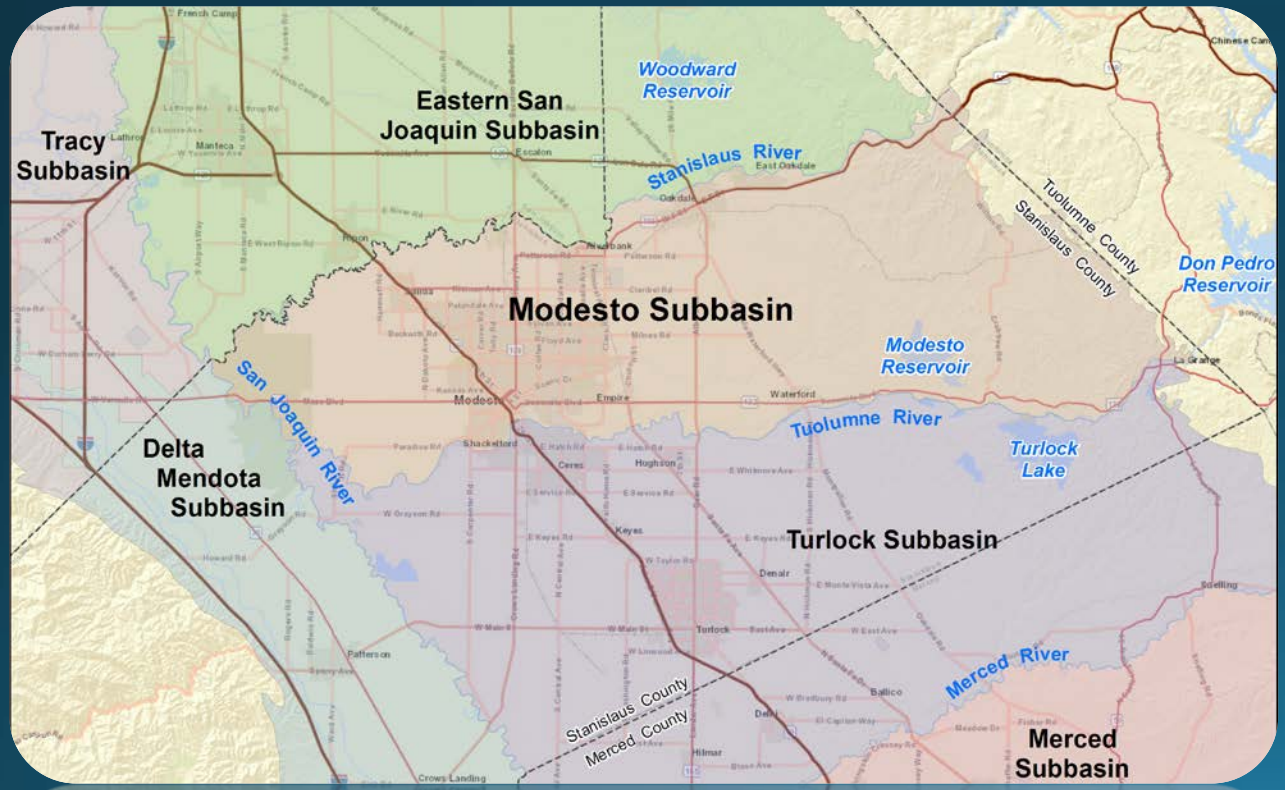
STRGBA Groundwater Sustainability Agency
Tuolumne Groundwater Sustainability Agency

Modesto Subbasin Groundwater Sustainability Plan (GSP) Technical Workshop No. 3

August 14, 2019



Presentation Outline

- Basin Setting - Groundwater Quality Analysis

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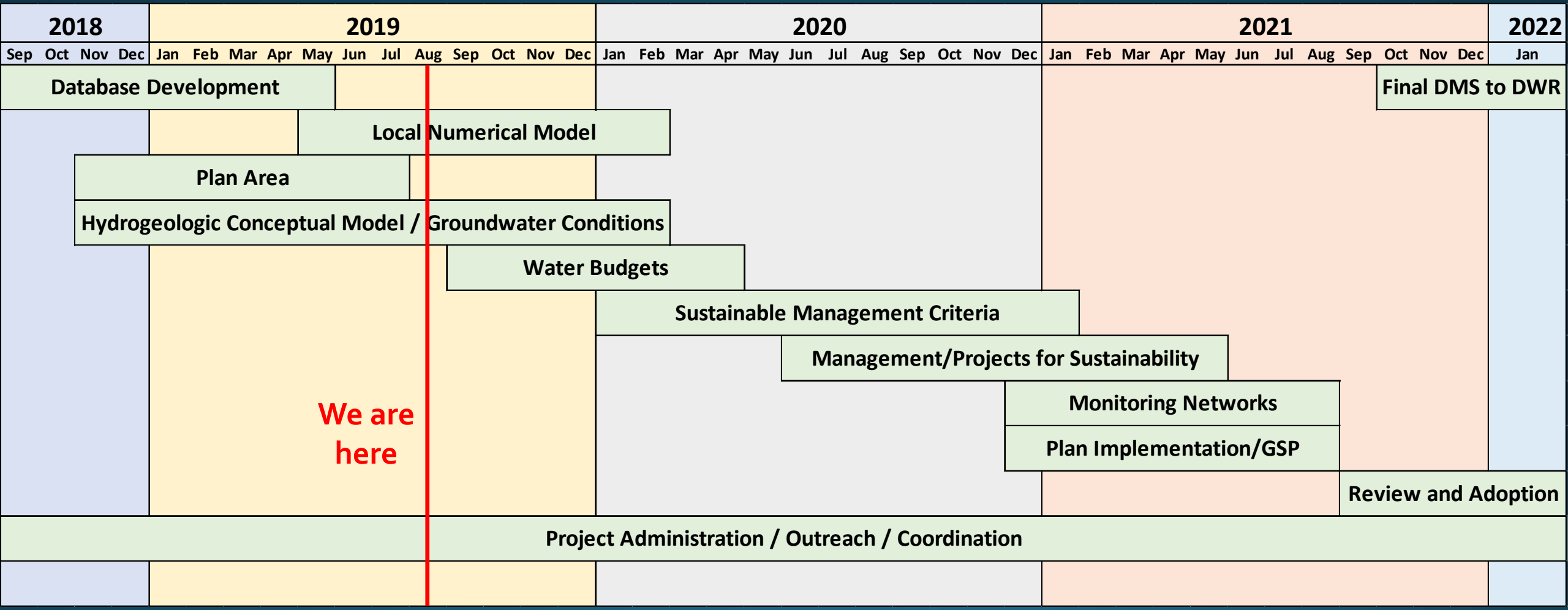
Modesto Subbasin GSP Timeline



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GSP Overview

Data Compilation / Data Management System

Institutional Setting – Water Supply / Plan Area

Hydrogeologic Conceptual Model / Groundwater

Water Budget (Current and Historical)

Technical Components

Today's Workshop

Sustainability Goals and Criteria

Policy Components

Management Scenarios Projected Water Budget

Monitoring Networks Plan Development

Management / Plan Components

TODD GROUNDWATER

Water Quality: Data Sources

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- Data Request to GSA Member Agencies:
  - City of Modesto, City of Oakdale, City of Riverbank, City of Waterford, Modesto Irrigation District, Oakdale Irrigation District, Stanislaus County, and Tuolumne County

- Eastern San Joaquin Water Quality Coalition

- Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS), includes:
  - RWQCB Waste Discharge Requirements (WDR), Dairy CARES program
  - California Department of Public Health (CDPH)
  - Department of Water Resources (DWR)
  - US Geological Survey (USGS), National Water Information System (NWIS)
  - GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) program

- GeoTracker

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Water Quality: Constituents

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Water Quality Database:

- Microsoft Access – 127,625 water-quality records
- 1,373 wells
- 260 unique constituents (physical, majors, nutrients, metals, & organics)
- Period of record: 1995 to present
  - Historical period: WY 1995 to 2014
  - Present period: WY 2015 to 2019

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Water Quality: Constituents

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Constituents of concern (9):

- Arsenic
- Boron (added from last workshop in July)
- Dibromochloropropane (DBCP)
- Nitrate
- Tetrachloroethylene (PCE)
- 1,2,3-Trichloropropane (TCP)
- Total Dissolved Solids (TDS)
- Uranium
- Gross Alpha (added from input – City of Modesto)

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Water Quality: Constituents

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Question about PFAS from July 10, 2019 STRGBA workshop:

PFAS: perfluoroalkyl and polyfluoroalkyl substances

- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonic acid (PFOS)

➢ No PFAS data in the GeoTracker / GAMA databases for Stanislaus county.

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Arsenic

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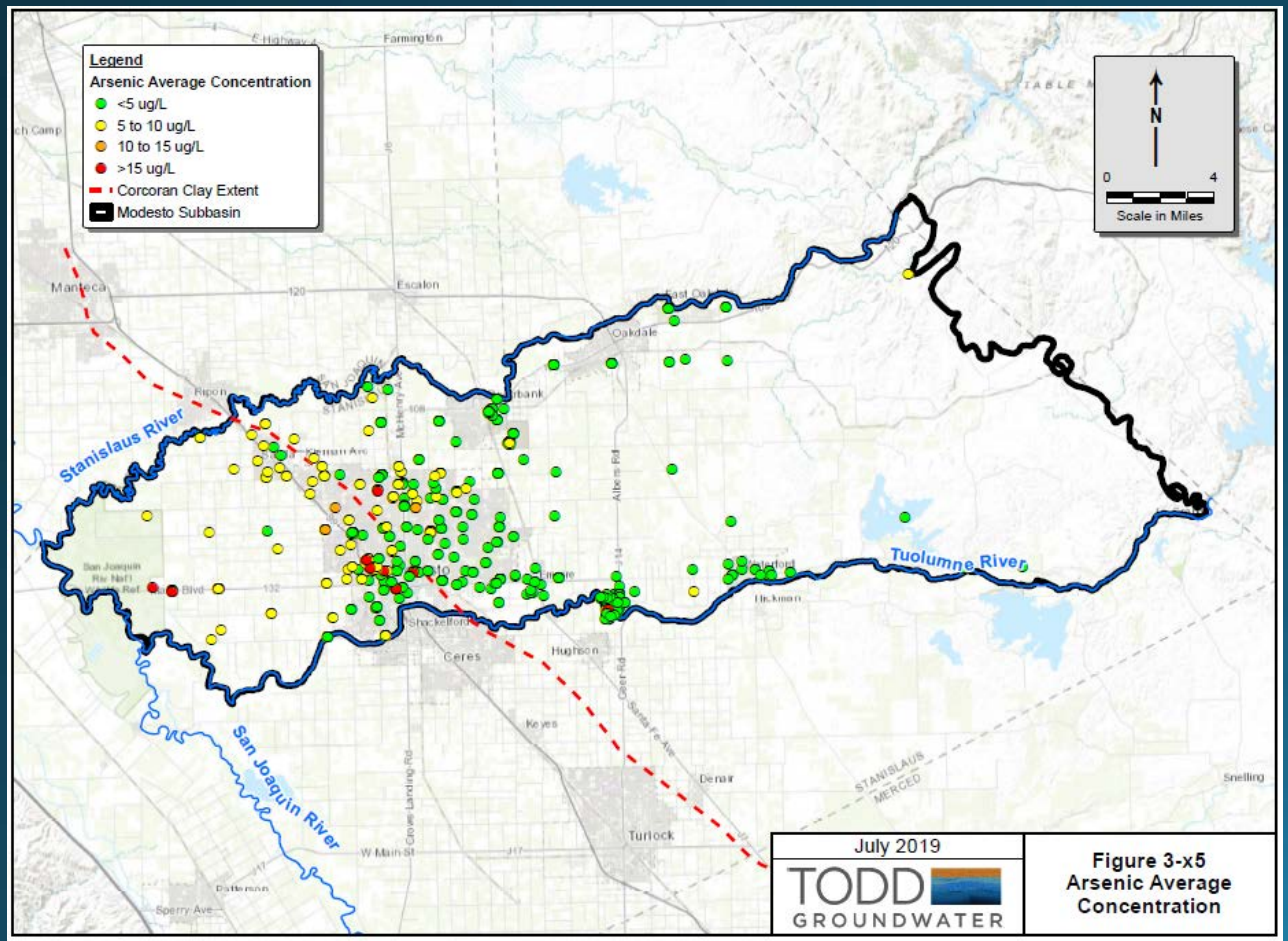
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Arsenic, µg/L	10 µg/L[1]	6,506	70%	22%	8%	0.0	3.0	5.0	300

