



Water Quality Trends Update

North Bosque River

Texas Institute for Applied Environmental Research
October 4, 2021

Waste Application Fields

- TIAER annually reviews TCEQ inspection data and does drive-by assessments of CAFOs and AFOs
- WAFs associated with AFOs are determined to be either “Active” or “Historical” based on the AFO’s operational status
- “Active” and “Historical” status for WAFs associated with CAFOs is determined based on TCEQ permit information

Active vs. Historical WAFs

- “Active” indicates a WAF is currently permitted to receive waste
- “Historical” indicates that a WAF no longer has waste applied due to:
 - Expired permit
 - Facility is no longer operational
 - Soil phosphorus limit reached
 - Other change in the designated use of the field

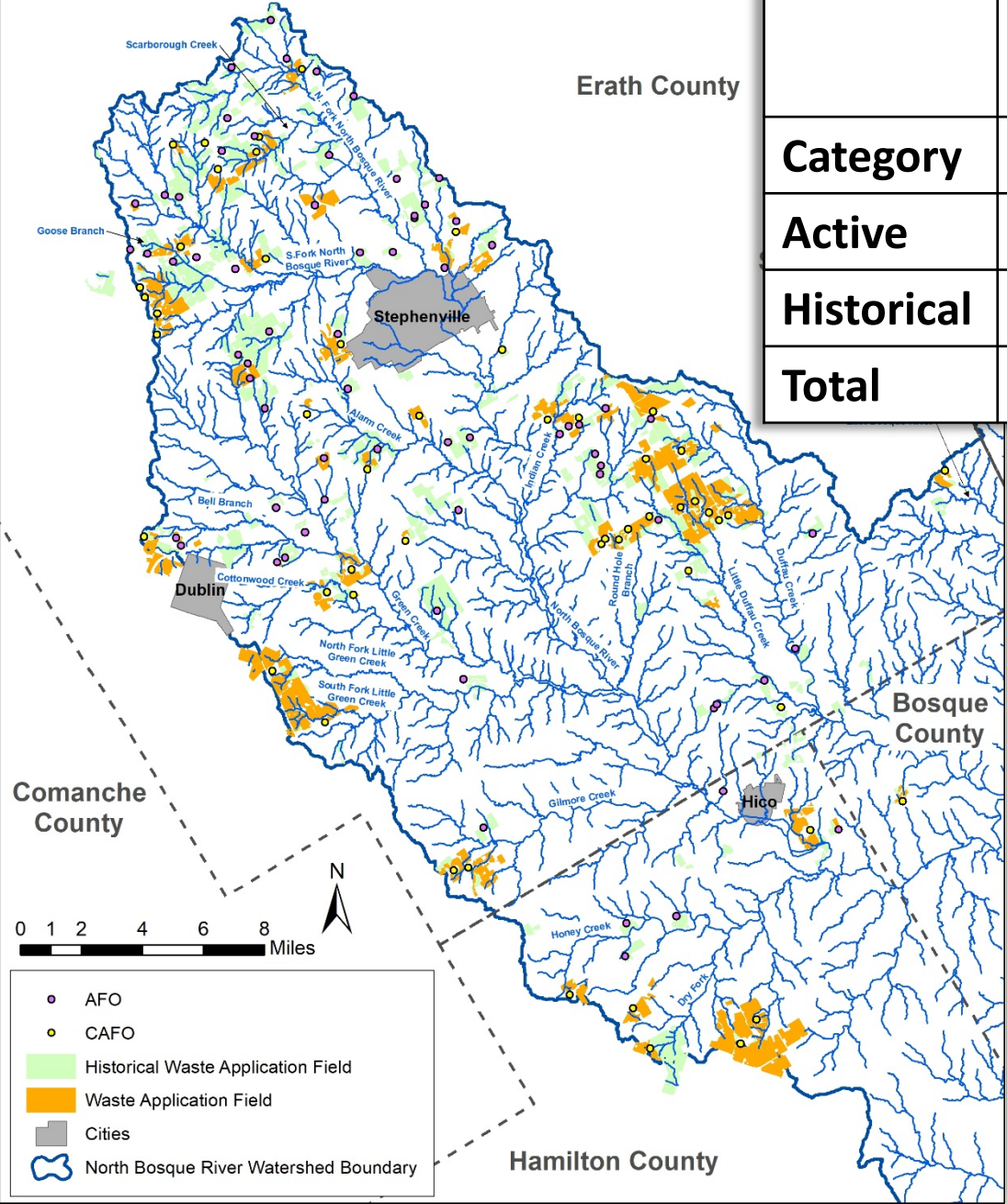
Tolar

	2000 WAFs	2020 WAFs	
Category	Acres	Acres	Change
Active	24,554	14,122	-43%
Historical	2,142	19,622	816%
Total	26,696	33,744	26%

Changes in Land Use

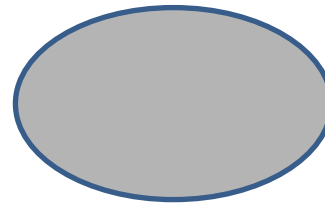
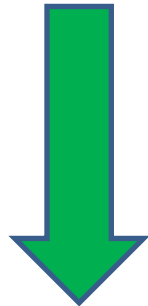
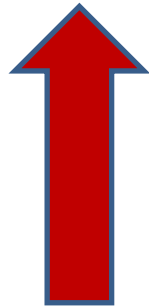
Map represents conditions as of fall 2020

WAF = waste application field



Trends -

Is water quality improving?

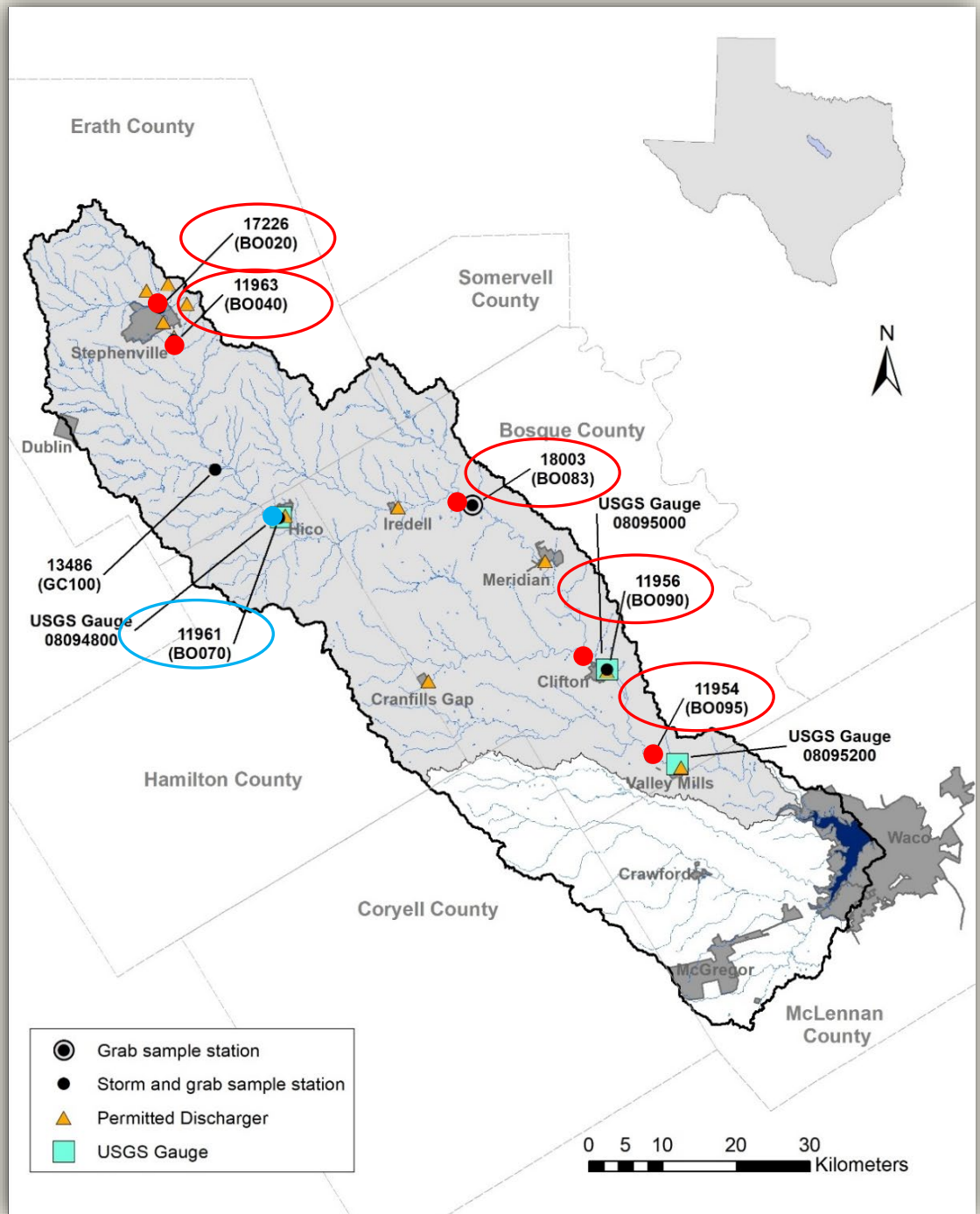


Sample Collection

- Routine Grab Samples for nutrients, chlorophyll- α , and TSS are collected bi-weekly at two stations and monthly at five stations
- *E. coli* samples are collected monthly at all stations
- Storm influenced samples are collected quarterly when possible







North Bosque Monitoring Stations

Index
Stations
circled in
Red



Phosphorus Trends:

North Bosque River Index Stations (+1)

