Stormwater Monitoring: Lake Thunderbird TMDL Monitoring Plan Implementation

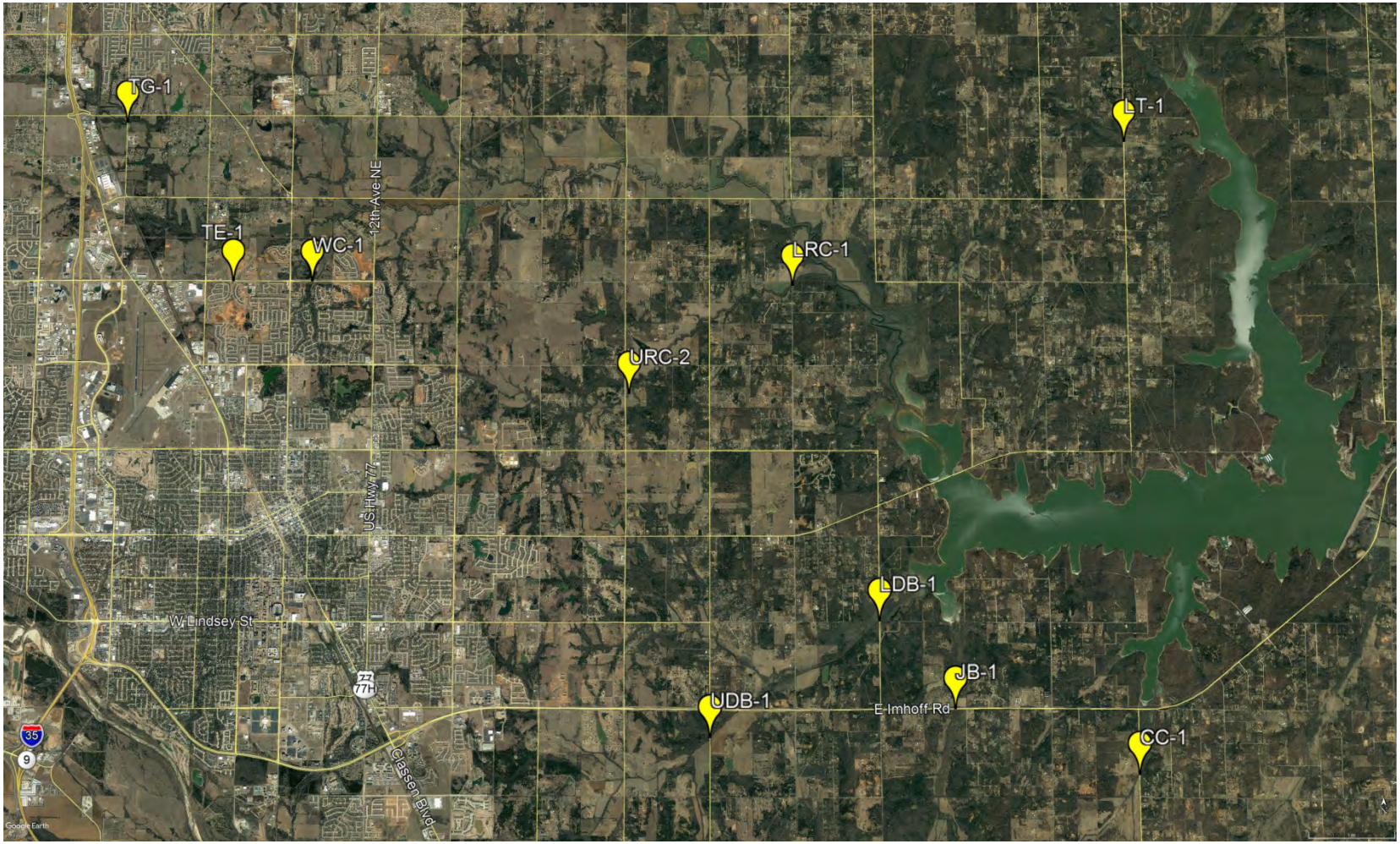
Sarah Dexter

OWRB
the water agency

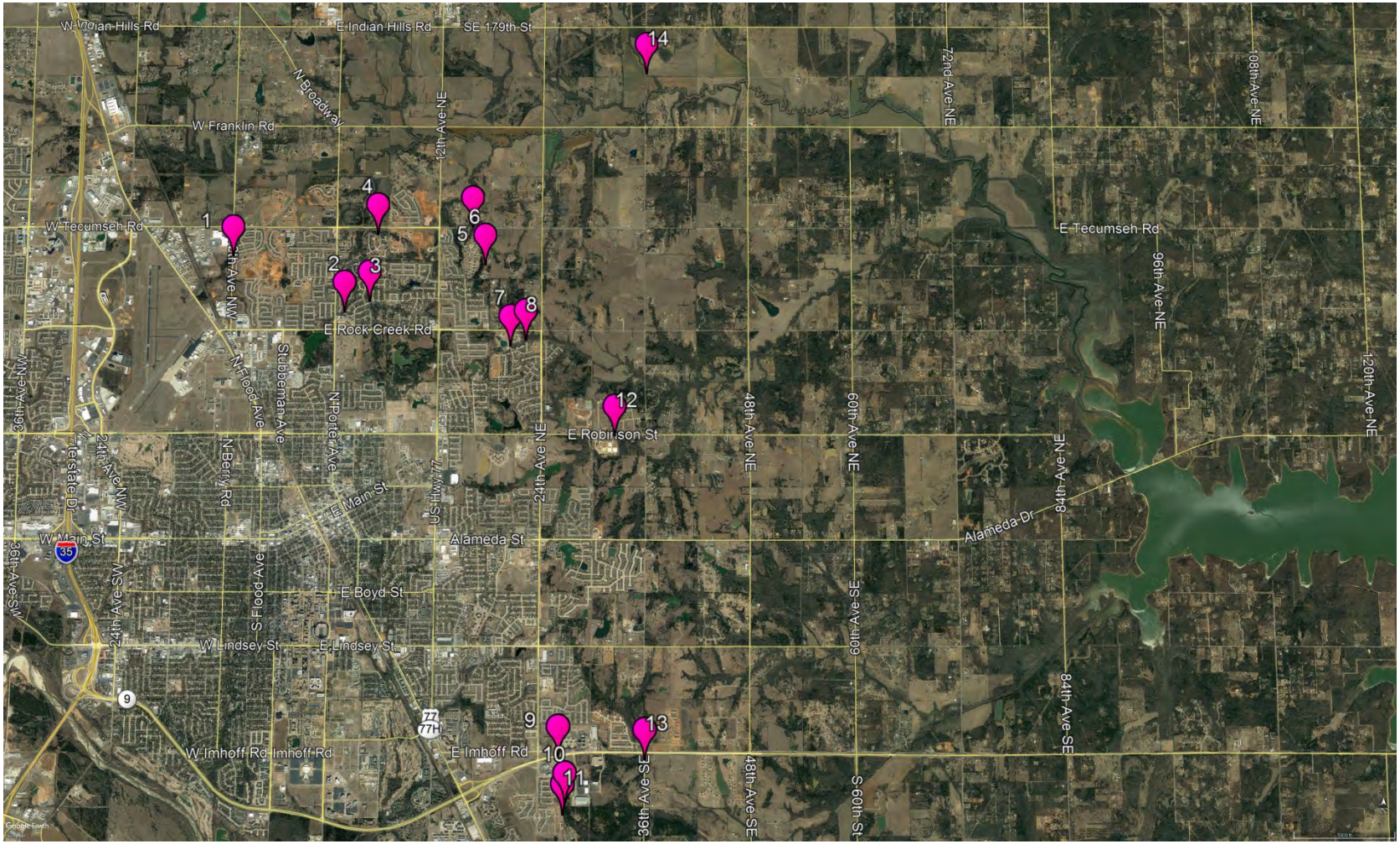
Introduction

- Lake Thunderbird TMDL ➡ TMDL Compliance Plan ➡ City of Norman monitoring plan
- Identify main sources of pollutants
  - Water collections
  - Discharge measurements
  - Sediment and nutrient loadings
- Determine trends and effectiveness of BMPs
- 3 years to develop a baseline for loadings, and 5 years to show trends

Site Locations



Site Locations Cont.