Average



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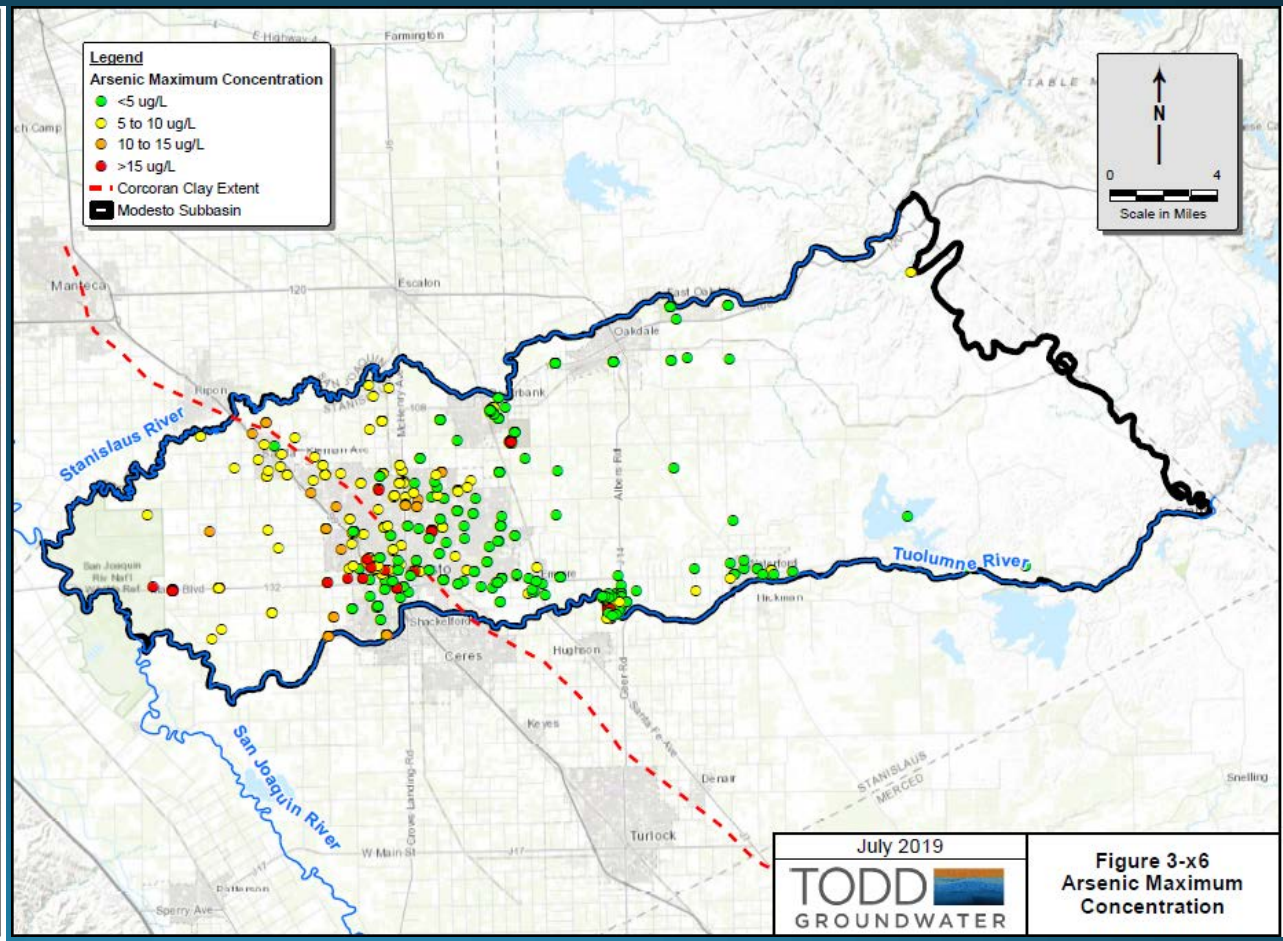

Boron

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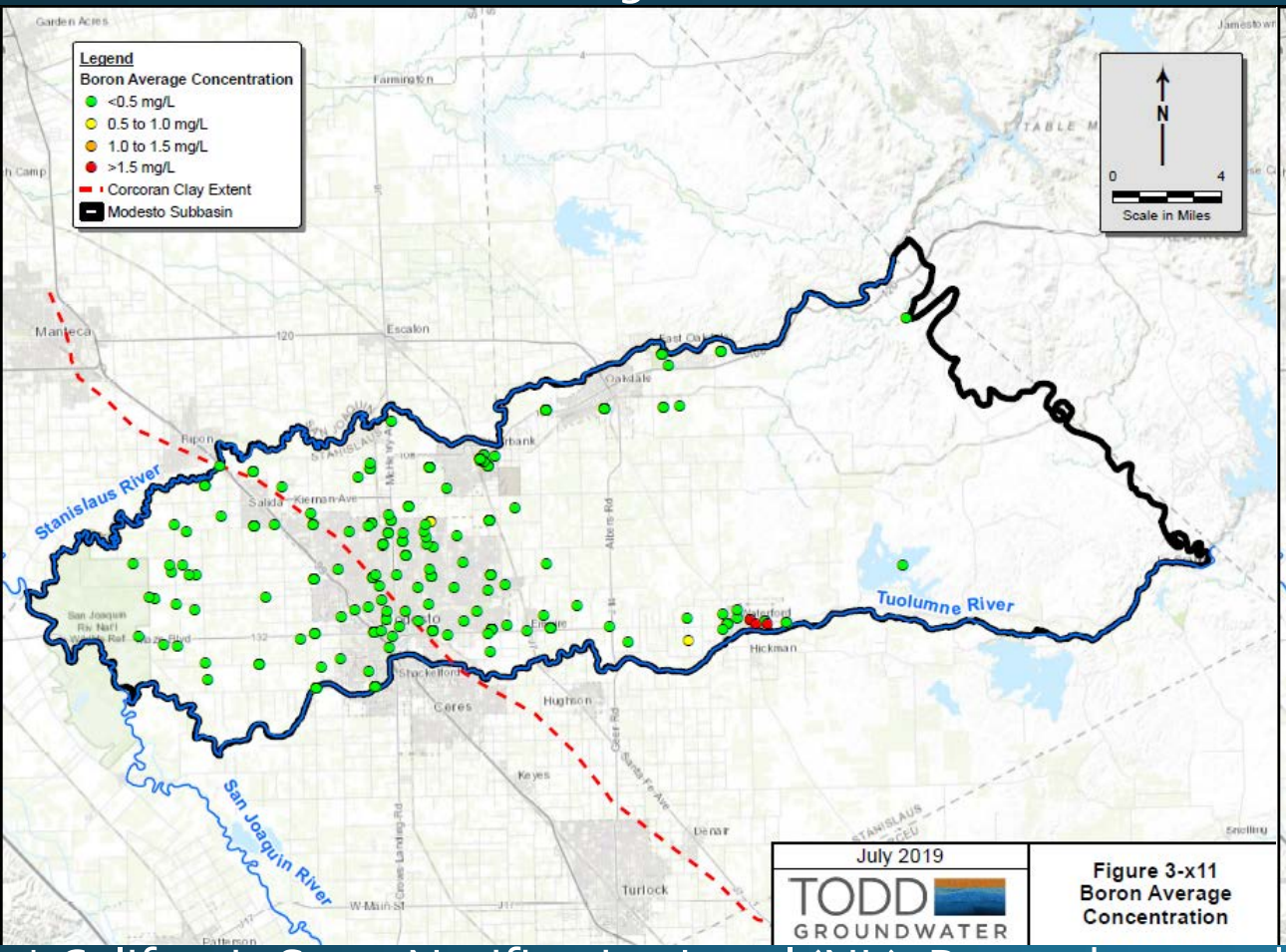
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Boron, mg/L	1 mg/L*	709	97%	1%	2%	0.0	0.0	2.0	200

Average



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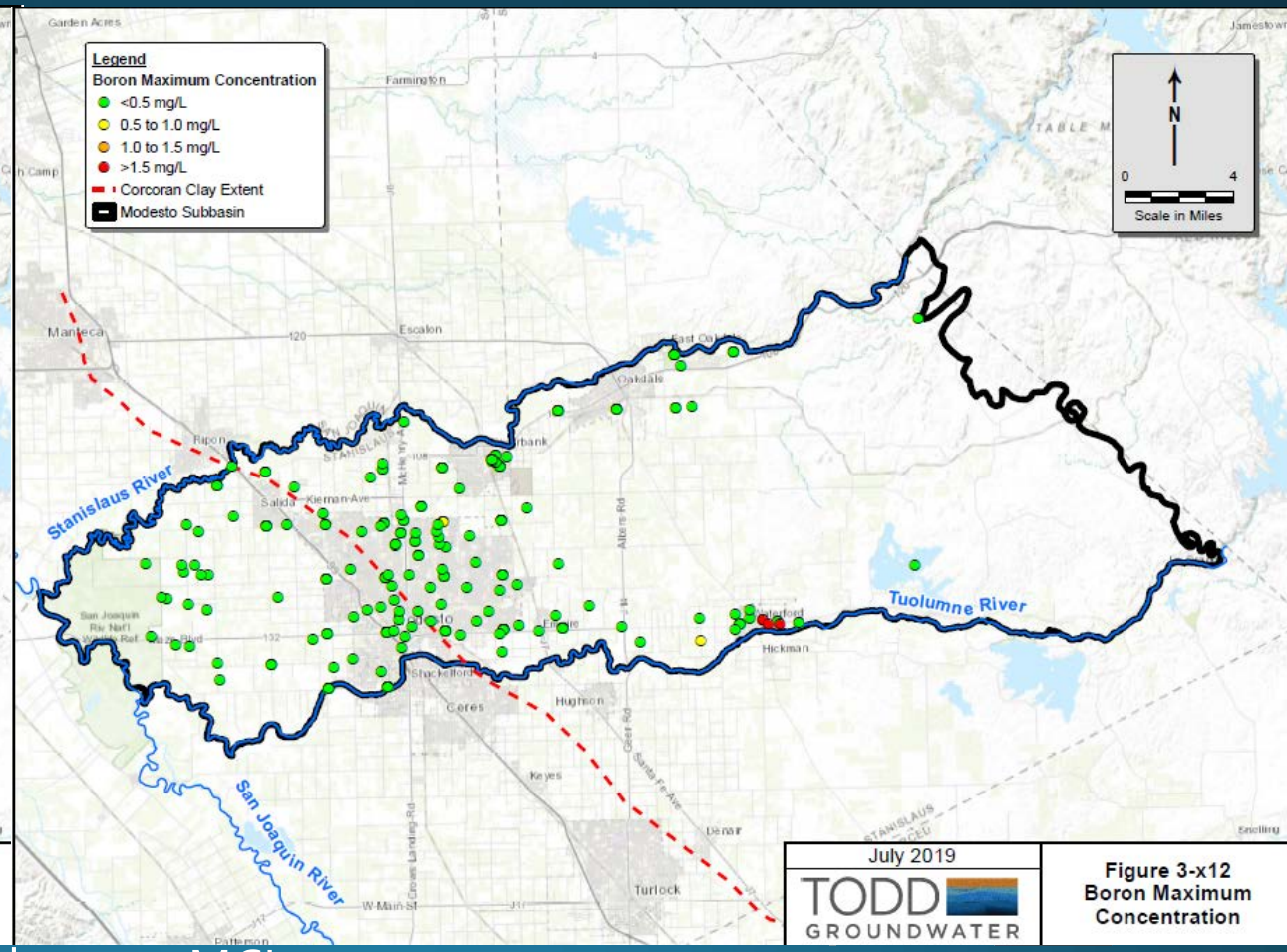

* California State Notification Level (NL). Boron does not have an MCL.

