Reference Project

Dobson Ranch Lake #8
Dobson Ranch, AZ

Lake Management Partner: Aquatic Consulting & Testing, Inc
Tempe, AZ

Lake Data	
Type:	Man-made
Use:	Drainage/Decorative
Size:	2.5 acres
Depth:	5 feet (avg)
Issues:	Sludge accumulation High phosphate Levels

Treatment	
Treatment Date:	Nov 2022
Product:	SchlixX Plus
Quantity:	750 kg
Dose:	~70g/m^2
Method:	Boat
Application Duration:	8 hours
Cost (List Price)*	USD 16,500

*Product was provided free of charge for evaluation purposes

Results	
Result Date:	May 2023
Sludge Reduction:	6 in. (avg)
Volume Reduction:	1.25 ac-ft
Phosphate Reduction:	>30%

Background

The lakes at Dobson Ranch, a community in Mesa, AZ, are part of a man-made drainage control system, that winds through the master-planned layout. Over the years, high nutrient levels – carried into the lakes from the main inflow feed and from run-off from cultivated lawns and golf course on the lakes' shores – have resulted in increased maintenance issues and costs, along with concerns on how to properly address the accumulating sediment in the future. This was especially the case in Lake #8, which forms the terminus of the system and ends in a spillway which acts as a dam and is particularly prone to sediment accumulation.

Treatment

Water and sludge samples were taken 3 months before treatment and analyzed, in order to determine the suitability, type and dosage of any proposed product application. In addition, the maintainer had performed regular sampling and testing. With the pre-treatment analysis and records going back several years, plus the professional assessment from the maintainer, Lake #8 was chosen to be a good candidate for treatment.

SchlixX Plus was chosen as the appropriate treatment as it can perform a triple function: i) increase Dissolved Oxygen (DO) levels over a period of months, ii) reduce sludge accumulations through aerobic microbial digestion and iii) prevent the re-release of biologically available phosphate from the digested sediment.

The dosage was determined to be 75g/m^2 of water surface area. Due to normal variations during treatment the final applied dosing ended up around 70g/m^2.

Treatment was executed on November 9, 2022. To reduce dusting and loss of the product to the wind, a purpose-built apparatus was used which pre-mixes the SchlixX Plus powder with water drawn from the lake and ejects it via submersed nozzles into the wake of the boat. The speed of travel was calculated based on the flowrate of the ejection pump, in order to achieve a uniform distribution of the product over the entire lake area.

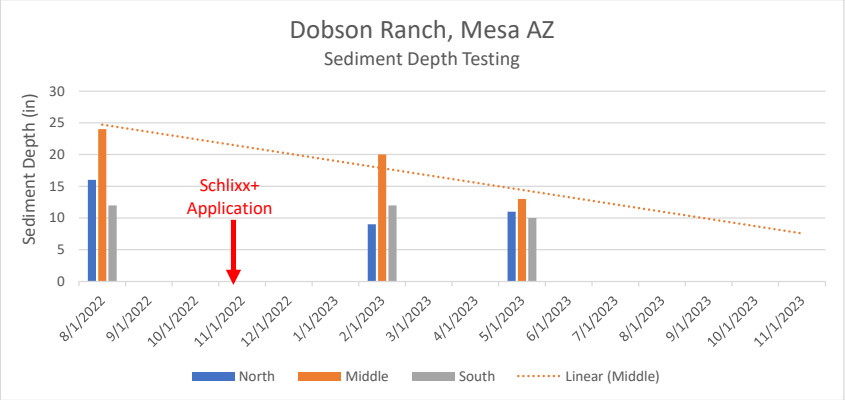
Boat with mixing chamber and product slurry ejection system

Boat travels the entire surface area of the lake, with product being ejected in the wake

