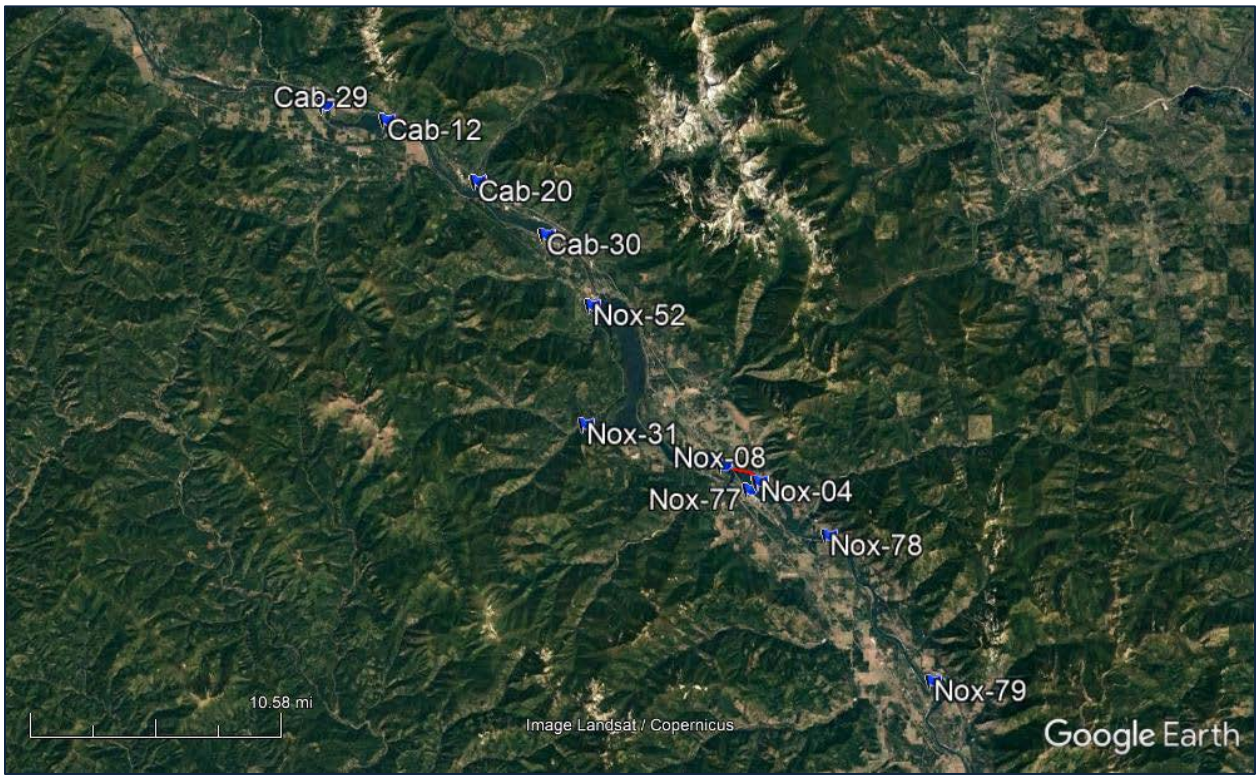
CLEAN LAKES INC.

NOXON RAPIDS & CABINET GORGE RESERVOIRS
SANDERS COUNTY, MONTANA

2019 Aquatic Invasive Species (AIS)
Aquatic Pesticide Application Report (APAR)



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Prepared For:
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October 2019

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 and Cabinet Gorge Reservoirs in 2019. 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 & Cabinet Gorge Reservoirs, Sanders County, Montana 2019 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 75.5 acres within previously identified and demarcated areas of Noxon Rapids and Cabinet Gorge Reservoirs.

PRE-TREATMENT SURVEYS: In July 2019 Craig McLane (Montana Fish, Wildlife and Parks) carried out visual and point intercept surveys of areas where nuisance growths of aquatic invasive species (AIS) were identified in the 2017 AIS report provided by Water and Environmental Technologies, Inc (WFT) as well as 2018 surveys carried out by MTFW&P. The previous surveys were used as the basis for planning the 2019 treatments. On July 18-19, 2019 CLI received the potential 2019 treatment GIS polygons and survey points from Kim McMahon Bergstrom. CLI developed a budgetary plan on August 2, 2019 based on July 2019 survey information.

SUMMARY OF ACRES TREATED: The final plan consisted of treating 75.4 acres of EWM in Noxon Rapids and Cabinet Gorge Reservoirs. Treatment plots were identified through GIS shapefiles and treatment plans at the direction of the county.

[1] NOXON RAPIDS AND CABINET GORGE RESERVOIRS, SANDERS COUNTY, MONTANA, 2019 AIS Aquatic Pesticide Application Plan (APAP)

TREATMENT SCHEDULE: The aquatic herbicide applications were performed on August 19 & 20, 2019, by CLI staff Thomas McNabb and Thomas Moorhouse as outlined in Table 1 below:

Table 1: Treatment Plots, Dates and Times

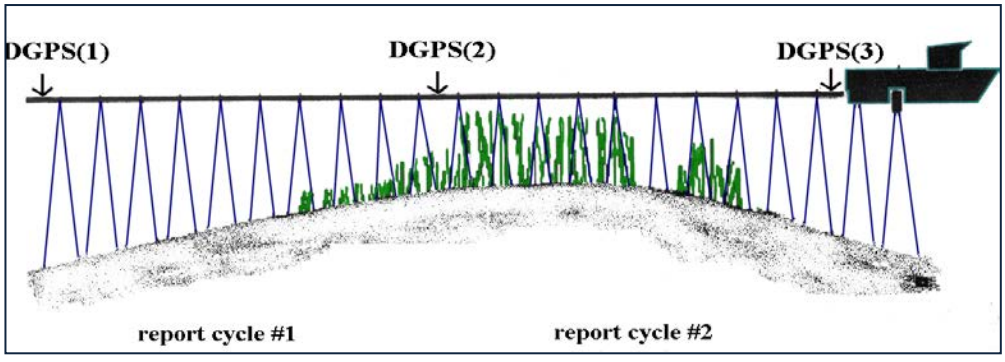
2019 Noxon-Cabinet Reservoirs Treatment Plan									
Plot Number	**Acreage (Ac)**	**Mean Depth (ft)**	**Date**	**Start**	**Stop**	**Wind (mph)**	**Wind Direction**	**Sky**	**Water Temp (F)**
NOX-79	**0.7**	**6.6**	**8/19/2019**	**6:06 PM**	**6:08 PM**	**5**	**S**	**Sunny**	**73.50**
NOX-78	**0.1**	**8.9**	**8/19/2019**	**6:31 PM**	**6:33 PM**	**5**	**S**	**Sunny**	**72.70**
NOX-77	**0.4**	**7.7**	**8/20/2019**	**7:09 AM**	**7:15 AM**	**light**	**none**	**Sunny**	**71.90**
NOX-73	**0.6**	**5.4**	**8/19/2019**	**6:46 PM**	**6:48 PM**	**3**	**W**	**Sunny**	**73.40**
NOX-03	**1.4**	**8.4**	**8/20/2019**	**8:07 AM**	**8:16 AM**	**0**	**none**	**Sunny**	**72.00**
NOX-31	**3.7**	**8.7**	**8/19/2019**	**3:52 PM**	**4:02 PM**	**5**	**W**	**Sunny**	**73.60**
NOX-52	**0.8**	**6.7**	**8/19/2019**	**4:34 PM**	**4:37 PM**	**6**	**WNW**	**PC**	**74.20**
Sub Total	**7.7**								
CAB-30	**2.3**	**4**	**8/20/2019**	**2:18 PM**	**2:48 PM**	**0**	**none**	**Sunny**	**72.60**
CAB-12	**1.7**	**4.9**	**8/20/2019**	**1:15 PM**	**1:18 PM**	**light**	**S**	**Sunny**	
CAB-29	**0.5**	**3.4**	**8/20/2019**	**1:30 PM**	**1:32 PM**	**light**	**S**	**Sunny**	
Sub Total	**4.5**								
NOX-04	**7.7**	**5.9**	**8/19/2019**	**2:17 PM**	**3:29 PM**	**5**	**NW**	**Sunny**	**74.10**
Sub Total	**7.7**								
NOX-02	**21.3**	**7.1**	**8/19/2019**	**1:07 PM**	**1:39 PM**	**5**	**NW**	**Sunny**	**73.60**
NOX-11	**16.6**	**5.1**	**8/20/2019**	**9:24 AM**	**9:52 AM**	**0**	**none**	**Sunny**	**72.00**
Sub Total	**37.9**								
CAB-05	**12.1**	**4.3**	**8/20/2019**	**3:00 PM**	**3:17 PM**	**Light**	**W**	**Sunny**	**72.40**
CAB-06	**5.5**	**3.3**	**8/20/2019**	**3:18 PM**	**3:29 PM**	**Light**	**W**	**Sunny**	**73.70**
Sub Total	**17.6**								
Total	**75.4**								

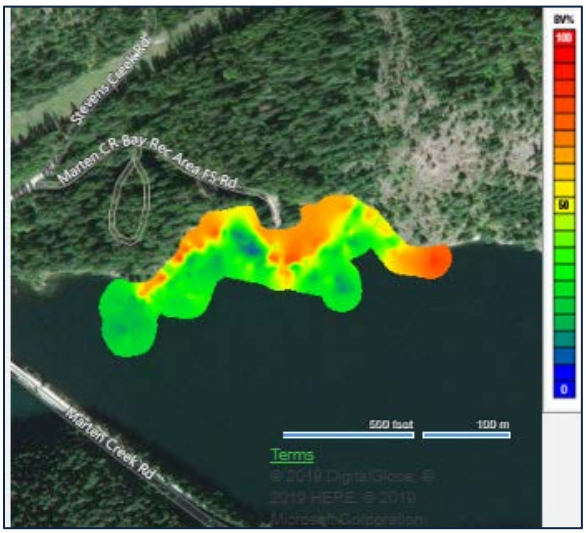
EQUIPMENT USED: A CLI Littoral Zone Treatment vessel (LittLine®) was used to perform the aquatic herbicide applications on August 19 and 20, 2019. The herbicide applications were made to the lower portion of the water column to increase herbicide concentration and exposure time (CET) relationships for the control of the target species. The application vessel was inspected on August 19, 2019 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® 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 (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. Due to an electronic technical difficulty, some plots in Cabinet Gorge reservoir were not captured.





The sonar data collected was processed and analyzed for At Time of Treatment Submerged Aquatic Vegetation (SAV) in the treatment plots (August 19 and 20, 2019), and at seven (7) Weeks Post Treatment (October 7, 2019). Some data did not meet quality control requirements due to equipment related technical issues, so that data is not available in some cases for the at time of treatment data. Data was collected to compare At Time of Treatment to seven (7) 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 Plot Nox-31, Noxon Reservoir, is pictured above.

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 the specified areas of Noxon Rapids and Cabinet Gorge Reservoirs 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). Kim Bergstrom accompanied CLI on the August 19, 2019 treatments. Provided in Table 2 is the Treatment Site Data outlining treatment information for each plot.

TREATMENT SITE DATA

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

2019 Noxon-Cabinet Reservoirs Treatment Plan					Tribune (Diquat)			Aquathol K (Endothall)		
Plot Number	Acreage (Ac)	Mean Depth (ft)	Volume	Product	Rate ppm	Gal/Ac	Gal Total Site	Rate ppm	Gal/Aft	Gal Total Site
NOX-79	0.7	6.6	5	End/Diq	0.37	2.0	1.4	1.8	1.16	5.3
NOX-78	0.1	8.9	1	End/Diq	0.37	2.0	0.2	1.8	1.16	1.0
NOX-77	0.4	7.7	3	End/Diq	0.37	2.0	0.8	1.8	1.16	3.6
NOX-73	0.6	5.4	3	End/Diq	0.37	2.0	1.2	1.8	1.16	3.7
NOX-03	1.4	8.4	12	End/Diq	0.37	2.0	2.8	1.8	1.16	13.6
NOX-31	3.7	8.7	32	End/Diq	0.37	2.0	7.4	1.8	1.16	37.2
NOX-52	0.8	6.7	5	End/Diq	0.37	2.0	1.6	1.8	1.16	6.2
Sub Total	7.7						15.4			70.7
CAB-30	2.3	4	9	End/Diq	0.37	2.0	4.6	1.8	1.16	10.6
CAB-12	1.7	4.9	8	End/Diq	0.37	2.0	3.4	1.8	1.16	9.6
CAB-29	0.5	3.4	2	End/Diq	0.37	2.0	1.0	1.8	1.16	2.0
Sub Total	4.5						9.0			22.2
NOX-04	7.7	5.9	45	End/Diq	0.37	2.0	15.4	1.8	1.16	52.5
Sub Total	7.7						15.4			52.5
NOX-02	21.3	7.1	151	End/Diq	0.37	2.0	42.6	1.8	1.16	174.8
NOX-11	16.6	5.1	85	End/Diq	0.37	2.0	33.2	1.8	1.16	97.8
Sub Total	37.9						75.8			272.6
CAB-05	12.1	4.3	52	End/Diq	0.37	2.0	24.2	1.8	1.16	60.1
CAB-06	5.5	3.3	18	End/Diq	0.37	2.0	11.0	1.8	1.16	21.0
Sub Total	17.6						35.2			81.1
Total	75.4						150.8			499.1

POST TREATMENT SURVEY: The Post Treatment survey was carried out by CLI (Moorhouse), and members of the Task Force (Kim Bergstrom, Alan Knudsen, and Juli Thurston) at Noxon Rapids Reservoir. Bergstrom and Knudsen were able to review sites downstream of and including NOX-11, while Alan Knudsen was able to review all Noxon Rapids Reservoir treatment sites. CLI carried out surveys at Cabinet Gorge Reservoir. Surveys

were conducted through visual estimates of injury/control, through occasional rake tosses, and via the use of a Lowrance HDS-9. Sonar logs were processed as described above. Water temperatures were approximately 59 F in both reservoirs on October 7, 2019. Table 3 provides information related to efficacy in each plot and 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 57% to 100%, while Post Treatment EWM Injury ranged from 80% to 100%. In Cabinet Gorge Reservoir the change in SAV Biovolume (BV) shows a range of 4% increase to a 28%, reduction, while Post Treatment EWM Injury ranged from 75% to 95%. The 4% increase in SAV% BV change can partly be attributed to a slightly larger area surveyed post treatment and the presence of EWM and native submersed aquatic vegetation present post treatment.

Table 3: Plot Percent Submersed Aquatic Vegetation (SAV) Cover and SAV Bio-Volume Present
At Time of Application and Seven (7) Weeks Post Treatment

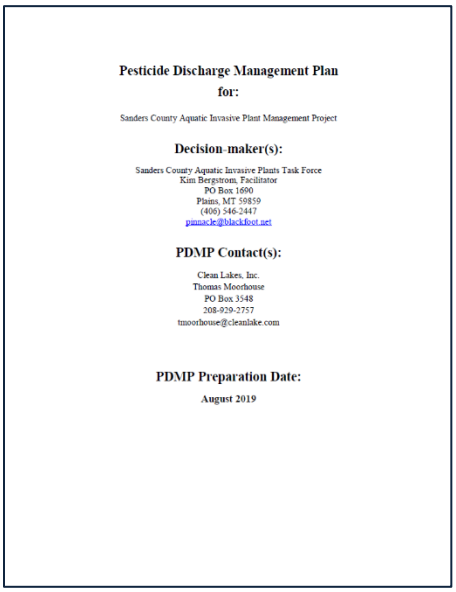
2019 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K and Tribune)
Noxon Rapids									
NOX-02	100.0	60.8	8/19/2019	14.5	11.7	10/7/2019	-81%	95% +/-	Endo/Diquat
NOX-03	100.0	35.8	8/20/2019	25.4	15.7	10/7/2019	-56%	95% +/-	Endo/Diquat
NOX-04	100.0	50.7	8/19/2019	20.3	14.4	10/7/2019	-72%	85% +/-	Endo/Diquat
NOX-11	99.7	55.5	8/20/2019	5.4	8.4	10/7/2019	-85%	98% +/-	Endo/Diquat
NOX-31	100.0	40.3	8/19/2019	32.8	17.3	10/7/2019	-57%	80% +/-	Endo/Diquat
NOX-52	100.0	32.7	8/19/2019	5.0	5.8	10/7/2019	-82%	98% +/-	Endo/Diquat
NOX-73	100.0	52.6	8/19/2019	0.0	0.0	10/7/2019	-100%	95% +/-	Endo/Diquat
NOX-77	100.0	25.8	8/20/2019	19.8	7.7	10/7/2019	-70%	90% +/-	Endo/Diquat
NOX-78	100.0	54.2	8/19/2019	0.0	0.0	10/7/2019	-100%	98% +/-	Endo/Diquat
NOX-79	99.3	46.3	8/19/2019	100.0	16.5	10/7/2019	-64%	100% +/-	Endo/Diquat

2019 Cabinet Gorge Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)
CAB-05	N/A	N/A	8/20/2019	42.9	19.0	10/7/2019	N/A	95% +/-	Endo/Diquat
CAB-06	N/A	N/A	8/20/2019	92.3	26.2	10/7/2019	N/A	90% +/-	Endo/Diquat
CAB-12	100	39.2	8/20/2019	72.8	28.4	10/7/2019	-28%	90% +/-	Endo/Diquat
CAB-29	82.9	32.3	8/20/2019	69.3	33.5	10/7/2019	4%	75% +/-	Endo/Diquat
CAB-30	N/A	N/A	8/20/2019	N/A	N/A	10/7/2019	N/A	N/A	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 October 7, 2019, approximately 7 weeks post treatment, were estimated during a survey as outlined above.

