



AQUATIC CONSULTING & TESTING, INC.

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Lic. No. AZ0003

30 June 2015

Ms. Debbie Tribioli
The Oasis at Anozira
c/o Kinney Management Services
6303 South Rural Road
Tempe, Arizona 85283

Ref: Oasis Lake, May 2015

Dear Ms. Tribioli:

The following report summarizes initial water quality data collected for Oasis Lake on 07 May 2015. Similar data will be reported each month and, once sufficient data has been collected, will be used to generate graphs to track changes in water quality. This report also includes field data sheets reflecting lake and mechanical system conditions each week during the month.

Chemical and Physical Composition

Temperature, Oxygen, and pH: Water temperature was 25.2 C (77 F) and the dissolved oxygen concentration was 12.4 mg/L. The amount of oxygen that can dissolve in water is temperature dependent; colder water can hold more oxygen than warmer water. At the time of sampling, the oxygen saturation was over 100 percent, indicating maximum oxygenation content and adequate operation of the aeration system. The dissolved oxygen content was also satisfactory for the fishery. The table below shows the USEPA criteria for dissolved oxygen in warm water fisheries.

Criterion	Early life stages	Other life stages
Daily mean	>6.0	>4.0
Daily minimum	>5.0	>3.0

Water temperature tolerance varies among fish species. However, the maximum weekly temperature tolerance of most common urban lake fish species is 32 to 35 C.

Turbidity: The turbidity of the lake water was relatively unchanged at 29.6 NTU. Water turbidity is impacted by dissolved and particulate matter in the water. As turbidity increases, clarity and aesthetic quality decreases.

pH: The lake water pH decreased to 8.3, well-within the desired range. Water pH is influenced by the chemical makeup of the water and the amount of algae in the lake. In a very simplified explanation for the role of algae, carbonic acid in the water is formed from dissolution of carbon dioxide. Carbonic acid tends to make the water more acidic and pH decreases. However, algae utilize carbon dioxide during photosynthesis during daylight, making less carbon dioxide available to form carbonic acid, and pH increases. The more algae present, the greater the increase in pH.

High pH can be problematic in terms of toxicity if high concentrations of ammonia are present in the water. Ammonia is in equilibrium between two forms; ammonium ion and ammonia gas. At pH concentrations above 9.0 SU, ammonia converts to the gas which is toxic to many aquatic organisms. At pH 8.3 any ammonia present would have no significant impact on the fishery.

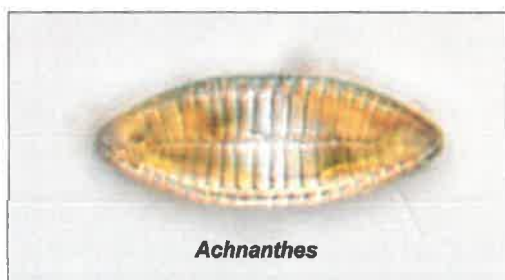
Nutrients: Nitrogen and phosphorus are the primary nutrients that stimulate algae and submerged plant growth. Phosphorus is typically the nutrient that dictates how much plant growth can be sustained in a lake. Usually if the total phosphorus concentration is below 0.030 mg/L, low levels of suspended algae occur. A nitrogen concentration of about 10 times the phosphorus (0.30 mg/L) is typically needed to support algal growth.

The total nitrogen concentration decreased to 1.30 mg/L as N. The phosphorus concentration also decreased to 0.093 mg/L as P. These data indicate that the lake has sufficient nutrients to support a high density algae population which is reflected in the phytoplankton data.

Biological Composition

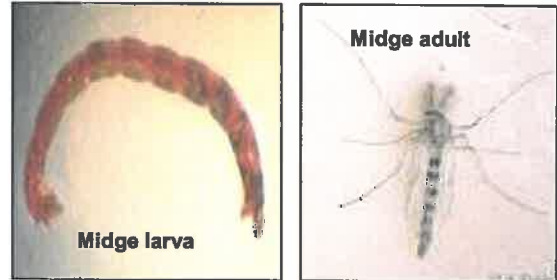
Phytoplankton (algae): The amount and types of algae in a lake dictate the aesthetic and operational quality of the water. Algae density affects the clarity and color of the water, two very important aesthetic criteria. The species composition dictates the form of growth observed; floating mats, suspended cells, stringy attached filaments, etc. It also impacts the choice, frequency, and dosage of herbicides used for water quality management.

