Basin Planning Priorities Task 2 Workshop – Critical Analysis of Ambient Water Quality and Alternative Methods to Comply Pt. 2:

Consideration of Alternative Methods

December 13, 2021

WEST YOST

Water. Engineered.

Agenda

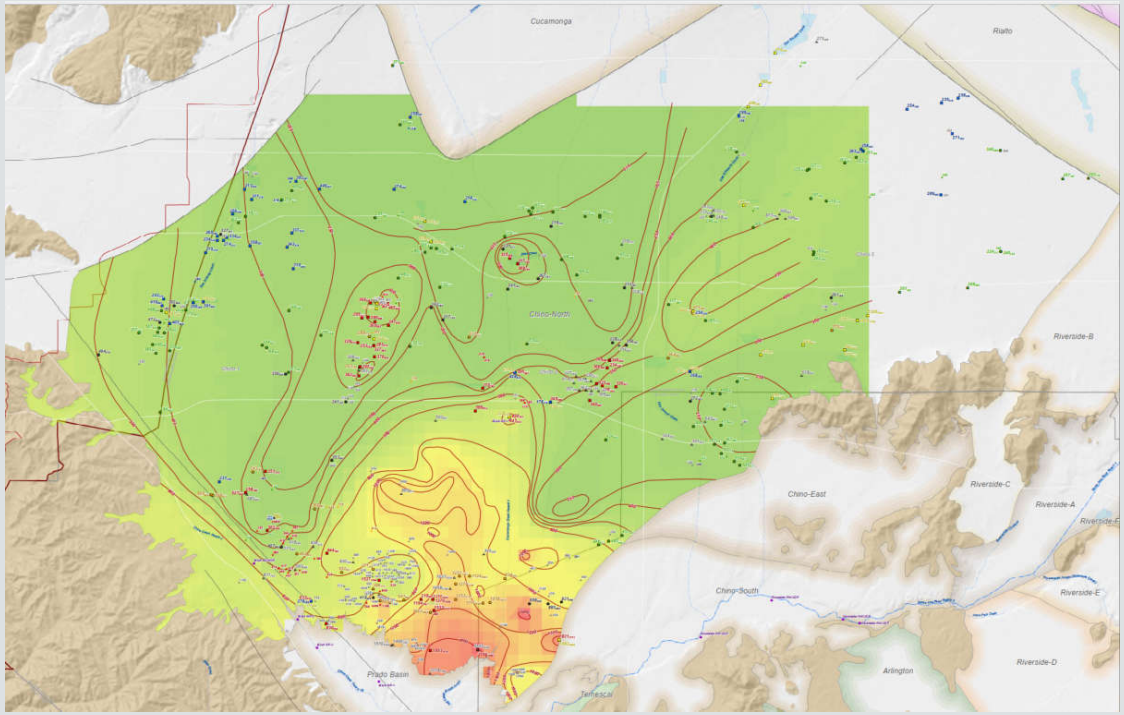
- Overview of questions to discuss in next two meetings
- Open discussion with review of examples:
  - PLEASE PARTICIPATE. There are no wrong answers or wrong opinions – all ideas, questions and concerns are important to hear.
  - Follow-up input will be collected
- Note: We will schedule individual meetings to discuss input with interested Task Force members in January. (1/11, 1/13, 1/14, and 1/18)

Reminder: Key Features of AWQ Methods Defined by TIN/TDS Task Force

- "Current" AWQ: the most recent 20-year historical record used to compute TDS/N statistics
  - 2018 AWQ Period of Record = January 1, 1999 through December 31, 2018
- Minimum of three years of data within the 20-year period is required to qualify for TDS/N statistic generation
- TDS/N statistics favored in contouring, average/median values are primarily for reference
- All statistics equally weighted in contouring, regardless of time period of available data within the 20-year computation period
- In areas with limited or no data, historical interpretations honored

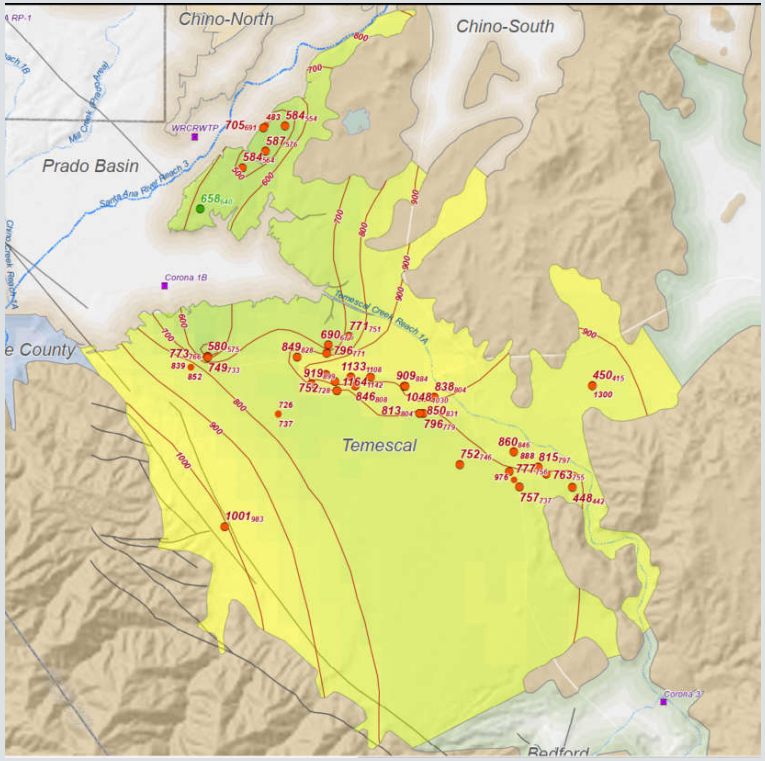
Challenges with Data and Statistics

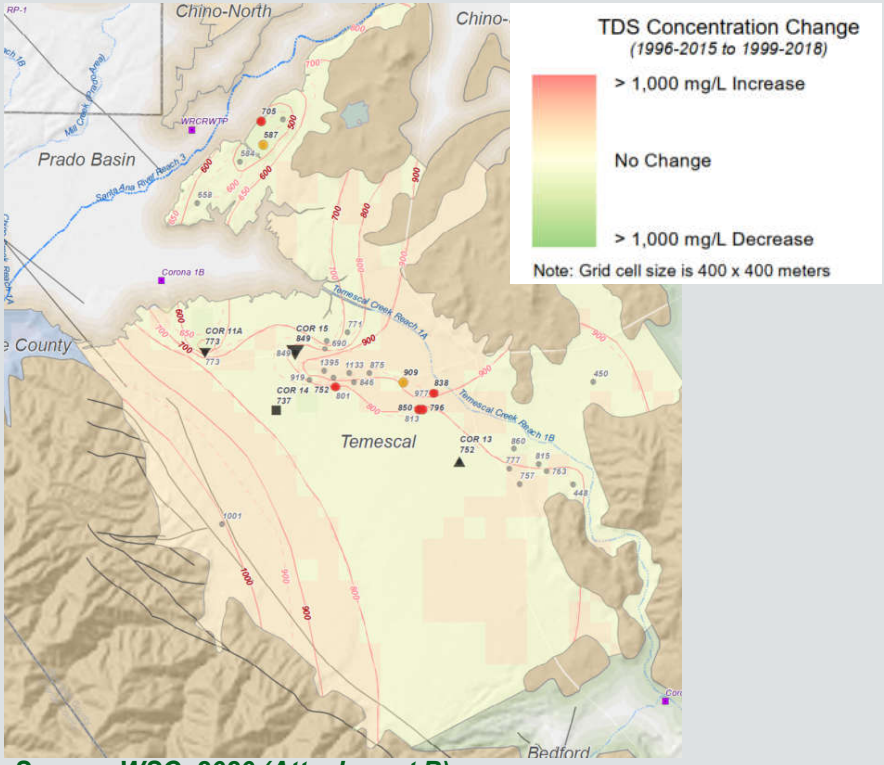
- There is ***a LOT*** of data
  - Difficult to standardize contouring approach
  - No attribution to new vs old data
  - Prioritization of old statistics vs recent data with averages only
  - Default assumption to honor contours in areas where wells lost
  - Mistakes are more likely
    - Examples



