# Stormwater Monitoring in Support of Lake Arcadia TMDL Development Jason Murphy





## Purpose

- Establish if Lake Arcadia is currently meeting its assigned beneficial uses
- Determine the extent of impairments to the waterbodies for 303(d) list
- Provide data for Total Maximum Daily Load (TMDL) development in Lake Arcadia
- Gather watershed data to assist in TMDL development



303(d) list: EPA's list of impaired and threatened waters





Sites represent the lacustrine, transitional and riverine zones of the Lake

### Spring Creek

## **Stream Sites**

Wynn Creek

SW

NE

SE





a di	Water Body ID	OK520710020030_00
River Oaks Golf Club	Beneficial Uses that are Impaired	Primary Body Contact, Fish & Wildlife Propagation
DF Deep Fork	Causes of Impairment	<i>E. coli</i> , macroinvertebrate and fish bio



## **Stream Sites**



### Wynn Creek



#### OK520710010040\_00

None Listed

None Listed – Monitored in support of potential TMDL



#### **Deep Fork Stream Sites** IS3 Spring Creek Lake Arcadia S2 E 33rd S E 33 rd St LS5 44th OK520710020060\_00 Water Body ID WC Vynn Creek Beneficial Uses that are Impaired None Listed **Causes of Impairment** None Listed – Monitored in support of potential TMDL DF Deep Fork mi





- Task 1- Planning & QAPP
- Task 2- Review monitoring & assessment data
- **Task 3- Purchase and Install Monitoring Equipment**
- Task 4- Conduct Monitoring to Support TMDL Development
- **Task 5- Prepare Water Quality Report for Review**



## Task 1- Planning & QAPP

 Meetings took place and a QAPP was written and submitted to DEQ/EPA for approval

**Output:** Submission and approval of QAPP containing the finalized monitoring plan

Quality Assurance Project Plan for TMDL Monitoring of Lake Arcadia and the Lake Arcadia Watershed

FY 17/18 Section §106 I-006400-17 Project 04

Prepared for: Oklahoma Department of Environmental Quality Water Quality Division 707 N. Robinson Oklahoma City, OK 73102 (405) 702-8100



Prepared by: Oklahoma Water Resources Board Water Quality Programs Division 3800 North Classen Blvd. Oklahoma City, Ok 73118 (405) 530-8800

> OWRB the water agency

December 2017



QAPP: Quality Assurance Project Planning

### Task 2- Review Monitoring & Assessment Data

- An initial review of existing and historical monitoring data used in assessment decisions
- Included in this process will be a comparison of DO data with existing bathymetry data to determine if a DO impairment exists
- **Output:** Compilation and review of existing monitoring data and relevant secondary data not previously used in assessment decisions. Volumetric assessment of Lake DO concentrations



### **Task 3- Purchase and Install Monitoring Equipment**

- Stream sites: a radar, data logger, and autosampler will be purchased and installed for all of the designated monitoring locations
- Lake sites: a buoy with a temperature string will be installed near the dam site

**Output:** Installation of monitoring network and linkage to OWRB's data telemetry systems.



## Equipment

Radar



#### Datalogger



Multi-parameter instrument in data buoy



**Temperature String** 



Autosampler





### Task 4- Conduct Monitoring to Support TMDL Development

#### Streams monitored monthly for:

- Total Suspended Solids (TSS)
- Nutrients (phosphorus and nitrogen series)
- Chlorophyll-a
- General water quality variables
- Turbidity

#### Lake Arcadia monitored monthly for:

- Total Suspended Solids
- Nutrients (phosphorus and nitrogen series)
- Chlorophyll-a
- General water quality variables
- Turbidity
- **TOC**
- Internal nutrient dynamics
- algal community assemblages

5 additional samples will be collected over the sampling period during targeted runoff events 2019) bi-weekly samples will be collected during the growing season (May-Sept 2018, May-June 2019)

#### **Outputs:** Monitoring data and relevant documentation



## **Establishing a Rating Curve**

After 15-20 discharge measurements at various stream stages, a initial rating curve is established. These various stage measurements come from monthly collections as well as targeted runoff events





### **Task 5- Prepare Water Quality Report for Review**

 OWRB will compile the water quality report for technical review by the state's TMDL Technical Workgroup

Outputs: Water Quality Data Report



## Conclusion

The overall measure of success for this Project is to produce water quality data needed in assessing the impact of the pollutants of concern in Lake Arcadia in order to support TMDL development. This includes the degree of impairment, adequate data for load allocation into Arcadia Lake, assignment of load RESO reductions within the watershed and identification of any impairments (for the measured parameters) in the watershed



## **Questions?**

### **Jason Murphy**

Streams Project Coordinator Water Quality Programs Division **OKLAHOMA WATER RESOURCES BOARD** 3800 N Classen Blvd, Oklahoma City, OK 73118 jason.murphy@owrb.ok.gov





### Julie Chambers julie.chambers@owrb.ok.gov

Joe Long joe.long@odeq.ok.gov

> Lance Phillips lance.phillips@owrb.ok.gov

Monty Porter monty.porter@owrb.ok.gov

> Chris Adams chris.adams@owrb.ok.gov

