



# Recomputation of Ambient Water Quality in the Santa Ana River Watershed

BMPTF: February 20, 2020

# Ambient Water Quality Phases

---

## 1: Data Gathering

- ✓ Data Compilation
- ✓ QA/QC, Process, and Upload recent data

## 2: Point Statistics

- ✓ Calculate Water Quality Point Statistics
- ✓ Shapiro-Wilk Test for Normality

## 3: Computations

- ✓ Groundwater Elevation Contours
- ✓ Nitrate, TDS Concentrations
- ✓ Compute ambient water quality for GMZ's

## 4: Interpretive Tools

- ✓ Innovative Interpretive Tool



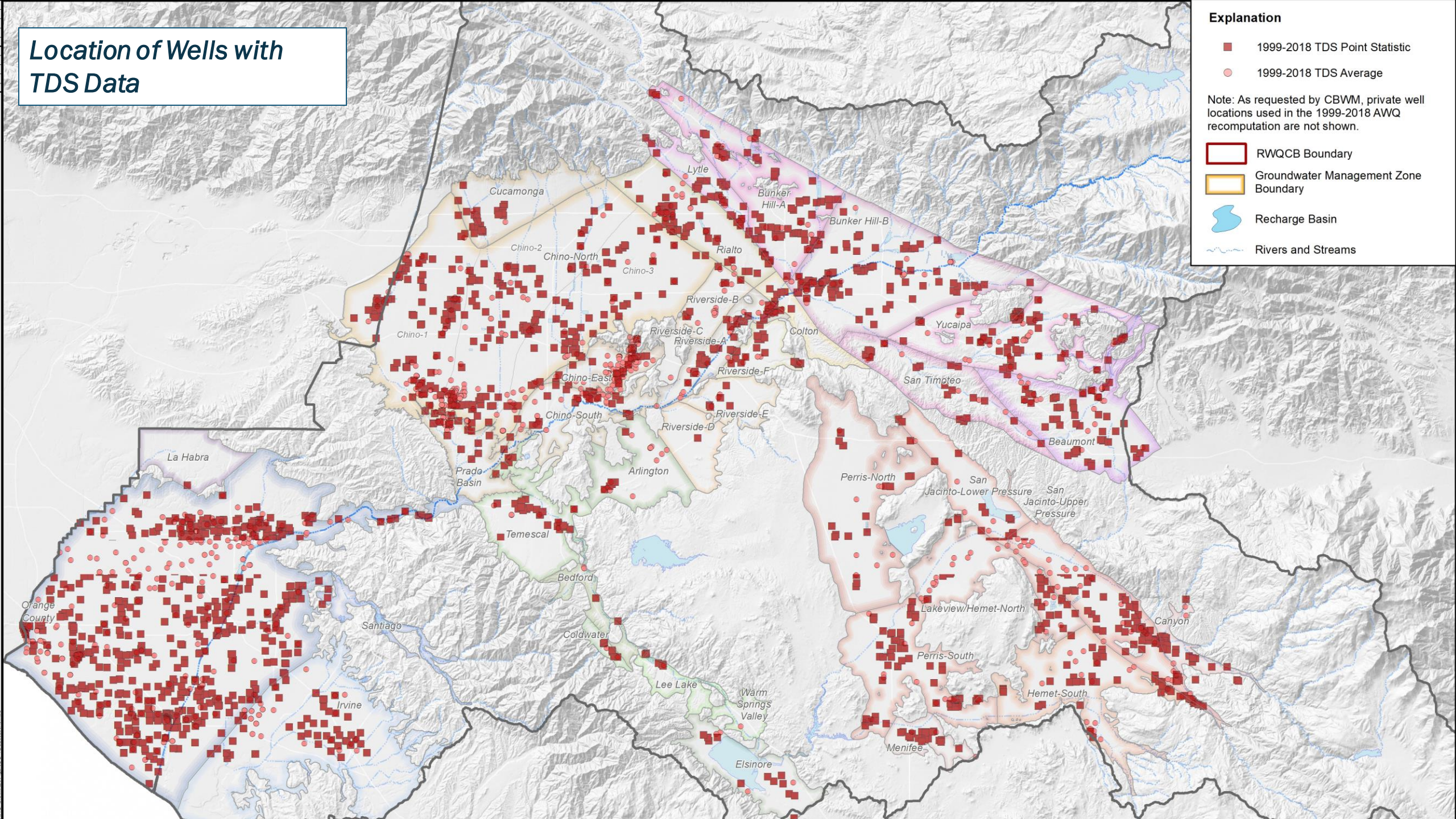
## Location of Wells with TDS Data

### Explanation

- 1999-2018 TDS Point Statistic
- 1999-2018 TDS Average

Note: As requested by CBWM, private well locations used in the 1999-2018 AWQ recomputation are not shown.