DBCP

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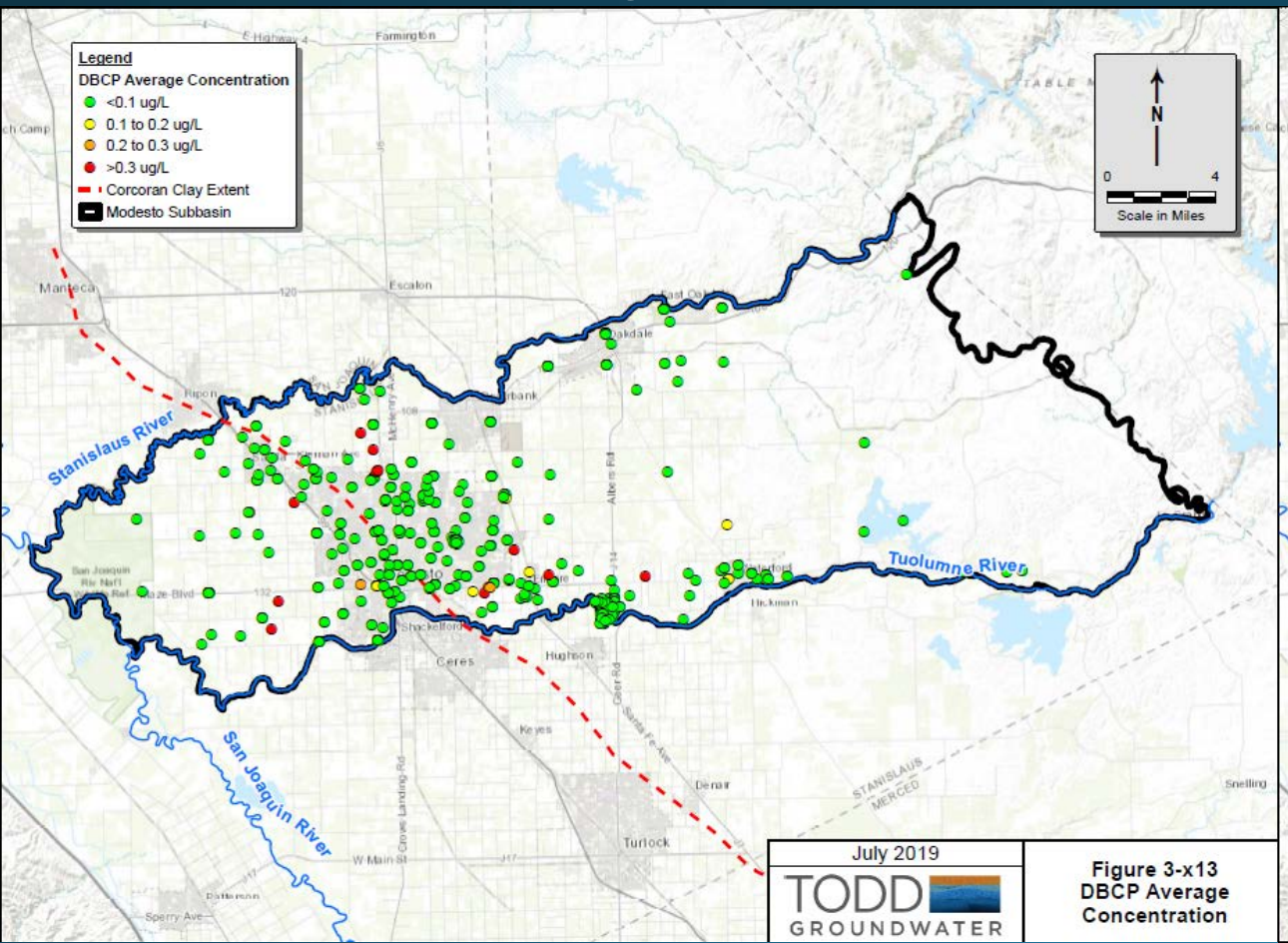
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
DBCP, µg/L	0.2 µg/L[1]	10,209	64%	22%	14%	0.0	0.0	0.1	18

Average



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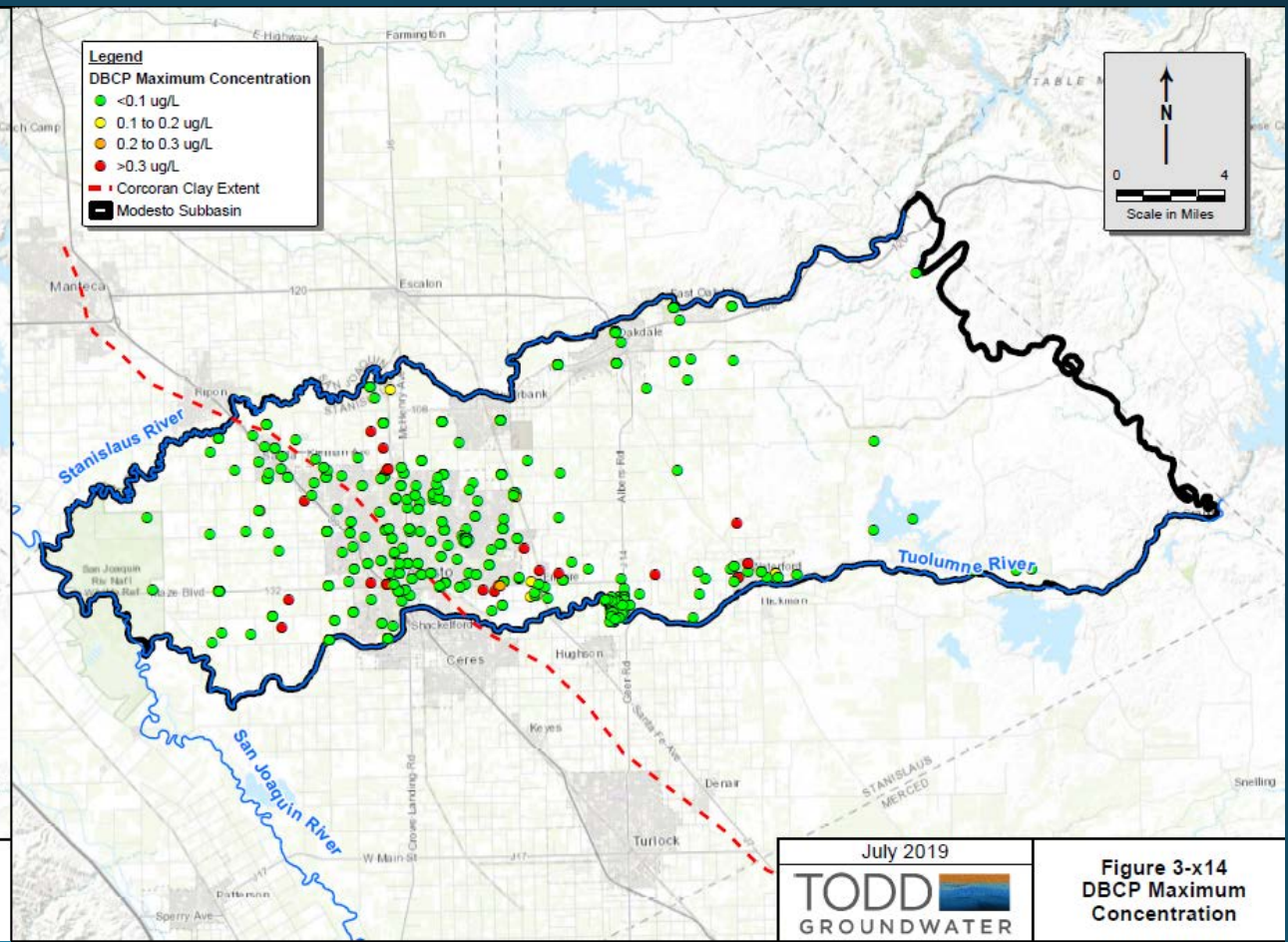

Nitrate (as N)

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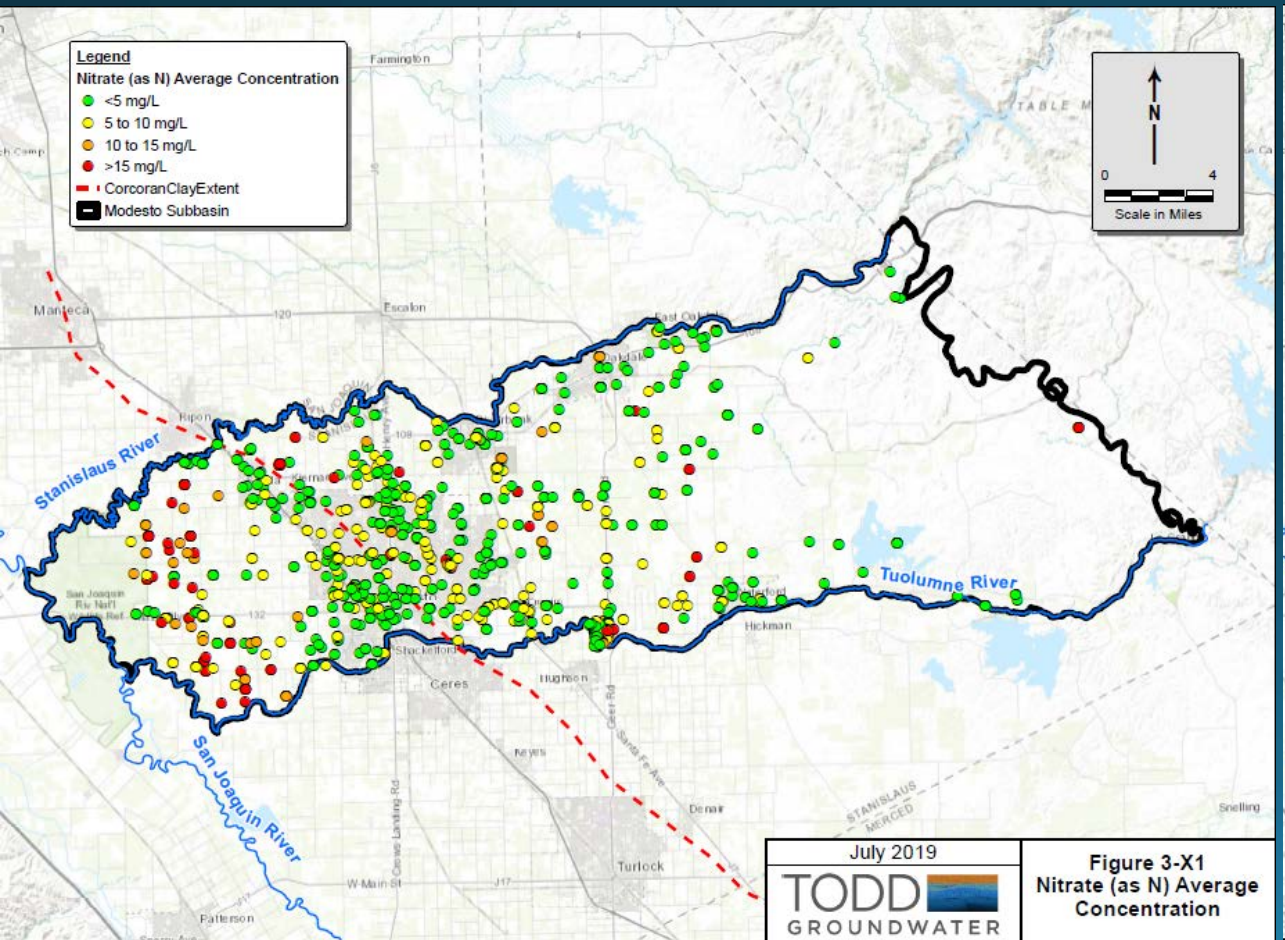
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Nitrate (as N), mg/L	10 mg/L[1]	35,885	45%	51%	4%	0.0	5.4	5.4	490

Average



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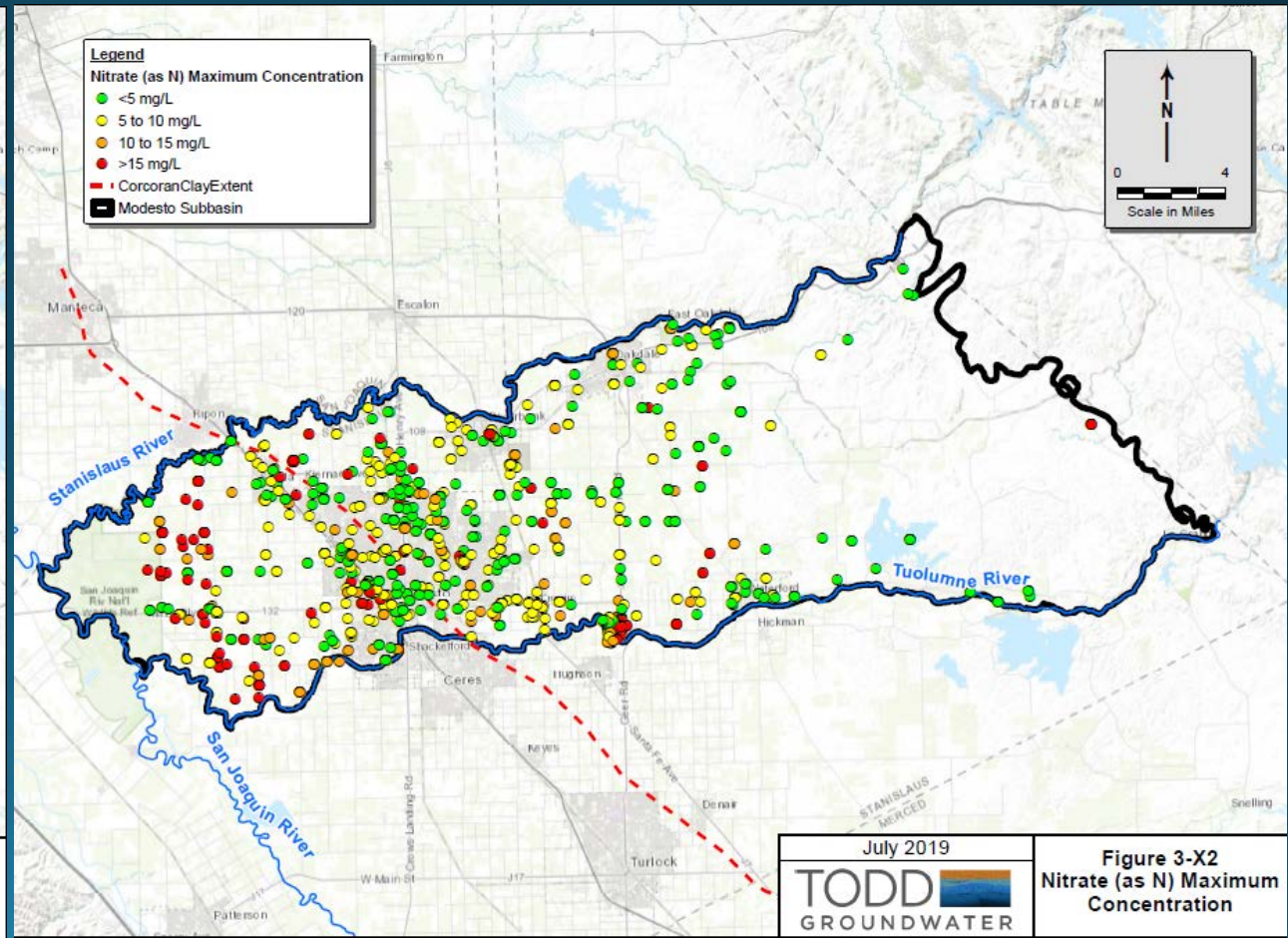

