NORTH CENTRAL TEXAS REGIONAL WET WEATHER CHARACTERIZATION PROGRAM

15th Annual EPA Region 6 Stormwater Conference

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North Central Texas Council of Governments

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Atkins

Overview

- Background
- Chemical Monitoring
- Biological Monitoring
- Data Review and Comparisons
- On-line Data Viewer
- Status of the Program
- Questions

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Background

NCTCOG

- North Central Texas Council of Governments (NCTCOG)
- Voluntary association of, by and for local governments
- Assist local governments
  - Planning for common needs
  - Cooperating for mutual benefit
  - Coordinating for sound regional development

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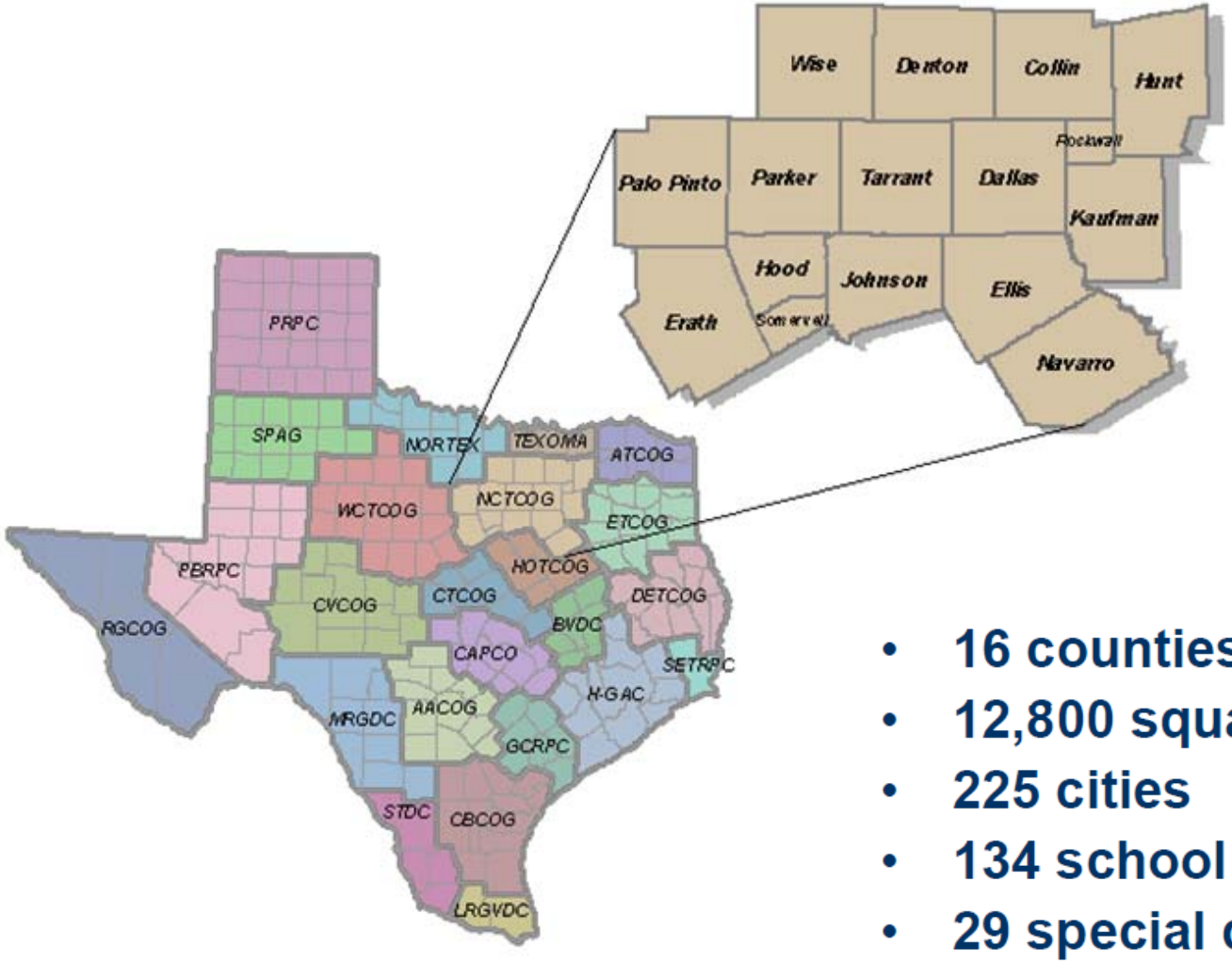
NCTCOG



- 16 counties
- 12,800 square miles
- 225 cities
- 134 school districts
- 29 special districts

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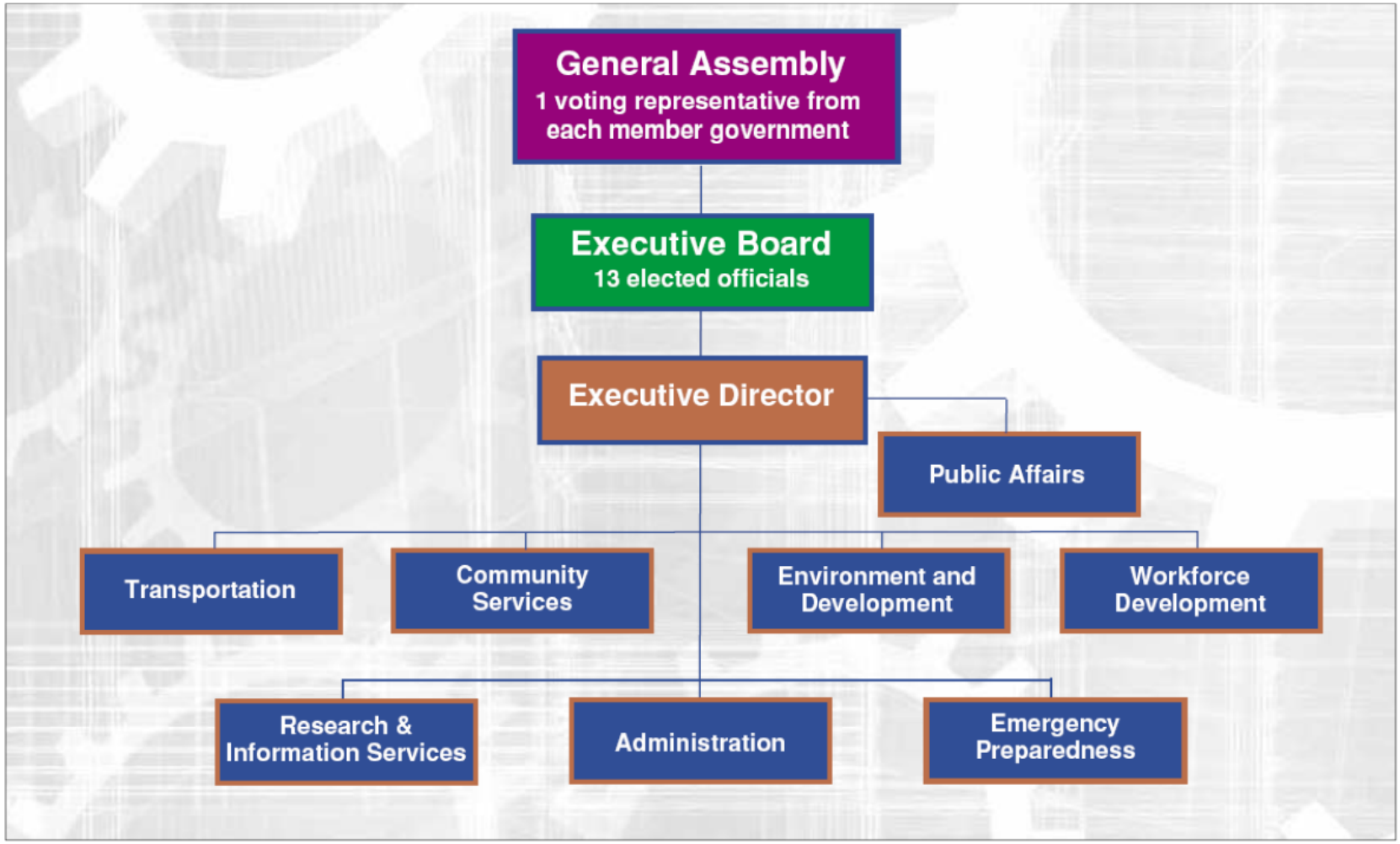
NCTCOG Structure



Regional Partnership

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- Regional Monitoring Program coordinated by NCTCOG
- Participants
  - Arlington
  - Dallas
  - Fort Worth
  - Garland
  - Irving
  - Mesquite
  - Plano
  - Texas Department of Transportation (TxDOT) – Dallas and Fort Worth Districts

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Application Phase

- 1992 – 1994
- Small, single land use watershed sampling
- 30 monitoring sites
- 188 constituents
- 210 samples
- Analysis of results
  - 15 redundant monitoring sites
  - Almost half of parameters never detected
  - Of those detected only portion merited further study

First Term

- 1997 – 2001
- 22 monitoring sites
  - 15 from previous network (small single land use watersheds)
  - New sites: 3 mixed land use, 3 in-stream, 1 developing watershed
- 33 constituents
- 330 samples
- Partners felt results did not characterize impact on receiving waters

RWWCP

- Partners proposed plan to switch to in-stream monitoring
- NCTCOG Regional Wet Weather Characterization Program (RWWCP)
- Participants
  - Arlington
  - Dallas
  - Fort Worth
  - Garland
  - Irving
  - Mesquite
  - Plano
  - North Texas Tollway Authority (NTTA)
  - Texas Department of Transportation (TxDOT) – Dallas District

RWWCP

- Permit option approved by TCEQ
- Baseline data establishment
  - Determine long-term water quality trends;
  - Assess the impact of stormwater discharge on receiving stream quality; and
  - Potential tool to evaluate BMP effectiveness.

