

# *Regulation 85 - Nutrients Management Control*

August 17, 2015

Triennial Review Informational  
Hearing Stakeholder Meeting



**COLORADO**  
Department of Public  
Health & Environment

# *Agenda*

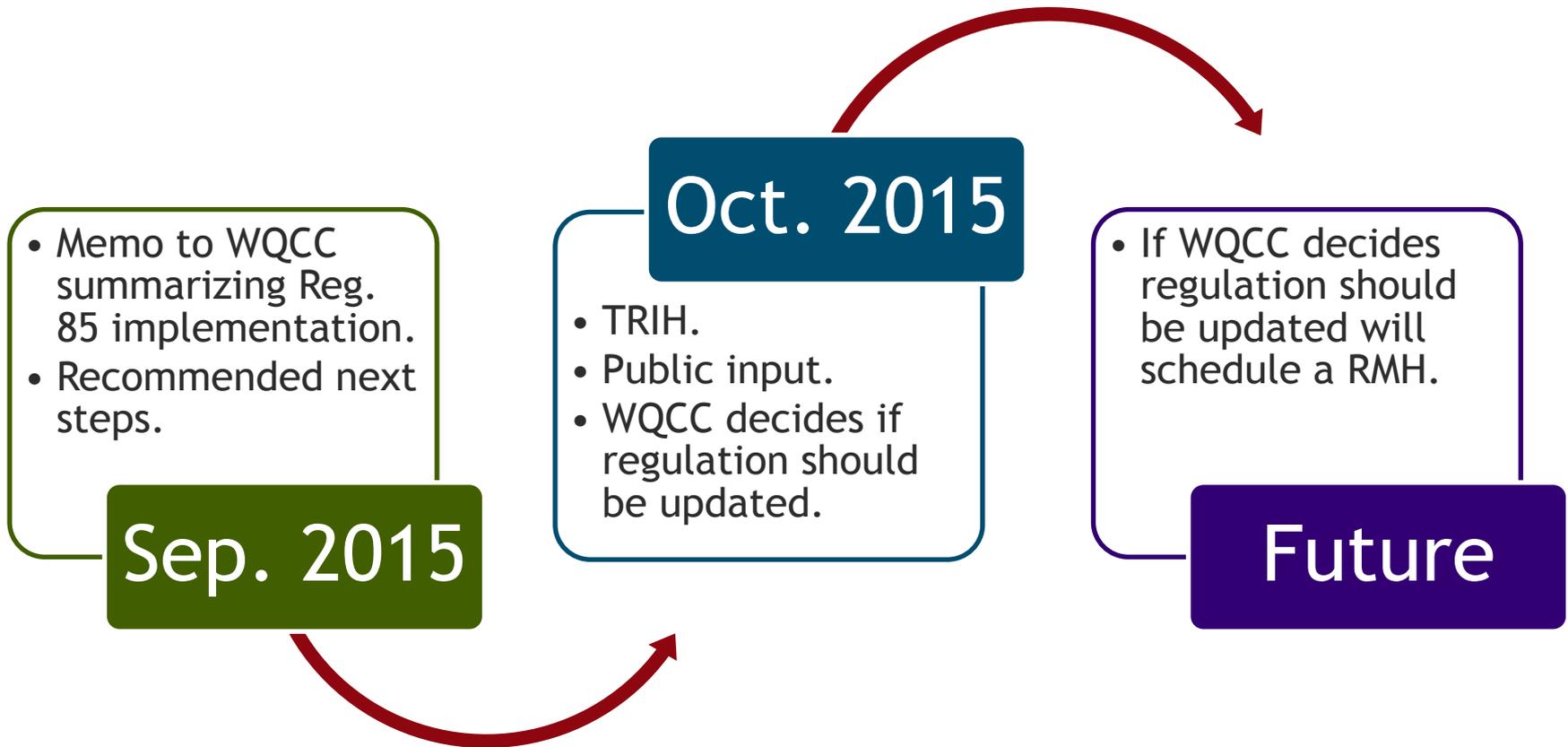
- Introductions and agenda review
- Triennial Review Informational Hearing schedule
- Point source monitoring progress
- Update on preliminary data analysis efforts
- Update on nonpoint source efforts
- Recommendations
- Next steps and +/- $\Delta$



# TRIENNIAL REVIEW INFORMATIONAL HEARING SCHEDULE



# Triennial Review Informational Hearing



# *Regulation 85 RMH would follow normal rulemaking process*

- Notice (WQCC and Colorado Register)
- Party status
- Proponents prehearing statements
- Responsive prehearing statements
- Rebuttal statements
- Prehearing conference
- Rulemaking hearing

# *Triennial Review Informational Hearing Memo Outline*

## Discharger Limitations

- June 2015 - Point Sources
- August 2015 - Nonpoint Sources

## Monitoring

- January 2015 - One Year of Data
- August 2015 - Two Years of Data

## Data Summary & Analysis

- January 2015 - Initial Report Out
- August 2015 - Updated information

## Regulation 31

- January 2015 - Initial Report Out

## Recommendations

- Implementation of regulation is going OK!
- August 2015 - Summary of Recommendations

# Key Dates

- **September 9, 2015** Water Quality Control Division memo posted on Water Quality Control Commission website.
- **September 30, 2015** Public comments for Triennial Review Informational hearing due to the Water Quality Control Commission Office.
- **October 13, 2015** Triennial Review Informational Hearing





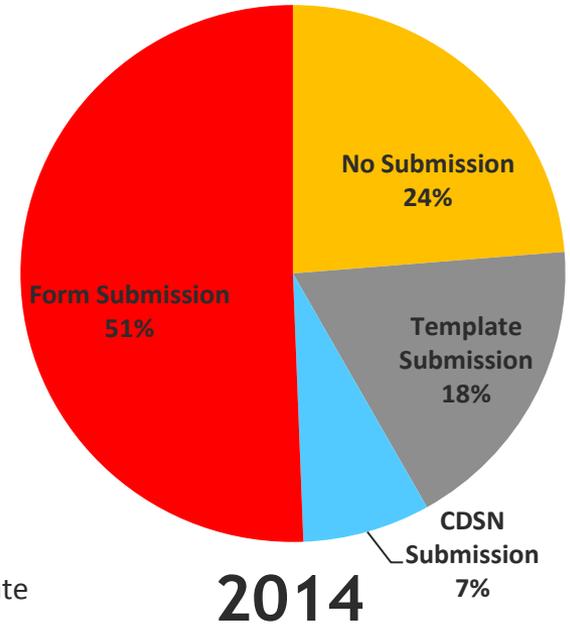
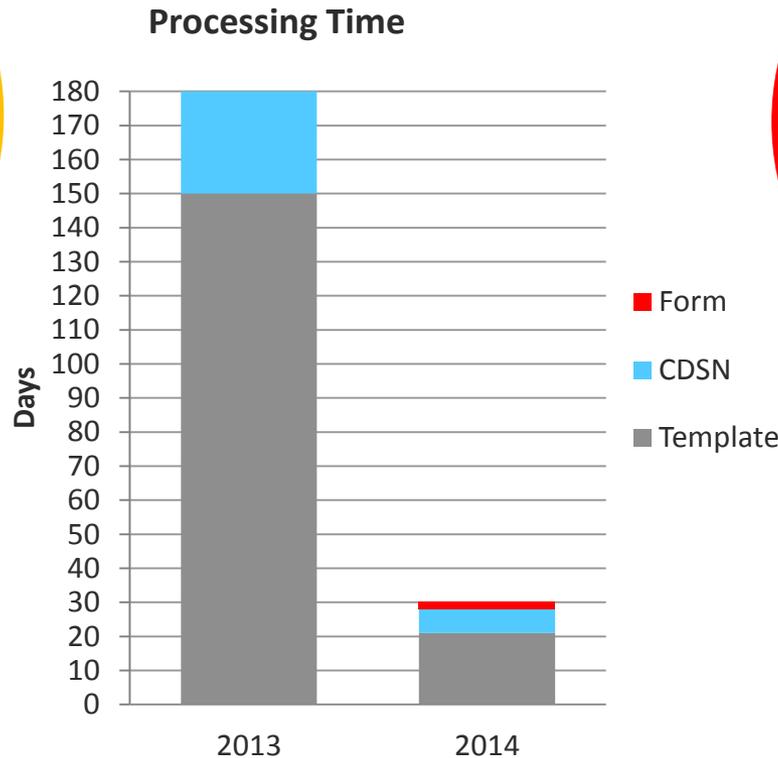
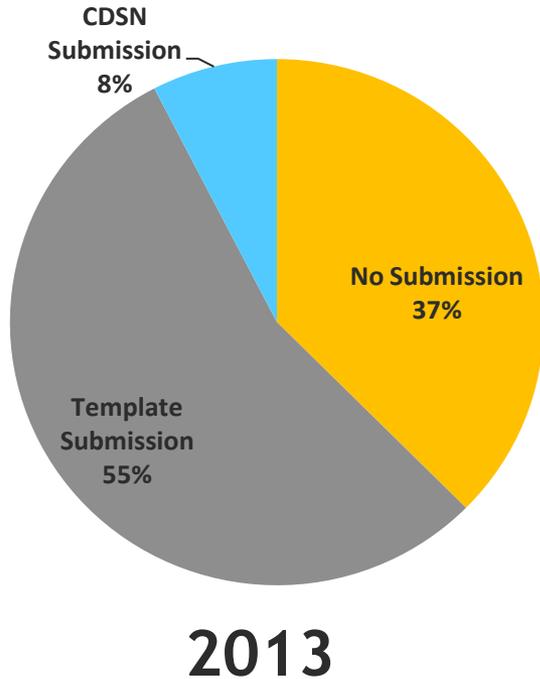
# POINT SOURCE MONITORING PROGRESS



# *2013/2014 Data Collection*

- 2013 monitoring data due April 15, 2014
  - Partial year
  - Received and processed 63% by December 2014
- 2014 monitoring data due April 15, 2015
  - Full year
  - Received and processed 75% by May 2015
- Cooling Towers Data due February 28<sup>th</sup>, 2015
  - 24 months of data
  - Received 80% by February 28, 2015

# Data Submission and Processing



# *Accessing Regulation 85 Data*

- The National Water Quality Data Portal
  - <http://waterqualitydata.us/portal/>
    - Includes water quality data from many entities including the USGS

## Search Parameters For Regulation 85

- Organization ID:
  - 21COL001\_WQX
- Project ID:
  - Reg\_85\_Monitoring

# The Water Quality Data Portal

Entering the search parameters

The screenshot displays the National Water Quality Monitoring Council's Water Quality Data portal. The page features a search interface with the following sections:

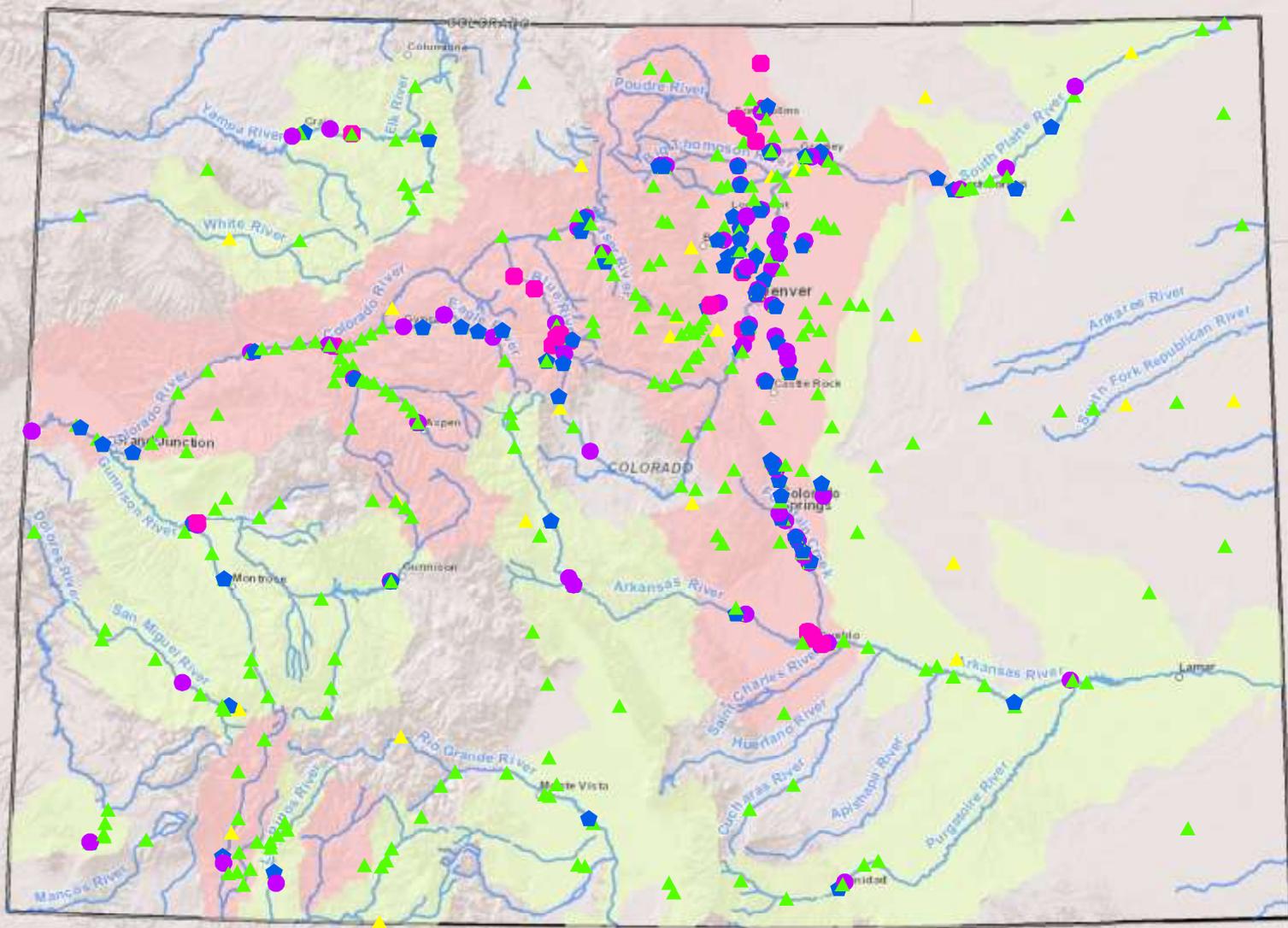
- LOCATION:** Includes fields for Country (All), State (US, CO), and County (All). It also has options for Point Location and Bounding Box, with sub-fields for Within (miles of), Lat, Long, North, South, East, and West. A "Use my location" button is present.
- SITE PARAMETERS:** Includes fields for Site type (All), Organization ID (21COL001\_WQX), Site ID, and HUC. The Organization ID field is circled in red.
- SAMPLING PARAMETERS:** Includes fields for Sample Media (All), Characteristic Group (All), Characteristic (All), and Project ID (Reg\_85\_Monitoring). The Project ID field is circled in red.

