



# AQUATIC CONSULTING & TESTING, INC.

1525 W. University Drive, Suite 106  
P.O. Box 1510  
Tempe, Arizona 85281  
Phone: (480) 921-8044 • Fax: (480) 921-0049

Lic. No. AZ0003

09 November 2015

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

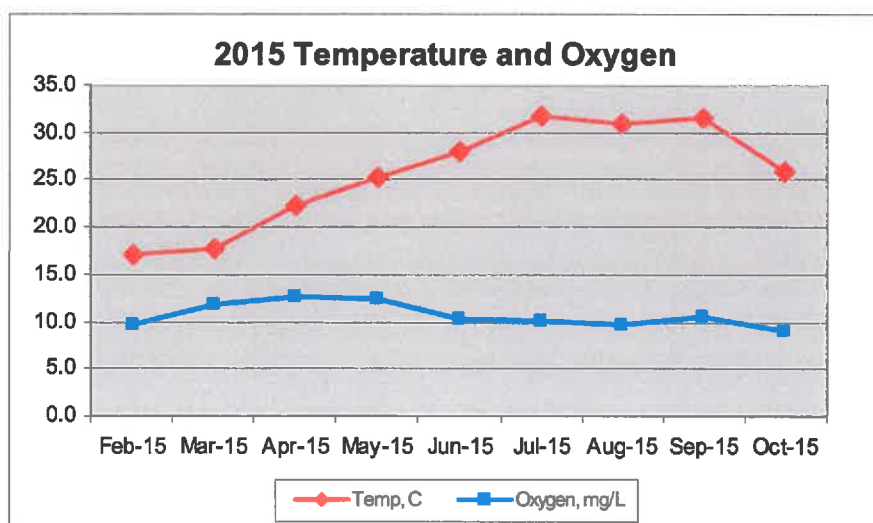
Ref: Oasis Lake, October 2015

Dear Ms. Tribioli:

The following report summarizes water quality data collected for Oasis Lake on 08 October 2015. Similar data have been reported each month and are used in this report to generate the graphs that will be used for tracking changes in water quality. The report also includes field data sheets reflecting lake and mechanical system conditions for each week during the month.

## Chemical and Physical Composition

**Temperature, Oxygen, and pH:** Water temperature was 26.0 C (79 F) and the dissolved oxygen concentration was 9.1 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 and despite a reduction in oxygen, the oxygen saturation was still over 100 percent, indicating maximum oxygenation and adequate operation of the aeration system.

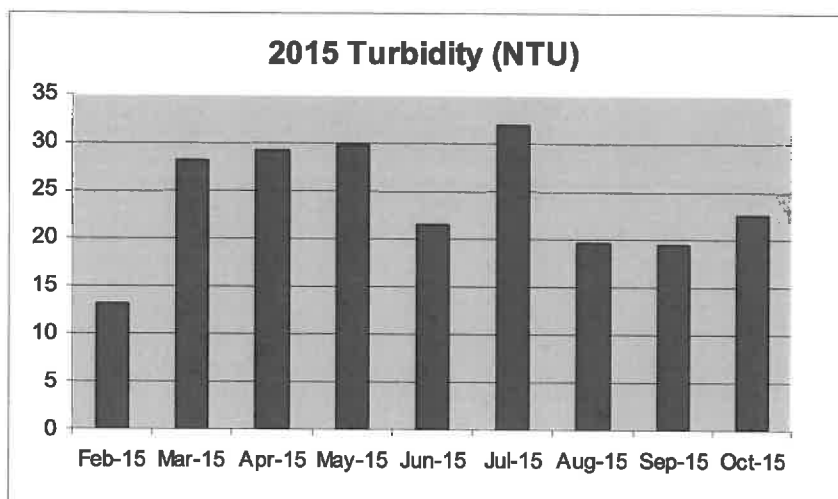


The dissolved oxygen content was also satisfactory for the fishery. The table below shows the USEPA criteria for dissolved oxygen in warm water fisheries.

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 increased slightly to 22.5 NTU. Water turbidity is impacted by dissolved and particulate matter in the water. As turbidity increases, clarity and aesthetic quality decreases.