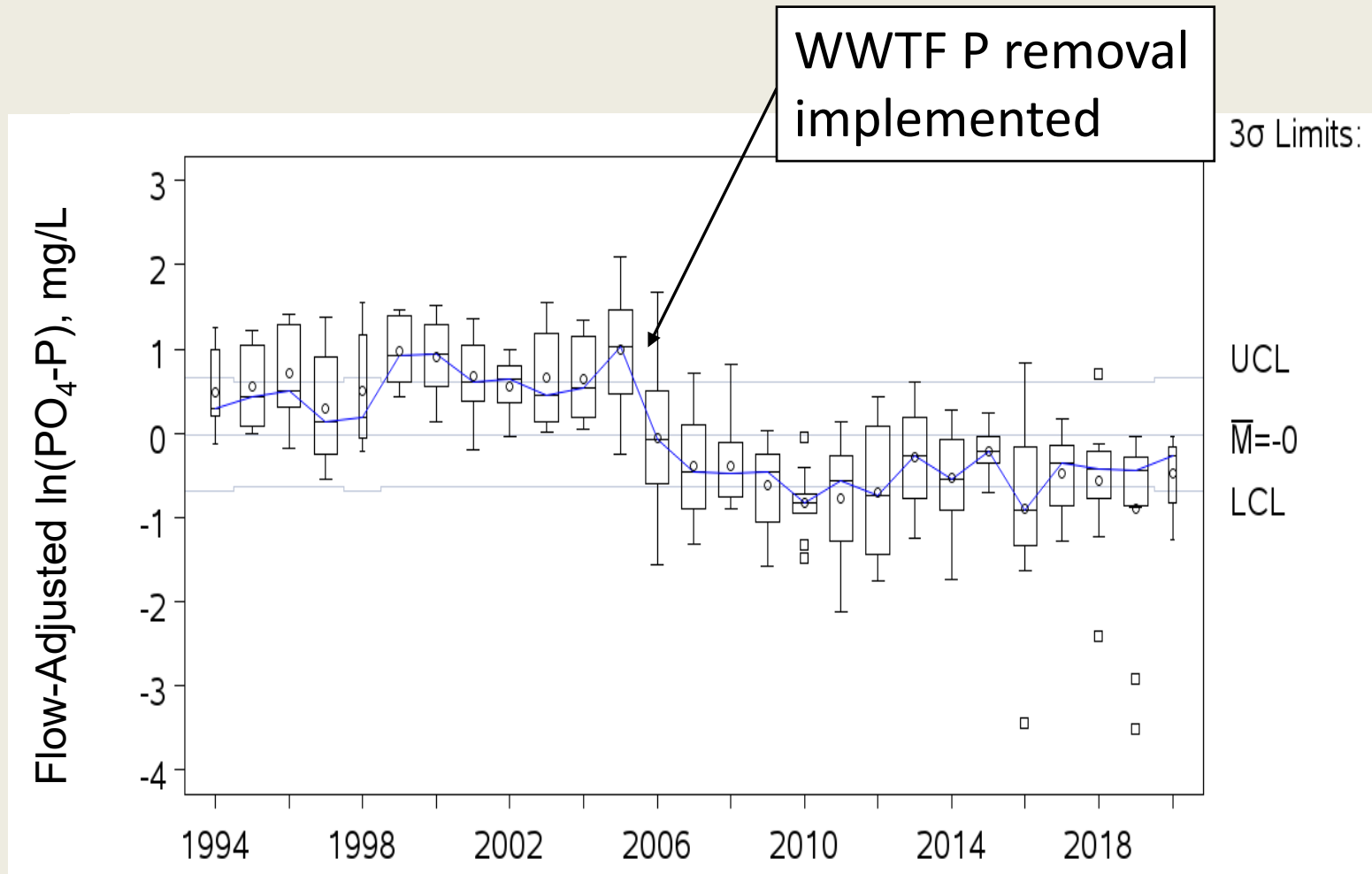
TIAER	TCEQ	Location	Period	SRP	Total P
BO020	17226*	Above Stephenville	1997-2020		
BO040	11963	Below Stephenville	1994-2020		
BO070	11963**	Near Hico	1993-2020		
BO083	18003***	Near Iredell	2003-2020		
BO090	11956	Near Clifton	1996-2020		
BO095	11954	Near Valley Mills	1996-2020		

