OKLAHOMA LAKE THUNDERBIRD TMDL

LAKE THUNDERBIRD WATERSHED

2018 OKC CONSTRUCTION WORKSHOP

Raymond Melton
www.okc.gov/swq

TMDL IS A POLLUTION BUDGET

- **Total Maximum Daily Load** is the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards (US EPA).

Calculated by: TMDL = WLA + LA + MOS

WLA (Waste Load Allocation): The portion of a receiving water's loading capacity that is allocated to one of its existing or future *point sources* of pollution (e.g., permitted waste treatment facilities or MS4 Permits).

LA (Load Allocation): The portion of the loading capacity attributed to (1) the existing or future *nonpoint sources* of pollution and (2) *natural background sources* (e.g., diffuse sources such as agriculture).

MOS (Margin of Safety): A required component of the TMDL that accounts for the uncertainty in the response of the waterbody to loading reductions.

TOTAL LAKE THUNDERBIRD WATERSHED

Municipalities/Other Areas:

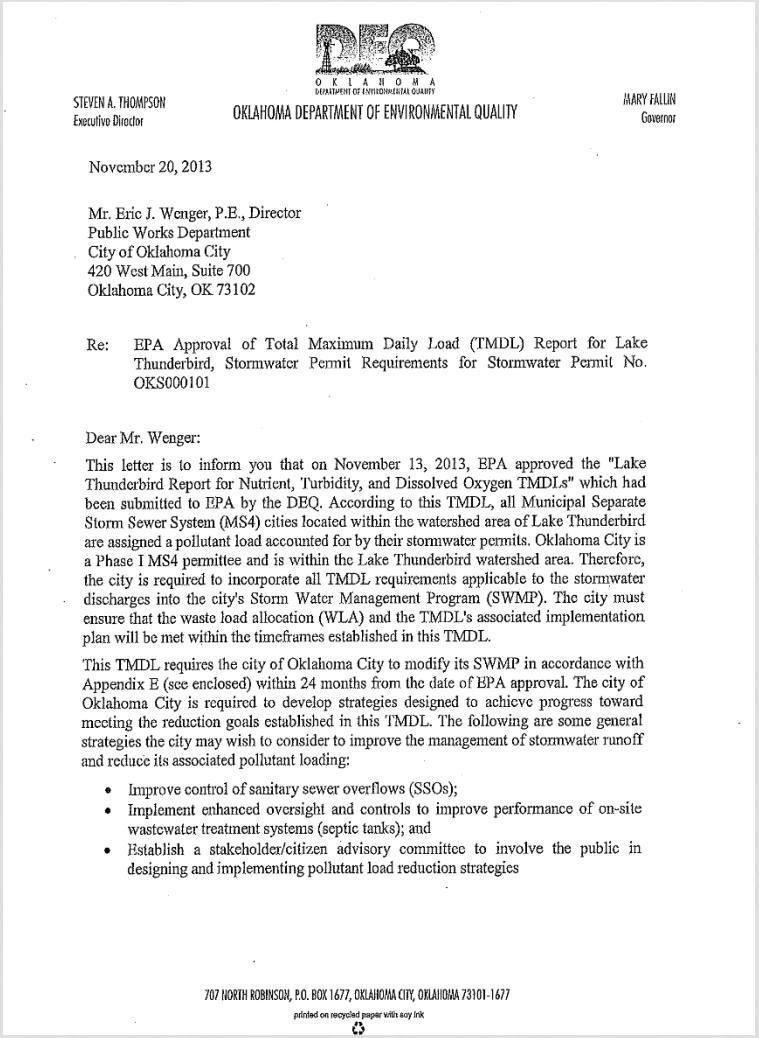
- Total = 256 mi^2
- 132 mi^2 (51%) Norman
- 97 mi^2 (38%) Oklahoma City
- 20 mi^2 (8%) Moore
- 7 mi^2 (3%) Other

BACKGROUND

OKLAHOMA CITY IS REGULATED UNDER A MS4 PHASE I PERMIT

- Oklahoma City received notification from the Oklahoma Department of Environmental Quality in **November 2013** that the EPA had approved the TMDL for Lake Thunderbird

The requirements include incorporation of the TMDL into the City's Storm Water Management Plan, a TMDL Compliance Plan and a Monitoring Plan submitted to ODEQ **within 2 years**



STEVEN A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

November 20, 2013

Mr. Eric J. Wenger, P.E., Director
Public Works Department
City of Oklahoma City
420 West Main, Suite 700
Oklahoma City, OK 73102

Re: EPA Approval of Total Maximum Daily Load (TMDL) Report for Lake Thunderbird, Stormwater Permit Requirements for Stormwater Permit No. OKS000101

Dear Mr. Wenger:

This letter is to inform you that on November 13, 2013, EPA approved the "Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs" which had been submitted to EPA by the DEQ. According to this TMDL, all Municipal Separate Storm Sewer System (MS4) cities located within the watershed area of Lake Thunderbird are assigned a pollutant load accounted for by their stormwater permits. Oklahoma City is a Phase I MS4 permittee and is within the Lake Thunderbird watershed area. Therefore, the city is required to incorporate all TMDL requirements applicable to the stormwater discharges into the city's Storm Water Management Program (SWMP). The city must ensure that the waste load allocation (WLA) and the TMDL's associated implementation plan will be met within the timeframes established in this TMDL.