- RWQCB Boundary
- Groundwater Management Zone Boundary
- Recharge Basin
- Rivers and Streams





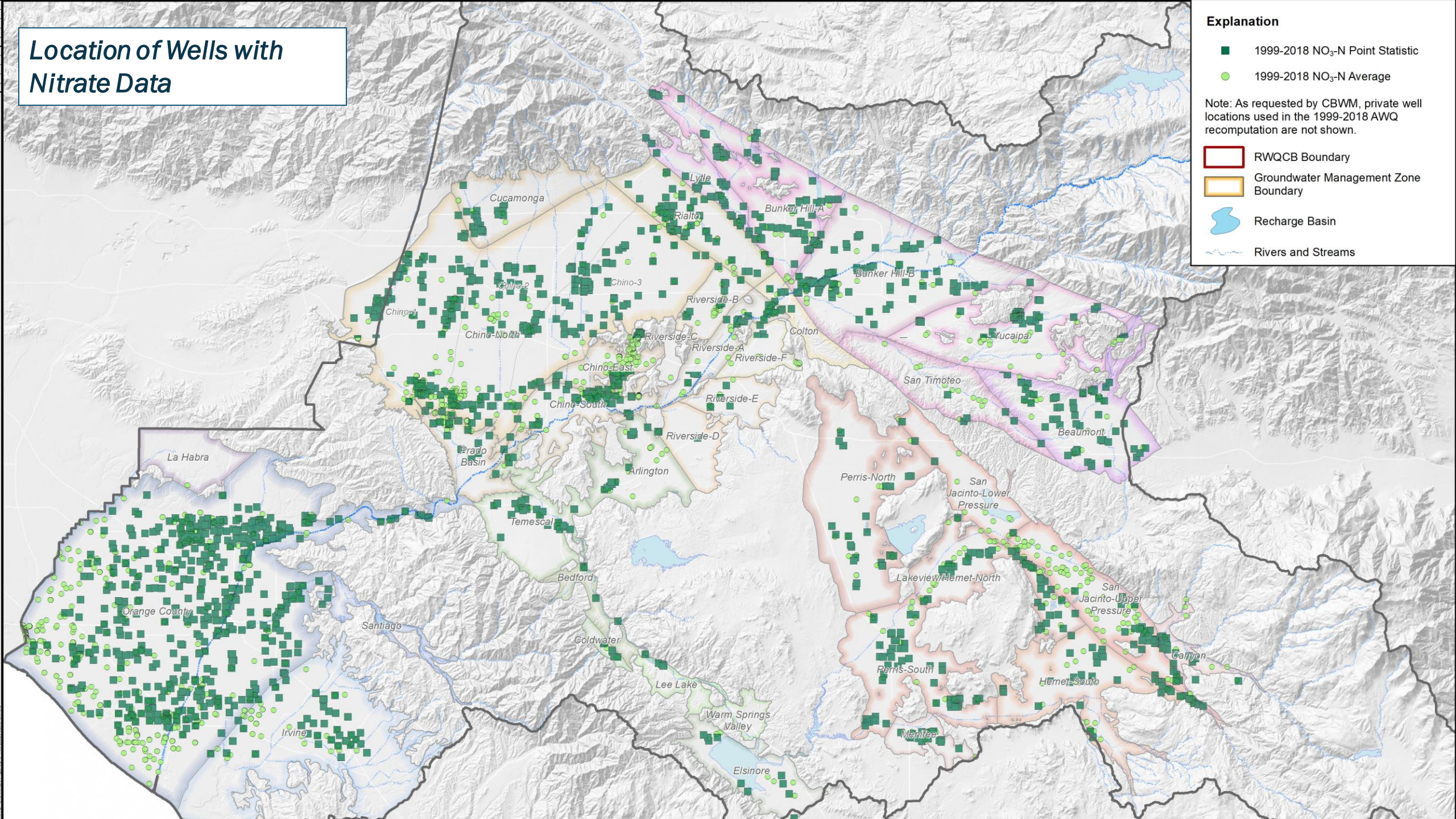
## Location of Wells with Nitrate Data

### Explanation

- 1999-2018 NO<sub>3</sub>-N Point Statistic
- 1999-2018 NO<sub>3</sub>-N Average

Note: As requested by CBWM, private well locations used in the 1999-2018 AWQ recomputation are not shown.

- RWQCB Boundary
- Groundwater Management Zone Boundary
- Recharge Basin
- Rivers and Streams



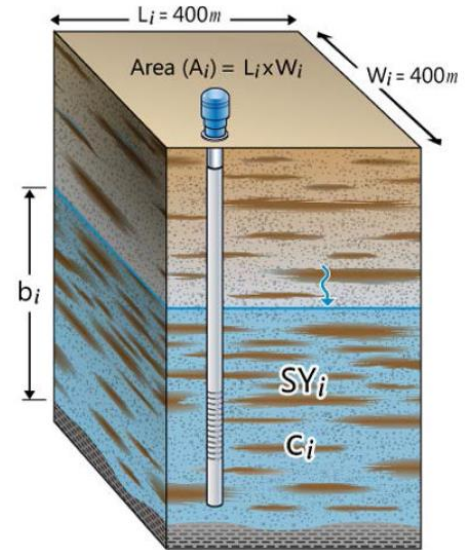


# Volume of Groundwater

$$V = \sum_{i=1}^n A_i \cdot (GWE_i - BOA_i) \cdot SY_i$$

where

$V$	= volume of groundwater in the GMZ
$A_i$	= area of the $i$ th grid cell
$GWE_i$	= groundwater elevation (feet msl)
$BOA_i$	= bottom of the aquifer of the $i$ th grid cell (feet msl)
$SY$	= specific yield of the $i$ th grid cell
$n$	= number of grid cells