* Downward trend is slight

** Not a designated Index Station

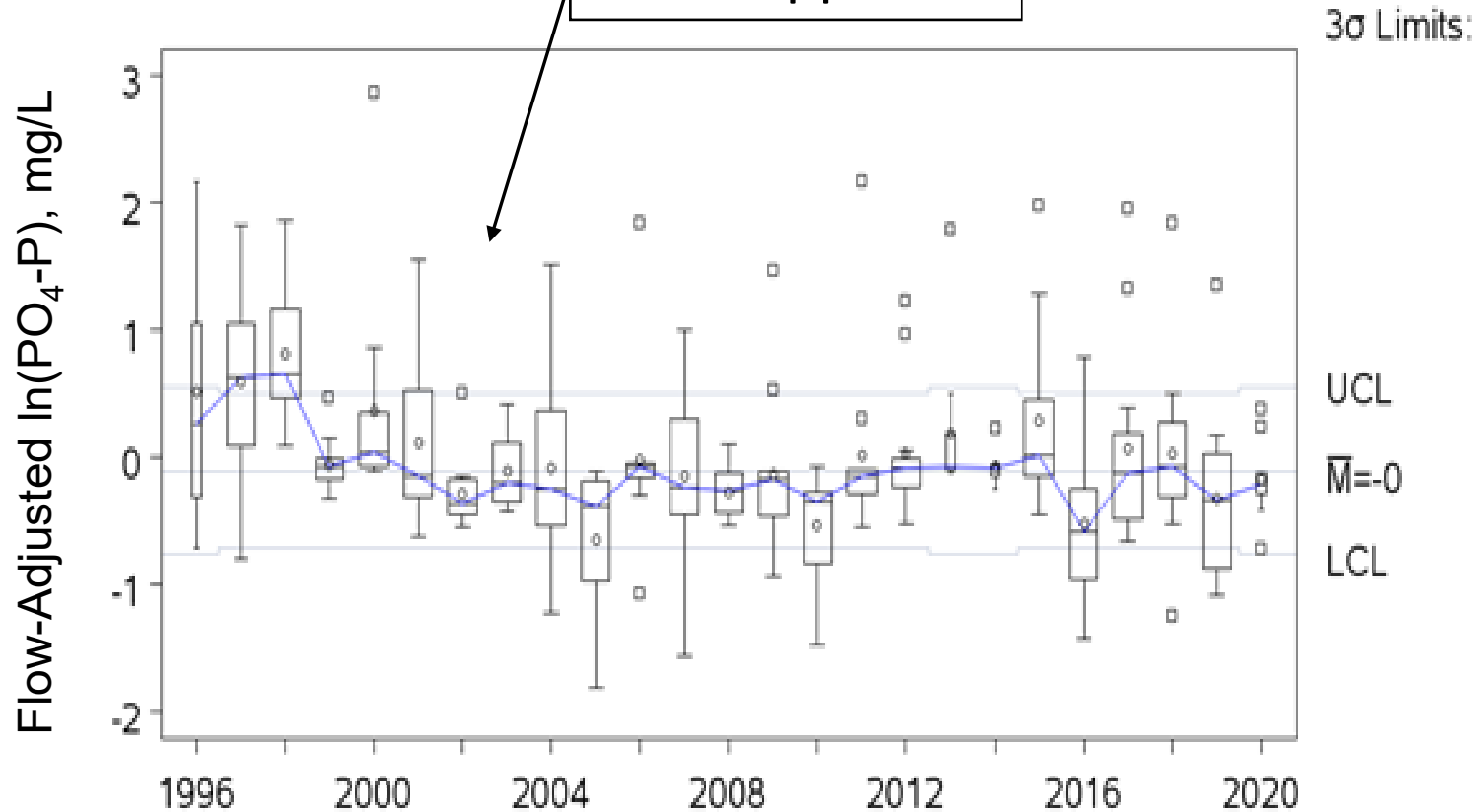
*** Limited flow data at station 18003

Water Quality Trends: BO040 below Stephenville



Water Quality Trends: BO095 near Valley Mills

I-Plan Approved

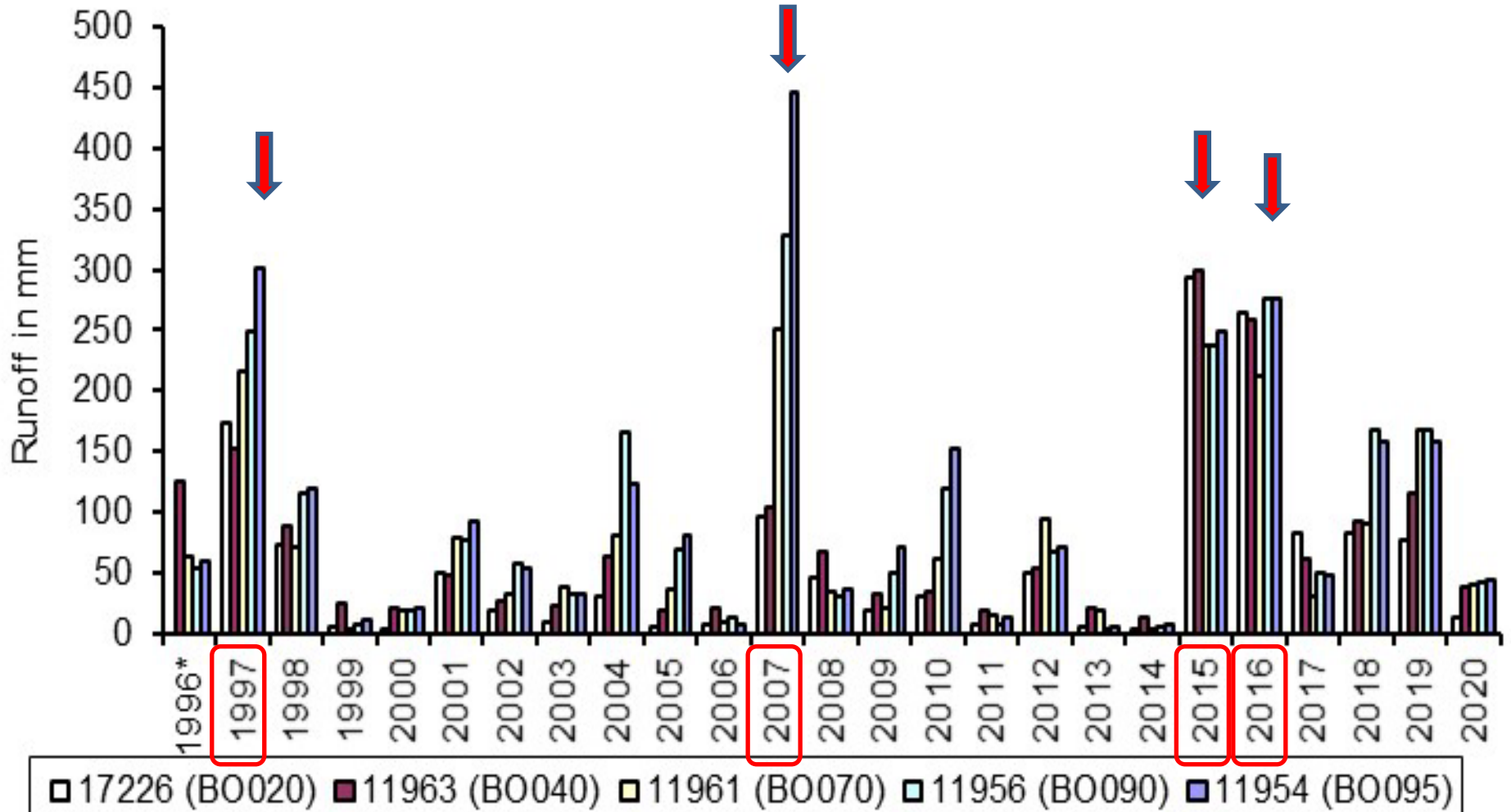


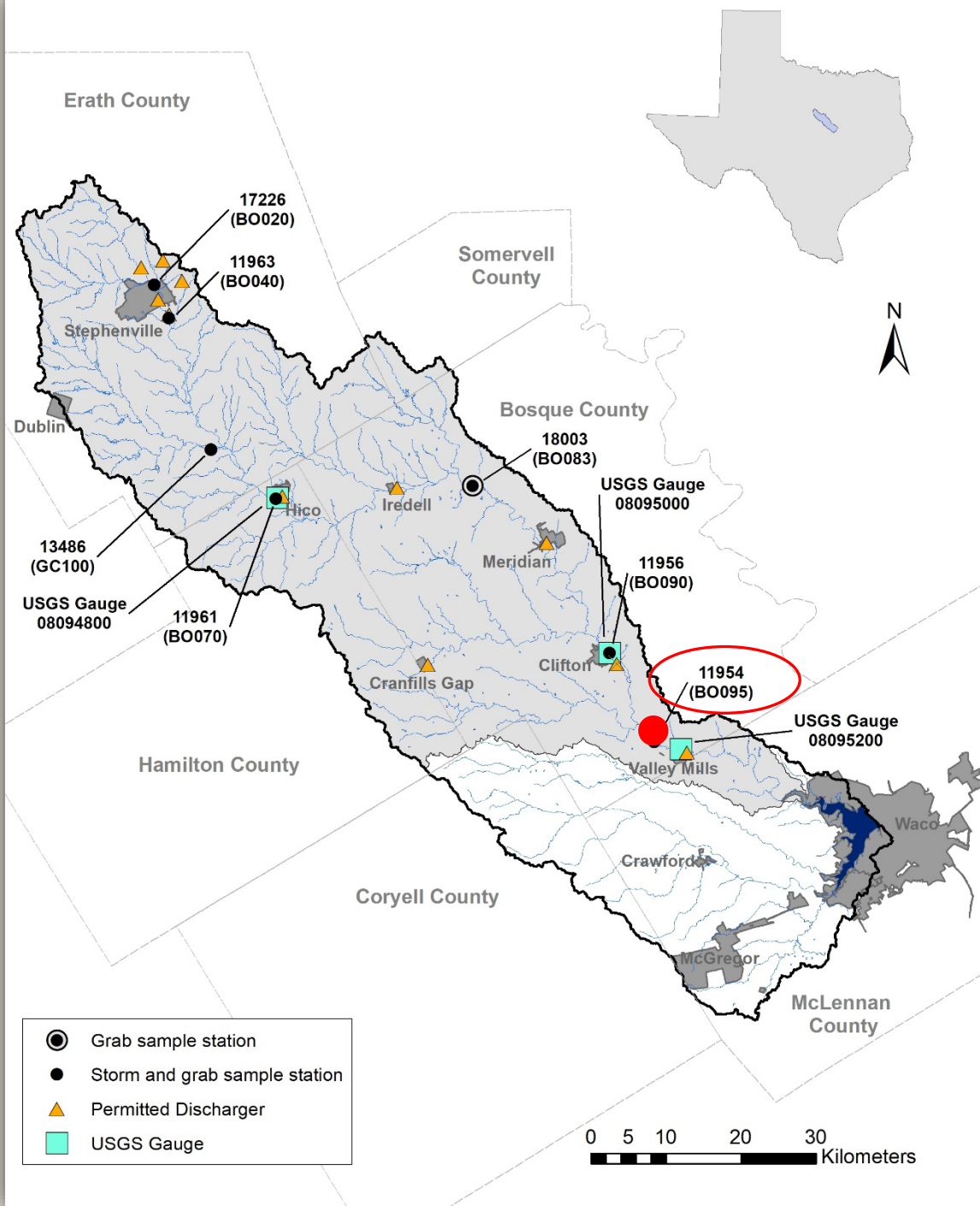
Have we met target goals?



Not entirely, but getting close

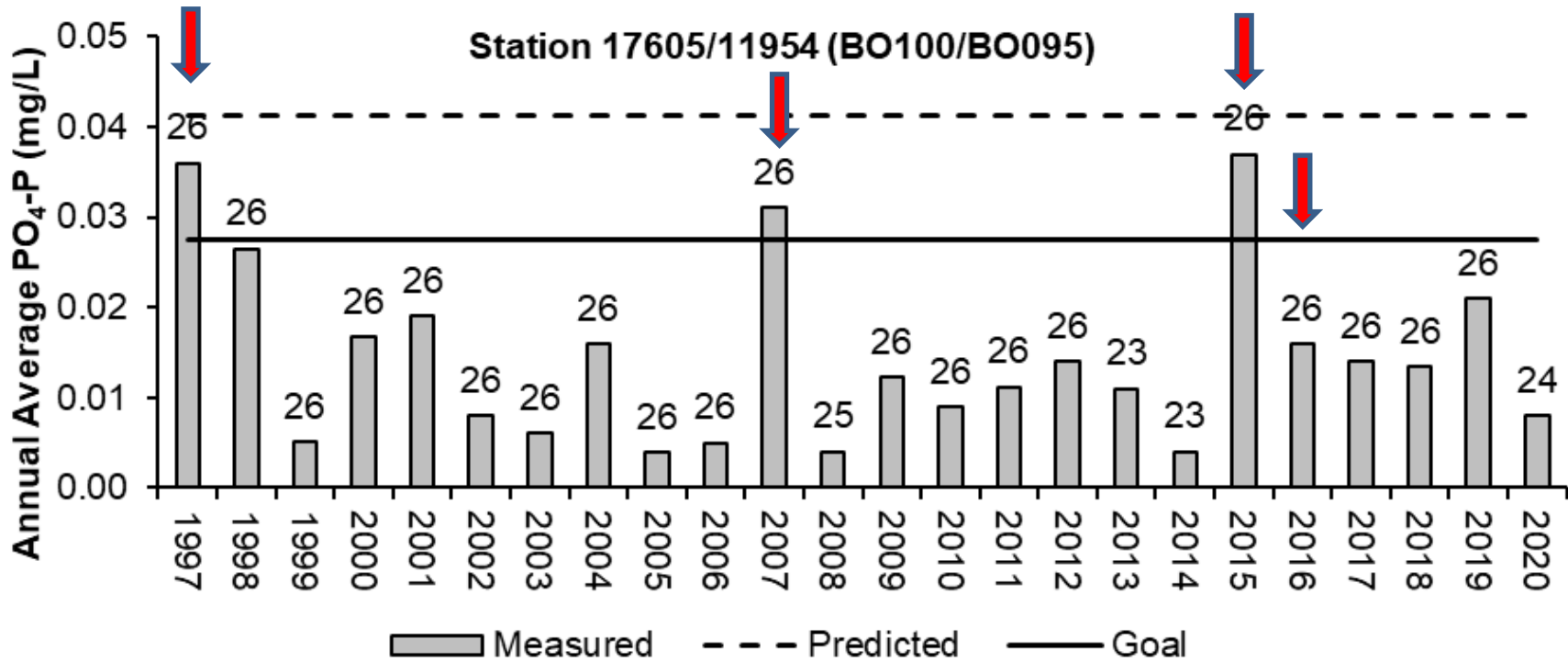
Normalized Runoff Volume





- Grab sample station
- Storm and grab sample station
- ▲ Permitted Discharger
- USGS Gauge