PCE

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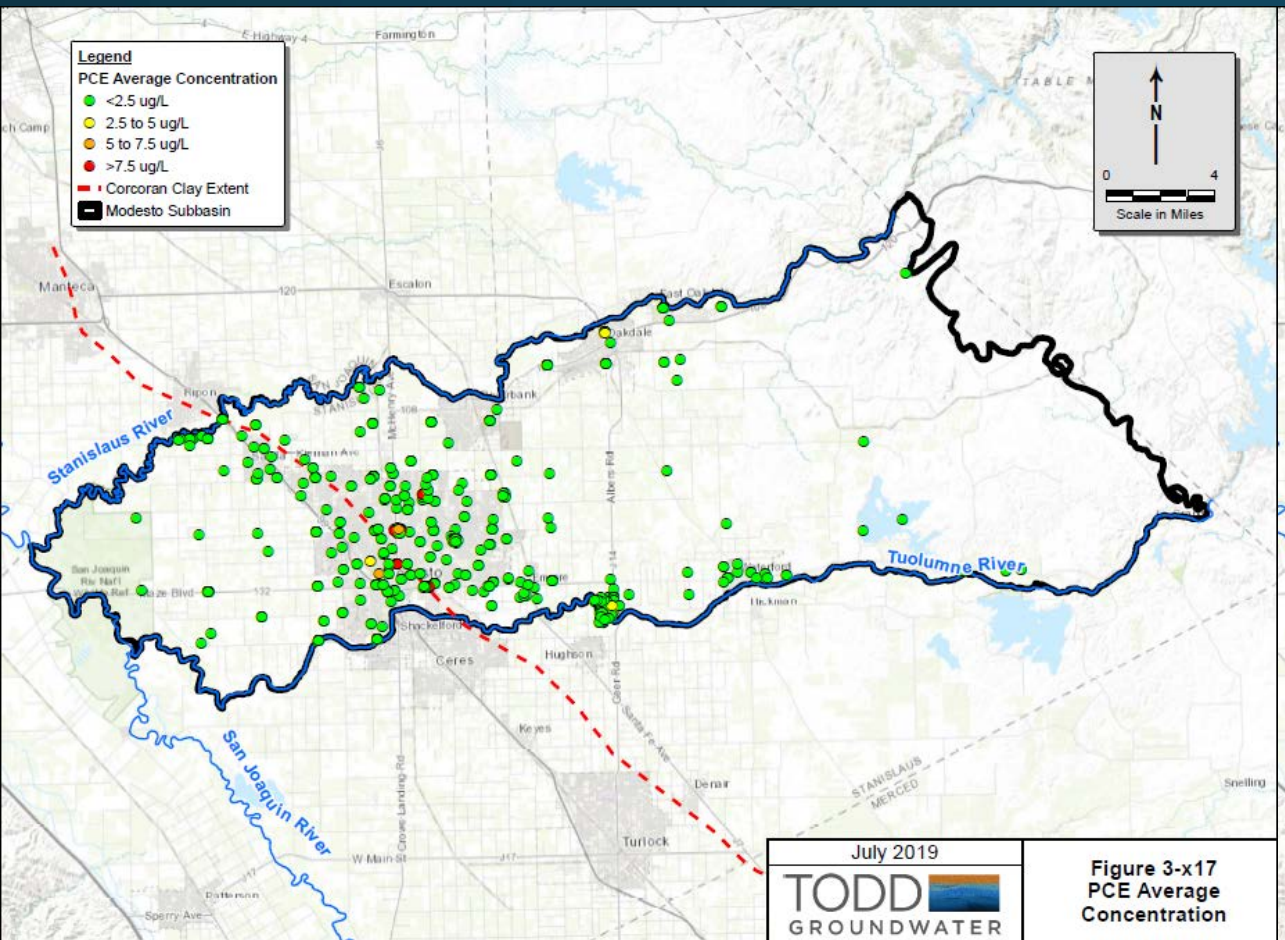
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
PCE, µg/L	5 µg/L[1]	9,845	88%	4%	8%	0.0	0.0	8.9	8860

Average



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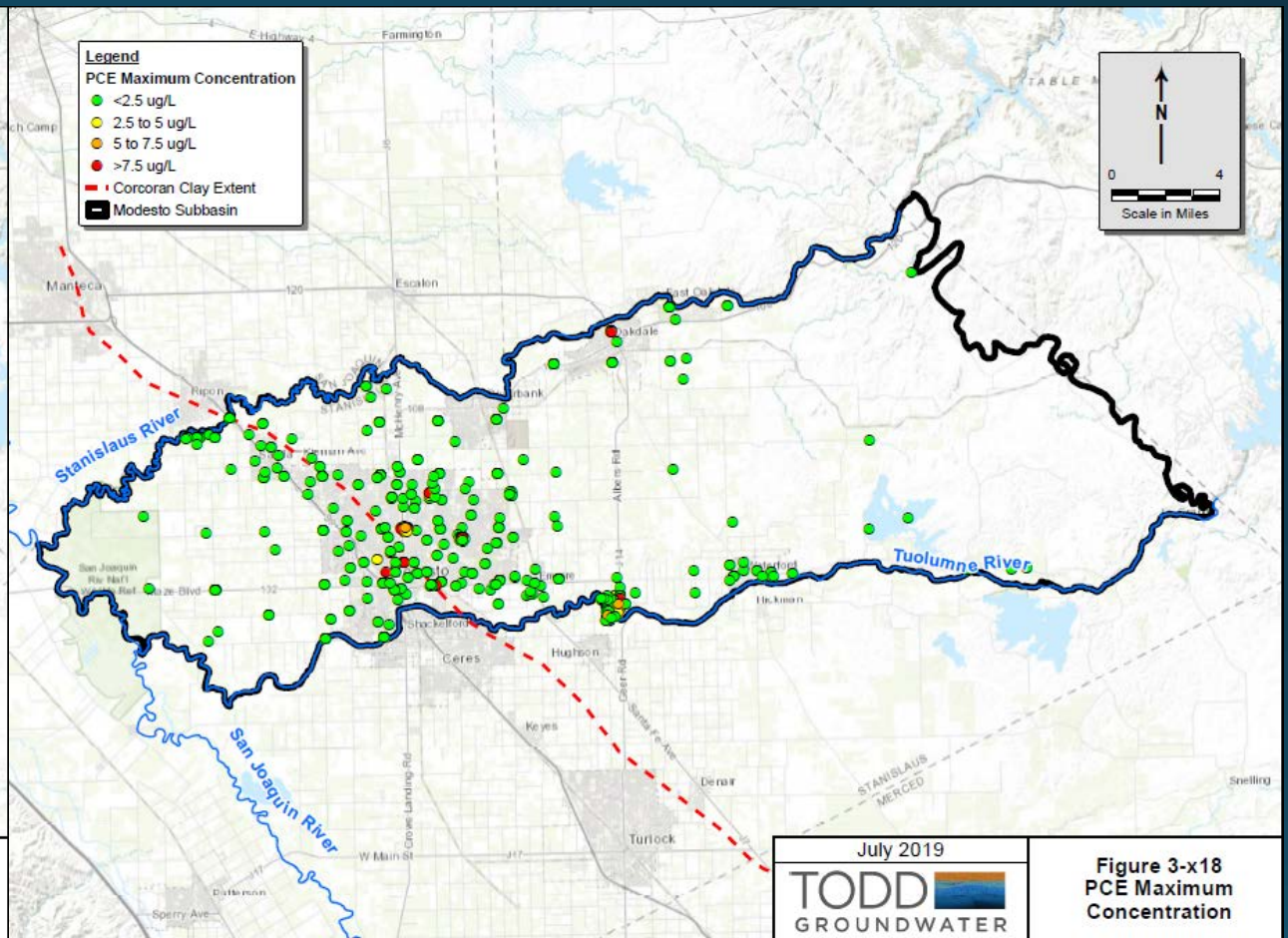

TCP

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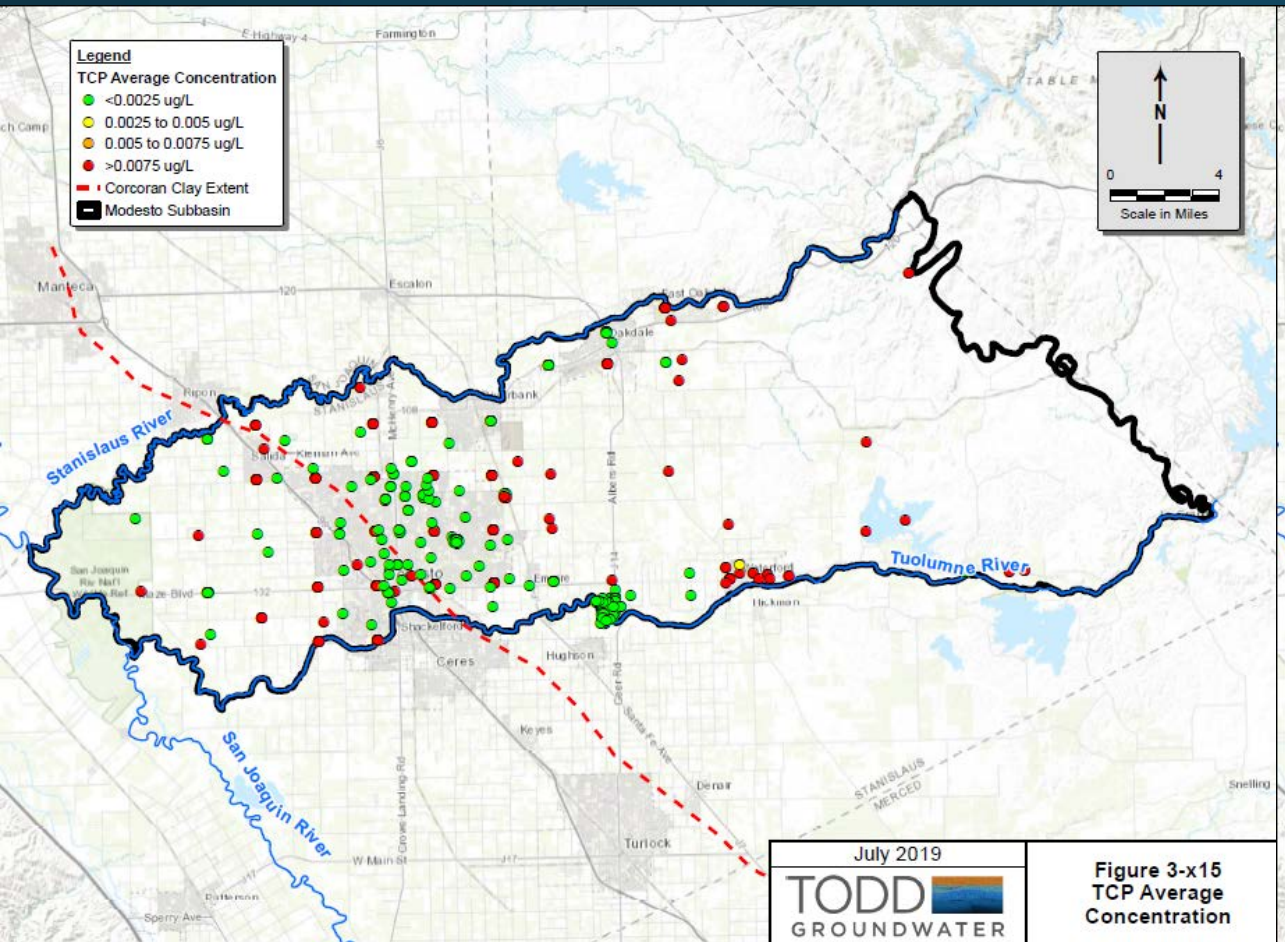
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
TCP, µg/L	0.005 µg/L[1]	6,566	83%	2%	15%	0.0	0.0	0.1	12