Source: WSC, 2020 (Attachment B)

Challenges with Data and Statistics Interpretation in areas with no data





Source: WSC, 2020 (Attachment B)

Overview of Questions for Consideration in Ongoing Methods and Data Collection

- Should we continue to rely on a 20-year period of record?
- Is all data good data? Is all data relevant data? What should we exclude, if any?
- Should we reduce the analysis to a set of key wells that ***must*** be monitored, and replaced if lost?
- Should we limit the area of analysis to exclude areas with no data, limited aquifer volume?
- Should we update the physical model of the groundwater basins if improved hydrogeologic characterizations are available since 2004?
- Who should be responsible to pay for and/or preform technical work to: fill data gaps? implement method improvements that only affect some GMZs?
- How do we prioritize our efforts/timeline to improve methods and data collection?
- Should we continue to perform full ambient water quality recomputation process in all GMZs?
- ***What questions or ideas do you have?***

Questions for Consideration in Ongoing Methods and Data Collection

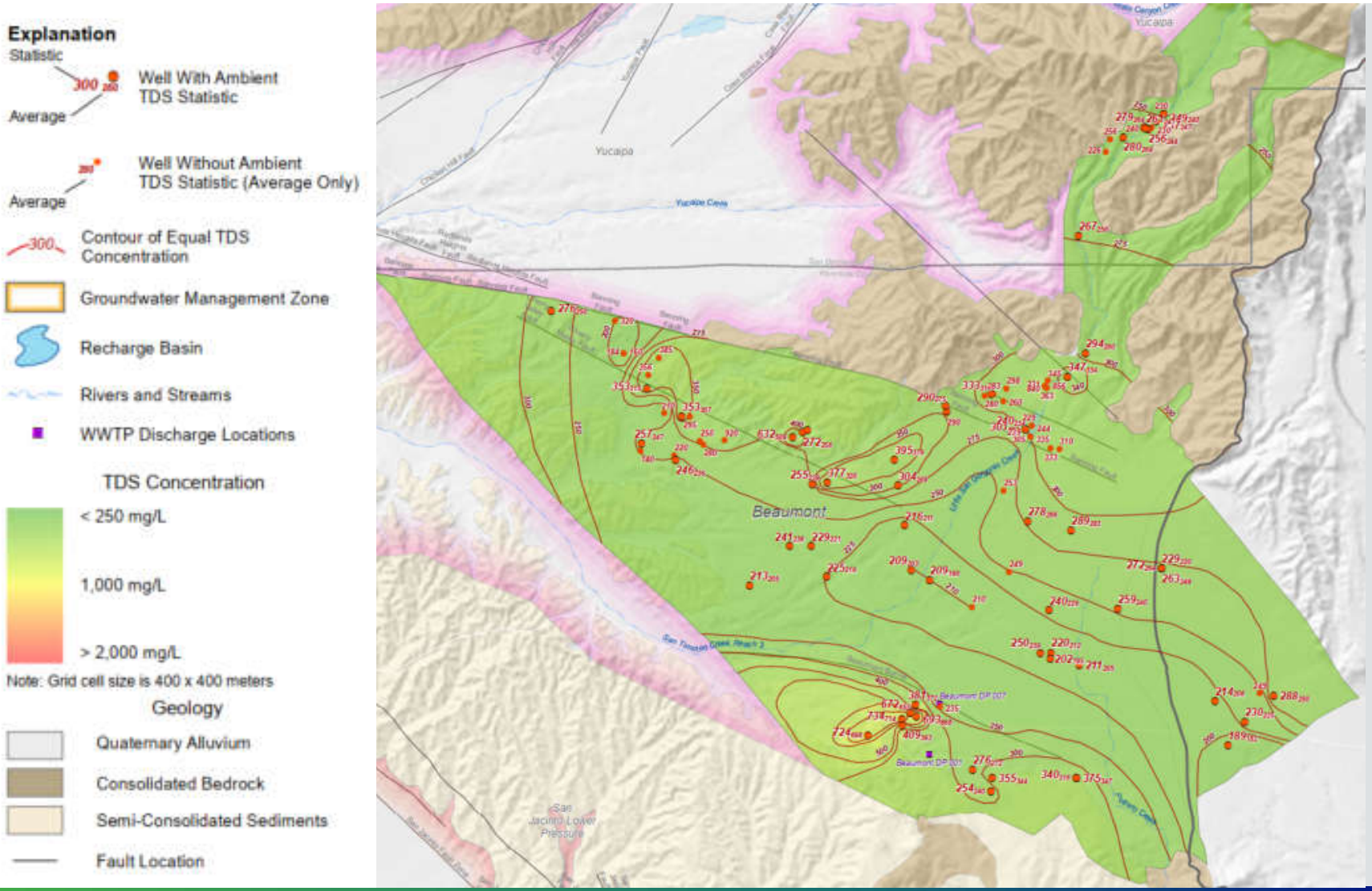
- We'll look at specific examples to support the discussion
- Keep in mind:
  - Each GMZ has its own challenges
  - A one-size fits all answers may be difficult

Discussion

Questions for Consideration in Ongoing Methods and Data Collection

- Should we continue to rely on a 20-year period of record?
  - If so, what improvements could be considered?