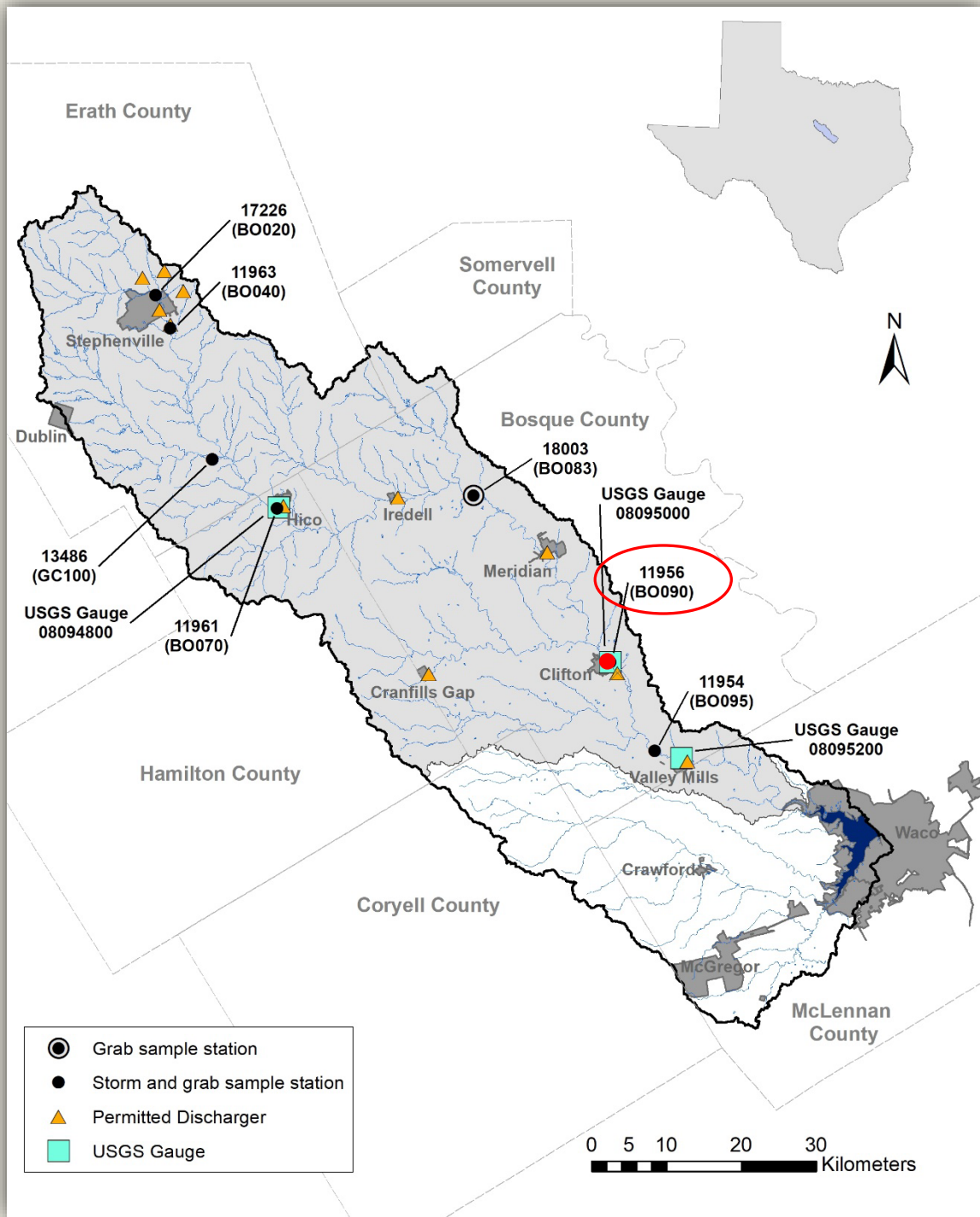
0 5 10 20 30 Kilometers

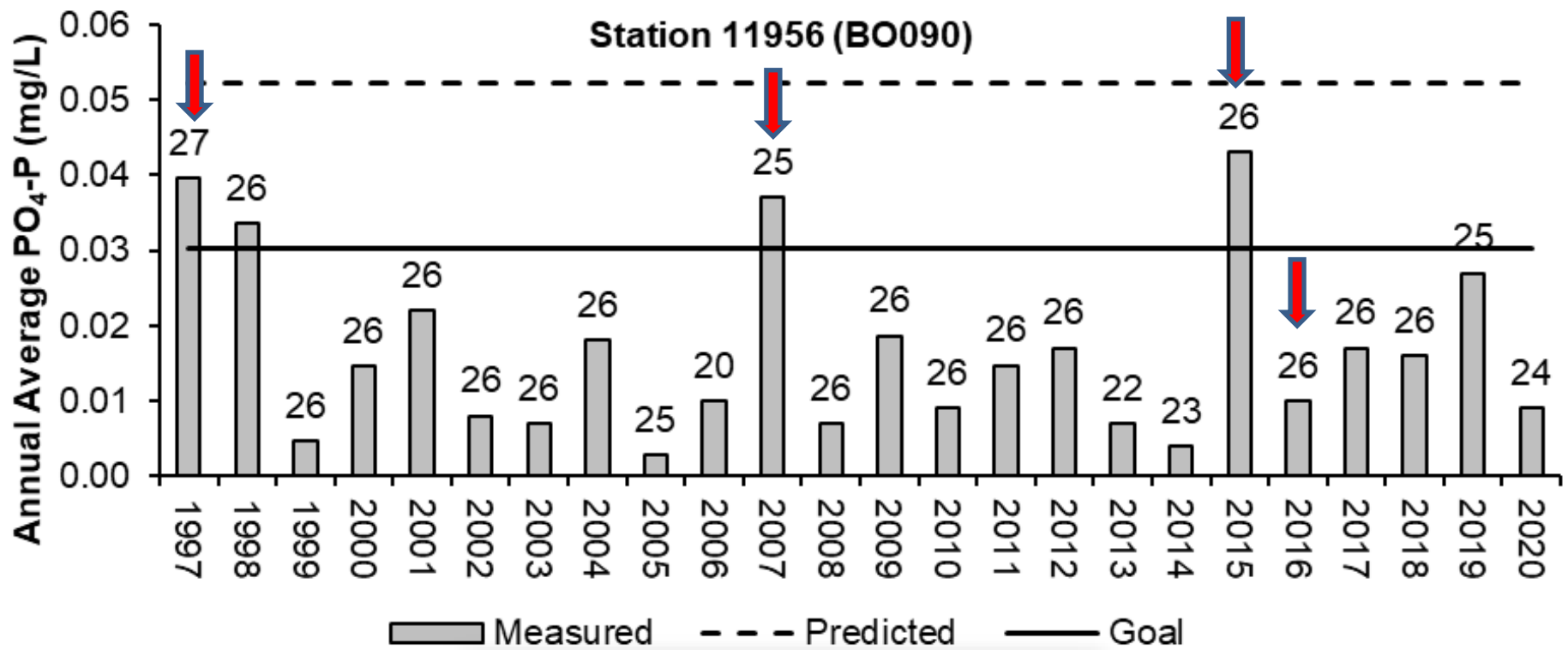


**North Bosque
May 29, 2015**



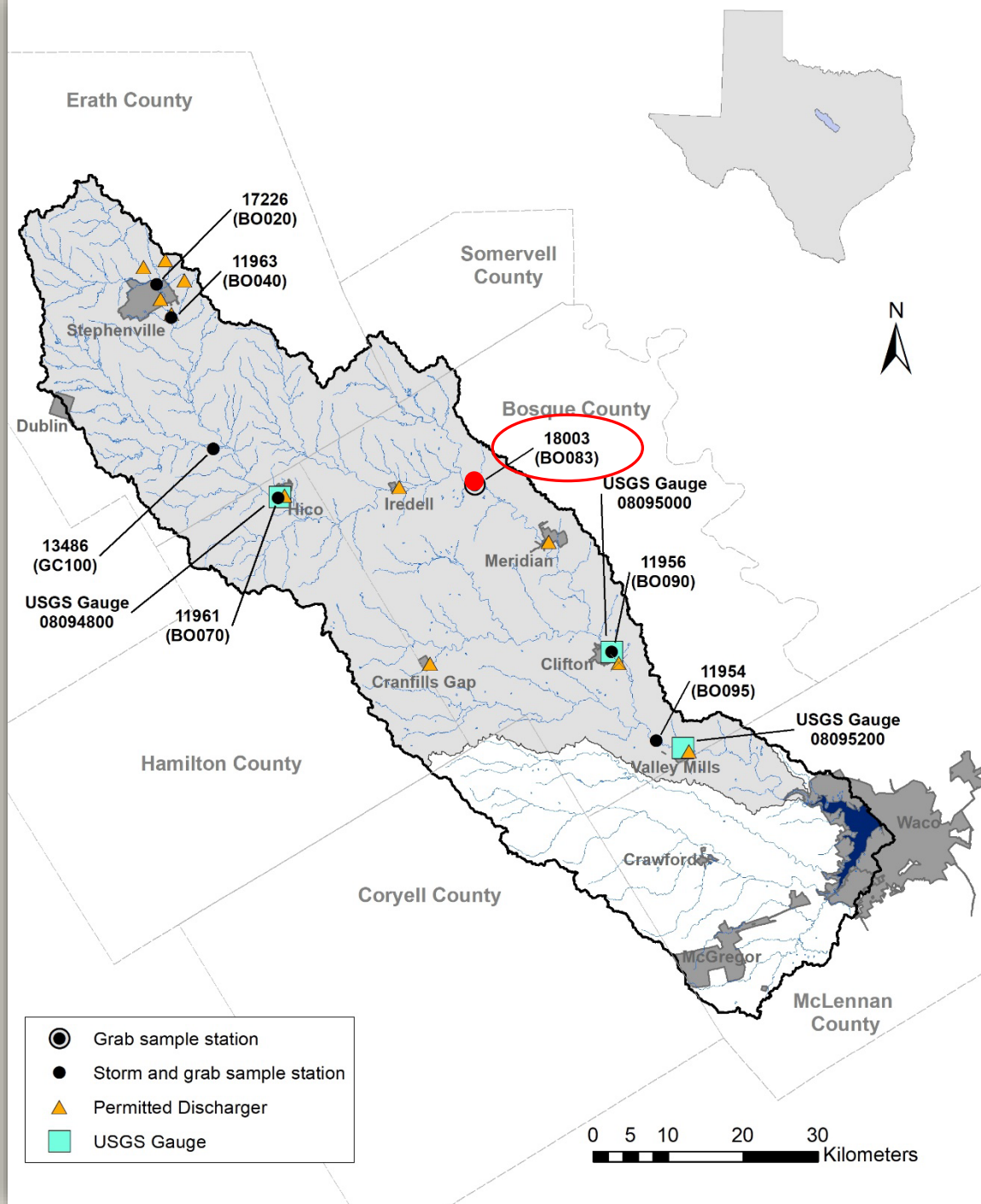
**Station
17605/11954
located near
Valley Mills**