# Downloading the Data

- One can choose to:
  - View the sites on a map
  - Download the site information
  - Download the results



# Summary of Monitoring Locations for Regulation 85



- Legend**
- ▲ Effluent Site
  - Downstream Site
  - Upstream Site
  - Auxiliary Site
  - ▲ Data Not Received

- Streams
- Delayed Watershed
- Priority Watershed

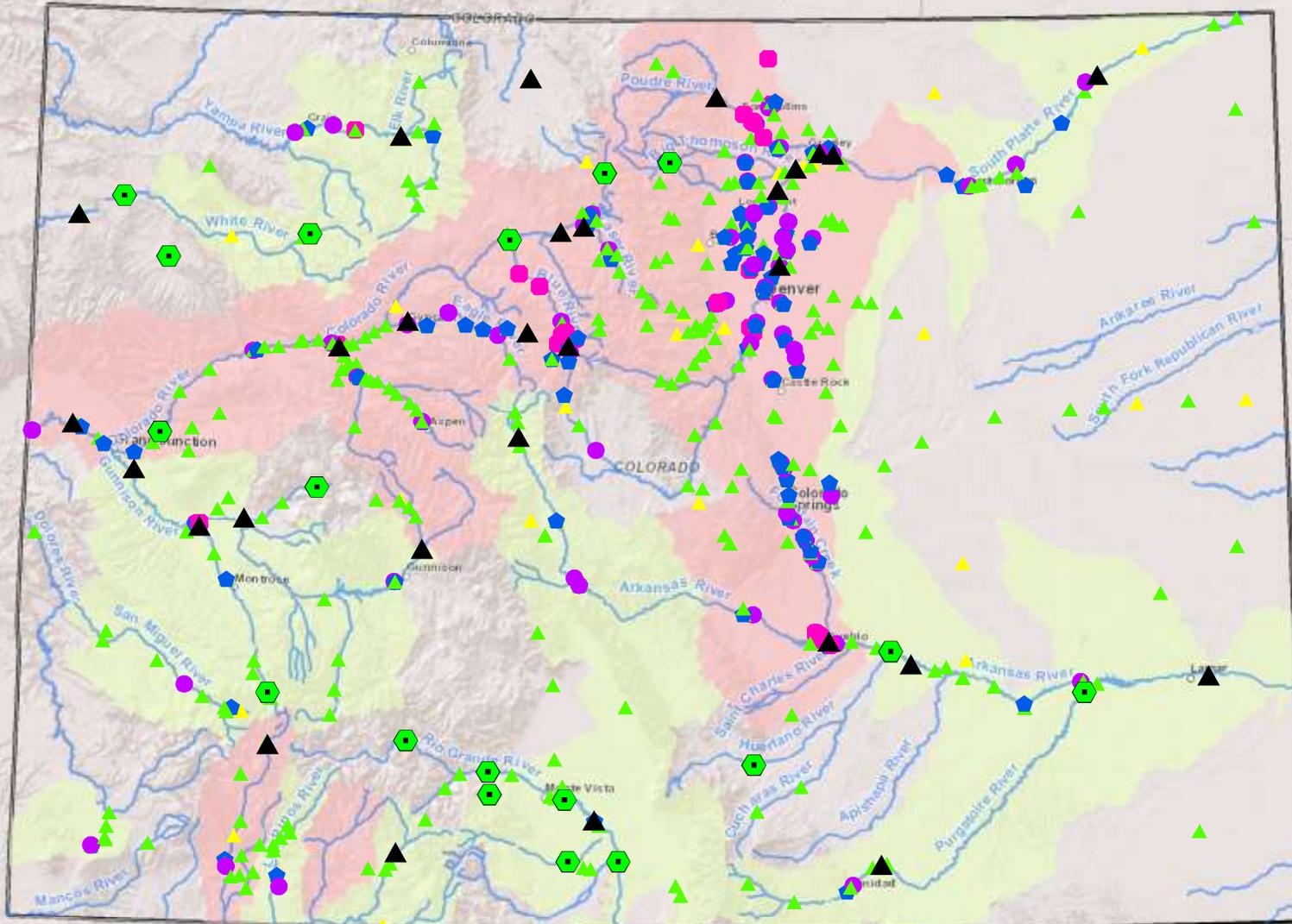


**DRAFT** Date: 8/6/2015

Use constraints: There are no restrictions and legal prerequisites for using this data set. The state of Colorado assumes no liability to the completeness, correctness, or fitness for use of this data set.



# Monitoring Locations for Regulation 85 - Additional Data Sites



- Legend**
- ▲ Effluent Site
  - Downstream Site
  - Upstream Site
  - Auxiliary Site
  - ▲ Data Not Received
  - ▲ Trend Site
  - Additional Sampling Site (Division)
  - Streams
  - Delayed Watershed
  - Priority Watershed



*DRAFT* Date: 8/6/2015

Use constraints: There are no restrictions and legal prerequisites for using this data set. The state of Colorado assumes no liability to the completeness, correctness, or fitness for use of this data set.



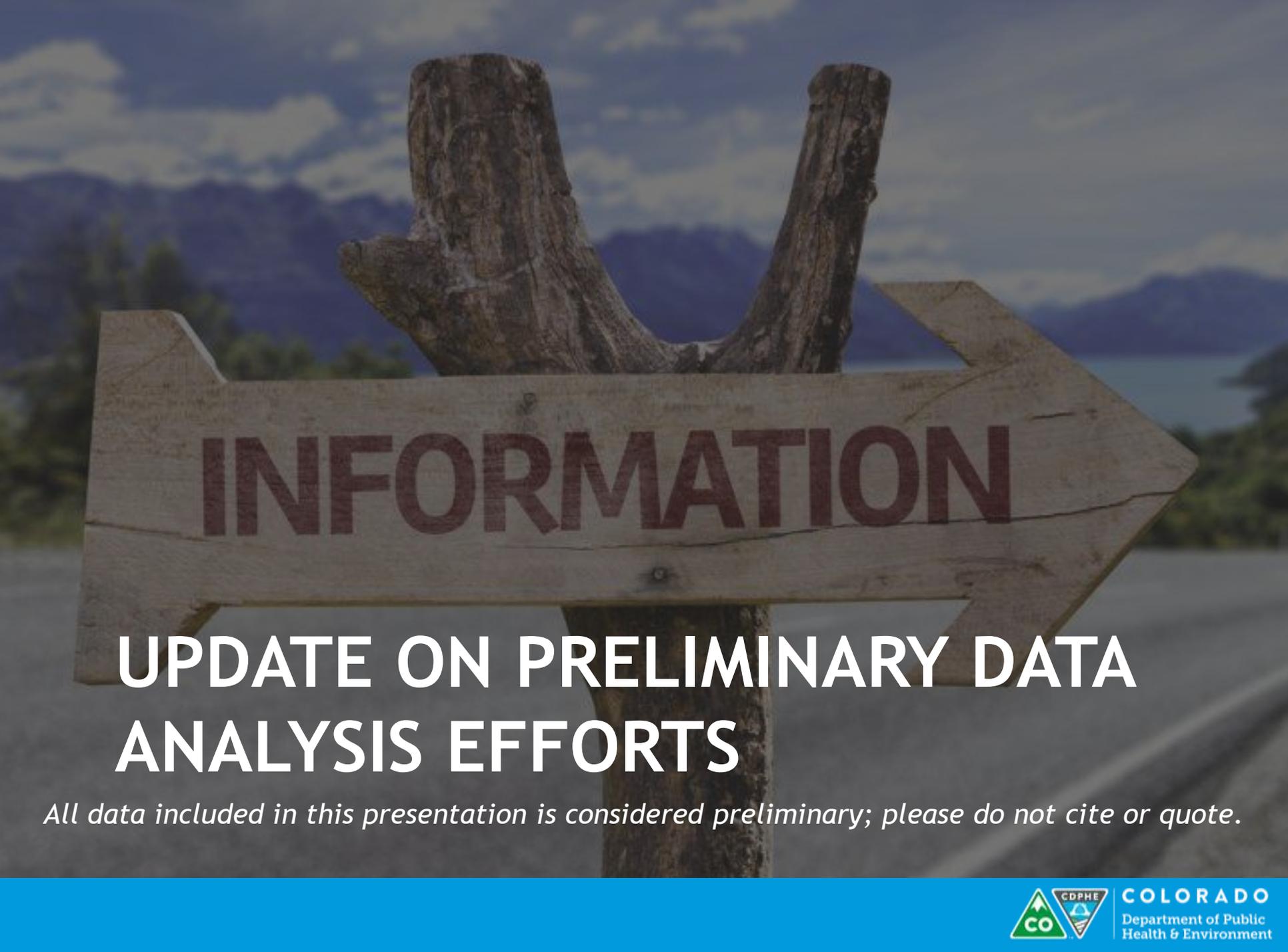
# Number of effluent samples by size of facility

Design Capacity Group (MGD)	2013			2014			
	# of facilities	theoretical expected data points <sup>1</sup>	actual data points	# of facilities	theoretical expected data points <sup>2</sup>	actual data points	total data points
≤ 1	181	905	895	208	1248	1246	2141
> 1 ≤ 2	15	150	188	25	300	295	483
> 2	51	510	695	65	780	833	1528
<b>total received</b>	<b>247</b>	<b>1565</b>	<b>1778</b>	<b>298</b>	<b>2328</b>	<b>2374</b>	<b>4152</b>

1 - based on ratio of 5 samples/year for facilities ≤ 1 MGD and 10 samples/year for facilities > 1 MGD (reduced sample sizes due to start date of March 2013)

2 - based on ratio of 6 samples/year for facilities ≤ 1 MGD and 12 samples/year for facilities > 1 MGD

\*Numbers reflect count of individual total phosphorus data points



**INFORMATION**

# **UPDATE ON PRELIMINARY DATA ANALYSIS EFFORTS**

*All data included in this presentation is considered preliminary; please do not cite or quote.*



**COLORADO**  
Department of Public  
Health & Environment

# *Preliminary Data Analysis*

- Nutrients in effluent
- Treatment technology
- Nutrients in Colorado's surface waters
- Nutrient loadings
- Cooling towers

# Nutrients in effluent

# *Key Points - Nutrients in Effluent*

Facilities subject to Regulation #85:

- Need to implement improvements to meet Total Phosphorus limits.
- Are close to meeting Total Inorganic Nitrogen limits but not on a consistent basis.

# Regulation 85.5

- Discharge Permit Limits

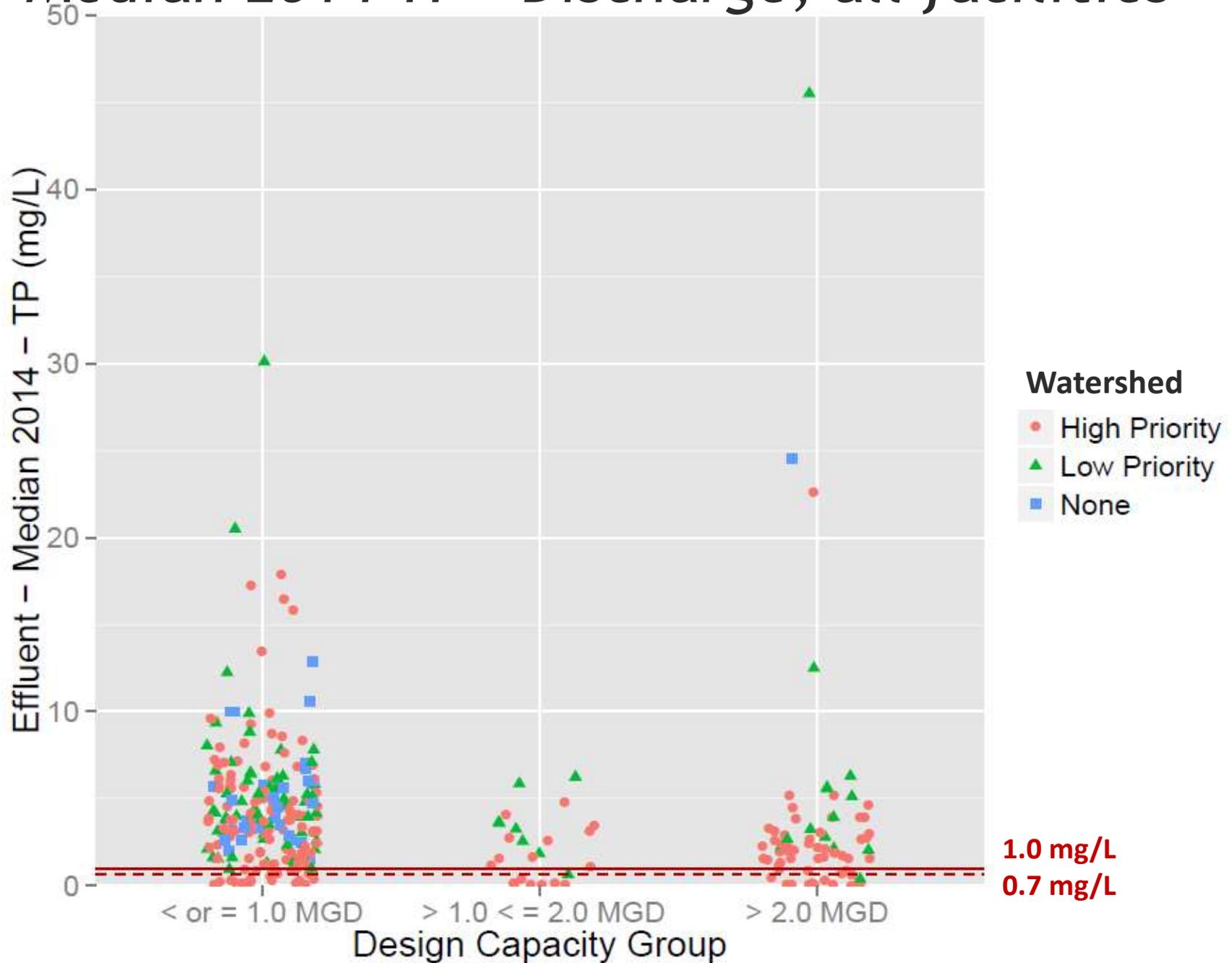
Parameter	Annual Median	95 <sup>th</sup> Percentile
TP (mg/L)	1.0 (0.7) <sup>1</sup>	2.5 (1.75)
TIN (mg/L)	15 (7)	20 (14)

1 – limit applied when preliminary effluent limits requested before (after) May 31, 2012

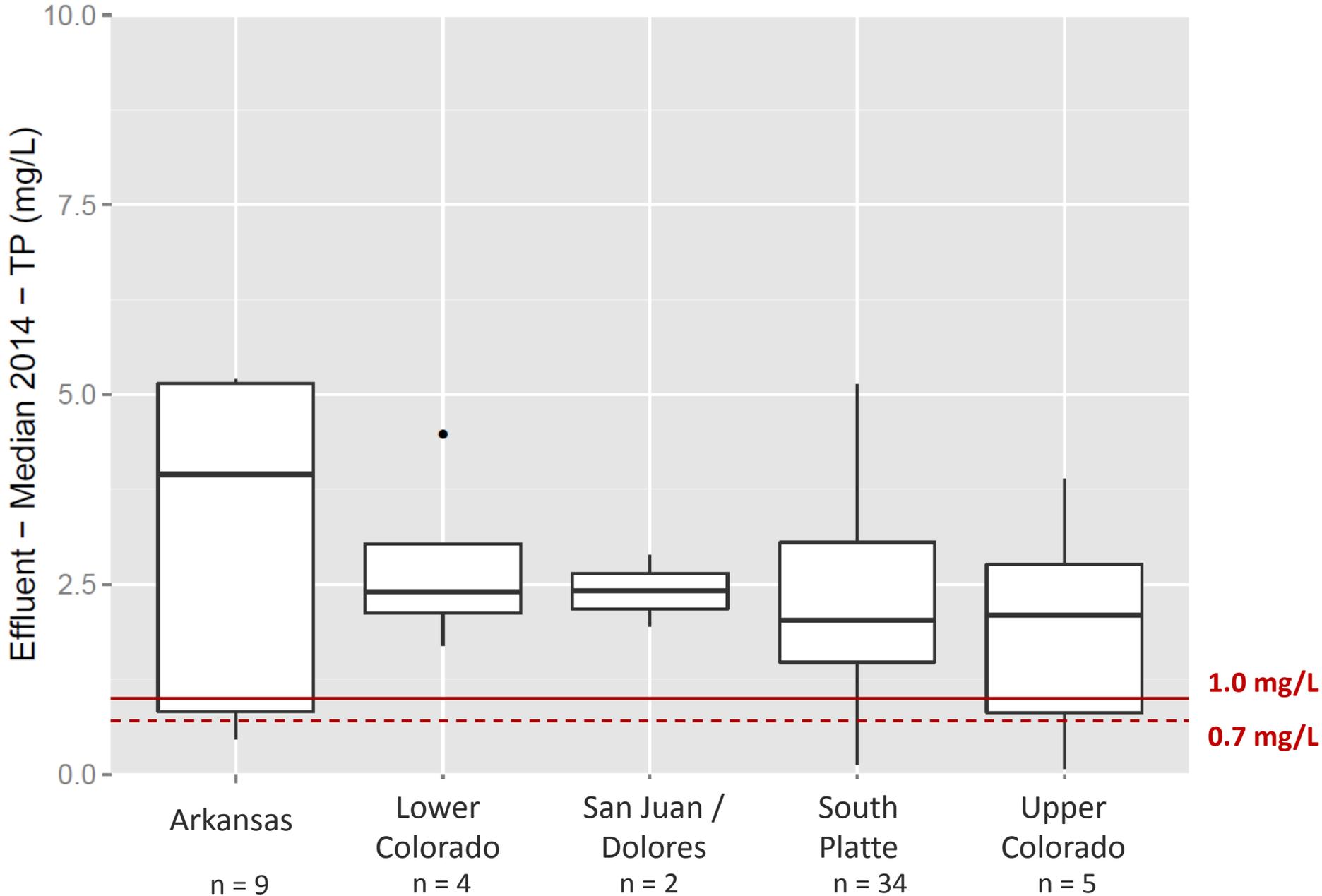
- Applies certain DWWTF > 2.0 MGD and non-domestics as detailed in Regulation 85.