Equipment

- WaterLOG® Storm 3 datalogger
- Data transmitted at 15 minute intervals
- WaterLOG® bubbler/pressure sensor or Nile series radar
- 8” tipping bucket rain gauge

OWRB
the water agency

Parameters

- Nitrate/Nitrite, Total Kjeldahl Nitrogen (TKN), total phosphorus (TP), total suspended solids (TSS)
- Temperature, pH, dissolved oxygen (DO), specific conductivity
- Turbidity
- Stream discharge
  - Permanent stations only

Storm Sampling

- Minimum of 4 times a year
- Collect as close to the peak of the hydrograph, but no more than 25% below the peak
- Rainfall amounts
- Outfalls 1-7 during even years, outfalls 8-14 during odd years

Problems & Solutions

- Stream conditions
- Construction
- Vandalism
  - Tamper proof bolts
  - Steel gauge boxes
- Storm sampling
  - Refrigerated autosamplers

Dry Sites

6/15/2016
LT-1

9/18/2017
LT-1

Construction

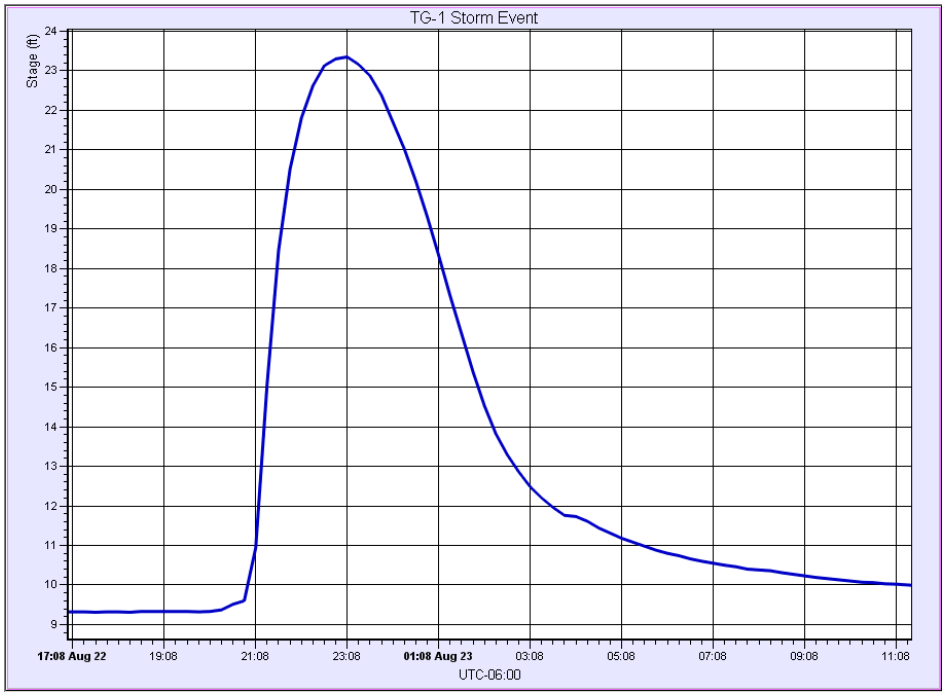
1/3/2018
LT-1

1/3/2018
LT-1

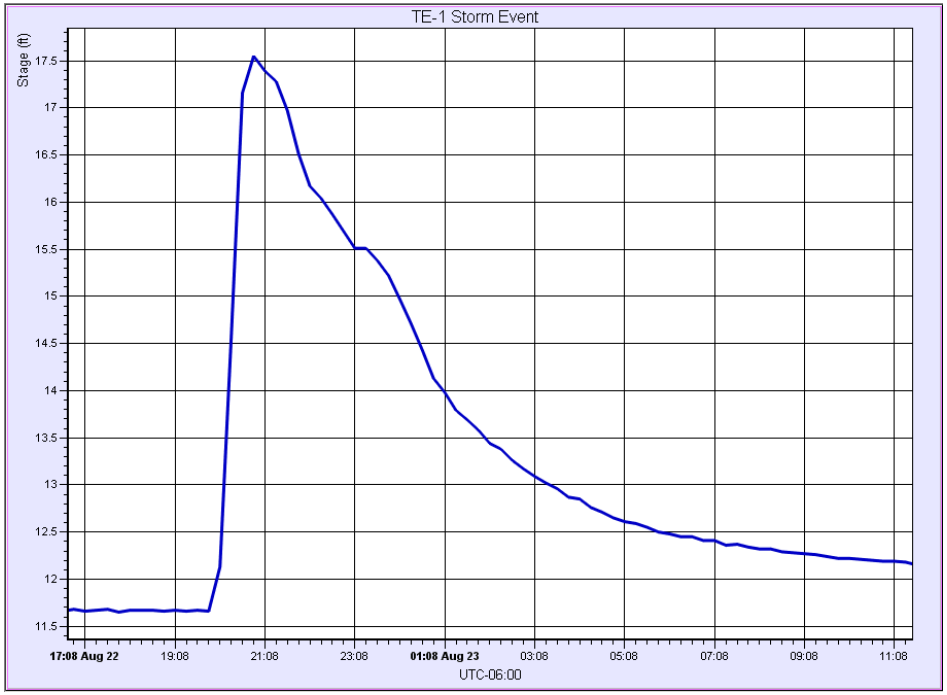
Vandalism

- CC-1
  - Solar panel August 2016
  - Gauge box August 2016
- LRC-1
  - Gauge box October 2016
- LDB-1
  - Solar panel June 2017