This TMDL requires the city of Oklahoma City to modify its SWMP in accordance with Appendix E (see enclosed) within 24 months from the date of EPA approval. The city of Oklahoma City is required to develop strategies designed to achieve progress toward meeting the reduction goals established in this TMDL. The following are some general strategies the city may wish to consider to improve the management of stormwater runoff and reduce its associated pollutant loading:

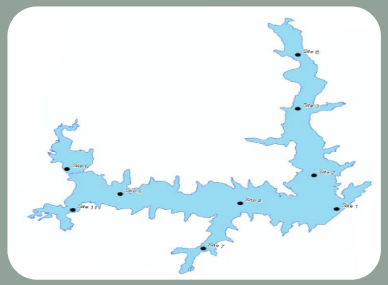
- Improve control of sanitary sewer overflows (SSOs);
- Implement enhanced oversight and controls to improve performance of on-site wastewater treatment systems (septic tanks); and
- Establish a stakeholder/citizen advisory committee to involve the public in designing and implementing pollutant load reduction strategies

707 NORTH ROBINSON, P.O. BOX 1677, OKLAHOMA CITY, OKLAHOMA 73101-1677

printed on recycled paper with soy ink

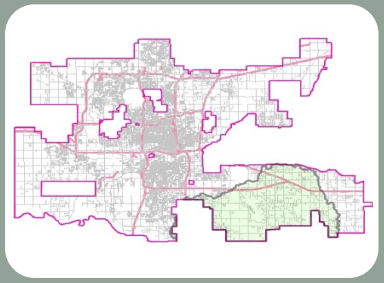
BACKGROUND

LAKE THUNDERBIRD AND WATERSHED



Lake Information

- 6,070 Acres
- Owned By the U.S. Bureau of Reclamation, Operational in 1966
- Designated Beneficial Uses: Flood Control, Municipal Water Supply, Recreation and Fish & Wildlife Propagation.
- Drinking water supply for Norman, Midwest City and Del City.



Watershed

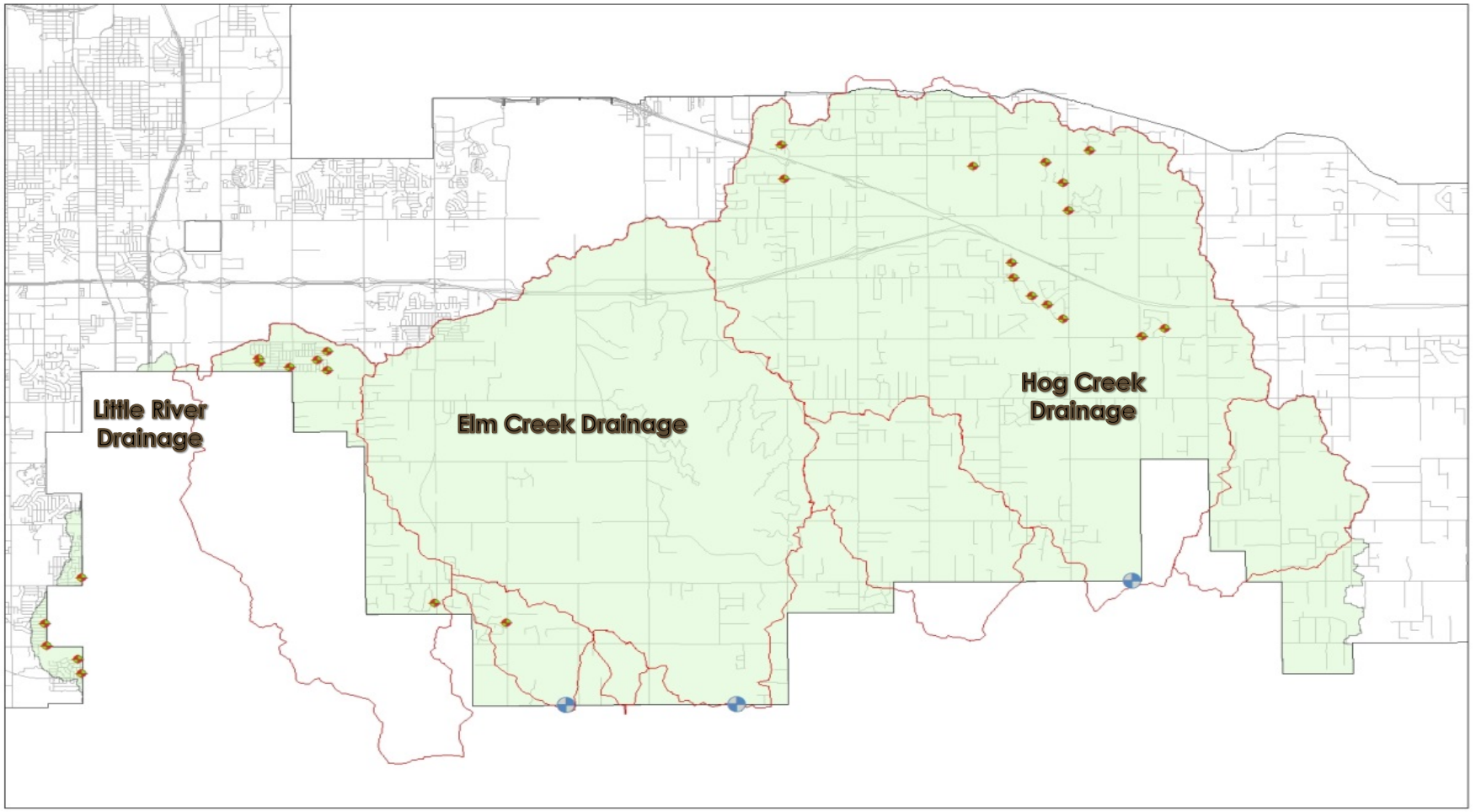
- 256 square miles
- Drainage area includes the City of Norman, Moore and Oklahoma City (to a much lesser extent Midwest City and Noble)
- The drainage area in Oklahoma City is approximately 97 square miles.