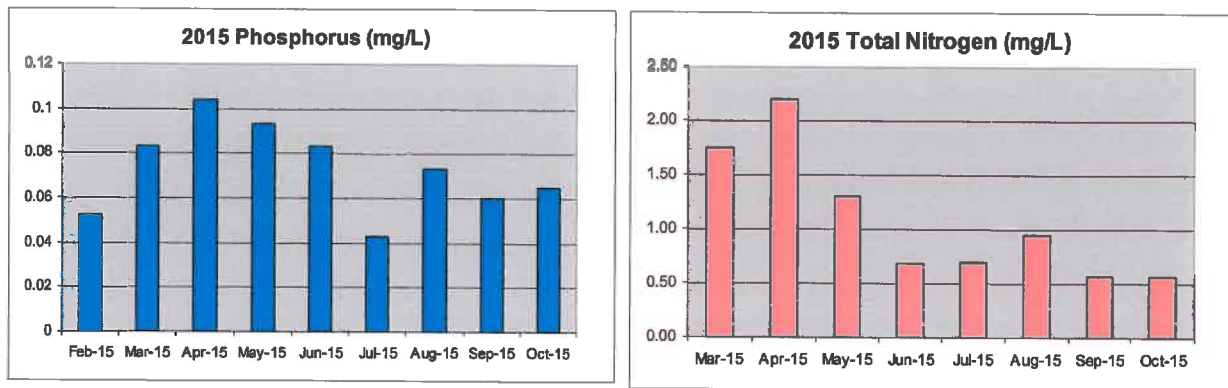


**pH:** The lake water pH increased to 11.1 SU; above the desired range. The measurement was taken in mid-afternoon, at the highest anticipated point of the day. Water pH is influenced by the chemical makeup of the water and the amount of algae in the lake. In a very simplified explanation for the role 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 that usually occurs.

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 8.0, ammonia would not have a significant adverse impact on the fishery. Despite the measured high pH, no signs of fish stress were observed.

**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.

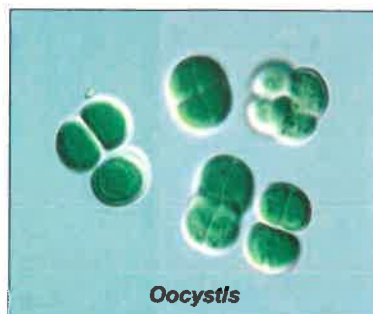
The total nitrogen concentration was unchanged at 0.56 mg/L as N. The phosphorus concentration was also stable at 0.065 mg/L as P. These data indicate that the lake still has sufficient nutrients to support a high density algae population. The phytoplankton data, below, indicate increased numbers of algae cells.

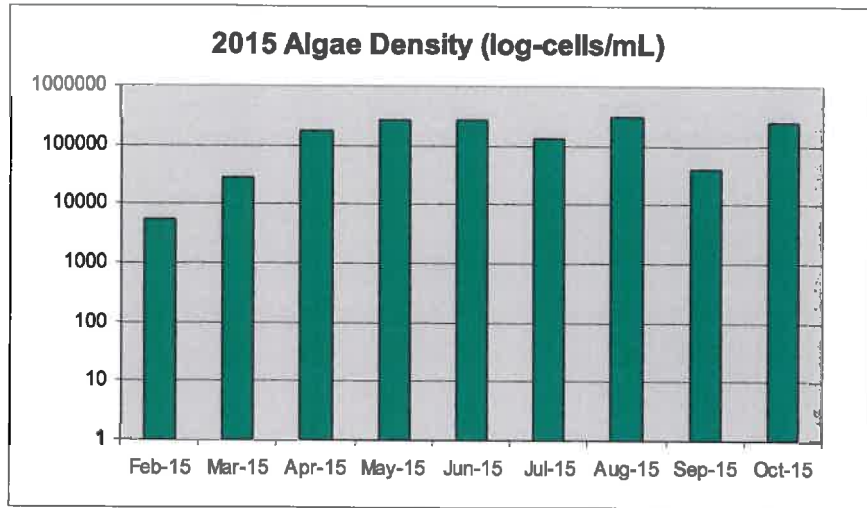


### Biological Composition

**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 to  $2.50 \times 10^5$  cells per mL; considered in the elevated category for an urban reservoir in metro-Phoenix. The dominant alga in Oasis Lake was *Chroococcus*, a colonial blue-green (Cyanophyta) form. This alga is usually can become problematic and cause lake water to become very green, turbid, and sometimes form surface swirls. This was case in late October in Oasis Lake. Surface swirls formed in the western cover, but were eliminated by an algaecide application. The potentially toxic (to fish) alga, *Prymnesium parvum*, was not detected in the lake water. Submerged weeds were not detected in the lake.





A single algaecide application was made to the western cove of the lake to help reduce surface swirls of algae.