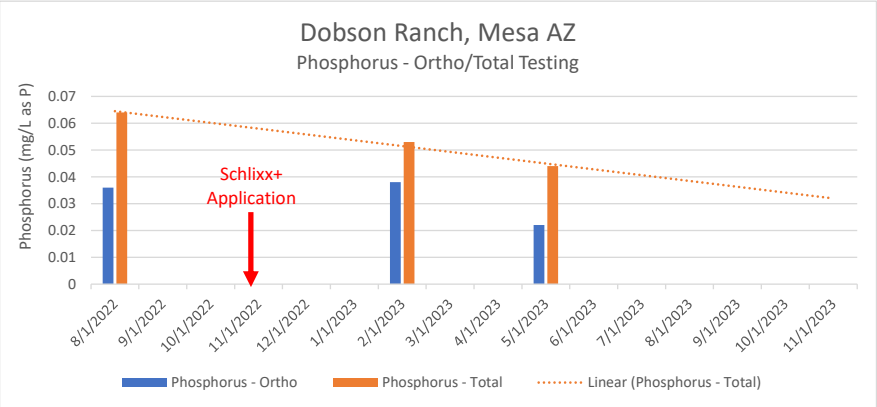
To cover the entire surface area of the 2.5 acre lake took one full work day including boat launch, prep and recovery.

Results

Measurements and samples were taken two times in the 6 months following the treatment. Analysis of both showed significant changes in both sediment and phosphate levels.



	8/24/2022	10/9/2022	2/2/2023	5/1/2023	8/1/2023	11/1/2023
North	16		9	11		
Middle	24		20	13		
South	12		12	10		



	8/24/2022	10/9/2022	2/2/2023	5/1/2023	8/1/2023	11/1/2023
Phosphorus - Ortho	0.036		0.038	0.022		
Phosphorus - Total	0.064		0.053	0.044		

No negative effects on other parameters that could influence the overall ecosystem, habitability or usability of the lake water could be observed.

Attachment: Pre- and Post-treatment analyses, lab and field report.

FIELD DATA 08-04-22
collected 0830 hr

	North	Middle	South
Sediment depth, in	16	24	12
Water depth, in	66	84	66
Total basin depth, in	82	108	78
Temp, C	33.0	31.3	33.0
Secchi depth, in	24	24	23

		pH, SU	EC, uS/cm	Temp, C	D.O. mg/L
Middle Profile	0 .0 m	8.9	1580	31.5	6.5
collected 0700 hr	0.5 m	8.9	1550	31.6	6.3
	1.0 m	8.9	1760	31.6	6.3
	1.5 m	8.9	1850	31.5	6.3
	2.0 m	8.9	1670	31.5	6.3

Mid-lake Water Composite

Alkalinity, mg/L as CaCO3	176
Phosphorus, ortho, mg/L as P	0.036
Phosphorus, total mg/L as P	0.064
Nitrate-N, mg/L	0.79
Nitrite-N, mg/L	<0.01
Ammonia-N, mg/L	0.05

Sediment Composite

Total soliuds, %	16.1
Total volatile solids, %	23.3
Nitrate-N, mg/kg	3.0
NitriteON, mg/kg	<1.0
Ammonia-N, mg/kg	1,060
ORP	-84
Iron, total, mg/kg	11300
Manganese, total, mg/kg	208
Phosphorus, total, mg/kg	776
Hydrogen Sulfide, mg/kg	<1
pH, SU	8.0

FIELD DATA 02-09-23
collected 0830 hr

	North	Middle	South
Sediment depth, in	9	20	12
Water depth, in	74	87	61
Total basin depth, in	83	107	73
Temp, C	12.7	12.9	12.7
Secchi depth, in	27	26	27

		pH, SU	EC, uS/cm	Temp, C	D.O. mg/L
Middle Profile	0 .0 m	8.2	2230	12.9	11.3
collected 0700 hr	0.5 m	8.2	2220	12.9	11.3
	1.0 m	8.2	2260	12.9	11.3
	1.5 m	8.2	2230	12.9	11.3
	2.0 m	8.2	2250	12.9	11.3

Mid-lake Water Composite

Alkalinity, mg/L as CaCO3	180
Phosphorus, ortho, mg/L as P	0.038
Phosphorus, total mg/L as P	0.053
Nitrate-N, mg/L	0.13
Nitrite-N, mg/L	<0.01
Ammonia-N, mg/L	0.09

Sediment Composite

Total soliuds, %	15.7
Total volatile solids, %	21.7
Nitrate-N, mg/kg	2.1
NitriteON, mg/kg	<1.0
Ammonia-N, mg/kg	1,930
ORP	-111
Iron, total, mg/kg	10,000
Manganese, total, mg/kg	114
Phosphorus, total, mg/kg	684
Hydrogen Sulfide, mg/kg	<1
pH, SU	8.1