*Focus on 2014 data since we have 12 months of data*

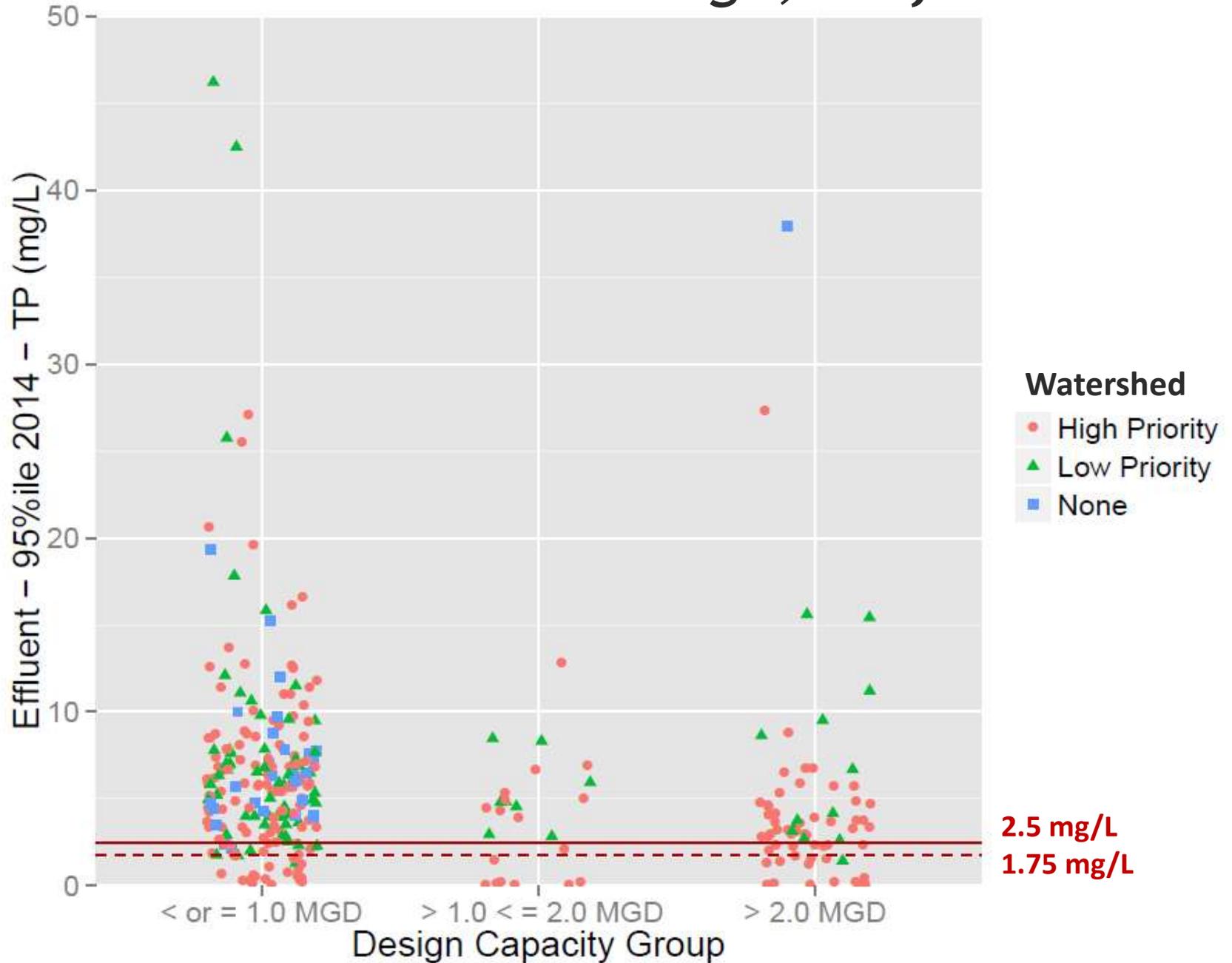
# Median 2014 TP - Discharge, all facilities



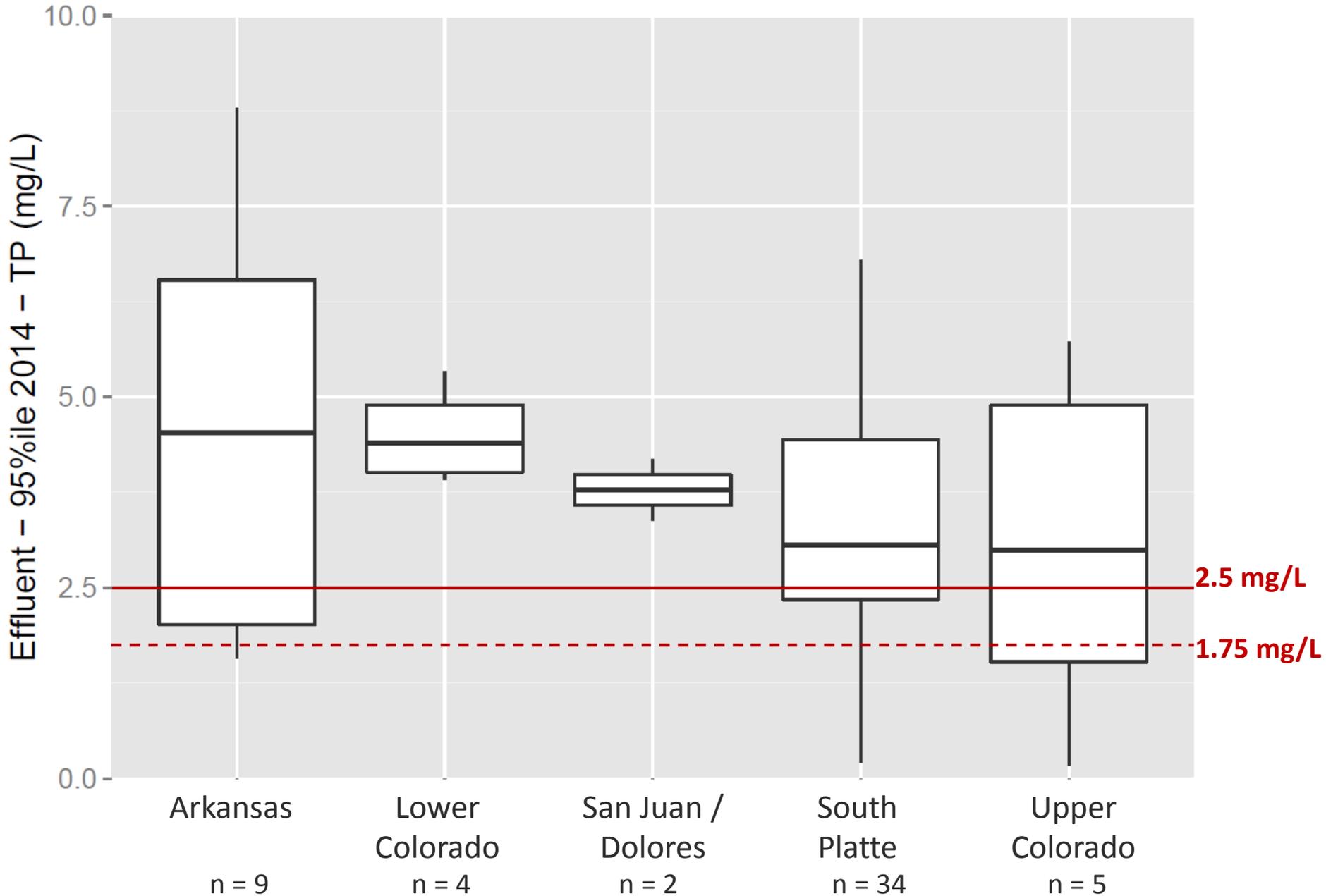
# Median 2014 TP - Discharge, facilities eligible for Permit Limits



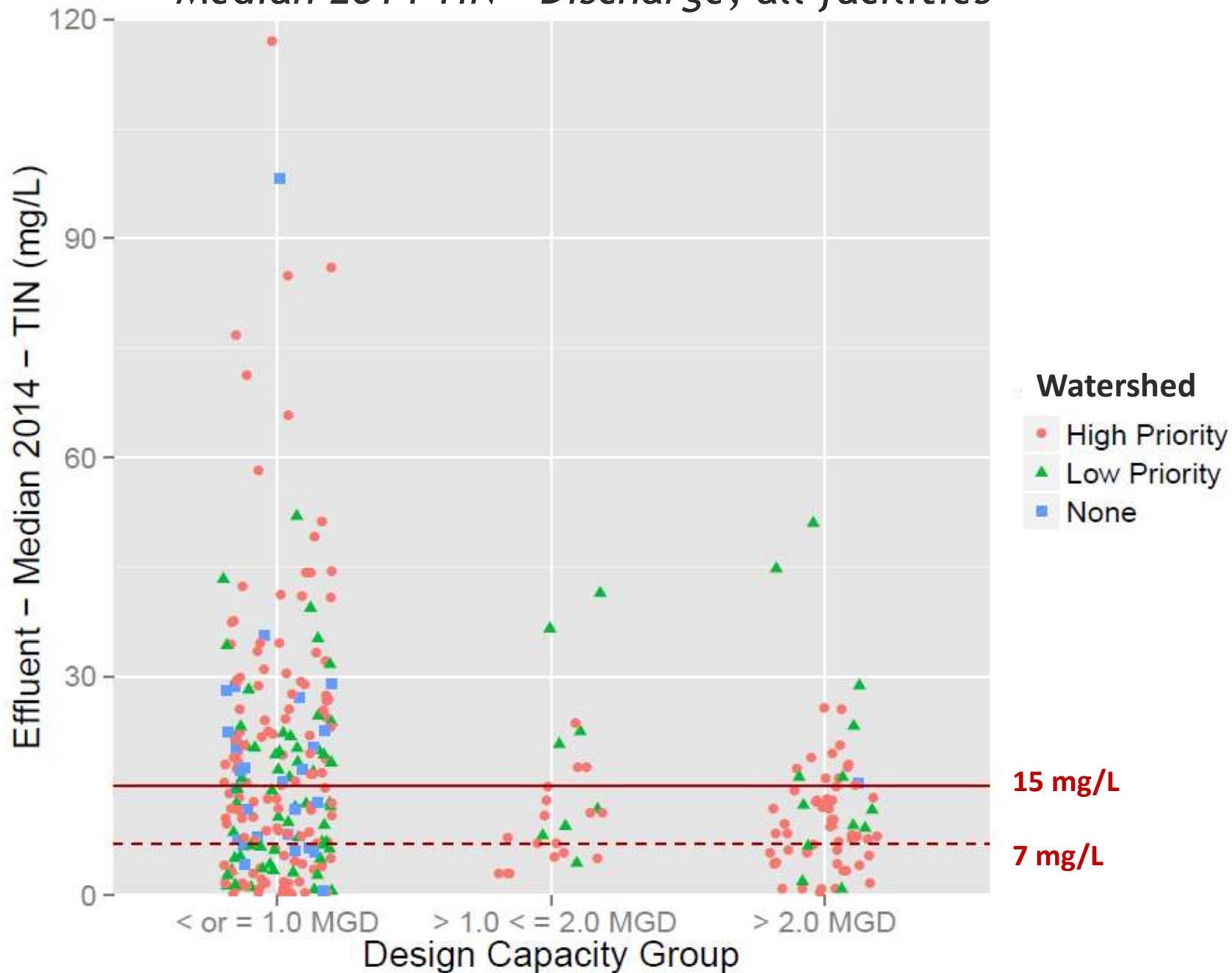
# 95%ile 2014 TP - Discharge, all facilities



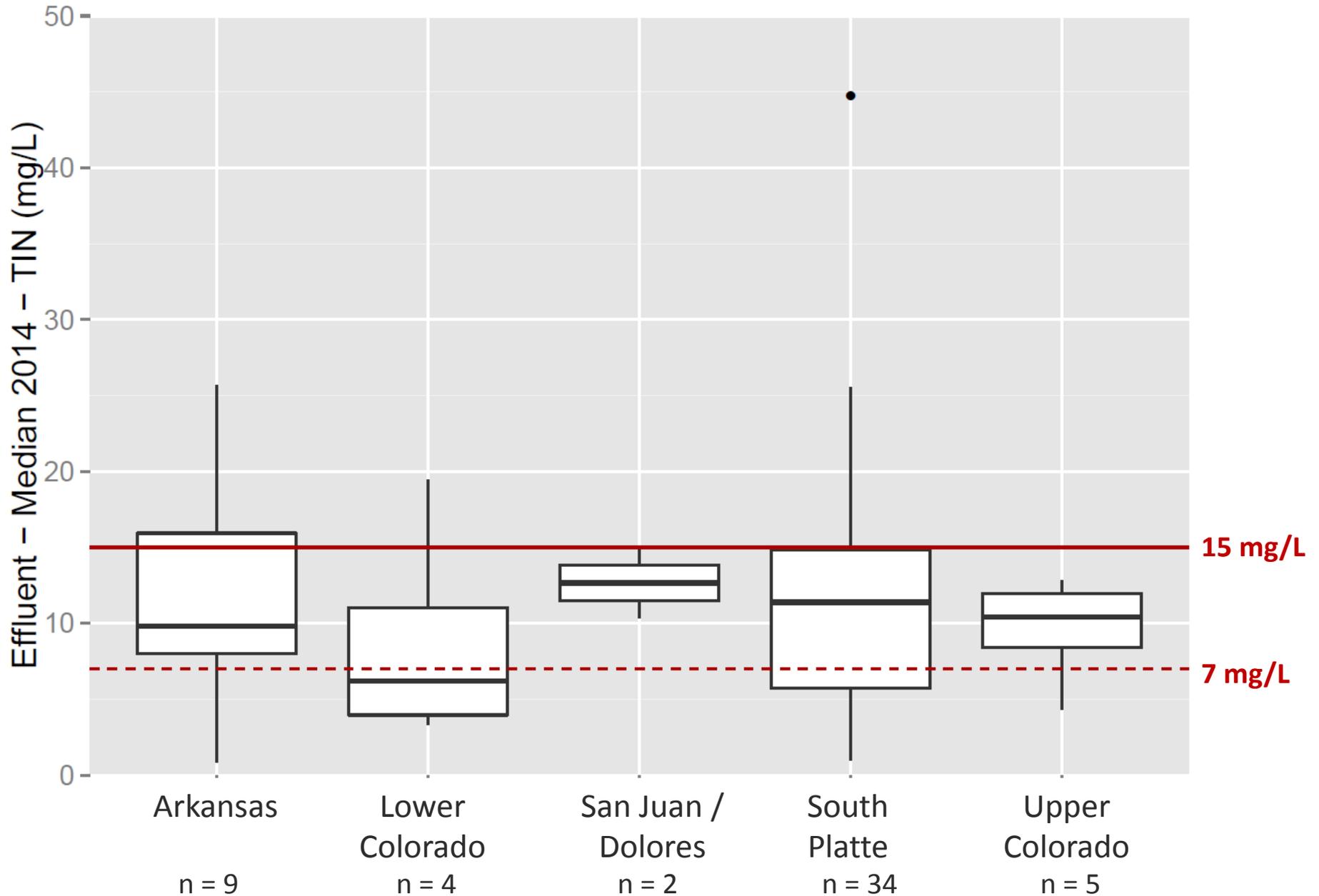
# 95<sup>th</sup>ile 2014 TP - Discharge, facilities eligible for Permit Limits