Lake Water Quality Problems

- Excessive Algae (Chlorophyll – A)
  - Due to excessive Nutrients (primarily Nitrogen and Phosphorus)
- Low Dissolved Oxygen Levels and poor water clarity (turbidity/total suspended solids)
- Other issues include taste and odor problems in water supplies and increased water treatment costs.

BACKGROUND

IMPACTED OKC WATERSHED



BACKGROUND

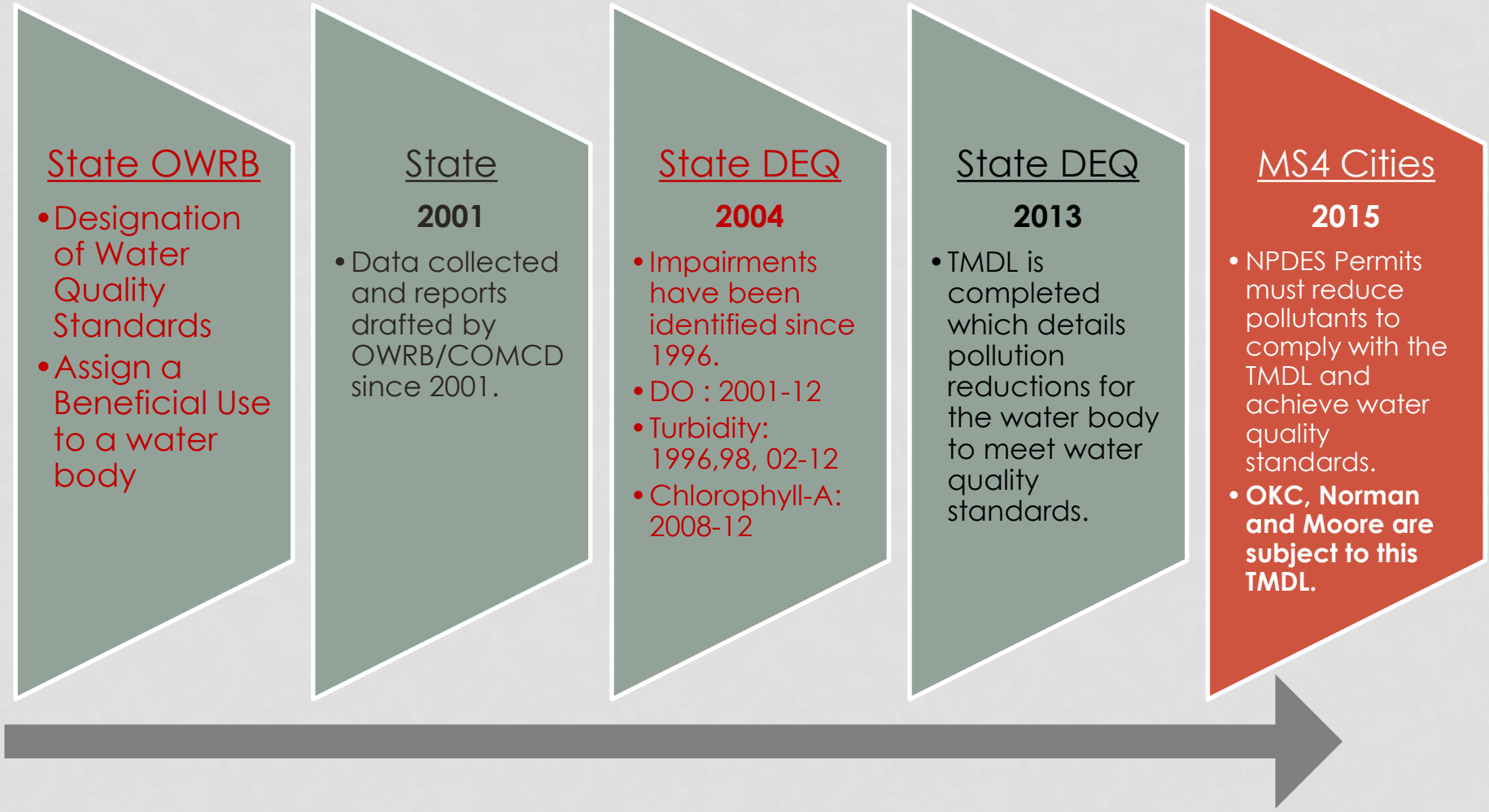
PRIMARY POLLUTANTS OF CONCERN

- **Nitrogen and Phosphorus** are common nutrients used to enhance plant growth. Excessive runoff can cause dense algae growth in waterways which can reduce oxygen, contribute to increased water treatment cost.
- **Suspended Solids** are finely divided silt, clay or sand which make up the primary transport of the sediment load in streams. Excessive sediment transport can cause accelerated fill, increased water treatment costs and disturb or destroy aquatic habitats.

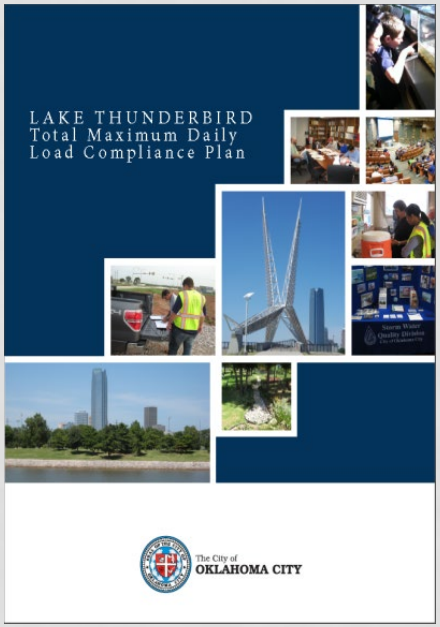
Nutrient Sources:
- Fertilizer
- Human/Animal Waste
- Erosion
- Septic Tanks