RWWCP Second Term

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- 2006 – 2010
  - 3 years in-stream sampling
  - 24 watersheds sampled
  - 77 sampling stations
  - Each watershed sampled 1 year
  - 1 sample per quarter/per site (except Fort Worth)
  - 285 samples collected

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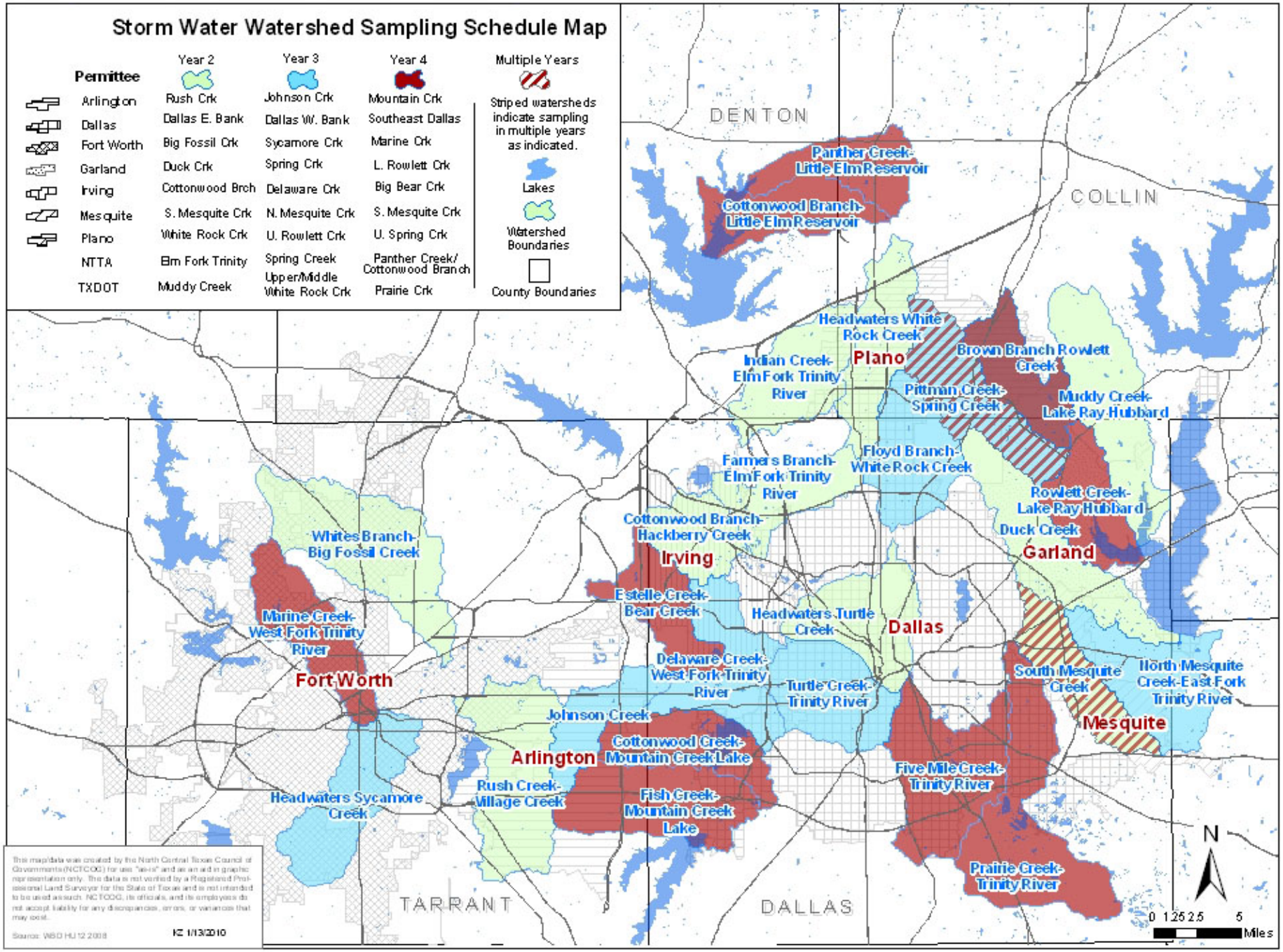
Storm Water Watershed Sampling Schedule Map
Permittee
Year 2
Year 3
Year 4
Multiple Years
Arlington
Rush Crk
Johnson Crk
Mountain Crk
Dallas
Dallas E. Bank
Dallas W. Bank
Southeast Dallas
Fort Worth
Big Fossil Crk
Sycamore Crk
Marine Crk
Garland
Duck Crk
Spring Crk
L. Rowlett Crk
Irving
Cottonwood Brch
Delaware Crk
Big Bear Crk
Mesquite
S. Mesquite Crk
N. Mesquite Crk
S. Mesquite Crk
Plano
White Rock Crk
U. Rowlett Crk
U. Spring Crk
NTTA
Elm Fork Trinity
Spring Creek
Panther Creek/ Cottonwood Branch
TXDOT
Muddy Creek
Upper/Middle White Rock Crk
Prairie Crk
Striped watersheds indicate sampling in multiple years as indicated.
Lakes
Watershed Boundaries
County Boundaries
DENTON
COLLIN
TARRANT
DALLAS
Panther Creek-Little Elm Reservoir
Cottonwood Branch-Little Elm Reservoir
Headwaters White Rock Creek
Plano
Brown Branch Rowlett Creek
Indian Creek-Elm Fork Trinity River
Pittman Creek-Spring Creek
Muddy Creek-Lake Ray Hubbard
Farmers Branch-Elm Fork Trinity River
Floyd Branch-White Rock Creek
Rowlett Creek-Lake Ray Hubbard
Duck Creek
Garland
Cottonwood Branch-Hackberry Creek
Irving
Whites Branch-Big Fossil Creek
Estelle Creek-Bear Creek
Headwaters Turtle Creek
Dallas
Marine Creek-West Fork Trinity River
Fort Worth
Delaware Creek-West Fork Trinity River
Turtle Creek-Trinity River
South Mesquite Creek
North Mesquite Creek-East Fork Trinity River
Mesquite
Johnson Creek
Cottonwood Creek-Mountain Creek Lake
Arlington
Five Mile Creek-Trinity River
Rush Creek-Village Creek
Fish Creek-Mountain Creek Lake
Headwaters Sycamore Creek
Prairie Creek-Trinity River
N
0 1.25 2.5 5
Miles
This map/data was created by the North Central Texas Council of Governments (NCTCOG) for use "as-is" and as an aid in graphic representation only. The data is not verified by a Registered Professional Land Surveyor for the State of Texas and is not intended to be used as such. NCTCOG, its officials, and its employees do not accept liability for any discrepancies, errors, or variances that may exist.
Source: WBD HU 12 2008
KZ 1/13/2010

RWWCP Third Term

- 2011-2016
  - 4 years in-stream sampling (except Fort Worth)
  - 24 watersheds
  - 48 sample stations
  - Each watershed sampled 2 years
  - 1 sample per quarter/per site (except Fort Worth)
  - 380 samples total
  - 132 samples collected to date

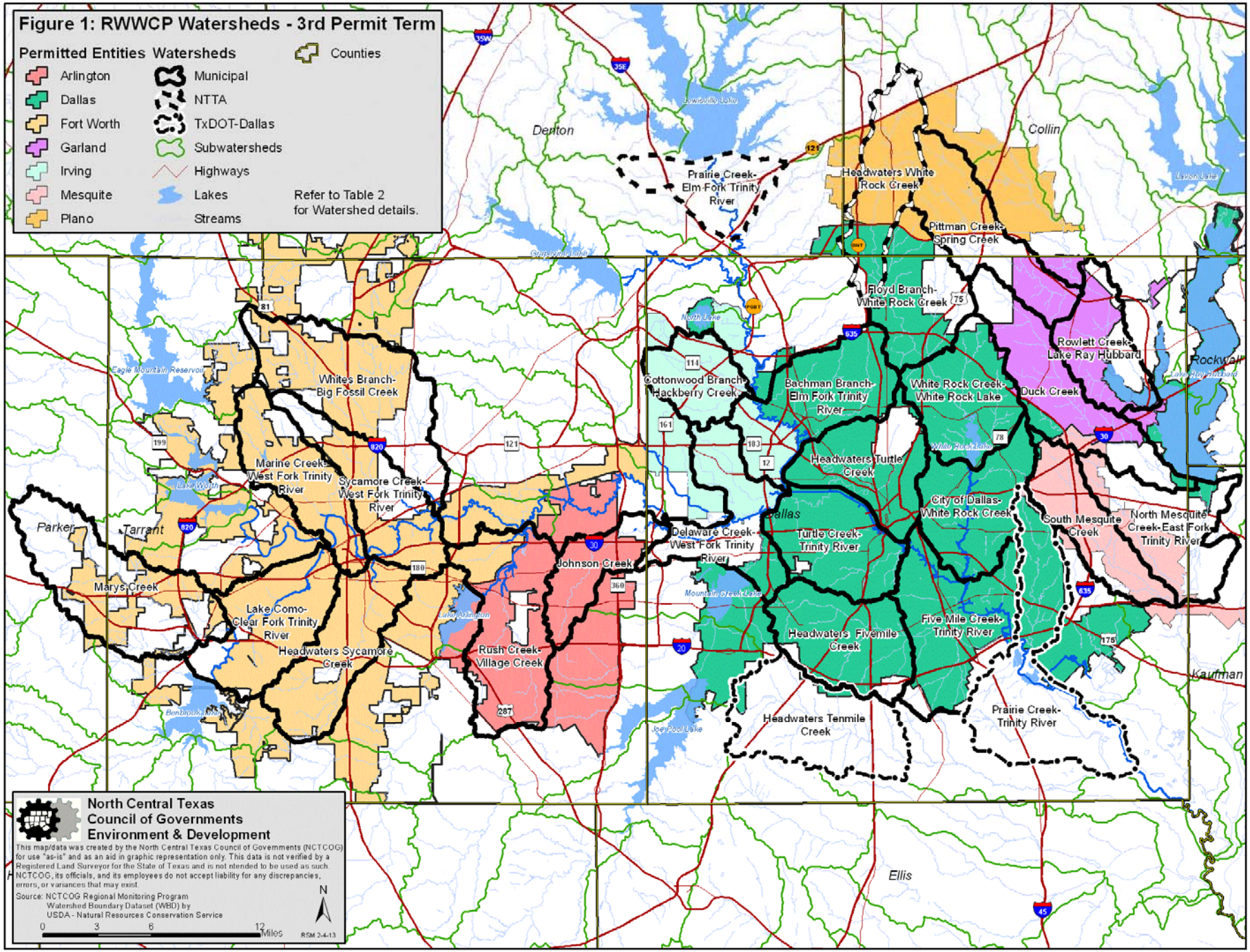
Figure 1: RWWCP Watersheds - 3rd Permit Term
Permitted Entities
Arlington
Dallas
Fort Worth
Garland
Irving
Mesquite
Plano
Watersheds
Municipal
NTTA
TxDOT-Dallas
Subwatersheds
Highways
Lakes
Streams
Counties
Refer to Table 2 for Watershed details.
Denton
Collin
Rockwall
Kaufman
Ellis
Parker
Tarrant
Dallas
Prairie Creek-Elm Fork Trinity River
Headwaters White Rock Creek
Pittman Creek-Spring Creek
Floyd Branch-White Rock Creek
Rowlett Creek-Lake Ray Hubbard
Duck Creek
White Rock Creek-White Rock Lake
Bachman Branch-Elm Fork Trinity River
Cottonwood Branch-Hackberry Creek
White's Branch-Big Fossil Creek
Marine Creek-West Fork Trinity River
Sycamore Creek-West Fork Trinity River
Headwaters Turtle Creek
City of Dallas-White Rock Creek
South Mesquite Creek
North Mesquite Creek-East Fork Trinity River
Delaware Creek-West Fork Trinity River
Turtle Creek-Trinity River
Johnson Creek
Marys Creek
Lake Como-Clear Fork Trinity River
Headwaters Sycamore Creek
Rush Creek-Village Creek
Headwaters Fivemile Creek
Five Mile Creek-Trinity River
Headwaters Tenmile Creek
Prairie Creek-Trinity River
North Central Texas Council of Governments
Environment & Development
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Source: NCTCOG Regional Monitoring Program
Watershed Boundary Dataset (WBD) by
USDA - Natural Resources Conservation Service
0 3 6 12 Miles
N
RSM 2-4-13