The total algae density in the lake increased slightly to 2.63×10^5 cells per mL; considered in the elevated category for an urban reservoir in metro-Phoenix. Increased day length, water temperature, and solar intensity with a low-lake level (greater light penetration) are likely responsible. The dominant alga in Oasis Lake remained *Achnanthes*, a unicellular diatom (Bacillariophyta). Diatoms are not usually problematic, but their dominance of golden to brown colored pigments gives the water a murky appearance. The potentially toxic (to fish) alga, *Prymnesium parvum*, was not detected in the lake water.



No submerged weeds were detected in the lake.

Midge flies: Midge flies are common inhabitants of most lakes. Adult females lay hundreds of eggs on the water surface. The eggs settle to the lake bottom and hatch in a few days. Larvae develop and grow in the superficial sediments over a three to four week period. In about 30 days the insect larvae become pupae, rise in the water column, and emerge as adult flies. The life cycle is shown diagrammatically below. The adults tend to swarm at dusk and dawn and become a nuisance. They fly into residents' eyes and mouths, congregate under eaves of houses, and leave a sticky messy residue when they die. Management techniques may include stocking of bottom-feeding fishes to consume the larvae and/or application of bacterial or chemical larvicides.



Minimal midge fly adults were detected during the month.

Fishery: Fish activity appeared normal. No dead fish were observed or reported during the month.

Waterfowl: Ducks and geese can be a beautiful sight on a small urban pond or lake. They seem to make the lake look more like a natural lake than an artificial reservoir. They are fascinating creatures. However, when ducks and geese become too numerous, several lake management and aesthetic problems can develop.

Bird droppings can be a nuisance and aesthetic detraction along the shoreline. The droppings create slippery conditions along the shoreline and certainly are not attractive in appearance. Because the droppings must be physically washed from the lake edge, they create an additional maintenance task. Some waterfowl, as geese can become aggressive to humans, especially after they have become accustomed to being fed human food. They can do significant damage to turf areas, ripping up and consuming grass. Water fowl are also a source of nitrogen and phosphorus; nutrients that stimulate algae growth in a lake and cause the water to turn green. Ducks like to forage vegetation from the land. They convert it to water-soluble forms of nitrogen and phosphorus during digestion. The wastes are then deposited in the lake while they swim. Bird wastes contain fecal bacteria. Because we sometimes fish and our children often play along the water's edge, hands or feet somehow find their way into the water. Thus, the waste material can pose a health risk. Finally, some diving birds as cormorants are excellent fishermen. These birds have reduced the fish populations in some nearby lakes, consuming game fish and reducing recreational benefits. They have also removed fish that had been added for weed and insect control. Frequent fish restocking increases operational costs for the lake owner.

Arizona Game and Fish Department has developed the following criteria for waterfowl on small urban lakes.

Excellent	<3/acre
Good	3-4/acre
Fair	5-6/acre
Poor	>6/acre

Based on the Arizona Game & Fish Department scale, the lake condition in terms of waterfowl was good during the month. A reduced variety and number of geese and ducks visited the lake on a daily basis. Cormorants were not observed. In terms of public health protection, the *E. coli* bacteria concentration was 8 per 100 mL. The State swimming standard for *E. coli* is 235 and the secondary (partial body contact) standard is 575 per 100 mL. The lake water meets both of these criteria.

Mechanical Systems and Field Observations

Weekly field inspection forms are attached to this report. The lake was cleaned of surface debris weekly.

- The Elliot South water feature was out of service during the month.
- Two (2) aerator diffuser stations continued to work poorly, but were functional.
- Lake level was low during the middle of the month.
- A leak in the Los Feliz water feature was found and reported.

