<b>Total</b>	<b>48.85</b>						<b>138.3</b>			<b>320.2</b>

**PERMIT COMPLIANCE:** CLI developed the Aquatic Pesticide Application Plan on August 1, 2022, as well as the Pesticide Discharge Management Plan (PDMP) required for the new NPDES Permit cycle. 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 2, 2022.



**SERVICES PROVIDED BY CLI:** All manpower, materials, insurance, equipment and technical advice required to perform aquatic herbicide applications in the project areas.

**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 2022 Pre-Treatment Surveys that were used to generate the final 2022 Treatment Plan.



**POST TREATMENT SURVEY:** The Post Treatment survey was carried out by CLI (Tom Moorhouse, Tuck Benney, and Kim McMahon) at Noxon Rapids Reservoir on September 15, 2022, six weeks after treatment. Water temperature was approximately 71 F. Surveys were conducted through



a combination of techniques, including visual estimates of injury/control, through rake tosses,

and via the use of a Lowrance HDS-9 where depth allowed. Sonar logs were processed as described above. Table 3 provides information related to efficacy in each plot compared to At-Time of Treatment and Post Treatment Control. In Noxon Rapids Reservoir the change in SAV Biovolume (BV) shows a reduction range of 13% to 60%, while Post Treatment EWM Injury ranged from 60% to 100%.

**Table 3: Plot Percent Submersed Aquatic Vegetation (SAV) Cover and SAV Bio-Volume Present At Time of Application and Six (6) Weeks Post Treatment**

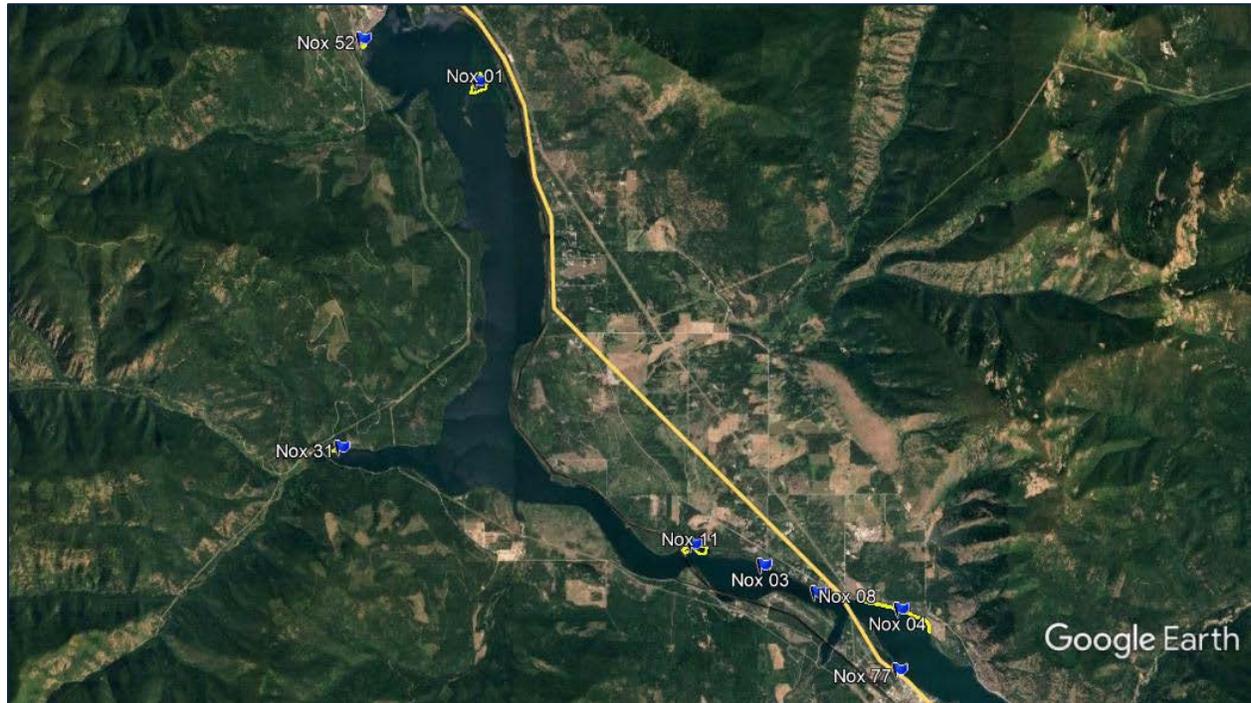
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-1	99.3	28.9	8/4/2022	98.2	15.1	9/15/2022	-48%	95%	Endo/Diquat
NOX-3	100.0	28.3	8/4/2022	98.7	16.8	9/15/2022	-41%	98%	Endo/Diquat
NOX-4	98.4	32.2	8/4/2022	72.3	17.8	9/15/2022	-45%	90%	Endo/Diquat
NOX-8	59.0	34.5	8/4/2022	55.8	19.3	9/15/2022	-44%	60%	Endo/Diquat
NOX-11	98.1	40.4	8/4/2022	59.4	16.1	9/15/2022	-60%	95%	Endo/Diquat
NOX-31	99.1	21.2	8/4/2022	99.3	18.4	9/15/2022	-13%	98%	Endo/Diquat
NOX-52	86.9	19.8	8/4/2022	79.3	10.6	9/15/2022	-46%	100%	Endo/Diquat
NOX-77	67.5	38.4	8/4/2022	91.2	16.6	9/15/2022	-57%	90%	Endo/Diquat

Note: Herbicides used Endo/Diquat = Combination of Aquathol K (Endothall) and Tribune (Diquat). Post Treatment Injury Rank of herbicide injury to EWM on September 15, 2022, 6 weeks post treatment, were estimated during a survey as outlined above.

The observations contained in this report (see below) 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 change in Submerged Aquatic Vegetation (SAV) Percent Area Coverage, height in the water column, and bio-volume can result, and can be attributed to a recovery or increase in native vegetation in response to selectively controlling the target species.

TREATMENT AREA PLOT MAPS

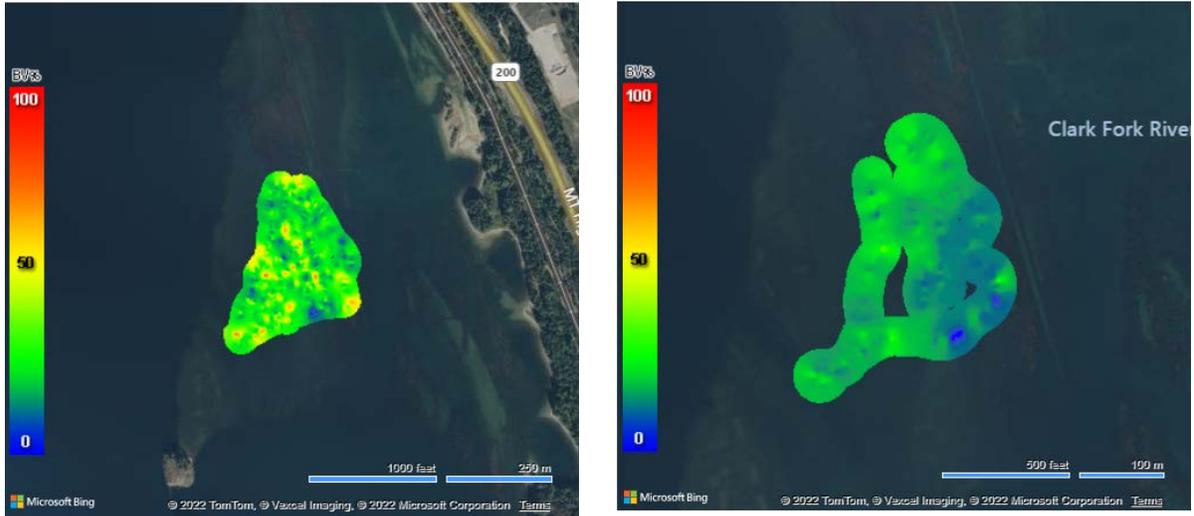
Overview of the 2022 Noxon Rapids Reservoir Treatment Plots (8/4/22)



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

NOXON RAPIDS RESERVOIR

Plot NOX-1: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)



2022 Noxon Rapids Reservoir 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 (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-1	99.3	28.9	8/4/2022	98.2	15.1	9/15/2022	-48%	95%	Endo/Diquat

**Observations/Notes NOX-1:** Treated with combination of endothall and diquat, control visually estimated at +/- 95%. Control excellent throughout plot. Some EWM at edges. Widespread Chara visible on bottom, and Coontail present.