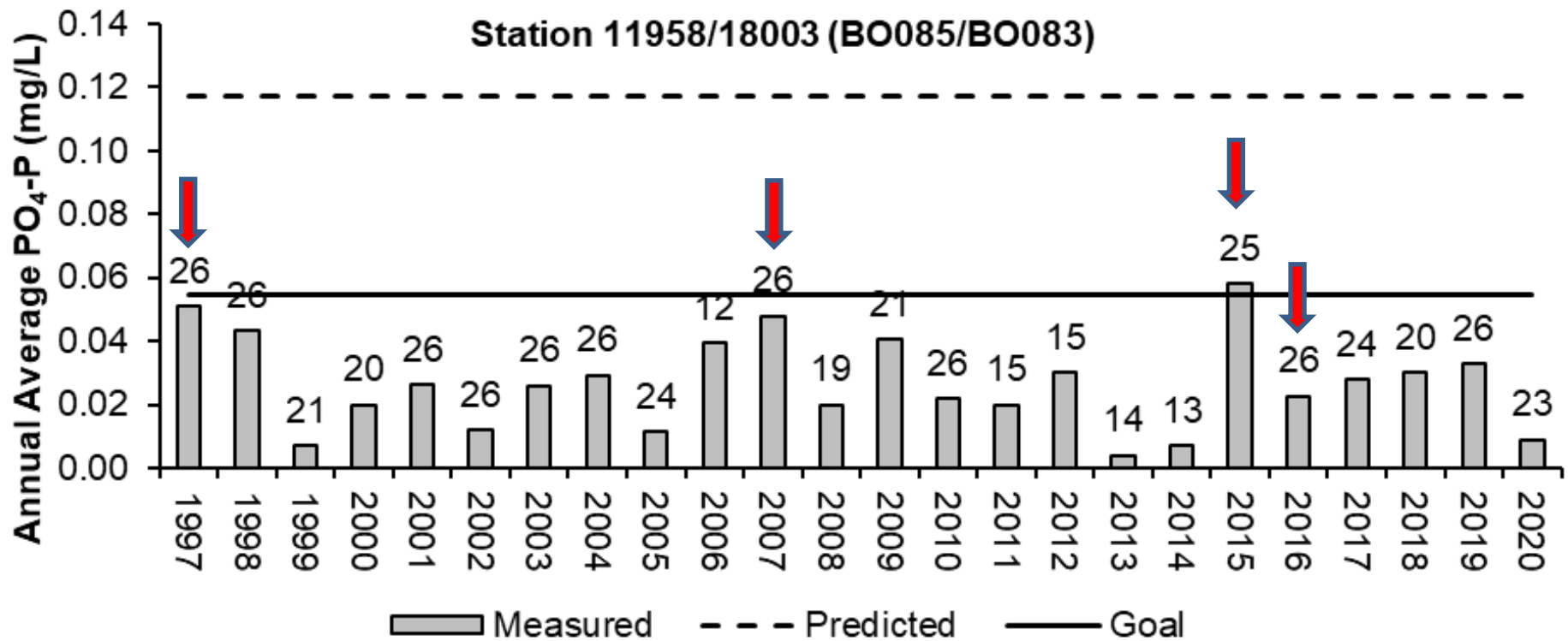
**Station 11956
located near
Clifton**





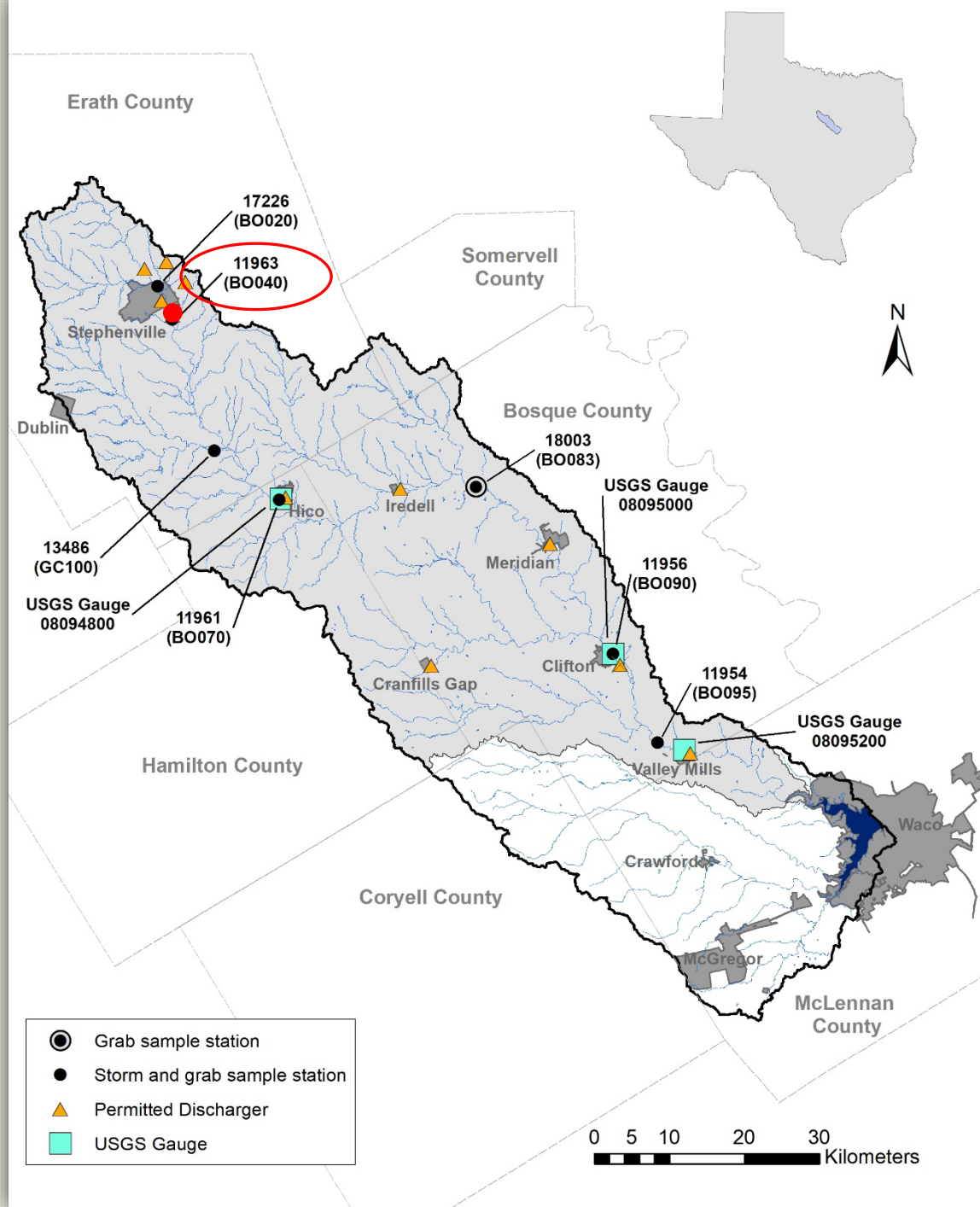
- Grab sample station
- Storm and grab sample station
- ▲ Permitted Discharger
- USGS Gauge