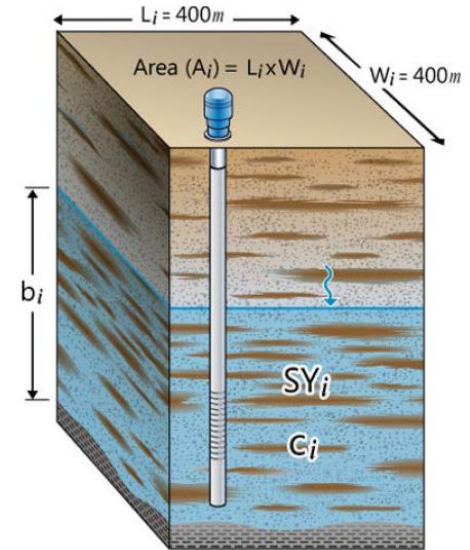


Source: WEI, 2014

# Volume Weighted Estimate of AWQ

$$C_{avg} = \frac{\sum_{i=1}^n C_i \cdot V_i}{\sum_{i=1}^n V_i}$$

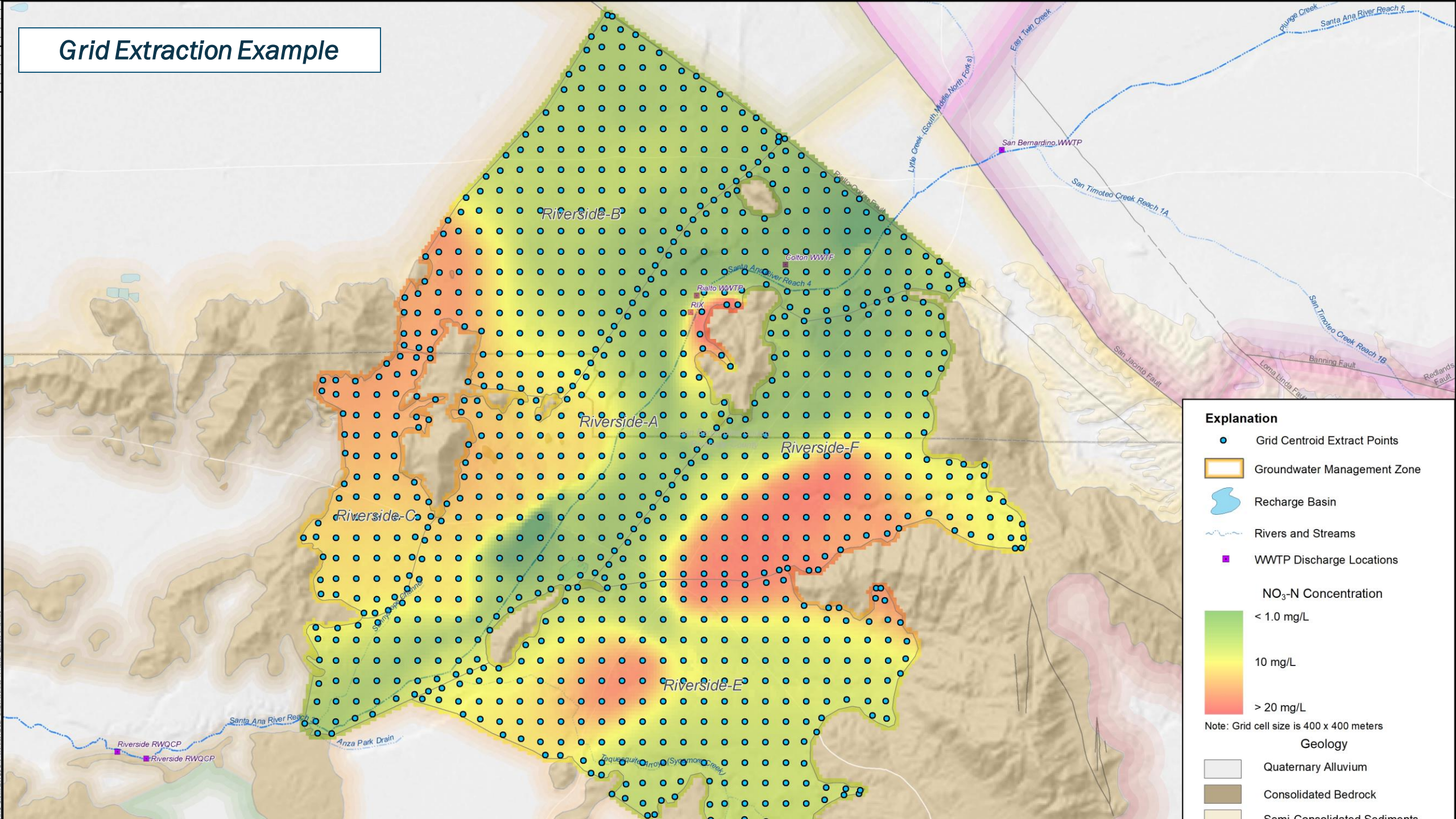
where  $C_{avg}$  = the volume-weighted current ambient concentration in a GMZ  
 $C_i$  = the current ambient concentration of groundwater in the  $i$ th grid cell  
 $V_i$  = the volume of groundwater in the  $i$ th grid cell  
 $n$  = number of grid cells