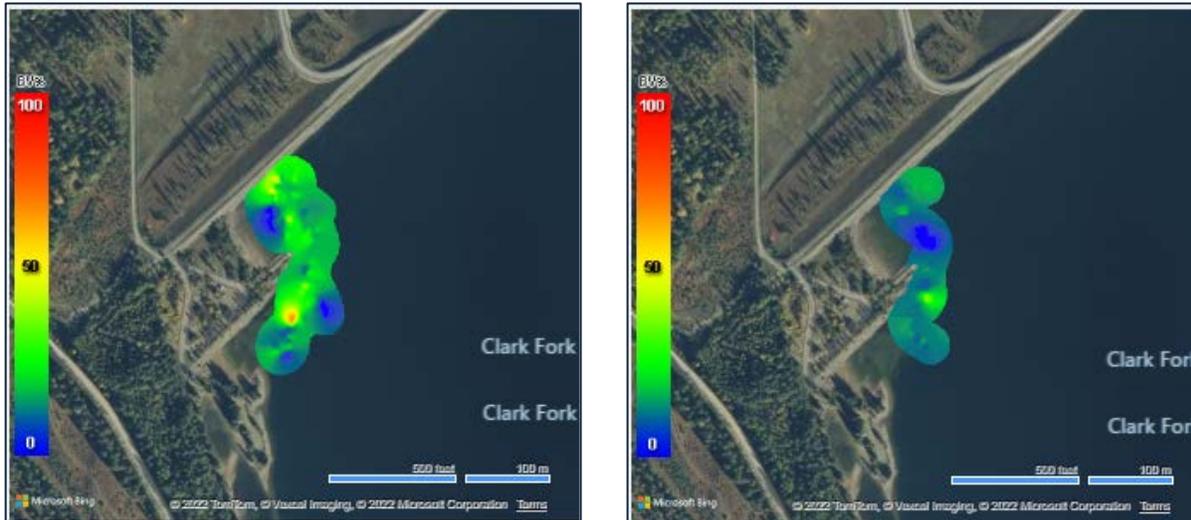
Plot NOX-1: At Time of Treatment (August 4, 2022)



Plot NOX-1: ~ Six (6) Weeks Post (September 15, 2022)



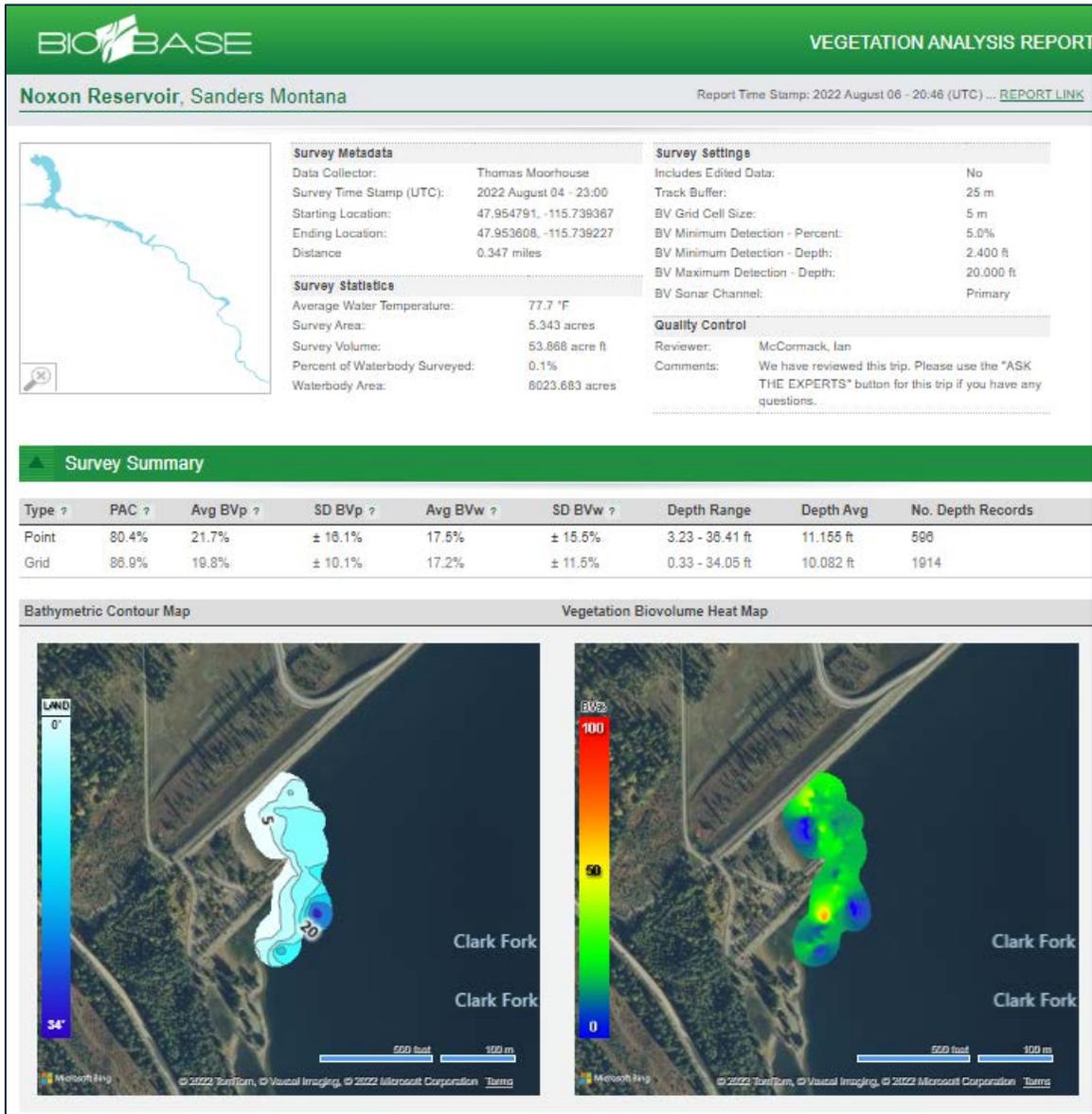
**Plot NOX-52: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



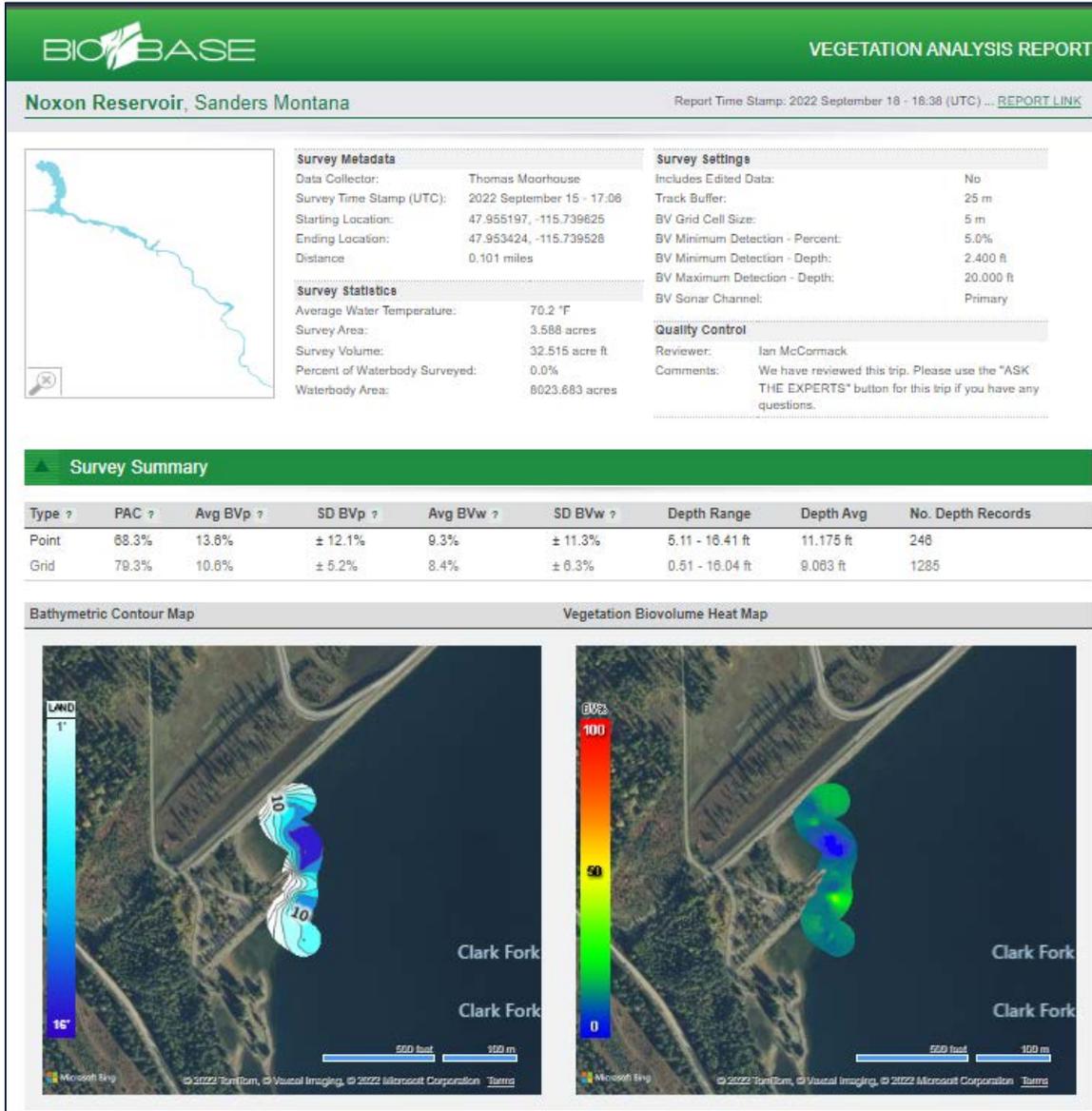
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-52	86.9	19.8	8/4/2022	79.3	10.6	9/15/2022	-46%	100%	Endo/Diquat