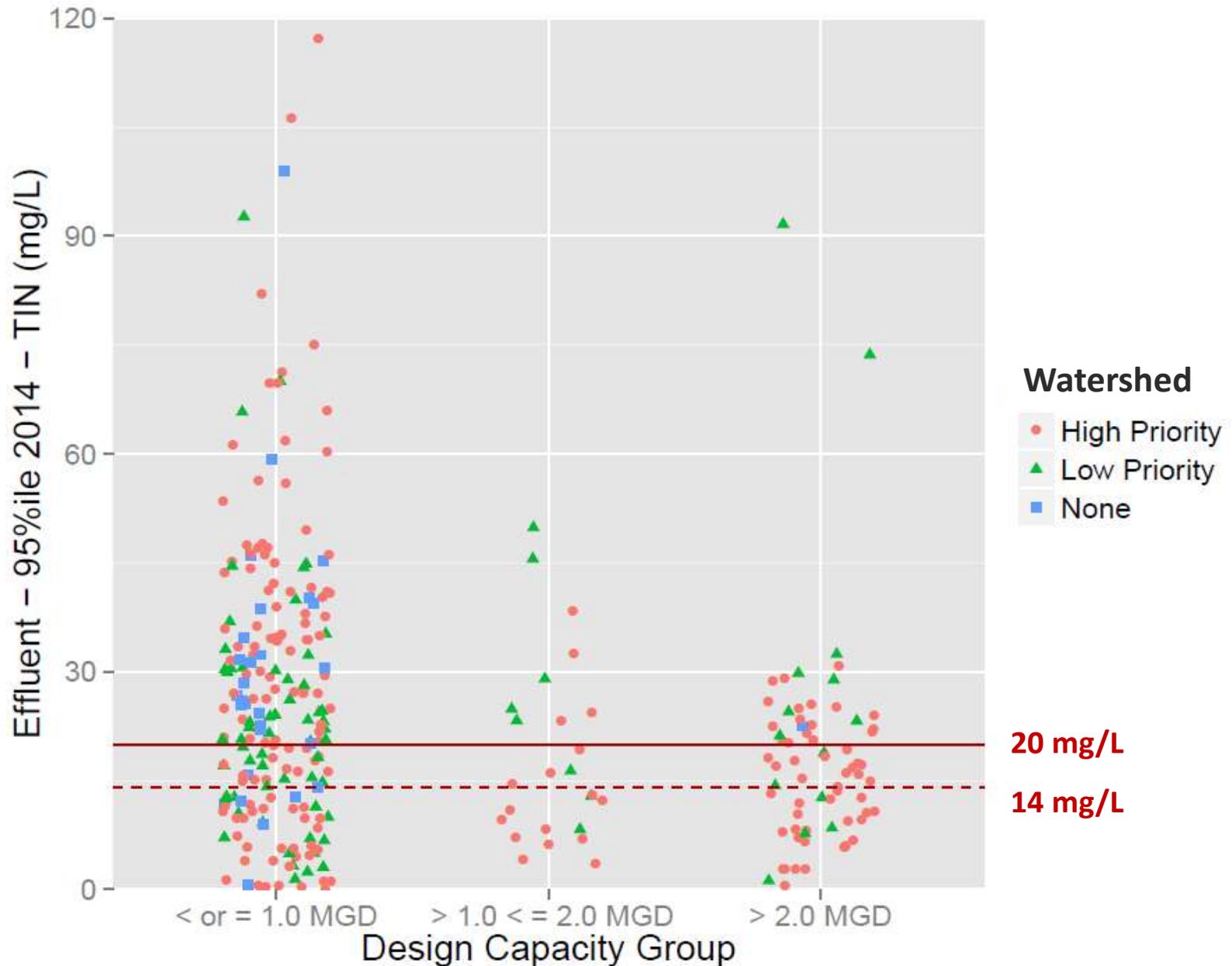
# Median 2014 TIN - Discharge, all facilities



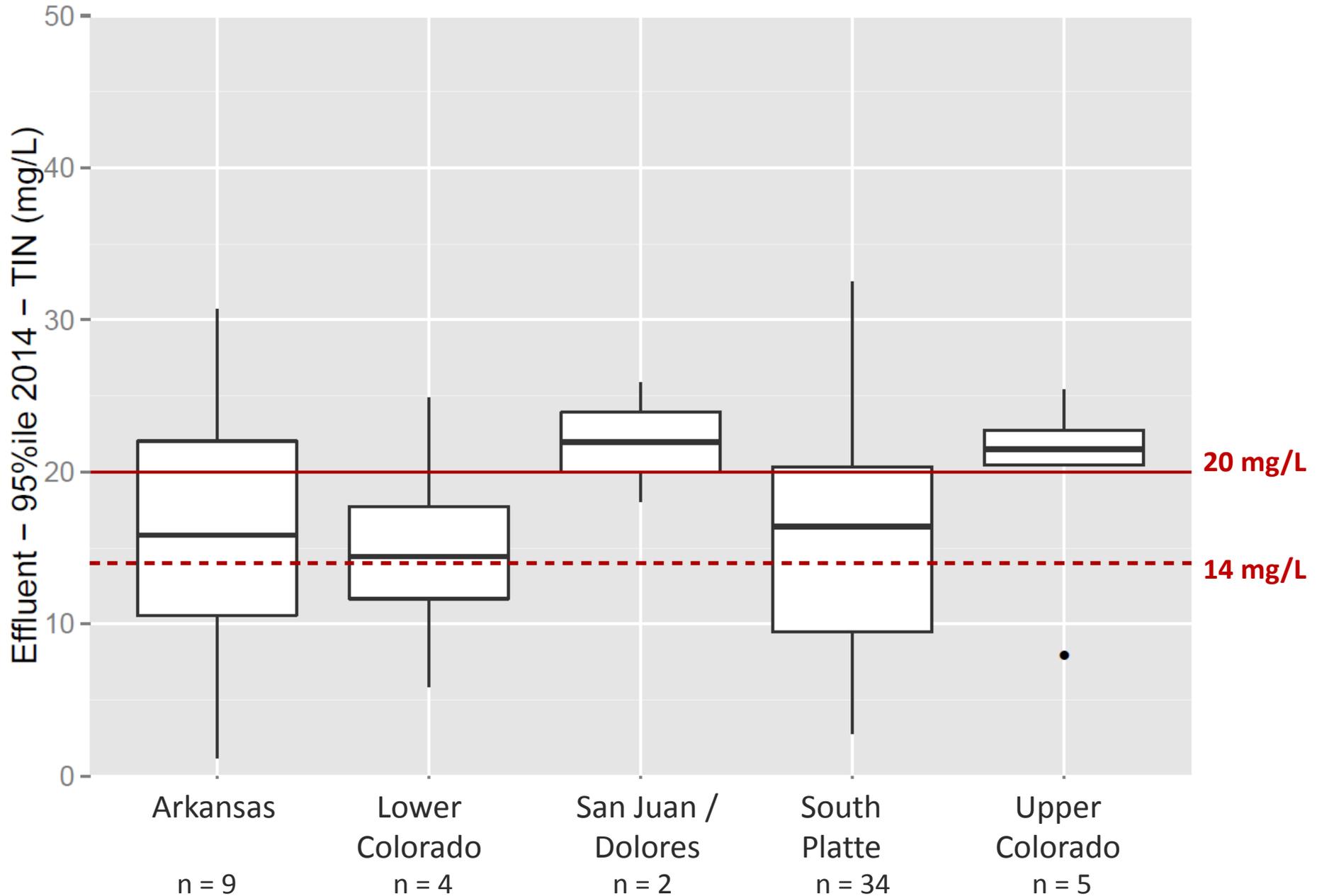
# Median 2014 TIN - Discharge, facilities eligible for Permit Limits



# 95%ile 2014 TIN - Discharge, all facilities



# 95%ile 2014 TIN - Discharge, Facilities Eligible for Permit Limits

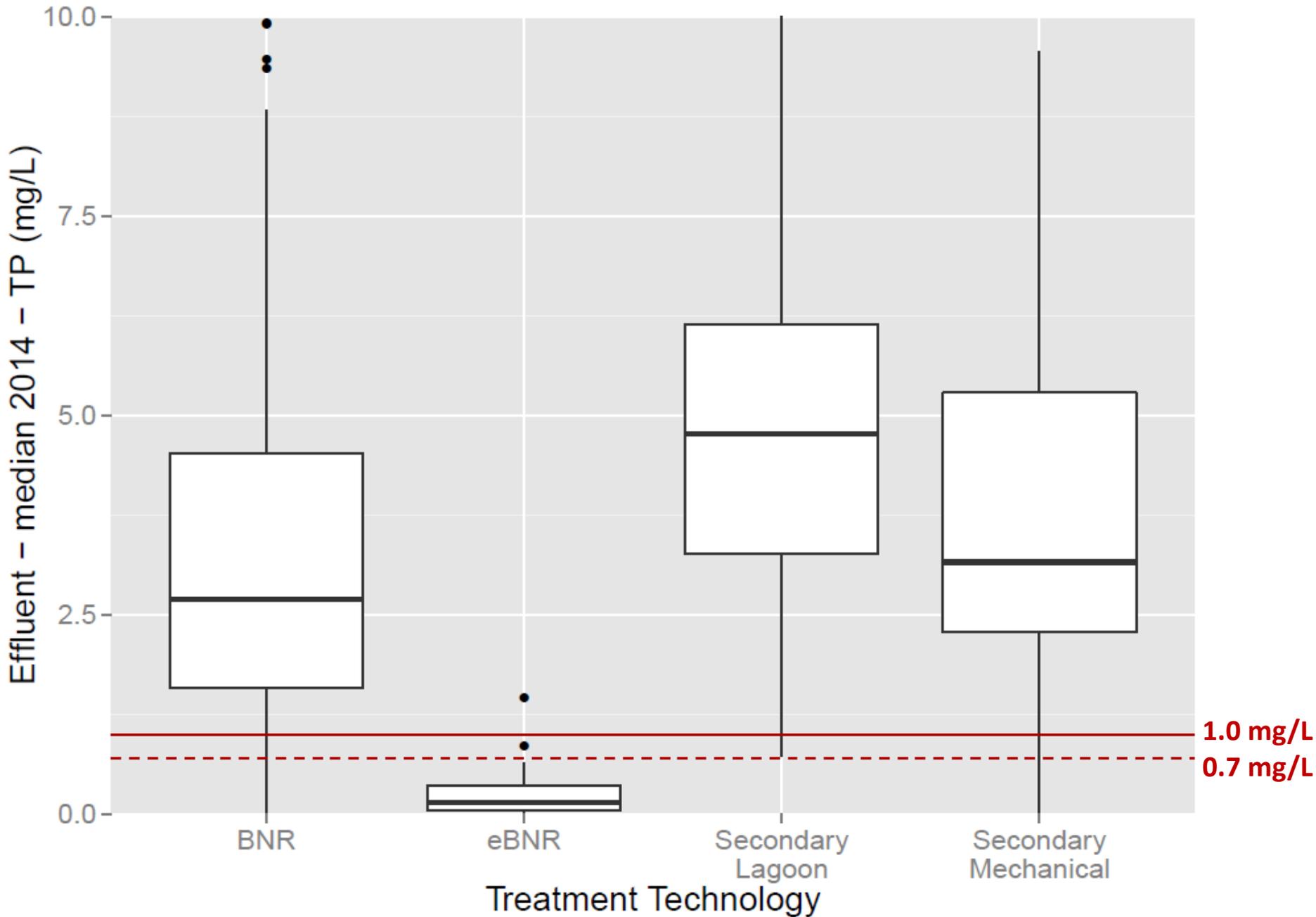


# Treatment Technology

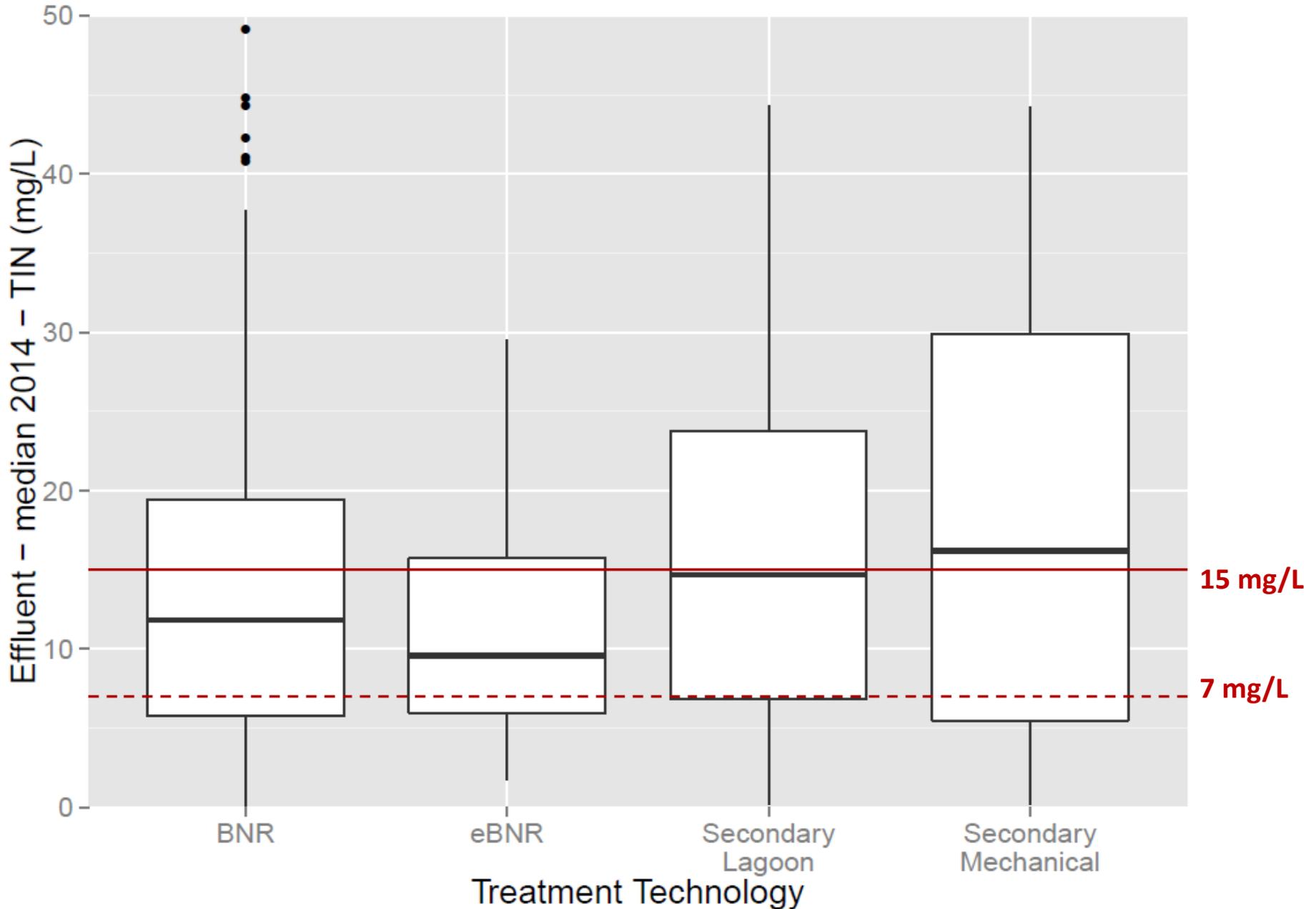
# *Key Points - Treatment Technology*

- Biological Nutrient Removal (BNR) facilities are close to meeting Total Inorganic Nitrogen Limits but not Total Phosphorus limits
- Enhanced Biological Nutrient Removal (eBNR) facilities perform well to meet Total Phosphorus and Total Inorganic Nitrogen limits
- Current excess capacity may be a factor in the ability to meet Total Inorganic Nitrogen and Total Phosphorus limits

