

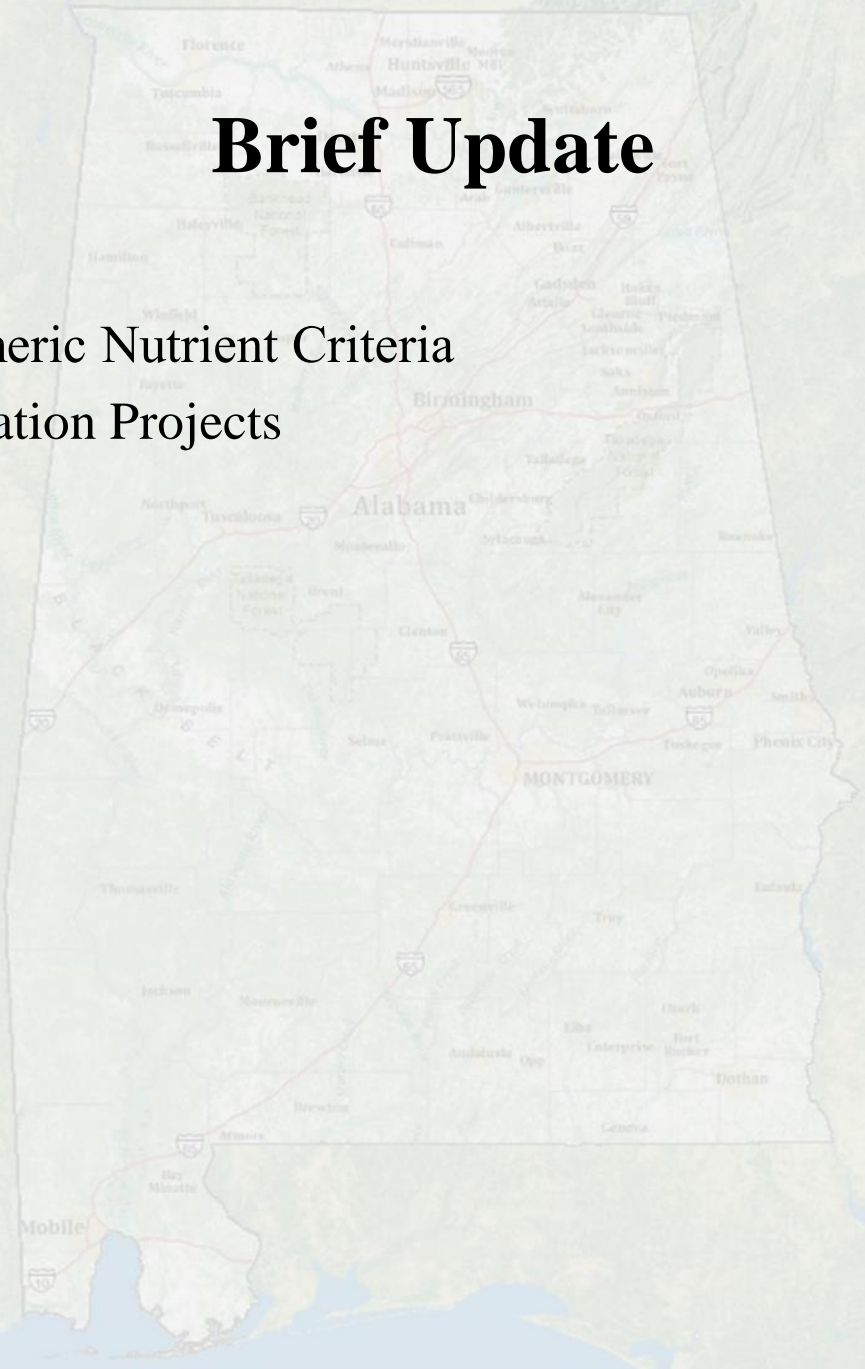
State of Alabama
Lake & Reservoir Criteria and
Nutrient Management Successes

2018 National Training Workshop
for CWA 303(d) Listing & TMDL

May 30, 2018

Brief Update

- Alabama's Numeric Nutrient Criteria
- Nutrient Restoration Projects



Numeric Nutrient Criteria

- Chlorophyll *a* criteria – primary indicator of cultural eutrophication
- Chl. *a* used as water quality targets for TMDLs
 - Impaired reservoir – ADEM conducts analyses to determine required pollutant load reduction (i.e. TP and/or TN)
 - Loads incorporated in NPS control plans and PS wastewater permits
- Selected because it is widely accepted among limnologists, scientists, and federal/state agencies as effective surrogate for estimating primary production responses to nutrient loading

Numeric Nutrient Criteria Lakes/Reservoirs

- Chlorophyll *a* criteria – primary tool used by ADEM
- To date: Criteria developed for 40 of 41 reservoirs
- EMC adopted February 2014/Effective April 2014
 - Lake Frank Jackson (Perdido-Escambia River Basin)
 - Bear Creek and Upper Bear Creek (Tennessee River Basin)
- EMC adopted December 2016/Effective February 2017
 - West Point Lake (Cahaba River Basin)
 - Criteria revised to correspond with GA's updated criteria
- Chl. *a* criteria for Woodruff (Alabama River Basin) tentative upon completion of modeling and analysis

Nutrient Criteria Implementation Schedule for Lakes and Reservoirs

Year	Number of Reservoirs	Major Basin(s)	Name of Reservoirs
2001	4	Chattahoochee, Coosa, Tallapoosa	West Point, W.F. George, Weiss, R.L. Harris
2002	9	Tallapoosa, Tennessee	Martin, Yates, Thurlow, Guntersville, Wheeler, Wilson, Pickwick, Little Bear, Cedar
2004	11	Alabama Black Warrior Chattahoochee Perdido-Escambia	Claiborne, Dannelly Bankhead, Holt, Lewis Smith, Oliver, Tuscaloosa, Warrior Harding Gantt, Point A
2005	5	Black Warrior Perdido-Escambia Lower Tombigbee Upper Tombigbee	Inland Jackson Coffeeville Demopolis, Gainesville
2010	8	Cahaba Coosa Escatawpa Upper Tombigbee	Purdy Jordan, Lay, Logan Martin, Mitchell, Neely Henry Big Creek Aliceville
2014	3	Perdido-Escambia Tennessee Tennessee	Frank Jackson Bear Creek Upper Bear Creek
???	1	Alabama	Woodruff