**Observations/Notes NOX-52:** Treated with combination of endothall and diquat, control visually estimated at +/- 100%. Control excellent throughout plot. Native plants visible and tall.

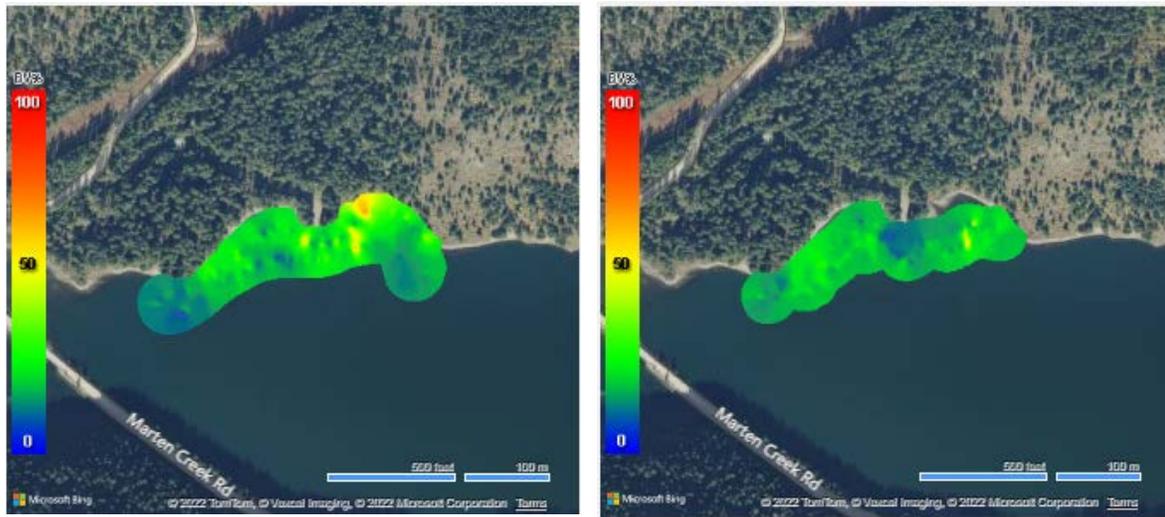
Plot NOX-52: At Time of Treatment (August 4, 2022)



Plot NOX-52: ~ Six (6) Weeks Post (September 15, 2022)



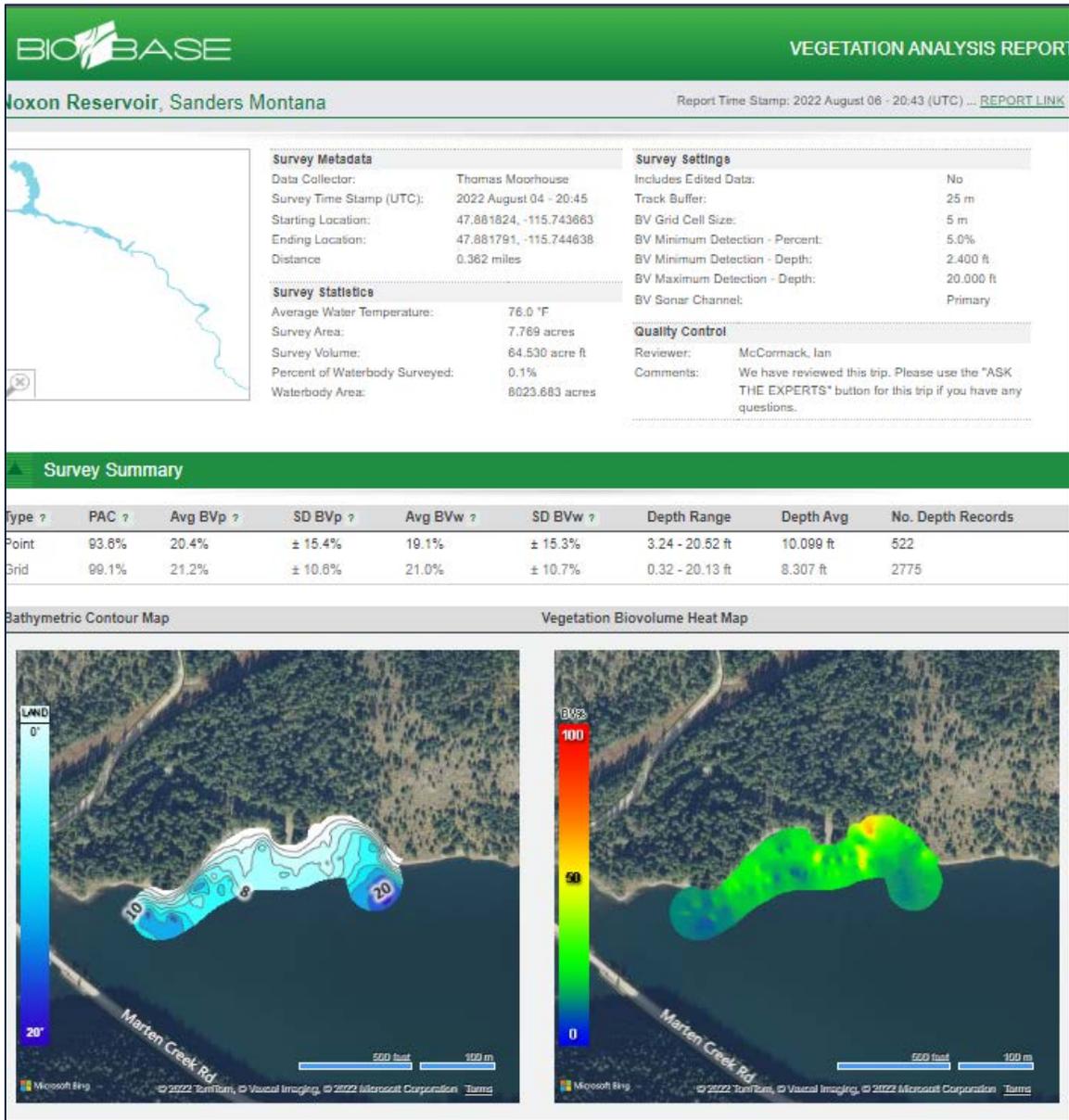
**Plot NOX-31: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