Source: WEI, 2014



# Grid Extraction Example





# 2018 Ambient Water Quality TDS

**Explanation**

**440** Groundwater Management Zone  
1999-2018 TDS AWQ (mg/L)

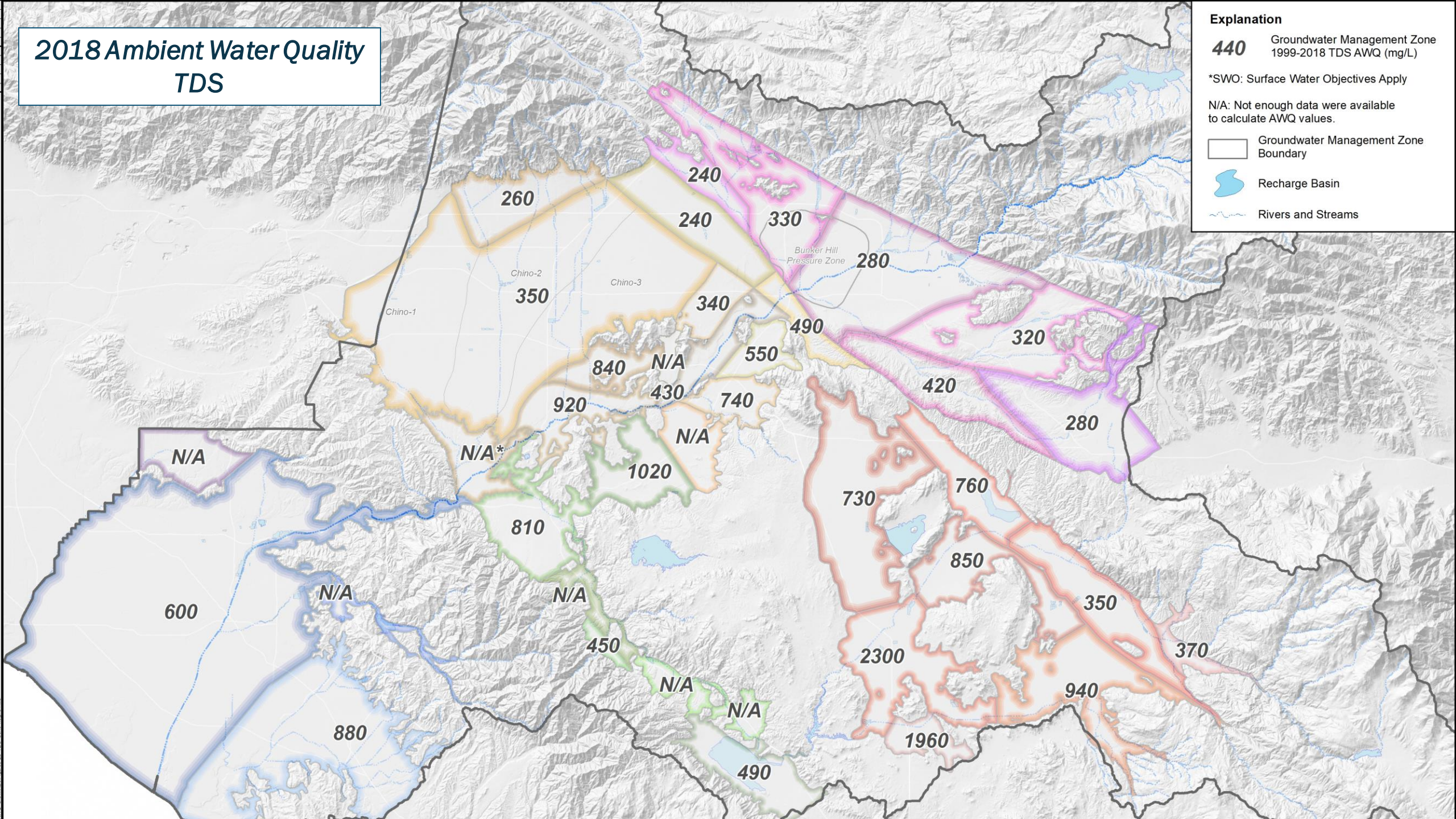
\*SWO: Surface Water Objectives Apply

N/A: Not enough data were available  
to calculate AWQ values.

Groundwater Management Zone  
Boundary

Recharge Basin

Rivers and Streams





# 2018 Assimilative Capacity TDS

## Explanation

### Assimilative Capacity

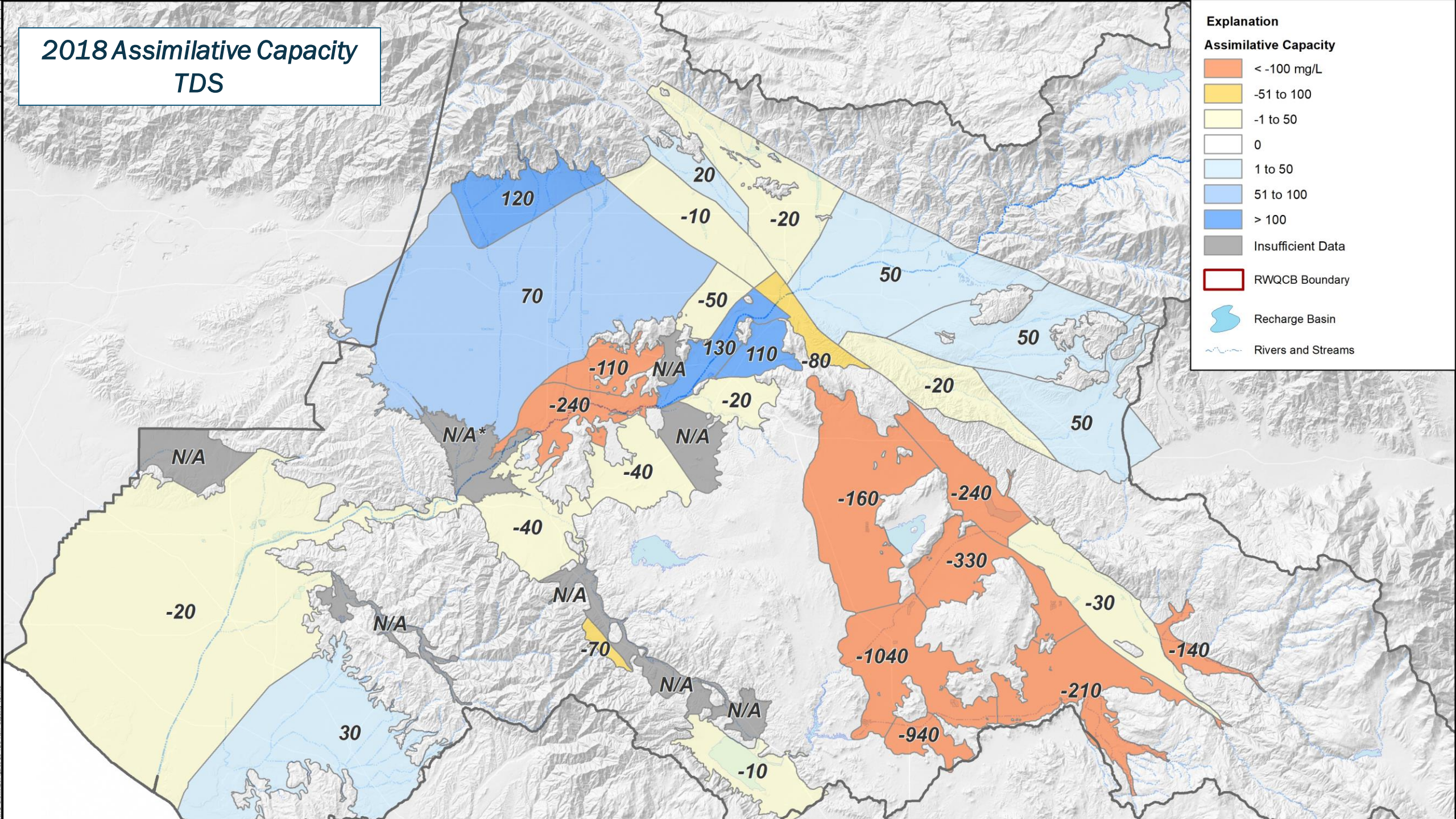
- < -100 mg/L
- 51 to 100
- 1 to 50
- 0
- 1 to 50
- 51 to 100
- > 100