Storm Events



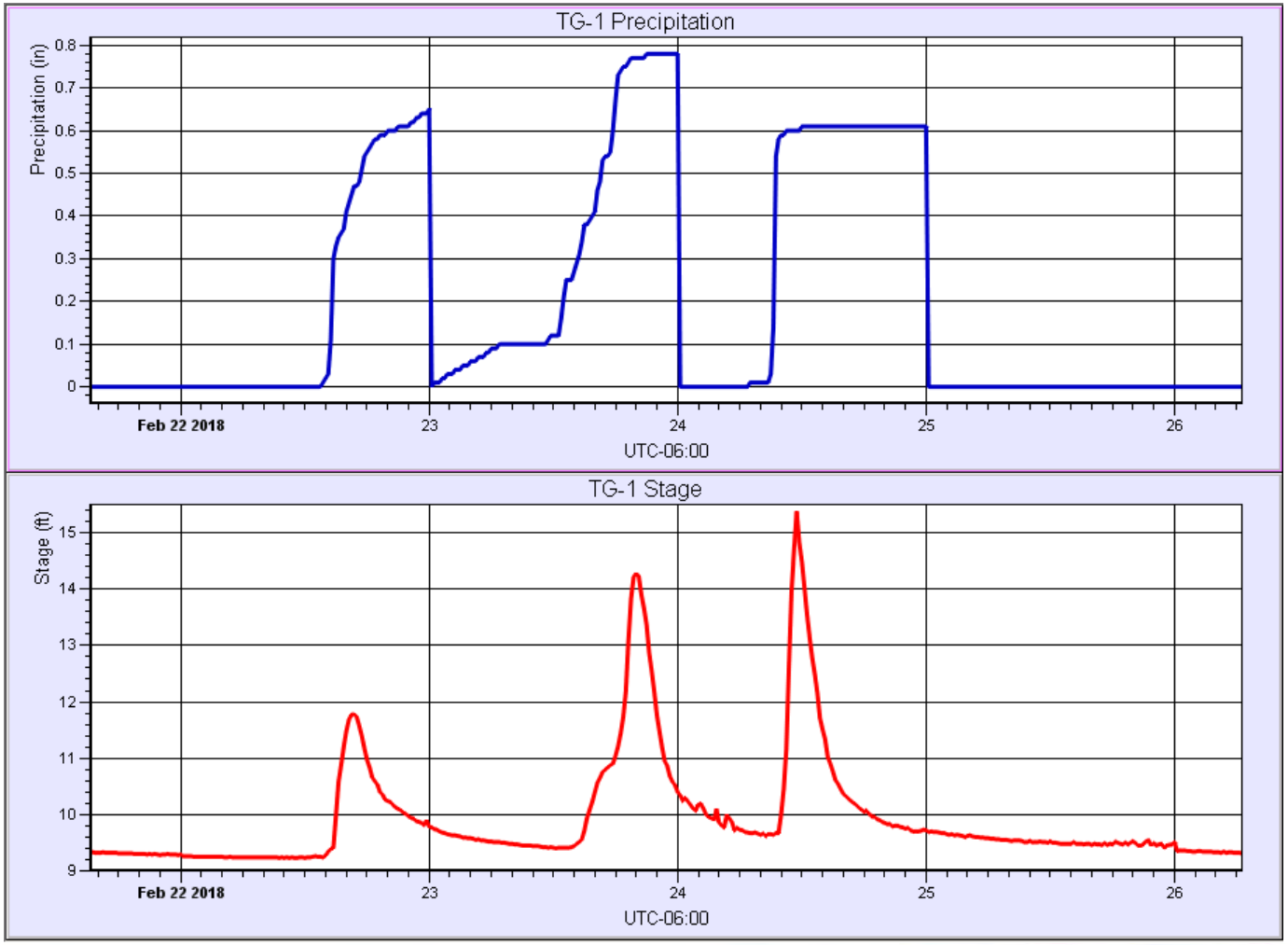
Total precipitation: 3.06 inches



Total Precipitation: 3.69 inches

OWRB
the water agency

Storm Events Cont.