Chemical Monitoring

Chemical Monitoring Periods

- January 1 – March 31
- April 1 – June 30
- July 1 – September 30
- October 1 – December 31

Chemical Monitoring Requirements

- Rain event greater than 0.1 inches;
- Preceding antecedent dry period of at least 72-hours; and
- Stream level must have a measurable rise

Chemical Monitoring Constituents

- E. coli
- Total Coliforms
- Oil and Grease
- pH
- BOD
- COD
- TSS
- TDS
- ~~Diazinon~~
- Carbaryl

- Dissolved Phosphorus
- Total Phosphorus
- Total Nitrogen
- ~~Total Cadmium~~
- Total Copper
- Total Lead
- Total Zinc
- Total Chromium
- Total Arsenic

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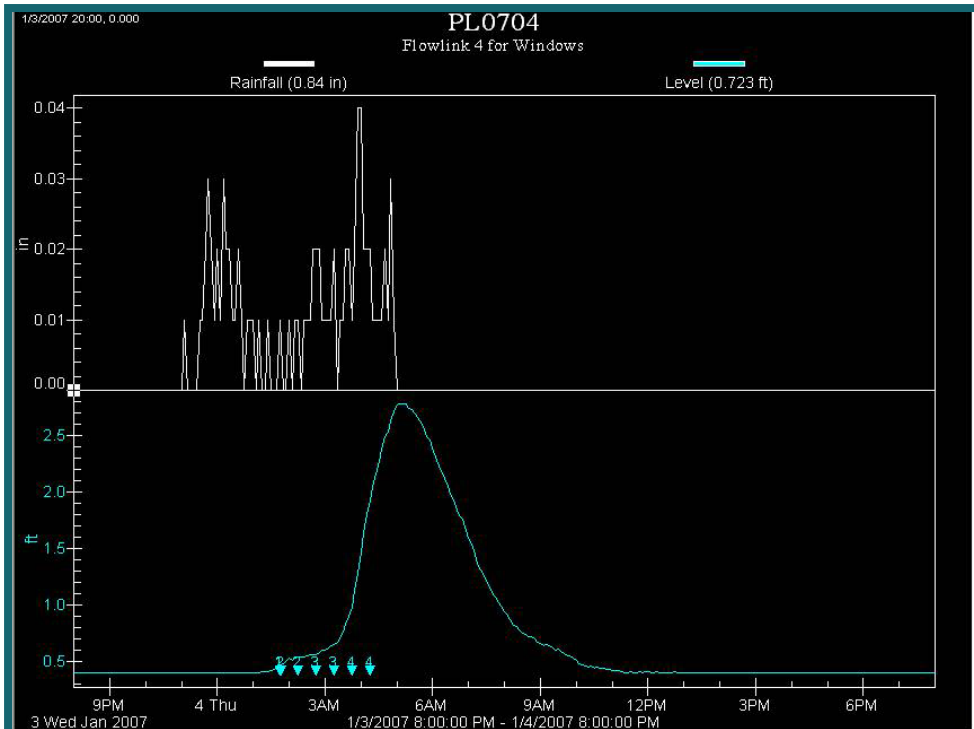
Equipment

6712
ISCO


1/3/2007 20:00, 0.000
PL0704
Flowlink 4 for Windows
Rainfall (0.84 in)
Level (0.723 ft)
in
0.04
0.03
0.02
0.01
0.00
ft
2.5
2.0
1.5
1.0
0.5
9PM
4 Thu
3AM
6AM
9AM
12PM
3PM
6PM
3 Wed Jan 2007
1/3/2007 8:00:00 PM - 1/4/2007 8:00:00 PM

Challenges

- Vandalism
- Flooding
- Theft
- Severe Weather

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Vandalism

Vandalism

Flooding

Severe Weather

Tornado Spotted in Texas - weather.com

Updated April 3rd, 2012, 2:20pm Eastern THIS IS BREAKING NEWS. CHECK BACK SOON FOR MORE INFORMATION The National Weather Service has conf...

TWC Weather

Watching incredible live coverage on TWC of a tornado near Dallas, TX "@StuOstro: TWC screen capture from moments ago http://yfrog.com/g03xrpj"

an hour ago

Jennifer Watson

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Biological Monitoring

Rapid Bioassessments

- Fort Worth
  - Second Term: 72 bioassessments completed under RWWCP
- Dallas
  - Bioassessments conducted since 2005 outside of RWWCP

Third Term 2012

- Fort Worth
  - 24 bioassessments
  - 6 watersheds
- Dallas
  - 8 bioassessments
  - 4 watersheds
- Garland
  - 2 bioassessments
  - 1 watershed
- Plano
  - 2 bioassessments
  - 1 watershed

Biological Monitoring

- Modifications between entities
- TCEQ, EPA guidance manuals
- Habitat assessment
- Physical conditions
- Macroinvertebrates
- Other biota
- Reference sites

Protocols

	Habitat	Fish	Benthos
Fort Worth	EPA	Electrofisher	Surber
Dallas	TCEQ	No fish	Kick-net and other substrates
Plano	TCEQ	Electrofisher and seines	Kick-net
Garland	TCEQ	Electrofisher and seines	Kick-net

Seining

Backpack Electrofisher

Kick-net

Largemouth Bass

Smallmouth Buffalo

Mussels

Data Review and Comparisons

Chemical Monitoring Data Review

- Second Term
- Data was considered baseline
- Not traditional outfall monitoring
- As an initial data set, not robust enough to make solid statistical analyses

Chemical Monitoring Data Review

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- Consistent pollutant concentrations between watersheds with a general decrease of concentrations from upstream to downstream
- Water quality generally yielded higher pollutant concentrations during warm months
- No statistical difference between long and short antecedent dry periods
- Larger storms generally produced higher in-stream concentrations

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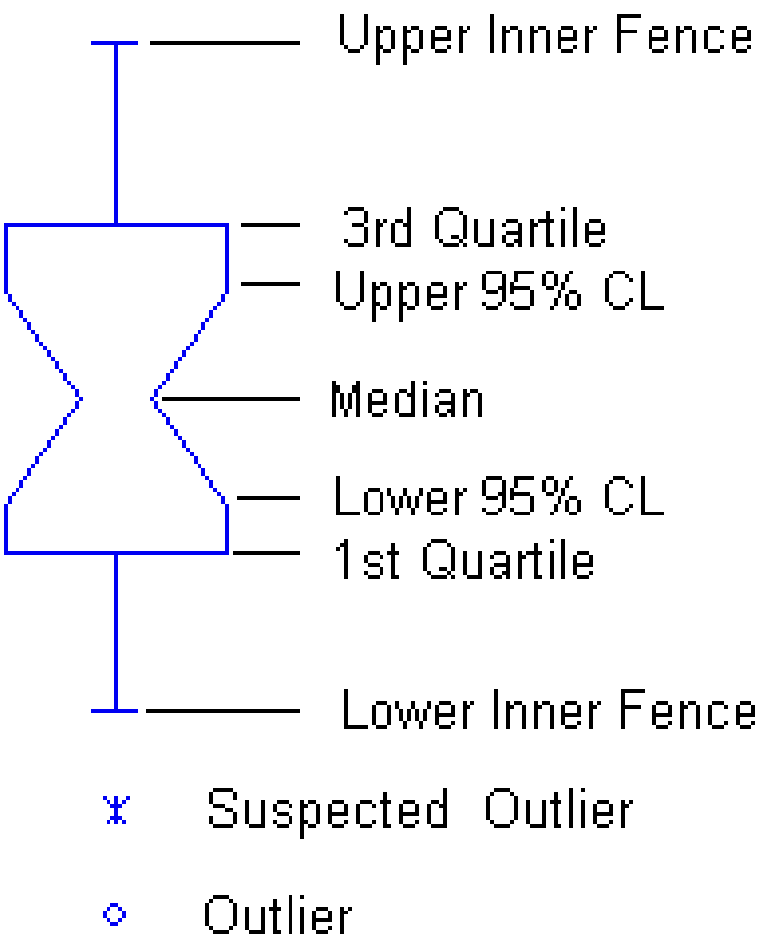
Chemical Monitoring Data Review