Numeric Nutrient Criteria Lakes/Reservoirs

- Chlorophyll *a* criteria developed for 40 of 41 lakes/reservoirs
- Lake/Reservoir sizes from 300 to 70,000 acres
- Chlorophyll *a* criteria range from 5 – 24 ug/L
 - Lake Martin – 5 ug/L
 - West Point – 24 ug/L
- Numeric criteria established as a growing season mean
 - Tennessee basin: May – October
 - All other basins: April – October
- Location specific, not a lake-wide average

WQS Activities

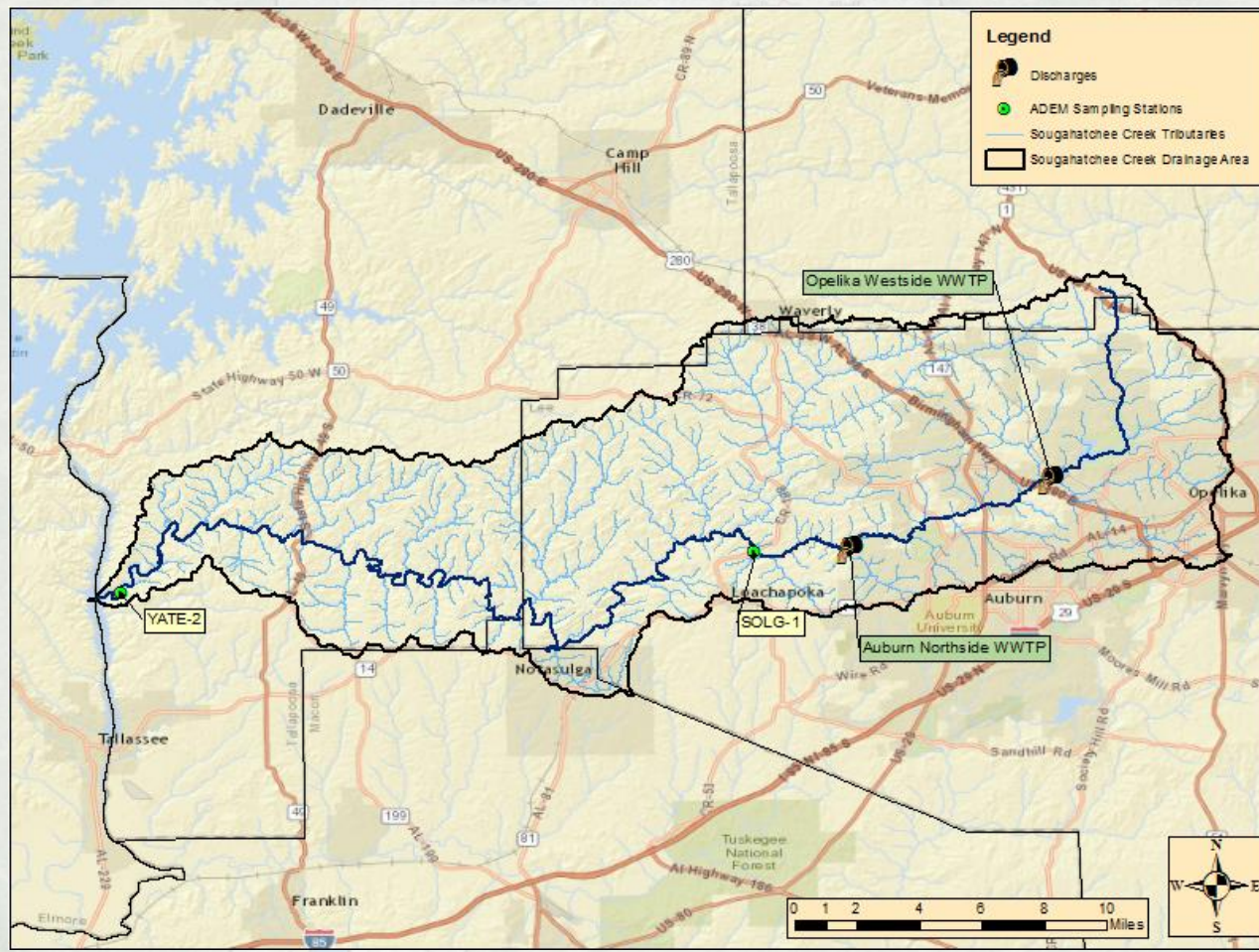
- In progress:
 - ADEM prioritizing Chl. a criteria for tributary embayments of lakes/reservoirs and coastal and estuarine waters
- ADEM is collaborating with Dr. Wilson at Auburn University to study cyanobacterial toxins that may pose a threat to reservoir drinking water intakes throughout Alabama.
 - 2-year project (Oct 2016 – Sept 2018)
 - 71 surface water utilities
 - Collect: Temp, DO, conductivity, pH, depth, GPS coordinates
 - Sample: nutrients, phytoplankton, toxins, taste and odors
 - So far no issues at drinking water reservoirs
 - Algal toxins low to undetectable in drinking water sources