# Median TP Discharge by Treatment Technology, All Facilities



# Median TIN Discharge by Treatment Technology , All Facilities

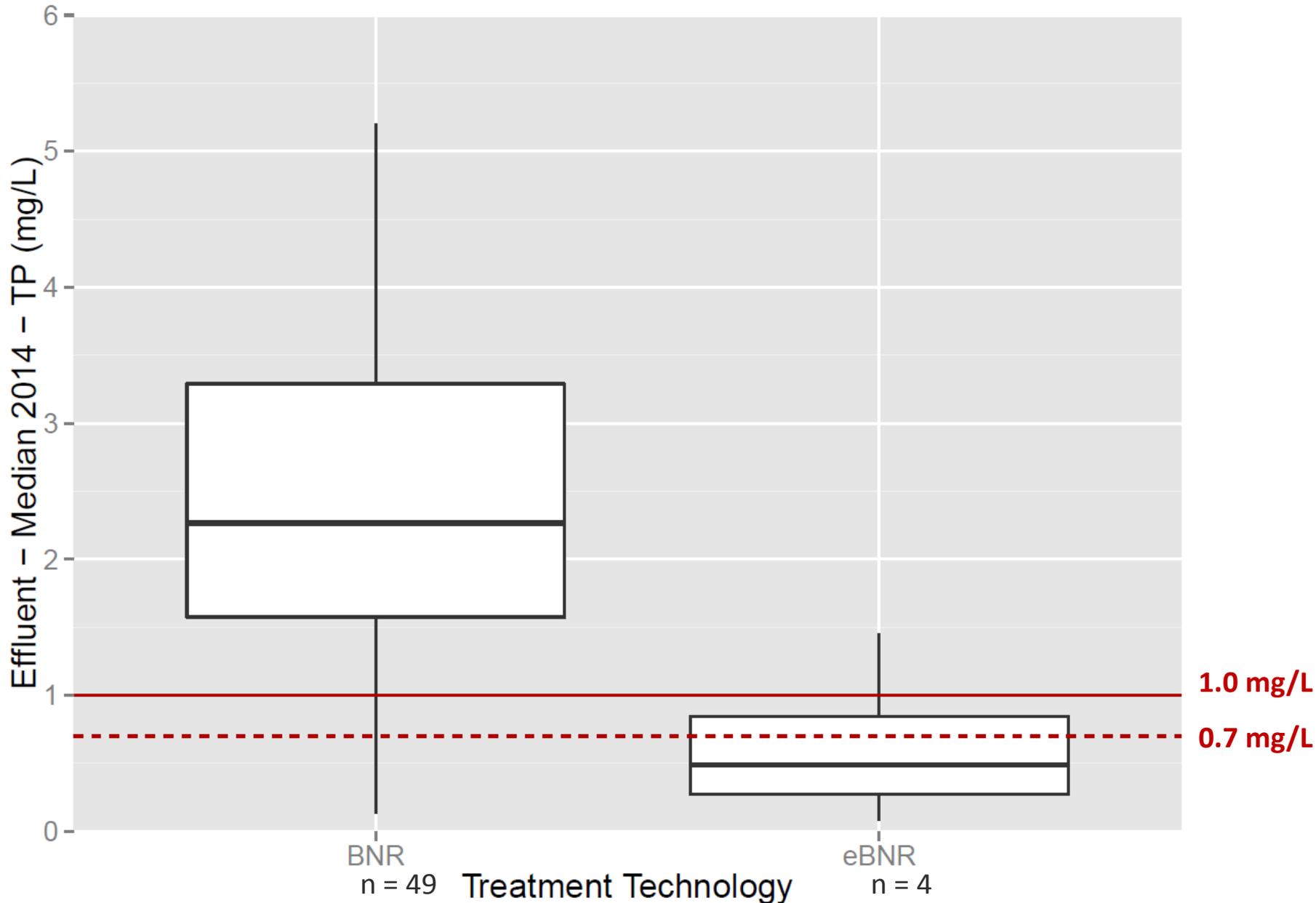


# *Derivation of Permit Limits*

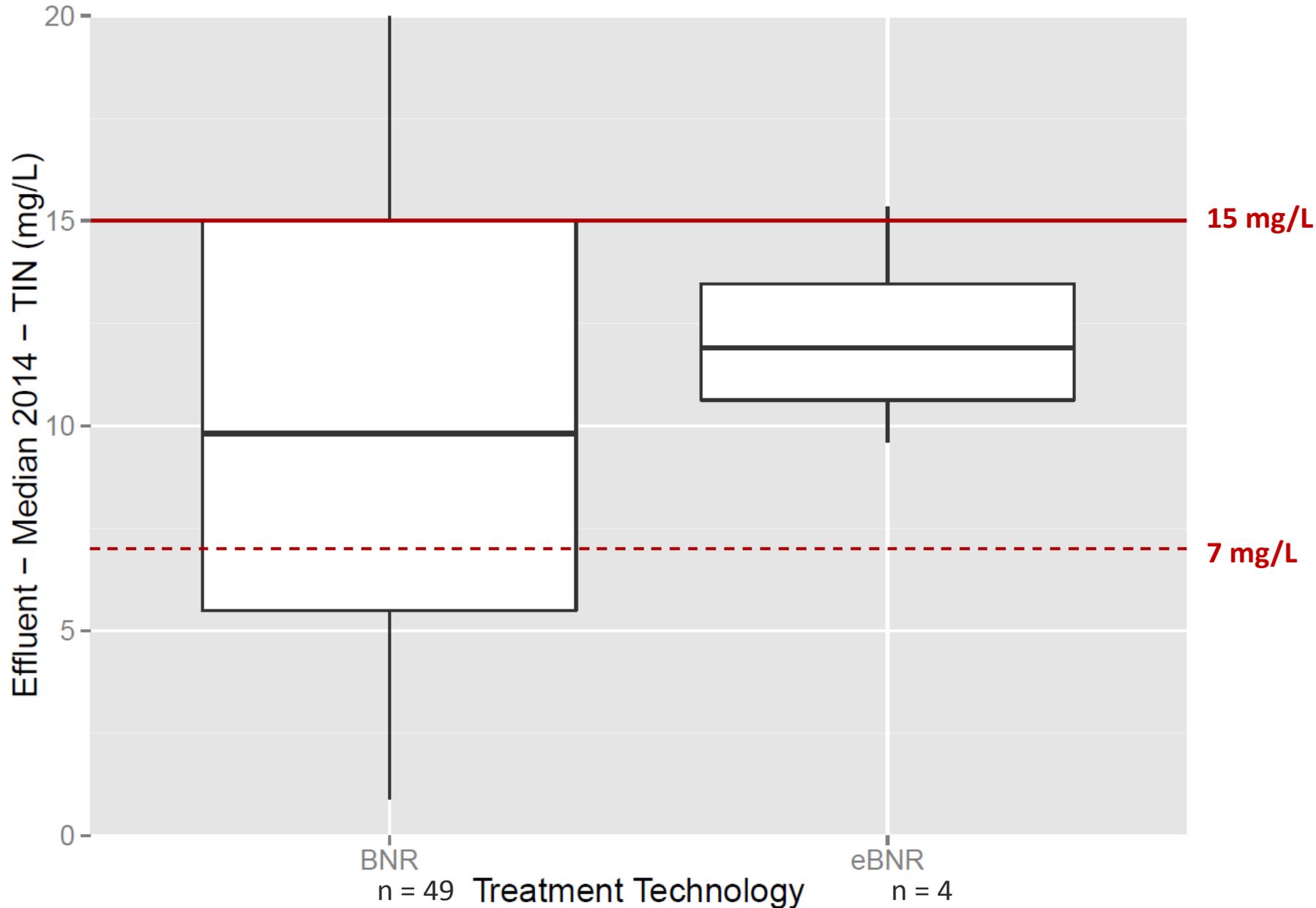
Per 85.15(III)

- For existing facilities, limits were set based on removal via biological nutrient removal (BNR)
  - 3 stage removal process
- For new facilities, limits were set based on removal via enhanced BNR (eBNR)
  - 4-5 stage removal process

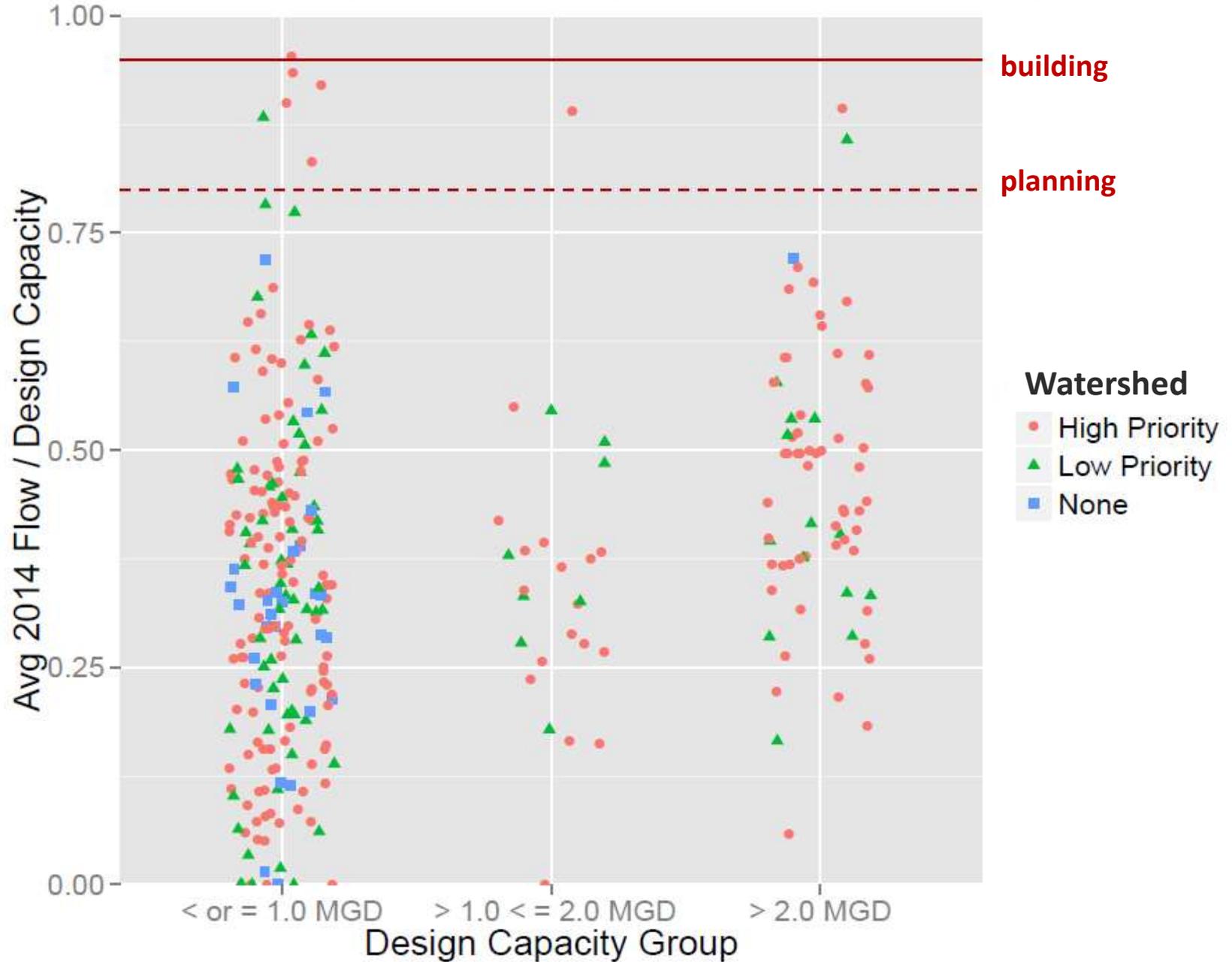
# Median TP Discharge by Treatment Technology, Facilities Eligible for Permit Limits, Outliers Removed



# Median TIN Discharge by Treatment Technology, Facilities Eligible for Permit Limits, Outliers Removed



# Percent of Design Capacity used, on average in 2014



# Nutrients in Colorado's Surface Waters



# *Key Points - Nutrients in Colorado's Surface Waters*

- The monitoring data provided by facilities is helping the division establish a good baseline.
- Not a lot of data collected where Nutrient standards apply

# Regulation 31.17

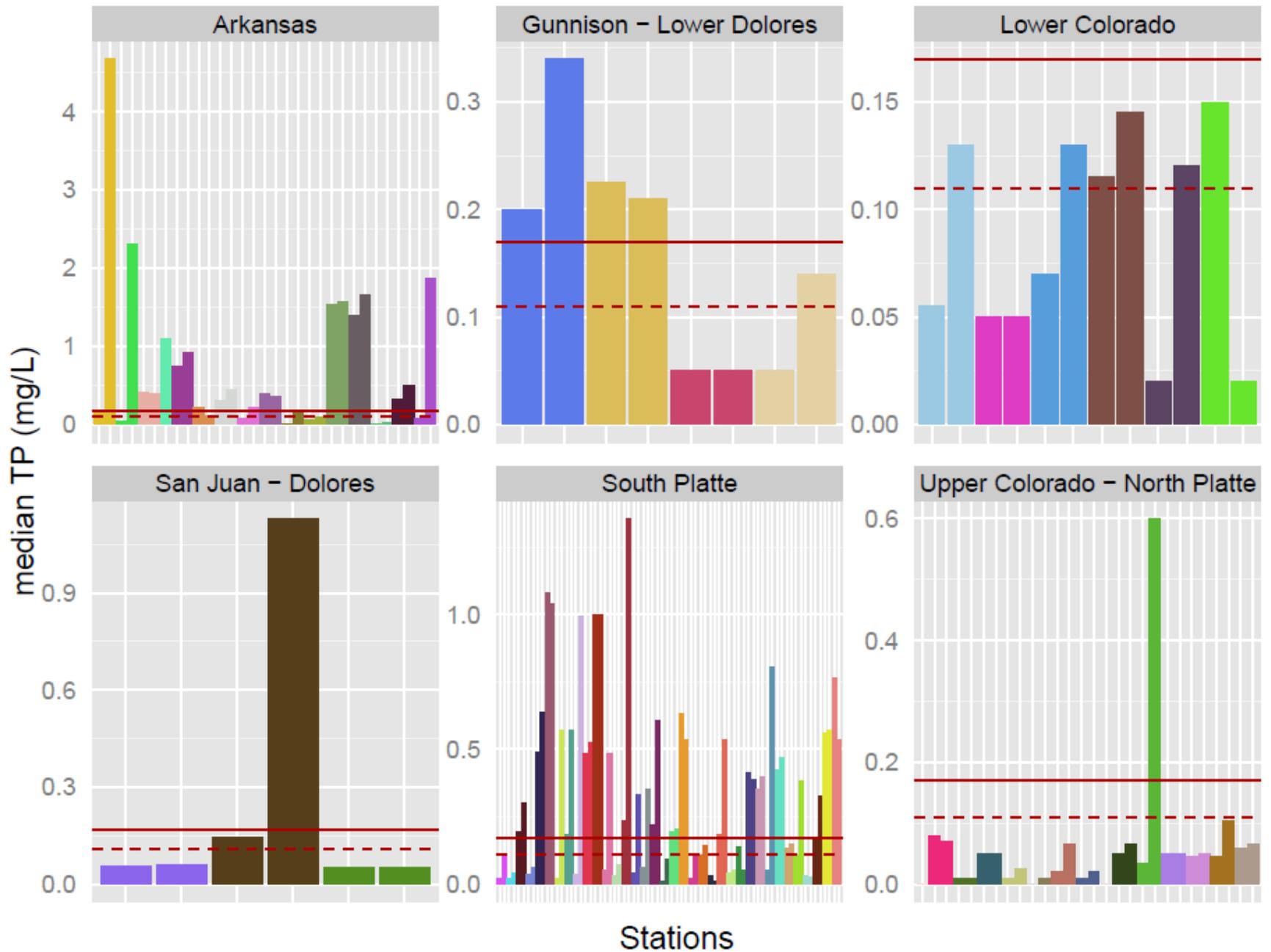
- Interim numeric values for TP and TN

Parameter <sup>1</sup>	Rivers and Streams	
	Cold	Warm
TP (mg/L)	0.11	0.17
TN (mg/L)	1.25	2.01