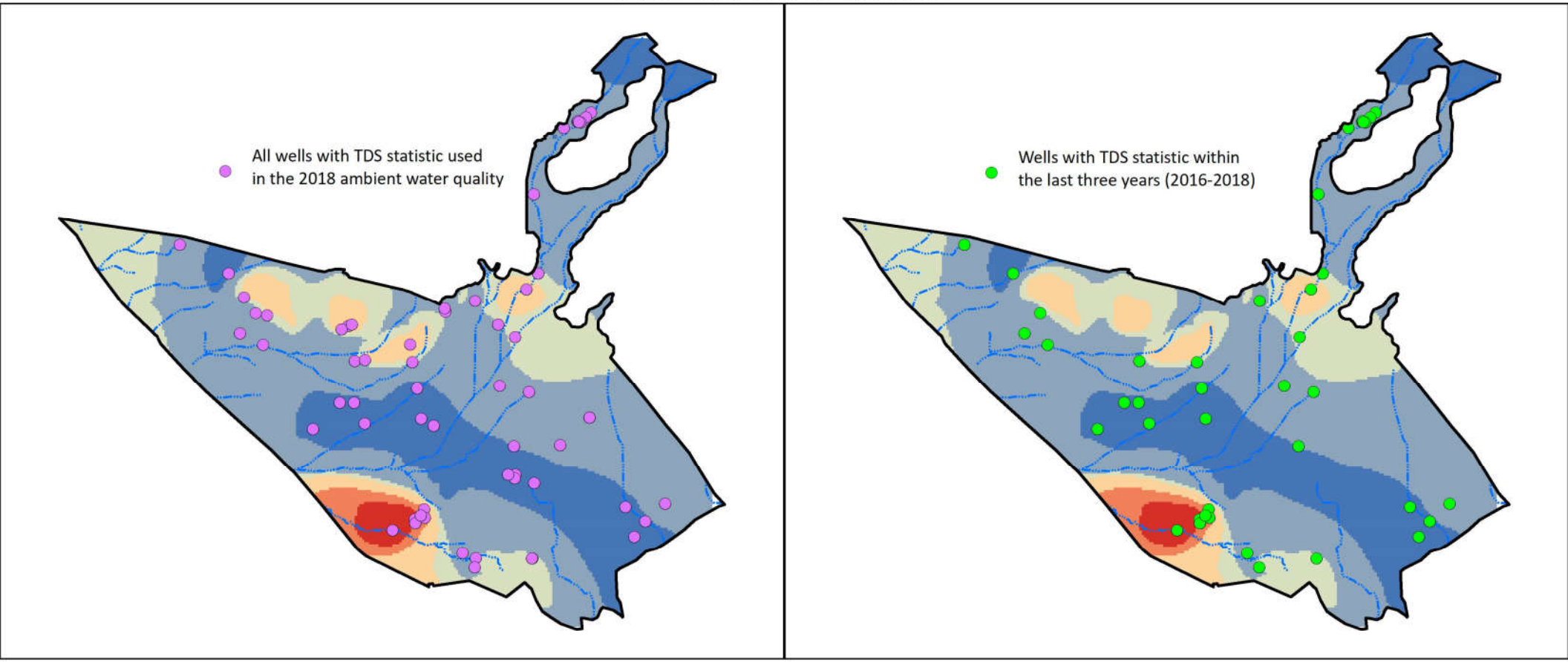
- Let look at what we do now…


Explanation
Statistic
Average
Well With Ambient TDS Statistic
Well Without Ambient TDS Statistic (Average Only)
Contour of Equal TDS Concentration
Groundwater Management Zone
Recharge Basin
Rivers and Streams
WWTP Discharge Locations
TDS Concentration
< 250 mg/L
1,000 mg/L
> 2,000 mg/L
Note: Grid cell size is 400 x 400 meters
Geology
Quaternary Alluvium
Consolidated Bedrock
Semi-Consolidated Sediments
Fault Location
Yucaipa
Beaumont

Questions for Consideration in Ongoing Methods and Data Collection

- Should we continue to rely on a 20-year period of record?
  - If so, what improvements could be considered?
- Should we prioritize wells with recent data only (over any data within analysis period)?
- Example of revised qualifying criteria:
  - Minimum of three years of data in the 20-year period ***AND*** data in the last three-year period

Beaumont Groundwater Management Zone

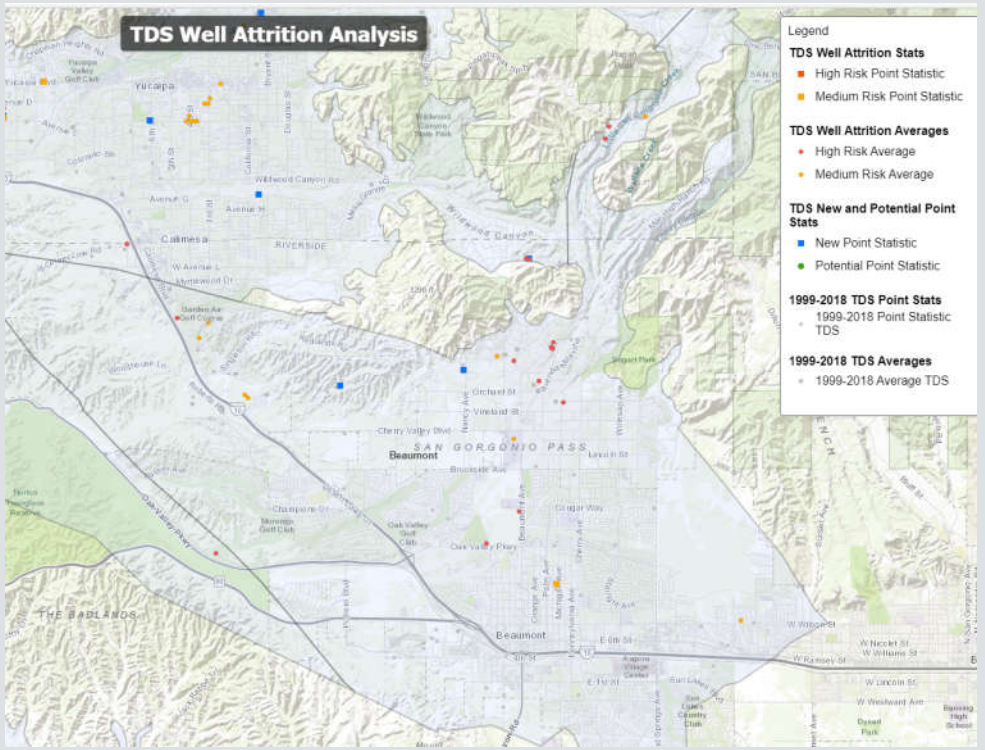


2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 330 mgl, antidegradation objective is 230 mgl)

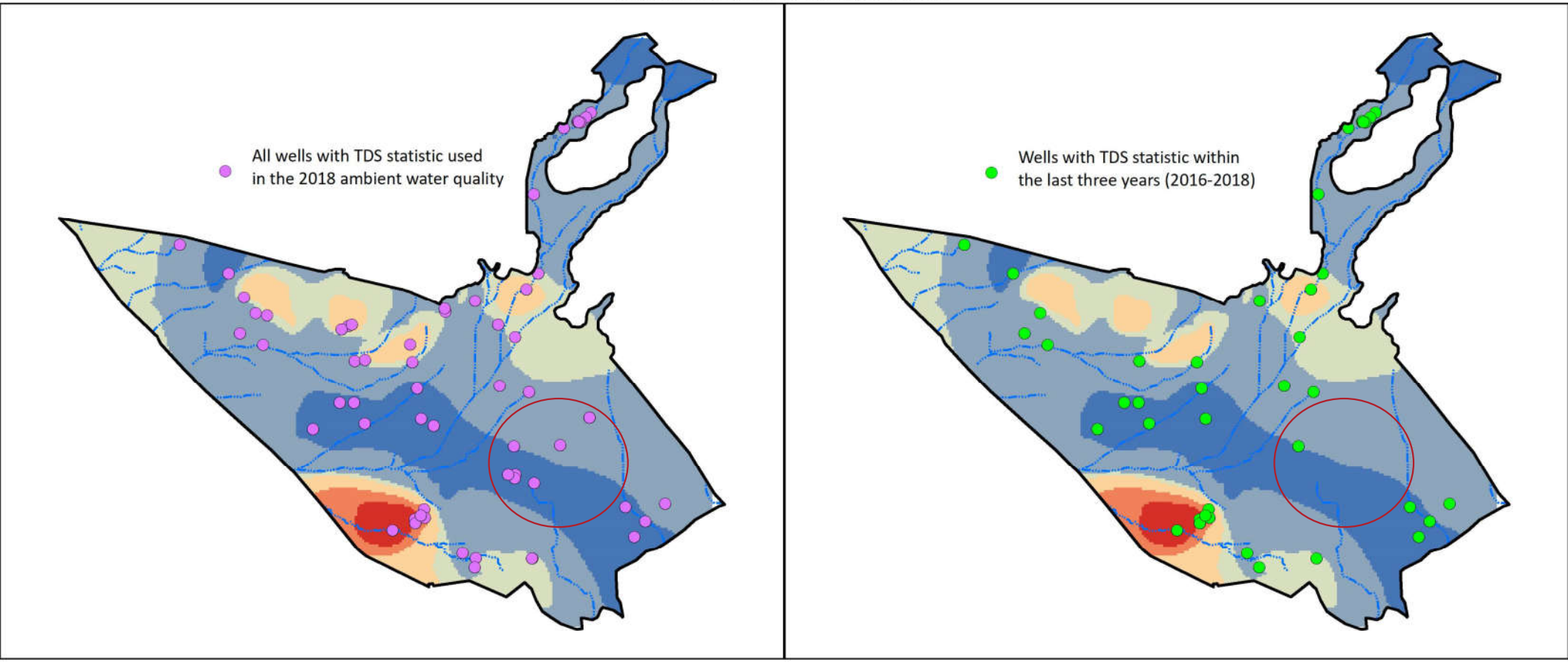
190 - 230	>300 - 330	>430 - 530
>230 - 300	>330 - 430	>530 - 700