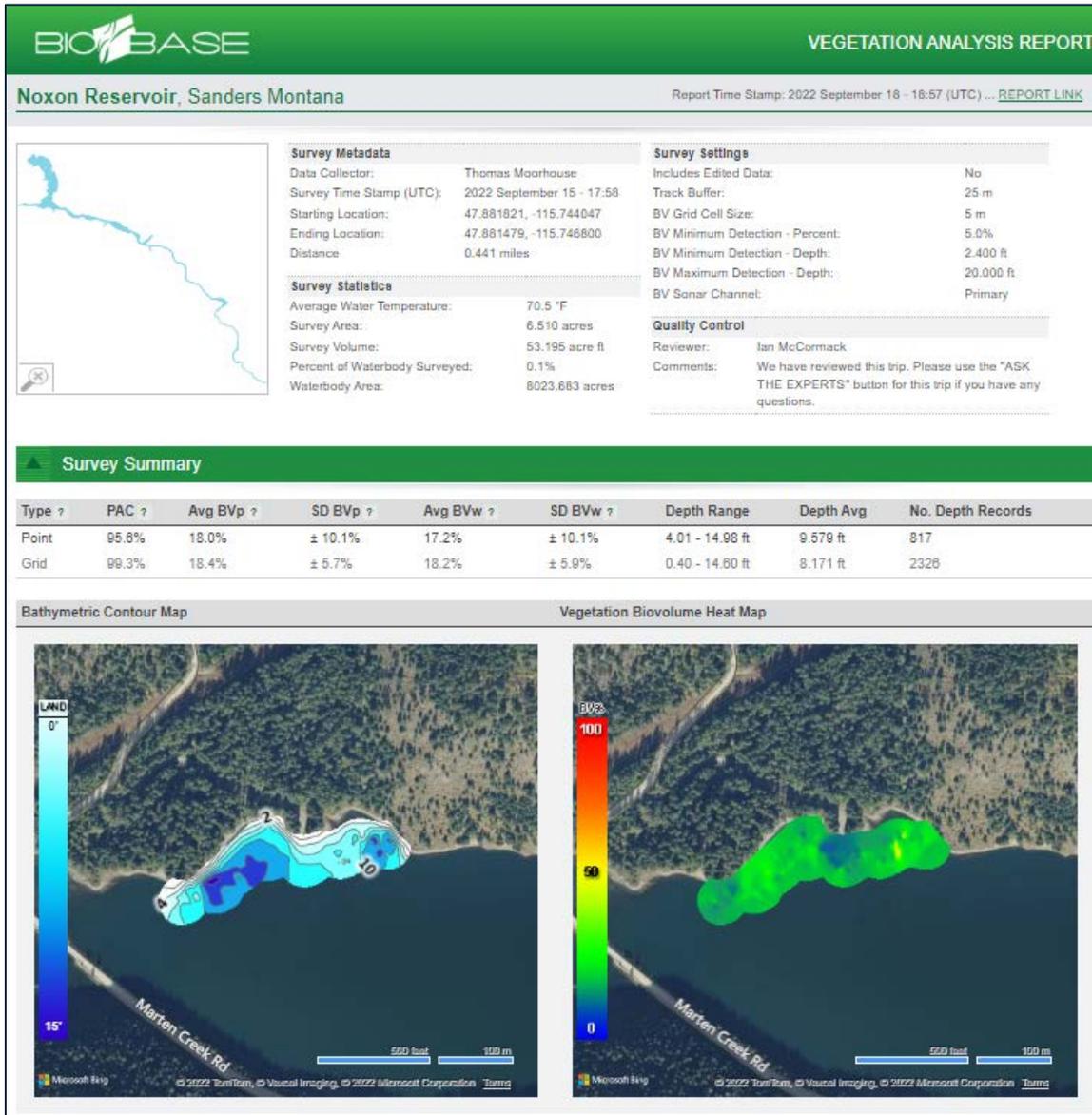
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-31	99.1	21.2	8/4/2022	99.3	18.4	9/15/2022	-13%	98%	Endo/Diquat

**Observations/Notes NOX-31:** Treated with combination of endothall and diquat, control visually estimated at +/- 98%. Control looks very good, abundant Coontail present in plot, dead EWM stems on rake toss. Floating fragments of EWM present.

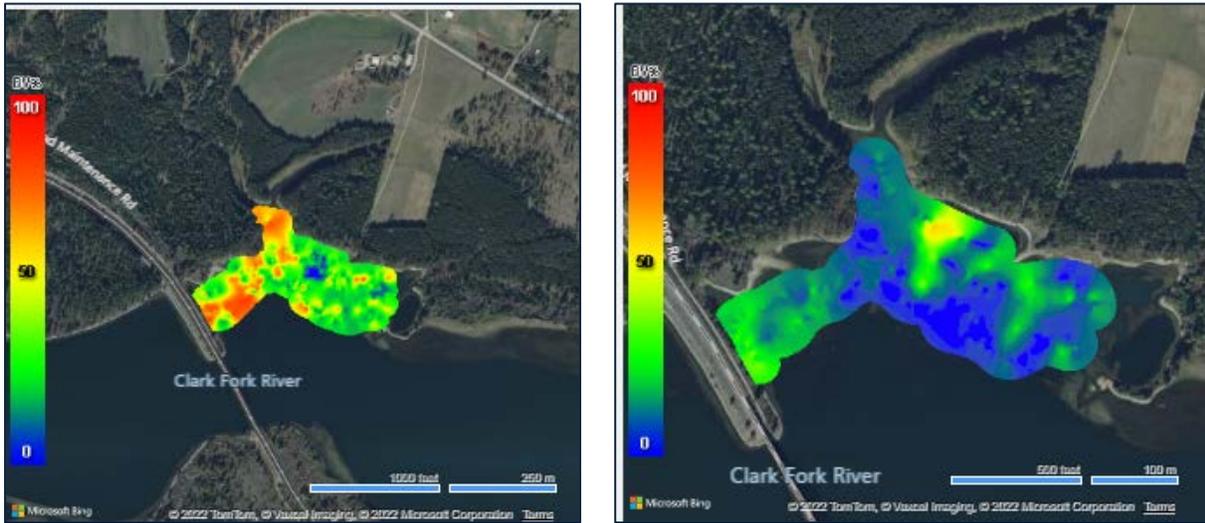
Plot NOX-31: At Time of Treatment (August 4, 2022)



Plot NOX-31: ~ Six (6) Weeks Post (September 15, 2022)



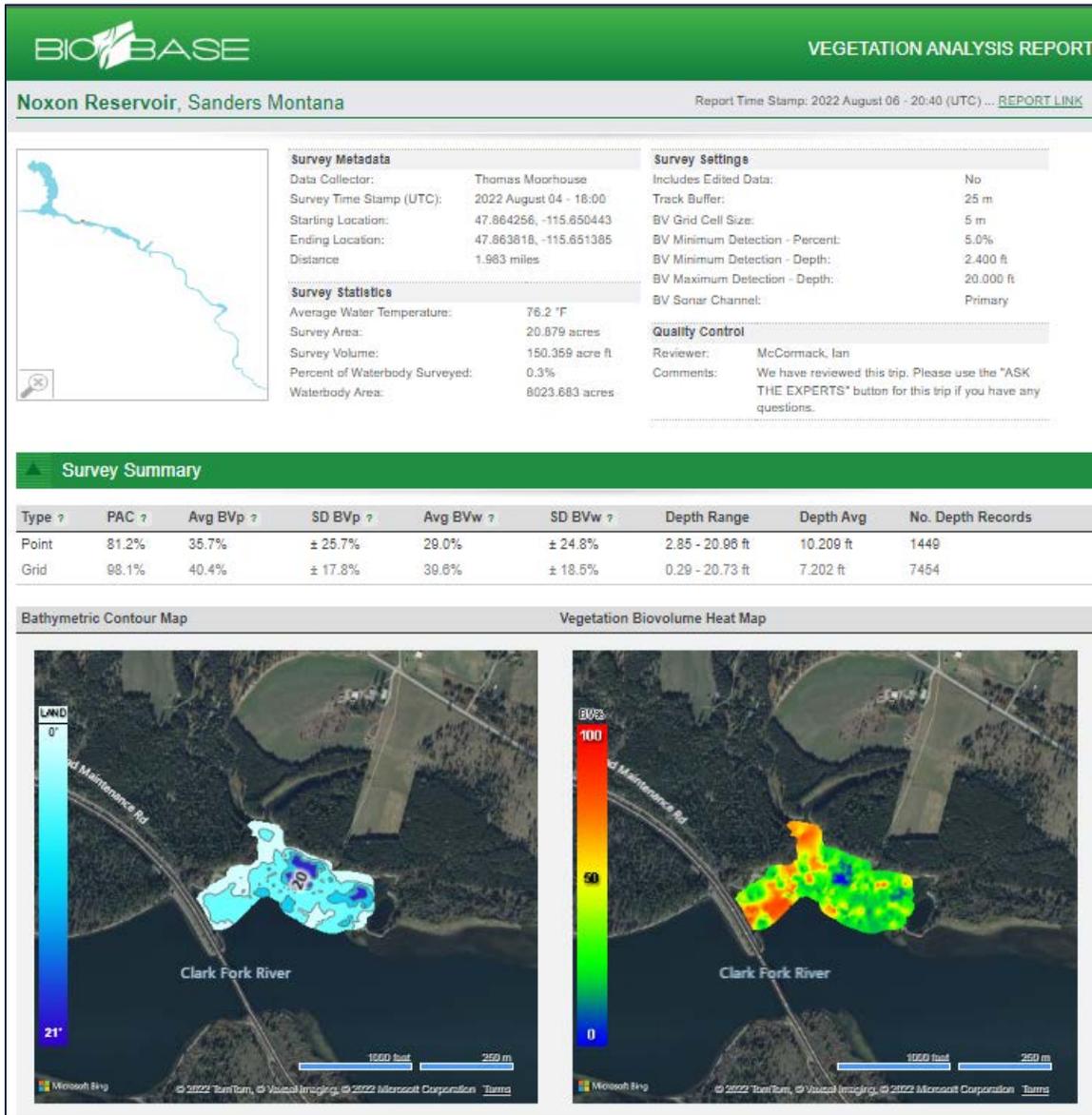
**Plot NOX-11: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