Nutrient Restoration Projects

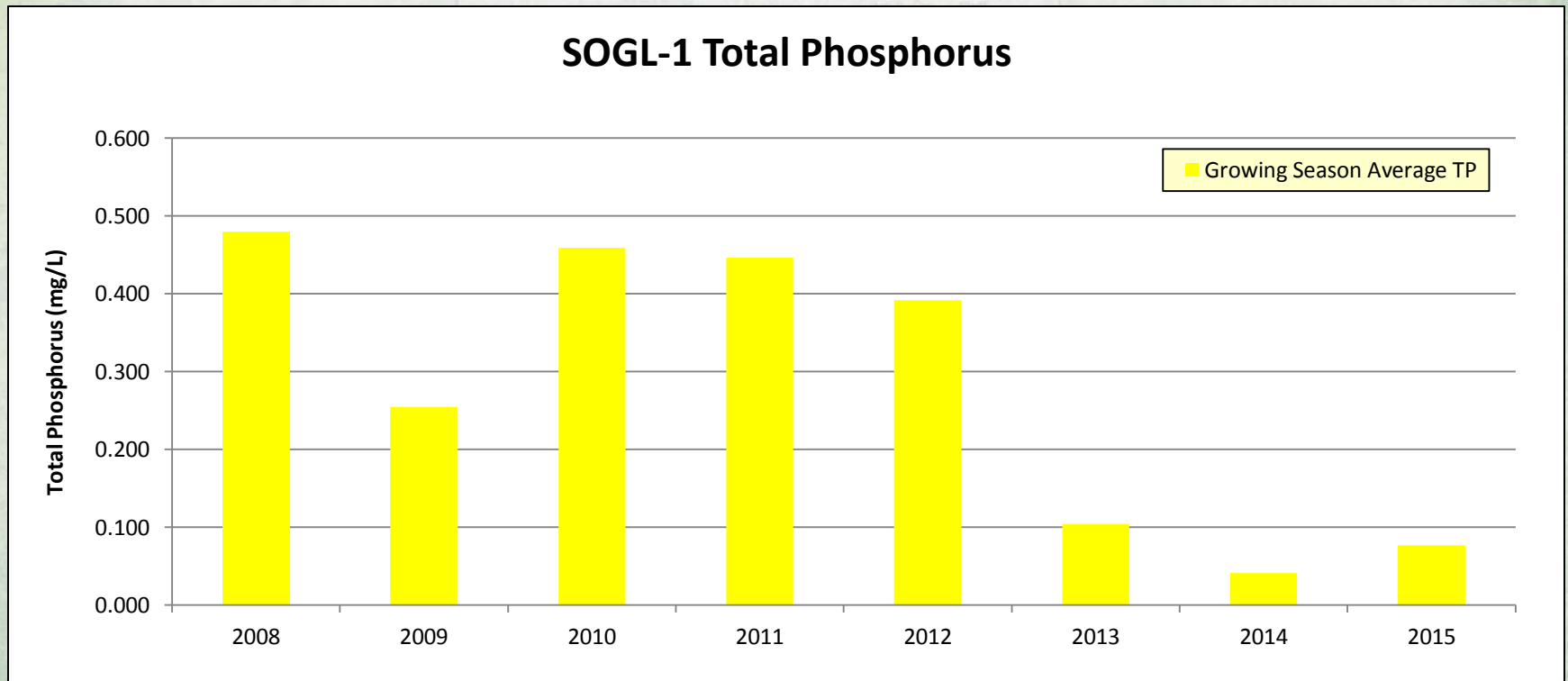
- Sougahatchee Creek
- Elkahatchee Creek
- Cahaba River



Sougahatchee Creek



Sougahatchee Creek Total Phosphorus



Note: Sougahatchee Creek Embayment TMDL approved October 2008

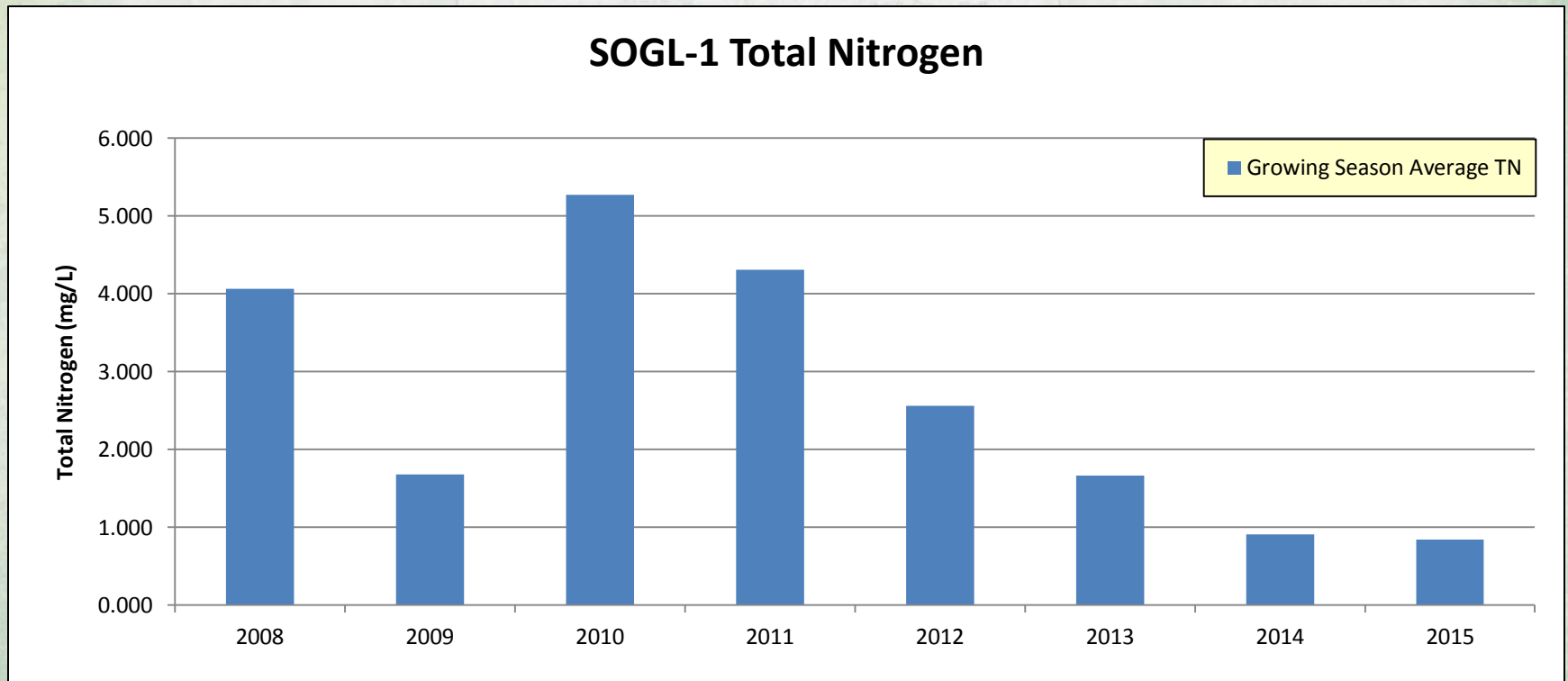
Auburn Northside WWTP diverted flow to another plant in February 2013