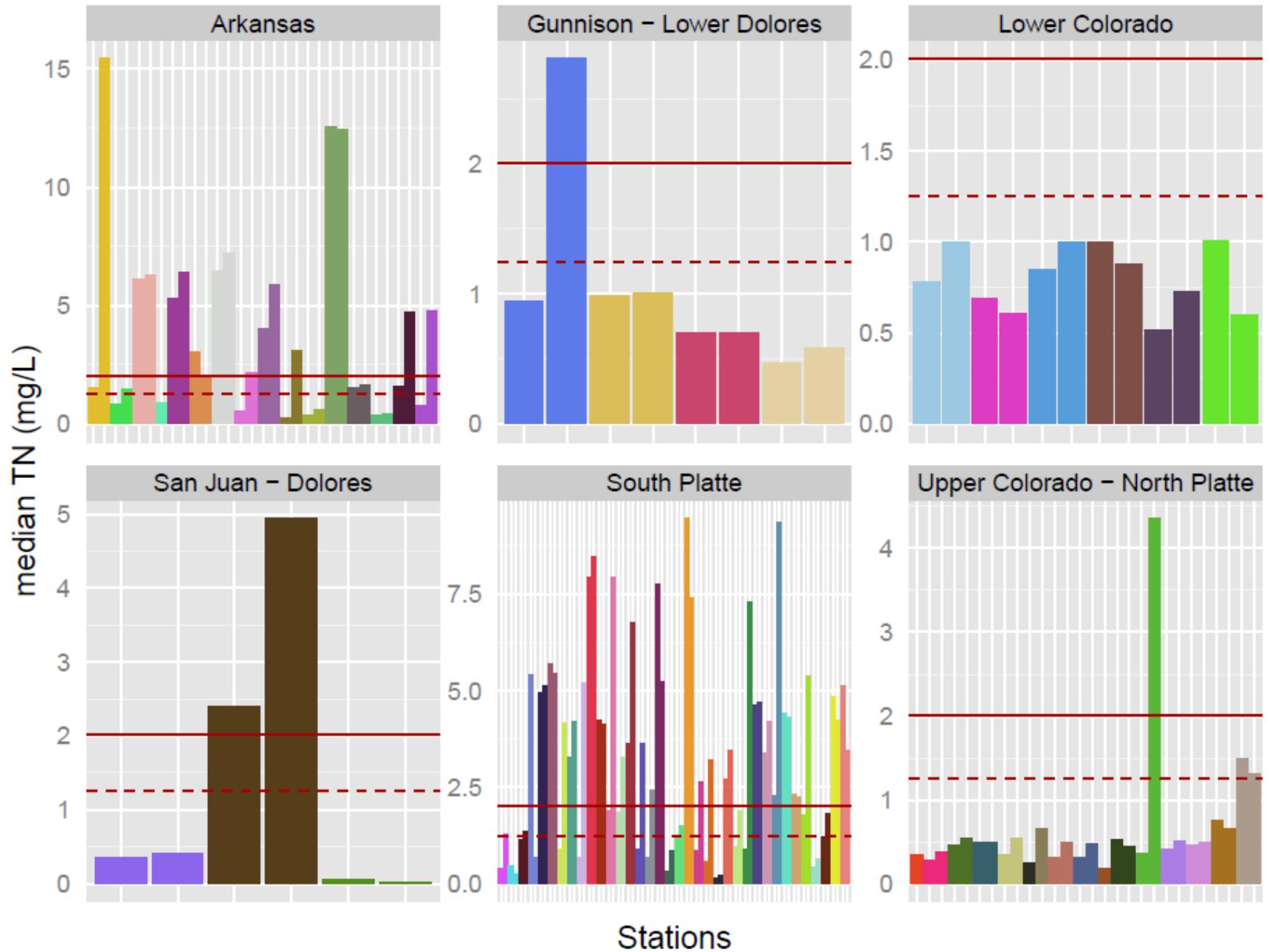
1 – allowable exceedance frequency 1-in-5 years

- TP (and Chl-a) are being adopted for waters upstream of DWWTF and non-domestics subject to nutrient discharge limits

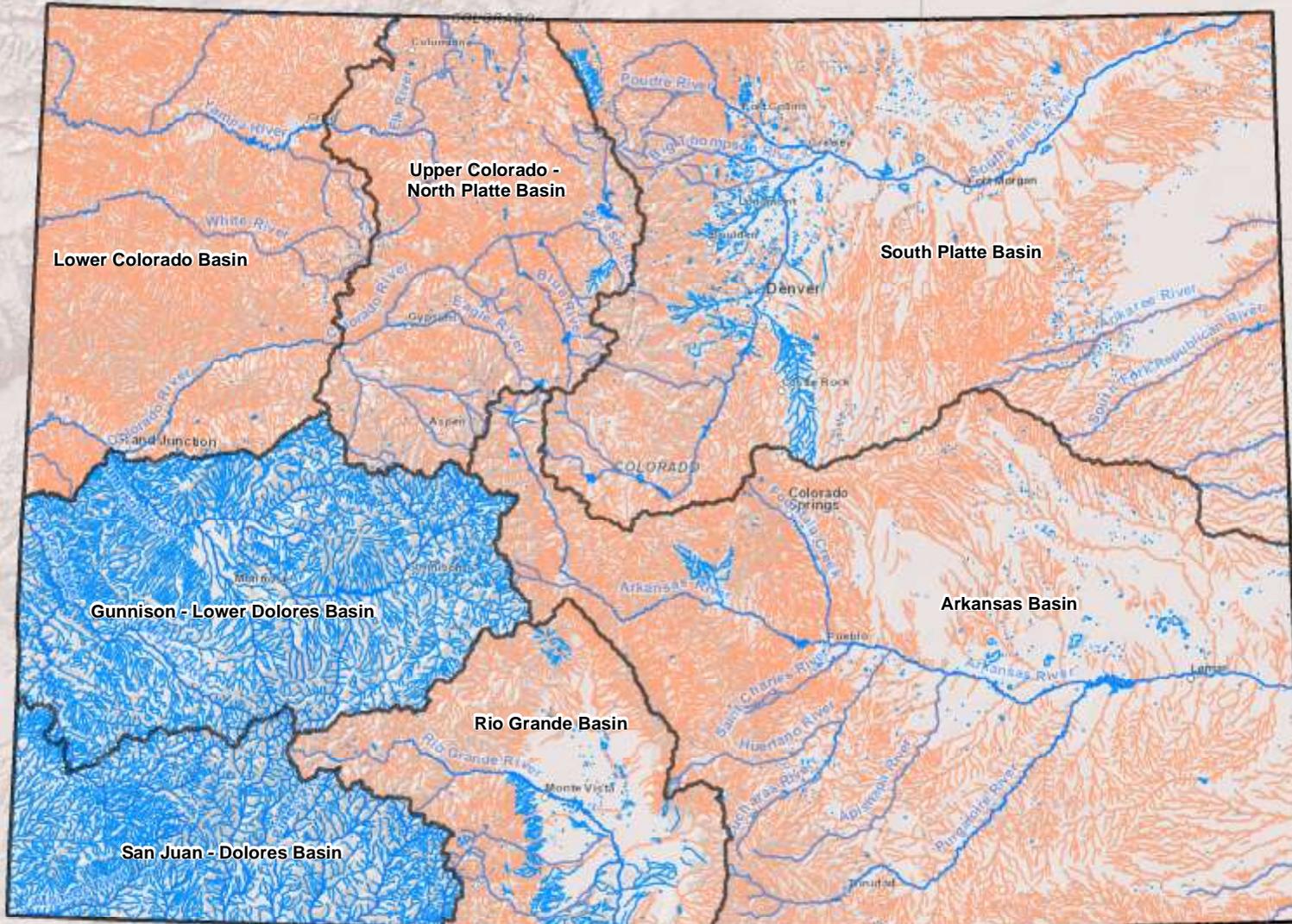
# Median TP instream



# Median TN instream



# WQCC Adoption of Total Phosphorus and Chlorophyll a Standards (as of July 2015)



- Legend**
- TP and Chl-a Standards Adopted<sup>1</sup>
  - TP and Chl-a Standards Not Adopted
  - Regulatory Basin Boundary

<sup>1</sup> Layer reflects headwater segments as well as segments with portions above facilities discharging prior to May 31, 2012 (per 32.5(4); 33.5(4); 36.5(4); 37.5(4)); draft 38.5(4)); Regulation 38 standards will be adopted in January, 2016.



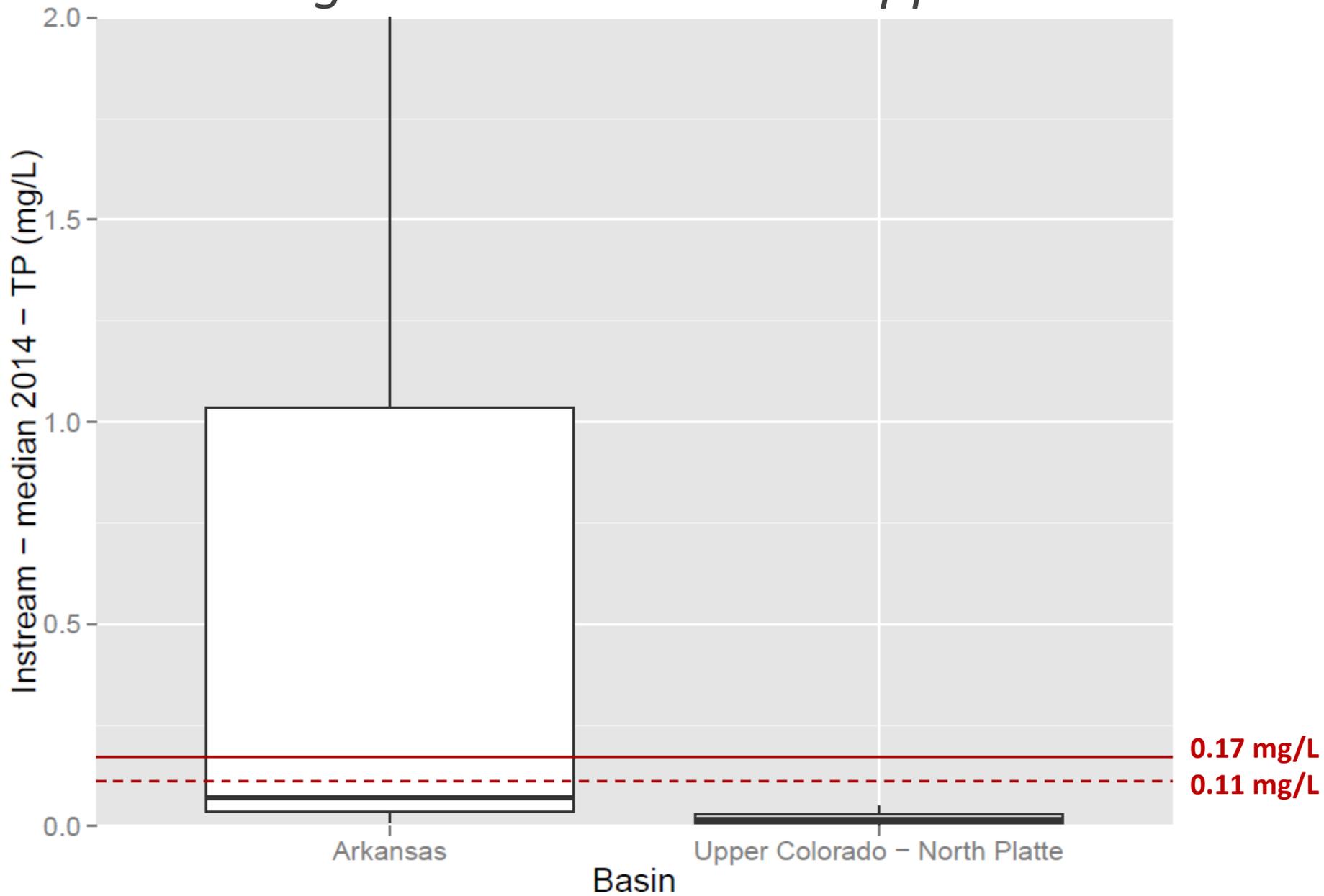
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Date: 8/6/2015

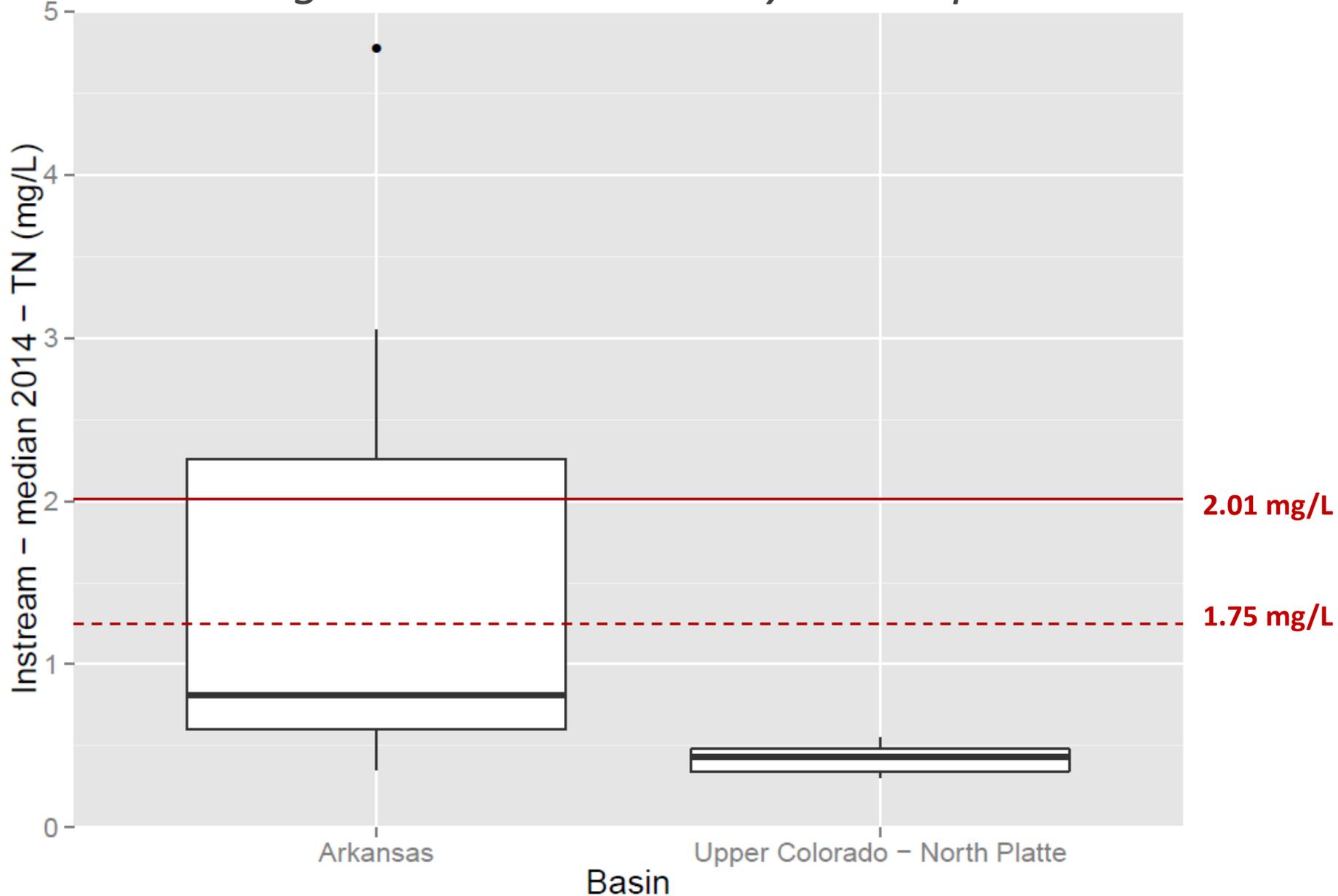
Use constraints: There are no restrictions and legal prerequisites for using this data set. The state of Colorado assumes no liability to the completeness, correctness, or fitness for use of this data set.