TG-1

6/14/2016

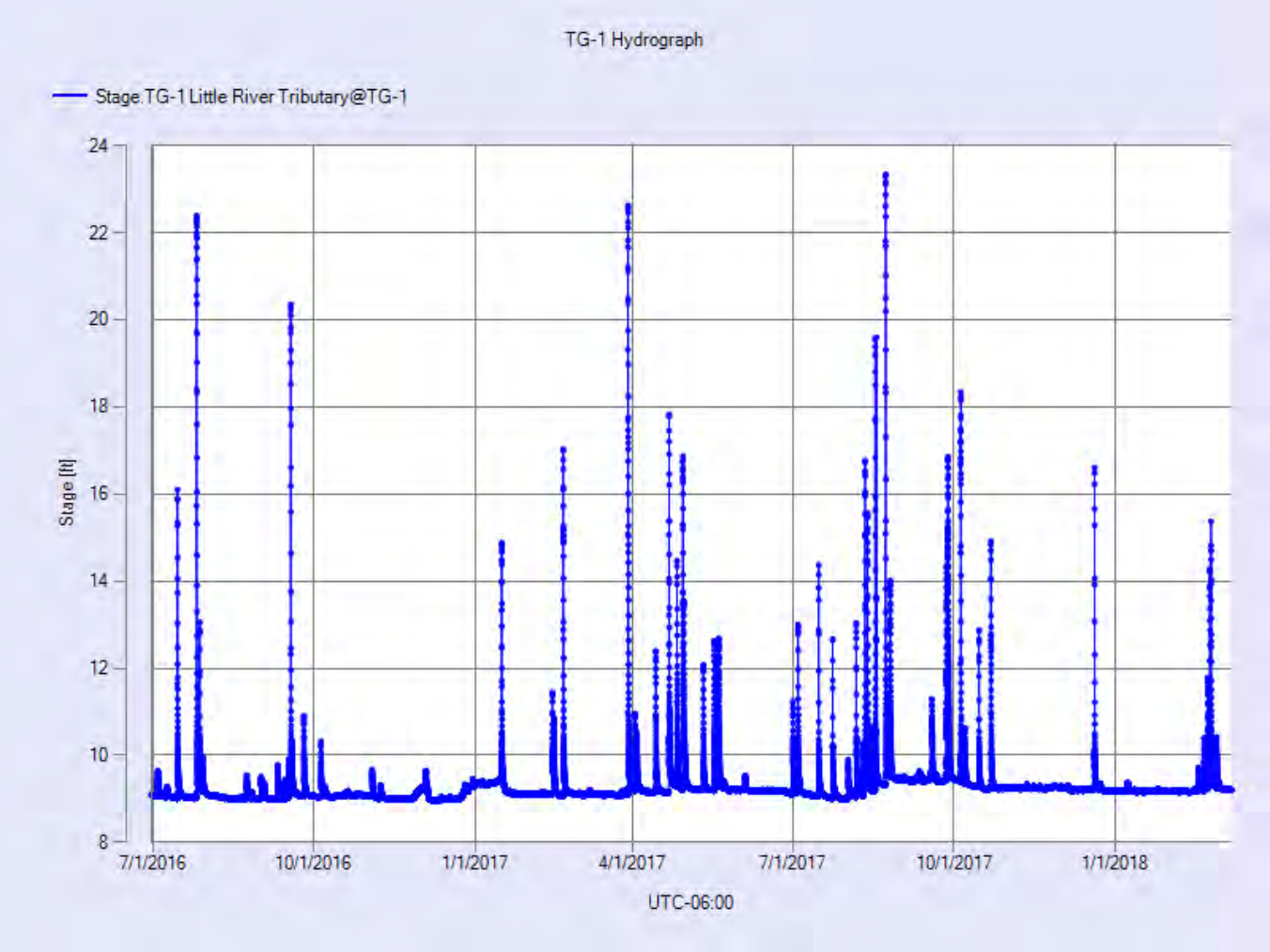
2/24/2018

Autosamplers

JOBOX® housing the autosampler

Isco Avalanche® refrigerated sampler

Trigger Points