Opelika Westside WWTP TP Limit Schedule: 2.5 mg/L effective May 1, 2011 – Aug. 31, 2013

1.0 mg/L effective Sept. 1, 2013 – Oct 31, 2016

0.25 mg/L effective Nov. 1, 2016 (TMDL Limit)

Sougahatchee Creek Total Nitrogen



Note: Sougahatchee Creek Embayment TMDL approved October 2008

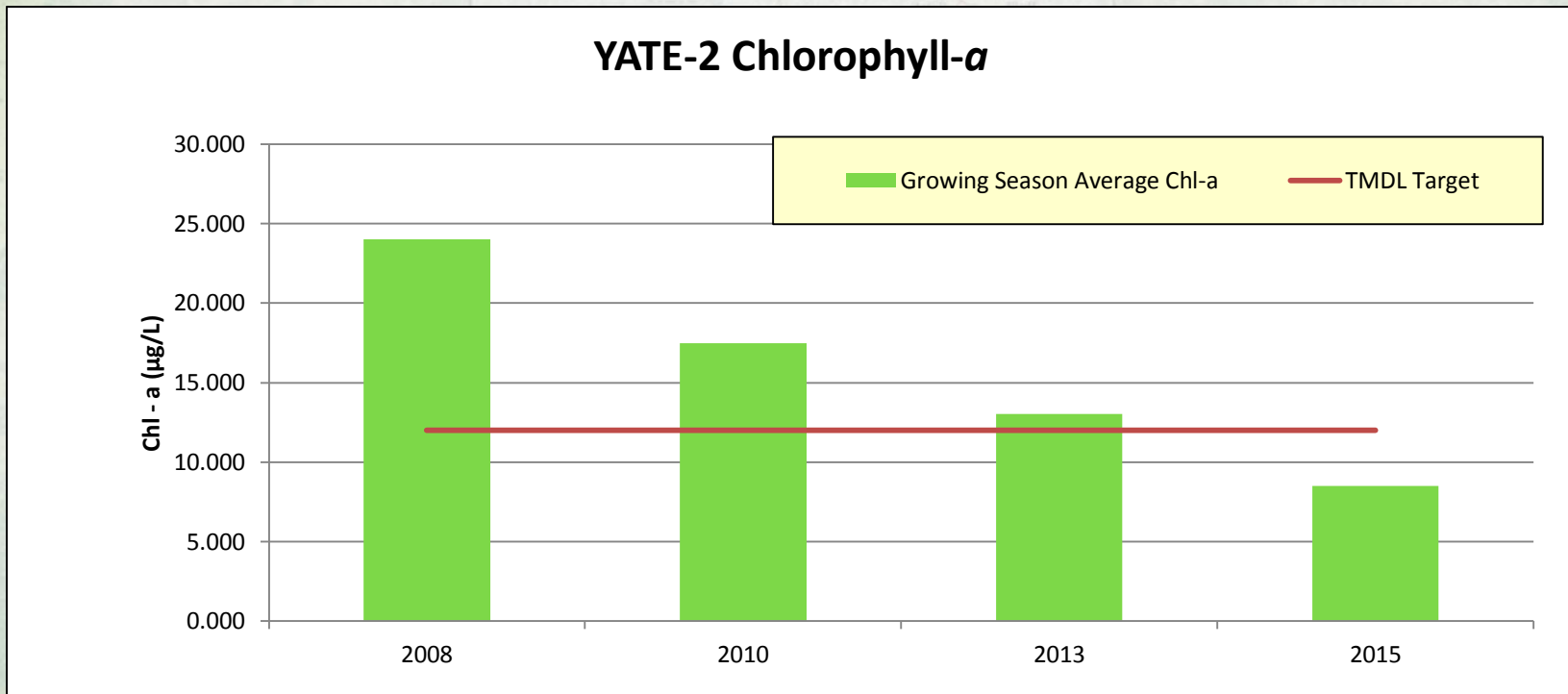
Auburn Northside WWTP diverted flow to another plant in February 2013

Opelika Westside WWTP TP Limit Schedule: 2.5 mg/L effective May 1, 2011 – Aug. 31, 2013