Average



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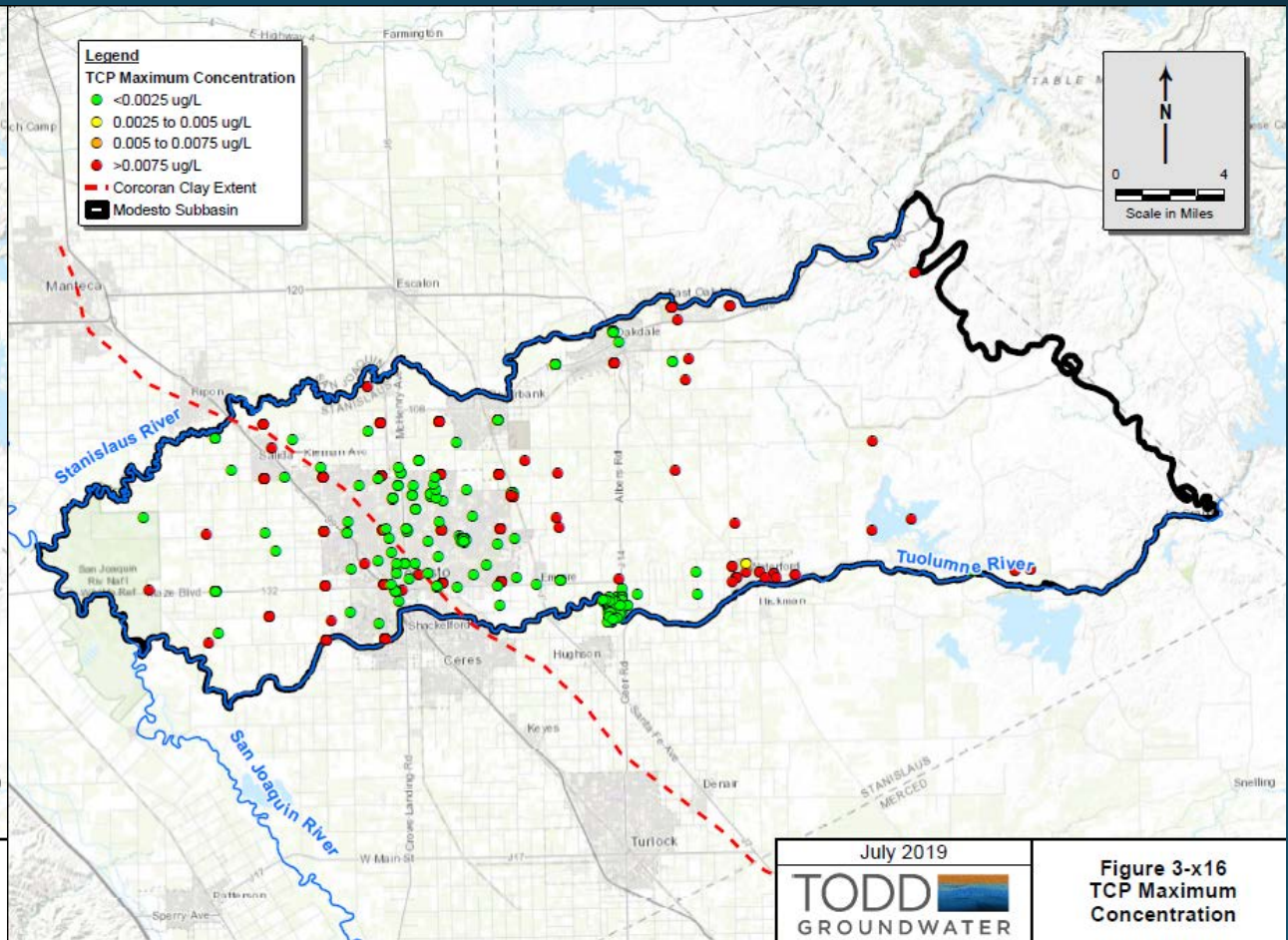

TDS

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1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Total dissolved solids, mg/L	1,000 mg/L[2]	8,033	73%	22%	5%	0.0	370	462	20,000