Questions for Consideration in Ongoing Methods and Data Collection

- Well Attrition helps us keep track of when we will lose data in the next six years
- Looking only at the loss of wells with no data for the last 14 years
- Recommendation: Focus on building and maintaining 20-year record at wells with recent data

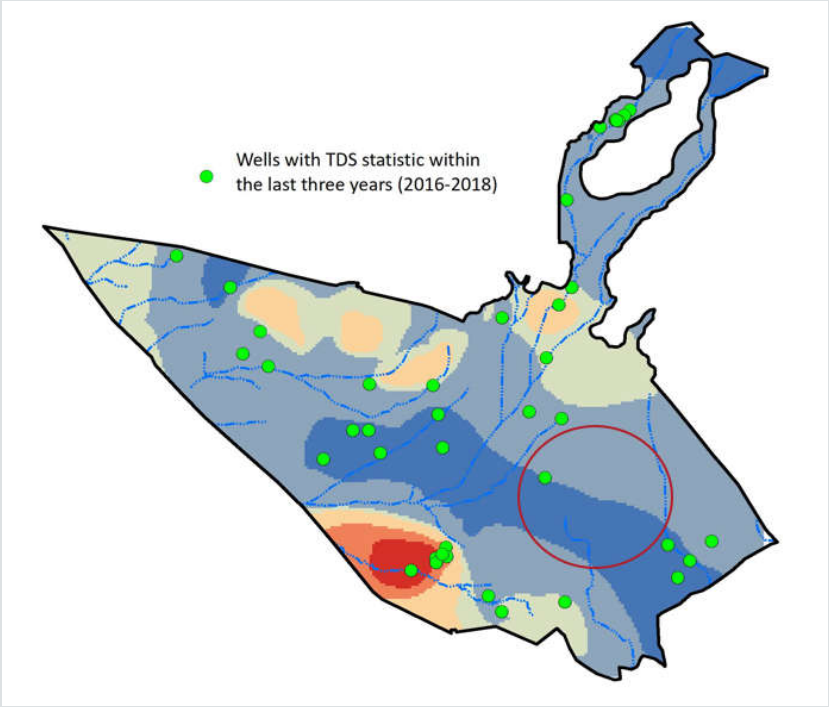


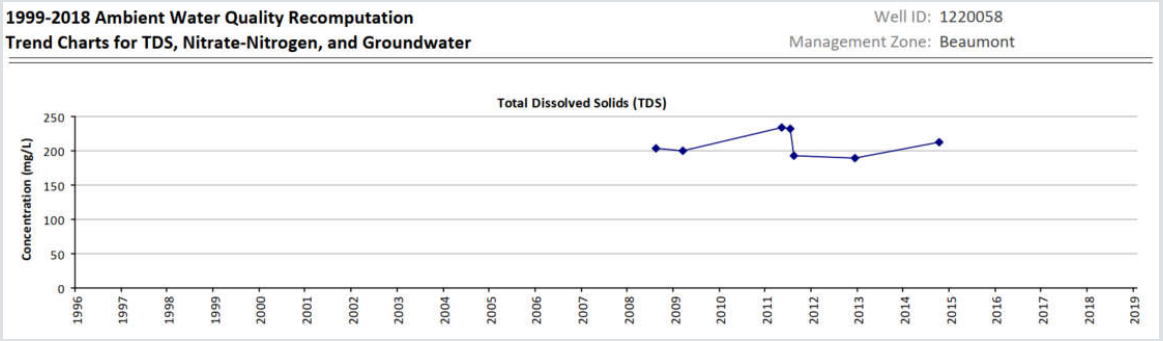
Beaumont Groundwater Management Zone

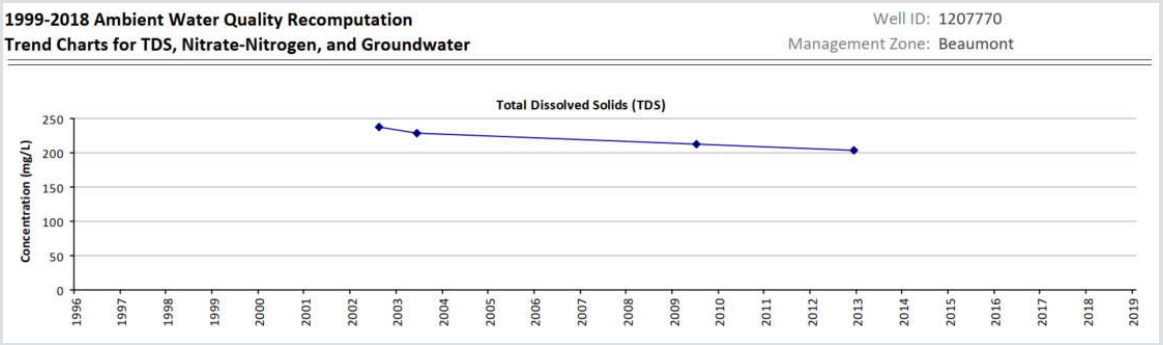


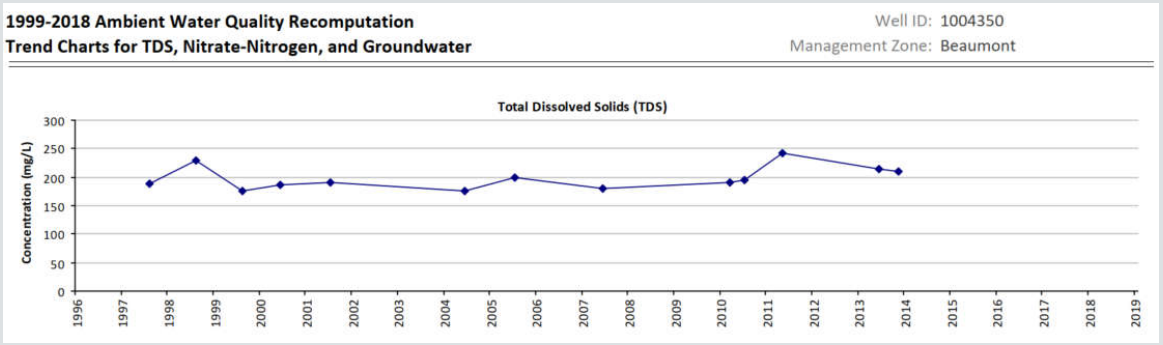
2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 330 mgl, antidegradation objective is 230 mgl)