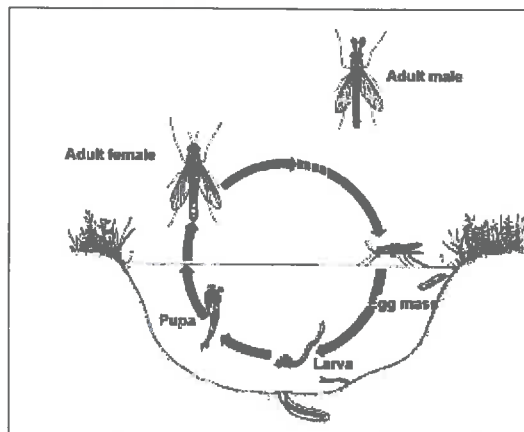


**Midge flies:** Midge flies are common inhabitants of most lakes. Adult females lay hundreds of eggs on the water surface. The eggs settle to the lake bottom and hatch in a few days. Larvae develop and grow in the superficial sediments over a three to four week period. In about



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. No significant change in variety and number of ducks was observed. A few geese (Canada geese, shown at right) were observed during routine inspections. Canada geese consume grass and deposit fecal matter on land and water. Cormorants were not observed.



In terms of public health protection, the *E. coli* bacteria concentration was 435 per 100 mL. The State swimming standard (full body contact) for *E. coli* is 235 and the secondary (partial body contact) standard is 575 per 100 mL. The lake water met the secondary standard.

## Mechanical Systems and Field Observations

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

- A small amount of water leakage was observed in the pump house.
- The Elliot north water feature water level was above the screen in early October.
- Light surface algae bloom occurred at the beginning and end of the month.

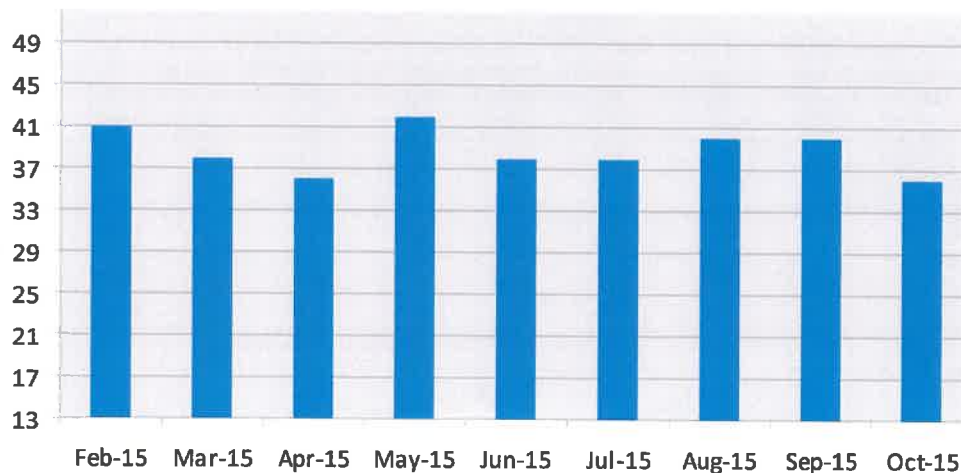
## Chemical/Biological Product Applications

A minor application of algaecide (Cutrine Ultra®) was made 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 fell to 36 as a result of increased algae, turbidity, and bacteria. Report card scores for the year are summarized below.

**2015 Report Card Scores**



Respectfully,

AQUATIC CONSULTING & TESTING, INC.

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





## **LABORATORY REPORTS**



## **FIELD INSPECTION FORMS**



## **PESTICIDE APPLICATION DOCUMENTS**



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Lic. No. AZ0003

## LABORATORY REPORT

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

**Date Submitted:** 10/08/15  
**Date Reported:** 11/05/15

**Attn:** Debbie Tribioli

**Project:** Monthly Lake Monitoring

## RESULTS

**Client ID:** Lake  
**ACT Lab No.:** BX09771

**Sample Type:** Surface Water  
**Sample Time:** 10/08/15 13:00

<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	10/25/15	10/25/15	SM 10200 F	See Attached	cells/mL
Algae Identification	10/25/15	10/25/15		See Attached	
Oxygen, Dissolved Field	10/08/15	10/08/15	SM4500 O G	9.1	mg/L as O <sub>2</sub>
pH, Field	10/08/15	10/08/15	SM4500H+ B	11.4	SU
Temperature, Field	10/08/15	10/08/15	SM2550 B	26.0	C
Nitrate + Nitrite - N	10/27/15	10/27/15	SM4500NO3 E	0.06	mg/L as N
Phosphorus, Total	10/12/15	10/12/15	365.3	0.065	mg/L as P
Total Kjeldahl Nitrogen	10/13/15	10/13/15	SMNorg C,NH <sub>3</sub> C/D	0.5	mg/L as N
E. coli, Colilert	10/08/15	10/09/15	SM 9223 B	435	MPN/100 mL
Turbidity	10/08/15	10/08/15	180.1	22.5	NTU

Reviewed by:

Frederick A. Amalfi, Ph.D.