Average

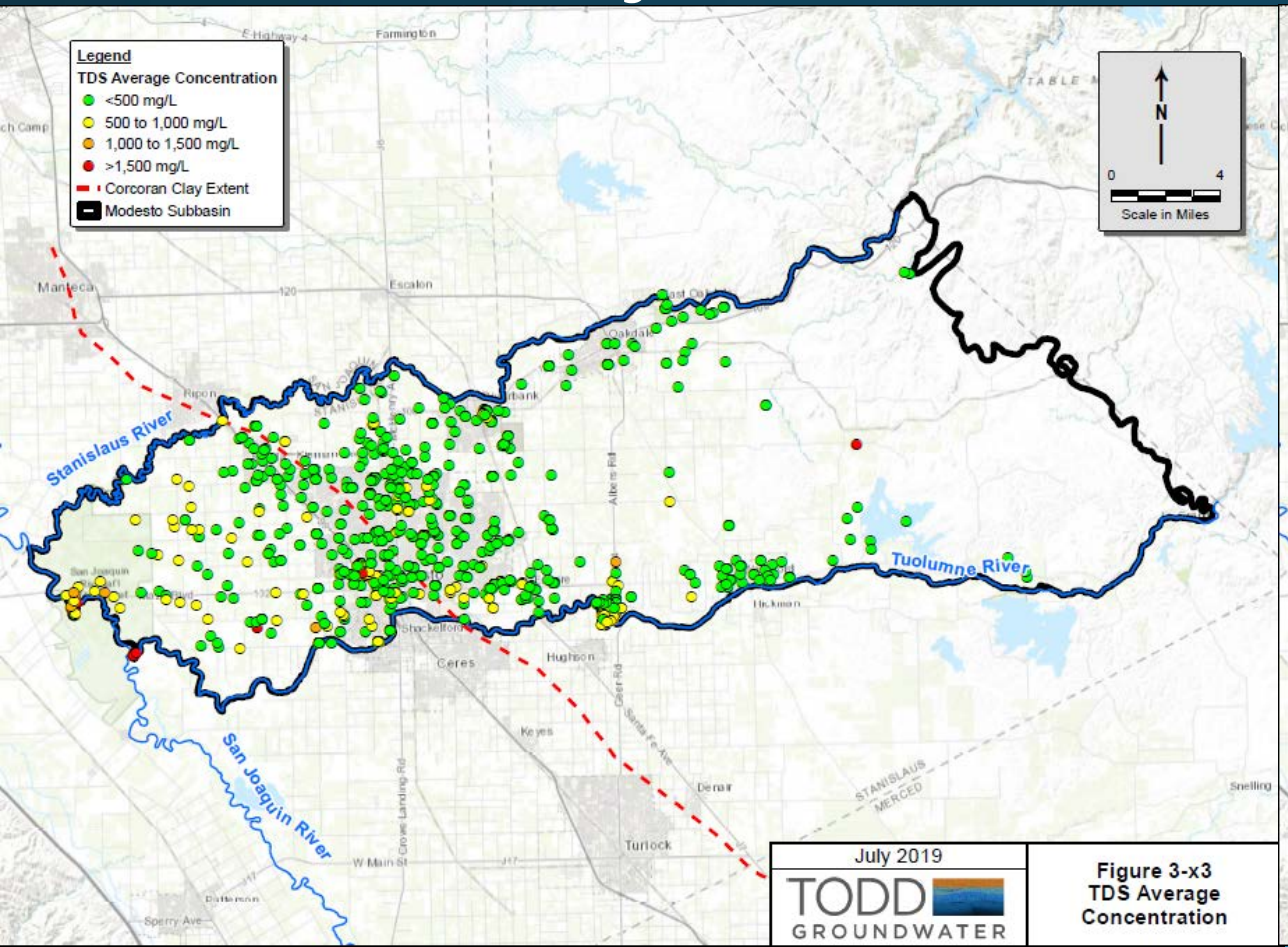

Figure 3-x3
TDS Average Concentration

Maximum

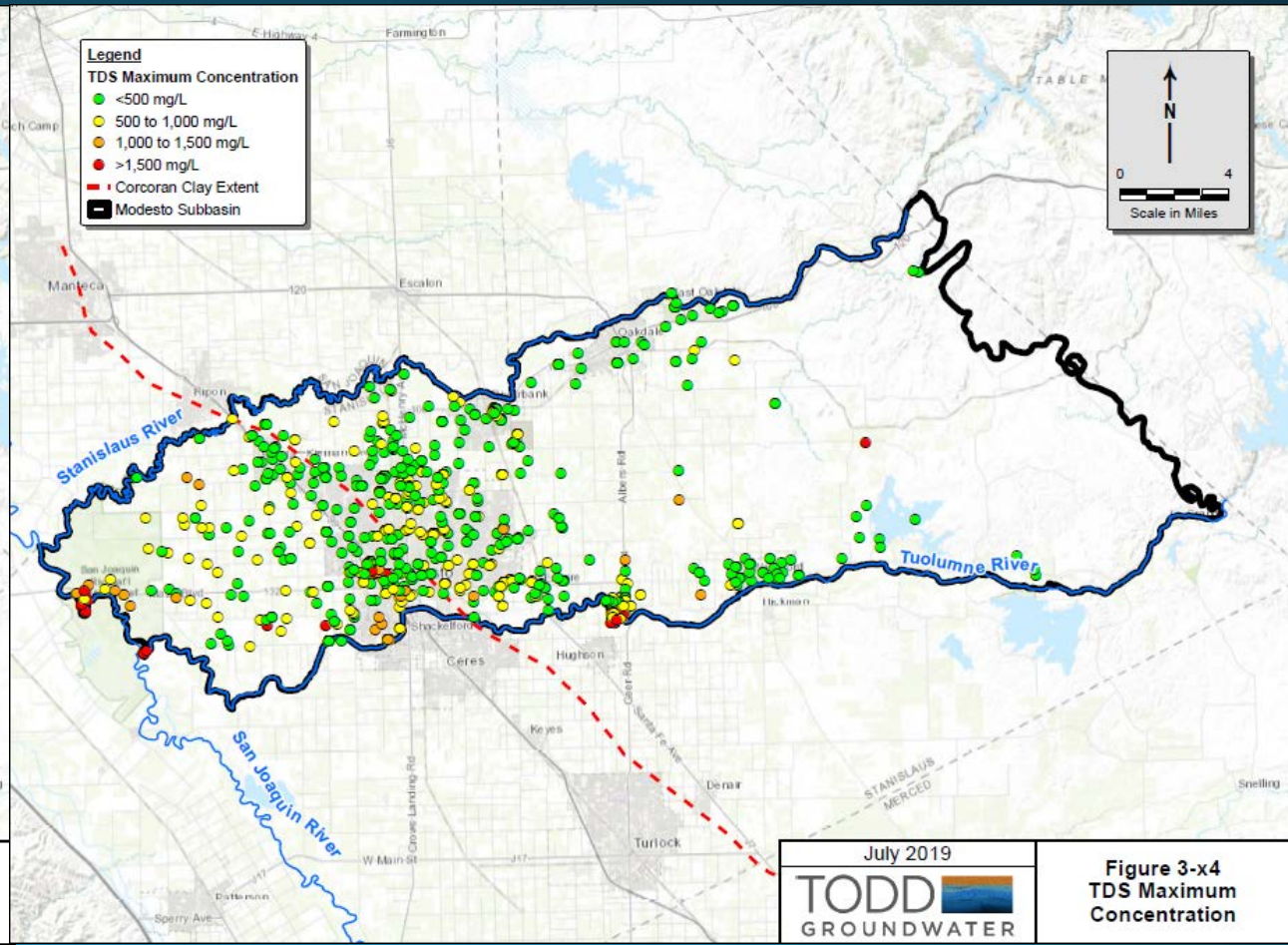

Figure 3-x4
TDS Maximum Concentration

Uranium

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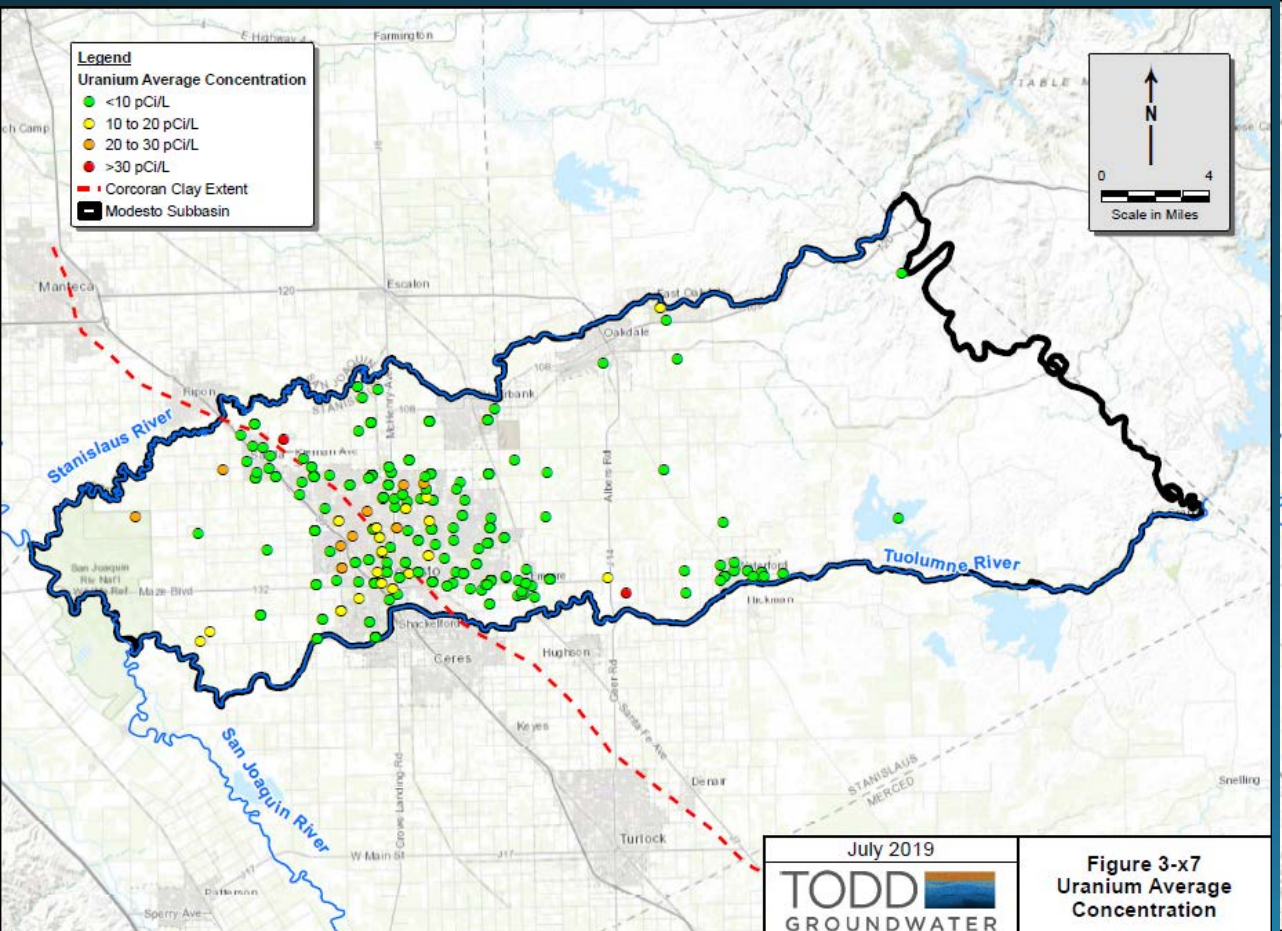
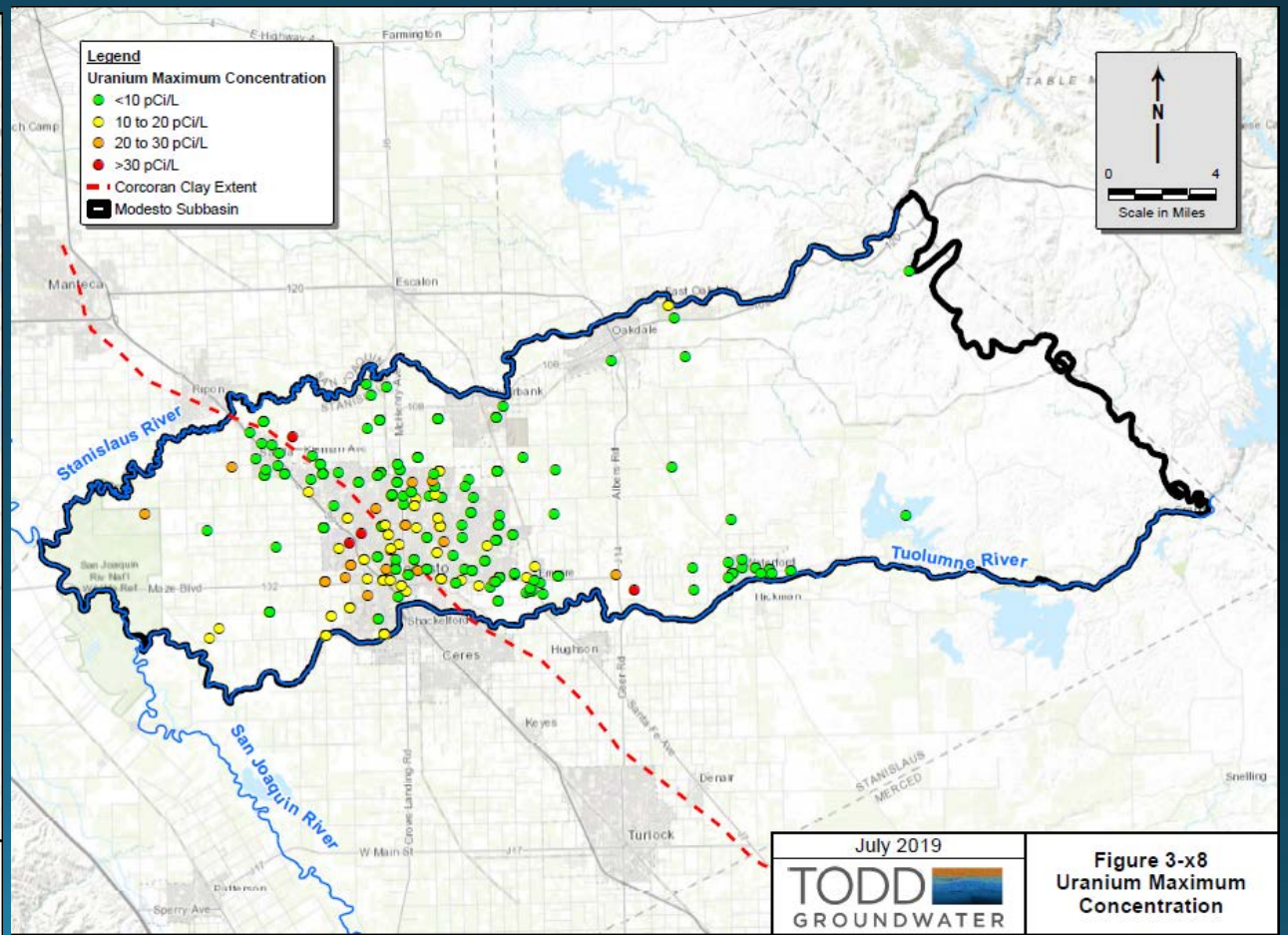
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Uranium, pCi/L	20 pCi/L[1]	4,356	66%	24%	10%	0.0	5.6	8.2	65

Average



Maximum



Gross Alpha

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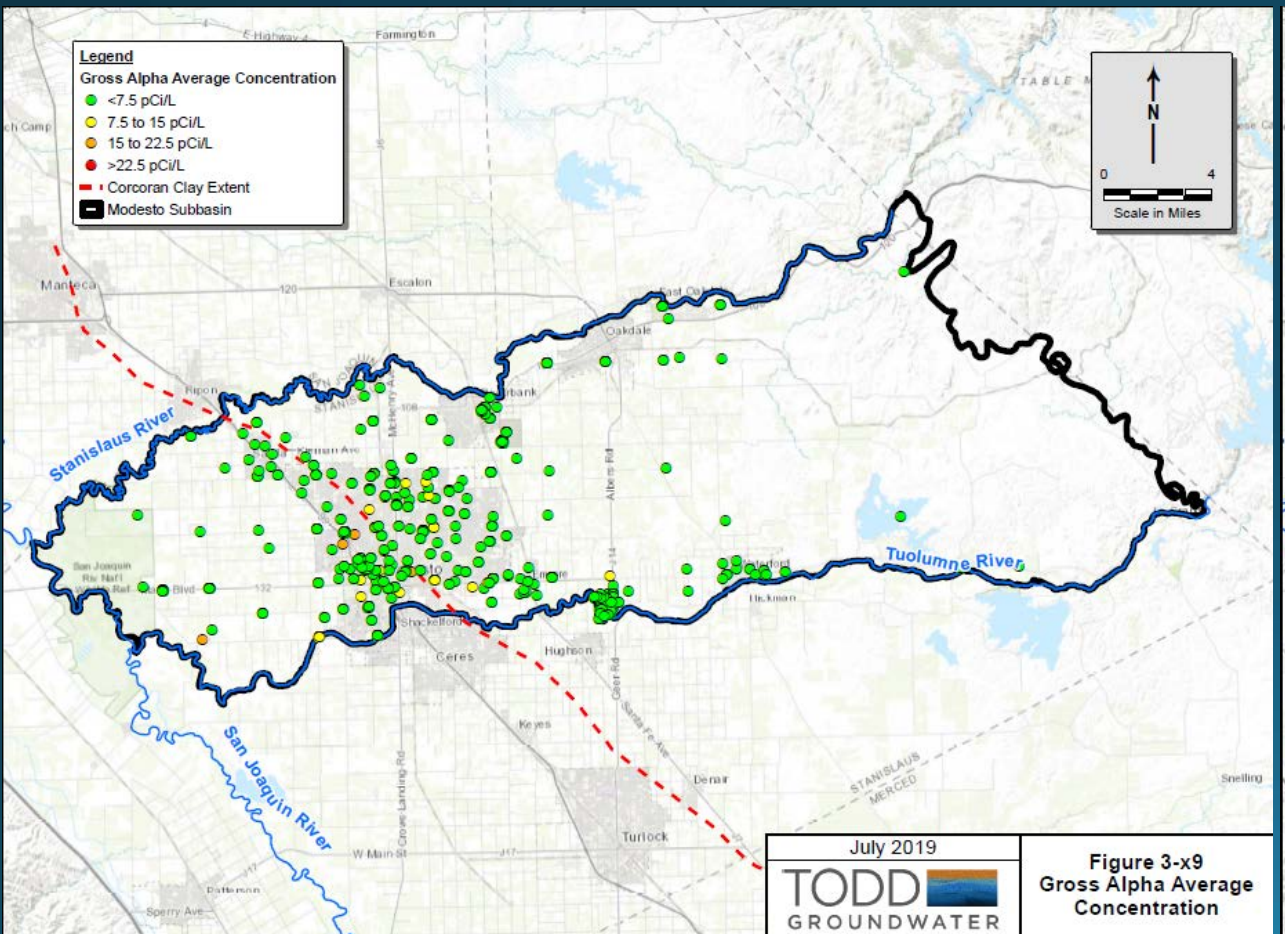
1995 to 2019

Water Quality Constituent	California MCL[1] or SMCL[2]	Number of Samples	Percentage of Samples			Concentrations			
			<0.5MCL	>0.5MCL to MCL	>MCL	Min.	Median	Avg.	Max.
Gross Alpha, pCi/L	15 pCi/L[1]	3,455	67%	20%	13%	-1	4	7	87

Average



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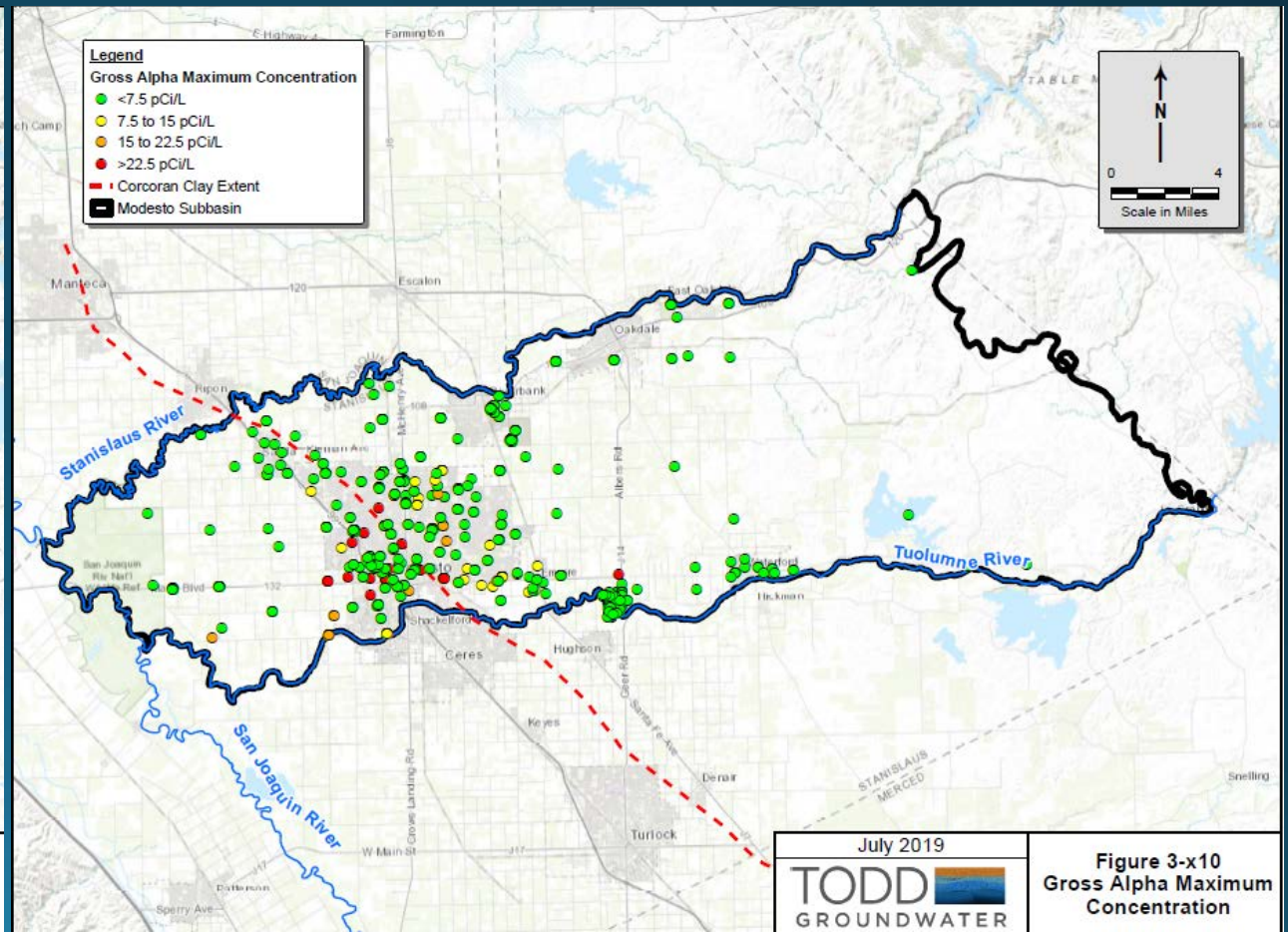