FIELD DATA 05-25-23
collected 0830 hr

	North	Middle	South
Sediment depth, in	11	13	10
Water depth, in	75	89	64
Total basin depth, in	86	102	74
Temp, C	27.9	27.9	27.6
Secchi depth, in	11	53	55

		pH, SU	EC, uS/cm	Temp, C	D.O. mg/L
Middle Profile	0 .0 m	8.0	2150	28.0	4.5
collected 0700 hr	0.5 m	7.9	2140	28.0	4.5
	1.0 m	7.9	2140	28.1	4.5
	1.5 m	7.9	2140	28.1	4.5
	2.0 m	7.9	2130	28.1	4.5

Mid-lake Water Composite

Alkalinity, mg/L as CaCO3	149
Phosphorus, ortho, mg/L as P	0.022
Phosphorus, total mg/L as P	0.044
Nitrate-N, mg/L	0.32
Nitrite-N, mg/L	<0.01
Ammonia-N, mg/L	0.11

Sediment Composite

Total soliuds, %	16.4
Total volatile solids, %	41.8
Nitrate-N, mg/kg	2.8
Nitrite-N, mg/kg	<1
Ammonia-N, mg/kg	1,930
ORP	-142
Iron, total, mg/kg	9,450
Manganese, total, mg/kg	113
Phosphorus, total, mg/kg	892
Hydrogen Sulfide, mg/kg	<1
pH, SU	7.1

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Lic. No. AZ0003

LABORATORY REPORT

Client: Atlantic Oase
236 Lena Drive
Aurora, OH 44202

Date Submitted: 05/25/23
Date Reported: 08/22/23

Attn: Frayne McAtee

Project: Oase-Dobson

RESULTS

Client ID: North
ACT Lab No.: CF03778

Sample Type: Field
Sample Time: 05/25/23 08:55

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Oxygen, Dissolved Field	05/25/23	05/25/23	SM4500 O G	4.6	mg/L as O2
pH, Field	05/25/23	05/25/23	SM4500H+ B	7.9	SU
Secchi Disk Depth	05/25/23	05/25/23	NALMS	0.28	meters
Temperature, Field	05/25/23	05/25/23	SM2550 B	27.9	C

Client ID: Middle
ACT Lab No.: CF03779

Sample Type: Aqeuous
Sample Time: 05/25/23 08:35

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Oxygen, Dissolved Field	05/25/23	05/25/23	SM4500 O G	4.5	mg/L as O2
pH, Field	05/25/23	05/25/23	SM4500H+ B	8.0	SU
Secchi Disk Depth	05/25/23	05/25/23	NALMS	0.38	meters
Temperature, Field	05/25/23	05/25/23	SM2550 B	28.0	C
Alkalinity, Total	05/31/23	05/31/23	SM 2320 B	149.	mg/L as CaCO3
Ammonia - N	05/31/23	05/31/23	SM4500NH3 D	0.11	mg/L as N
Nitrate + Nitrite - N	06/02/23	06/02/23	SM4500NO3 E	0.32	mg/L as N
Nitrite - N	05/25/23	05/25/23	SM4500NO2 B	<0.01	mg/L as N
Phosphate, ortho	05/26/23	05/26/23	365.3	0.022	mg/L as P
Phosphorus, Total	06/16/23	06/19/23	365.3	0.046	mg/L as P

RESULTS

Client ID: South
ACT Lab No.: CF03780

Sample Type: Field
Sample Time: 05/25/23 08:15

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Oxygen, Dissolved Field	05/25/23	05/25/23	SM4500 O G	4.3	mg/L as O2
pH, Field	05/25/23	05/25/23	SM4500H+ B	7.8	SU
Secchi Disk Depth	05/25/23	05/25/23	NALMS	1.41	meters
Temperature, Field	05/25/23	05/25/23	SM2550 B	27.6	C