The observations contained in this report are general seven (7) 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.

PERMIT COMPLIANCE: CLI developed the Aquatic Pesticide Application Plan on August 16, 2019, 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 14, 2019.



Pesticide Discharge Management Plan for:

Sanders County Aquatic Invasive Plant Management Project

Decision-maker(s):

Sanders County Aquatic Invasive Plants Task Force
Kim Bergstrom, Facilitator
PO Box 1690
Plains, MT 59859
(406) 546-2447
pinnacle@blackfoot.net

PDMP Contact(s):

Clean Lakes, Inc.
Thomas Moorhouse
PO Box 3548
208-929-2757
tmoorhouse@cleanlake.com

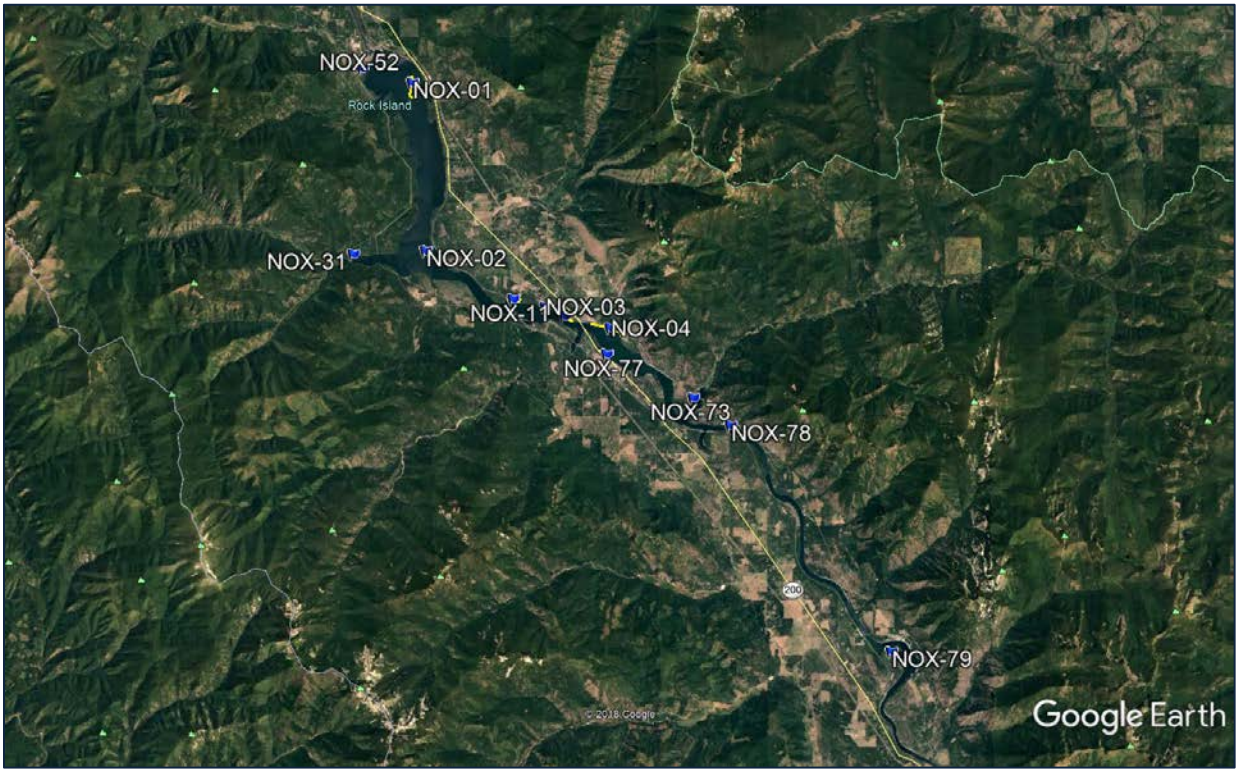
PDMP Preparation Date:

August 2019

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 2019 Pre-Treatment Surveys that were used to generate the final 2019 Treatment Plan.

TREATMENT AREA PLOT MAPS
Overview of the 2019 Noxon Rapids Reservoir Treatment Plots (8/20/19)

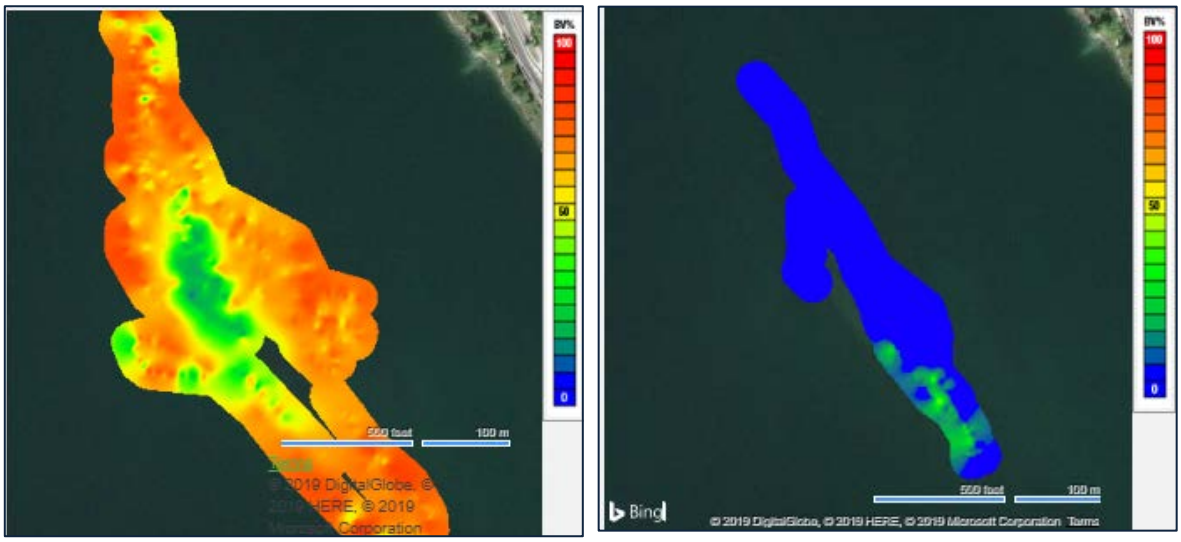


Overview of the 2019 Cabinet Gorge Reservoir Treatment Plots (8/20/19)

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

NOXON RAPIDS RESERVOIR

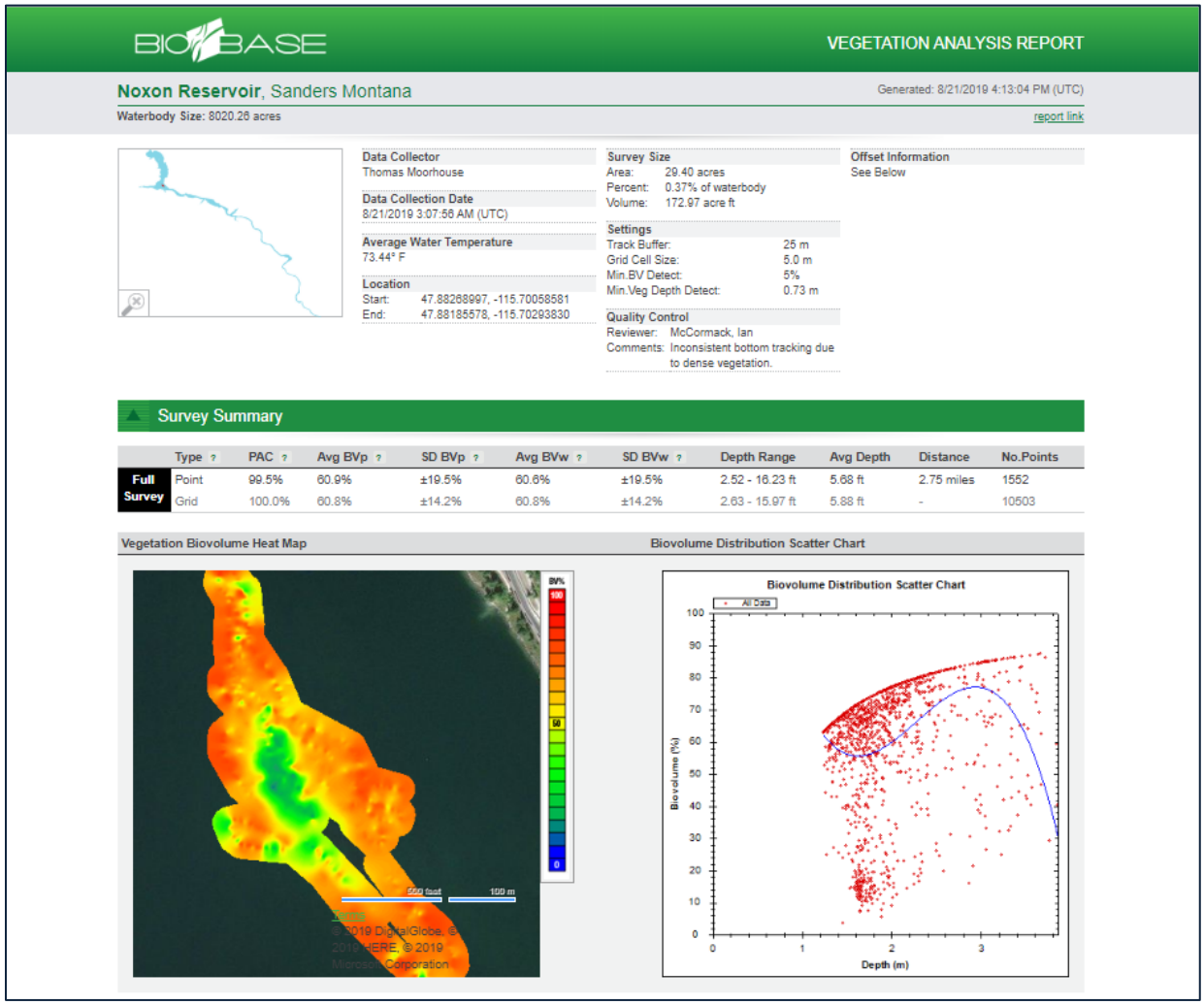
Plot NOX-02: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-02	100.0	60.8	8/19/2019	14.5	11.7	10/7/2019	-81%	95% +/-	Endo/Diquat

Observations/Notes NOX-02: Treated with combination of endothall and diquat, control visually estimated at +/- 95%. Some Coontail and Elodea present post treatment.

Plot NOX-02: At Time of Treatment (August 19, 2019)



BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana — Generated: 8/21/2019 4:13:04 PM (UTC)

Waterbody Size: 8020.26 acres — report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:07:56 AM (UTC)

Average Water Temperature
73.44° F

Location
Start: 47.88268997, -115.70058581
End: 47.88185578, -115.70293830

Survey Size
Area: 29.40 acres
Percent: 0.37% of waterbody
Volume: 172.97 acre ft

Settings
Track Buffer: 25 m
Grid Cell Size: 5.0 m
Min.BV Detect: 5%
Min.Veg Depth Detect: 0.73 m

Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	99.5%	60.9%	±19.5%	60.6%	±19.5%	2.52 - 16.23 ft	5.68 ft	2.75 miles	1552
	Grid	100.0%	60.8%	±14.2%	60.8%	±14.2%	2.63 - 15.97 ft	5.88 ft	-	10503

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart

Plot NOX-02: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 3:53:46 AM (UTC)

Waterbody Size: 8020.26 acres — report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 5:41:30 PM (UTC)

Average Water Temperature
60.67° F

Location
Start: 47.88481771, -115.70418215
End: 47.88249654, -115.70227131

Survey Size
Area: 11.17 acres
Percent: 0.14% of waterbody
Volume: 61.46 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

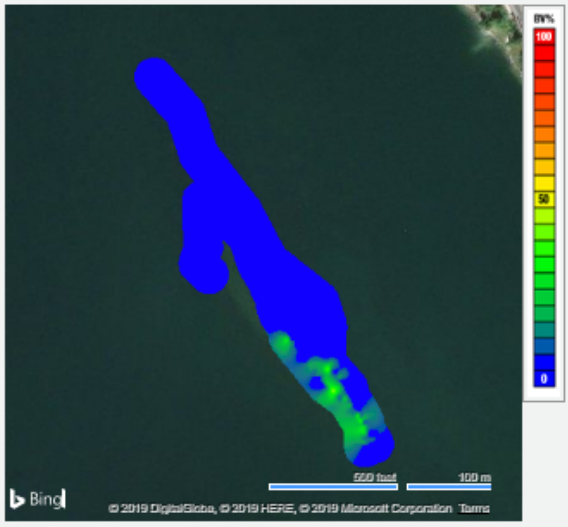
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

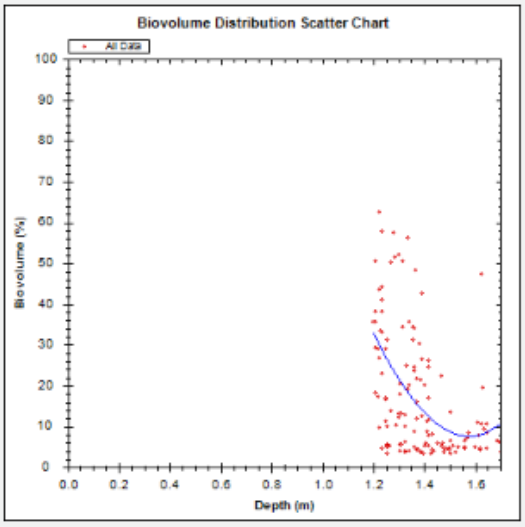
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	10.5%	21.4%	±15.4%	2.2%	±8.0%	2.79 - 10.11 ft	5.49 ft	0.81 miles	969
	Grid	14.5%	11.7%	±5.6%	1.7%	±4.6%	2.94 - 9.67 ft	5.50 ft	-	580

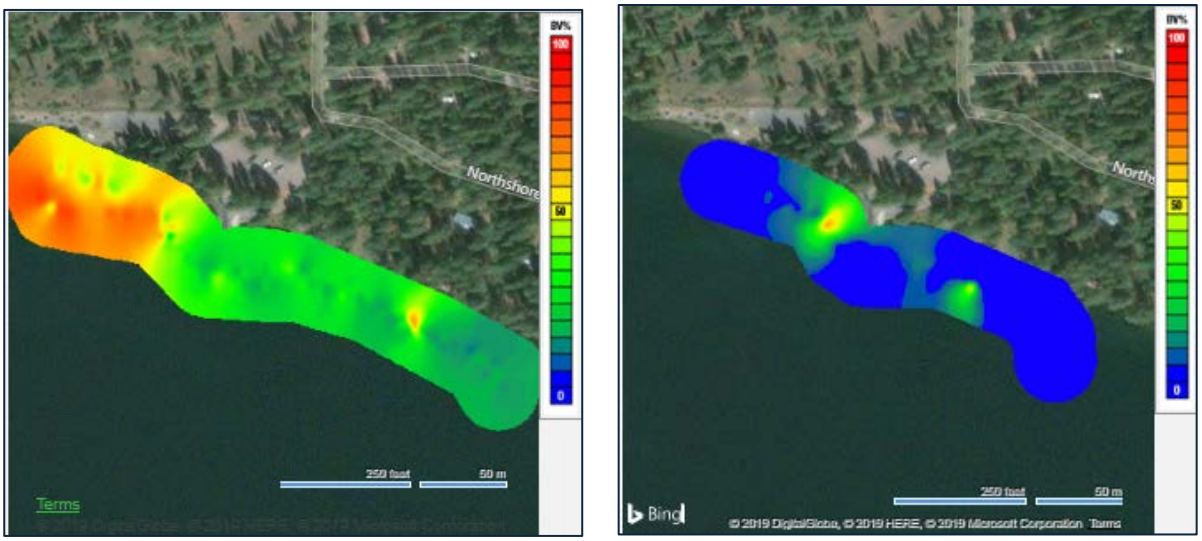
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-03: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



2019 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)
NOX-03	100.0	35.8	8/20/2019	25.4	15.7	10/7/2019	-56%	95% +/-	Endo/Diquat

Observations/Notes NOX-03: Treated with combination of endothall and diquat, control visually estimated at +/- 85%. Some Elodea present post treatment.