- Wet-weather in-stream concentrations are typically higher than Clean Rivers Program (generally collected during dry weather)
- Certain wet-weather in-stream concentrations were higher than outfall samples, certain wet-weather in-stream pollutants were lower (NSQD and Prior North Texas NPDES data)
- Currently there are no wet-weather in-stream water quality standards by the EPA or State of Texas to use as benchmarks or comparison values

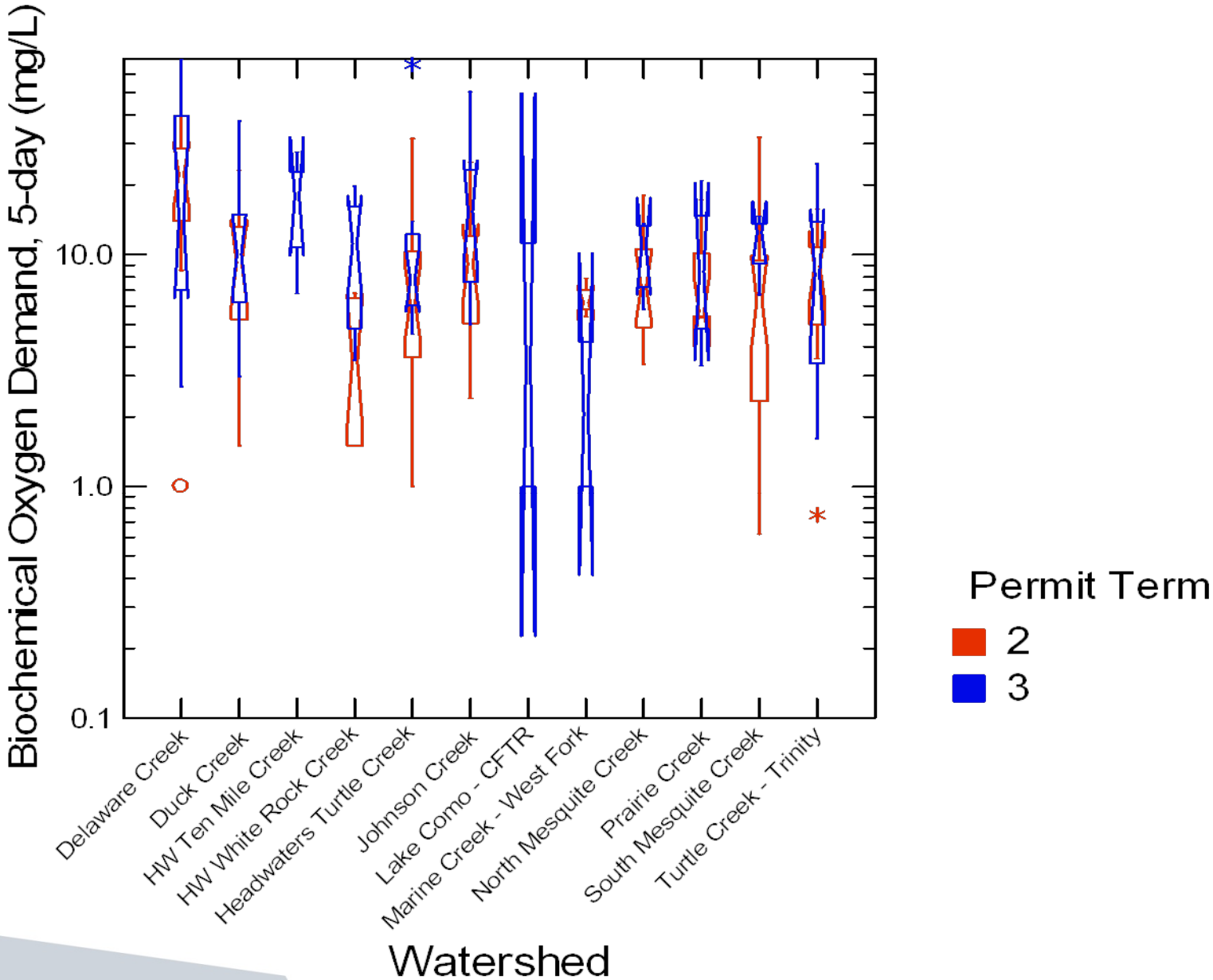
Chemical Monitoring Data Review



Disclaimer

- Very preliminary 3rd term data analysis
- Small “n” values
- Statistical analysis not performed
- Visual analysis
- Opinion of the presenter
- Not all constituents shown for brevity

Chemical Monitoring Data Review



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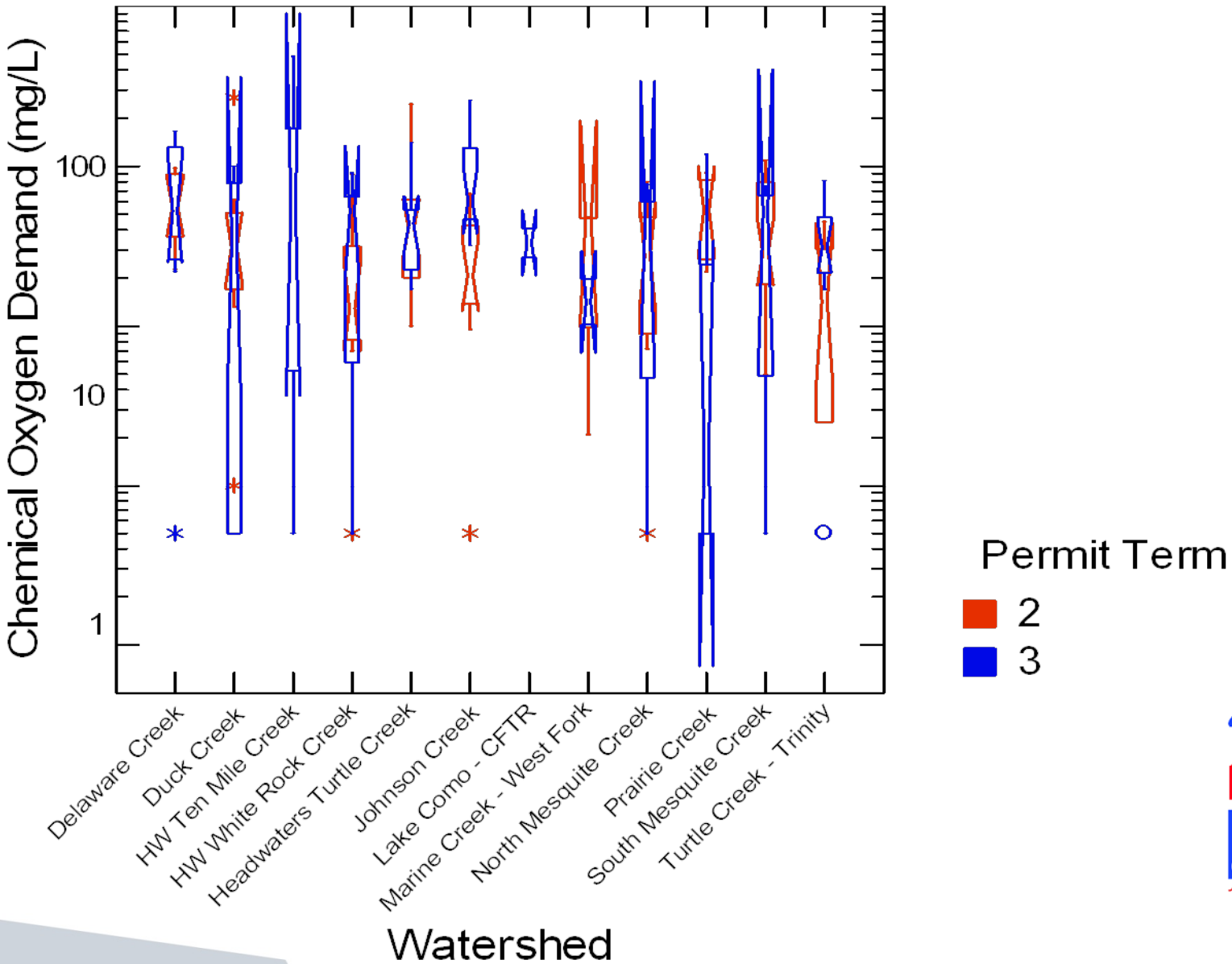