Laboratory Director



## ALGAE IDENTIFICATION

AC&T Lab No.	BX09771	Date Collected	10/08/15
Client I.D.	Oasis	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				<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	6	5645	2.26%
<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				<i>Oscillatoria</i>	cyn-f	15	14113	5.64%
<i>Cephalomonas</i>	chl-ug				<i>Pandorina</i>	chl-cg			
<i>Ceratium</i>	pyr-ug				<i>Pediastrum</i>	chl-c			
<i>Chlamydomonas</i>	chl-ug				<i>Peridinium</i>	pyr-ug			
<i>Chlorella</i>	chl-u				<i>Phacotus</i>	chl-ug			
<i>Chlorococcum</i>	chl-c				<i>Phacus</i>	chl-ug			
<b>Chroococcus</b>	cyn-c	196	184414	73.68%	<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				<i>Rhopalodia</i>	bac-u			
<i>Cosmocladium</i>	chl-c				<i>Scenedesmus</i>	chl-c			
<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>Spondyliumorum</i>	chl-c			
<i>Diatoma</i>	bac-u				<b>Spirulina</b>	cyn-f	30	28227	11.28%
<i>Dinobryon</i>	bac-c				<b>Staurastrum</b>	chl-u	2	1882	0.75%
<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				<b>Synedra</b>	bac-u	13	12232	4.89%
<i>Golenkinia</i>	chl-c				<i>Synura</i>	cry-cg			
<i>Gomphonema</i>	bac-u				<b>Tetraedron</b>	chl-u	4	3764	1.50%
<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								

check 100.00%

Aquatic Consulting & Testing, Inc.  
1525 W. University Dr., Suite 106  
Tempe, Arizona 85281

Count (cells/mL) 2.50E+05

**Aquatic Consulting & Testing, Inc.**

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

**Chain of Custody**

**Client Project Info:**

**Monthly 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 Murcott*

Sample Location ID: **Lake** Date: **10-8-15** Time: **1300** Matrix: **SW**

Client Project Info:		Sample Containers & Preservation		Field Measurements:		AC&T Laboratory Sample Identification	
Monthly Lake Monitoring	Oasis at Anozira	Sample Containers	Preservation	pH, Temp, O2	Golden Algae	Algae Count & ID	Turbidity
		Non Preserved					
		N2S2O3 (Sterile)					
		HNO3 (Nitric)					
		H2SO4 (Sulfuric)					
		Lugole					
		Other:					

AC&T Client Reporting Information:		AC&T Laboratory Sample Identification	
Total Phosphorous (P-T)	X	AC&T Laboratory Sample Identification	
Total Kjeldahl Nitrogen (TKN)	X		
Total E.Coll-MPN	X		
Turbidity	X		
Algae Count & ID	X		
Golden Algae			
pH, Temp, O2	X		

**1. RELINQUISHED BY:**  
 Signature: *Andrew Murcott*  
 Print Name: Andrew Murcott  
 Date: 10-8-15

**2. RECEIVED BY:**  
 Signature: \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Date: \_\_\_\_\_

**3. RELINQUISHED BY:**  
 Signature: *Darrell Belair*  
 Print Name: Darrell Belair  
 Date: 10-8-15

**4. RECEIVED BY:**  
 Signature: \_\_\_\_\_  
 Print Name: \_\_\_\_\_  
 Date: \_\_\_\_\_

Project Location:	A C & T Sample Receipts:
Oasis at Anozira	Total # Containers: <b>5</b>
PO#:	Custody Seals: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Lake Contract	Samples Intact: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Notes:	Samples On Ice: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
	Ice Type: WET BLUE
	Sample Receipt Temperature: <b>27°C</b>

# OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 10/1/15  
By: AM

### Aeration System Operation

operational  Problem

Details: Light microcystis & Floating Blue-green Algae mats (small)