Chemical/Biological Product Applications

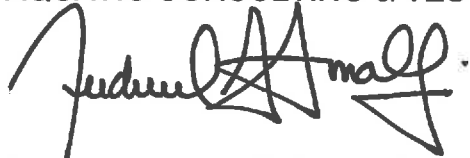
No applications were made to the lake during the month.

Lake Report Card

The water quality data are summarized on the attached Oasis Lake Report Card. Each salient parameter has been qualitatively evaluated and then assigned a numeric value for comparison and tracking purposes. The overall rating increased from 36 to 42, primarily as a result of decreased nutrients and improved pH. Despite turbid waters, the lake rating moved into the "Excellent" category for May 2015.

Respectfully,

AQUATIC CONSULTING & TESTING, INC.



Frederick A. Amalfi, Ph.D., C.L.M.
Laboratory Director





LABORATORY REPORTS



FIELD INSPECTION FORMS



PESTICIDE APPLICATION DOCUMENTS

OASIS LAKE REPORT CARD

DATE OF EVALUATION:

May-15

CONDITION **EXCELLENT**

SCORE **42**

PREVIOUS EVALUATION:

Apr-15

CONDITION **GOOD**

SCORE **36**

CONDITION	RESULT	RATIONALE	4 pts EXCELLENT	3 pts GOOD	2 pts FAIR	1 pt POOR	SCORE
Turbidity (NTU)	29.6	aesthetics	<5	5-10	11-20	>20	1
Dissolved oxygen (mg/L)	12.4	aquatic life, sediment nutrient release, odors	>7.0	5.6-6.9	4.0-5.5	<4.0	4
Nitrogen, total (mg/L)	1.30	algae and macrophyte growth	<0.5	0.5-1.0	1.0-2.0	>2.0	2
Phosphorus, total (mg/L)	0.093	algae and macrophyte growth	<0.03	0.03-0.05	0.06-0.10	>0.10	2
Algae density (no./mL)	2.6 x 10 ⁵	aesthetics	<5 x 10 ⁴	5x10 ⁴ - 9x10 ⁴	1 x 10 ⁵ - 5x 10 ⁶	>5 x 10 ⁵	3
Algae form (dominant)	diatoms	aesthetics, treatability	greens; no floating mats	diatoms; no floating mats	blue-greens; no floating mats	blue-greens; floating mats common	3
Macrophytes (% cover)	<1	aesthetics, boating	none	<10%	11-20%	>20%	4
pH (SU) avg.	8.3	swimming, fishery, ammonia toxicity	6.5-8.0	8.0-8.5	8.5-9.0	>9.0	4
E. coli bacteria (#/100 mL) avg.	8	public health protection	<20	21-80	81-125	>125	4
Midge flies	no nuisances	quality of life	no nuisances	minor nuisances	moderate nuisances	significant nuisances	4
Waterfowl (no. per acre)	2	nutrient and bacteria loading	<2	2-5	6-10	>10	3
Fishery	normal	recreation, aesthetics	no fish piping; no fish kills	some fish piping, gulping; no fish kills	fish piping before dawn; occasional fish kills	fish piping common; fish kills common	4
Shoreline/banks	no edge growths	aesthetics	no evidence of salt crusts or algal scums	some white deposits and scums	numerous patches of salt deposits and algae scums	most of lake shore covered with crusts or scums	4

SCORING KEY:

Excellent	Good	Fair	Poor
42-48	36-41	30-35	<30

Definitions: Ratings

Excellent: Lake aesthetic and operational conditions above level of expectation.

Good: Lake aesthetic and operational conditions at level of expectation.

Fair: Lake aesthetic and operational conditions slightly below level of expectation.

Poor: Lake aesthetic and operational conditions considerably below level of expectation.

Definitions: Terms

Macrophyte: Large plant, observable without the aid of a microscope, that may be floating, submerged or emergent.

Midge: Small, flying, non-biting "gnat-like" insect whose larval stage exists in the lake sediments (bloodworm).