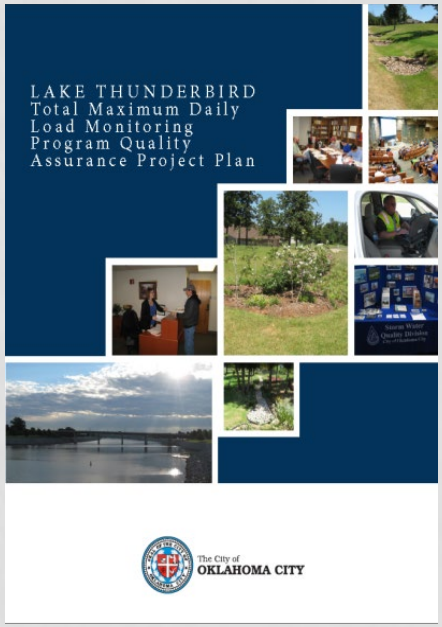
TSS Sources:
- Erosion
- Urban impervious surface runoff
- Resuspension

THE PROCESS


State OWRB
• Designation of Water Quality Standards
• Assign a Beneficial Use to a water body
State
2001
• Data collected and reports drafted by OWRB/COMCD since 2001.
State DEQ
2004
• Impairments have been identified since 1996.
• DO : 2001-12
• Turbidity: 1996,98, 02-12
• Chlorophyll-A: 2008-12
State DEQ
2013
• TMDL is completed which details pollution reductions for the water body to meet water quality standards.
MS4 Cities
2015
• NPDES Permits must reduce pollutants to comply with the TMDL and achieve water quality standards.
• OKC, Norman and Moore are subject to this TMDL.

COMPLIANCE AND MONITORING PLAN TIMELINE





- Compliance Plan and the Monitoring Plan were submitted to ODEQ on **November 13, 2015.**
- After a **60 day review** by the State, OKC received comments to adjust some elements of the plans.
- OKC submitted revised plans on **April 5, 2016.**
- The monitoring program must be started by **November 13, 2016.**