### Lake Surface

Lake surface cleaning

Floating Fountains  West  East  South

operational  Problem Details: \_\_\_\_\_

### Pump house

housekeeping  leaks  ventilation  lighting Notes Good

### Compressors

operational  Problem Details: Good

### Pumps

operational  Problem Details: Good

### 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 13.0
- Temperature 30.1
- pH 9.0
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli
- Golden algae (seasonal)



# OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 10/8/15  
By: [Signature]

### Aeration System Operation

Operational  Problem

Details: 2 poorly

### Lake Surface

Lake surface cleaning

Floating Fountains  West  East  South

Operational  Problem Details: \_\_\_\_\_

### Pump house

housekeeping  leaks  ventilation  lighting Notes \_\_\_\_\_

### Compressors

Operational  Problem Details: Pump leak slightly

### Pumps

Operational  Problem Details: Larger puddle

### Entry Fountains

Elliot North:  Operational  Screens cleared  Problem Details: Water level above screen

Elliot South:  Operational  Screens cleared  Problem Details: \_\_\_\_\_

Los Feliz:  Operational  Screens cleared  Problem Details: \_\_\_\_\_

### Monthly Chemistry & Biology

- Dissolved oxygen 11.4
- Temperature 26.0
- pH 9.1
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli
- Golden algae (seasonal)



# OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 10/15/15  
By: [Signature]

### Aeration System Operation

operational  Problem

Details: 2 weak aerators

### Lake Surface

Lake surface cleaning

### Floating Fountains West East South

operational  Problem Details: \_\_\_\_\_

### Pump house

housekeeping  leaks  ventilation  lighting Notes \_\_\_\_\_

### Compressors

operational  Problem Details: Good

### 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 13.1
- Temperature 26.9
- pH 9.2
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli
- Golden algae (seasonal)





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### PESTICIDE TREATMENT NOTICE & RECORD

**Client: The Oasis at Anozira**  
**Attn: Debbie Tribioli**  
The Oasis at Anozira  
C/O Kinney Management Services  
6303 South Rural Road  
Tempe, Az 85283

**Location: Lake on Anozira Parkway**

<b>Date: 10-30-15</b>	<b>Time: 11:30</b>	<b>Conditions: X clear</b>	<b>pt cloudy</b>	<b>overcast</b>
		<b>cold</b>	<b>X mild</b>	<b>hot</b>

<b>Material:</b>	<b>Reg. No. (*restricted)</b>	<b>Tot. Qty:</b>	<b>Acres/Volume:</b>
<b>Cutrine Ultra</b>		<b>0.5 gal</b>	<b>0.5 Aft</b>

**Target: surface algae**

**Degree of infestation: local - high**

**Application: Surface spray. 1.0 gal/Aft x 0.5 Aft= 0.5 gal**

**Dosage/rate 1.0 gal/Aft**

**Percent active ingredient: 9% Cu**

**Applicator: Amalfi**

**Cert. No. 900496**

**Remarks/follow-up:**

**Precautionary Statement:**

**Warning-Pesticides can be harmful. Keep children and pets away from pesticide applications until dry, dissipated, or aerated. For more information contact Aquatic Consulting & Testing, Inc. at 480-921-8044 and ask for Dr. Rick Amalfi. AC&T License No. 4418 F. A. Amalfi QP#1360 Cert. No. 900496**

# OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 10/22/15  
By: am

### Aeration System Operation

operational  Problem

Details: 2 aerators pool

### Lake Surface

Lake surface cleaning

### Floating Fountains West East South

operational  Problem Details: \_\_\_\_\_

### Pump house

housekeeping  leaks  ventilation  lighting Notes \_\_\_\_\_

### Compressors

operational  Problem Details: Good

### 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 10.5
- Temperature 24.5
- pH 9.1
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli
- Golden algae (seasonal)



# OASIS AT ANOZIRA FIELD INSPECTION FORM (

wpdoc/lists&forms)

Date: 10/20/19  
By: am

## Aeration System Operation

operational  Problem

Details: 2 week aerators

## Lake Surface

Lake surface cleaning

Floating Fountains  West  East  South

operational  Problem Details: \_\_\_\_\_

## Pump house

housekeeping  leaks  ventilation  lighting Notes \_\_\_\_\_

## Compressors

operational  Problem Details: Good

## 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: \_\_\_\_\_

Some Microcystis  
Monthly Chemistry & Biology

- Dissolved oxygen 8.3
- Temperature 22.3
- pH 8.9
- Algae ID and count
- Ammonia-N
- Organic N (TKN)
- Phosphorus
- Turbidity
- E. coli
- Golden algae (seasonal)