1.0 mg/L effective Sept. 1, 2013 – Oct 31, 2016

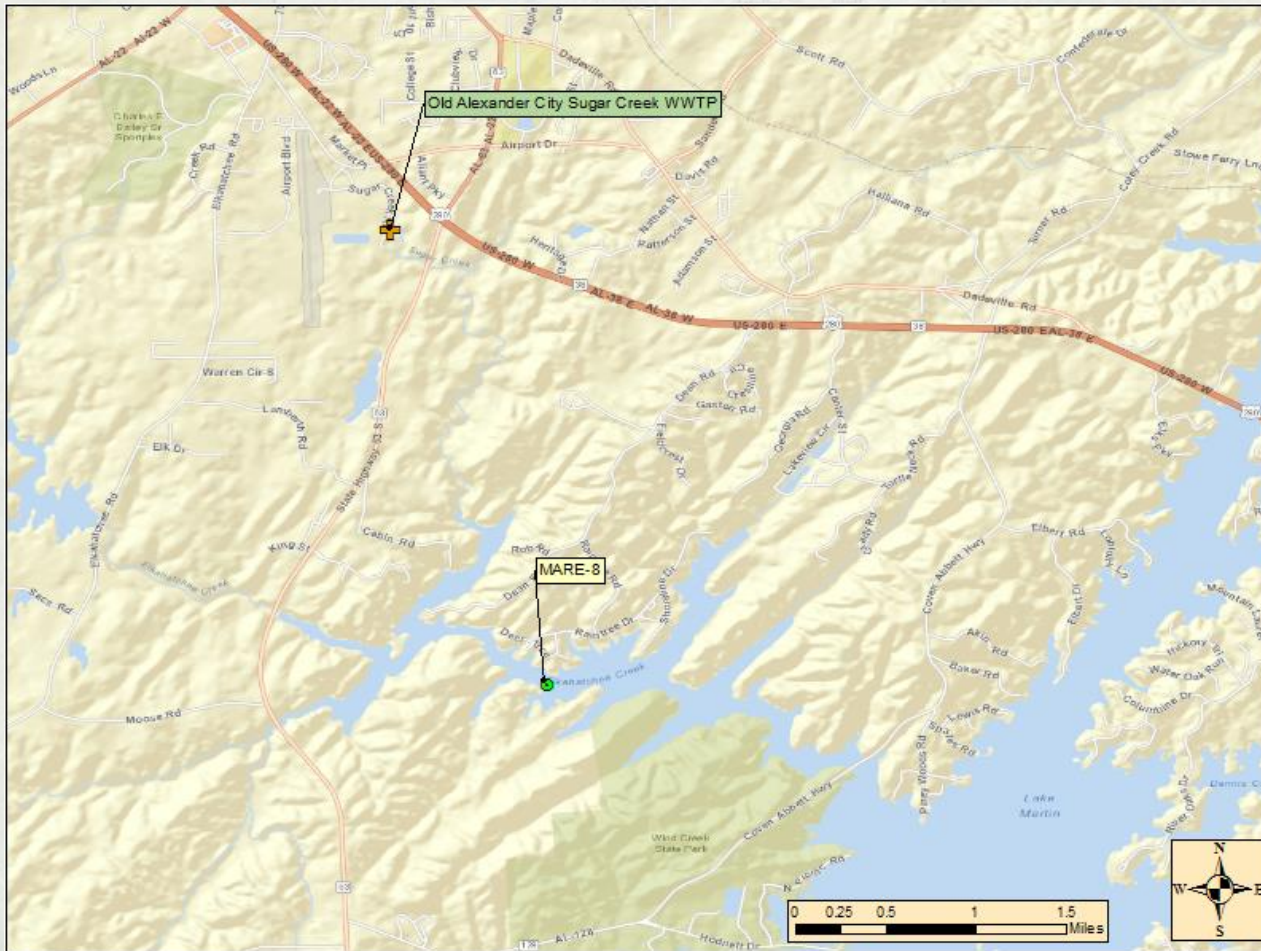
0.25 mg/L effective Nov. 1, 2016 (TMDL Limit)

Sougahatchee Creek Chlorophyll-a



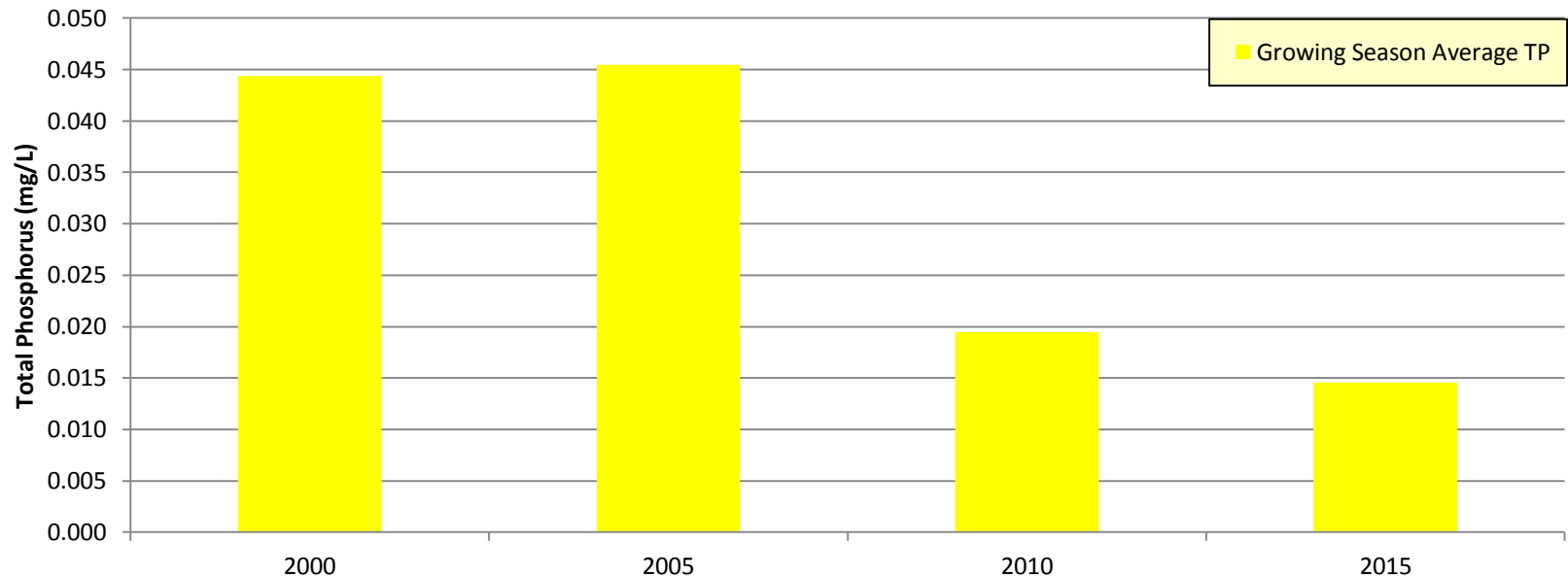
Note: Sougahatchee Creek Embayment TMDL approved October 2008 (TMDL Chl- α Target = 12 $\mu\text{g/L}$)
Auburn Northside WWTP diverted flow to another plant in February 2013
Opelika Westside WWTP TP Limit Schedule: 2.5 mg/L effective May 1, 2011 – Aug. 31, 2013
1.0 mg/L effective Sept. 1, 2013 – Oct 31, 2016
0.25 mg/L effective Nov. 1, 2016 (TMDL Limit)