Intent of the Compliance & Monitoring Plans

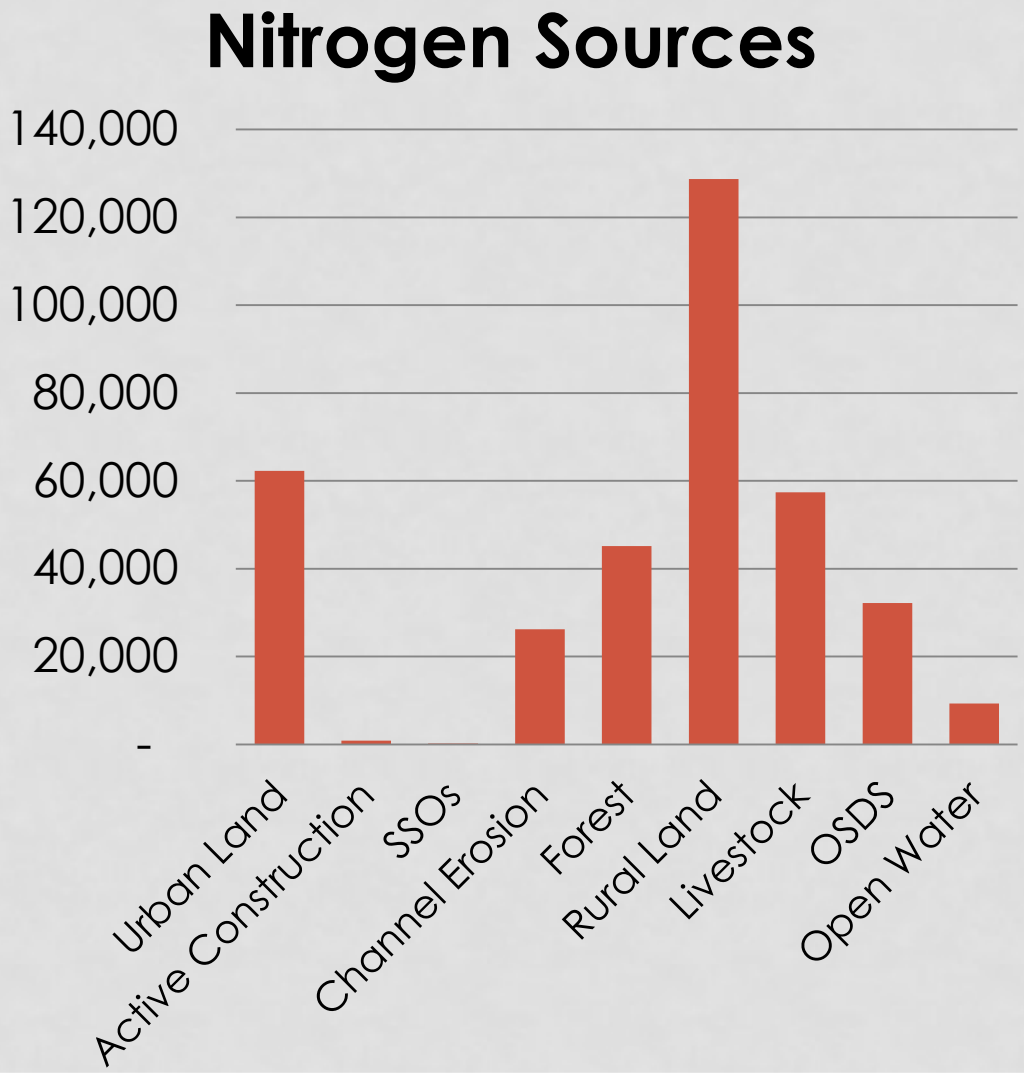
- Develop a long-term monitoring program
- Propose changes to municipal code
- Study and develop methods for post-development.
- Create a TMDL outreach program to educate stakeholders.
- Propose City owned/operated structural controls to meet mandated pollutant reductions.

COMPLIANCE PLAN

POLLUTION SOURCES

Staff utilized a water quality model of the watershed to determine land use based pollution sources for Nitrogen, Phosphorus and Suspended Solids.

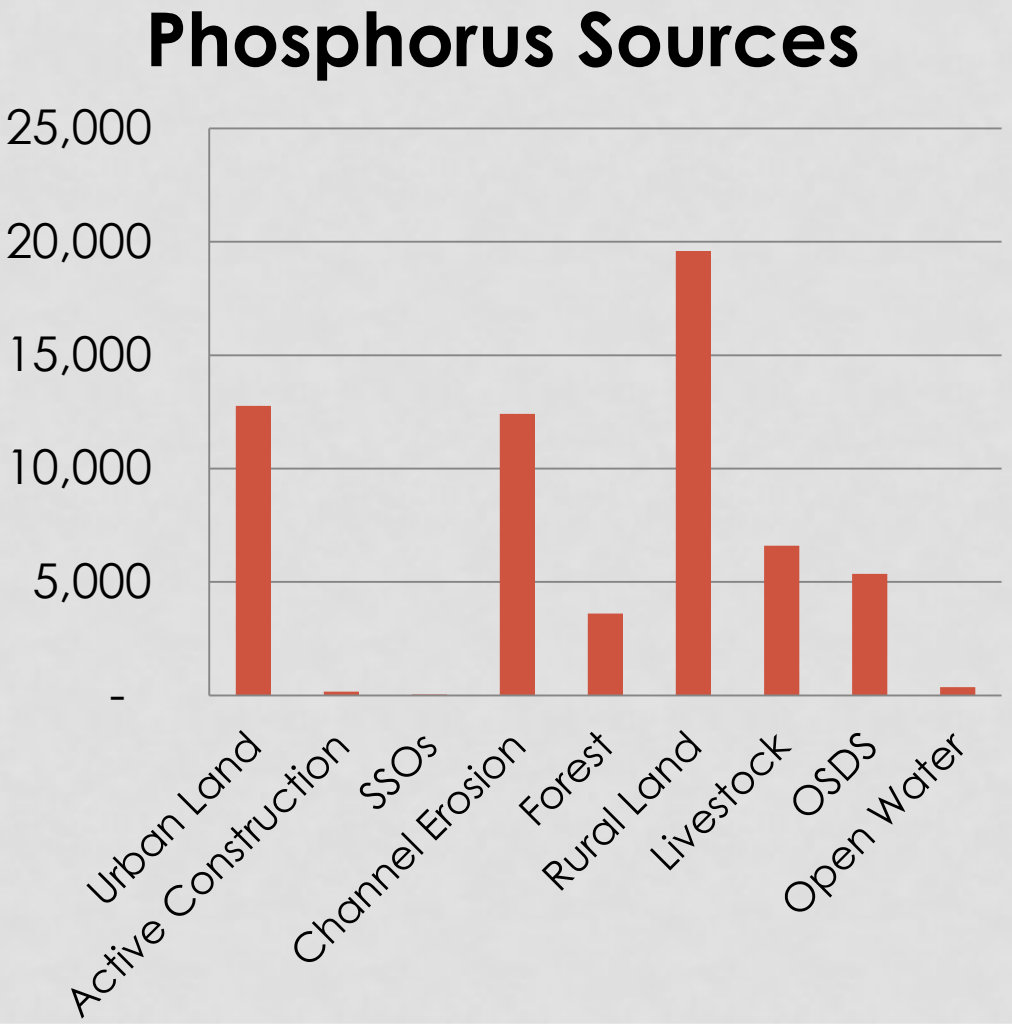
- **Open Water – 3%**
- **Channel Erosion – 7%**
- **Septic Systems – 9%**
- **Forest – 12%**
- **Livestock – 16%**
- **Urban Land – 17%**
- **Rural Land – 36%**