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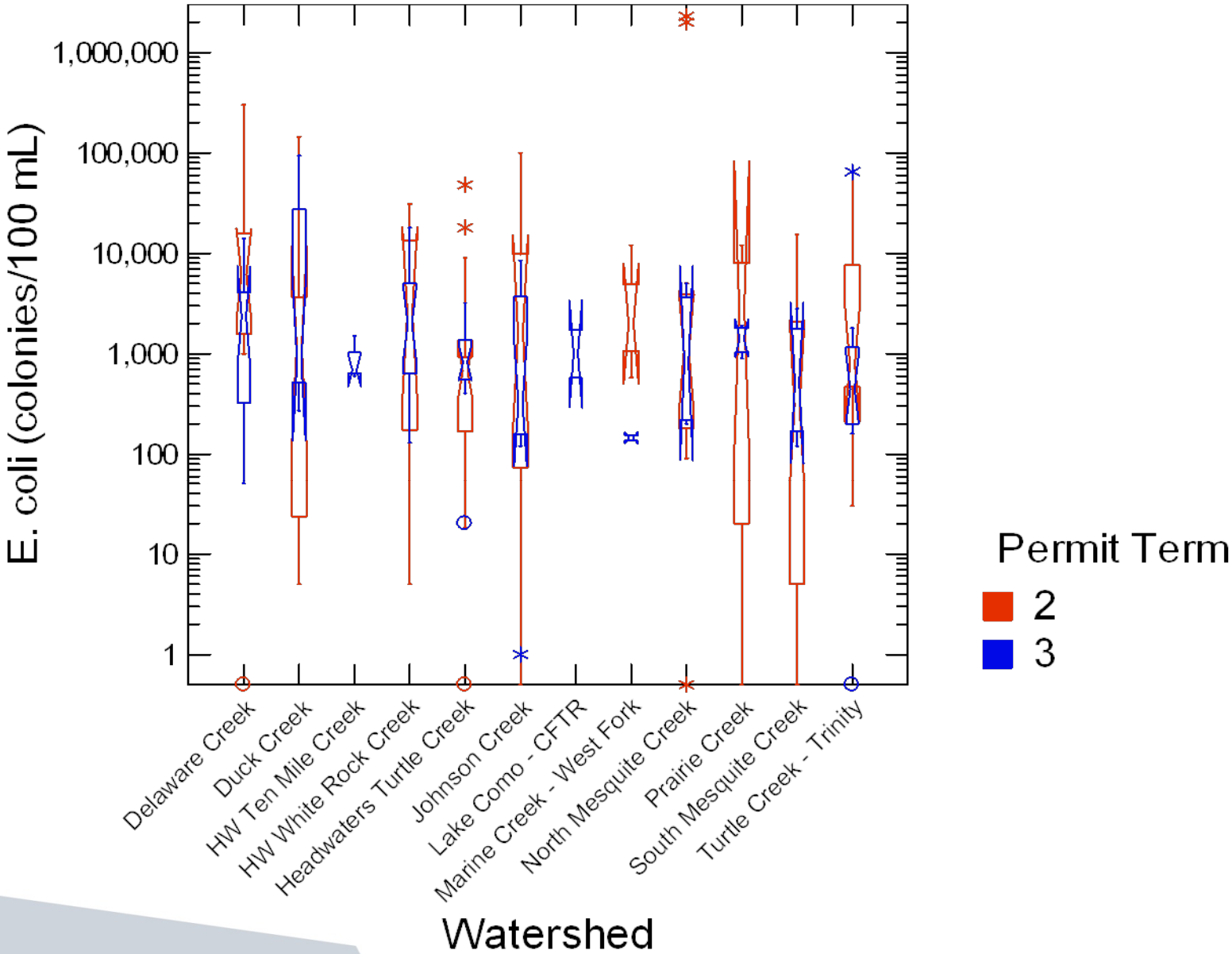

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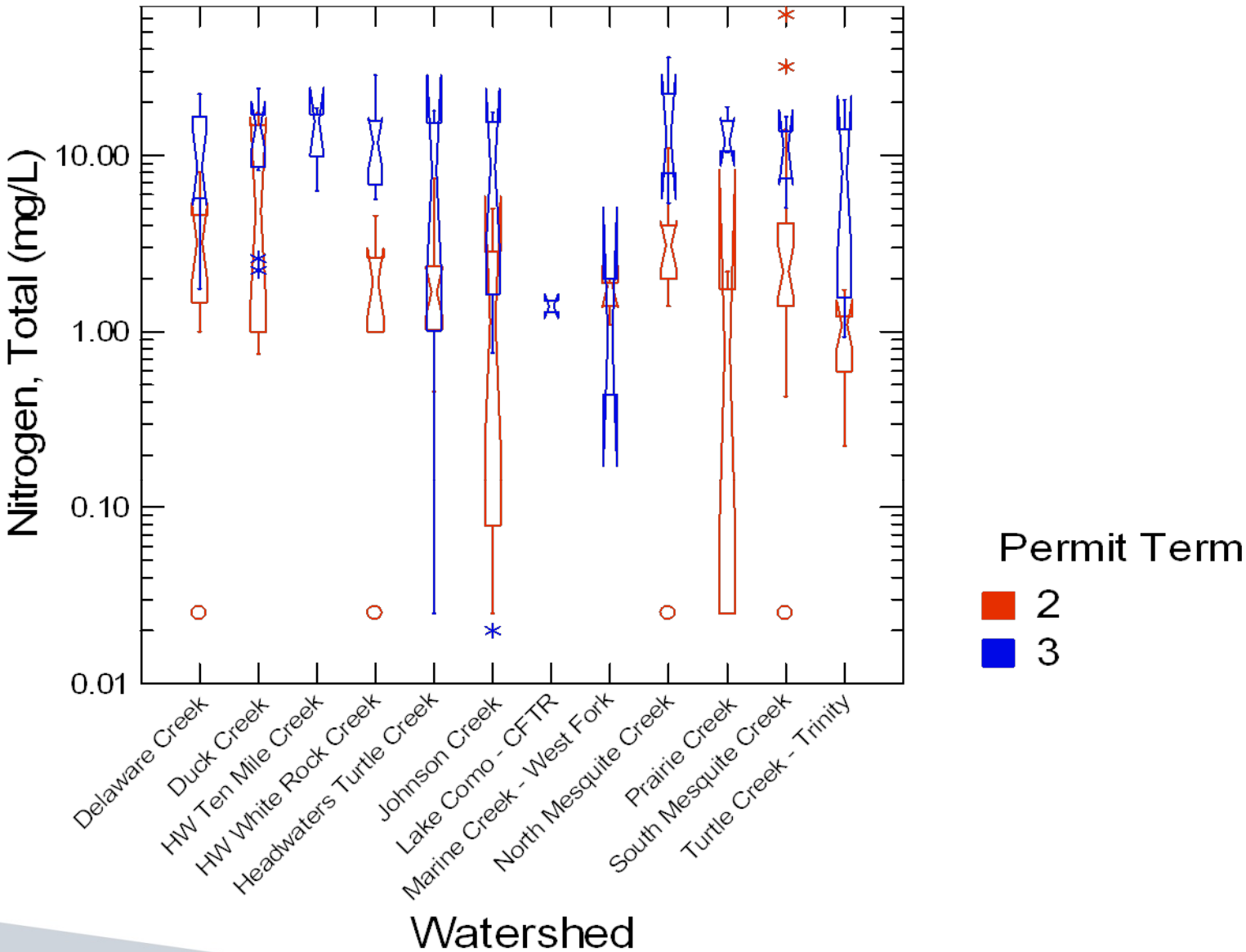

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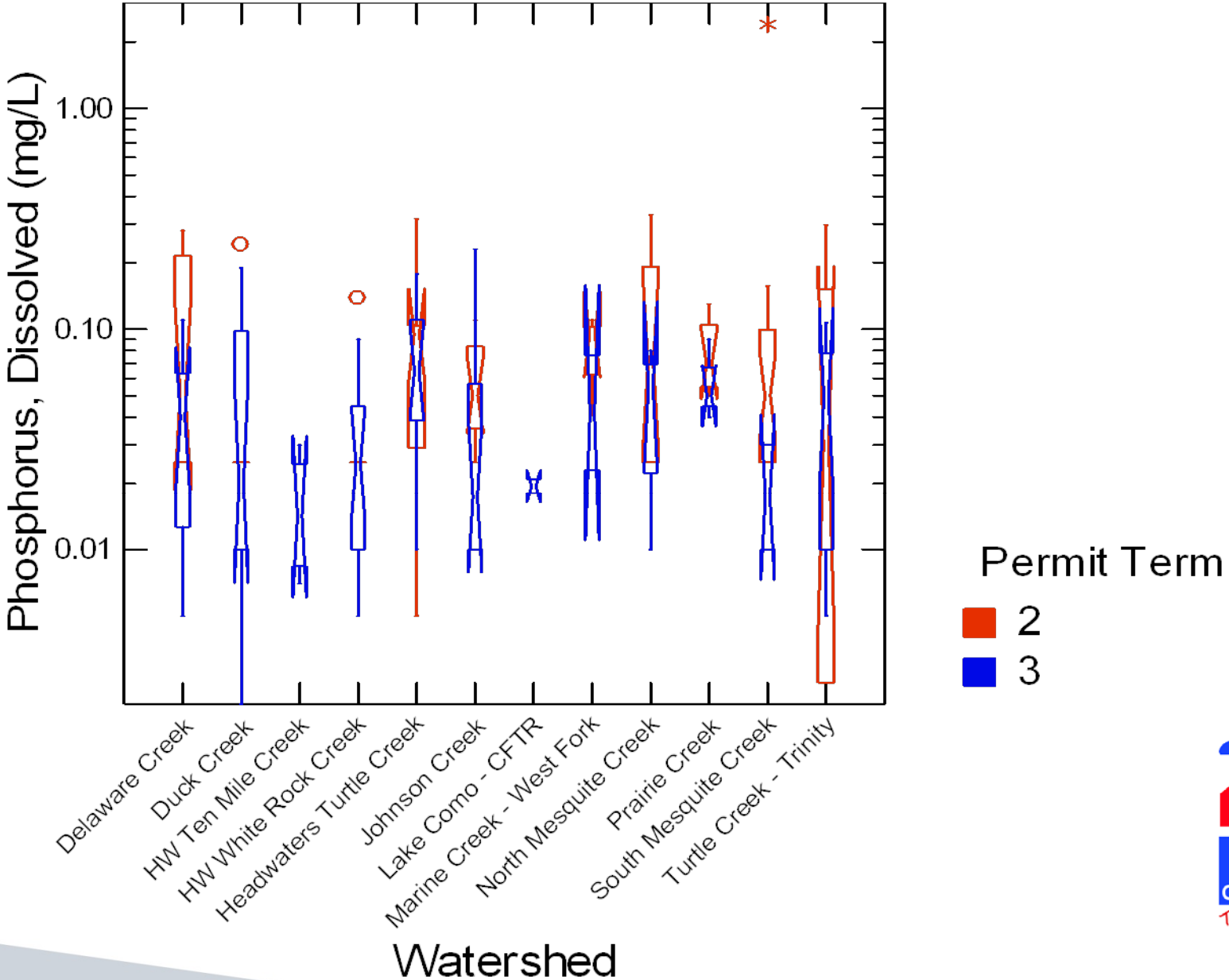