N/A: not applicable; insufficient data or too early in development of lake (an arbitrary 3 rating is provided for these items).

pH: -log hydrogen ion conc.; amount of acid in the water identified on scale 1-14; 1 being most acid, 7 neutral, and 14 being most caustic.

Phytoplankton (algae): Microscopic plant fraction of the plankton community.

Piping: Act of fish coming to surface of water and capturing a bubble of air in their mouth; a sign of low oxygen concentrations.

Plankton: Organisms of relatively small size that have relatively small powers of locomotion or that drift in the water.

Turbidity: Degree to which particles and color in the water scatter light; the "cloudiness" of the water.



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LABORATORY REPORT

Client: Oasis at Anozira
c/o Kinney Management Services
6303 S. Rural Road
Tempe, Arizona 85283
Attn: Debbie Tribioli

Date Submitted: 05/07/15
Date Reported: 06/10/15

Project: Monthly Lake Monitoring

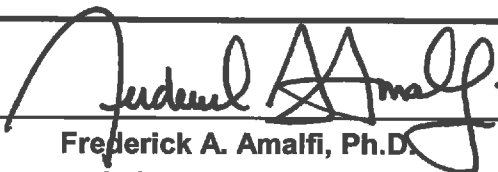
RESULTS

Client ID: Lake
ACT Lab No.: BX04152

Sample Type: Surface Water
Sample Time: 05/07/15 12:40

<u>Parameter</u>	<u>Analysis Date</u>		<u>Method No.</u>	<u>Result</u>	<u>Unit</u>
	<u>Start</u>	<u>End</u>			
Algae Count	05/21/15	05/21/15	SM 10200 F	See Attached	cells/mL
Algae Identification	05/21/15	05/21/15		See Attached	
Golden Algae	05/07/15	05/07/15	P/C Microscopy	Absent	Pres/Abs
Oxygen, Dissolved Field	05/07/15	05/07/15	SM4500 O G	12.4	mg/L as O2
pH, Field	05/07/15	05/07/15	SM4500H+ B	8.3	SU
Temperature, Field	05/07/15	05/07/15	SM2550 B	25.2	C
Nitrate + Nitrite - N	05/27/15	05/27/15	SM4500NO3 E	<0.05	mg/L as N
Phosphorus, Total	05/21/15	05/21/15	365.3	0.093	mg/L as P
Total Kjeldahl Nitrogen	05/13/15	05/13/15	SMNorg C,NH3 C/D	1.3	mg/L as N
E. coli, Colilert	05/07/15	05/08/15	SM 9223 B	8	MPN/100 mL
Turbidity	05/07/15	05/07/15	180.1	29.6	NTU

Reviewed by:


Frederick A. Amalfi, Ph.D.
Laboratory Director

ALGAE IDENTIFICATION

AC&T Lab No.	BX04152	Date Collected	05/07/15
Client I.D.	Oasis at Anozira	Collected By	AC&T

Divisions: bac=Bacillariophyta; chl=Chlorophyta; cry=Chrysophyta; cyn=Cyanophyta; eug=Euglenophyta; hap=Haptophyta; pyr=Pyrrhophyta
 Forms: u=unicell; c=colony; f=filament; g= flagellate