COMPLIANCE PLAN

POLLUTION SOURCES

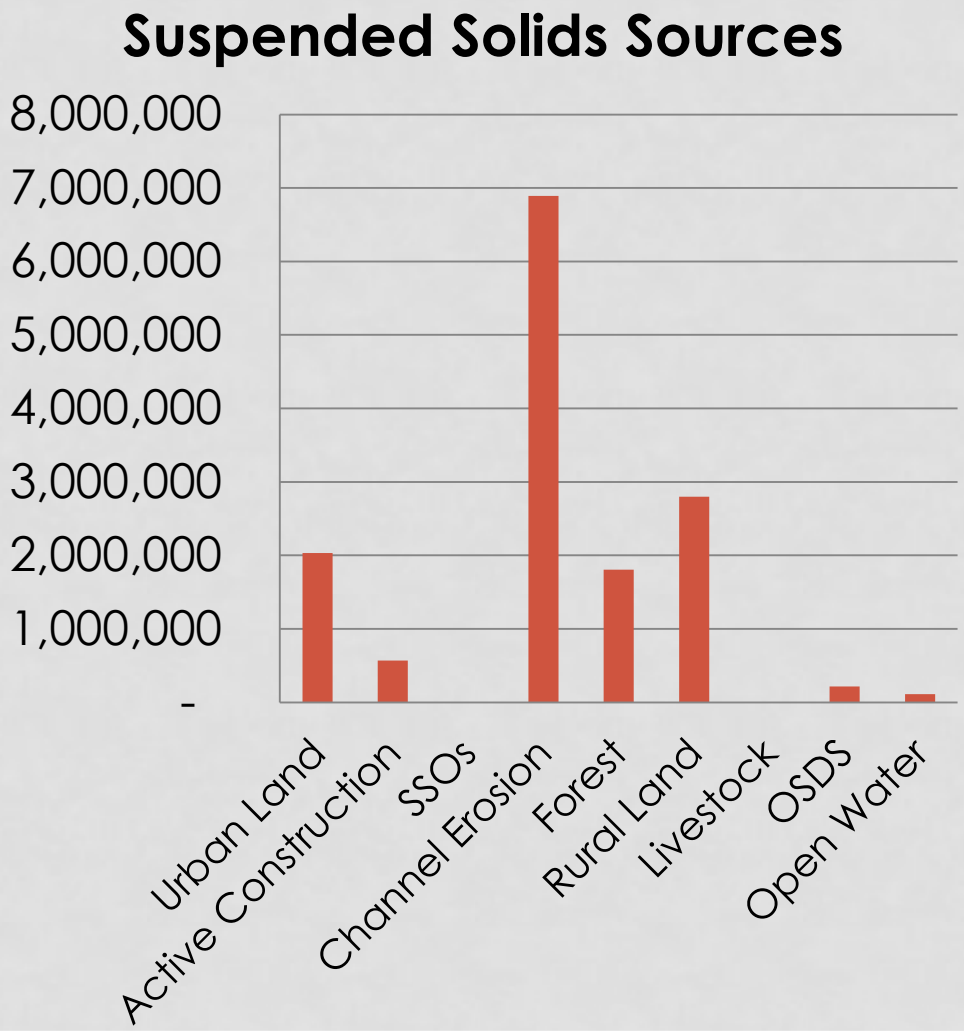
- Open Water – 1%
- Forest – 6%
- Septic Systems – 9%
- Livestock – 11%
- Channel Erosion – 20%
- Urban Land – 21%
- Rural Land Use – 32%