Client ID: Sed Comp
ACT Lab No.: CF03781

Sample Type: Soil-Comp
Sample Time: 05/25/23 09:00

Parameter	Analysis Date Start	Analysis Date End	Method No.	Result	Unit
Ammonia - Soil	06/08/23	06/08/23	SM4500NH3BC mod.	2020.	mg/kg as N
Hydrogen Sulfide	05/30/23	05/30/23	Hach H2S-C	<1	mg/kg, as rec.
Nitrate + Nitrite - N	06/17/23	06/17/23	SM4500NO3E mod.	2.8	mg/kg as N
Nitrite - N	06/07/23	06/07/23	SM4500NO2B mod.	<1.	mg/kg as N
Oxidation Reduction Potential	06/05/23	06/05/23	SM 2580 (mod)	-142.	mV
Phosphorus, Total	06/08/23	06/09/23	365.3 mod.	892.	mg/kg as P
Iron, Total	06/09/23	06/09/23	6020A	9450.	mg/kg
Manganese, Total	06/09/23	06/09/23	6020A	113.	mg/kg
pH, 1:1 Extract	06/06/23	06/06/23	150.1 (mod.)	7.1@28C	SU
Total Solids	06/02/23	06/08/23	SM2540 G	16.4	%
Total Volatile Solids	06/08/23	06/09/23	SM 2540 G	41.8	%

Reviewed by: 

Frederick A. Amalfi, Ph.D.
Laboratory Director

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CHAIN OF CUSTODY

PWS ID #_____ PAGE___OF___

Client Name: Case
Address: 125 Lena Dr. (Street)
Aurora, OH 44202 (City, State, Zip)
Phone:
EMail: F. McAtee@case.com
Contact: Frayne McAtee
Sampler Signature:

PO#
Project: Case - Dobson
Remarks:

SAMPLE ID	SAMPLE Date	SAMPLE Time	SAMPLE TYPE	Metals (See Below)	TDS / TSS / VTS / SETT / TVS / VSS	HEM / TPHC / MBAS / CN / Sulfide	BOD / COD / New Source	Tot.P / PO_4	Nitrate + Nitrite / Nitrite	TKN / Ammonia	Field pH, T, DO, SD2	525 / 625 / 8270	524 / 624 / 8260	Perchlorate / Radio / Asbestos	Total Coliform / Presence/Absence / MPN	E. Coli / Fecal Strep	Fecal Coliform / MF	MICRO SCOPE ID	Plate Count	Algae ID/Count / GA	Acute / Chronic	Soil-pH	No. of Containers: HCl	$Na_2S_2O_3$	H_2SO_4	HNO_3	NONE	NaOH	NaOH/ZnAc	Laboratory Number
North	5/25/23	0855	FID				ORP				X	AIK	H2S														0		CF03778
Middle	↓	0835	AO		X			X	X	X	X	X													1		1		779
South	↓	0815	FID								X														0				780
Sed Comp	5/25/23	0900	Sed Comp	X	X		X	TP	X	X			X									X			3				CF03781

X field pH, T, DO, SD2 attached

Metals: ☐ Al ☐ Sb ☐ As ☐ Ba ☐ Be ☐ B ☐ Cd ☐ Ca ☐ Cr ☐ Co ☐ Cu ☐ Au ☒ Fe ☐ Pb ☐ Mg ☒ Mn ☐ Hg ☐ Mo ☒ Ni ☐ Se ☐ Ag ☐ Na ☐ Sr ☐ Tl ☐ Sn ☐ Ti ☐ V ☐ Zn

[X] TOTAL [ ] DISSOLVED [ ] SDWA [ ] TCLP [ ] RCRA

Sample Types: DW, GW, SW, WW, AQ, Soil, Sludge or Solid

Sample Receiving:
ICE ☑ Y ☐ N
Intact: ☑ Yes ☐ No
Temp: 10C Auth Init: _____
Pres: ☑ Yes/V ☐ No/Lab
Sterile: ☐ Yes ☑ No
Total # containers: 5

1. Relinquished By:	2. Relinquished By:	3. Relinquished By:
Date: 05-25-23 Time: 1200 AM/PM	Date: Time: AM/PM	Date: Time: AM/PM
1. Received By:	2. Received By:	3. Received By:
Date: 5-25-23 Time: 1200 AM/PM	Date: Time: AM/PM	Date: Time: AM/PM

Attn: Your signature on this document authorizes analysis regardless of sample condition at time of submittal

By signing this chain of custody, the designated client and agent agree to pay Aquatic Consulting & Testing, Inc. for all services rendered in conjunction with the submitted samples within 30 days of invoice. It is the client's responsibility to note purchase order numbers or other responsible parties on the form and failure to do so does not constitute justification for non-payment.

White-Laboratory Yellow-Report Pink-Client

Sample delivery group # : _____