Base = 9.3

Trigger 1 = 13.5

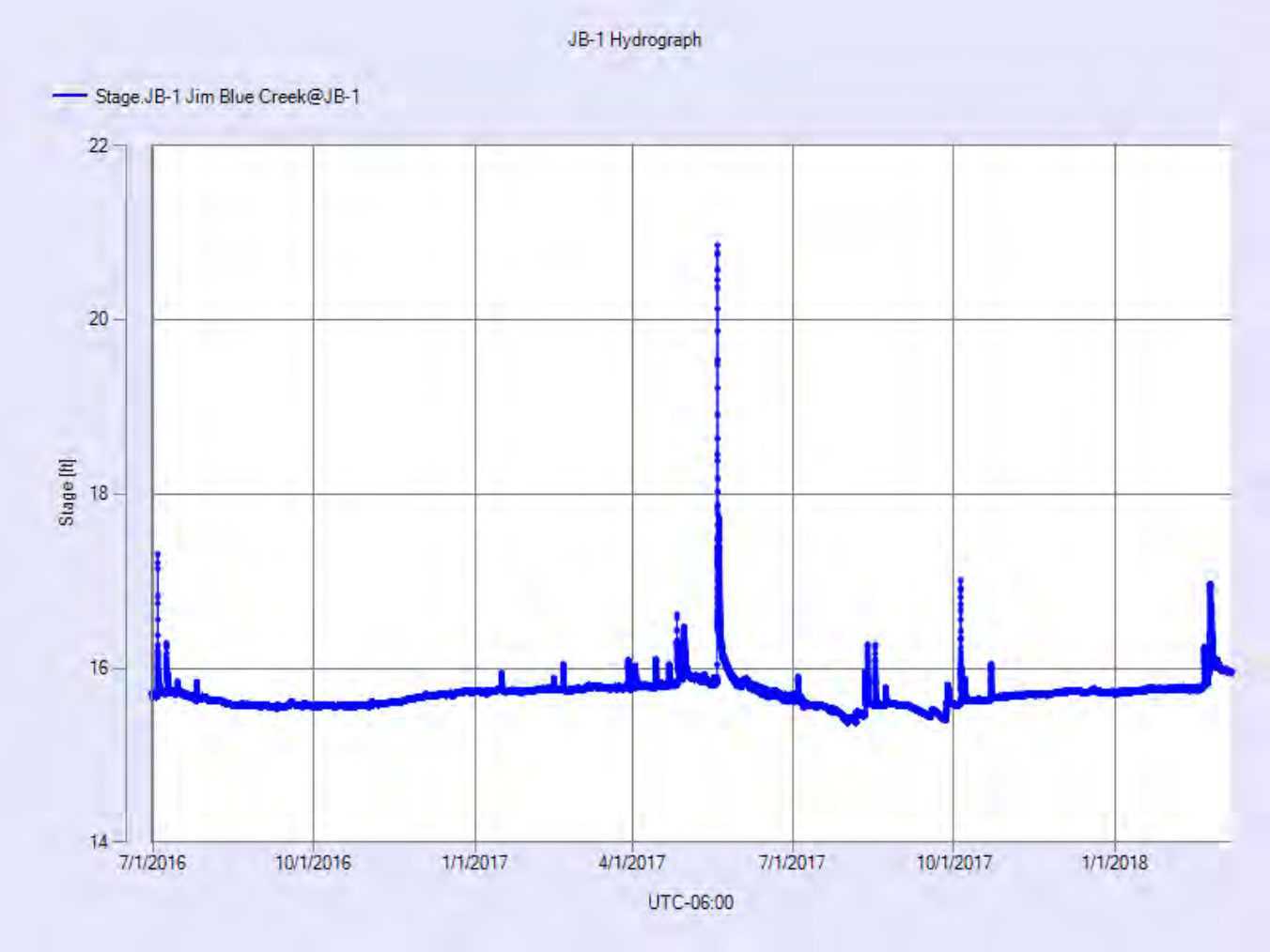
Trigger 2 = 15

Trigger 3 = 16.5

Trigger 4 = 20

OWRB
the water agency

Trigger Points Cont.