2022 Noxon Rapids Reservoir 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 (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-11	98.1	40.4	8/4/2022	59.4	16.1	9/15/2022	-60%	95%	Endo/Diquat

**Observations/Notes NOX-11:** Treated with combination of endothall and diquat, control visually estimated at +/- 95%. Control very good, Coontail present with some Spirogyra (filamentous algae) making visual estimation difficult do to similarities in appearance to EWM. West end of plot near railroad track had EWM still present, but obviously damaged.

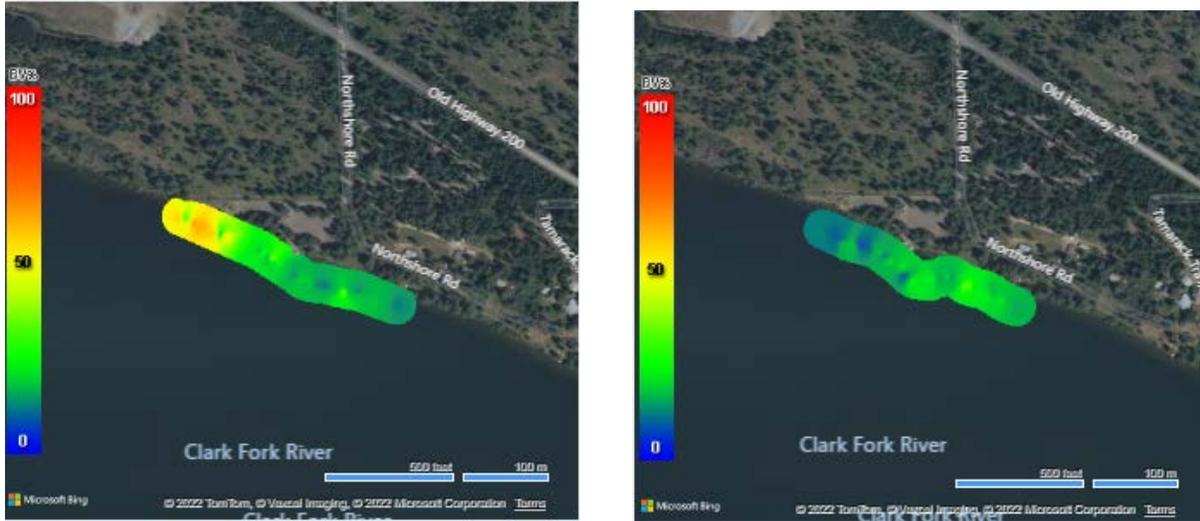
Plot NOX-11: At Time of Treatment (August 4, 2022)



Plot NOX-11: ~ Six (6) Weeks Post (September 15, 2022)



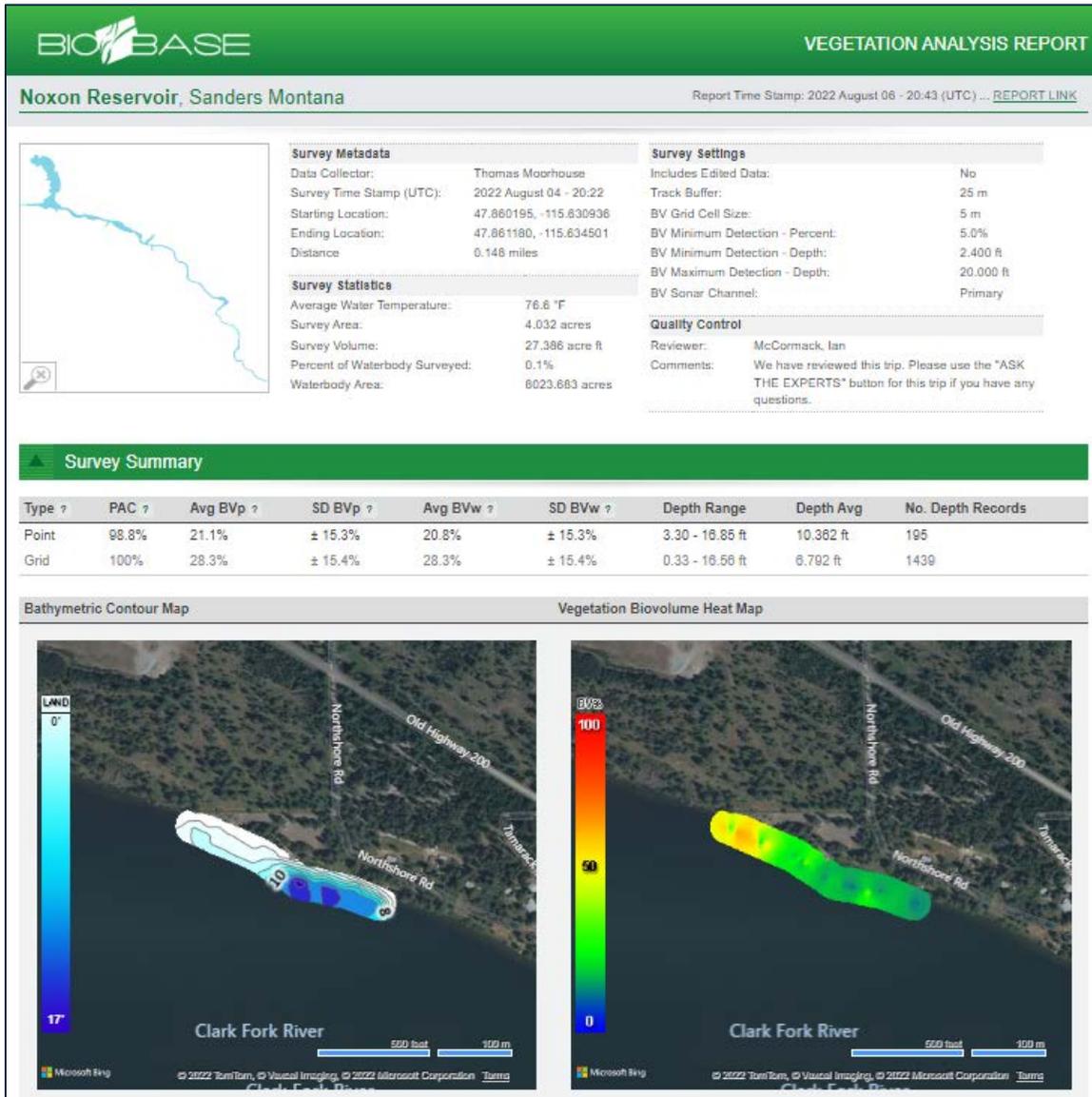
**Plot NOX-03: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