Historical vs Present

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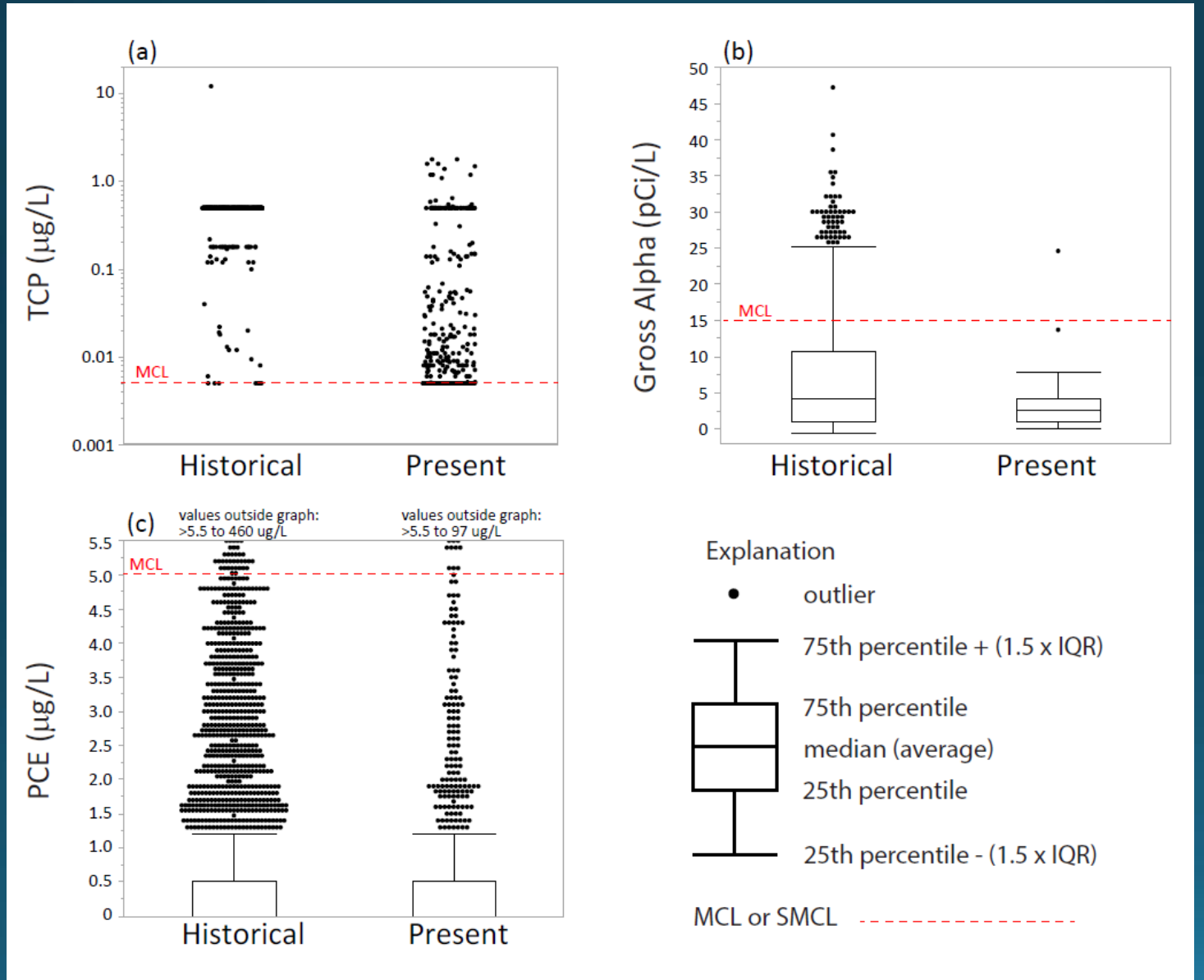
No statistical differences between historical and present periods: TCP, PCE, and Gross Alpha



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Historical vs Present

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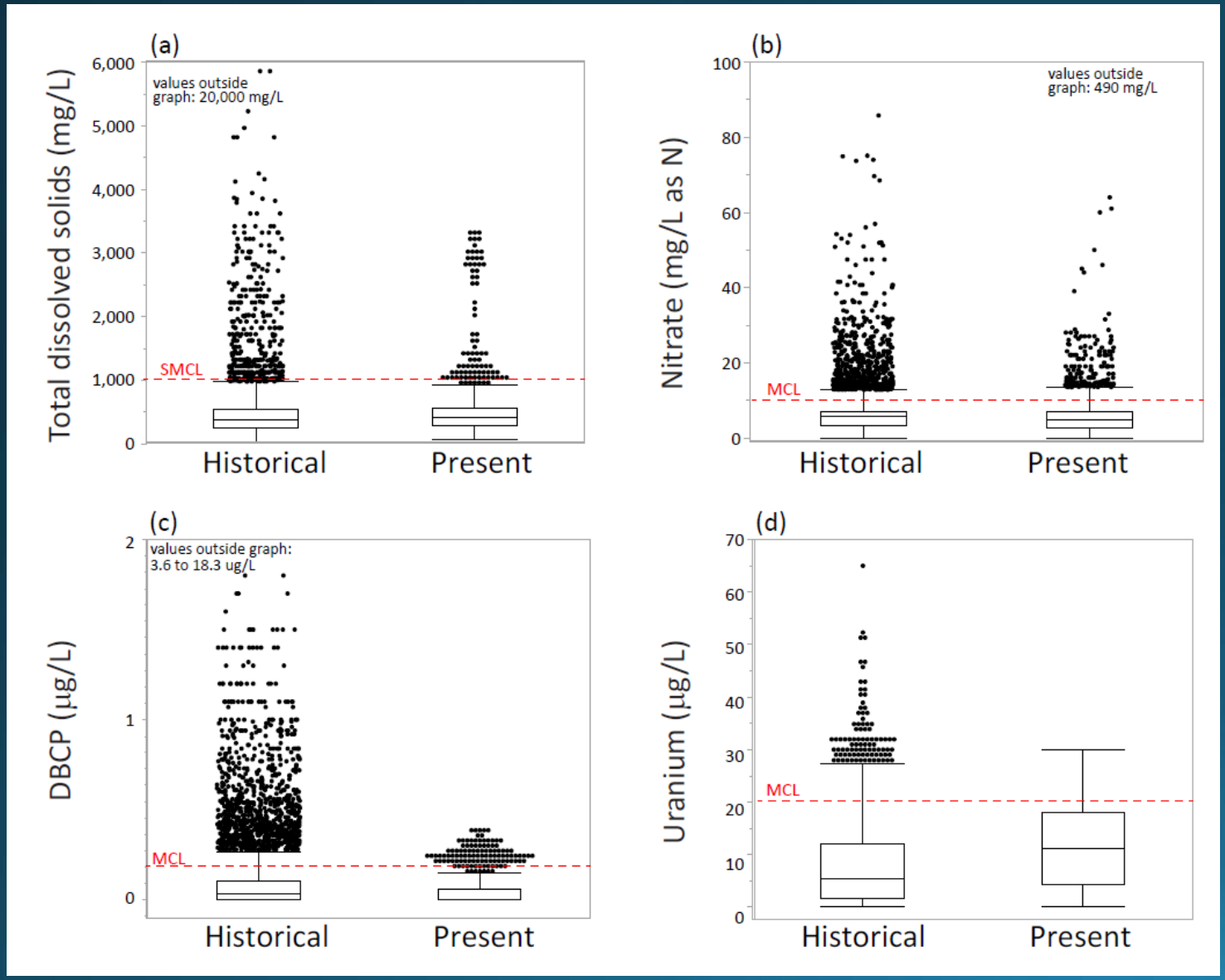
Statistical differences between historical and present periods: TDS, DBCP, Nitrate, Uranium

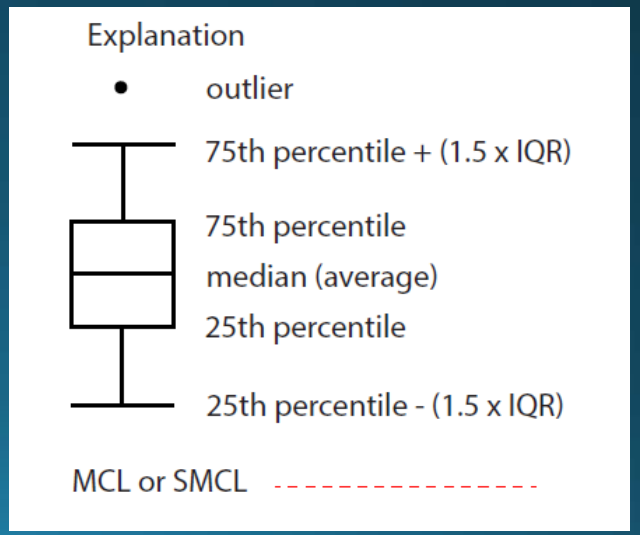


Median concentration <u>lower</u> in present compared to historical:

- DBCP & Nitrate

Median concentration <u>higher</u> in present compared to historical:

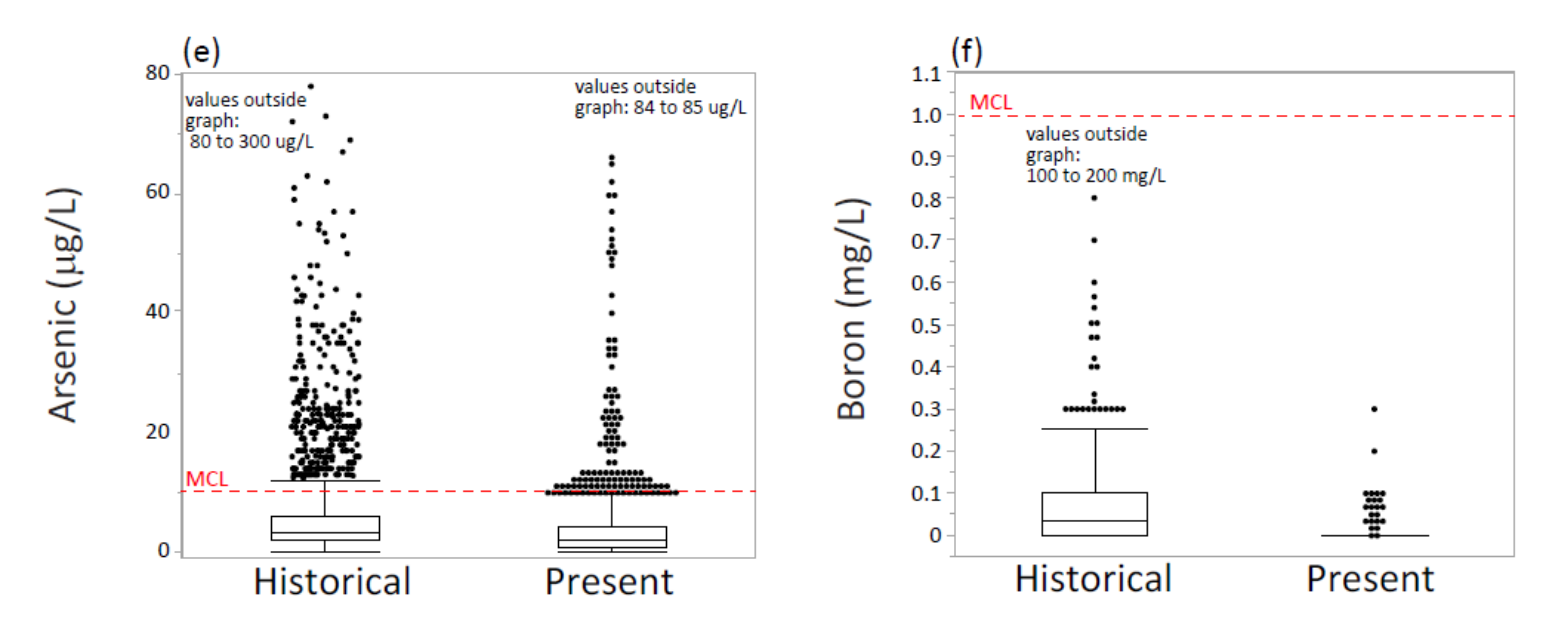
- TDS & Uranium



Historical vs Present

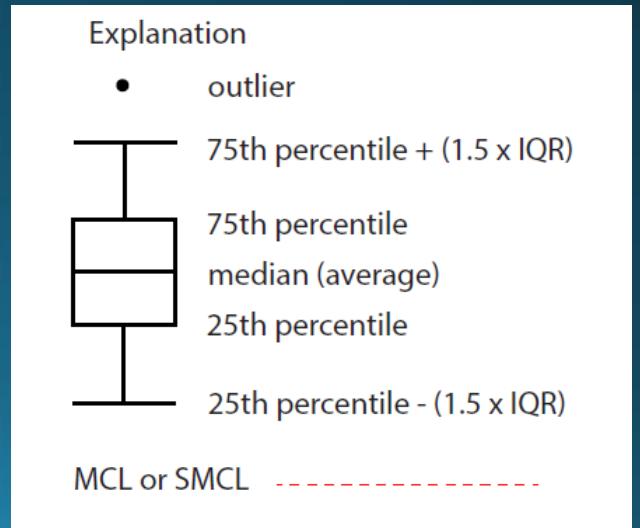
DRAFT

Statistical differences between historical and present periods: Arsenic and Boron