COMPLIANCE PLAN

POLLUTION SOURCES

- Open Water – 1%
- Septic Tanks – 1%
- Construction – 4%
- Forest – 13%
- Rural Land – 19%
- Urban Land – 14%
- Channel Erosion – 48%

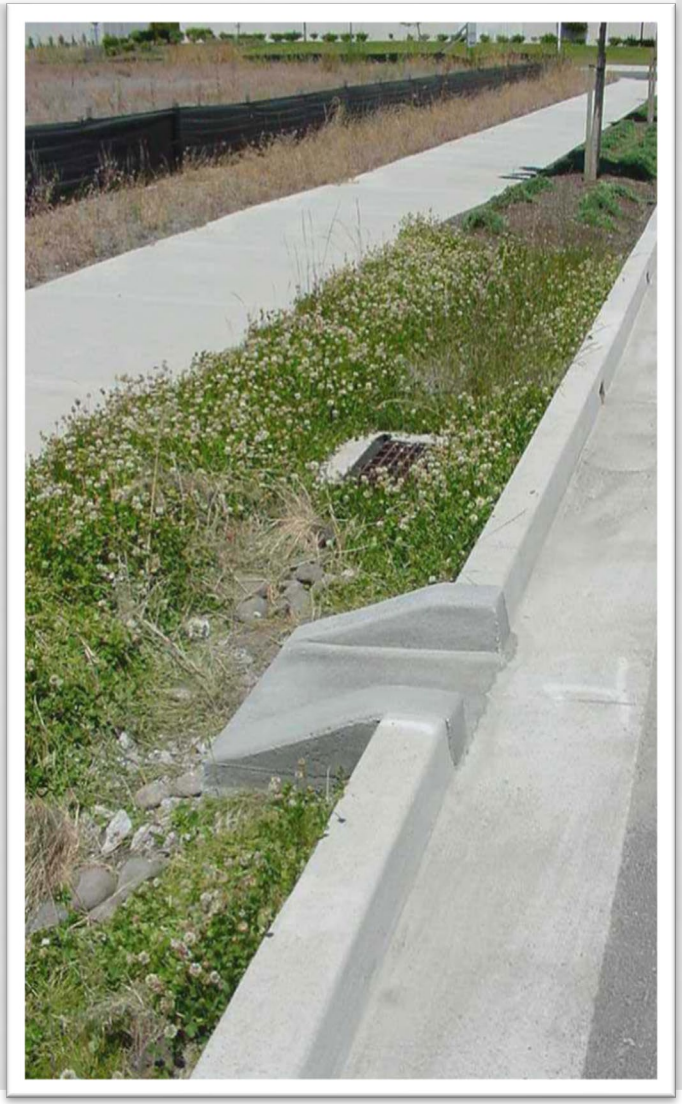


COMPLIANCE PLAN

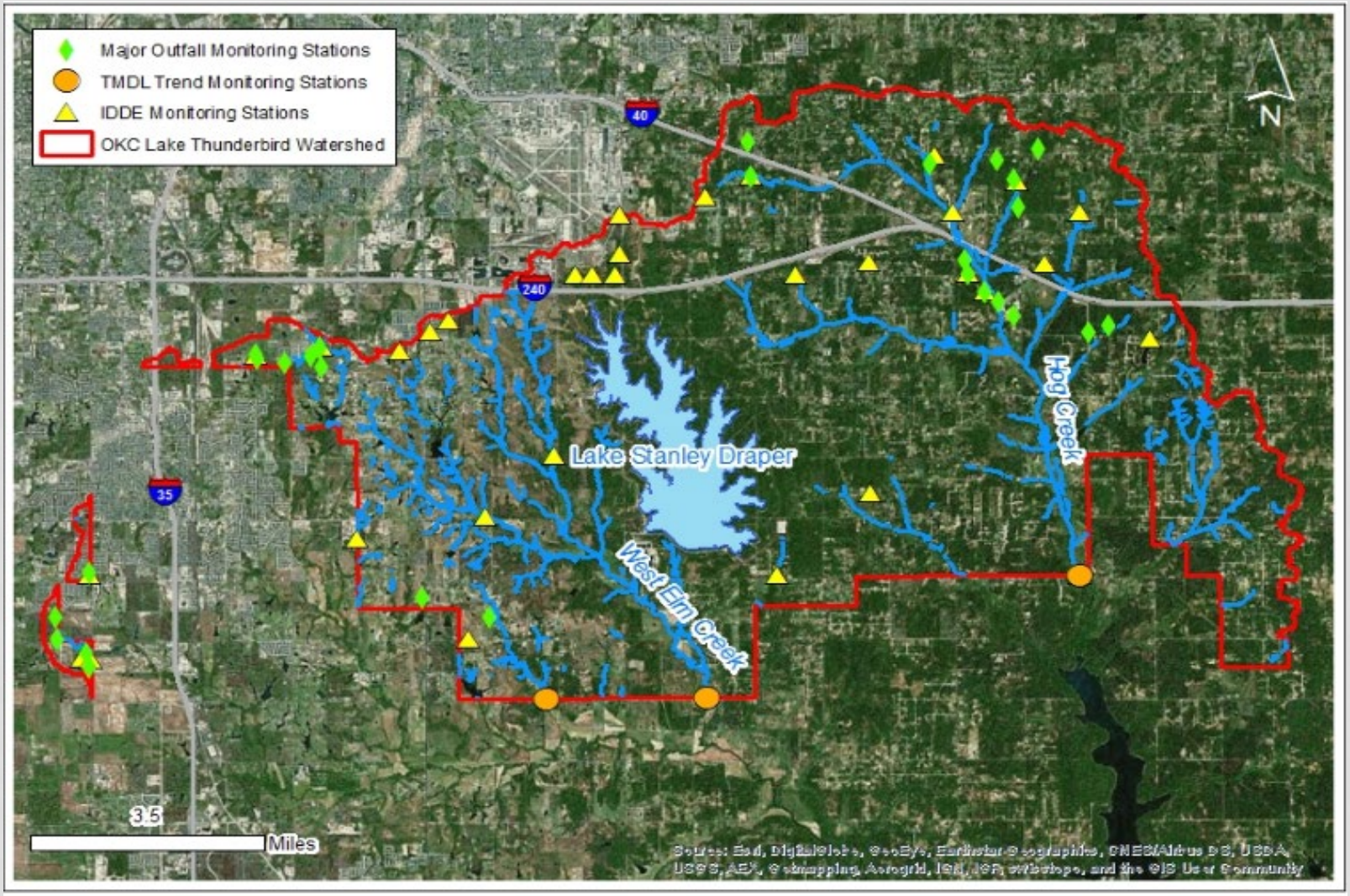
BEST MANAGEMENT PRACTICES

- **Non – Structural BMPs:** Behavioral changes or efforts designed to prevent or reduce waterborne pollutants *before* they enter the storm drainage network.

- **Structural BMPs:** Constructed facilities designed to treat or remove waterborne pollutants *after* they enter the storm drainage network



MONITORING STATIONS



MONITORING COSTS

Program	Equipment	Cost
Pour Point	Automatic Samplers / Flow / Telemetry (3 Units)	$53,586 (one time purchase costs)
Pour Point	Laboratory Services	$4,000/Annually
Pour Point	Telemetry Annual Service Charges	$360/Annually
Major Outfall	Passive Samplers	$4,000/Annually
Major Outfall	Laboratory Services	$8,000/Annually

Program Year	2016	2017	2018	2019	2020
Total Cost	$69,946	$16,360	$16,360	$16,360	$16,360

COMPLIANCE PLAN

PRIORITIES

- TMDL monitoring program
- Outreach/educational programs
-
- Develop methodologies to reduce post construction pollution export
- Develop a list of approved structural Best Management Practices