Elkahatchee Creek Embayment



Elkahatchee Creek Embayment Total Phosphorus

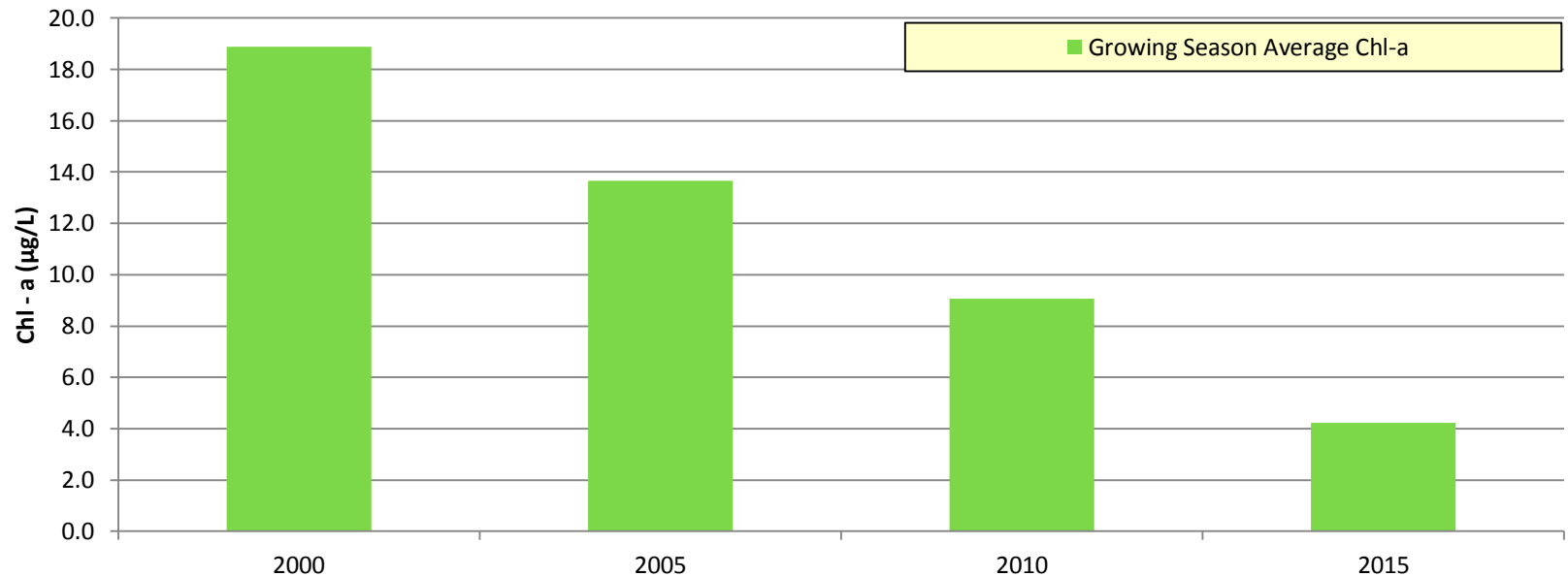
MARE-8 Total Phosphorus



Note: Alexander City Sugar Creek WWTP relocated its discharge from Sugar Creek to the Tallapoosa River in June 2001.

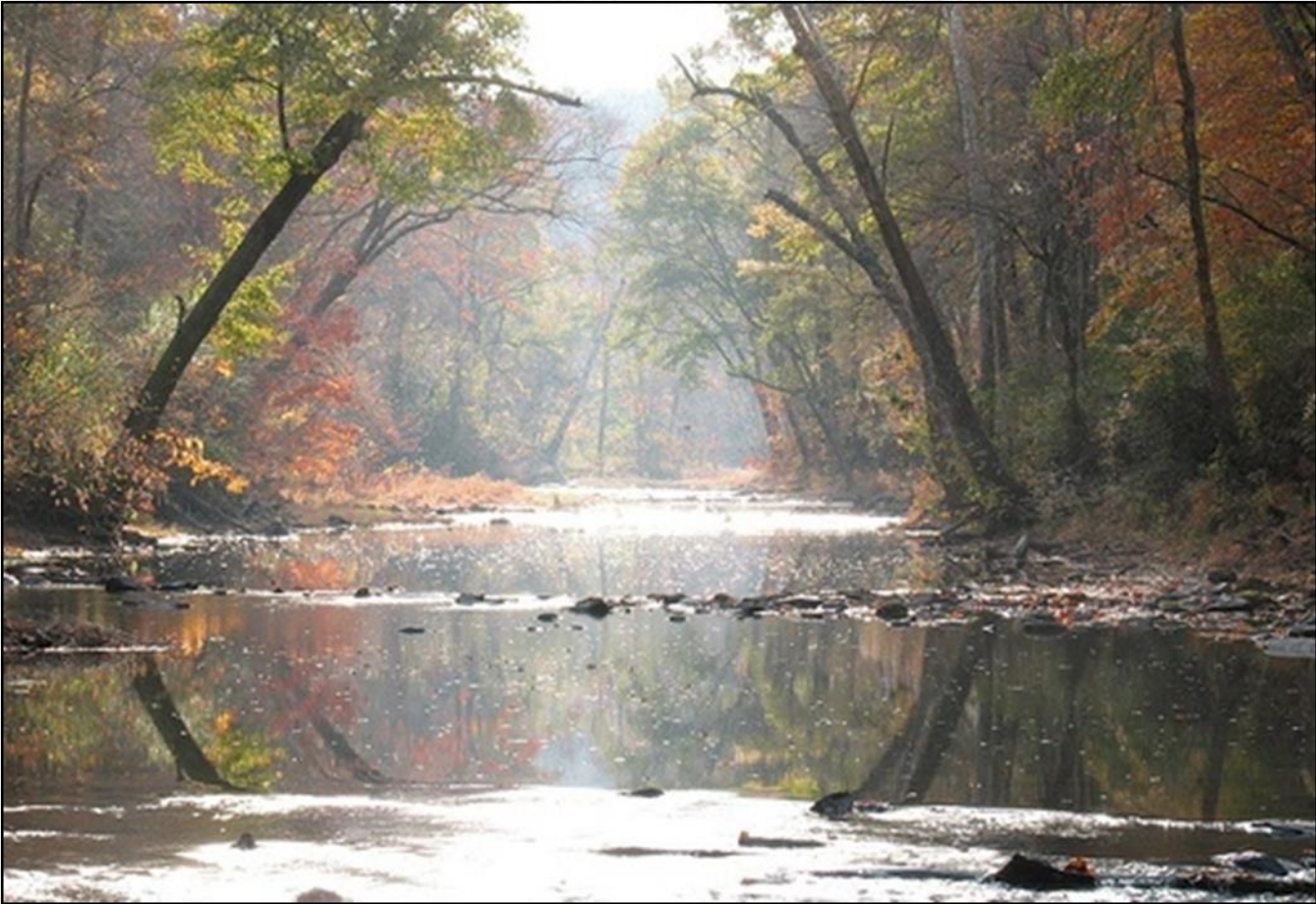
Elkahatchee Creek Embayment Chlorophyll-a