190 - 230	>300 - 330	>430 - 530
>230 - 300	>330 - 430	>530 - 700

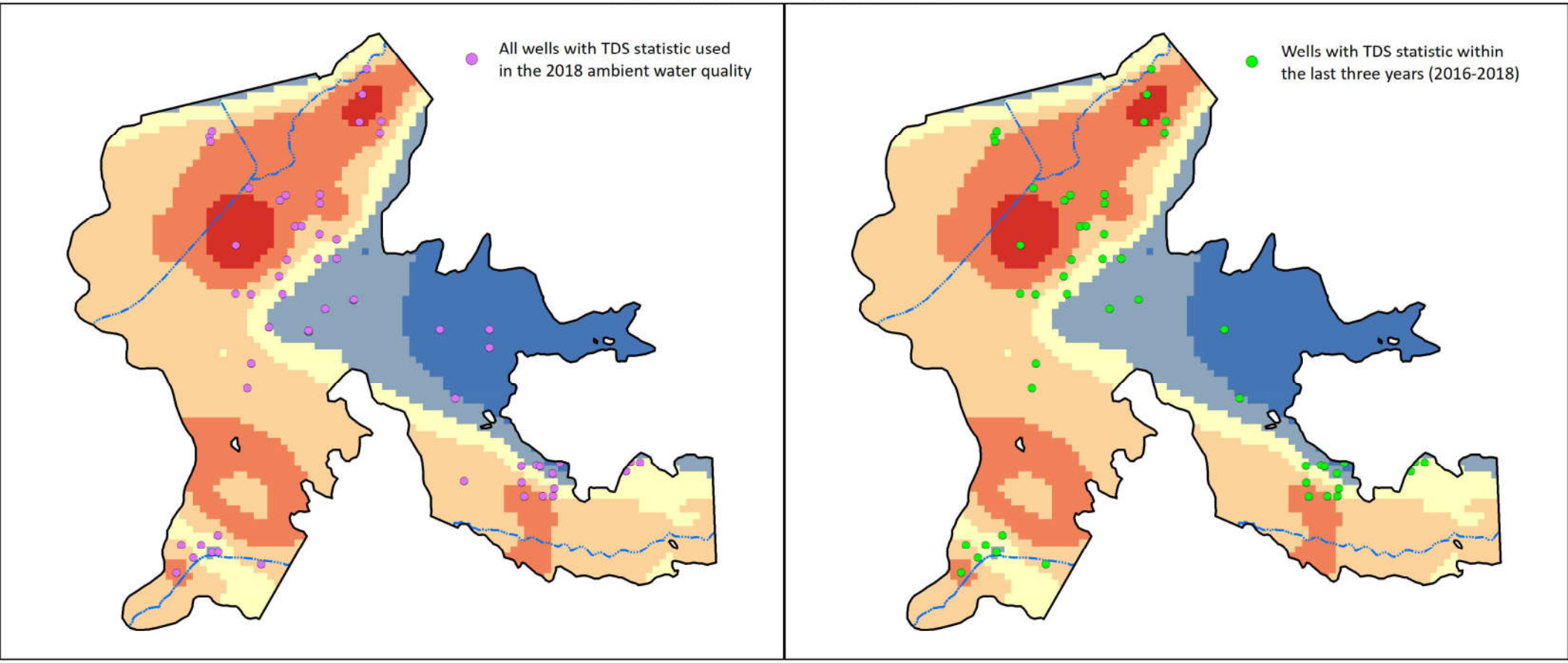

Wells with TDS statistic within
the last three years (2016-2018)


1999-2018 Ambient Water Quality Recomputation
Trend Charts for TDS, Nitrate-Nitrogen, and Groundwater
Well ID: 1220058
Management Zone: Beaumont
Total Dissolved Solids (TDS)
Concentration (mg/L)


1999-2018 Ambient Water Quality Recomputation
Trend Charts for TDS, Nitrate-Nitrogen, and Groundwater
Well ID: 1207770
Management Zone: Beaumont
Total Dissolved Solids (TDS)
Concentration (mg/L)


1999-2018 Ambient Water Quality Recomputation
Trend Charts for TDS, Nitrate-Nitrogen, and Groundwater
Well ID: 1004350
Management Zone: Beaumont
Total Dissolved Solids (TDS)
Concentration (mg/L)

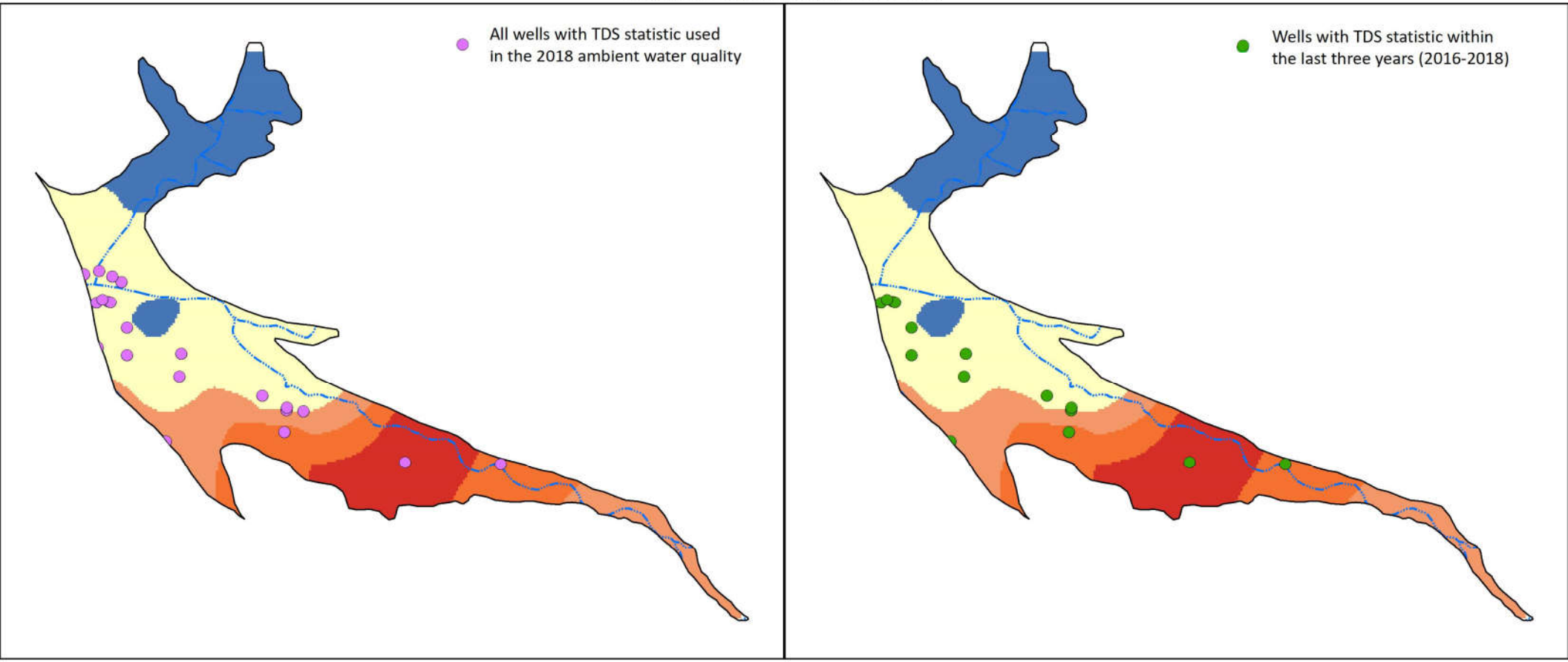
Perris South Groundwater Management Zone



2018 Ambient TDS (mgl)
(TDS objective is 1,260 mgl)

180 - 700	>1,260 - 2,000	>2,800 - 4,400
>700 - 1,260	>2,000 - 2,800	>4,400 - 8,000