# *Median TP for instream monitoring locations located in segments where TP std applies*



*Median TN for instream monitoring locations located in segments where TN may be adopted*

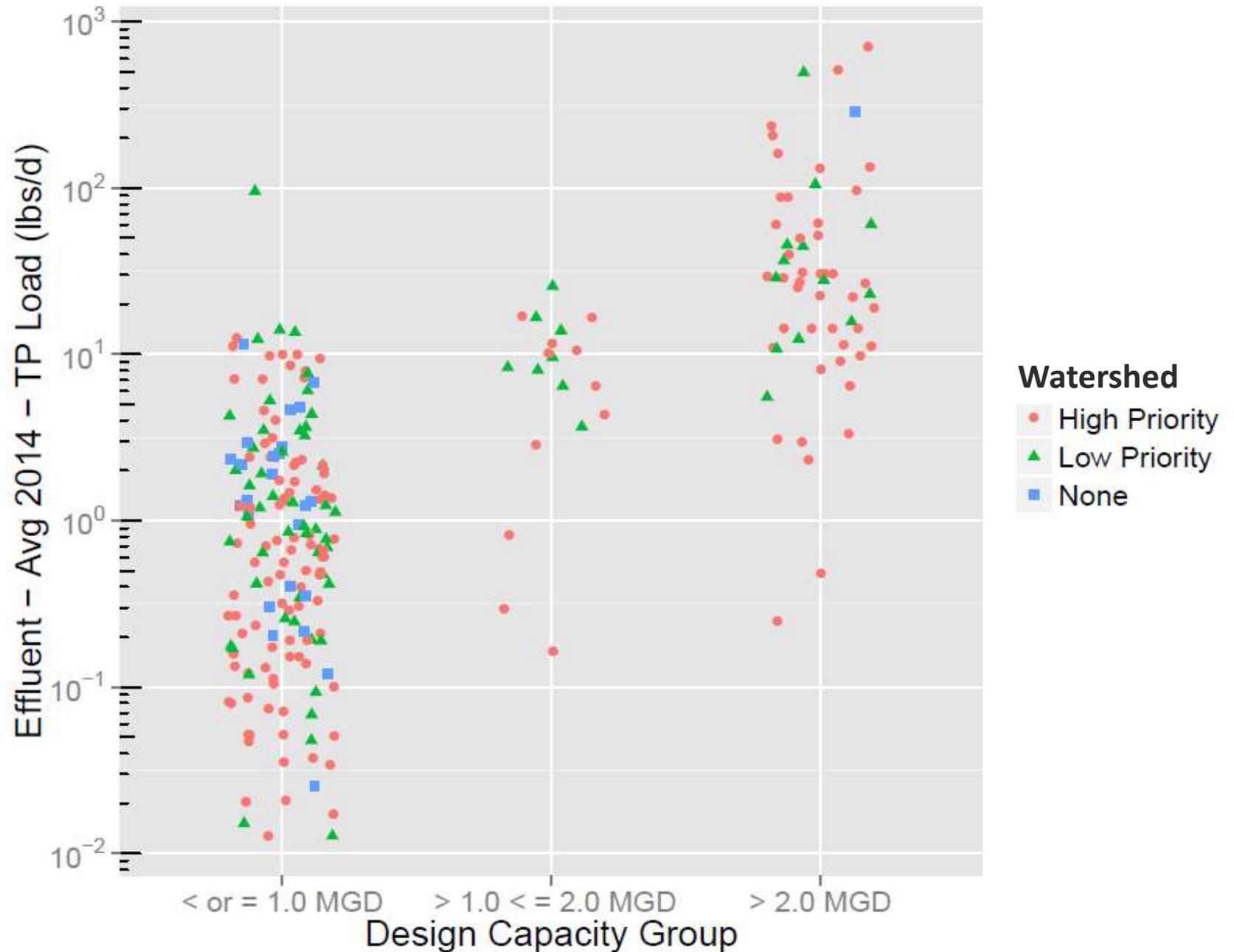


# Nutrient Loads

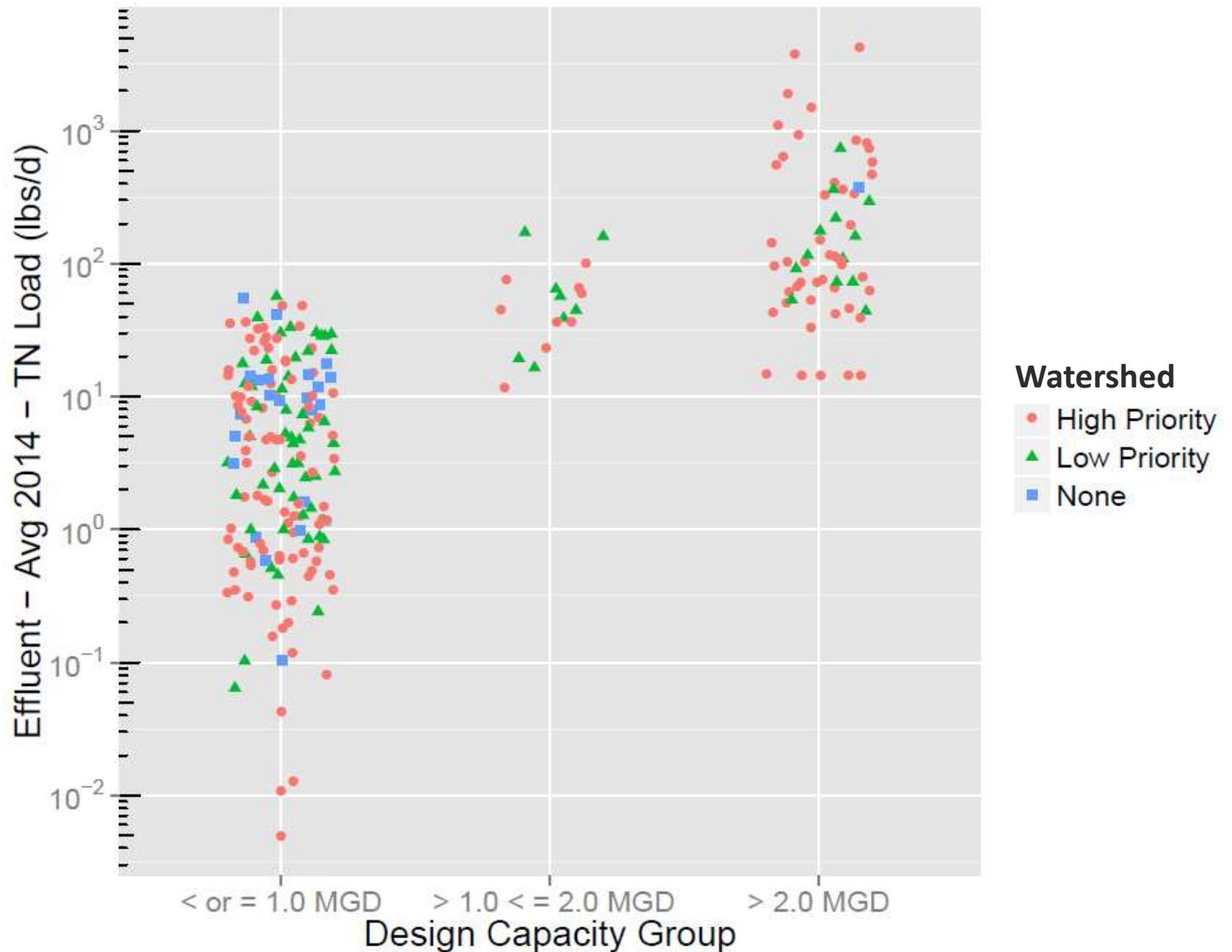
# *Key Points - Nutrients Loads*

- The majority of nutrient loading is from larger domestic wastewater treatment facilities subject to Regulation #85 limits.
- Evaluating if priority watersheds were correctly established

# Average 2014 TP Load, All Facilities



# Average 2014 TIN Load, All Facilities



# Cooling Towers



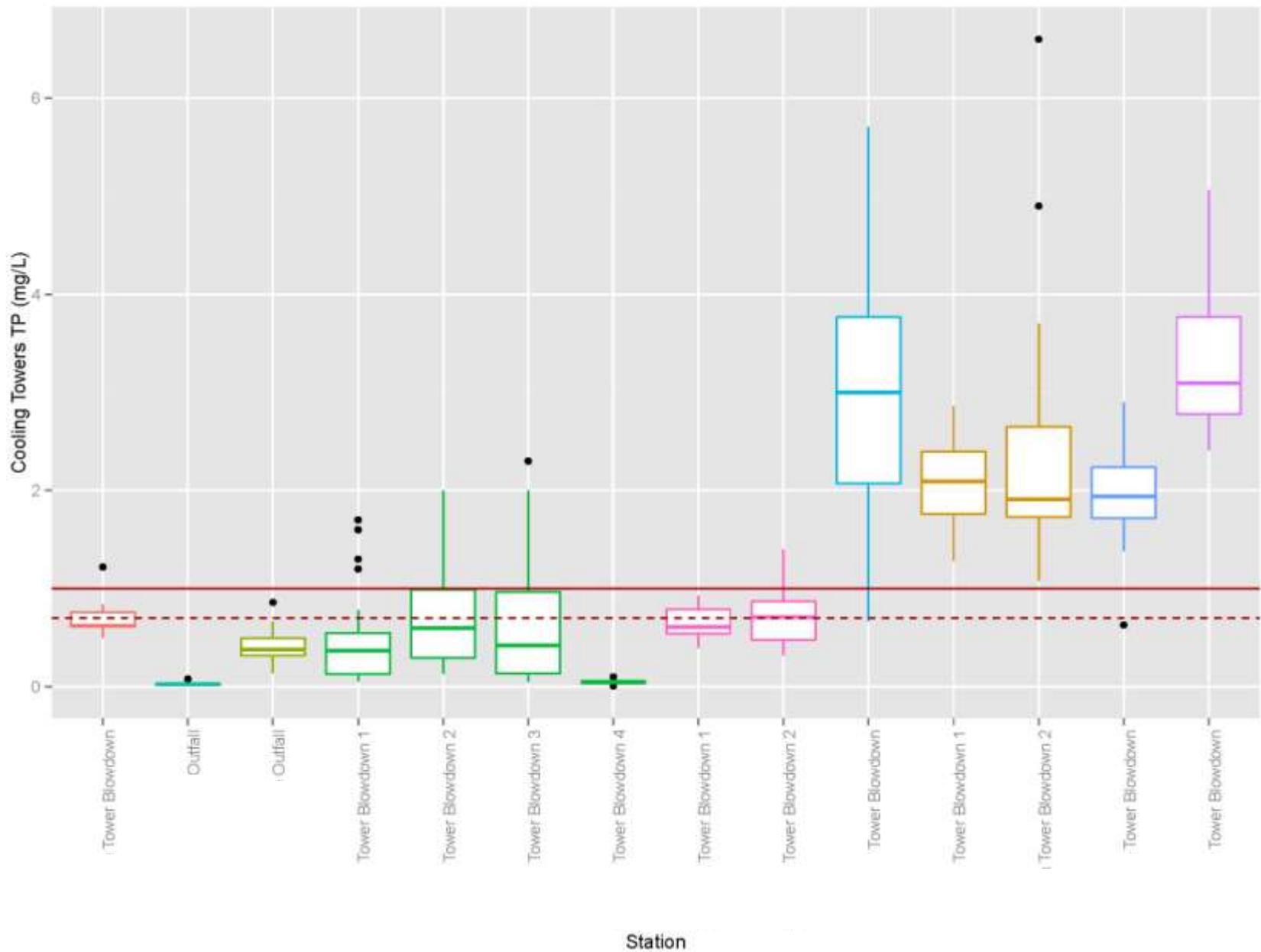
# *Key Points - Cooling Towers*

- Additional investigation is needed prior to the division making a recommendation on cooling towers and their contribution to nutrient loading.
- Although the sampling methodology could have been better designed, no further sampling is required