Insufficient Data

RWQCB Boundary

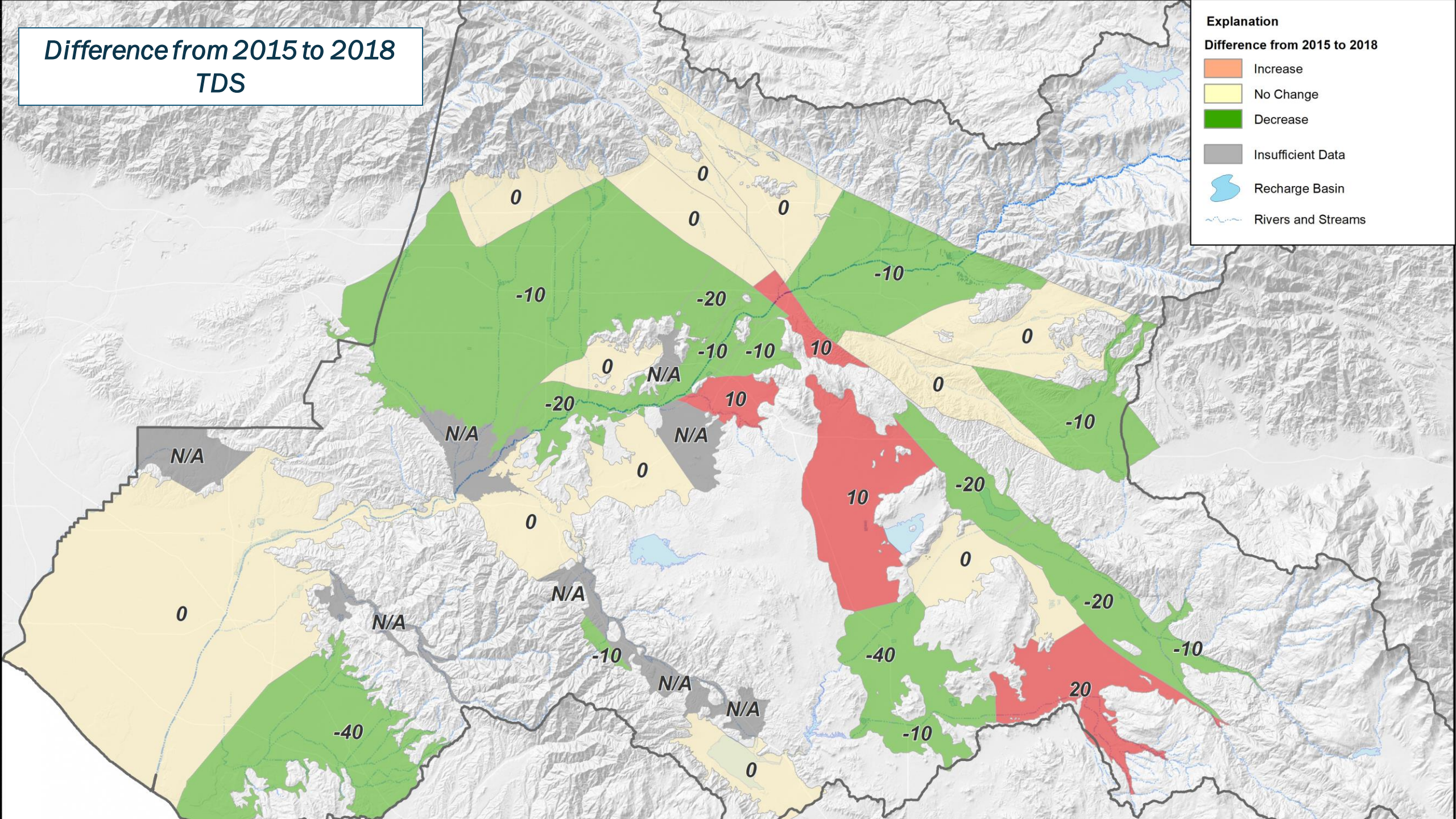
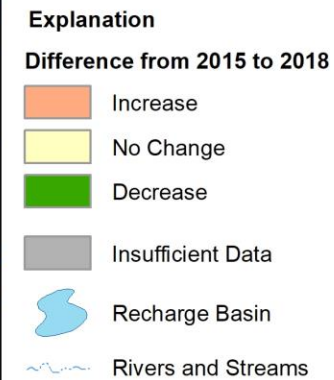
Recharge Basin