Plot NOX-03: At Time of Treatment (August 20, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/22/2019 10:17:31 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:15:23 AM (UTC)

Average Water Temperature
72.11° F

Location
Start: 47.85995040, -115.63034460
End: 47.85986573, -115.63039868

Survey Size
Area: 4.86 acres
Percent: 0.06% of waterbody
Volume: 38.31 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

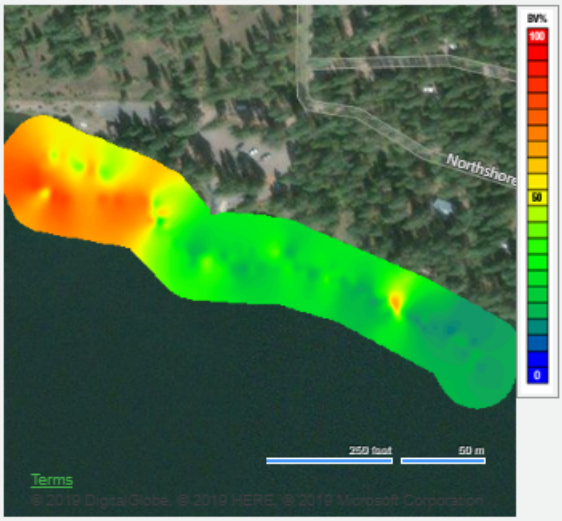
Quality Control
Reviewer: Ian McCormack
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

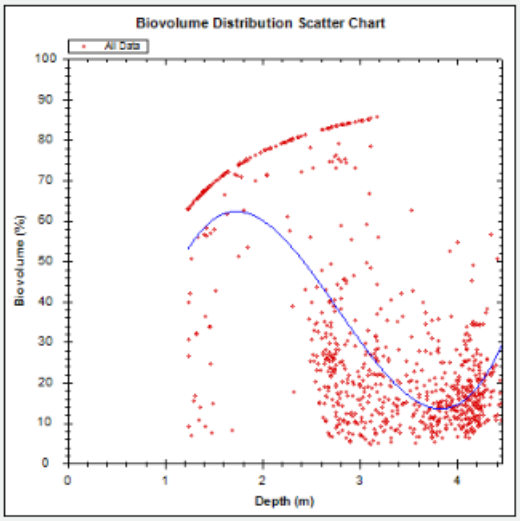
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	97.7%	30.3%	±23.5%	29.6%	±23.2%	3.04 - 15.31 ft	10.44 ft	0.38 miles	866
	Grid	100.0%	35.8%	±20.5%	35.8%	±20.5%	0.31 - 14.12 ft	7.88 ft	-	1735

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-03: ~ Seven (7) Weeks Post (October 7, 2019)

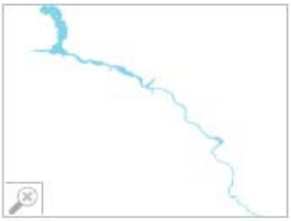
BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 3:57:25 AM (UTC)

Waterbody Size: 8020.26 acres

report link



Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 7:05:57 PM (UTC)

Average Water Temperature
59.77° F

Location
Start: 47.85999877, -115.63111975
End: 47.86097846, -115.63379672

Survey Size
Area: 3.48 acres
Percent: 0.04% of waterbody
Volume: 27.16 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

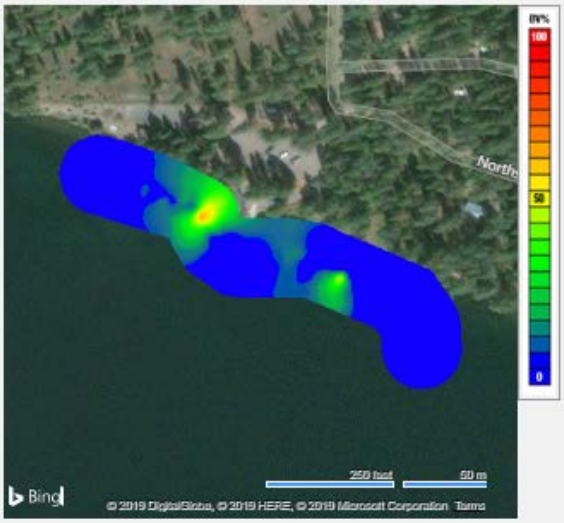
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

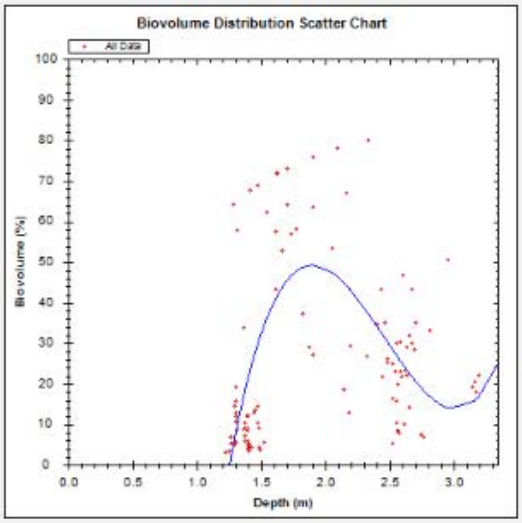
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	15.5%	29.1%	±22.2%	4.5%	±13.0%	3.15 - 21.46 ft	9.78 ft	0.19 miles	659
	Grid	25.4%	15.7%	±12.0%	4.0%	±9.1%	0.36 - 20.41 ft	7.81 ft	-	315

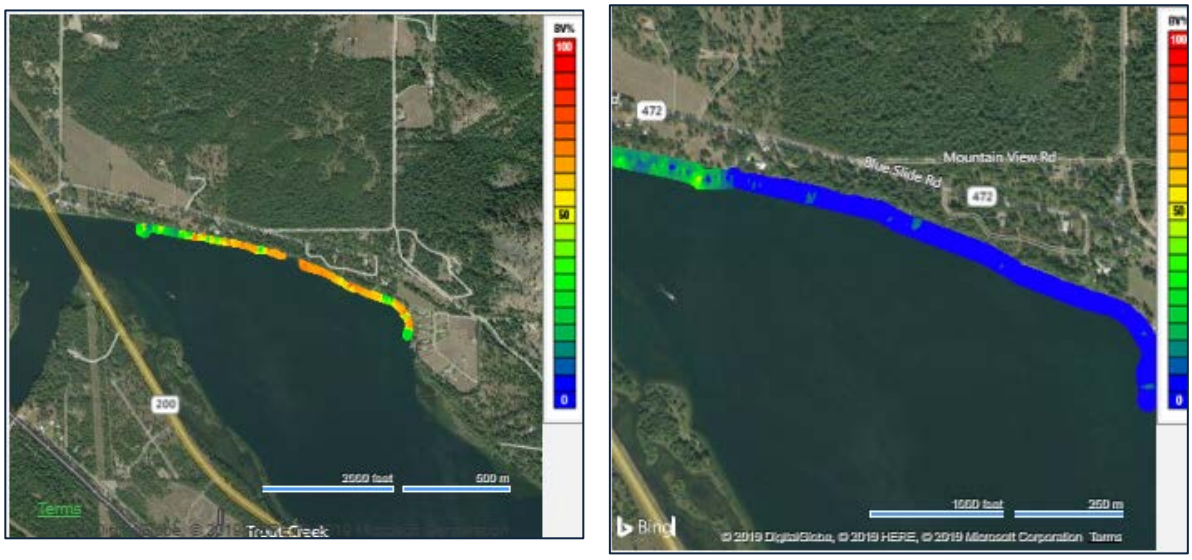
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-04: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-04	**100.0**	**50.7**	**8/19/2019**	**20.3**	**14.4**	**10/7/2019**	**-72%**	**85% +/-**	**Endo/Diquat**

Observations/Notes NOX-04: Treated with combination of endothall and diquat, control visually estimated at +/- 75 to 85%. Better control in upper 3/4s of plot 85% +/-. Downstream part of plot variable control, all EWM injured, some entirely while other plants less so. Potential increased water velocity downstream and more exposed.

Plot NOX-04: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:13:03 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:09:28 AM (UTC)

Average Water Temperature
74.33° F

Location
Start: 47.84954769, -115.58889210
End: 47.85404772, -115.60580118

Survey Size
Area: 14.61 acres
Percent: 0.18% of waterbody
Volume: 64.84 acre ft

Settings
Track Buffer: 25 m
Grid Cell Size: 5.0 m
Min.BV Detect: 5%
Min.Veg Depth Detect: 0.73 m

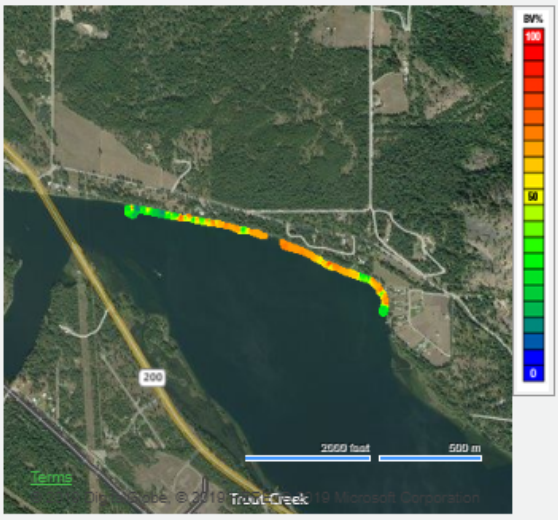
Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

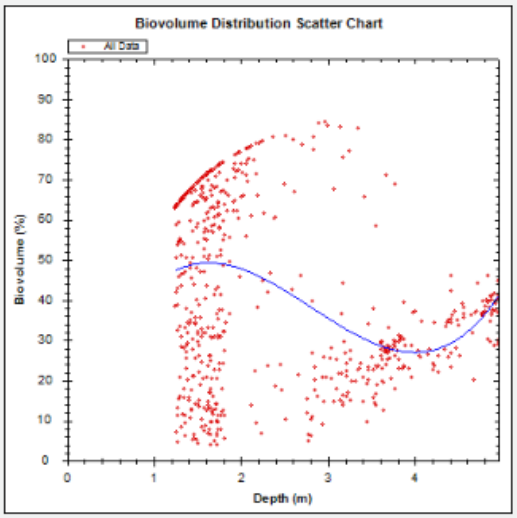
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	95.8%	43.7%	±22.1%	41.9%	±21.7%	2.70 - 16.69 ft	6.01 ft	0.96 miles	689
	Grid	100.0%	50.7%	±17.2%	50.7%	±17.2%	0.27 - 16.00 ft	4.44 ft	-	5213

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-04: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 5:50:52 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 7:35:27 PM (UTC)

Average Water Temperature
60.17° F

Location
Start: 47.85422312, -115.60576513
End: 47.84908194, -115.58896420

Survey Size
Area: 18.63 acres
Percent: 0.23% of waterbody
Volume: 93.56 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

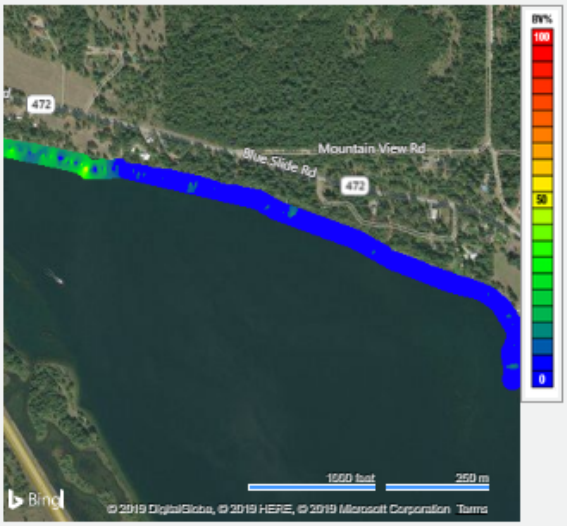
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

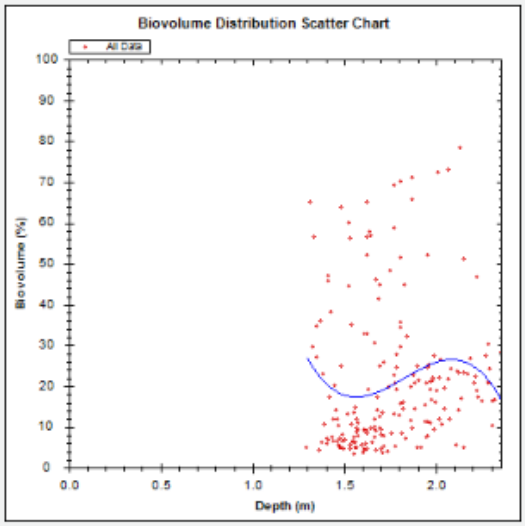
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	16.0%	22.8%	±17.6%	3.6%	±10.4%	3.07 - 12.76 ft	6.64 ft	0.95 miles	1130
	Grid	20.3%	14.4%	±7.1%	2.9%	±6.6%	0.31 - 12.40 ft	5.02 ft	-	1348

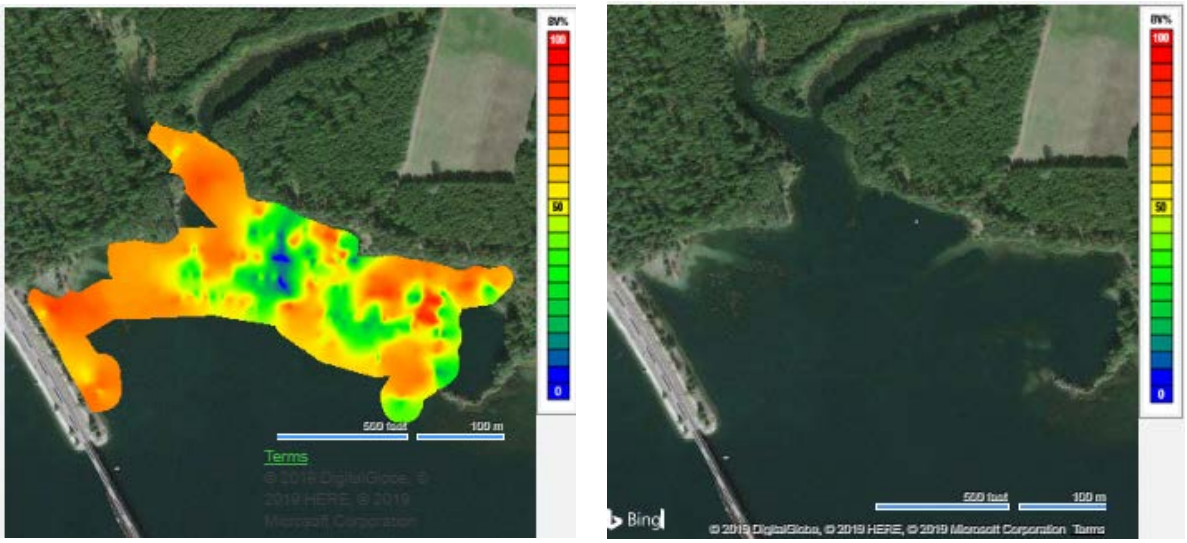
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-11: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-11	99.7	55.5	8/20/2019	5.4	8.4	10/7/2019	-85%	98% +/-	Endo/Diquat

Observations/Notes NOX-11: Treated with combination of endothall and diquat, control visually estimated at +/- 98%. Some Elodea present post treatment. Post October 7, 2019 image not available due to a technical issue related to the cloud-based processing site (BioBase).