Genus	Div.-Form	Rel. Count	Total per mL	Comp.	Genus	Div.-Form	Rel. Count	Total per mL	Comp
<i>Achnanthes</i>	bac-u	185	174065	66.07%	<i>Microcystis</i>	cyn-c			
<i>Anabaena</i>	cyn-f				<i>Microspora</i>	chl-f			
<i>Ankistrodesmus</i>	chl-u				<i>Mougeotia</i>	chl-f			
<i>Aphanocapsa</i>	cyn-c				<i>Navicula</i>	bac-u			
<i>Asterionella</i>	bac-c				<i>Nitzschia</i>	bac-u			
<i>Botryococcus</i>	chl-c				<i>Oocystis</i>	chl-c			
<i>Carteria</i>	chl-ug	2	1882	0.71%	<i>Oscillatoria</i>	cyn-f	30	28227	10.71%
<i>Cephalomonas</i>	chl-ug				<i>Pandorina</i>	chl-cg			
<i>Ceratium</i>	pyr-ug				<i>Pediastrum</i>	chl-c	4	3764	1.43%
<i>Chlamydomonas</i>	chl-ug				<i>Peridinium</i>	pyr-ug	2	1882	0.71%
<i>Chlorella</i>	chl-u				<i>Phacotus</i>	chl-ug			
<i>Chlorococcum</i>	chl-c				<i>Phacus</i>	chl-ug			
<i>Chroococcus</i>	cyn-c	18	16936	6.43%	<i>Pinnularia</i>	bac-u			
<i>Chroomonas</i>	crp-ug				<i>Pithophora</i>	chl-f			
<i>Closterium</i>	chl-u				<i>Prymnesium</i>	hap-ug			
<i>Cocconeis</i>	bac-u				<i>Rhizoclonium</i>	chl-f			
<i>Coelastrum</i>	chl-c				<i>Rhoicosphenia</i>	bac-u			
<i>Cosmarium</i>	chl-u	1	941	0.36%	<i>Rhopalodia</i>	bac-u			
<i>Cosmocladium</i>	chl-c				<i>Scenedesmus</i>	chl-c	12	11291	4.29%
<i>Crucigenia</i>	chl-c				<i>Scytonema</i>	chl-f			
<i>Cryptomonas</i>	crp-ug				<i>Selanastrum</i>	chl-u			
<i>Cyclotella</i>	bac-u				<i>Sphaerocystis</i>	chl-c			
<i>Cymbella</i>	bac-u				<i>Spondylumorum</i>	chl-c			
<i>Diatoma</i>	bac-u				<i>Spirulina</i>	cyn-f	20	18818	7.14%
<i>Dinobryon</i>	bac-c				<i>Staurastrum</i>	chl-u	1	941	0.36%
<i>Dunaliella</i>	chl-u				<i>Stephanodiscus</i>	bac-u			
<i>Epithemia</i>	bac-u				<i>Stigeoclonium</i>	chl-f			
<i>Euglena</i>	eug-ug				<i>Surirella</i>	bac-u			
<i>Fragilaria</i>	bac-u				<i>Synechococcus</i>	cyn-u			
<i>Frustulia</i>	bac-u				<i>Synechocystis</i>	cyn-c			
<i>Glenodinium</i>	pyr-ug				<i>Synedra</i>	bac-u	5	4704	1.79%
<i>Golenkinia</i>	chl-c				<i>Synura</i>	cry-cg			
<i>Gomphonema</i>	bac-u				<i>Tetraedron</i>	chl-u			
<i>Gonium</i>	chl-cg				<i>Tetrastrum</i>	chl-c			
<i>Gonyaulax</i>	pyr-ug				<i>Trachelomonas</i>	eug-ug			
<i>Gyrosigma</i>	bac-u				<i>Vaucheria</i>	chl-f			
<i>Hydrodictyon</i>	chl-c				<i>Volvox</i>	chl-cg			
<i>Lyngbya</i>	cyn-f				<i>Zygnema</i>	chl-f			
<i>Melosira</i>	bac-f								
<i>Meridion</i>	bac-u								
<i>Merismopedia</i>	cyn-c								

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Count (cells/mL) 2.63E+05

check 100.00%

Aquatic Consulting & Testing, Inc.