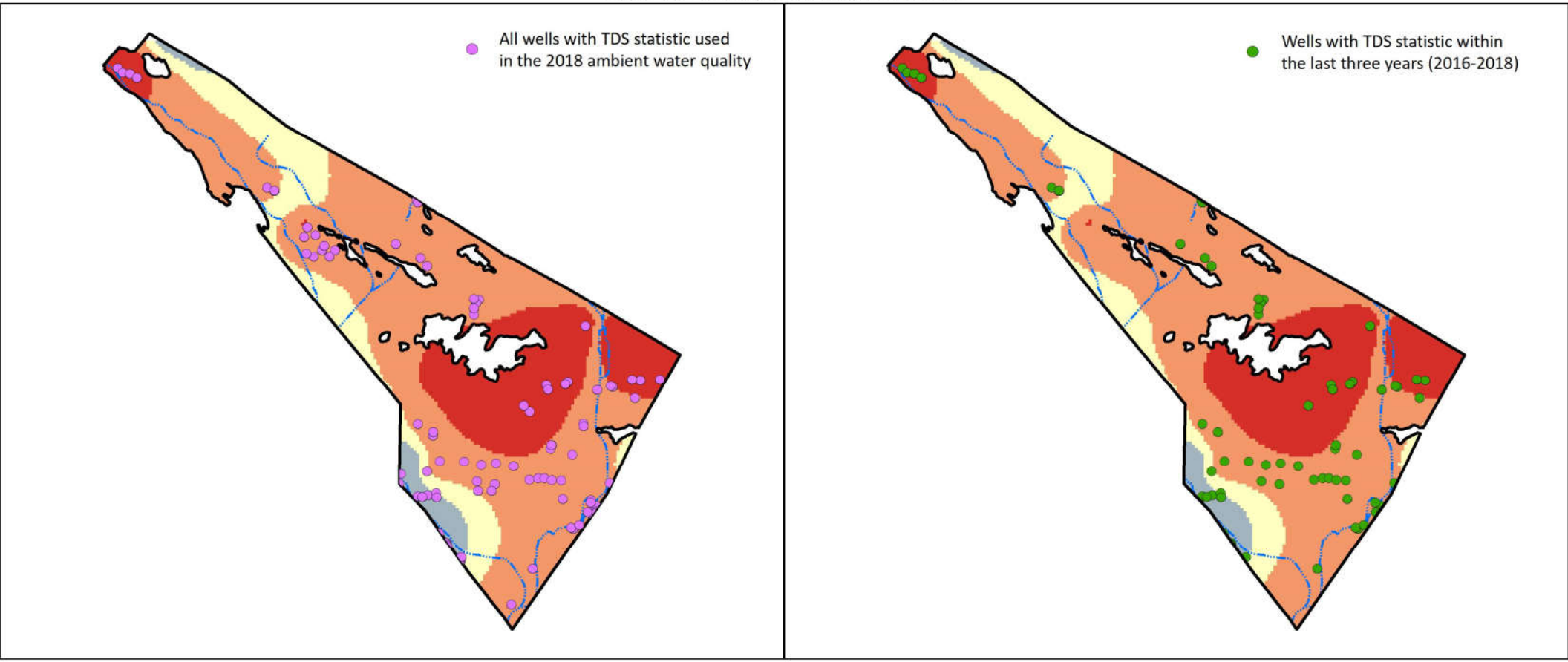
Canyon Groundwater Management Zone



2018 Ambient TDS (mgl)
(TDS objective is 230 mgl)

196 - 230 | 231 - 330 | 331 - 430 | 431 - 530 | 531 - 630

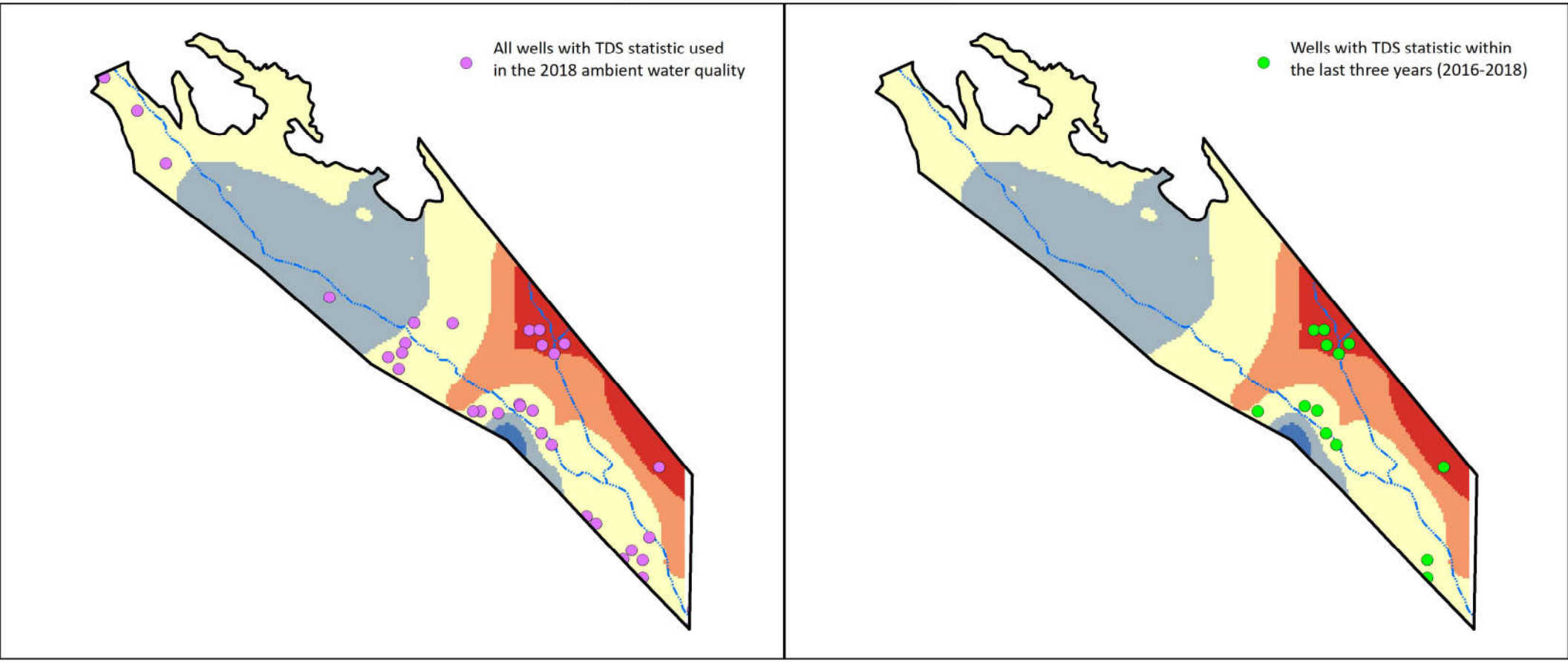
Bunker Hill - A Groundwater Management Zone