Base = 15.75

Trigger 1 = 15.9

Trigger 2 = 16.1

Trigger 3 = 16.4

Trigger 4 = 16.8

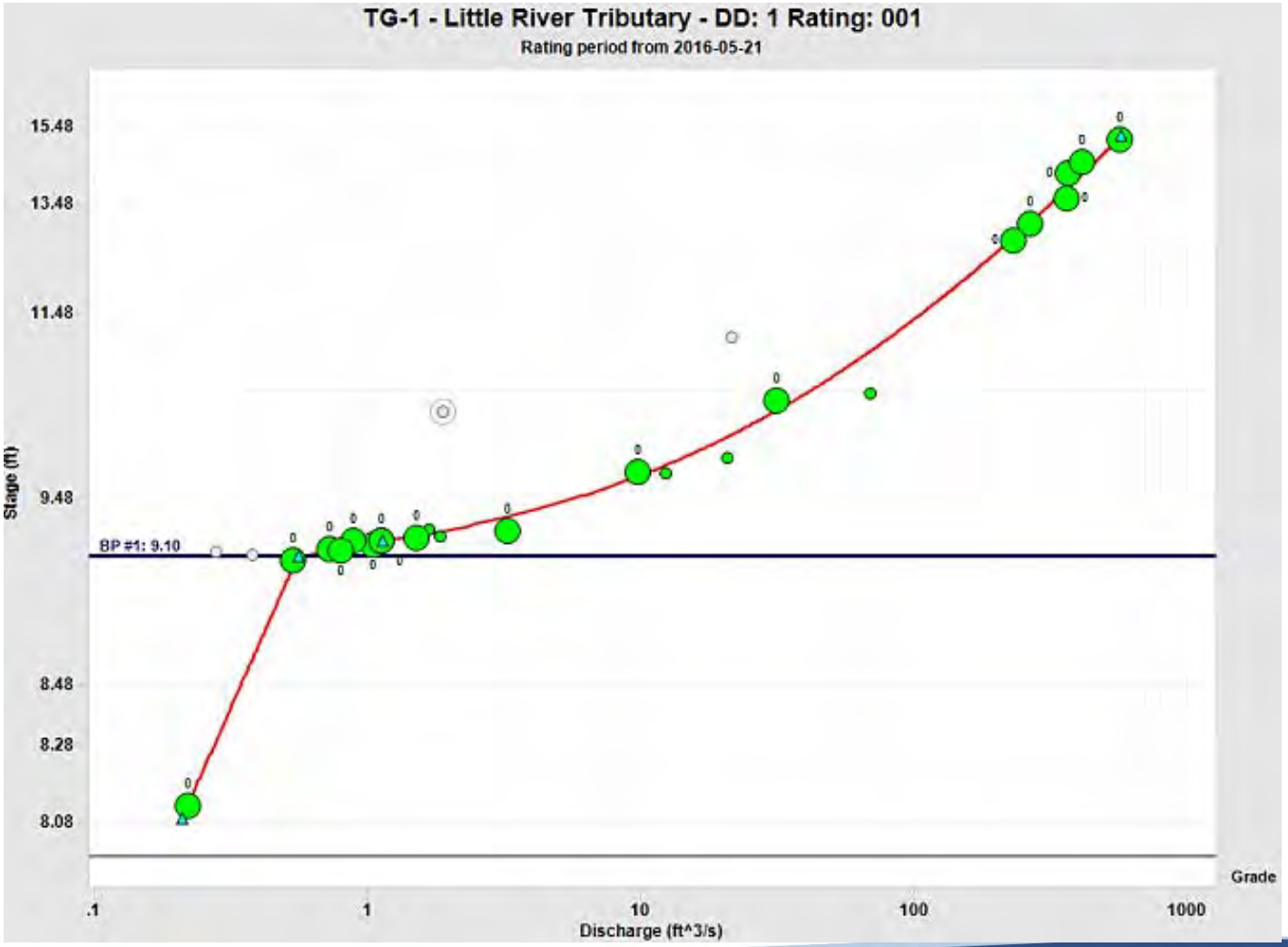
OWRB
the water agency

JB-1

12/21/2016

2/24/2018

Rating Curve Development



OWRB
the water agency

TE-1

1/24/2018

2/24/2018

WC-1

6/14/2016

2/24/2018

URC-2

8/8/2016

2/24/2018

LRC-1

10/24/2016

2/24/2018

LDB-1

12/21/2016

6/15/2016

UDB-1

8/9/2016

2/24/2018

Conclusion

- After 3 years a baseline for sediment/nutrient concentrations will be established
- After 5 years trend analysis will track the effectiveness of the Compliance Plan
  - Identify critical areas
  - Make revisions/updates as necessary
- Reduce sediment/nutrient load to potentially remove Lake Thunderbird from the 303(d) list

Questions?

Sarah Dexter

Streams Monitoring Specialist

Water Quality Division

Oklahoma Water Resources Board

sarah.dexter@owrb.ok.gov

www.owrb.ok.gov

OWRB
the water agency