Rivers and Streams





*Difference from 2015 to 2018*  
TDS





# 2018 Ambient Water Quality Nitrate as N

**Explanation**

**10.4** Groundwater Management Zone  
1999-2018 NO<sub>3</sub>-N AWQ (mg/L)

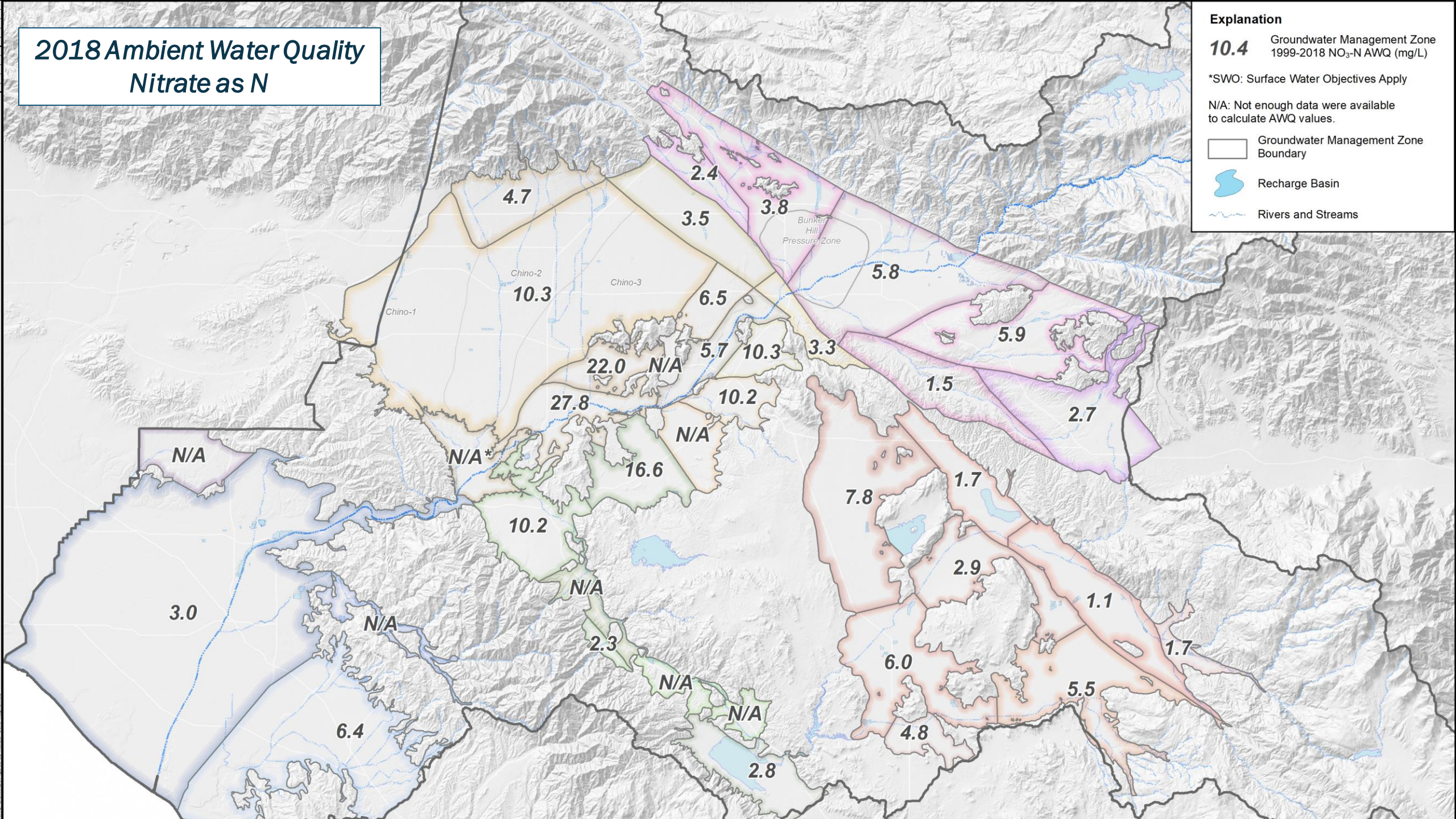
\*SWO: Surface Water Objectives Apply

N/A: Not enough data were available  
to calculate AWQ values.