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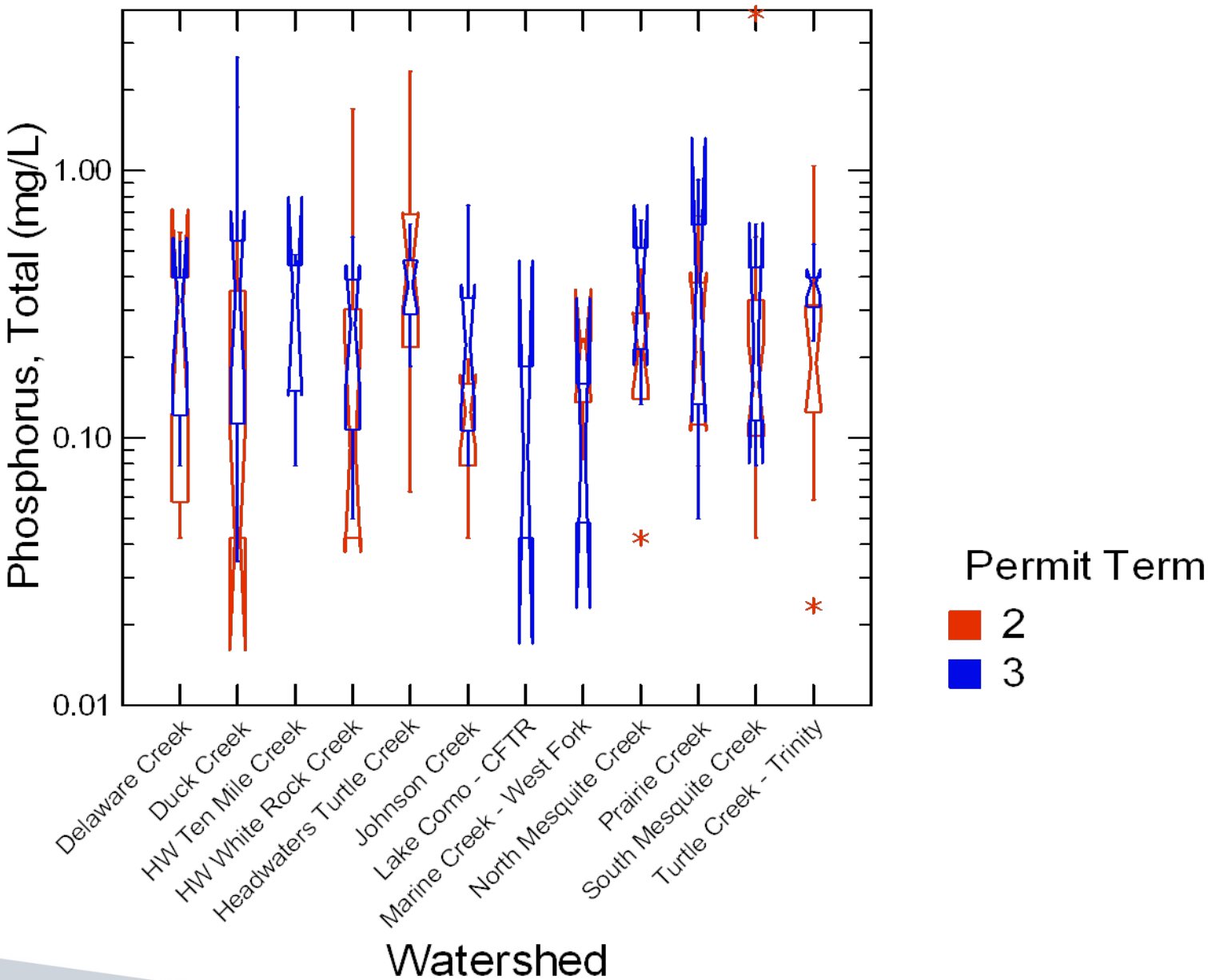

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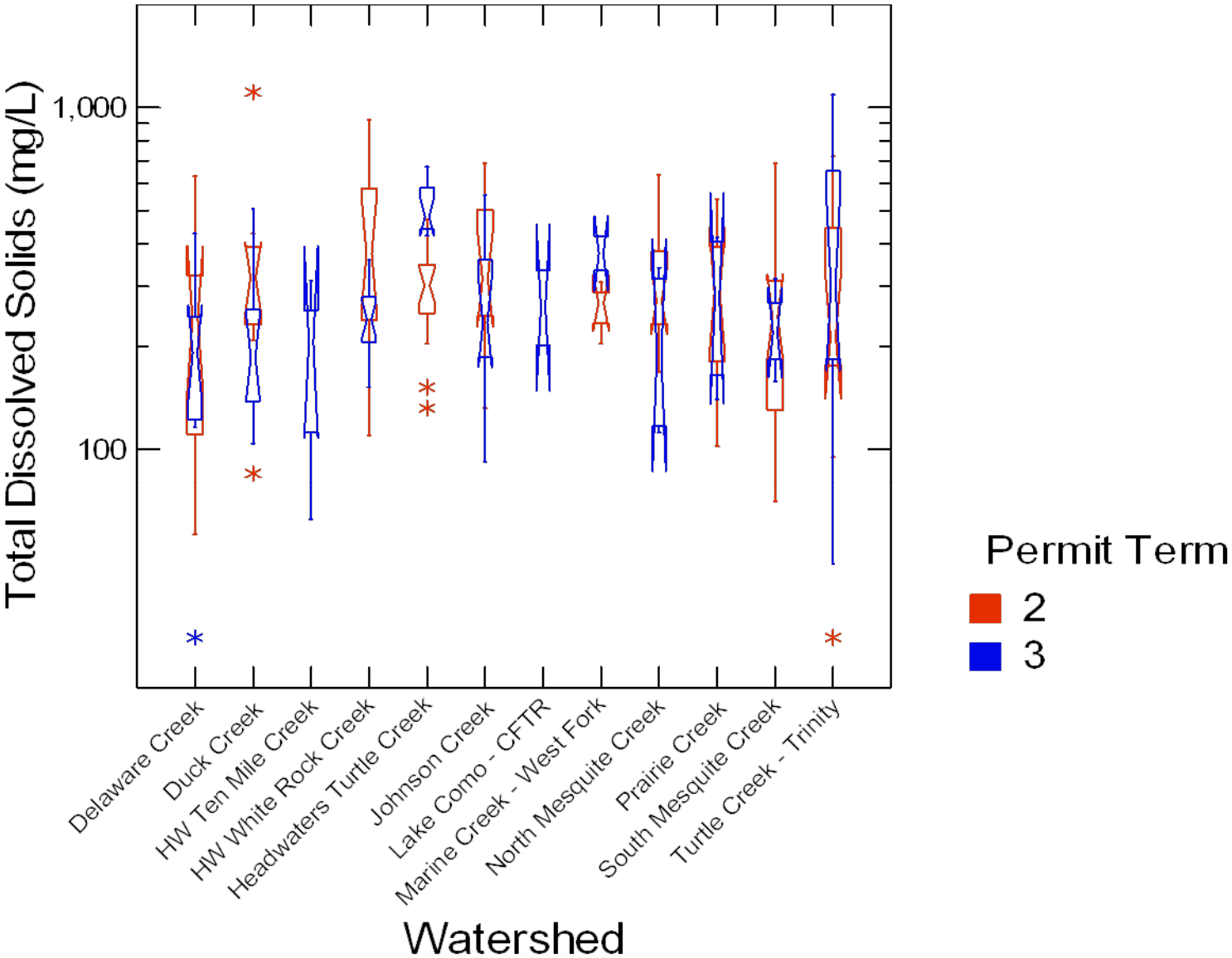
Chemical Monitoring Data Review



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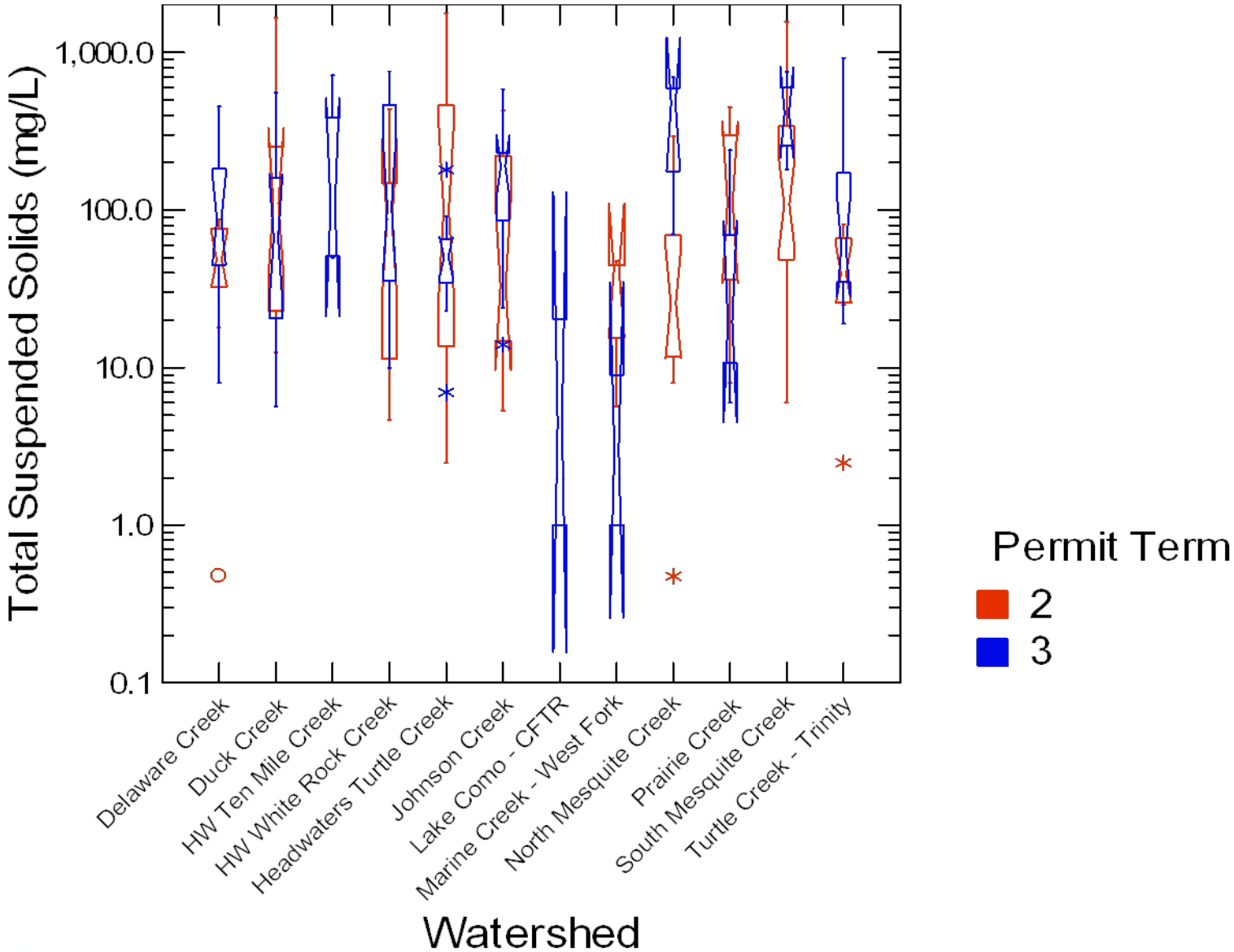