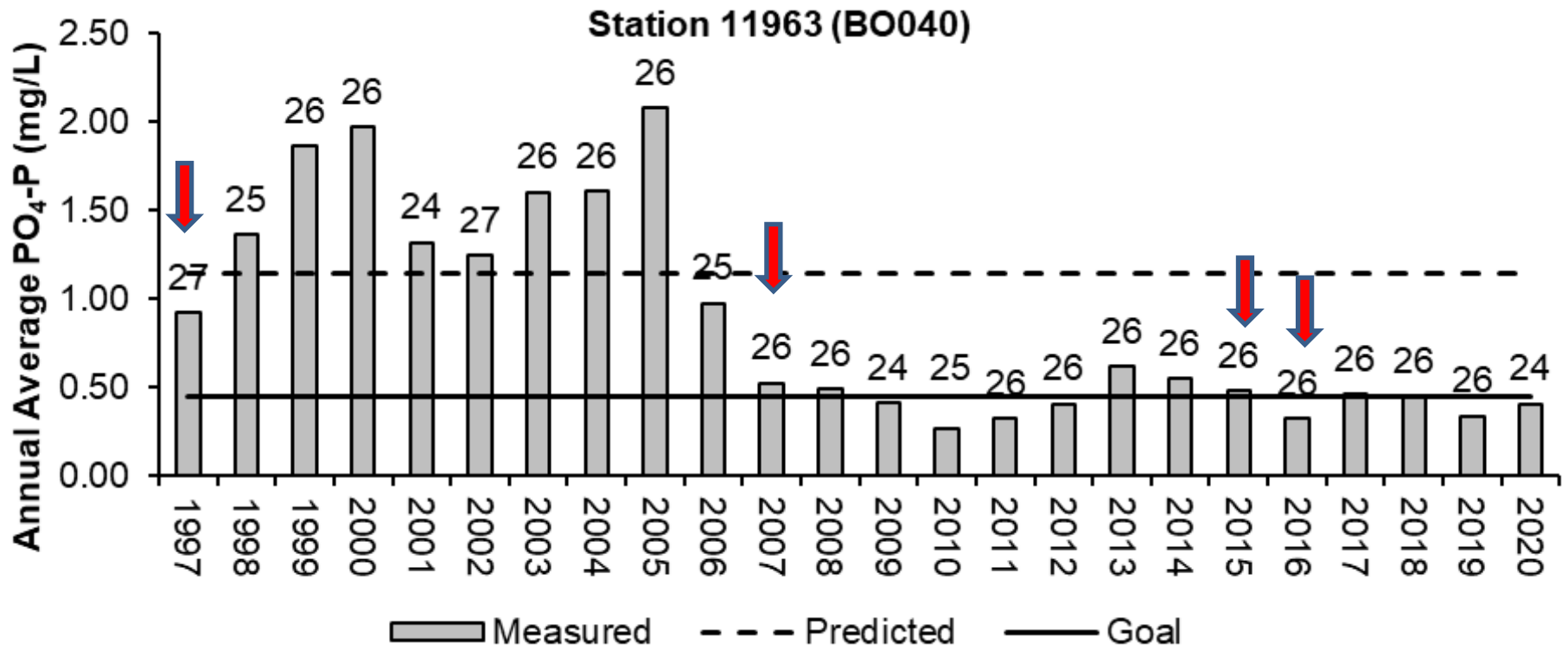
0 5 10 20 30
Kilometers



**Station
11958/18003
located near
Iredell**

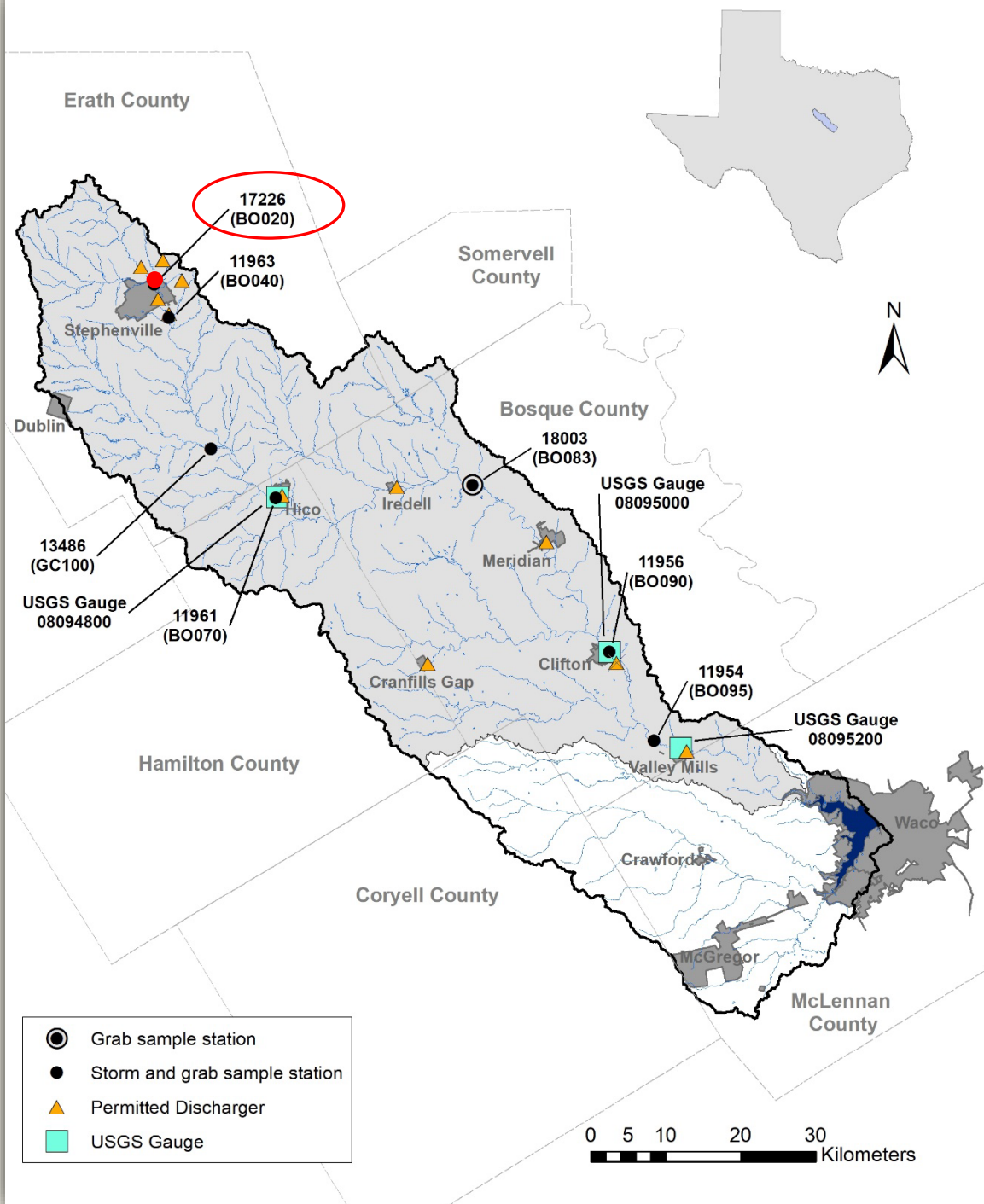


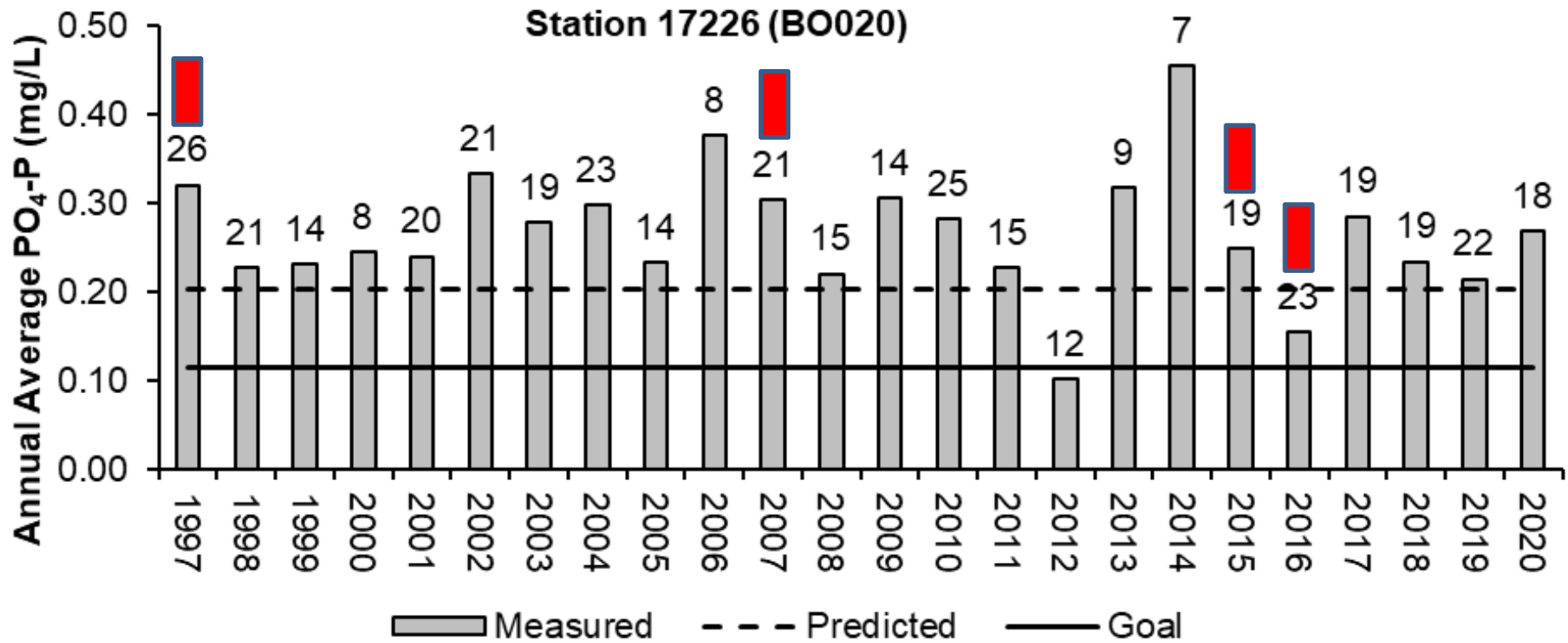




**Station 11963
located
below
Stephenville**







Station 17226
located
above
Stephenville



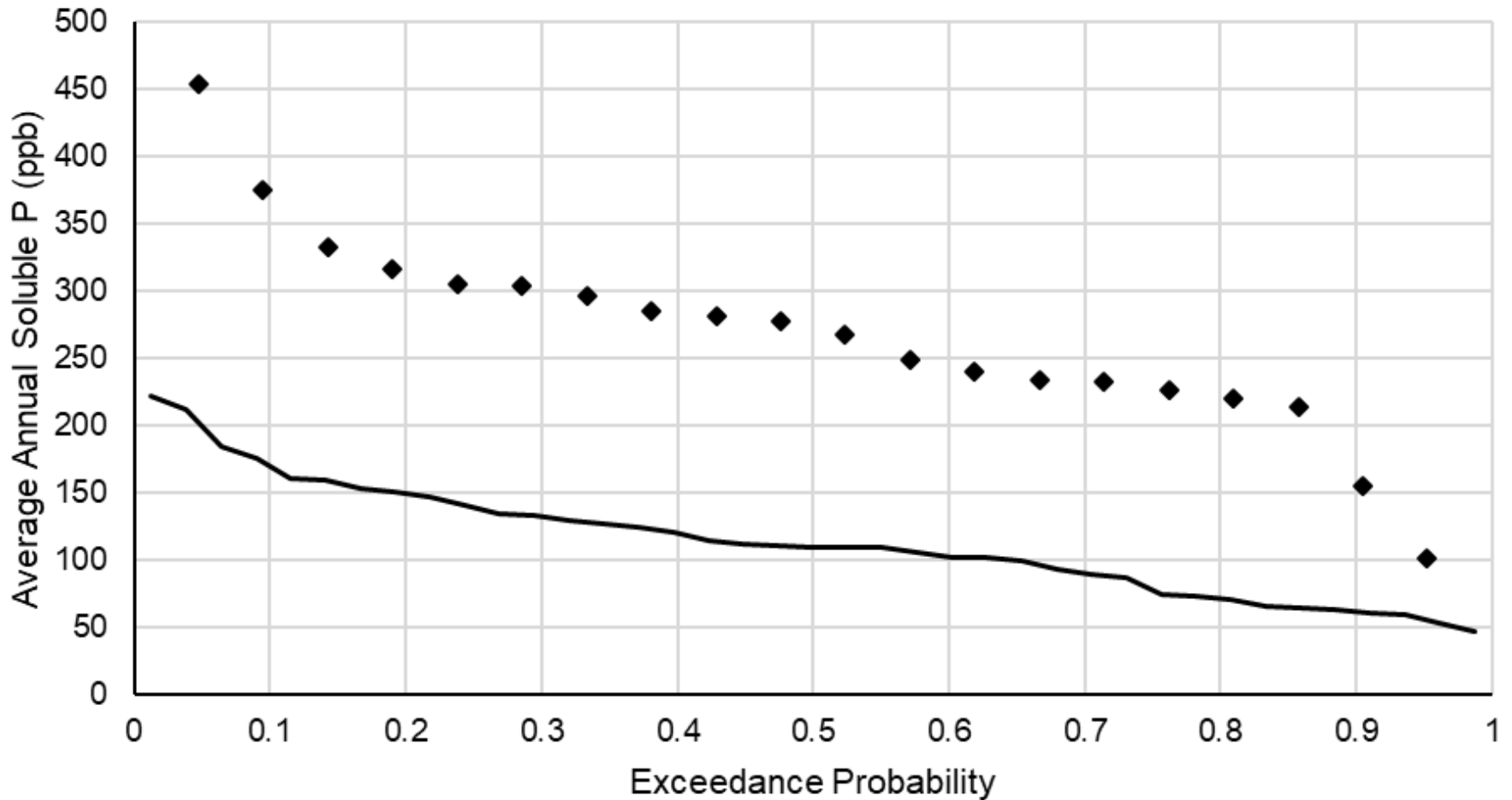
Probability Distribution Curves

The I-Plan indicates the following for determining success:

- If the monitored data curve is entirely below the model predicted TMDL-e curve, then water quality goal is being attained.
- If the monitored data curve is entirely above the predicted TMDL e-curve then the water quality goal is not being attained.
- Partial attainment occurs if the monitored data curve crosses the model predicted TMDL-e curve.