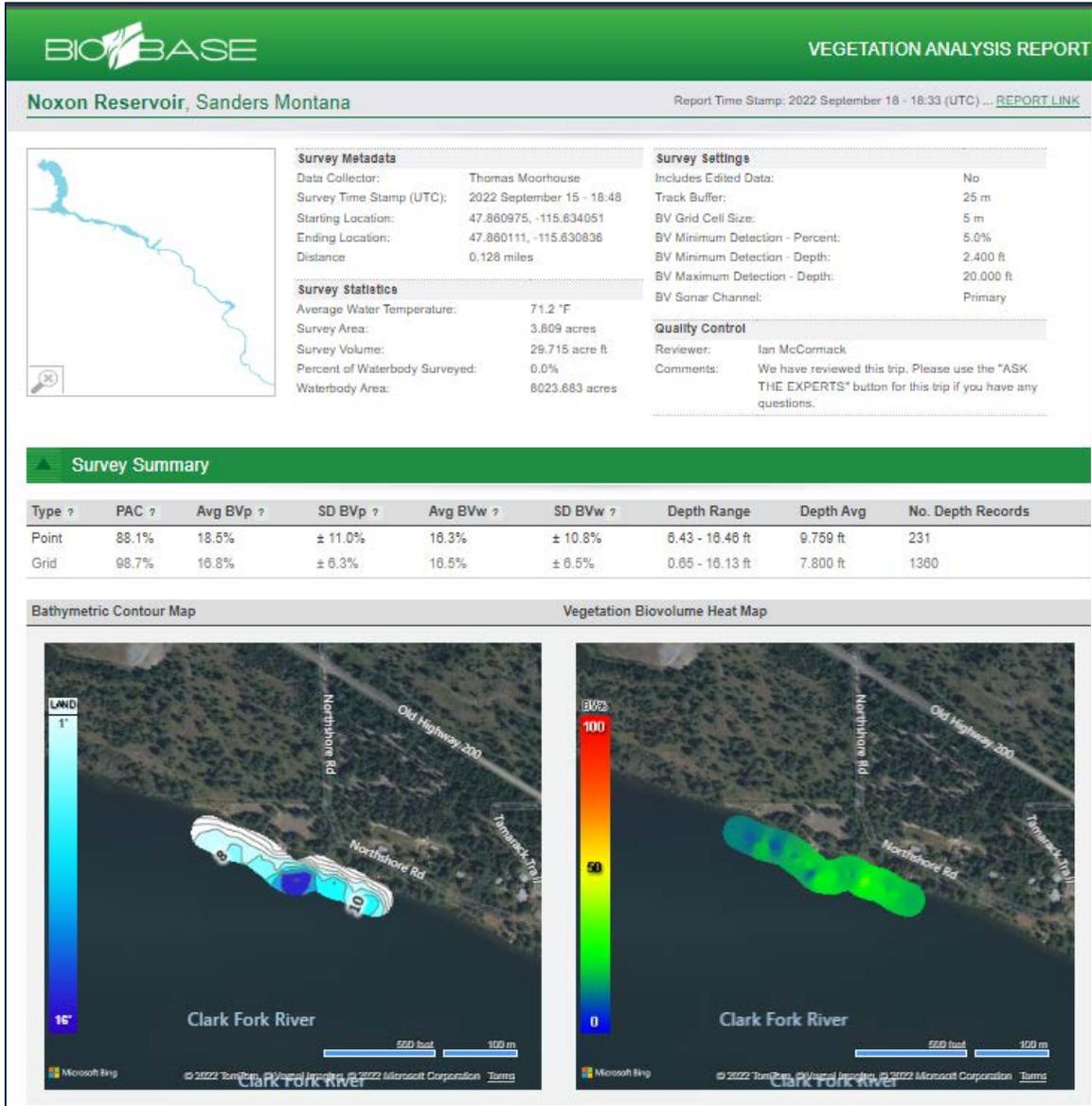
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected- Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-3	100.0	28.3	8/4/2022	98.7	16.8	9/15/2022	-41%	98%	Endo/Diquat

**Observations/Notes NOX-03:** Treated with combination of endothall and diquat, control visually estimated at +/- 98 % control. Some EWM present at very end of plot, otherwise excellent control. Some SAV present. EWM floating fragments present.

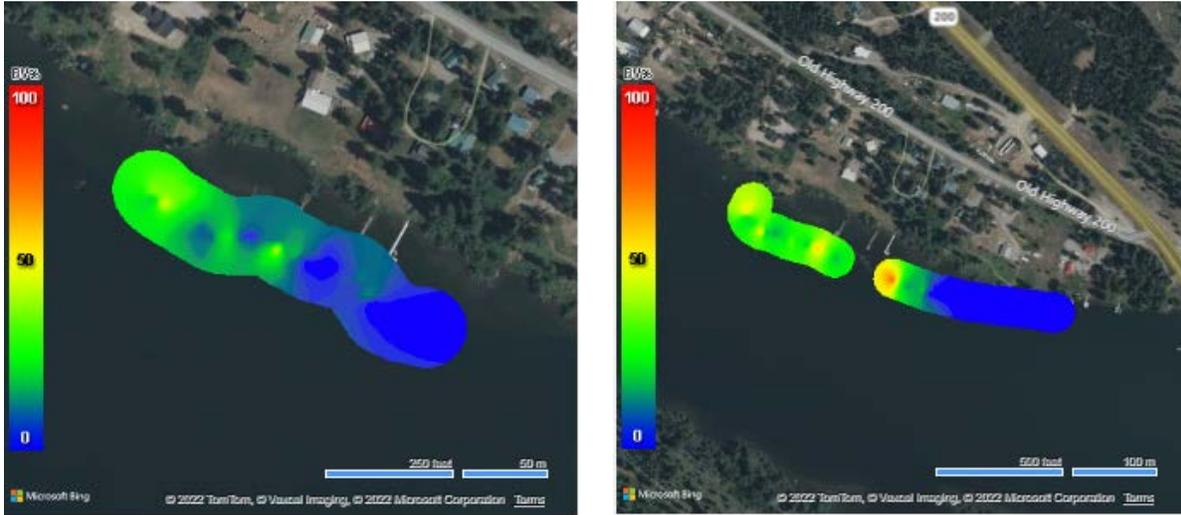
Plot NOX-03: At Time of Treatment (August 4, 2022)



Plot NOX-03 ~ Six (6) Weeks Post (September 15, 2022)



**Plot NOX-8: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



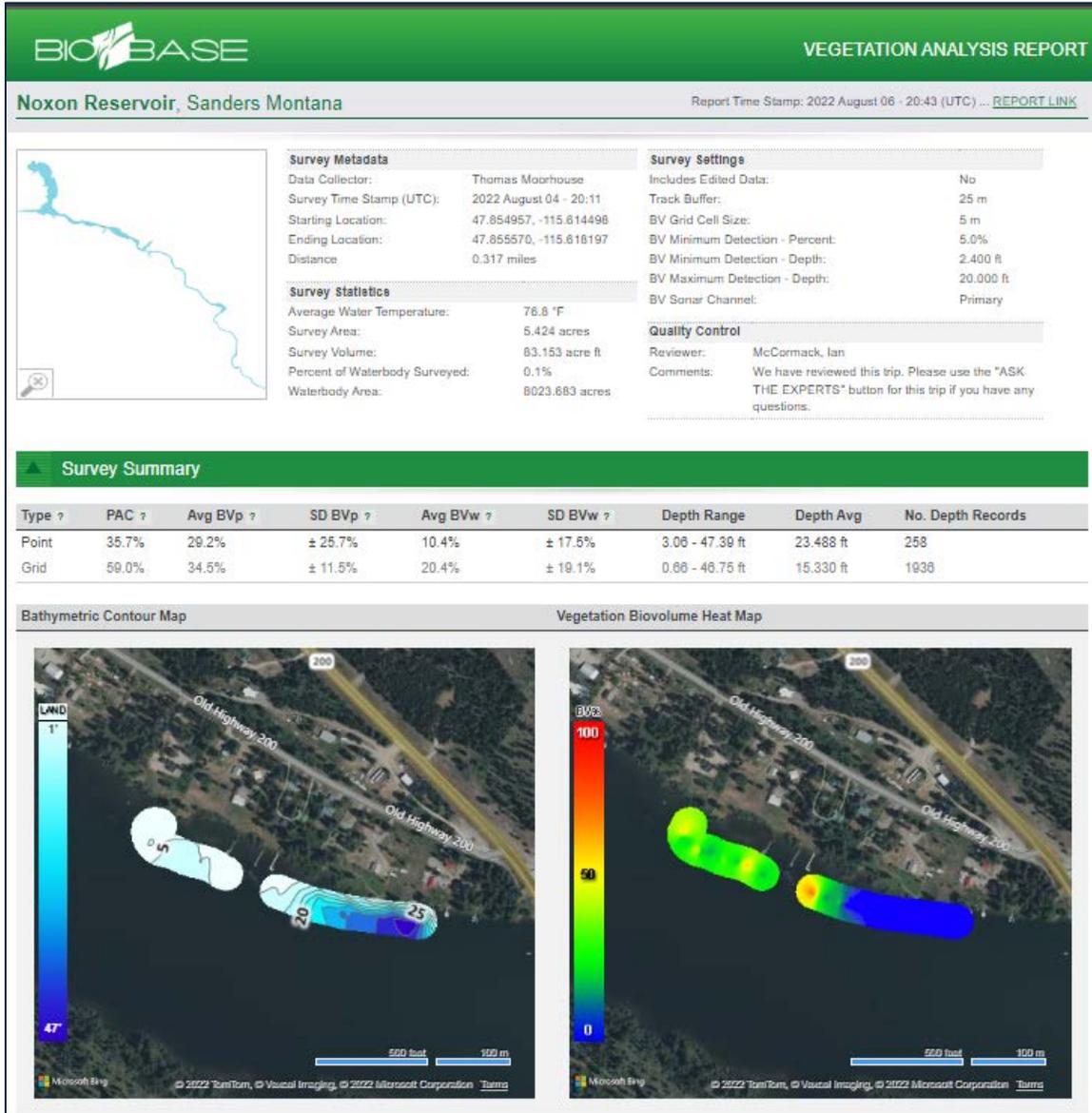
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-8	59.0	34.5	8/4/2022	55.8	19.3	9/15/2022	-44%	60%	Endo/Diquat