2018 Ambient TDS (mgl)
(TDS objective is 310 mgl)

195 - 250 | > 310 - 340
> 250 - 310 | > 340 - 380 | > 380 - 510

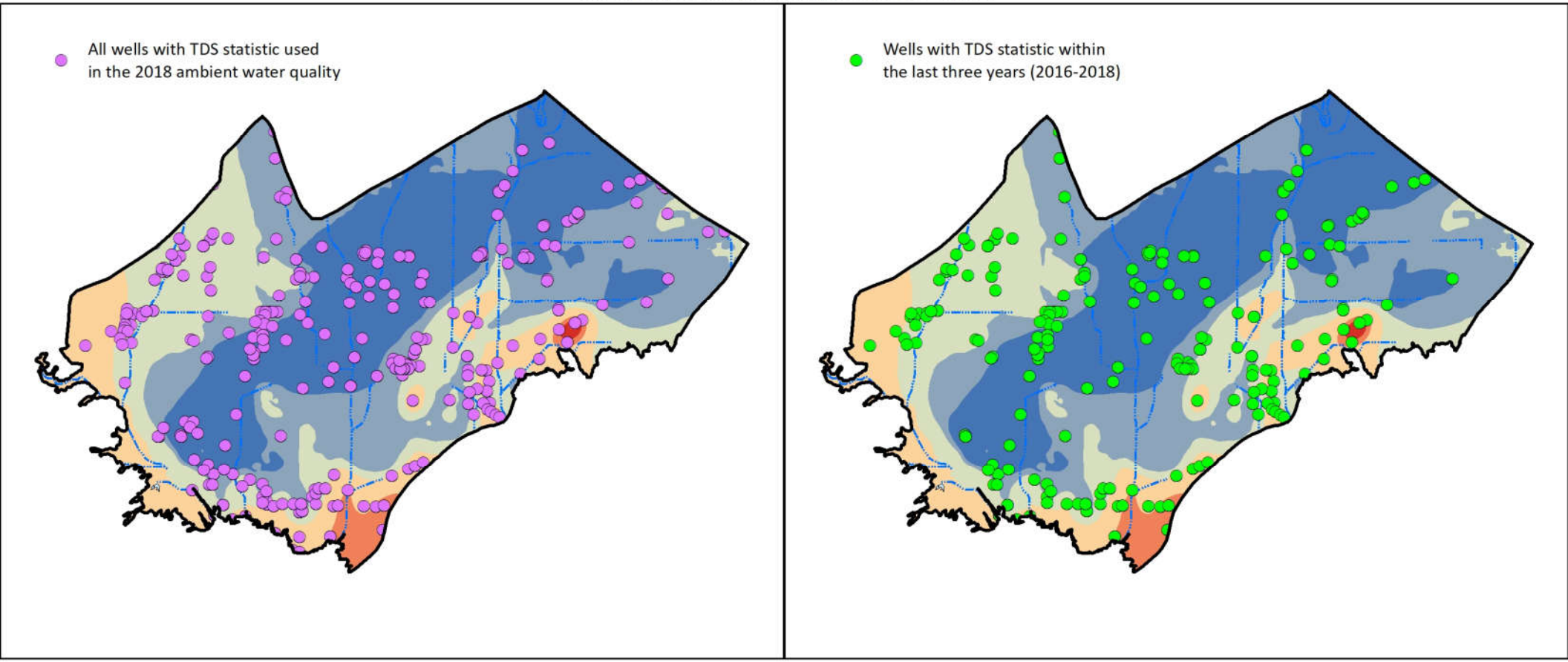
Lytle Creek Groundwater Management Zone



2018 Ambient TDS (mgl)
(TDS objective is 260 mgl)

> 120 - 160	> 190 - 260
> 160 - 190	> 260 - 300
	> 300 - 370

Chino North Groundwater Management Zone - Layer 2



2018 Ambient TDS (mgl)
(TDS objective is 420 mgl)

198 - 250	>300 - 420	>800 - 1,000
>250 - 300	>420 - 800	>1,000 - 1,200

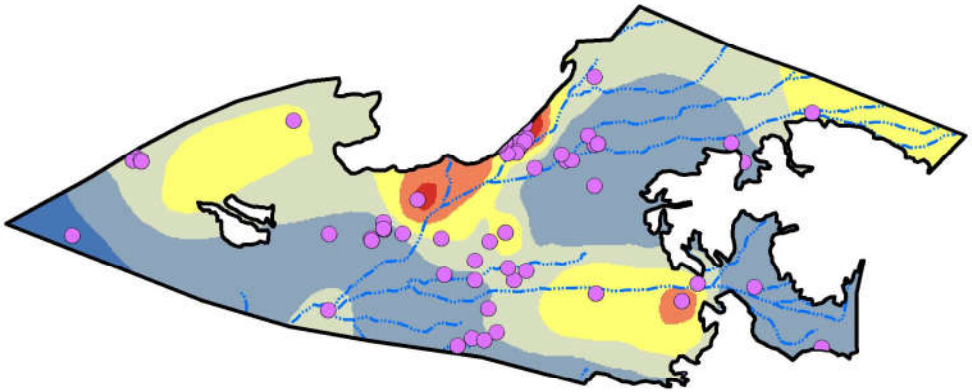
Questions for Consideration in Ongoing Methods and Data Collection

- Is all data good data? Is all data relevant data?
  - Should we include landfill or other clean-up site monitoring wells? If so, all of them or case by case?
  - Should the high TDS concentrations along the Pacific Coast of Orange County GMZ be included in the ambient concentration – especially in light of regional groundwater management actions to address seawater intrusion?
  - Are there other examples of data that is not relevant?

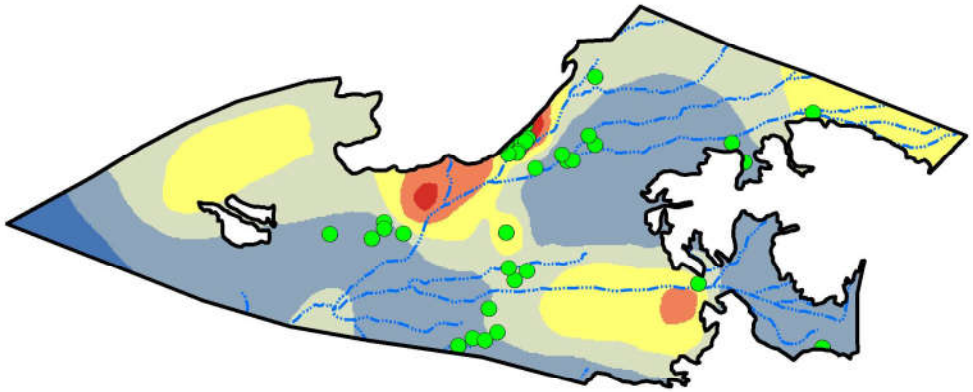
- Should we reduce the analysis to a set of key wells that MUST be monitored?

Yucaipa Groundwater Management Zone

All wells with TDS statistic used in the 2018 ambient water quality



Wells with TDS statistic within the last three years (2016-2018)

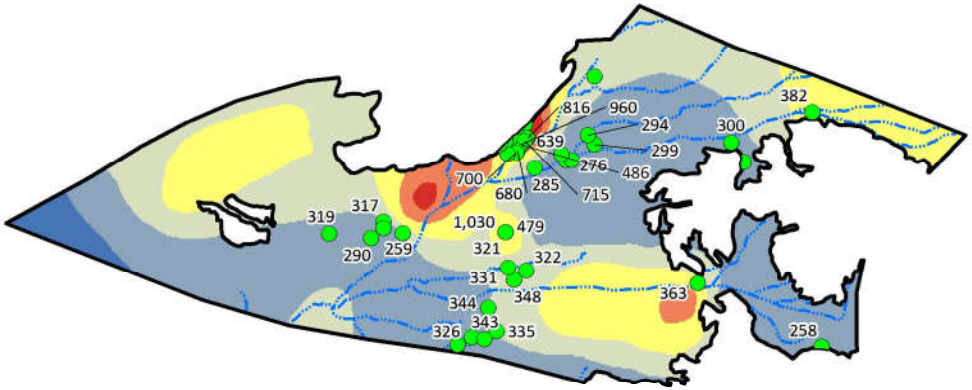


2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 370 mgl, TDS antidegradation objective is 320 mgl)