Station 17226 Above Stephenville

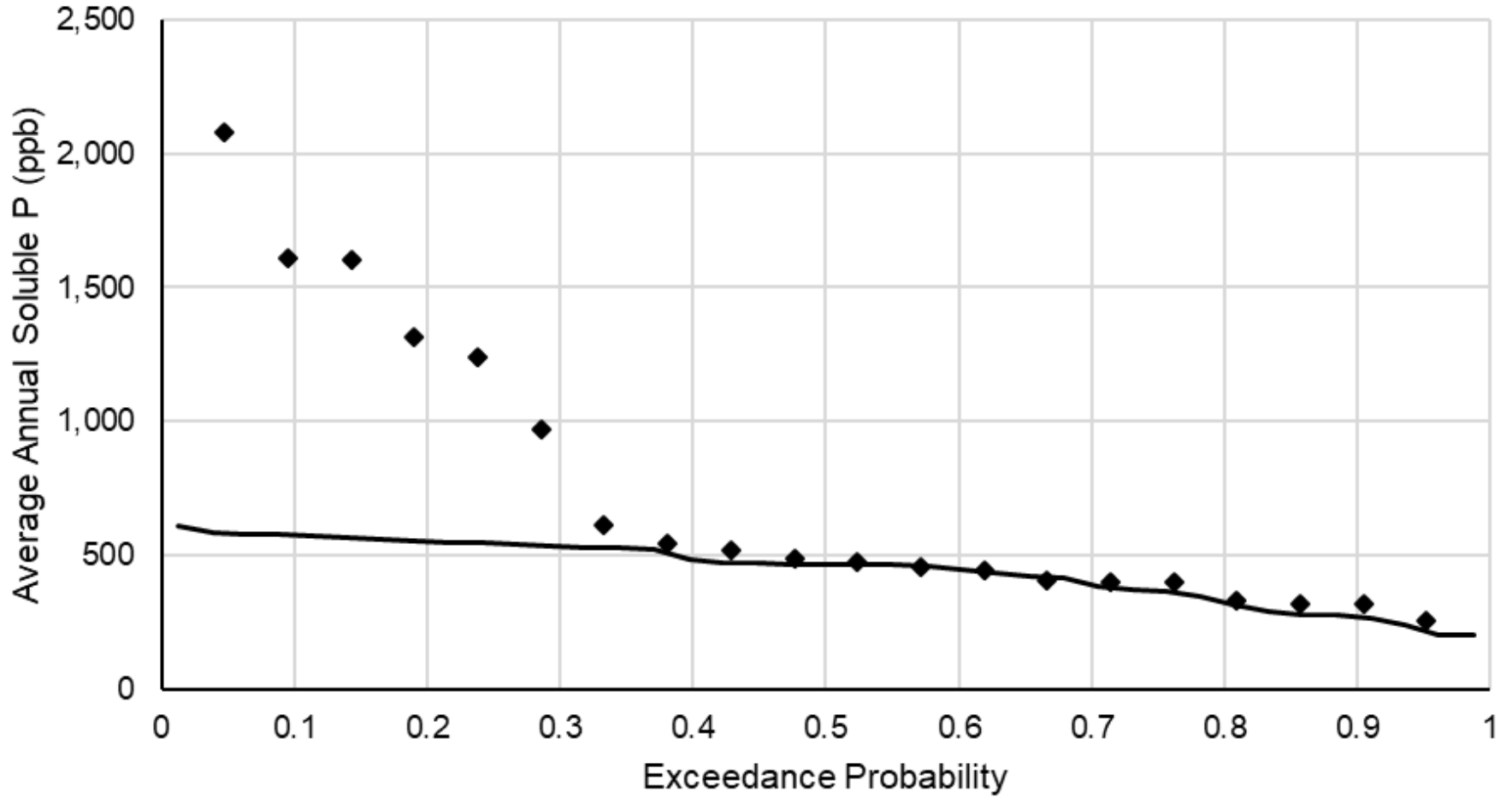
Above Stephenville



— TMDL-e ◆ Annual Avg. 2001-2020

Station 11963 Below Stephenville

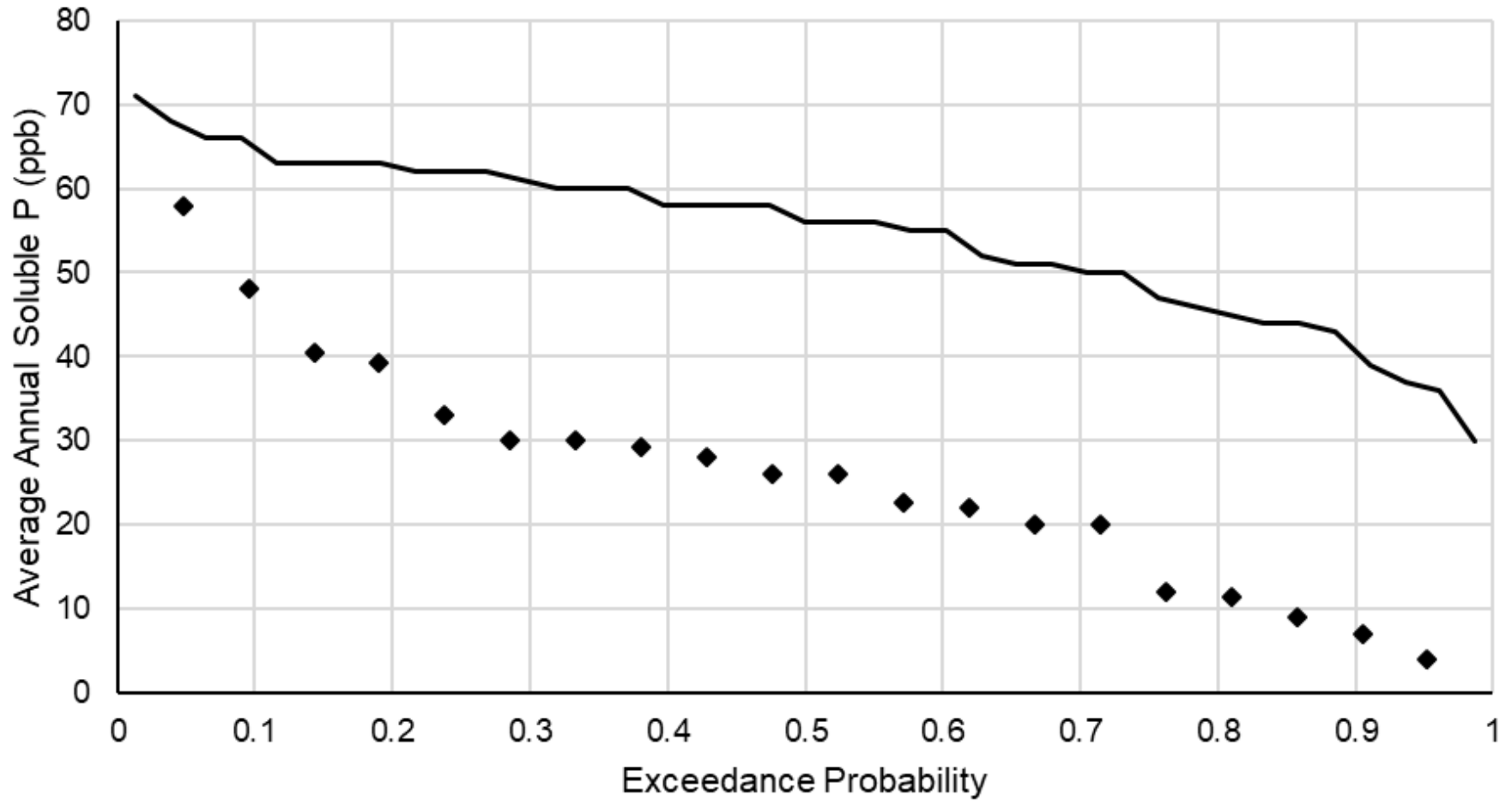
Below Stephenville



— TMDL-e ◆ Annual Avg. 2001-2020

Station 18003 Above Meridian

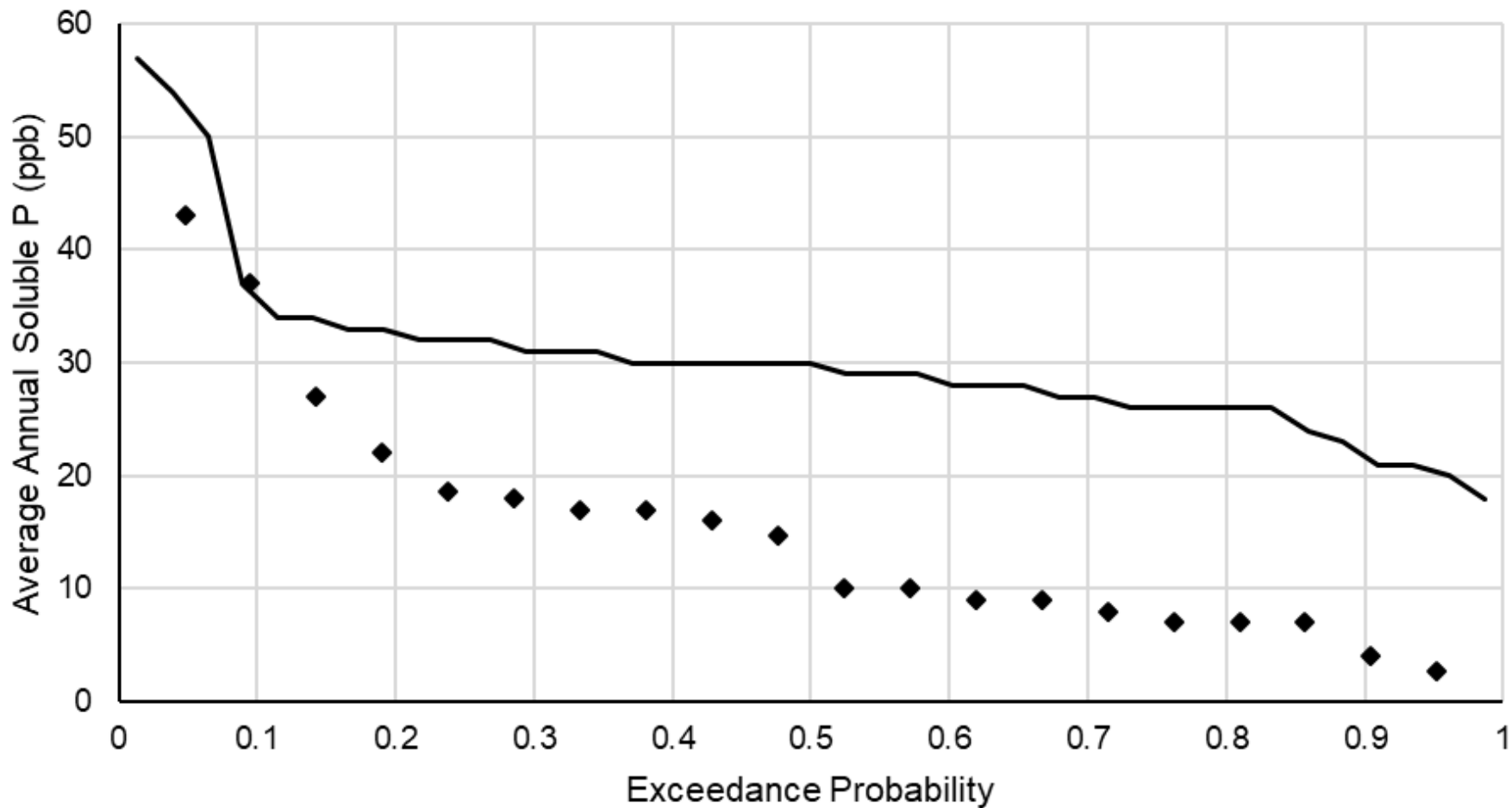