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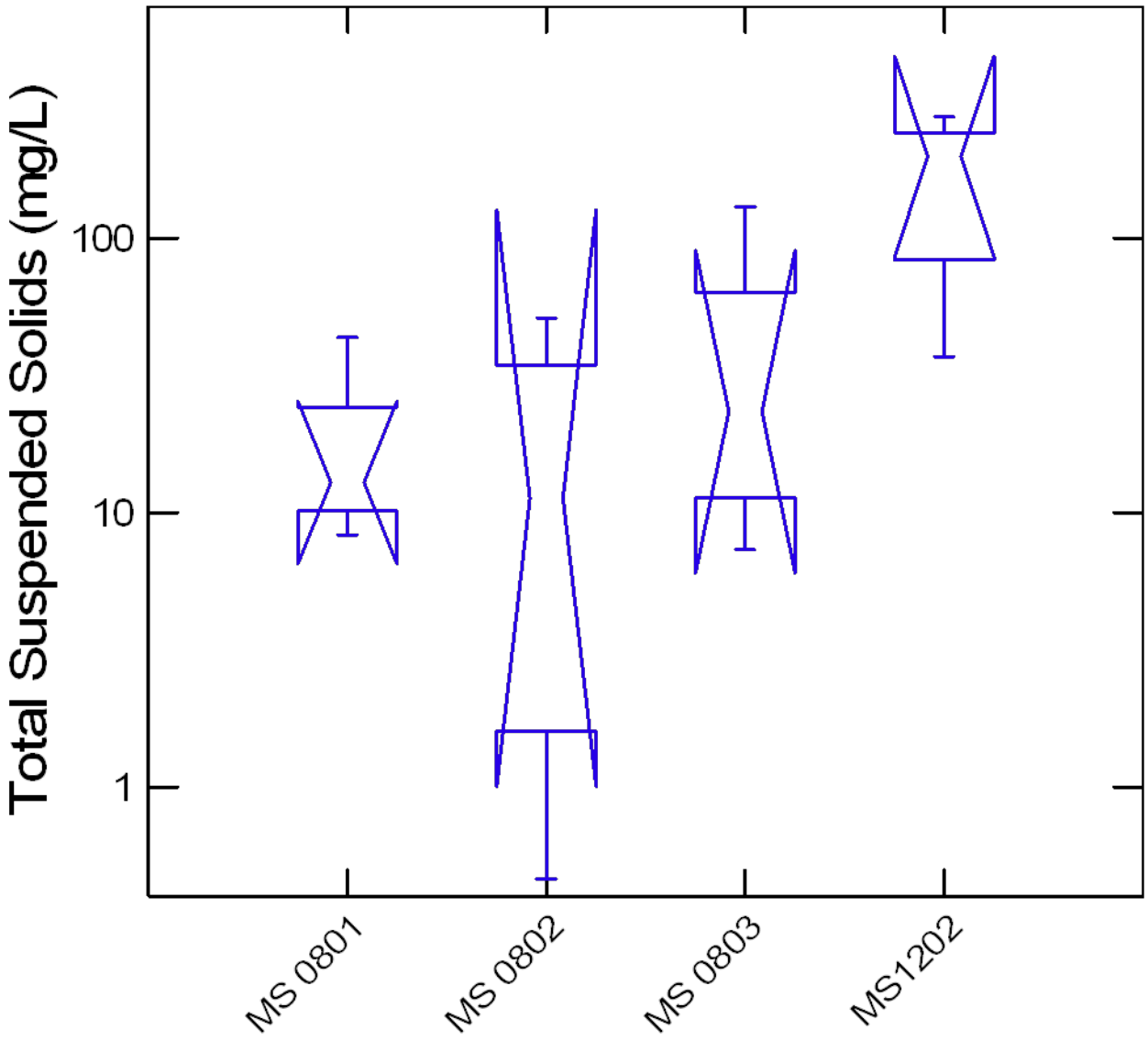

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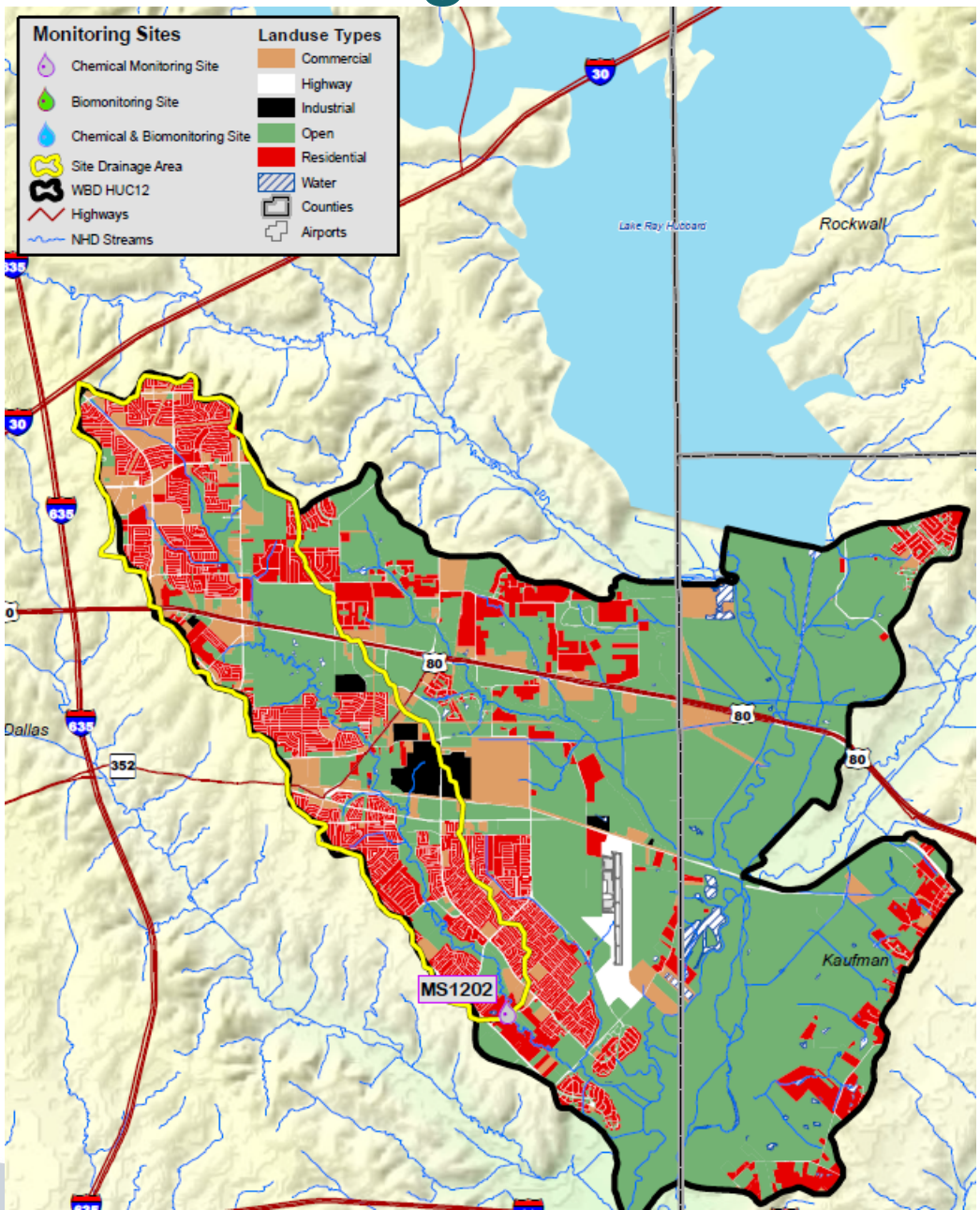

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Biological Monitoring Data Review

	Limited	Intermediate	High	Exceptional
Fort Worth				
Dallas				
Plano				
Garland				