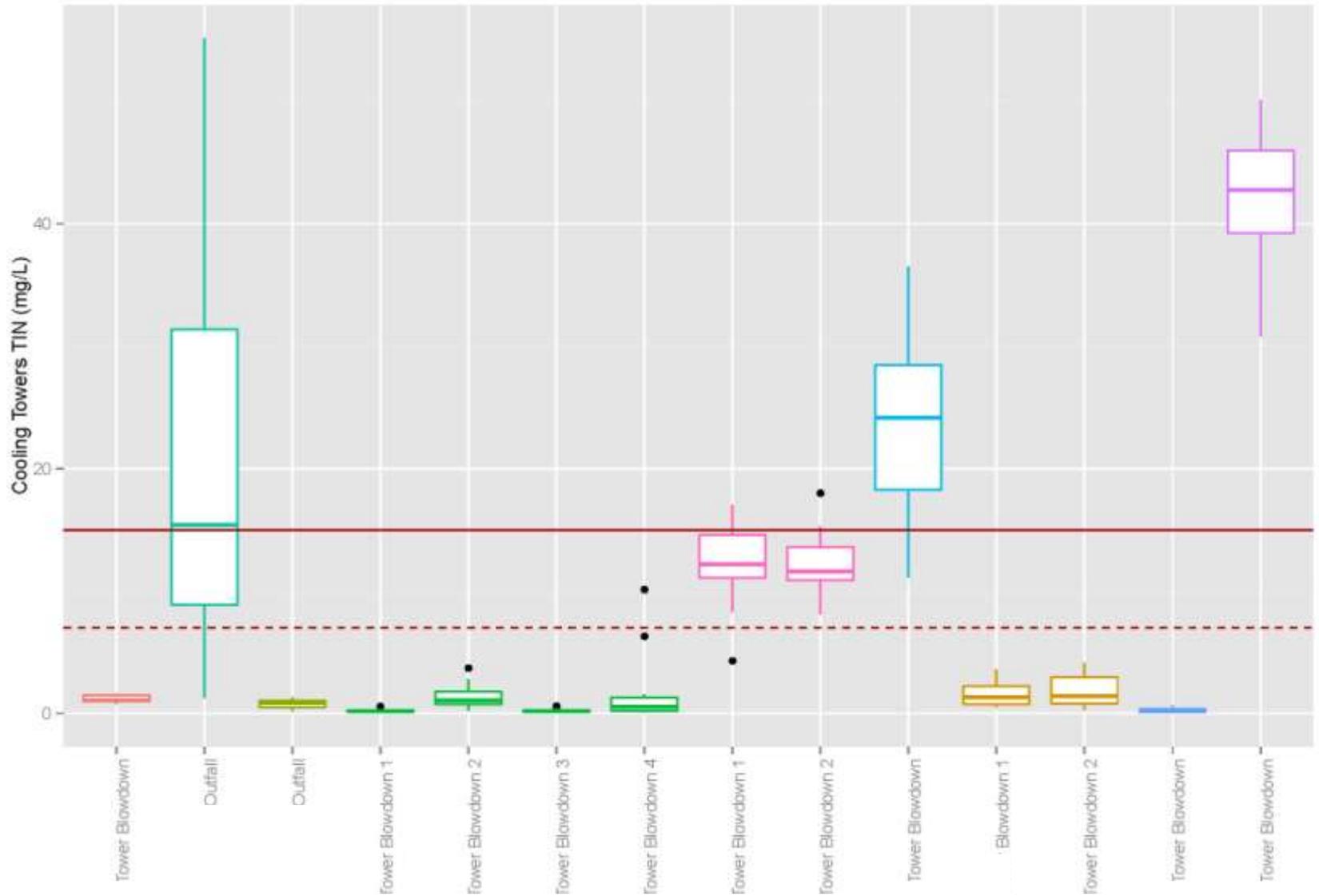
# *Cooling Tower Reports*

- Due February 28, 2015 to WQCD
- Two year report Nov. 2012 - Oct. 2014

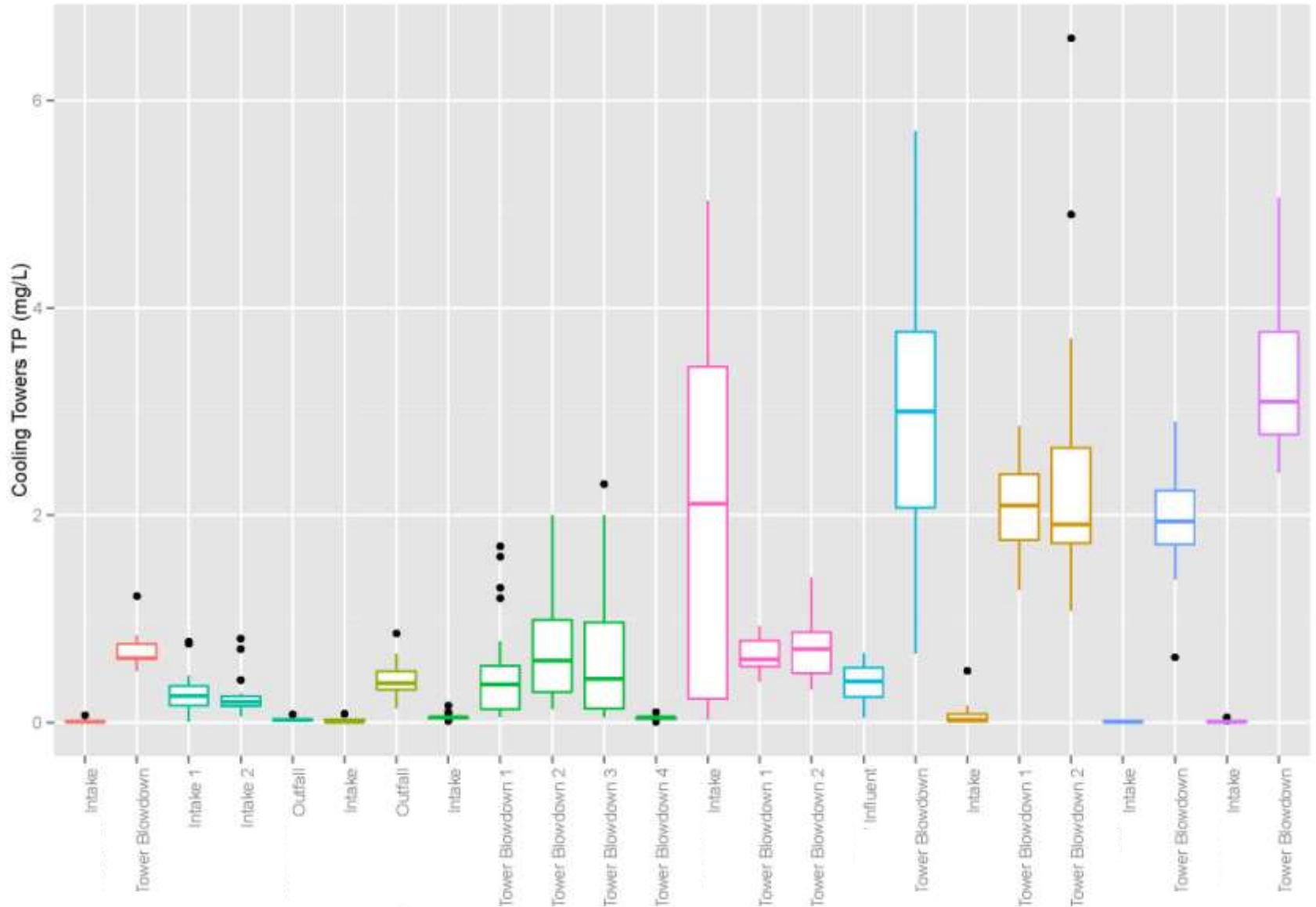
# Blowdown vs. Effluent Limits November 2012 – October 2014 TP



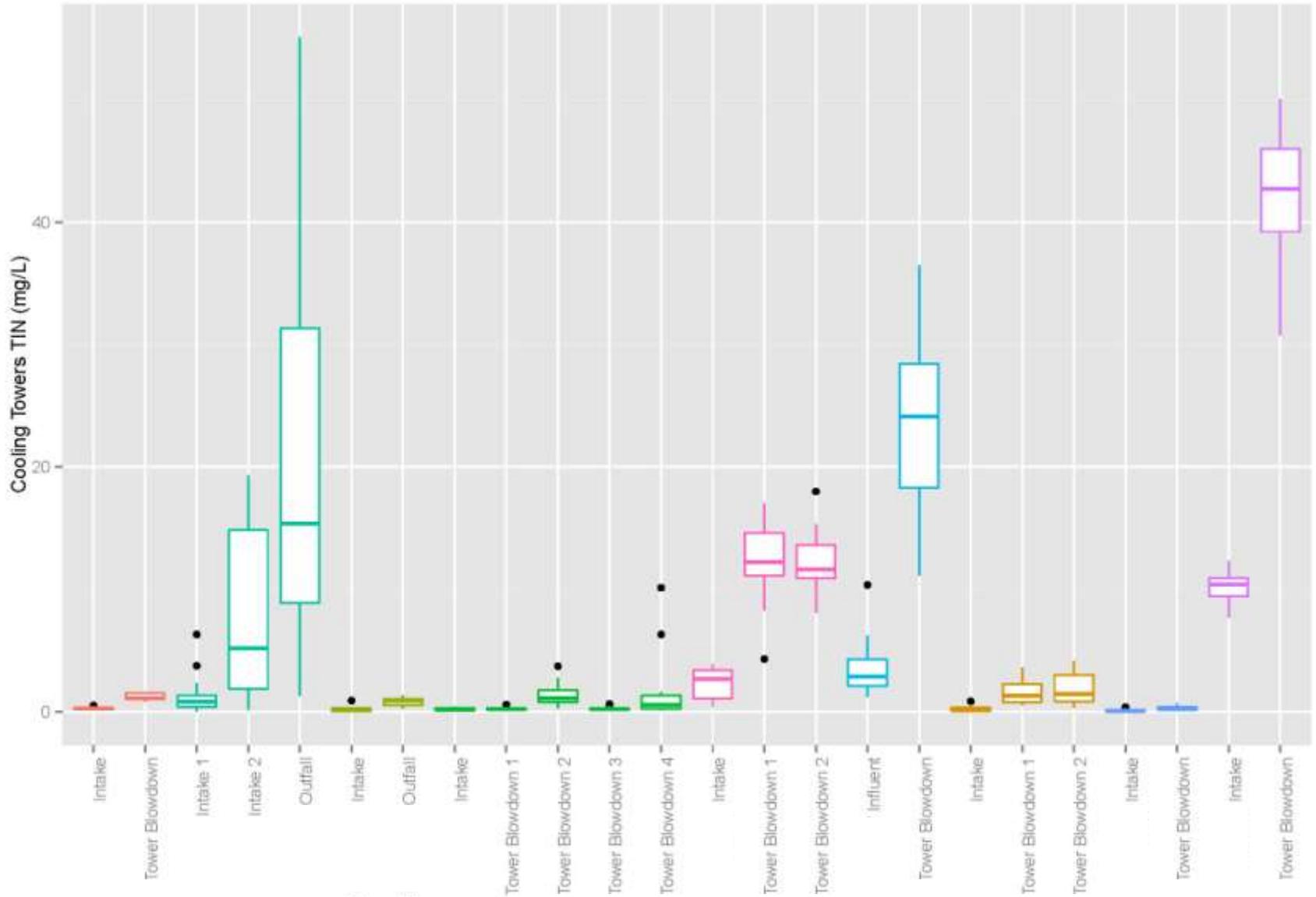
# Blowdown vs. Effluent Limits November 2012 – October 2014 TIN



# Input- Output Total Phosphorus for November 2012 – October 2014



# Input-Output Total Inorganic Nitrogen for November 2012 – October 2014



# Key Points - Review

## Nutrients in Effluent:

- Facilities subject to Regulation #85:
  - Need to implement improvements to meet Total Phosphorus limits
  - Are close to meeting Total Inorganic Nitrogen limits but not on a consistent basis

## Treatment Technology:

- Biological Nutrient Removal (BNR) facilities are close to meeting Total Inorganic Nitrogen Limits but not Total Phosphorus limits
- Enhanced Biological Nutrient Removal (eBNR) facilities perform well to meet Total Phosphorus and Total Inorganic Nitrogen limits
- Current excess capacity may be a factor in the ability to meet Total Inorganic Nitrogen and Total Phosphorus limits

## Nutrients in Surface Waters:

- The monitoring data provided by facilities is helping the division establish a good baseline
- Not a lot of data collected where Nutrient standards apply

## Nutrient Loadings:

- The majority of nutrient loading is from larger domestic wastewater treatment facilities subject to Regulation #85 limits
- Evaluating if priority watersheds were correctly established

## Cooling towers:

- Additional investigation is needed prior to the division making a recommendation on cooling towers and their contribution to nutrient loading
- Although the sampling methodology could have been better designed, no further sampling is required



# *Regulation 85 Nonpoint Source Pollution Program Efforts*



# *Funded NPS Efforts*

- CLEAN Center
- South Platte Agricultural Nutrients (SPAN)
- Agricultural Community Outreach
- National Water Quality Initiative (NWQI)
- Selenium/nutrients investigations in Lower Arkansas River

# ***CLEAN Center***

- Funding support of \$278,000
- Regulation 85 monitoring and assessment tool
- SWAT Model
- Watershed assessment tool
- [www.erams.com/cdphe](http://www.erams.com/cdphe)

# eRAMS

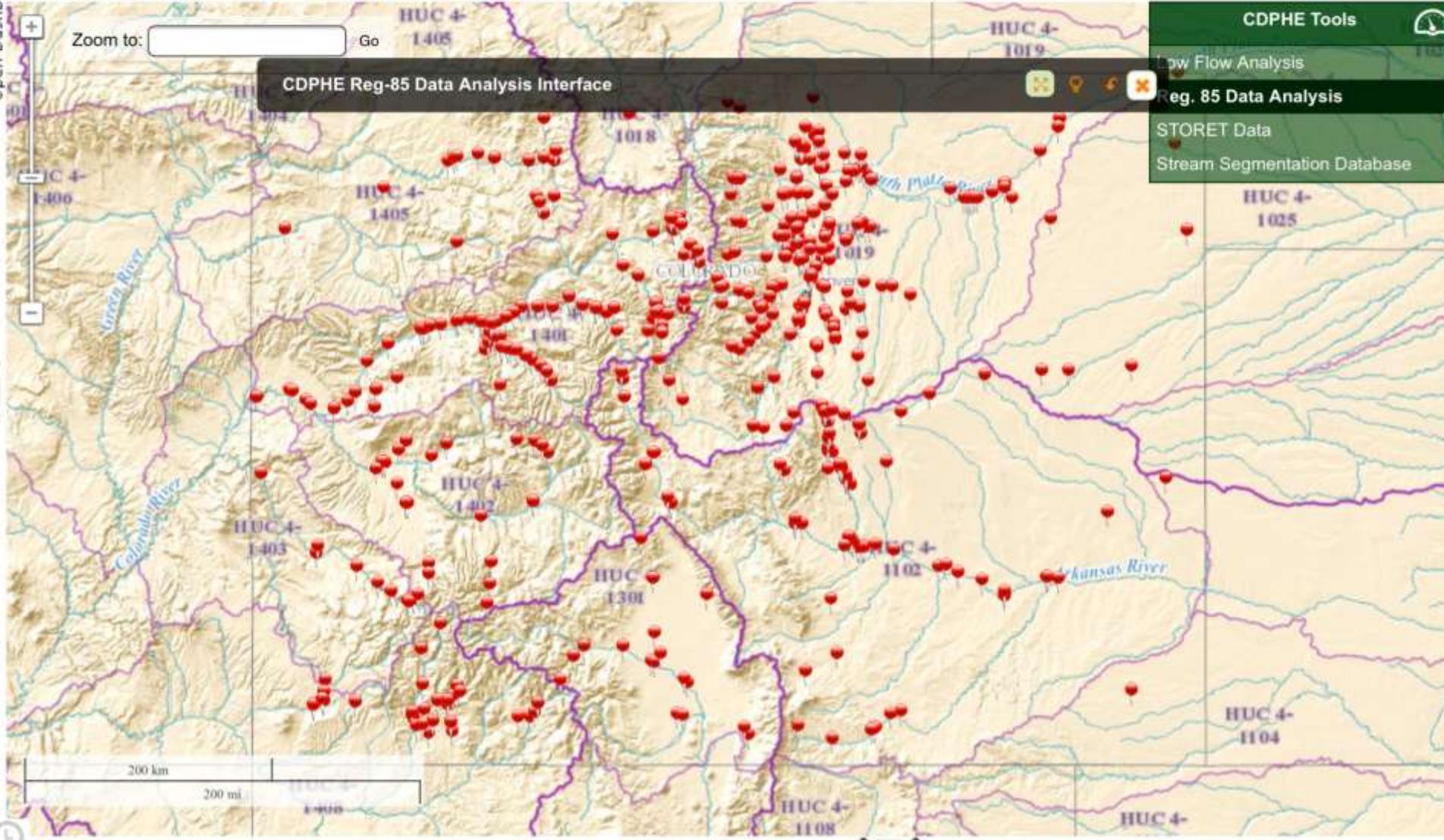
Open Dashboard



Zoom to:  Go

## CDPHE Reg-85 Data Analysis Interface

- CDPHE Tools
- Low Flow Analysis
- Reg. 85 Data Analysis**
- STORET Data
- Stream Segmentation Database



# *SWAT Model*

- USDA and Texas A&M cooperative
- Identify watersheds needing enhanced monitoring or Nutrient BMPs
- Predict of nutrient changes in watersheds with BMP implementation, wastewater treatment changes, population growth, and land use changes

# *Watershed Assessment Tool*

- Use in conjunction with SWAT Model
- Assess watershed scale nutrient pollution sources (land use, permitted sources, diffuse sources)
- NPS Project identification and implementation
- TMDL development

# *SPAN*

- Funding support of \$219,000
- Building a Nutrient BMP database specifically for Colorado agriculture
- Complements BMP database developed by Wright Water Engineers
- Projected completion date: June 2016

# *Agricultural Community Outreach*

- CSU Extension
- Funding support of \$200,000
- Creating a Regulation 85 communication plan and media for the agricultural community
- Projected completion date: Dec 2016

# *National Water Quality Initiative (NWQI)*

- Funding support of \$318,000
- Monitoring and assessment of agricultural nutrient BMPs effectiveness in the Grape Creek watershed
- Projected completion in 2017

# *Selenium/Nutrients in the Lower Arkansas River Valley*

- Funding support of \$200,000
- Working with local conservation districts to promote the implementation of nutrient BMPs
- Projected completion in Dec 2016

# *Other NPS Efforts*

- Participation with the Colorado Monitoring Framework Agriculture Alliance and the Brown and Caldwell Agriculture Thinking Group
- Developing the Governor's Working Group on Agricultural Nutrient Pollution
- Reservoir Control Regulations
- Agriculture BMP Implementation

# *Other NPS Efforts*

- 2015 coordination with U.S. EPA and National Resources and Conservation Service (NRCS)
- Developing MOU with NRCS for data sharing
- Obtained and reviewed BMP implementation data from CSU Extension surveys

# RECOMMENDATIONS



# *Recommend Changes to Regulation #85 and Section 31.17 of Regulation #31*

- I. Regulation #85 and Section 31.17 of Regulation #31 Phase 2 Effective Date
- II. 85.5 Specific Limitations for Dischargers of Nutrients
- III. 85.6 Monitoring Requirements
- IV. Section 31.17 of Regulation #31
- V. General Clean-up and Corrections

# *I. Regulation #85 and Section 31.17 of Regulation #31 Phase 2 Effective Date*

- May 31, 2022
  - Commission could adopt interim phosphorus, nitrogen and chlorophyll ‘a’ values downstream of wastewater facilities
  - Regulation #85 could apply to all facilities >1.0 MGD unless located in a disadvantaged community
- Division recommends that scope of hearing include recommendation on Phase 2 effective date

## *II. 85.5 Specific Limitations for Dischargers of Nutrients*

- Include in proposal:
  - Provide definition of new domestic wastewater treatment works that is consistent with other regulations
  - Allow all facilities to request preliminary effluent limits
  - Reference monitoring requirements
  - Federal facilities
- Scope should include consideration of:
  - Cooling towers
  - Trading

### *III. 85.6 Monitoring Requirements*

- Include in proposal:
  - None at this time
- Scope should include consideration of:
  - Monitoring end date

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## *IV. Section 31.17 of Regulation #31*

- Include in proposal:
  - Clarifications to 31.17(e)(i) to be consistent with recent commission policy decisions about headwaters
- Scope should include consideration of:
  - None at this time

## *V. General Clean-up and Corrections*

- General clean-up and corrections to increase usability and clarity of Regulation #85
- Fix typographical and other minor errors

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# NEXT STEPS

# Key Dates

- **September 9, 2015** Water Quality Control Division memo posted on Water Quality Control Commission website.
- **September 30, 2015** Public comments for Triennial Review Informational hearing due to the Water Quality Control Commission Office.
- **October 13, 2015** Triennial Review Informational Hearing