Plot NOX-11: At Time of Treatment (August 20, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 9/18/2019 7:42:59 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:16:39 AM (UTC)

Average Water Temperature
71.88° F

Location
Start: 47.86261122, -115.64843444
End: 47.86314337, -115.65330166

Survey Size
Area: 20.96 acres
Percent: 0.26% of waterbody
Volume: 155.47 acre ft

Settings
Track Buffer: 25 m
Grid Cell Size: 5.0 m
Min.BV Detect: 5%
Min.Veg Depth Detect: 0.73 m

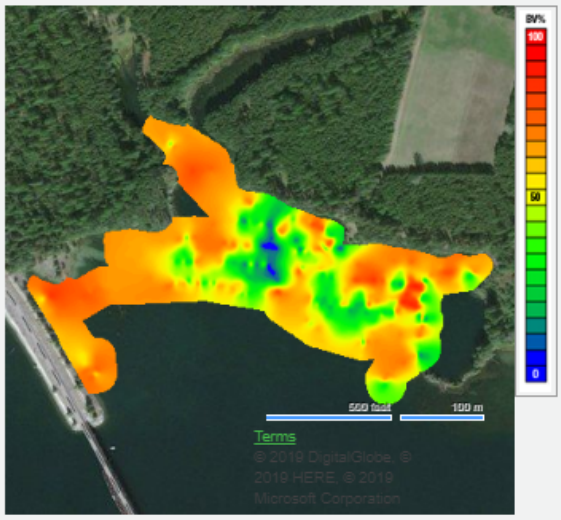
Quality Control
Reviewer: Ian McCormack
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

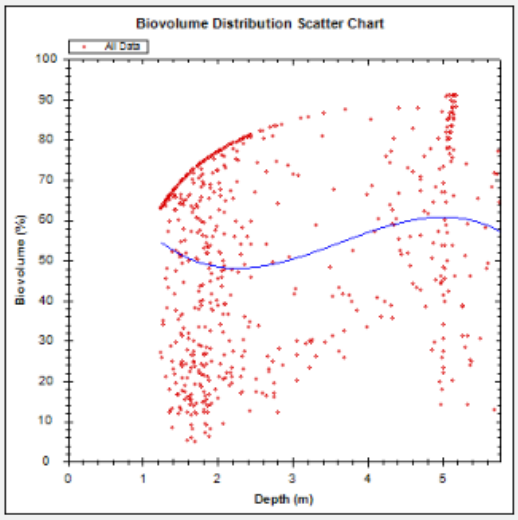
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	93.0%	52.6%	±22.8%	48.9%	±22.3%	2.50 - 56.47 ft	7.47 ft	1.69 miles	728
	Grid	99.7%	55.5%	±15.5%	55.3%	±15.8%	0.25 - 45.96 ft	7.42 ft	-	7459

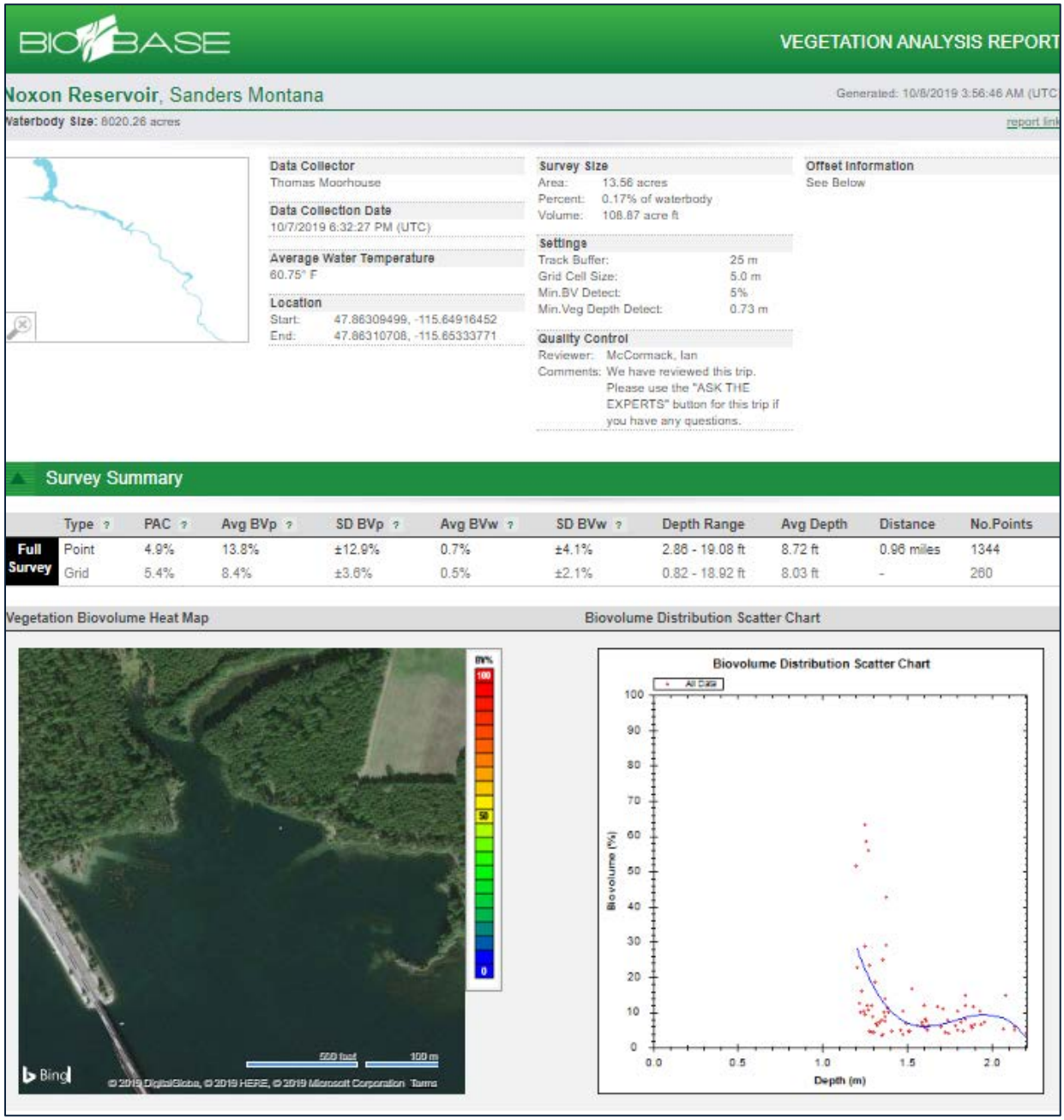
Vegetation Biovolume Heat Map



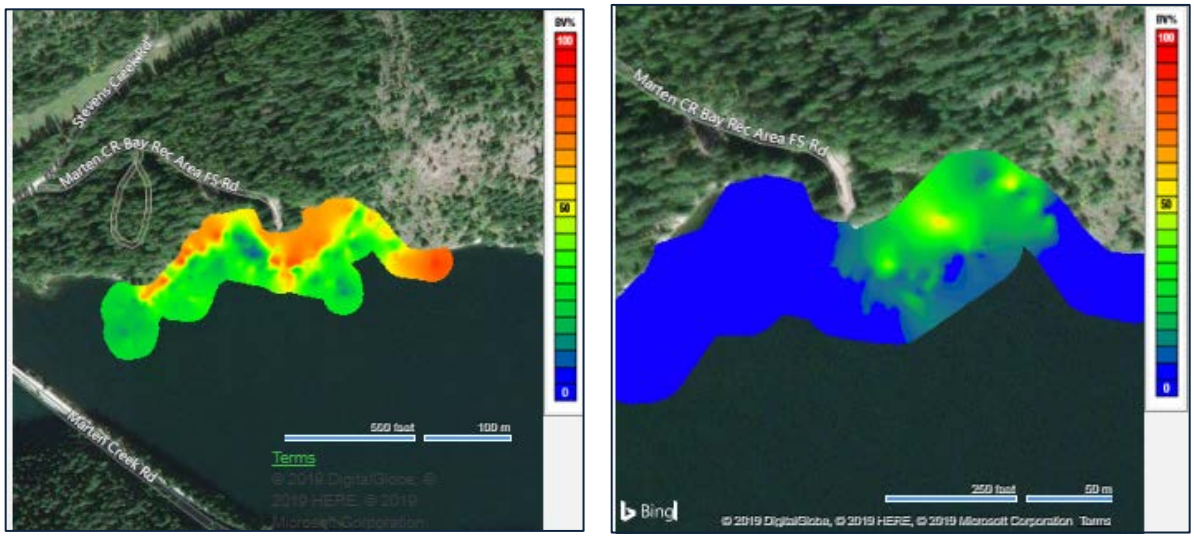
Biovolume Distribution Scatter Chart



Plot NOX-11: ~ Seven (7) Weeks Post (October 7, 2019)
October 7, 2019 image above not available due to a technical issue
related to the cloud-based processing site (BioBase).



Plot NOX-31: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-31	**100.0**	**40.3**	**8/19/2019**	**32.8**	**17.3**	**10/7/2019**	**-57%**	**80% +/-**	**Endo/Diquat**

Observations/Notes NOX-31: Treated with combination of endothall and diquat, control visually estimated at +/- 80%. Control looks better deep, and at eastern and western ends. Suspect a potential spring or subsurface water flows from small drainage immediately adjacent to the site could be impacting contact exposure times in this particular area of lower level control.

Plot NOX-31: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:13:51 PM (UTC)

Waterbody Size: 8020.28 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:11:53 AM (UTC)

Average Water Temperature
73.52° F

Location
Start: 47.88165025, -115.74300275
End: 47.88128755, -115.74448094

Survey Size
Area: 8.55 acres
Percent: 0.11% of waterbody
Volume: 69.50 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

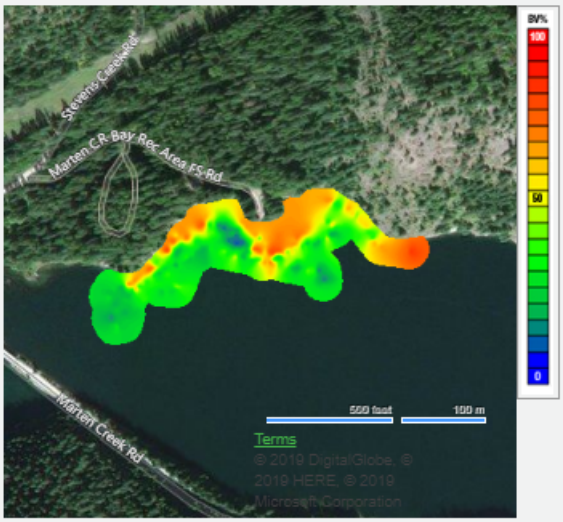
Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

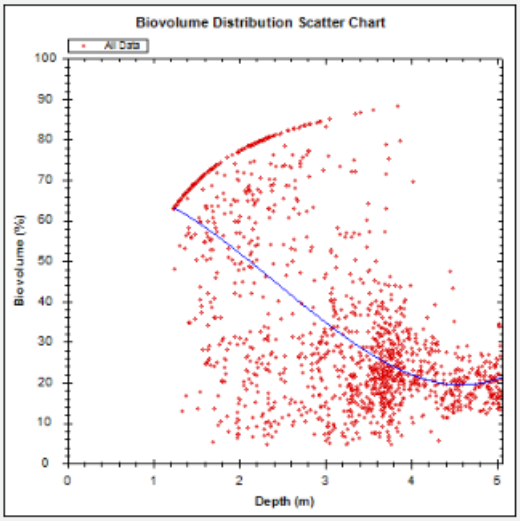
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	96.9%	35.4%	±22.2%	34.3%	±21.9%	2.53 - 18.13 ft	9.61 ft	0.88 miles	1500
	Grid	100.0%	40.3%	±18.6%	40.3%	±18.6%	0.25 - 16.47 ft	8.12 ft	-	3055

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-31: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 3:55:51 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 6:02:38 PM (UTC)

Average Water Temperature
60.49° F

Location
Start: 47.88162003, -115.74317400
End: 47.88154144, -115.74554452

Survey Size
Area: 6.37 acres
Percent: 0.08% of waterbody
Volume: 46.42 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

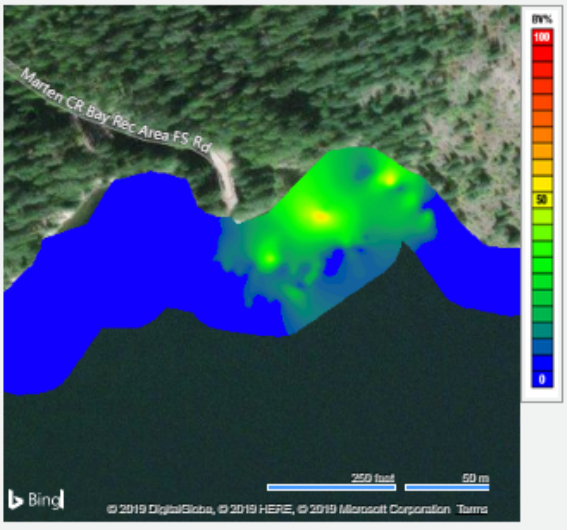
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

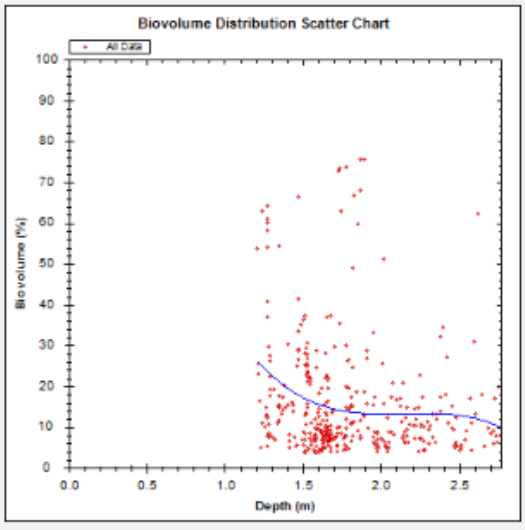
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	19.0%	16.7%	±14.6%	3.2%	±8.7%	3.06 - 19.83 ft	8.68 ft	0.56 miles	1818
	Grid	32.8%	17.3%	±10.3%	5.7%	±10.0%	0.31 - 18.56 ft	7.28 ft	-	747

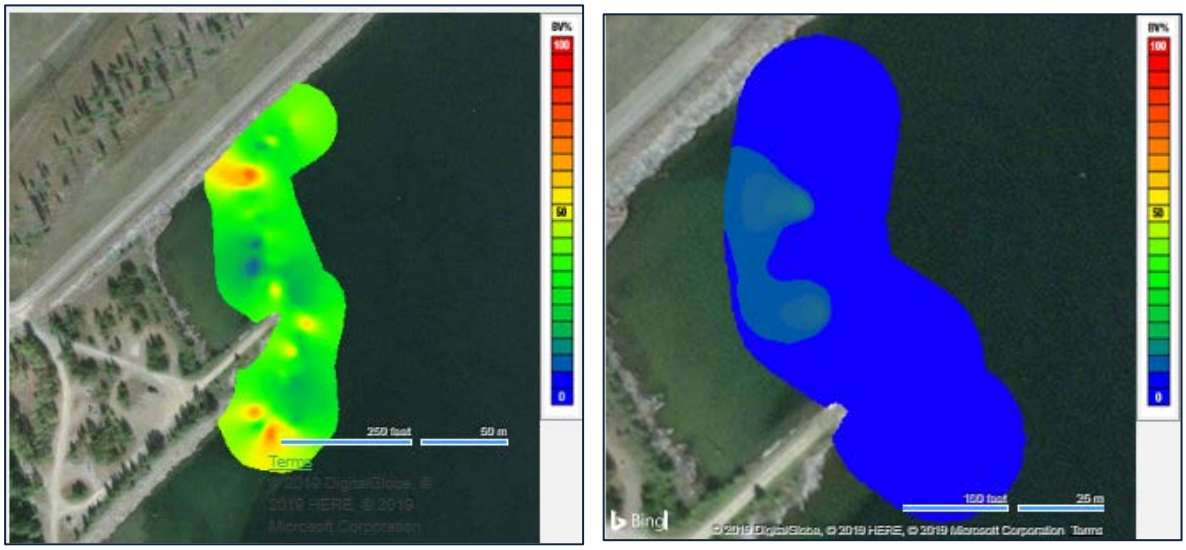
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-52: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-52	100.0	32.7	8/19/2019	5.0	5.8	10/7/2019	-82%	98% +/-	Endo/Diquat

Observations/Notes NOX-52: Treated with combination of endothall and diquat, control visually estimated at +/- 98%. Coontail and Nitella present post treatment.

Plot NOX-52: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:11:40 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:12:51 AM (UTC)

Average Water Temperature
74.13° F

Location
Start: 47.95535215, -115.73962273
End: 47.95497186, -115.73997425

Survey Size
Area: 3.24 acres
Percent: 0.04% of waterbody
Volume: 26.75 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

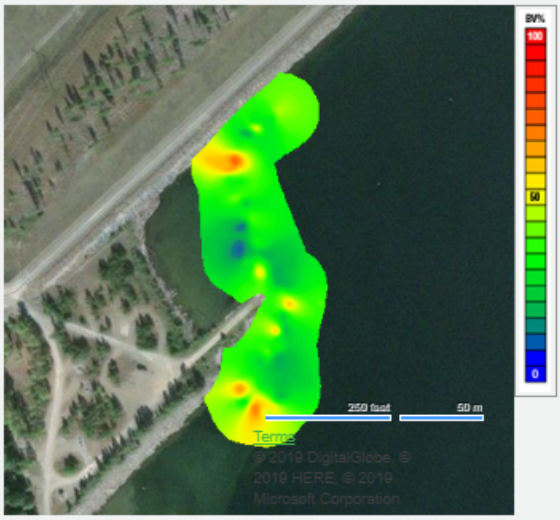
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

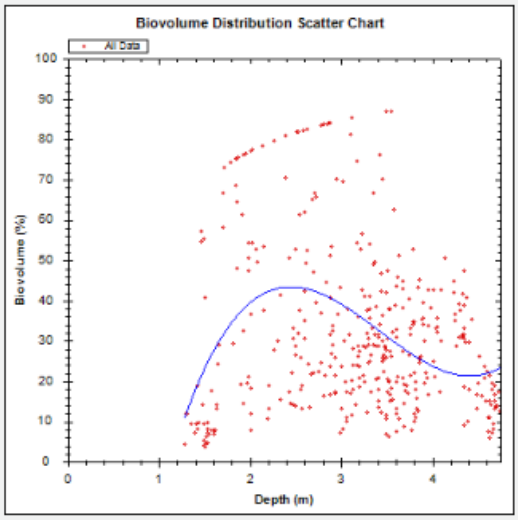
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	95.2%	32.4%	±20.3%	30.9%	±19.9%	4.16 - 15.75 ft	10.26 ft	0.24 miles	397
	Grid	100.0%	32.7%	±11.0%	32.7%	±11.0%	0.49 - 15.47 ft	8.25 ft	-	1161

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-52: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 3:51:32 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 5:01:46 PM (UTC)

Average Water Temperature
60.39° F

Location
Start: 47.95422938, -115.73935233
End: 47.95507448, -115.73988412

Survey Size
Area: 1.93 acres
Percent: 0.02% of waterbody
Volume: 13.94 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