MARE-8 Chlorophyll-a



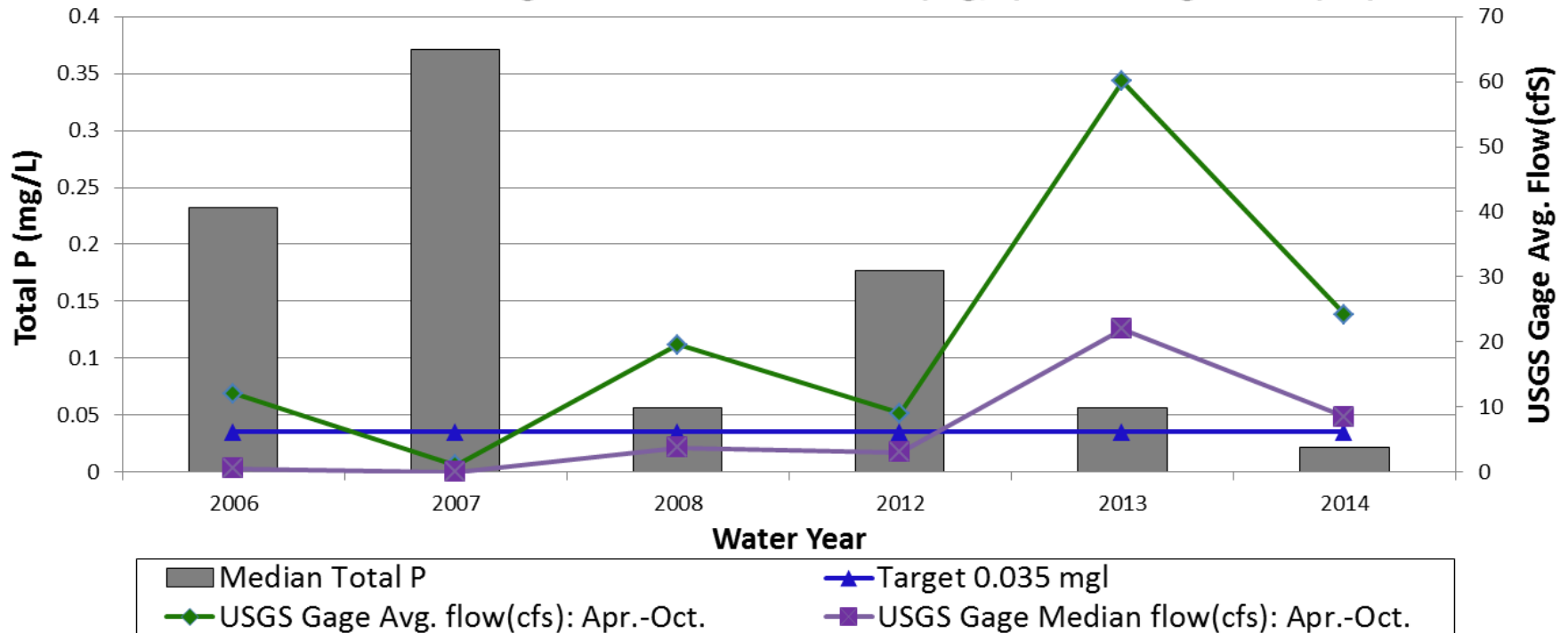
Note: Alexander City Sugar Creek WWTP relocated its discharge from Sugar Creek to the Tallapoosa River in June 2001.

Cahaba River



Cahaba River Nutrient TMDL Station C-1 (CR 10 Roper Rd)