Groundwater Management Zone  
Boundary

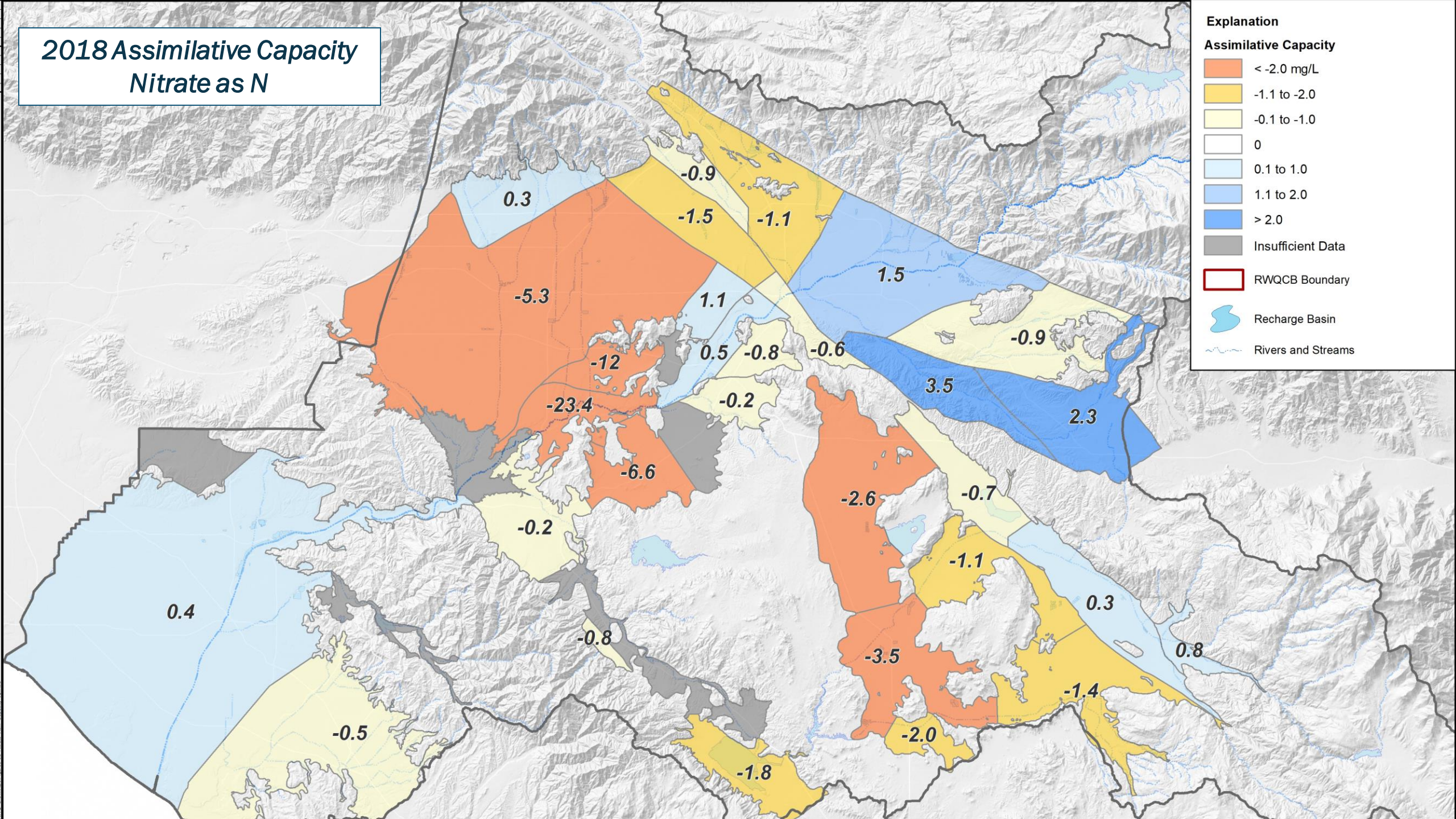
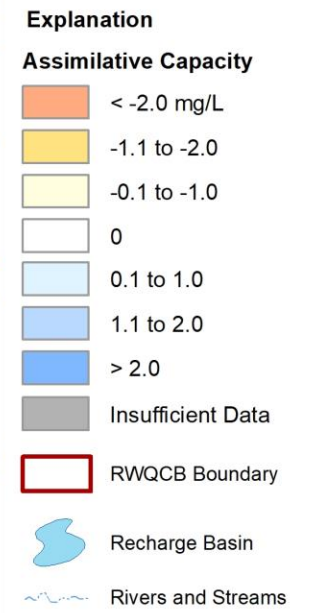
Recharge Basin