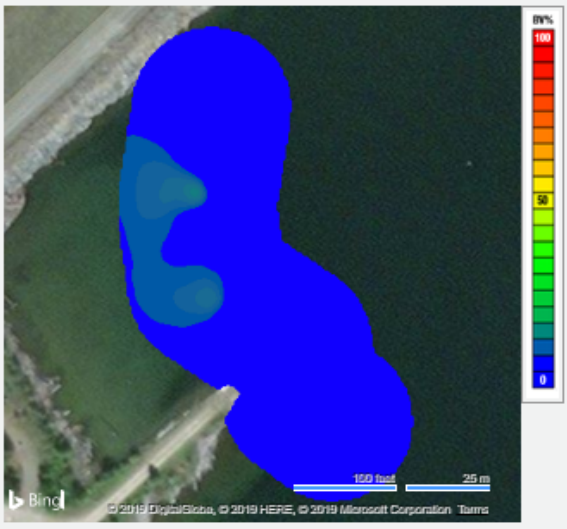
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

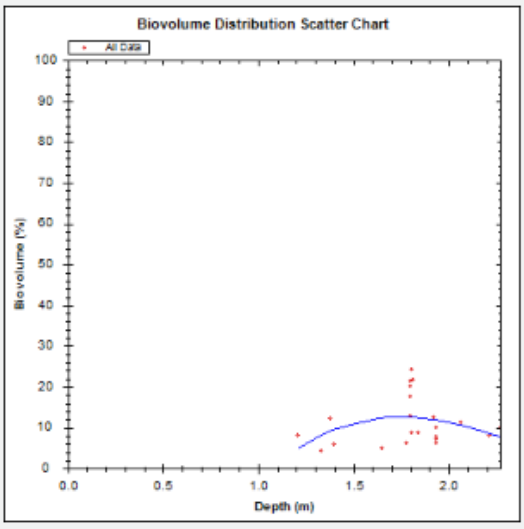
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	5.2%	11.9%	±5.6%	0.6%	±2.9%	2.92 - 15.32 ft	9.81 ft	0.09 miles	404
	Grid	5.0%	5.8%	±0.7%	0.3%	±1.3%	0.55 - 14.79 ft	7.22 ft	-	35

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-73: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)

2018 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 and or Tribune)
Nox-78	100.0	32.3	8/16/2018	100.0	32.3	9/27/2018	0%	50% +/-	Diquat

Observations/Notes NOX-73: Treated with combination of endothall and diquat, control visually estimated at +/- 95%. Some EWM present to west of dock. Difficult to see in water due to blue-green algae bloom (BGA). Evidence of severe BGA bloom visible as scum lines on the shoreline. Post October 7, 2019 image above not available due to a technical issue related to the cloud-based processing site (BioBase).

Plot NOX-73: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:10:15 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:14:31 AM (UTC)

Average Water Temperature
73.34° F

Location
Start: 47.82502655, -115.54301403
End: 47.82474817, -115.54612364

Survey Size
Area: 3.35 acres
Percent: 0.04% of waterbody
Volume: 35.72 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

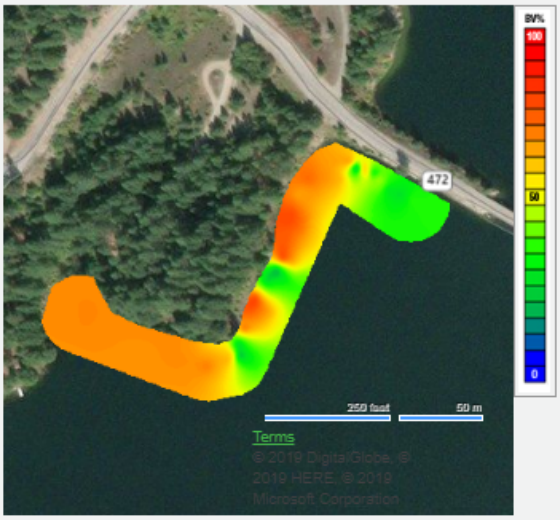
Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

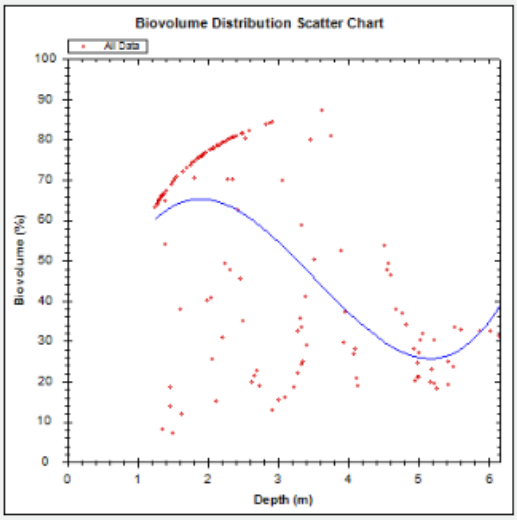
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	96.3%	54.0%	±23.6%	52.0%	±23.3%	2.74 - 56.90 ft	10.71 ft	0.20 miles	163
	Grid	100.0%	52.6%	±15.8%	52.6%	±15.8%	0.28 - 44.24 ft	10.66 ft	-	1195

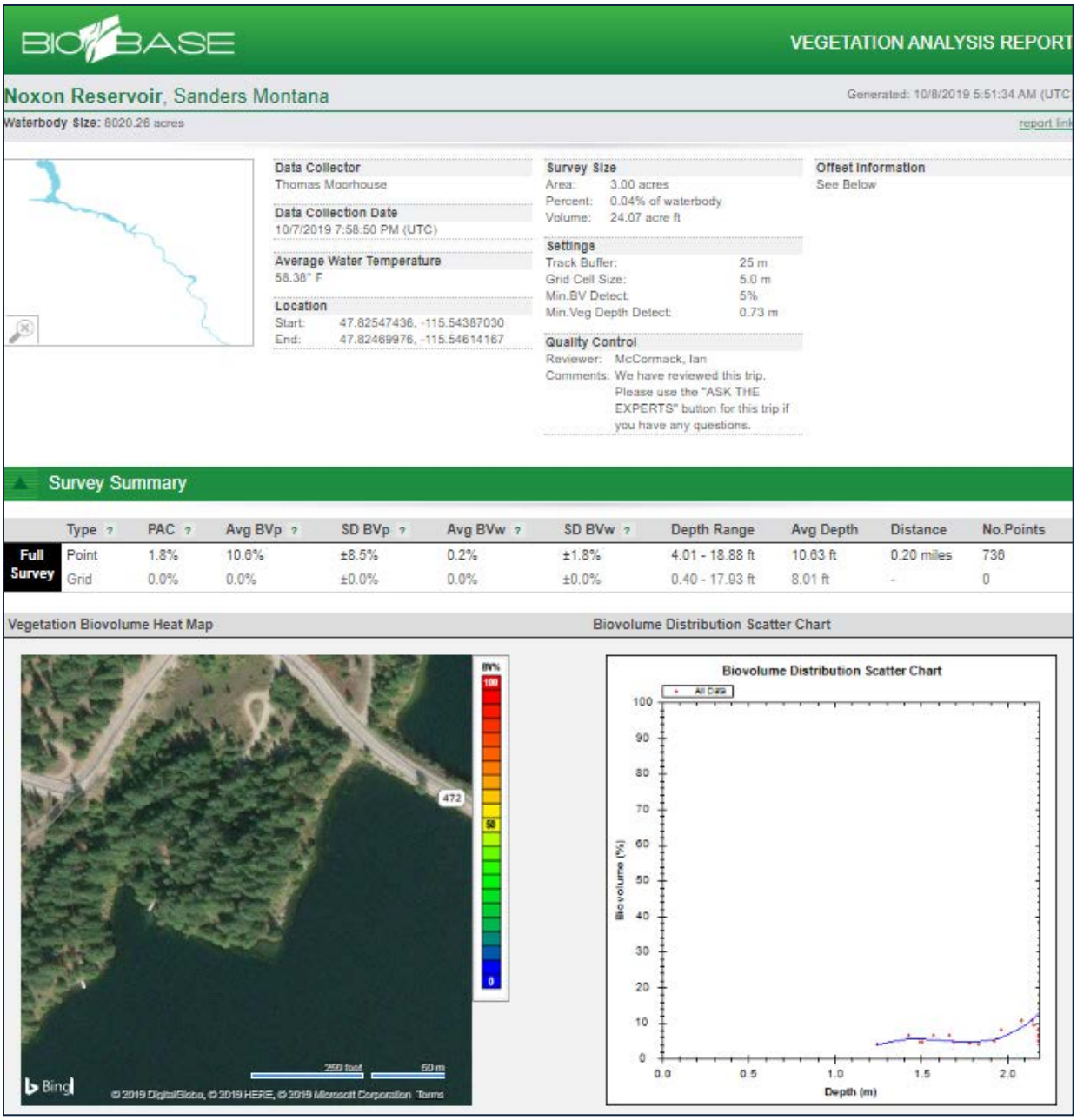
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-73: ~ Seven (7) Weeks Post (October 7, 2019)
October 7, 2019 image above not available due to a technical issue related to the cloud-based processing site (BioBase).



BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 5:51:34 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector: Thomas Moorhouse

Data Collection Date: 10/7/2019 7:58:50 PM (UTC)

Average Water Temperature: 58.38° F

Location: Start: 47.82547436, -115.54387030; End: 47.82469976, -115.54614167

Survey Size: Area: 3.00 acres; Percent: 0.04% of waterbody; Volume: 24.07 acre ft

Settings: Track Buffer: 25 m; Grid Cell Size: 5.0 m; Min.BV Detect: 5%; Min.Veg Depth Detect: 0.73 m

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.

Offset Information: See Below

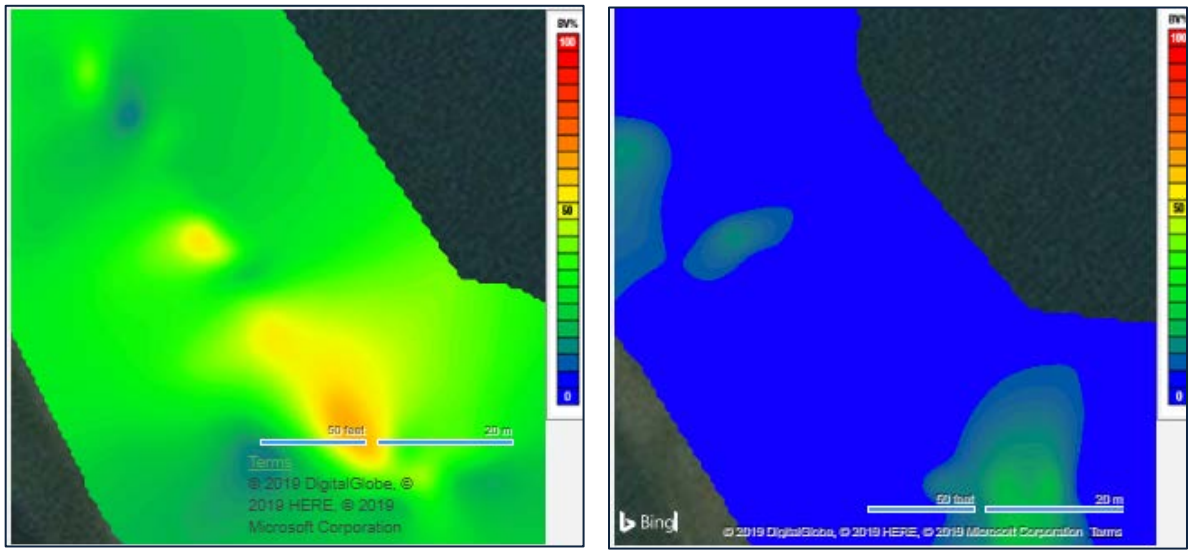
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	1.8%	10.6%	±8.5%	0.2%	±1.8%	4.01 - 18.88 ft	10.63 ft	0.20 miles	736
	Grid	0.0%	0.0%	±0.0%	0.0%	±0.0%	0.40 - 17.93 ft	8.01 ft	-	0

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart

Plot NOX-77: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



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 and Tribune)
NOX-77	100.0	25.8	8/20/2019	19.8	7.7	10/7/2019	-70%	90% +/-	Endo/Diquat

Observations/Notes NOX-77: Treated with combination of endothall and diquat, control visually estimated at +/- 90%. Patch of EWM present along southern edge of swim beach buoy line.

Plot NOX-77: At Time of Treatment (August 20, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:09:44 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:15:26 AM (UTC)

Average Water Temperature
71.91° F

Location
Start: 47.84192578, -115.59626503
End: 47.84184713, -115.59618391

Survey Size
Area: 2.08 acres
Percent: 0.03% of waterbody
Volume: 14.39 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

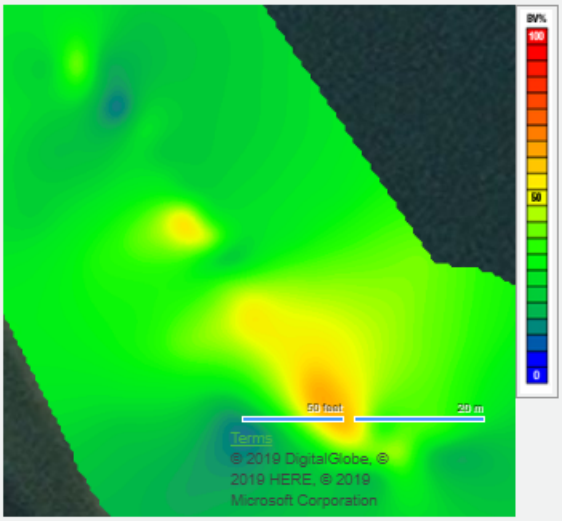
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

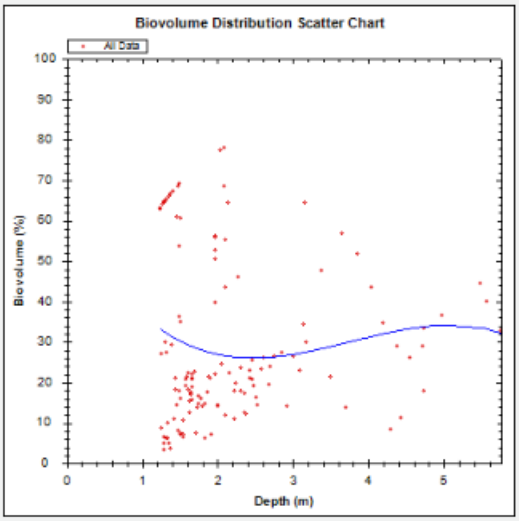
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	85.8%	30.0%	±19.9%	25.7%	±18.8%	2.61 - 25.44 ft	5.72 ft	0.13 miles	155
	Grid	100.0%	25.8%	±8.9%	25.8%	±8.9%	1.39 - 23.24 ft	6.91 ft	-	743

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-77: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 5:53:27 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 9:04:07 PM (UTC)

Average Water Temperature
57.43° F

Location
Start: 47.84182898, -115.59609378
End: 47.84176849, -115.59638221

Survey Size
Area: 2.07 acres
Percent: 0.03% of waterbody
Volume: 17.37 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

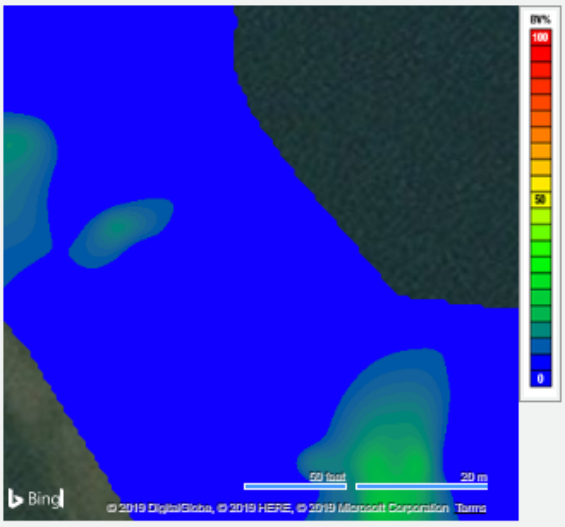
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

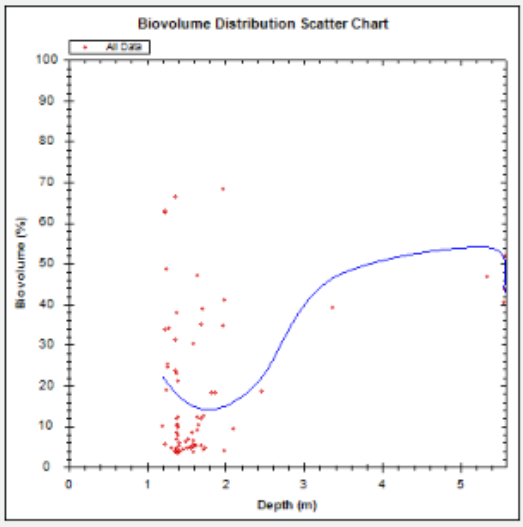
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	11.1%	23.4%	±18.0%	2.6%	±9.2%	3.28 - 25.09 ft	7.61 ft	0.17 miles	505
	Grid	19.8%	7.7%	±2.6%	1.5%	±3.3%	0.76 - 23.20 ft	8.38 ft	-	146