On-Line Data Viewer

On-Line Data Viewer

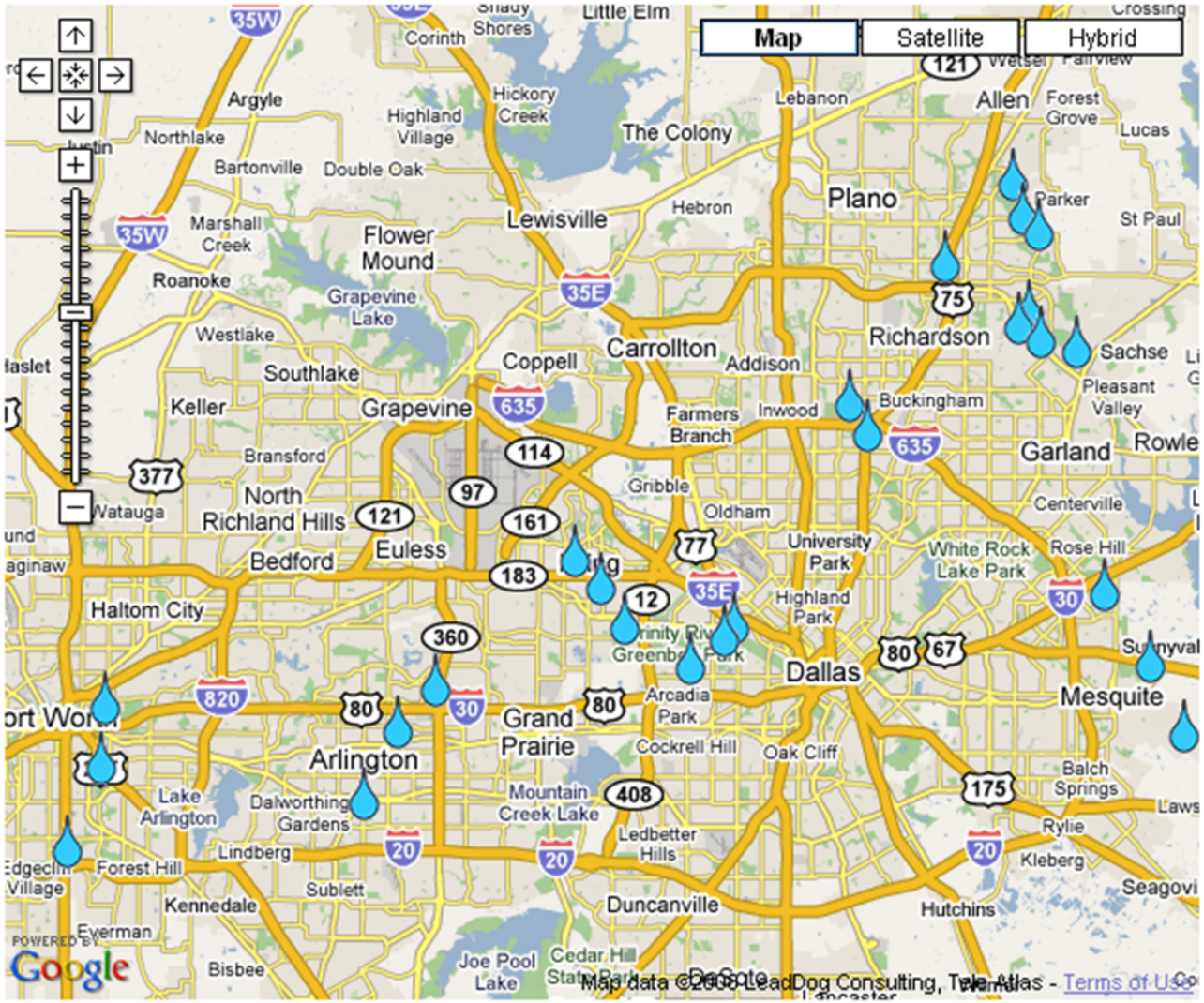
- Internet browser – view previous and current sampling activities
- Google-based station maps
- Zoom in to site locations
- Allows stakeholders to view data in their neighborhood
- Ability to retrieve sampling event data
- Data exportable
- Visit: www.dfwstormwater.com

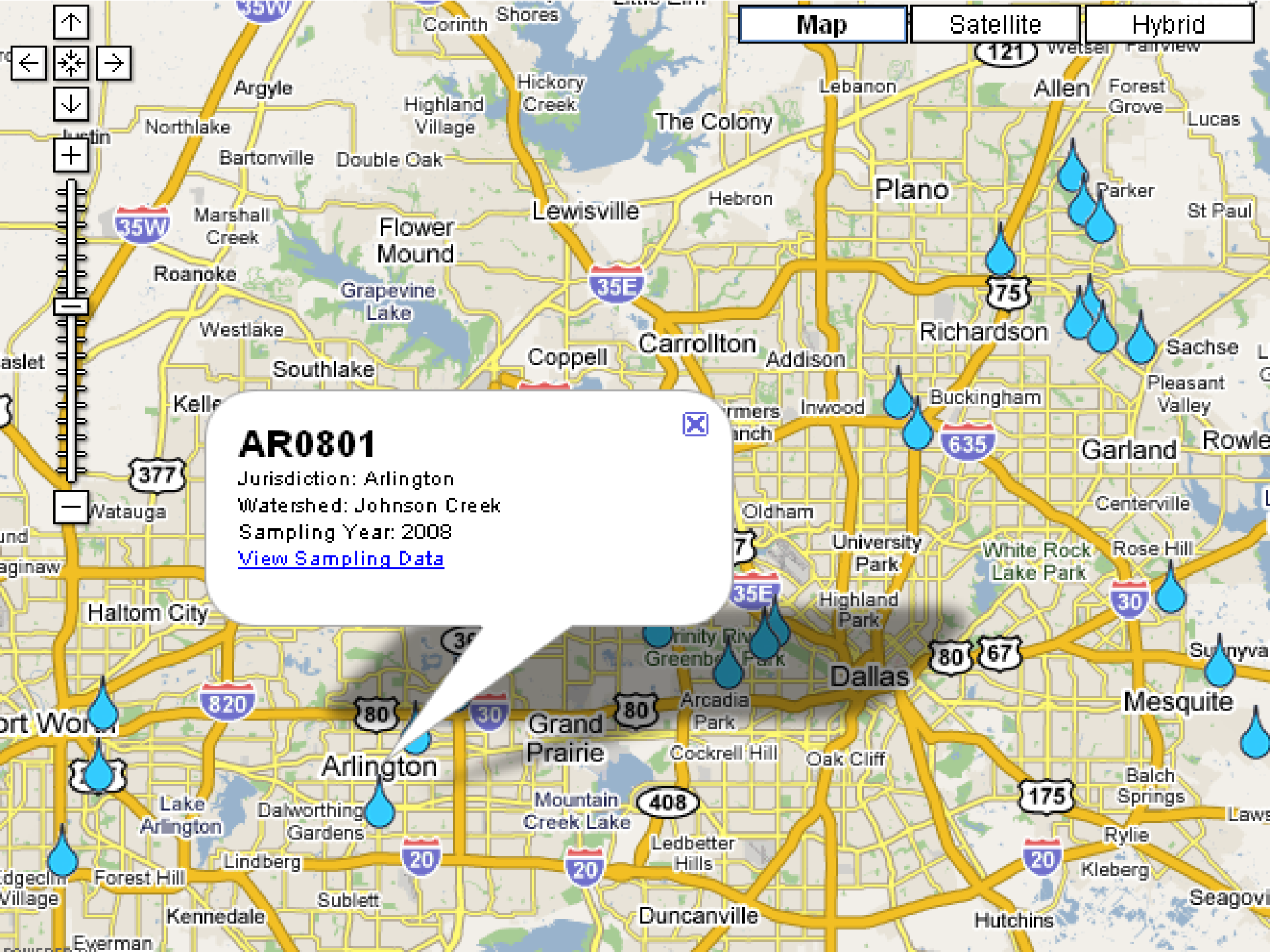
2008 Wet Weather Monitoring Stations

Welcome to the NCTCOG Wet Weather Monitoring online data viewer. To view the sampling data, click on a station in the map and select "View Sampling Data" or use the list below. More information on the program is available here.

View stations for a different year: [2007]

IE Users: If the monitoring stations do not appear, refresh the page. Click here for more troubleshooting info.




Map
Satellite
Hybrid
AR0801
Jurisdiction: Arlington
Watershed: Johnson Creek
Sampling Year: 2008
View Sampling Data
Corinth
Shores
Argyle
Highland Village
Hickory Creek
The Colony
Lebanon
Allen
Forest Grove
Lucas
Northlake
Bartonville
Double Oak
Plano
Parker
St Paul
Marshall Creek
Flower Mound
Lewisville
Hebron
Roanoke
Grapevine Lake
Westlake
Southlake
Coppell
Carrollton
Addison
Richardson
Sachse
Pleasant Valley
Buckingham
Inwood
Garland
Centerville
Oldham
University Park
White Rock Lake Park
Rose Hill
Highland Park
Haltom City
Dallas
Mesquite
Arcadia Park
Grand Prairie
Arlington
Cockrell Hill
Oak Cliff
Balch Springs
Lake Arlington
Dalworthing Gardens
Mountain Creek Lake
Ledbetter Hills
Rylie
Kleberg
Lindberg
Forest Hill
Sublett
Kennedale
Duncanville
Hutchins
Everman
35W
35E
121
75
635
377
820
80
30
67
408
20
175

Station Info: AR0801

Station ID	Year	Jurisdiction	Watershed	Location Description	Latitude	Longitude
AR0801	2008	Arlington	Johnson Creek	Johnson Creek at Matlock Road	32.6929166	-97.1165555

Sampled Events

1st Quarter:

Storm Summary	Storm Start	Storm End	Description	Rainfall Station	Rainfall Total (in)	Peak Rate (in)	Antecedent Dry Period (hrs)
	1/25/2008 3:20:00 AM	1/25/2008 2:25:00 PM	Thunderstorms developed across the metroplex along a cold front that moved into the area from west northwest direction to the east southeast.	AR0801	0.31	0.07	672

Collection Info	Flow Start	Flow End	1st Aliquot Collected	Last Aliquot Collected	# Aliquots Collected	Peak Depth (ft)	Avg Depth (ft)	Sample Volume (gal)	Ambient Air Temp (°F)	Water Temp (°F)	Sample Comments
	1/25/2008 4:00:00 AM	1/25/2008 1:45:00 AM	1/25/2008 4:12:00 AM	1/25/2008 6:15:00 AM	6	0.45	0.3	3.5	35		All aliquots were successfully collected.

Composite	TDS (mg/L)	TSS (mg/L)	BOD (mg/L)	COD (mg/L)	Nitrogen Total (mg/L)	Phosphorus Dissolved (mg/L)	Phosphorus Total (mg/L)	Carbaryl Total (mg/L)	Arsenic Total (mg/L)	Chromium Total (mg/L)	Copper Total (mg/L)	Lead Total (mg/L)	Zinc Total (mg/L)	Diazinon (µg/L)	Cadmium Total (mg/L)
	506	54.7	13.2	48.9	5	0.11 J	0.13	***	<0.002 U	<0.003 U	0.01261 J	<0.004 U	0.019 J	<0.037 U	<0.001 U

Grab	Oil & Grease (mg/L)	pH Lab (su)	pH Field (su)	E.Coli (col/100mL)	Total Coliform (col/100mL)	Specific Conductivity (uS/cm)
	2.21 J	7.89	7.26	30	5000	***

Download Lab Report

Status of the Program

- Continue monitoring for 3 years (except Fort Worth – 4 years)
- Data available on-line with interactive map for public access
- Continue to establish baseline data on receiving streams in the DFW Metroplex
- Develop and explore uses of the data
- Develop proposal for next permit term based on data analysis and regulatory environment

Questions?

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