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 Tempe, Arizona 85281
 (480) 921-8044 Fax (480) 921-0049

Chain of Custody

Client Project Info:

Weekly Lake Monitoring
 Oasis at Anozira

AC&T Client Reporting Information:

Oasis at Anozira
 c/o Kinney Management Services
 Attn: Debbie Tribioli
 6303 South Rural Road
 Tempe, AZ 85283
 P: 480-820-3451
 E: debbie@kinneymanagement.com

AC&T Sampler:

Andrew Marvett

Sample Location ID:	Date:	Time:	Metric:
Lake	5-7-15	12:40	SW

NO3+NO2	Total Phosphorous (P-T)	Total Kjeldahl Nitrogen (TKN)	Total E.Coli-MPN	Turbidity	Algae Count & ID	Golden Algae	Field Measurements: pH, Temp, O2
X	X	X	X	X	X	X	X

Non Preserved	Na2S2O3 (Sterile)	HNO3 (Nitric)	H2SO4 (Sulfuric)	Lugols	Other:
	22		11		

1. RELINQUISHED BY:	2. RECEIVED BY:
Signature: <i>Andrew Marvett</i> Print Name: Andrew Marvett Date: 5/7/15 Time: 1347	Signature: <i>MMcCleann</i> Print Name: m m c c l e a n n Date: MAY 07 2015 Time: 1347
AC&T Sample Receipt Total # Containers: 4 Custody Seals: YES NO Samples Intact: YES NO Samples On Ice: YES NO Ice Type: WET BLUE Sample Receipt Temperature: 26°C Notes: <i>Wpis. run</i>	

OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 5/2/15
By: [Signature]

Aeration System Operation

operational Problem

Details: Water level down

Lake Surface

Lake surface cleaning

Floating Fountains West East South

operational Problem Details: _____

Pump house housekeeping leaks ventilation lighting Notes _____

Compressors operational Problem Details: No Key!!

Pumps operational Problem Details: _____

Entry Fountains

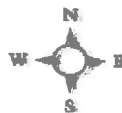
Elliot North: operational Screens cleared Problem Details: _____

Elliot South: operational Screens cleared Problem Details: Not running

Los Feliz: operational Screens cleared Problem Details: _____

Monthly Chemistry & Biology

- Dissolved oxygen 12.4
- Temperature 25.2
- pH 8.3
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli



OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 5/14/15
By: [Signature]

Aeration System Operation

operational Problem

Details: Lake level down 12-15 inches
Water brown & turbid 1 dead coot

Lake Surface

Lake surface cleaning

Floating Fountains West East South

operational Problem Details: All aerators working 2 poorly

Pump house housekeeping leaks ventilation lighting Notes

Compressors operational Problem Details: No Key !!!

Pumps operational Problem Details: _____

Entry Fountains

Elliot North: operational Screens cleared Problem Details: _____

Elliot South: operational Screens cleared Problem Details: _____

Los Feliz: operational Screens cleared Problem Details: _____

Monthly Chemistry & Biology

- Dissolved oxygen 2.5
- Temperature 25.4
- pH 8.4
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli



OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 5/20/15
By: Am

Aeration System Operation

operational Problem

Details: 2 aerators working poorly
Water brown & turbid

Lake Surface

Lake surface cleaning

Floating Fountains West East South

operational Problem Details: _____

Pump house housekeeping leaks ventilation lighting Notes _____

Compressors operational Problem Details: No Key!!

Pumps operational Problem Details: _____

Entry Fountains

Elliot North: operational Screens cleared Problem Details: _____

Elliot South: operational Screens cleared Problem Details: water going in
but level very low

Los Feliz: operational Screens cleared Problem Details: _____

Monthly Chemistry & Biology

- Dissolved oxygen 12.6
- Temperature 24.8
- pH 9.3
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli



OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 5/27/15

By: [Signature]

Aeration System Operation

operational Problem

Details: All Aerators on (2 running poorly

Lake Surface

Lake surface cleaning No

Floating Fountains West East South

operational Problem Details: _____

Pump house housekeeping leaks ventilation lighting Notes Good

Compressors operational Problem Details: _____

Pumps operational Problem Details: _____

Entry Fountains

Elliot North: operational Screens cleared Problem Details: _____

Elliot South: operational Screens cleared Problem Details: Off For Repairs

Los Feliz: operational Screens cleared Problem Details: Leak left wall

Monthly Chemistry & Biology

- Dissolved oxygen 12.2
- Temperature 29.5
- pH 9.5
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli