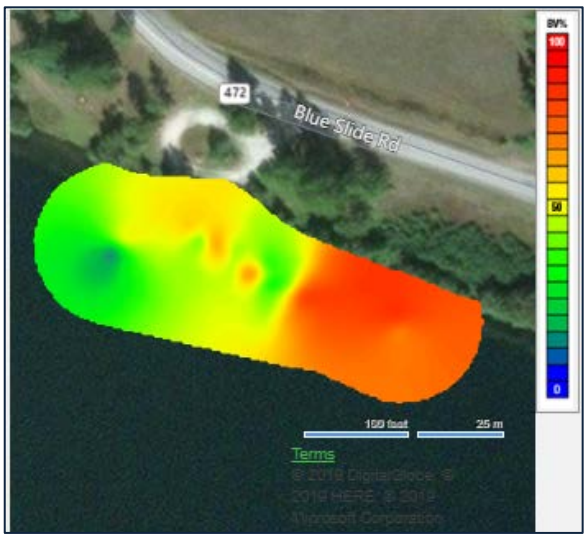
Vegetation Biovolume Heat Map

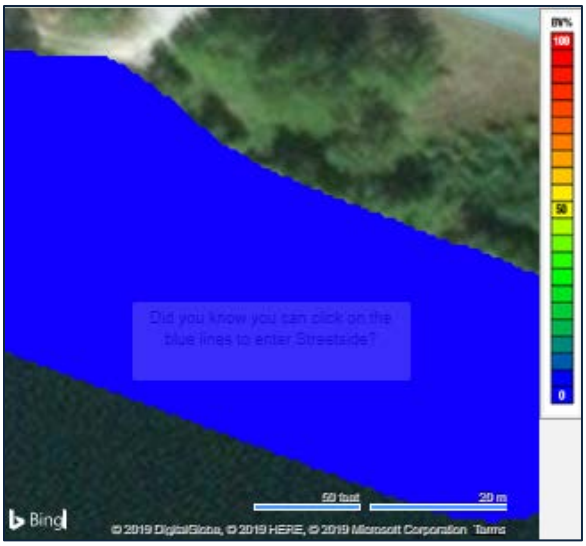


Biovolume Distribution Scatter Chart



Plot NOX-78: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)





2019 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)**
NOX-78	**100.0**	**54.2**	**8/19/2019**	**0.0**	**0.0**	**10/7/2019**	**-100%**	**98% +/-**	**Endo/Diquat**

Observations/Notes NOX-78: Treated with combination of endothall and diquat, control visually estimated at +/- 98%. Clarity impacted by Blue Green Algae bloom.

Plot NOX-78: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:13:58 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:14:22 AM (UTC)

Average Water Temperature
72.75° F

Location
Start: 47.81344259, -115.52371640
End: 47.81343048, -115.52359021

Survey Size
Area: 1.63 acres
Percent: 0.02% of waterbody
Volume: 25.19 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

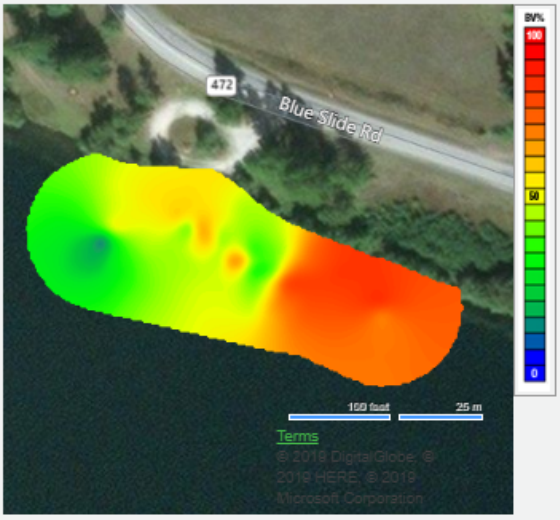
Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

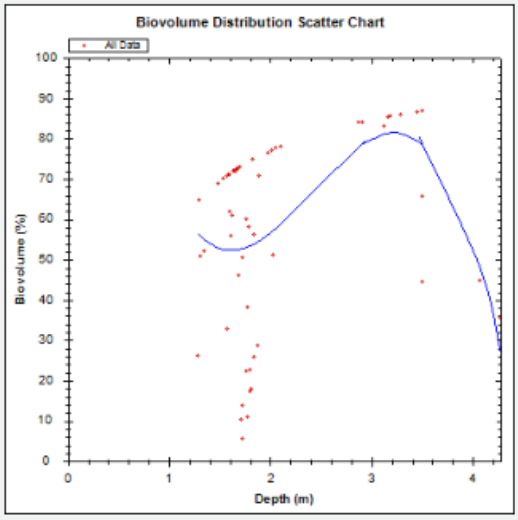
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	92.2%	58.2%	±23.2%	53.6%	±22.7%	2.75 - 56.99 ft	15.58 ft	0.13 miles	64
	Grid	100.0%	54.2%	±17.9%	54.2%	±17.9%	0.28 - 54.92 ft	15.43 ft	-	582

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-78 ~ Seven (7) Weeks Post (October 7, 2019)

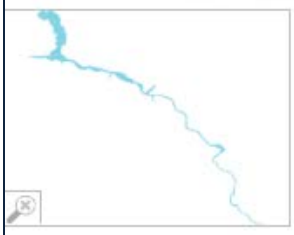
BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 5:52:12 AM (UTC

Waterbody Size: 6020.26 acres

report lin



Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 8:09:50 PM (UTC)

Average Water Temperature
56.34° F

Location
Start: 47.81343048, -115.52367133
End: 47.81364838, -115.52453661

Survey Size
Area: 1.14 acres
Percent: 0.01% of waterbody
Volume: 8.99 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

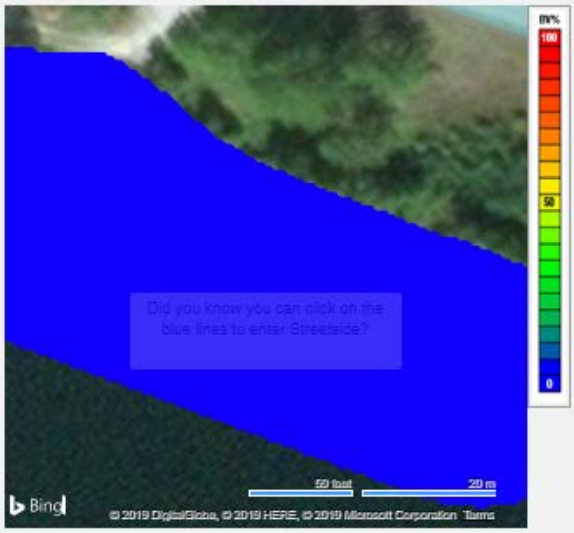
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	0.0%	NaN%	±NaN%	0.0%	±0.0%	7.76 - 16.72 ft	11.43 ft	0.06 miles	210
	Grid	0.0%	0.0%	±0.0%	0.0%	±0.0%	0.78 - 15.28 ft	7.90 ft	-	0

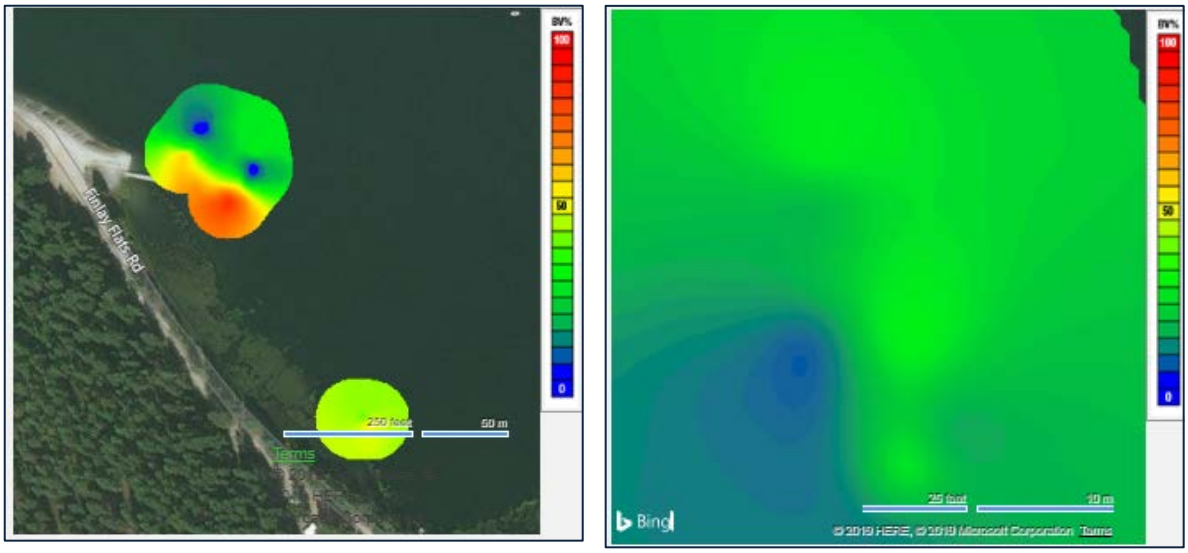
Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart

No vegetation detected in survey

Plot NOX-79: At Time of Treatment (August 19, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)



2019 Noxon Rapids Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)**
NOX-79	**99.3**	**46.3**	**8/19/2019**	**100.0**	**16.5**	**10/7/2019**	**-64%**	**100% +/-**	**Endo/Diquat**

Observations/Notes NOX-79: Treated with combination of endothall and diquat, control visually estimated at +/- 100%. Elodea present post treatment. Part of plot was exposed or to shallow to approach, however no EWM visible. Abundant filamentous algae.

Plot NOX-79: At Time of Treatment (August 19, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 8/21/2019 4:10:54 PM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:13:29 AM (UTC)

Average Water Temperature
73.67° F

Location
Start: 47.72381268, -115.43039193
End: 47.72343069, -115.42970692

Survey Size
Area: 4.15 acres
Percent: 0.05% of waterbody
Volume: 35.70 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

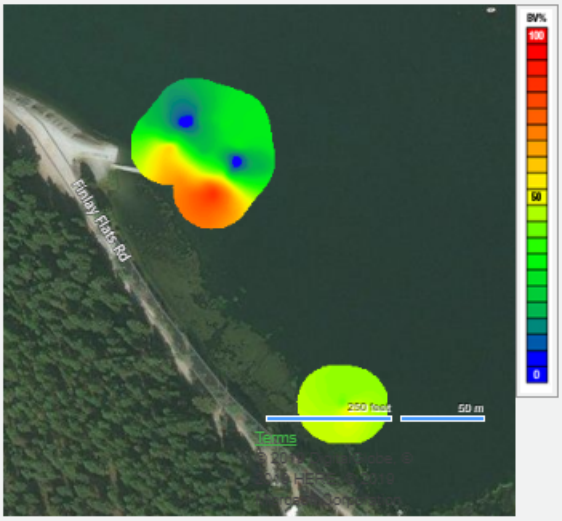
Quality Control
Reviewer: McCormack, Ian
Comments: Inconsistent bottom tracking due to dense vegetation.

Offset Information
See Below

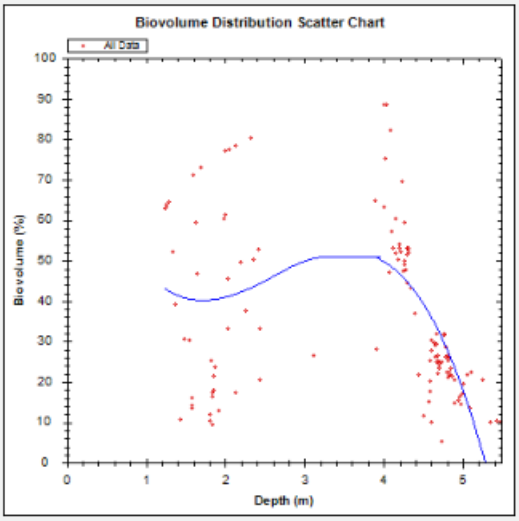
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	85.3%	36.4%	±20.6%	31.0%	±19.7%	2.64 - 51.49 ft	8.97 ft	0.19 miles	150
	Grid	99.3%	46.3%	±16.6%	46.0%	±16.9%	0.33 - 42.36 ft	8.61 ft	-	1463

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot NOX-79: ~ Seven (7) Weeks Post (October 7, 2019)

BIOBASE — VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders Montana

Generated: 10/8/2019 5:52:47 AM (UTC)

Waterbody Size: 8020.26 acres

report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 8:32:21 PM (UTC)

Average Water Temperature
53.06° F

Location
Start: 47.72422499, -115.43053615
End: 47.72434625, -115.43050911

Survey Size
Area: 0.97 acres
Percent: 0.01% of waterbody
Volume: 4.98 acre ft

Settings
Track Buffer: 25 m
Grid Cell Size: 5.0 m
Min.BV Detect: 5%
Min.Veg Depth Detect: 0.73 m

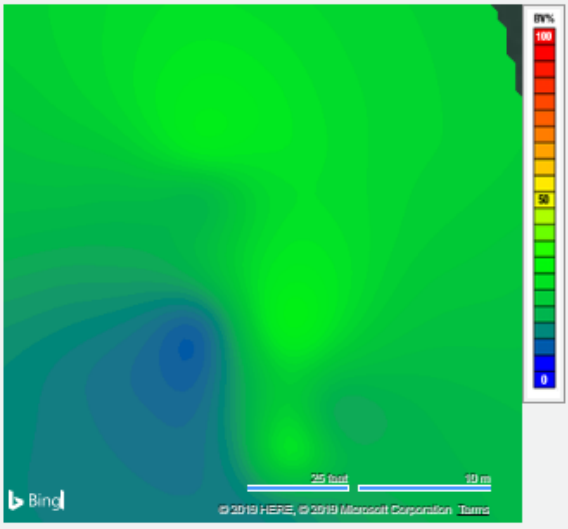
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

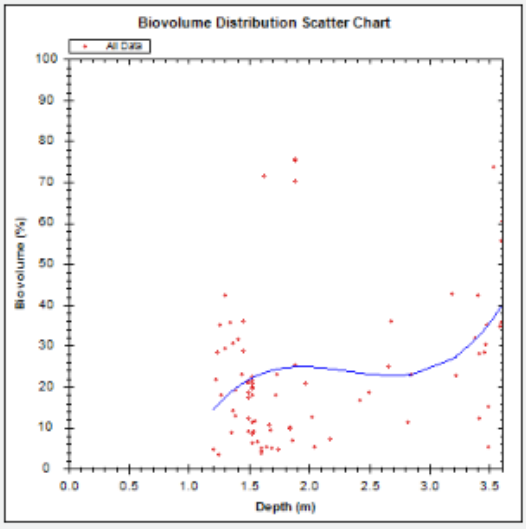
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	44.6%	26.4%	±19.0%	11.8%	±16.0%	3.07 - 12.06 ft	6.90 ft	0.05 miles	168
	Grid	99.9%	16.5%	±5.0%	16.5%	±5.0%	2.34 - 10.91 ft	5.16 ft	-	343

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart

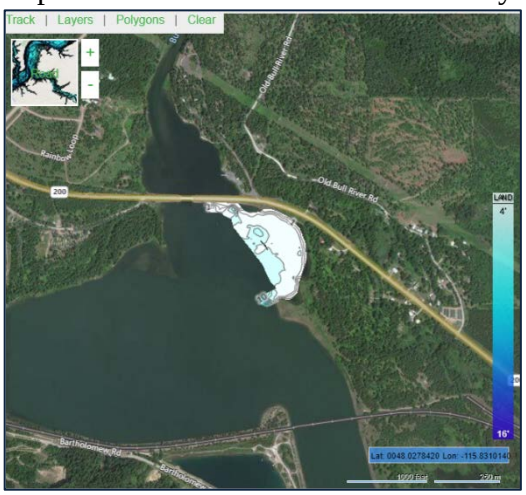


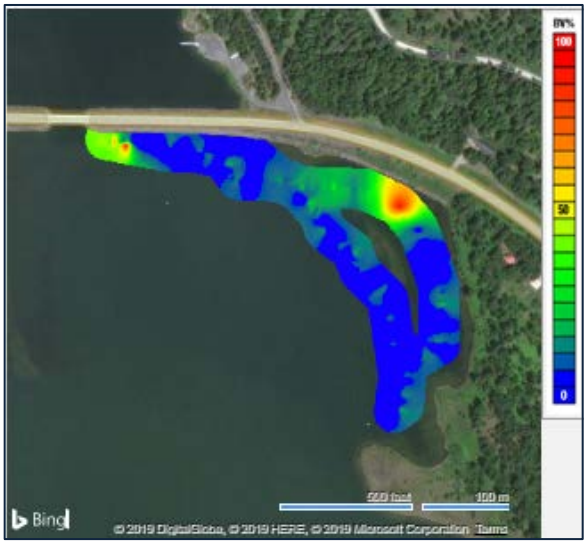
PRE AND POST TREATMENT SUBMERSED AQUATIC VEGETATION (SAV) DATA, SAV PERCENT COVER, AND BIO-VOLUME DATA SETS

CABINET GORGE RESERVOIR

Plot CAB-05: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)

No at time of treatment data vegetation heat map available due to technical difficulty.





2019 Cabinet Gorge Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)
CAB-05	N/A	N/A	8/20/2019	42.9	19.0	10/7/2019	N/A	95% +/-	Endo/Diquat

Observations/Notes CAB-05: Treated with combination of endothall and diquat, control visually estimated at +/- 90%. Coontail and Elodea present post treatment. Some EWM on plot edges.

Plot CAB-05: At Time of Treatment (August 20, 2019)

No at time of treatment data vegetation heat map available due to technical difficulty.

Plot CAB-05: ~ Seven (7) Weeks Post (October 7, 2019)

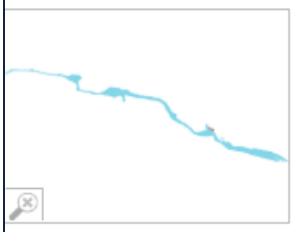
BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana

Generated: 10/8/2019 3:45:39 AM (UTC)

Waterbody Size: 2833.28 acres

report link



Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 10:29:49 PM (UTC)

Average Water Temperature
56.43° F

Location
Start: 48.02861754, -115.84493496
End: 48.02866576, -115.84488991

Survey Size
Area: 11.24 acres
Percent: 0.40% of waterbody
Volume: 39.90 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

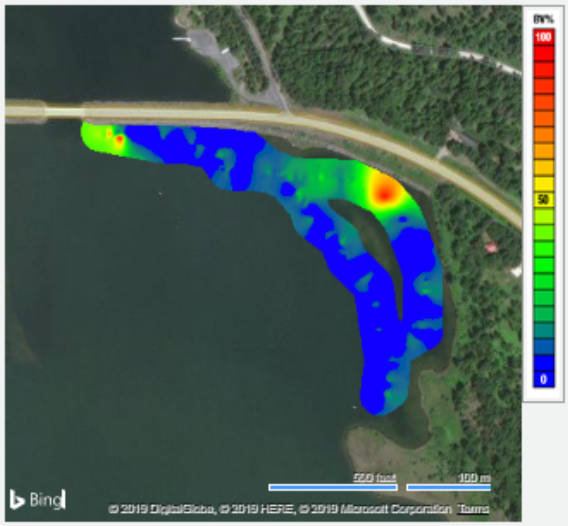
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

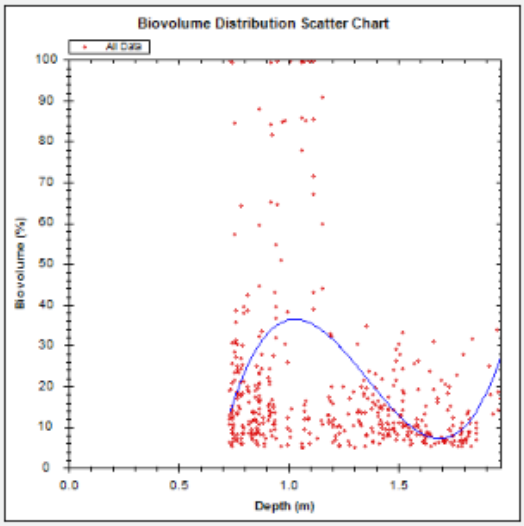
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	29.7%	22.2%	±24.3%	6.6%	±15.8%	1.39 - 11.04 ft	4.24 ft	0.82 miles	1528
	Grid	42.9%	19.0%	±17.6%	8.2%	±14.9%	0.14 - 9.40 ft	3.55 ft	-	1734

Vegetation Biovolume Heat Map

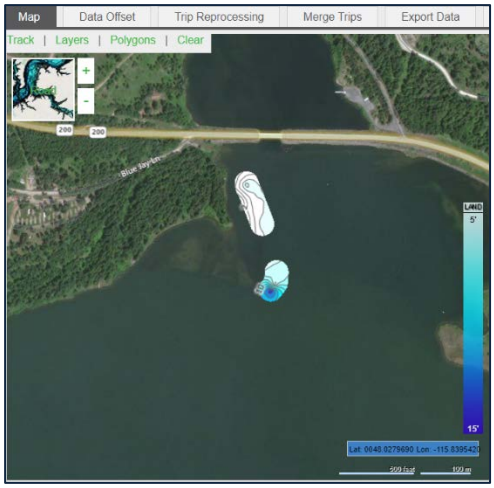


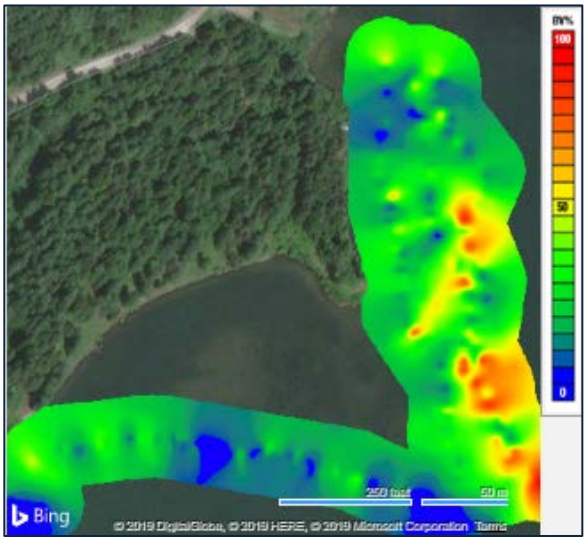
Biovolume Distribution Scatter Chart



Plot CAB-06: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)

No at time of treatment data vegetation heat map available due to technical difficulty.





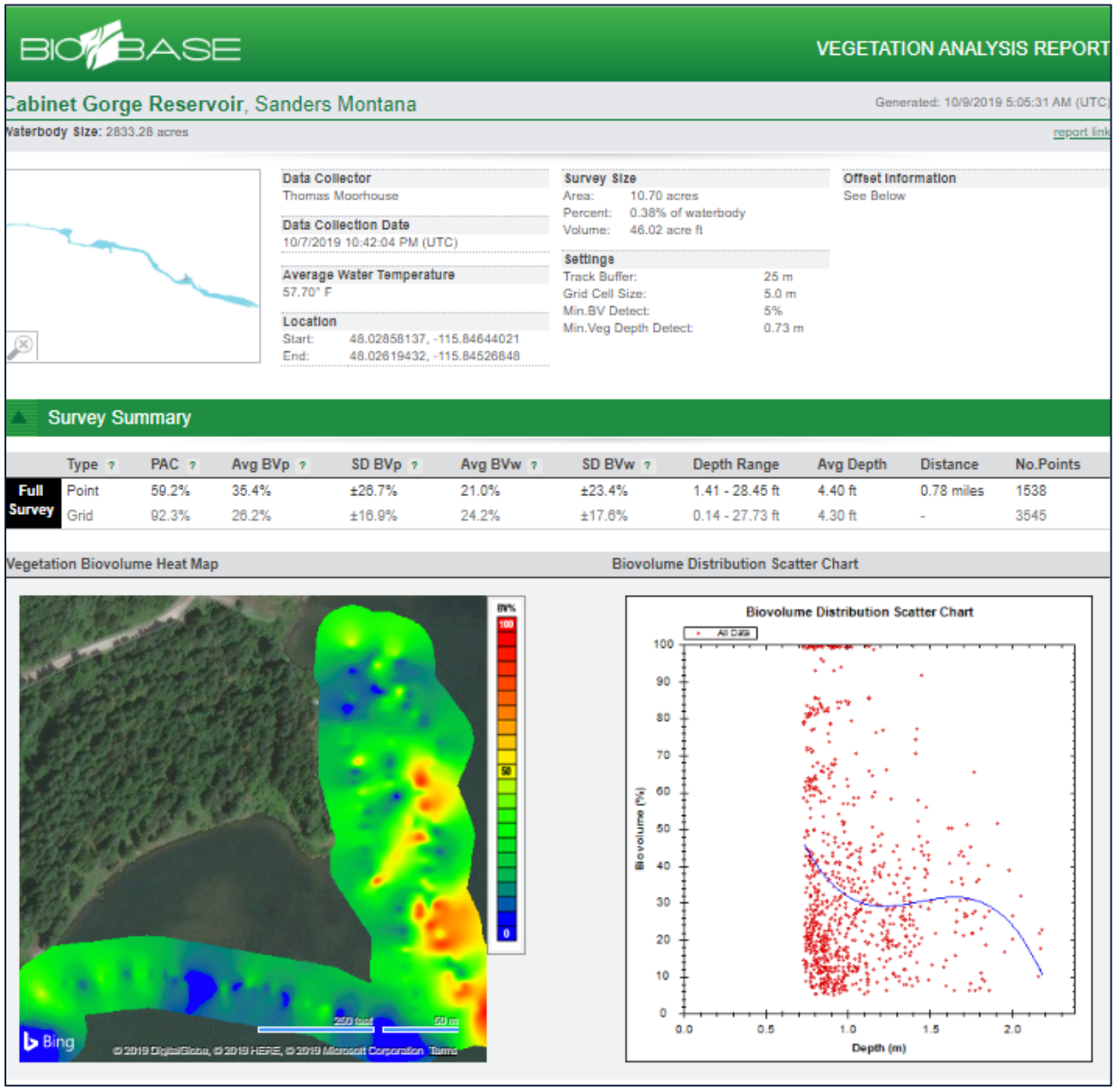
2019 Cabinet Gorge Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K and Tribune)
CAB-06	N/A	N/A	8/20/2019	92.3	26.2	10/7/2019	N/A	90% +/-	Endo/Diquat

Observations/Notes CAB-06: Treated with combination of endothall and diquat, control visually estimated at +/- 95%. Elodea and Coontail present post treatment. Some EWM present along edge of plot on south an east sides.

Plot CAB-06: At Time of Treatment (August 20, 2019)

No at time of treatment data vegetation heat map available due to technical difficulty.

Plot CAB-06: ~ Seven (7) Weeks Post (October 7, 2019)



BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana — Generated: 10/9/2019 5:05:31 AM (UTC)

Waterbody Size: 2833.28 acres — report link

Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 10:42:04 PM (UTC)

Average Water Temperature
57.70° F

Location
Start: 48.02858137, -115.84644021
End: 48.02619432, -115.84526848

Survey Size
Area: 10.70 acres
Percent: 0.38% of waterbody
Volume: 46.02 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

Offset Information
See Below

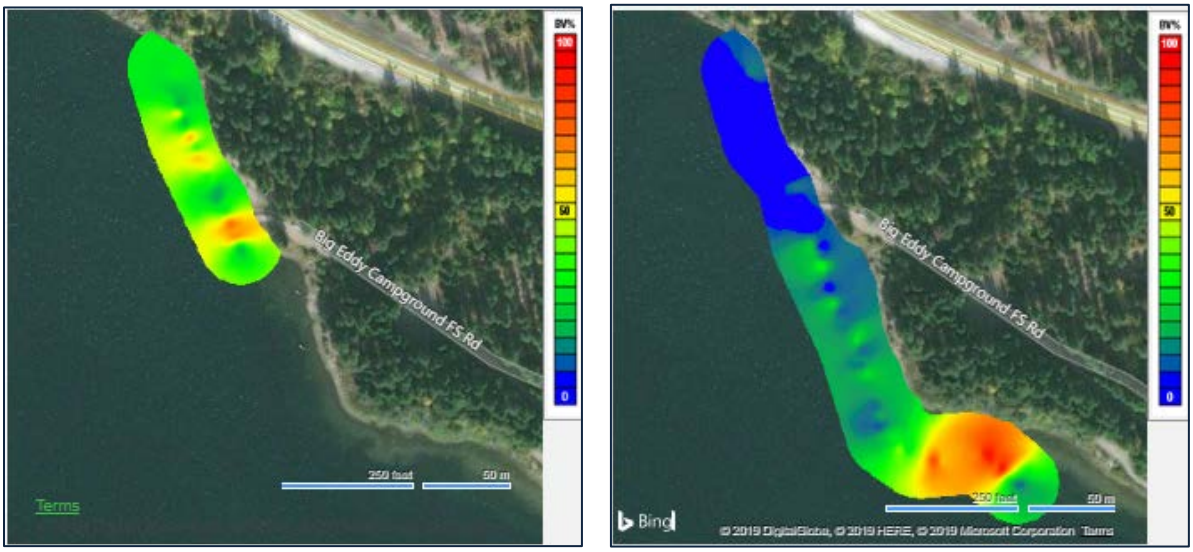
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	59.2%	35.4%	±26.7%	21.0%	±23.4%	1.41 - 28.45 ft	4.40 ft	0.78 miles	1538
	Grid	92.3%	26.2%	±16.9%	24.2%	±17.6%	0.14 - 27.73 ft	4.30 ft	-	3545

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart

Plot CAB-12: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)

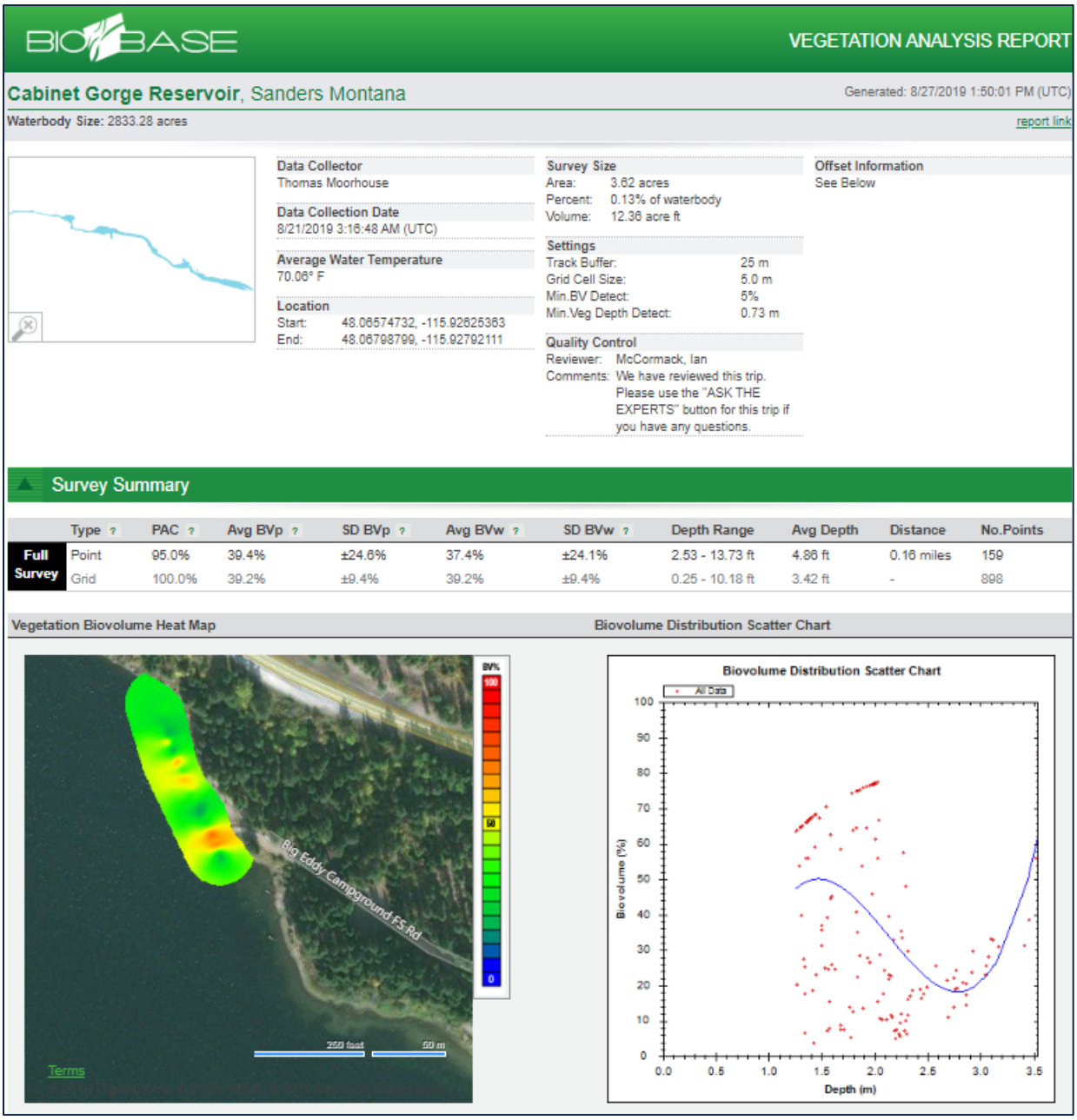


2018 Cabinet Gorge Reservoir AIS Treatment Plots: At Time of and ~ Six (6) Week Post Plot SAV % Cover and SAV BioVolume Data (Grid Data)									
Plot Number	SAV % Cover	SAV % Bio-Volume	Date Data Collected Pre Treatment	SAV % Cover	SAV % Bio-Volume	Date Data Collected-Post Treatment	SAV % BV Change	Post Treatment EWM Injury Rank	Herbicides Used (Aquathol K and or Tribune)
Cab-29	100.0	27.7	8/16/2018	98.2	11.3	9/27/2018	-59%	95% +/-	Endo/Diquat

Observations/Notes CAB-12: Treated with combination of endothall and diquat, control visually estimated at +/- 90% to 95%. Some injured EWM visible, mostly dead. Elodea and Coontail present post treatment. Due to a technical difficulty less than the whole plot data is available at time of treatment.