**Observations/Notes NOX-8:** Treated with combination of endothall and diquat, control visually estimated at +/-60 % control. EWM present downstream end of plot, and in isolated areas within plot and near docks.

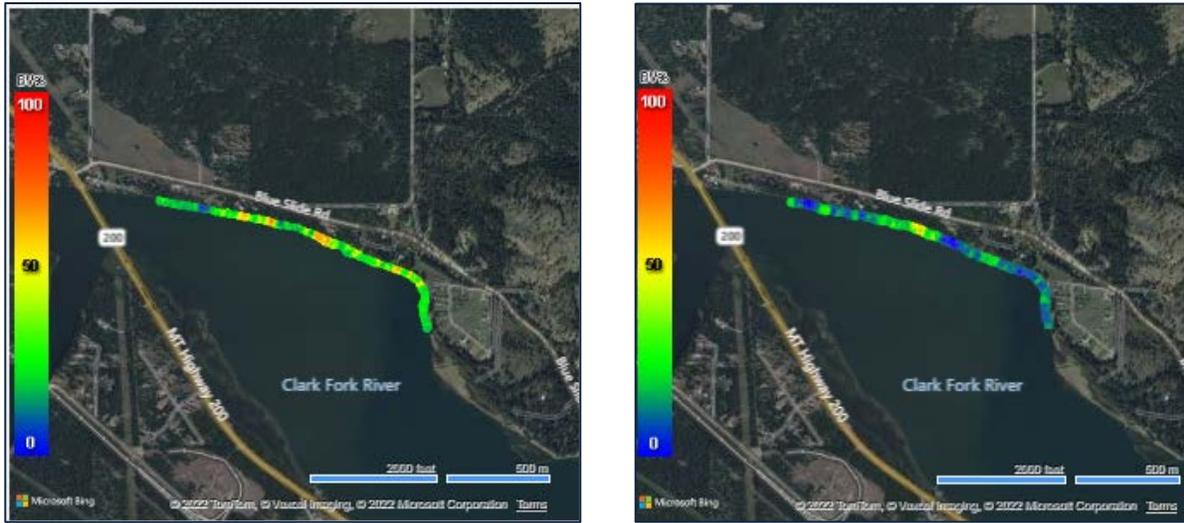
Plot NOX-8: At Time of Treatment (August 4, 2022)



Plot NOX-8: ~ Six (6) Weeks Post (September 15, 2022)



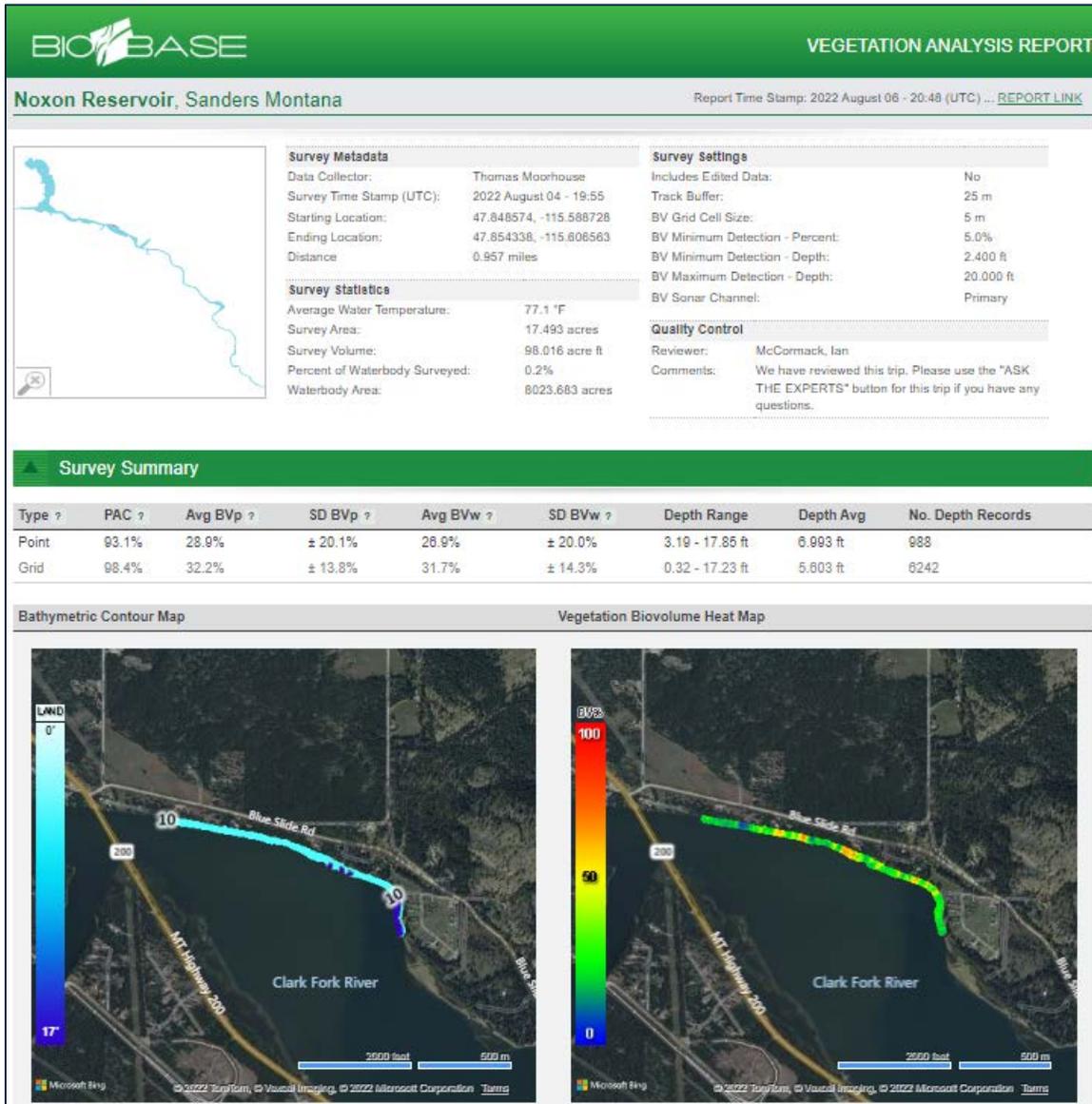
**Plot NOX-04: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