- Enhance non-structural BMPs

2016 - 2017

COMPLIANCE PLAN

PRIORITIES

- Conduct feasibility studies
- Identify retrofit opportunities
- Propose revisions to Municipal Code
- Continue monitoring programs and analysis

2017 - 2019

COMPLIANCE PLAN

PRIORITIES

- Construct structural BMPs for pollutant load reduction
- Continue monitoring

2019 - 2026

2016-17 GOALS ACCOMPLISHED

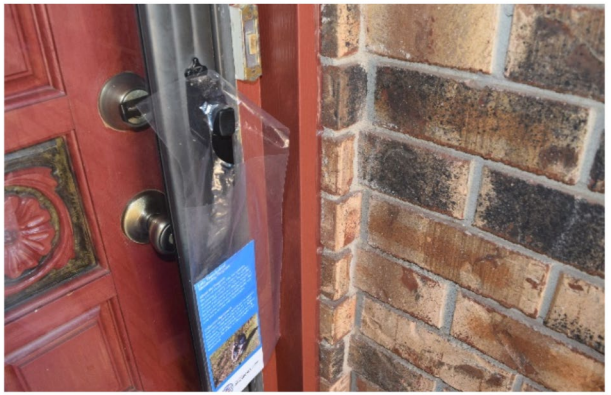
- Installed 14 Passive Samplers
- Identifying Structural BMP's within the Watershed
- Meetings with Moore, Norman and OKC
- Lunch-n-Learn with City Staff
- Completed/Distributed TMDL Door Hanger
- Developed FAQ Sheet for Contractors
- Began Ordinance Updates
- Collected Samples
- Developed Pet Waste Brochure

2017-18 GOALS ACCOMPLISHED

- 12 Quarterly Grab Samples
- 124 Trend Monitoring Samples
- 4 Passive Samples Collected
- 33 Dry Weather Stations Visited
- 104 Hours TMDL Training

2017-18 CONTINUED

- Distribution of Letter for Construction and Industrial TMDL Requirements
- 142,931 Lake Thunderbird TMDL Contacts
- 18 Rain Barrels Distributed
- $13,200,000 Lake Thunderbird Watershed Bond Approved



SAMPLING

COLLECTING SAMPLES

TMDL COMPLIANCE PLAN

LAKE THUNDERBIRD WATERSHED

QUESTIONS

Thank you

Raymond Melton
Raymond.melton@okc.gov
www.okc.gov/swq