Plot CAB-12: ~ Seven (7) Weeks Post (October 7, 2019 Right)

Due to a technical difficulty less than the whole plot treatment data vegetation heat map available.



BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana — Generated: 8/27/2019 1:50:01 PM (UTC)

Waterbody Size: 2833.28 acres — report link

Data Collector: Thomas Moorhouse

Data Collection Date: 8/21/2019 3:16:48 AM (UTC)

Average Water Temperature: 70.06° F

Location: Start: 48.06574732, -115.92625383; End: 48.06798799, -115.92792111

Survey Size: Area: 3.62 acres; Percent: 0.13% of waterbody; Volume: 12.36 acre ft

Settings: Track Buffer: 25 m; Grid Cell Size: 5.0 m; Min.BV Detect: 5%; Min.Veg Depth Detect: 0.73 m

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.

Offset Information: See Below

Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	95.0%	39.4%	±24.6%	37.4%	±24.1%	2.53 - 13.73 ft	4.86 ft	0.16 miles	159
	Grid	100.0%	39.2%	±9.4%	39.2%	±9.4%	0.25 - 10.18 ft	3.42 ft	-	898

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart

Plot CAB-12: ~ Seven (7) Weeks Post (October 7, 2019)

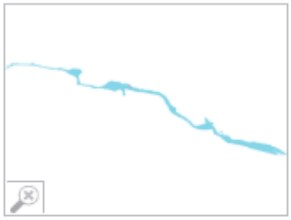
BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana

Generated: 10/8/2019 3:49:55 AM (UTC)

Waterbody Size: 2833.28 acres

report link



Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 11:08:49 PM (UTC)

Average Water Temperature
58.48° F

Location
Start: 48.06569311, -115.92564072
End: 48.06791571, -115.92784900

Survey Size
Area: 3.95 acres
Percent: 0.14% of waterbody
Volume: 15.20 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

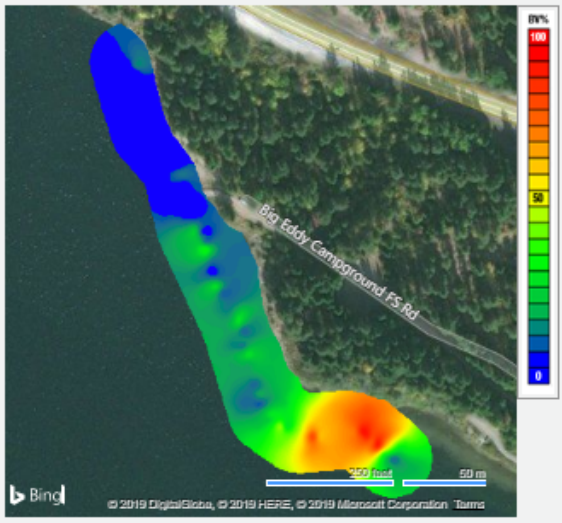
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

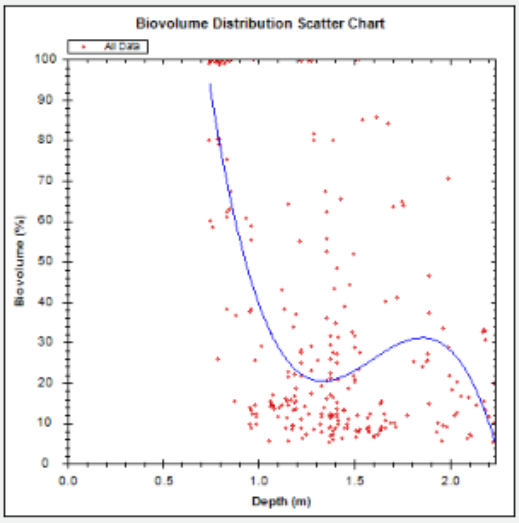
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	44.9%	32.1%	±29.8%	14.4%	±23.2%	1.81 - 9.06 ft	5.16 ft	0.23 miles	566
	Grid	72.8%	28.4%	±22.8%	20.7%	±23.2%	0.19 - 8.26 ft	3.85 ft	-	1034

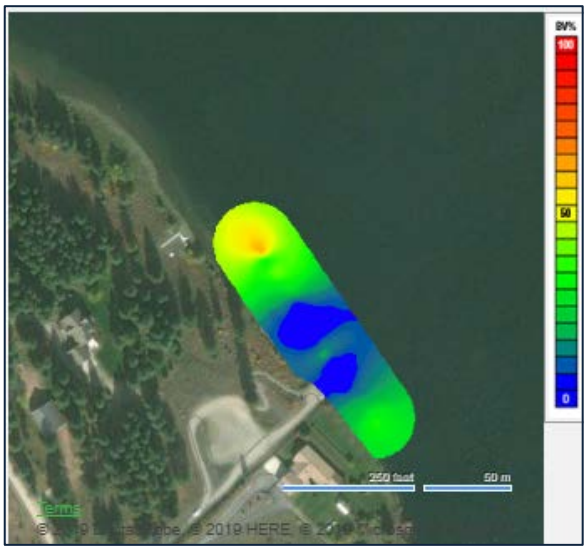
Vegetation Biovolume Heat Map

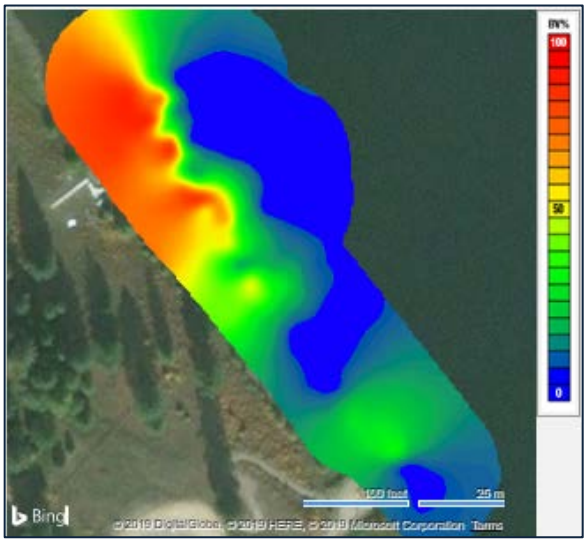


Biovolume Distribution Scatter Chart



Plot CAB-29: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)





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 and Tribune)
CAB-29	82.9	32.3	8/20/2019	69.3	33.5	10/7/2019	4%	75% +/-	Endo/Diquat

Observations/Notes CAB-29: Treated with combination of endothall and diquat, control visually estimated at +/- 75%. North end of plot had weaker control. Elodea and Coontail present post treatment.

Plot CAB-29: At Time of Treatment (August 20, 2019)

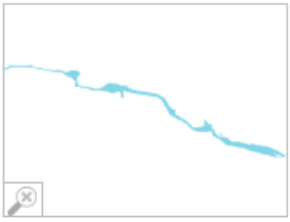
BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana

Generated: 8/27/2019 1:50:47 PM (UTC)

Waterbody Size: 2833.28 acres

report link



Data Collector
Thomas Moorhouse

Data Collection Date
8/21/2019 3:18:36 AM (UTC)

Average Water Temperature
71.46° F

Location
Start: 48.07668471, -115.98475042
End: 48.07528153, -115.98327223

Survey Size
Area: 2.73 acres
Percent: 0.10% of waterbody
Volume: 11.58 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

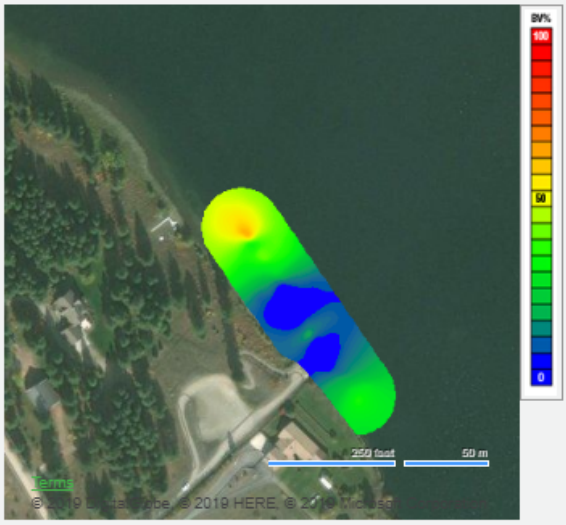
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

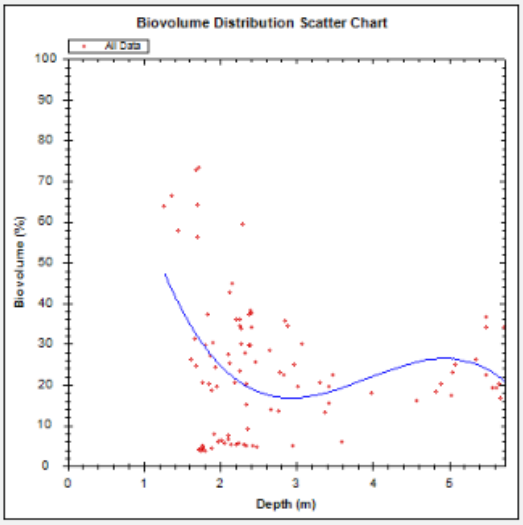
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	56.3%	26.3%	±16.3%	14.8%	±15.0%	2.80 - 15.27 ft	5.51 ft	0.12 miles	158
	Grid	82.9%	32.3%	±13.8%	26.8%	±17.5%	0.28 - 10.92 ft	4.24 ft	-	813

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot CAB-29: ~ Seven (7) Weeks Post (October 7, 2019)

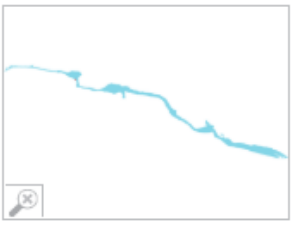
BIOBASE — VEGETATION ANALYSIS REPORT

Cabinet Gorge Reservoir, Sanders Montana

Generated: 10/8/2019 3:50:59 AM (UTC)

Waterbody Size: 2833.28 acres

report link



Data Collector
Thomas Moorhouse

Data Collection Date
10/7/2019 11:21:06 PM (UTC)

Average Water Temperature
58.72° F

Location
Start: 48.07646189, -115.98459720
End: 48.07540198, -115.98340743

Survey Size
Area: 2.52 acres
Percent: 0.09% of waterbody
Volume: 11.32 acre ft

Settings

Track Buffer:	25 m
Grid Cell Size:	5.0 m
Min.BV Detect:	5%
Min.Veg Depth Detect:	0.73 m

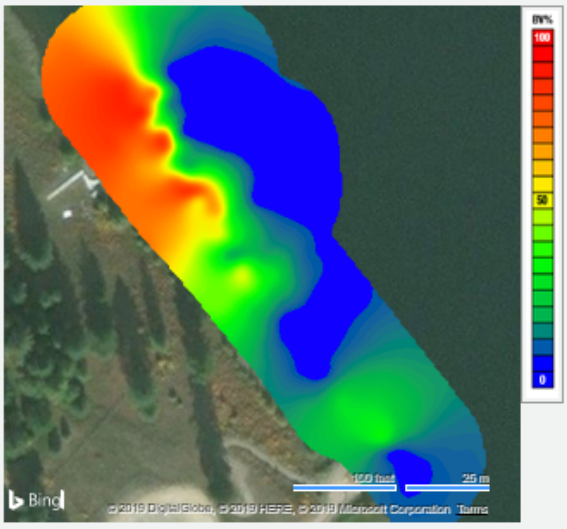
Quality Control
Reviewer: McCormack, Ian
Comments: We have reviewed this trip. Please use the "ASK THE EXPERTS" button for this trip if you have any questions.

Offset Information
See Below

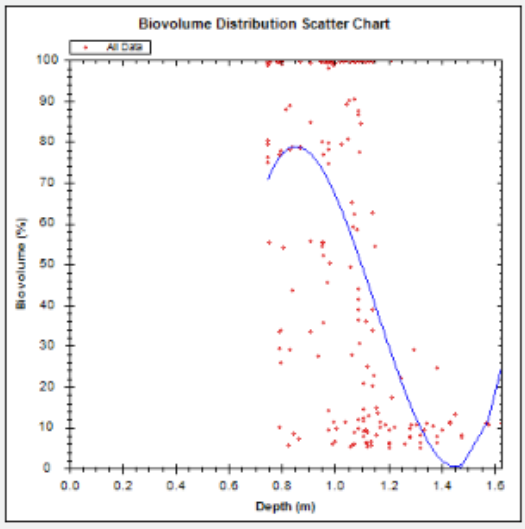
Survey Summary

	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No.Points
Full Survey	Point	41.0%	54.3%	±38.7%	22.3%	±32.2%	1.86 - 18.20 ft	5.91 ft	0.19 miles	478
	Grid	69.3%	33.5%	±27.4%	23.2%	±27.6%	0.19 - 17.84 ft	4.49 ft	-	629

Vegetation Biovolume Heat Map

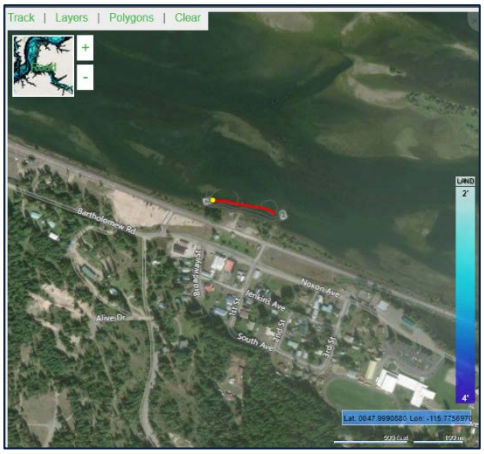


Biovolume Distribution Scatter Chart



Plot CAB-30: At Time of Treatment (August 20, 2019 Left), ~ Seven (7) Weeks Post (October 7, 2019 Right)

No at time of treatment vegetation heat map available due to technical difficulty on 8/20/19. No data available for 10/7/19 due to lateness in day and rainfall making condition unsafe to travel to this site.



2019 Cabinet Gorge Reservoir AIS Treatment Plots: At Time of and ~ Seven (7) 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 and Tribune)
CAB-30	N/A	N/A	8/20/2019	N/A	N/A	10/7/2019	N/A	N/A	Endo/Diquat

Observations/Notes CAB-30: Treated with combination of endothall and diquat, control not estimated as site was not visited due to safety concerns associated with rainfall, cloudy conditions, and lateness in day. No at time of treatment vegetation heat map available due to technical difficulty on 8/20/19.

Plot CAB-30: At Time of Treatment (August 20, 2019)

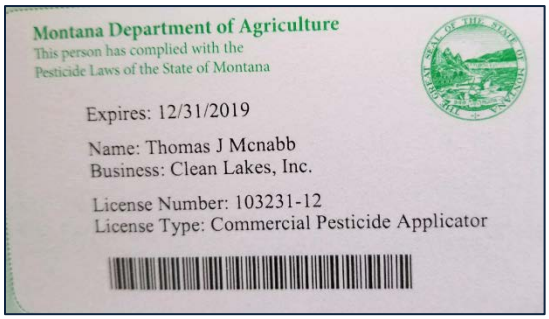
No at time of treatment data vegetation heat map available due to technical difficulty.

Plot CAB-30: ~ Seven (7) Weeks Post (October 7, 2019 Right)

No data available for 10/7/19 due to lateness in day, cloudy conditions, and rainfall making condition unsafe to travel to this site.

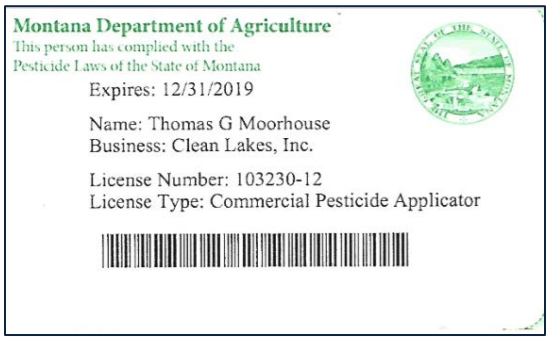
LIST OF PROJECT PERSONNEL

PROJECT DIRECTOR:


Montana Department of Agriculture
This person has complied with the
Pesticide Laws of the State of Montana
Expires: 12/31/2019
Name: Thomas J Mcnabb
Business: Clean Lakes, Inc.
License Number: 103231-12
License Type: Commercial Pesticide Applicator

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
Expires: 12/31/2019
Name: Thomas G Moorhouse
Business: Clean Lakes, Inc.
License Number: 103230-12
License Type: Commercial Pesticide Applicator

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: Tony Mastromarino

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

END OF AQUATIC PESTICIDE APPLICATION REPORT