Rivers and Streams



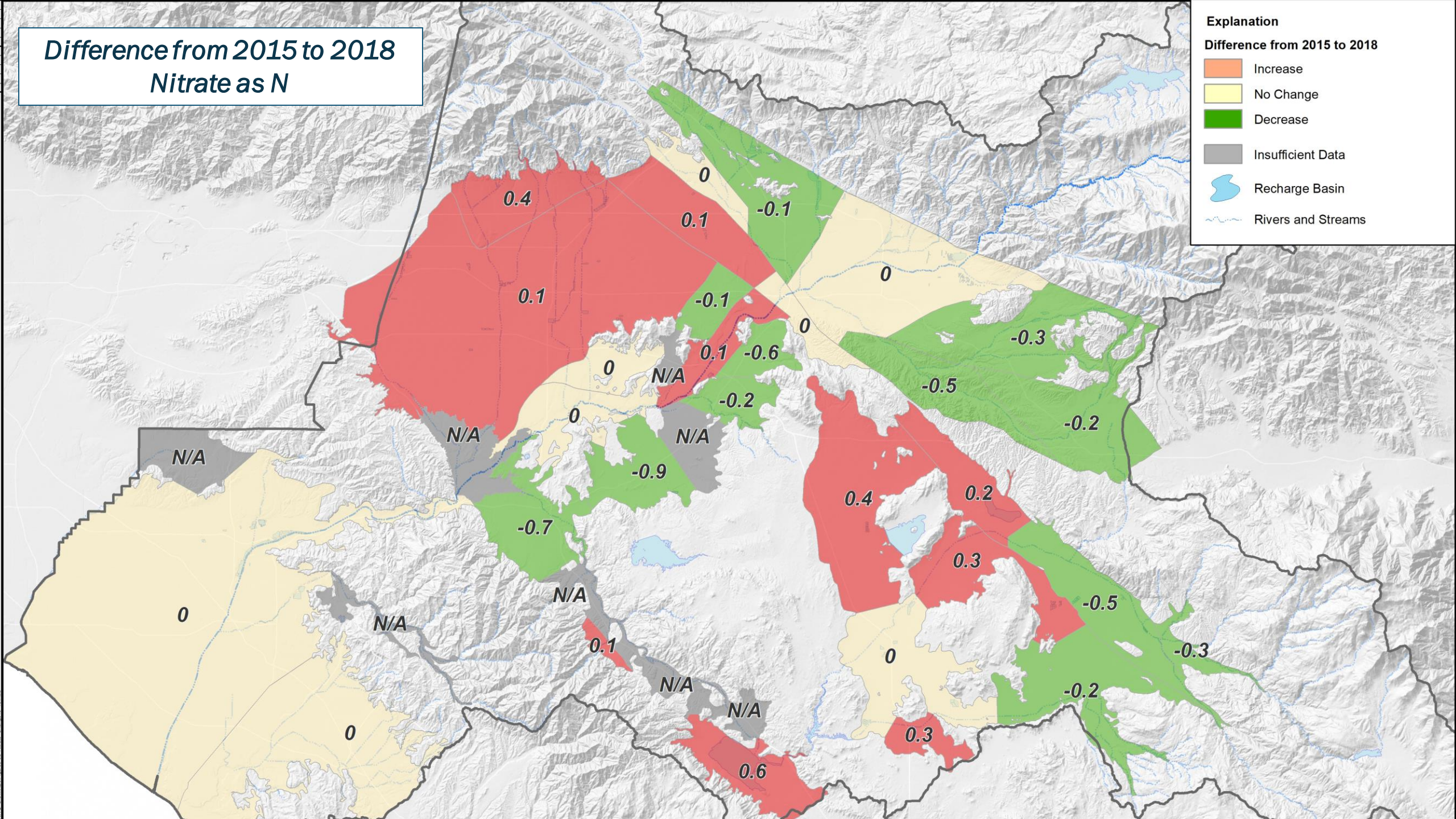
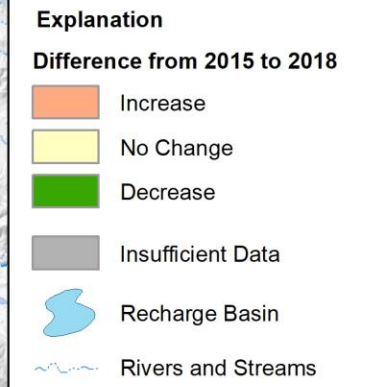


# 2018 Assimilative Capacity Nitrate as N



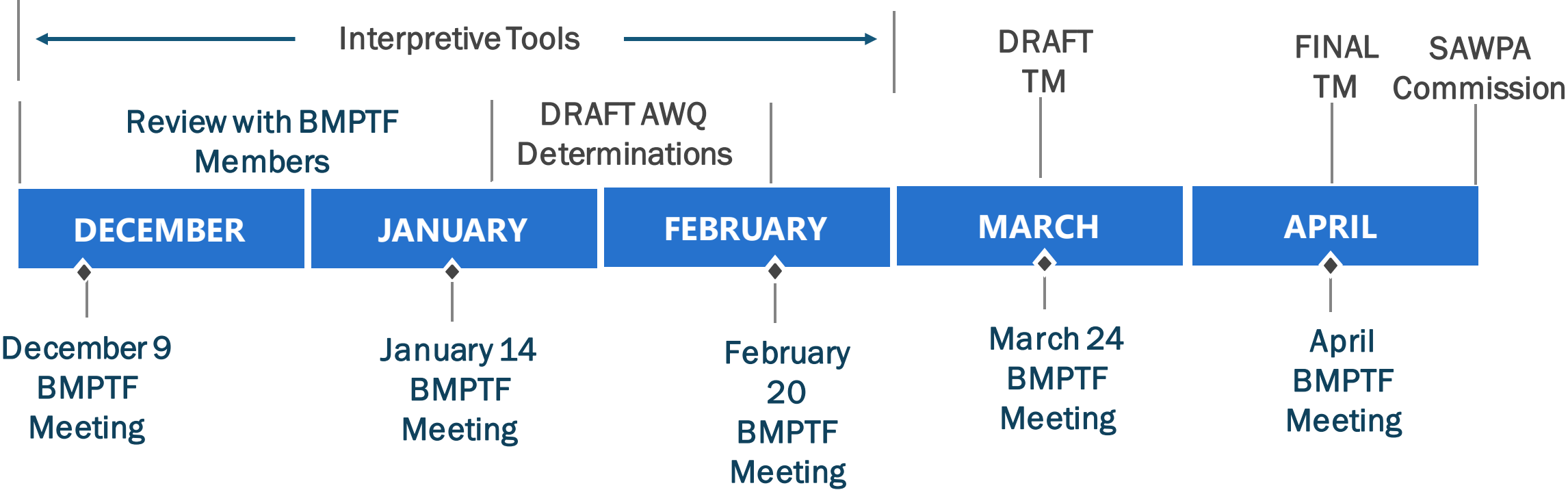


***Difference from 2015 to 2018  
Nitrate as N***





# Near-term Schedule





A photograph of two people kayaking on a calm body of water. The person in the foreground is on the left, wearing a green shirt, with their arms and hands on a black paddle. The person in the background is further away, also in a kayak, with a yellow paddle. The water is still, reflecting the light. The sky is a pale blue. A white horizontal line with a dot in the center is positioned above the text.

# QUESTIONS?