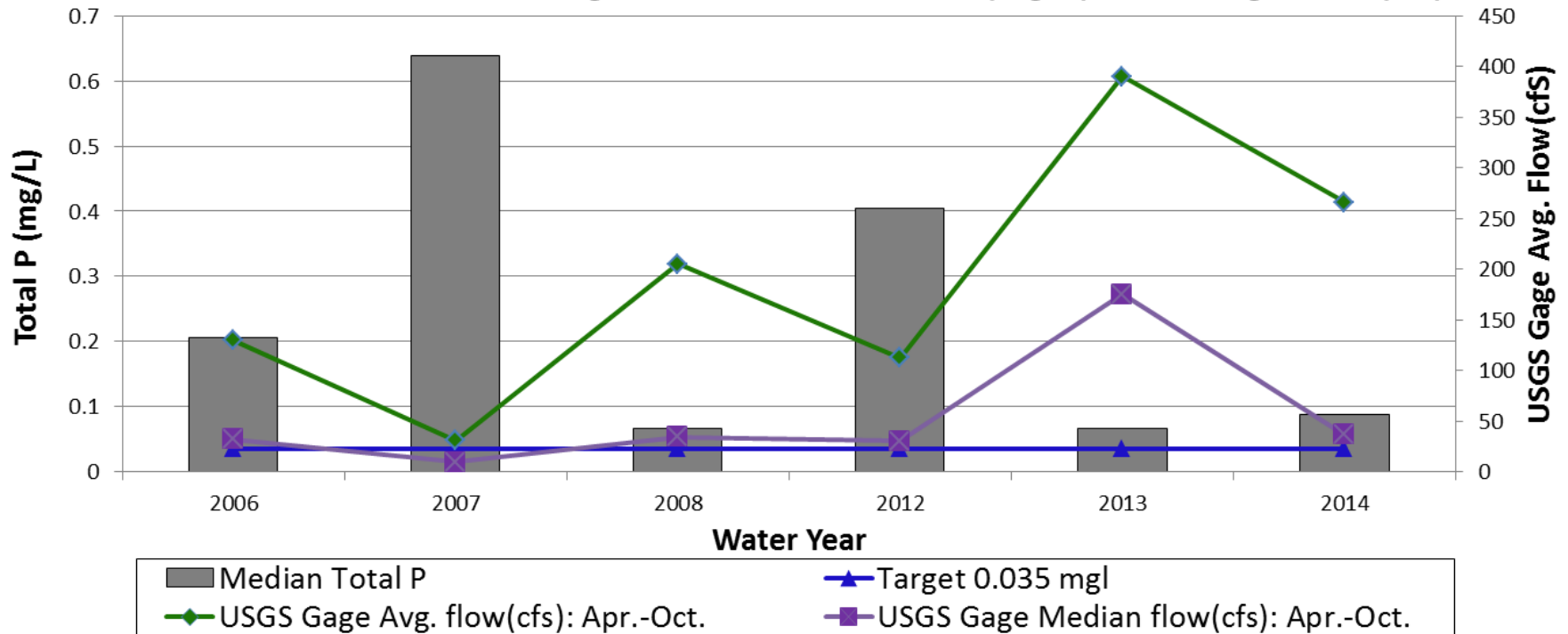
Station C-1: Growing Season Median Total P (mg/L) vs. Average Flow (cfs)



Cahaba River Nutrient TMDL

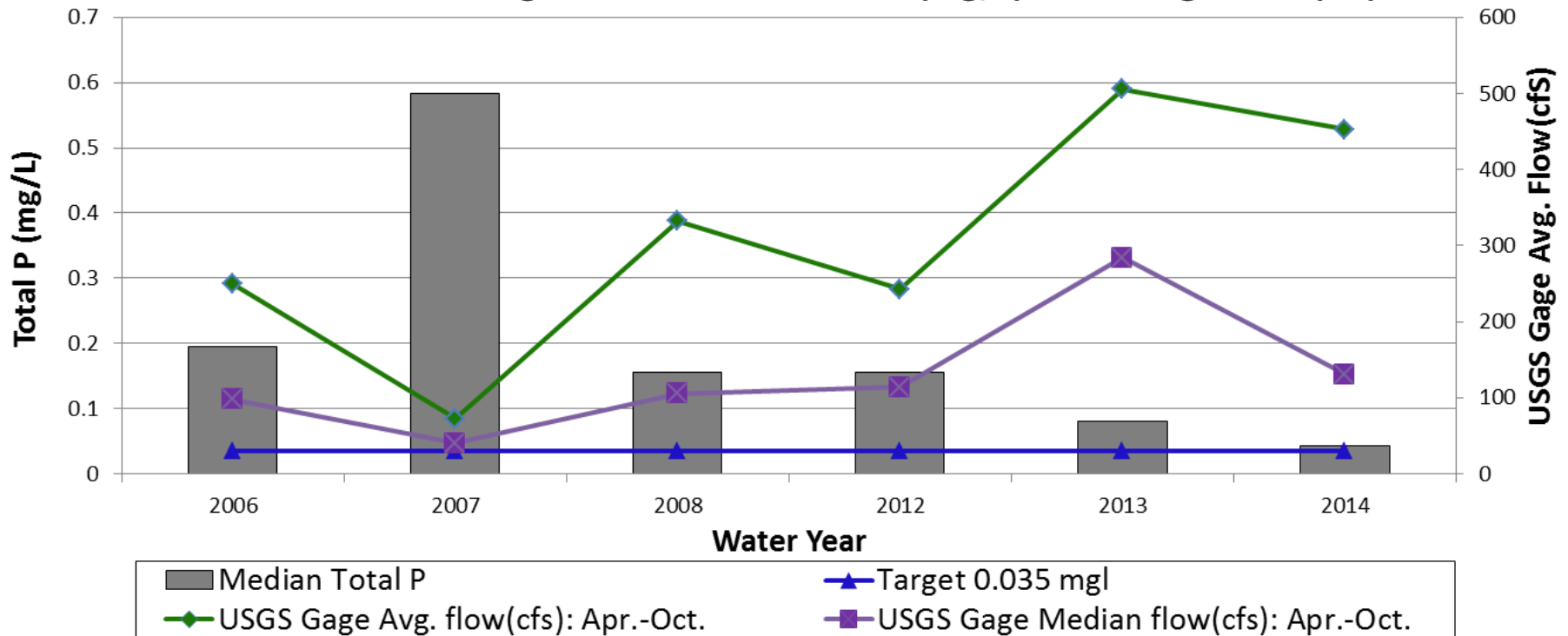
Station CAHS-1 (CR 175 Old Montgomery Hwy)

Station CAHS-1: Growing Season Median Total P (mg/L) vs. Average Flow (cfs)



Cahaba River Nutrient TMDL Station C-3 (Hwy 52 near Helena)

Station C-3: Growing Season Median Total P (mg/L) vs. Average Flow (cfs)



Questions??

Jennifer Haslbauer
Chief, Standards & Planning Section
Water Quality Branch

334-274-4250

jhaslbauer@adem.alabama.gov