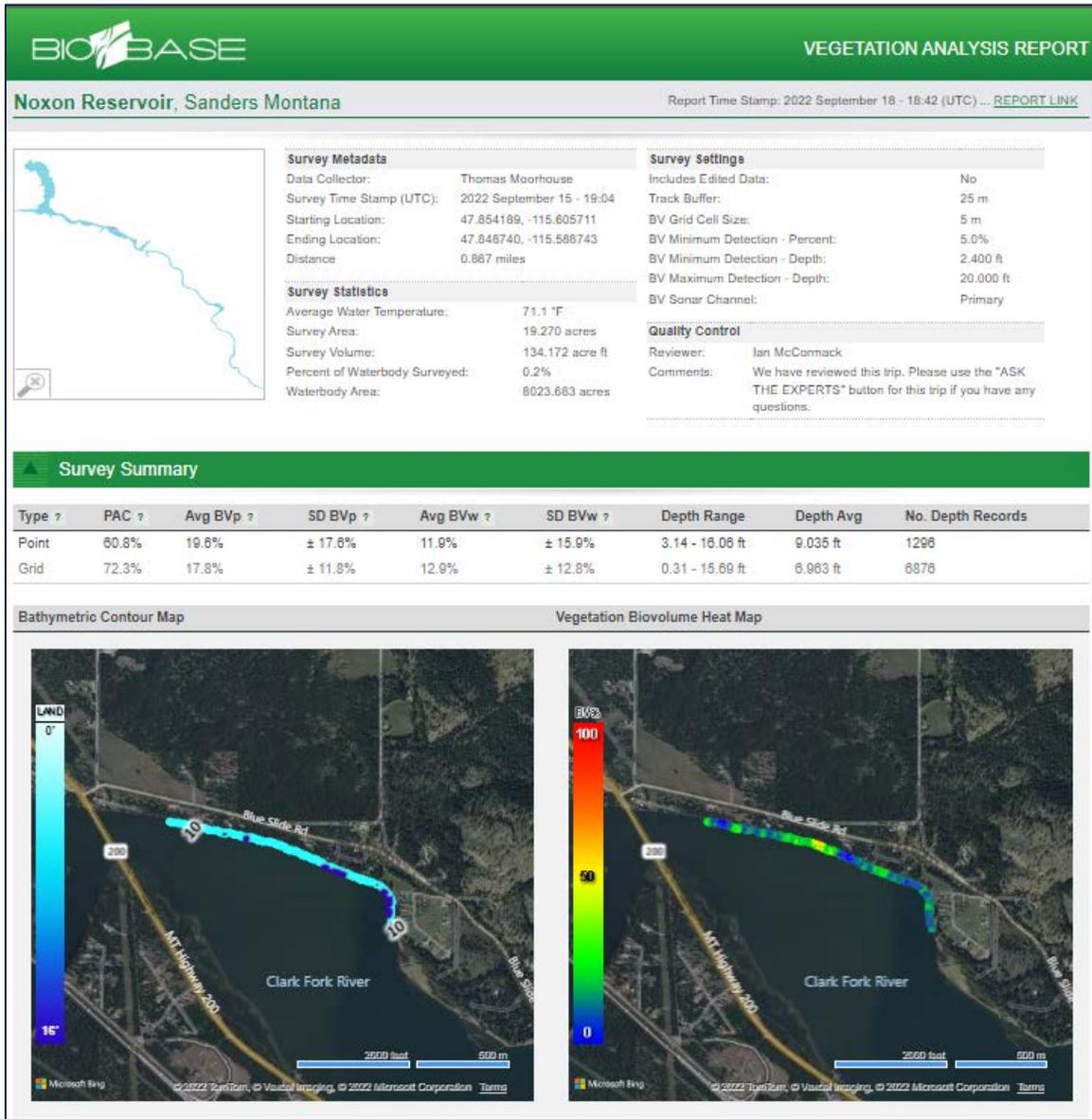
2022 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-4	98.4	32.2	8/4/2022	72.3	17.8	9/15/2022	-45%	90%	Endo/Diquat

**Observations/Notes NOX-04:** Treated with combination of endothall and diquat, control visually estimated at 90 % control. Upper half looked better than lower half in terms of control. EWM downstream damaged but still alive.

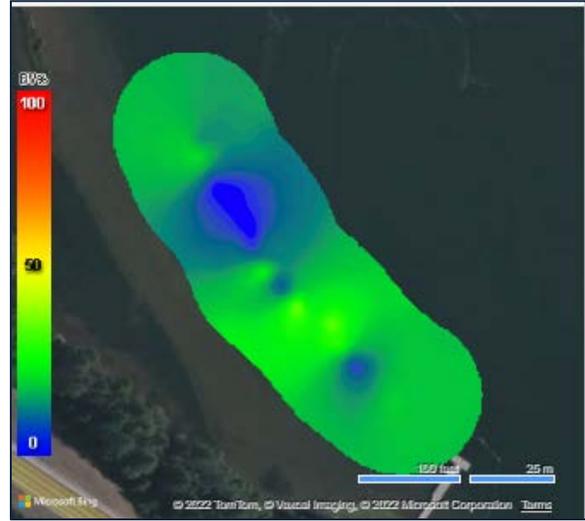
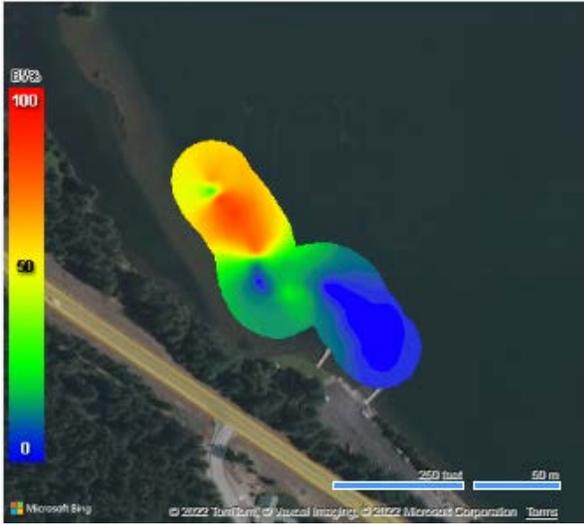
Plot NOX-04: At Time of Treatment (August 4, 2022)



Plot NOX-04~ Six (6) Weeks Post (September 15, 2022)



**Plot NOX-77: At Time of Treatment (August 4, 2022 Left),  
~ Six (6) Weeks Post (September 15, 2022 Right)**



2022 Noxon Rapids Reservoir 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 (Aquathol K/Tribune)
<b>Noxon Rapids</b>									
NOX-77	67.5	38.4	8/4/2022	91.2	16.6	9/15/2022	-57%	90%	Endo/Diquat

**Observations/Notes NOX-77:** Treated with combination of endothall and diquat, control visually estimated at 90 % control. Treatment missed the swim beach area at boom, rest of plot looked very good.

Plot NOX-77: At Time of Treatment (August 4, 2022)

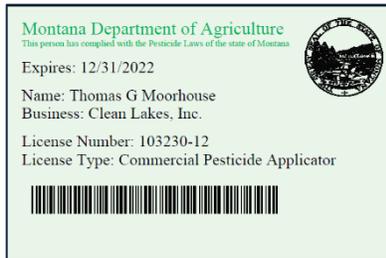


Plot NOX-77~ Six (6) Weeks Post (September 15, 2022)



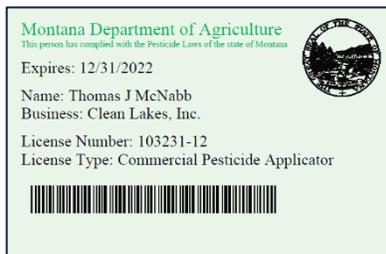
**LIST OF PROJECT PERSONNEL**

**PROJECT DIRECTOR:**



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

**PROJECT MANAGER:**



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

**SITE SAFETY AND HEALTH OFFICER:**

Drew McNabb  
Cell Phone: 925-482-7177

**ALTERNATE SITE SAFETY OFFICER:**

Thomas Benney  
Cell Phone: 925-766-8863

**EMERGENCY RESPONSE COORDINATOR:**

Drew McNabb  
Cell Phone: 925-482-7177

**ALTERNATE EMERGENCY COORDINATOR:**

Thomas Benney  
Cell Phone: 925-766-8863

**SANDERS COUNTY AIP  
TASK FORCE COORDINATOR**

Kim Bergstrom  
Phone: 406-826-2374  
Email: [pinnacle@blackfoot.net](mailto:pinnacle@blackfoot.net)

**END OF AQUATIC PESTICIDE APPLICATION REPORT**