Median concentration lower in present compared to historical:

- Arsenic & Boron



Trend Analysis

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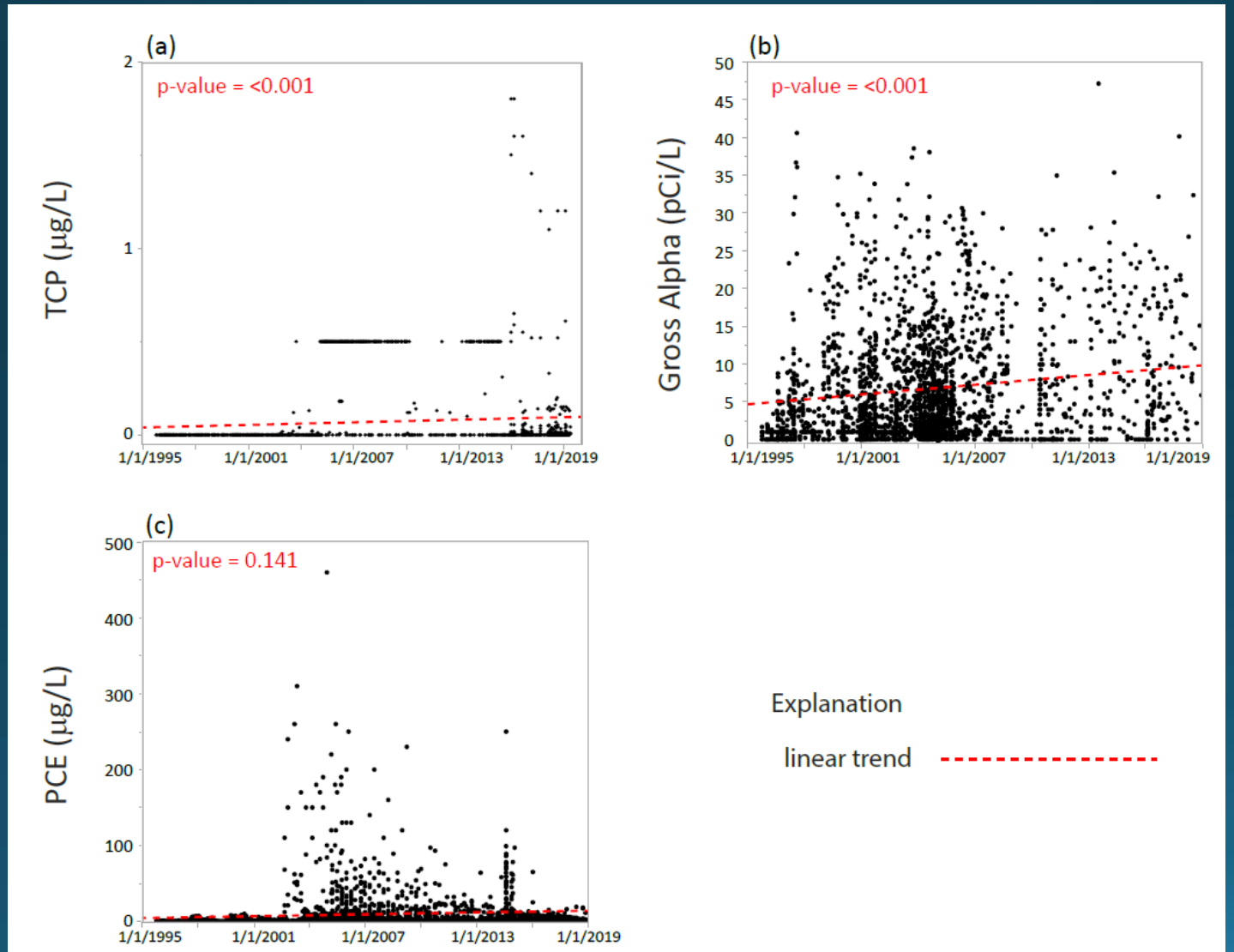
Increasing trend: TCP & Gross Alpha
No trend: PCE



TODD GROUNDWATER

Trend Analysis

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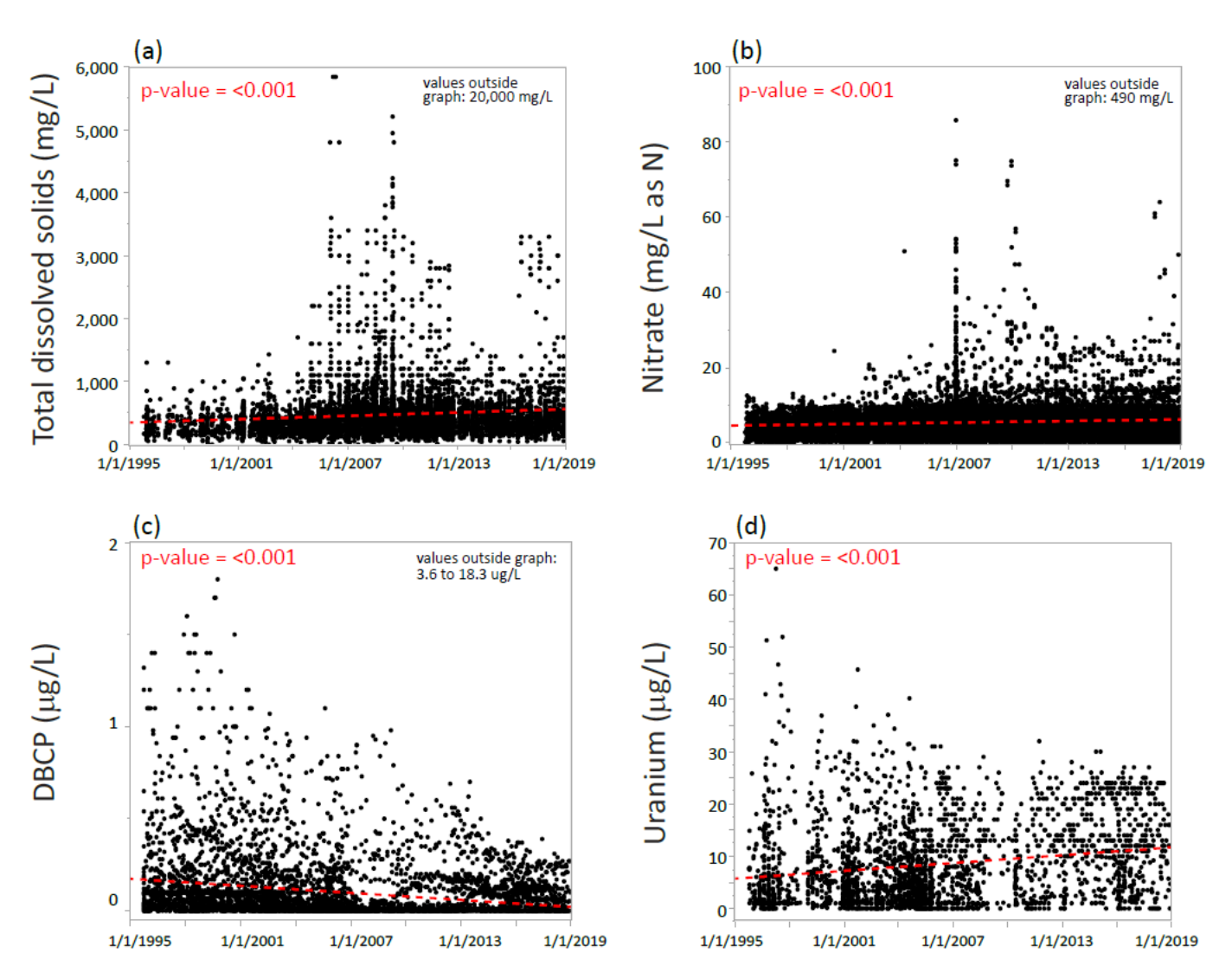
Increasing trend: TDS, Nitrate, and Uranium
Decreasing trend: DBCP



TODD GROUNDWATER

Trend Analysis

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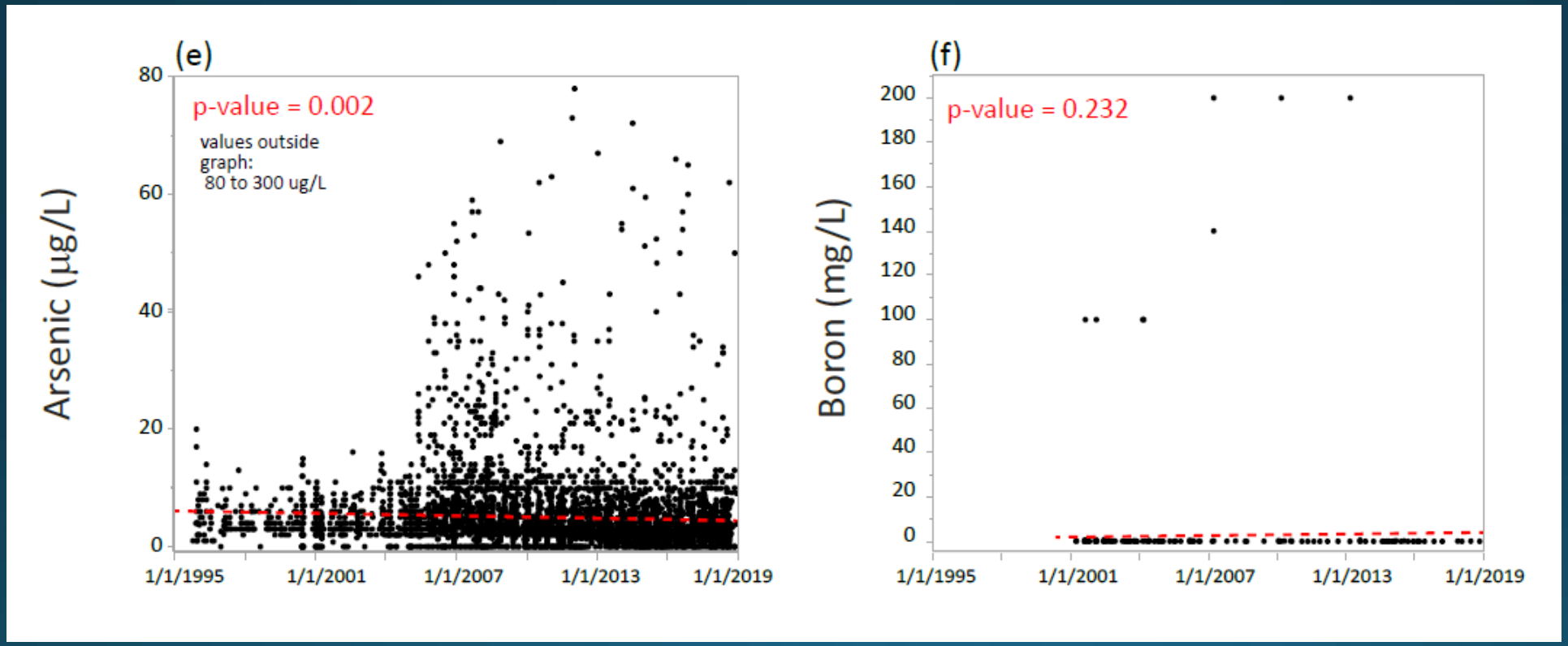
Decreasing trend: Arsenic
No Trend: Boron



TODD GROUNDWATER

Water Quality: Next Steps

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- Resolve mapping and depth of Corcoran Clay
- Analysis of the three Principal Aquifers:
  - Western Upper (above Corcoran)
  - Western Lower (below Corcoran)
  - Eastern (east of Corcoran)
- This analysis will support decisions for future monitoring networks.

TODD GROUNDWATER