Above Meridian



— TMDL-e ◆ Annual Avg. 2001-2020

Station 11956 at Clifton

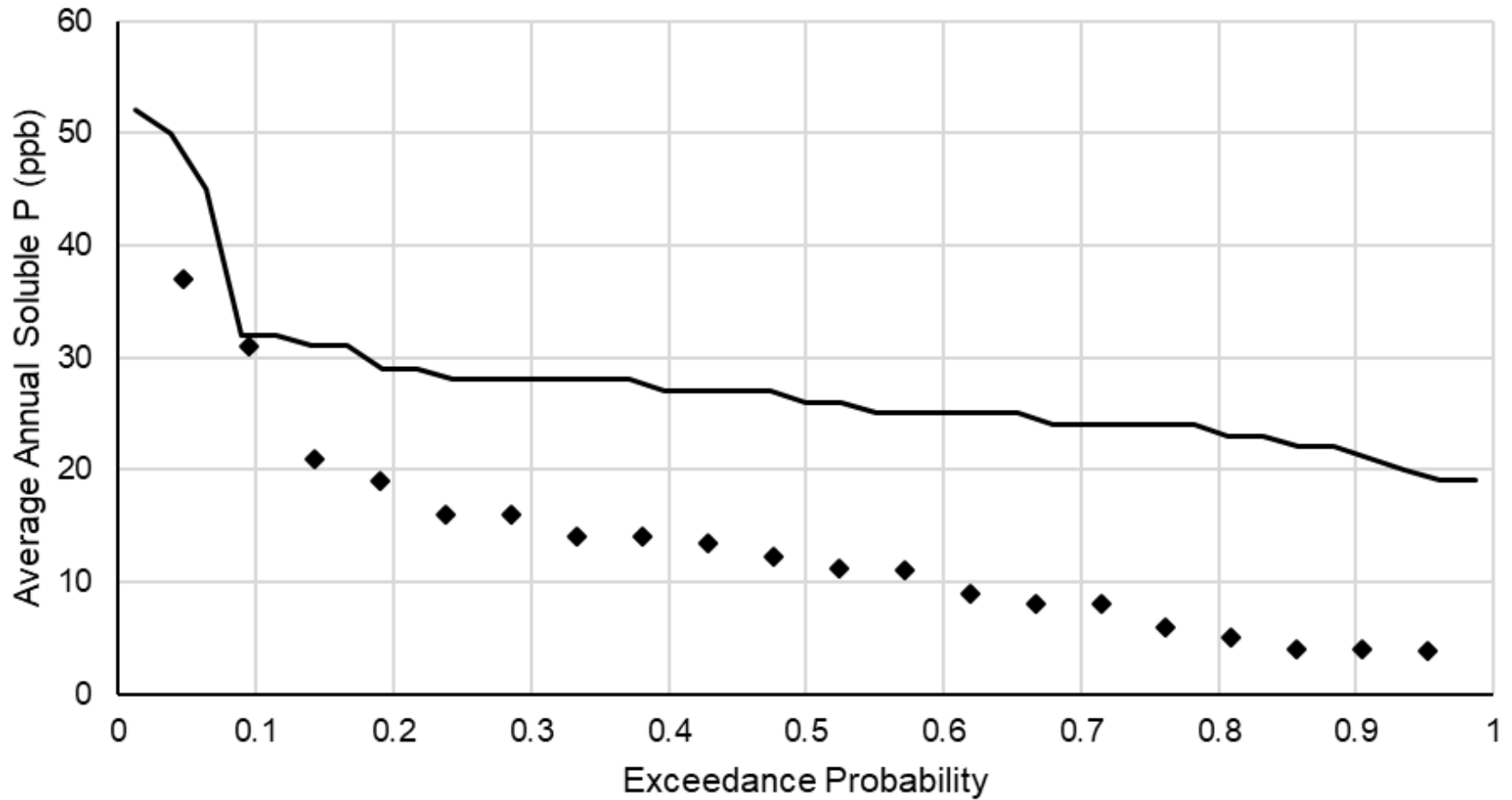
Clifton



— TMDL-e ◆ Annual Avg. 2001-2020

Station 11954 at Valley Mills

Valley Mills



— TMDL-e ◆ Annual Avg. 2001-2020

Is Water Quality Improving?

Yes!

Changes in
treatment by
WWTFs & land
management are
having an impact