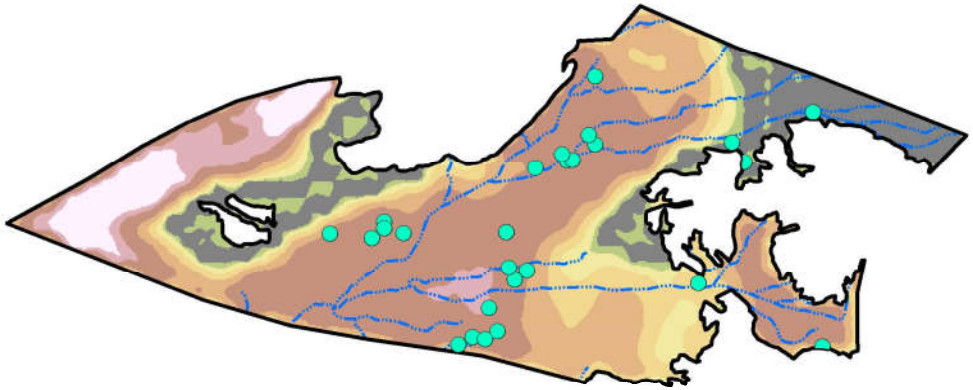
130 - 250	>320 - 370	>450 - 550
>250 - 320	>370 - 450	>550 - 815

Yucaipa Groundwater Management Zone

Wells with TDS statistic within the last three years (2016-2018)



Non-landfill wells with TDS statistic within the last three years (2016-2018)



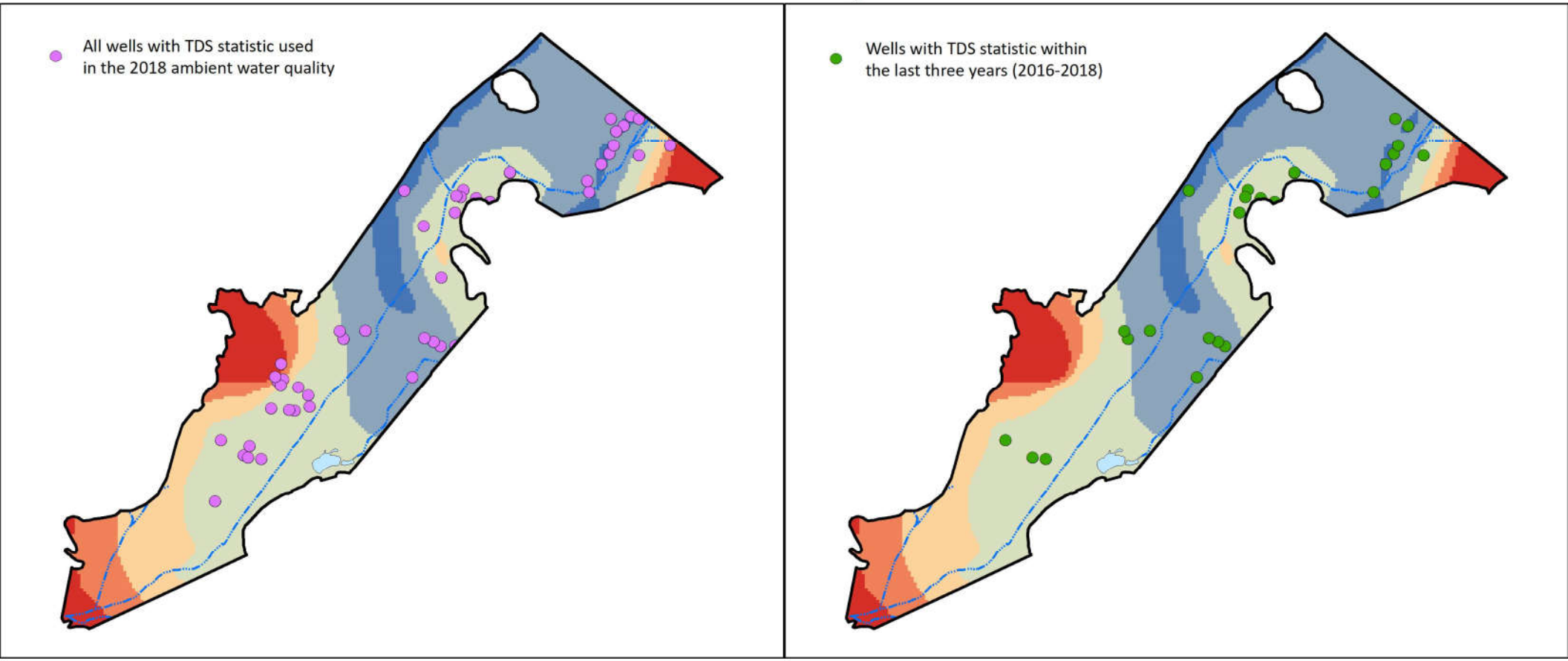
2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 370 mgl, TDS antidegradation objective is 320 mgl)

- 130 - 250
- >250 - 320
- >320 - 370
- >370 - 450
- >450 - 550
- >550 - 815

2018 Groundwater Storage (af)

- 0 - 1
- >1 - 50
- >50 - 200
- >200 - 500
- >500 - 1,000
- >1,000 - 2,000
- >2,000 - 2,500
- >2,500 - 4,900

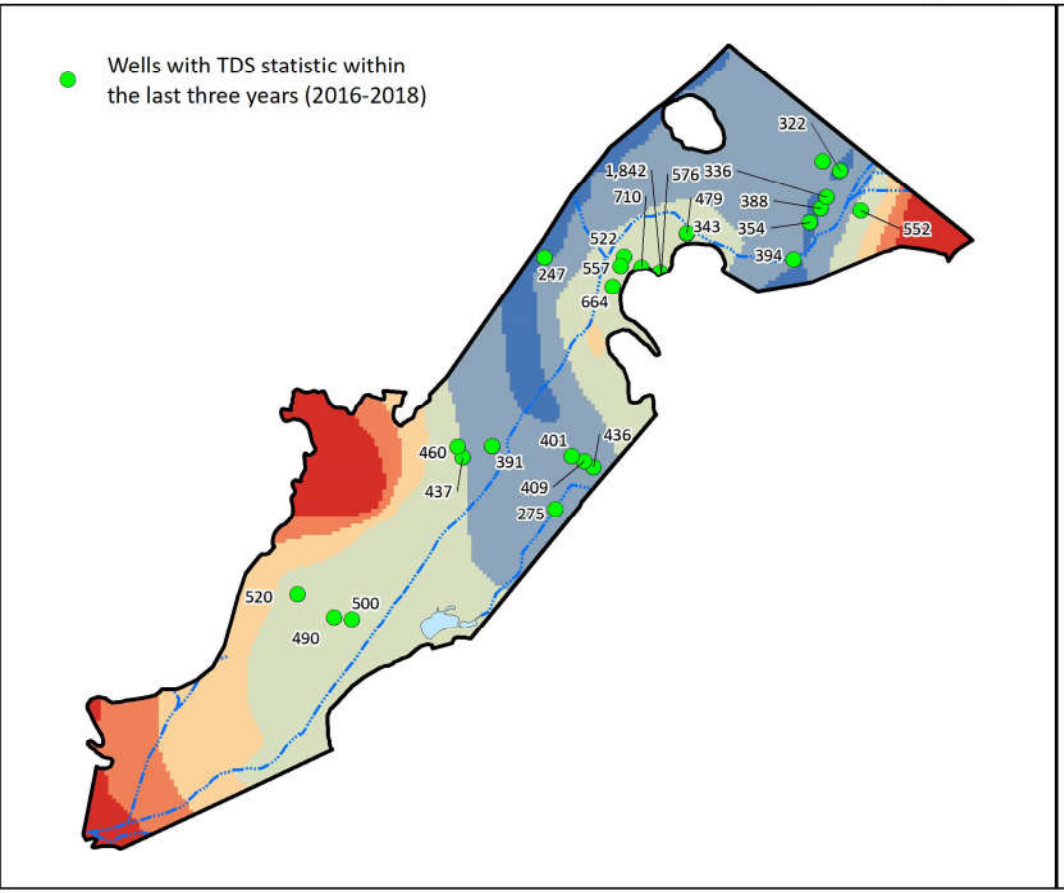
Riverside-A Groundwater Management Zone

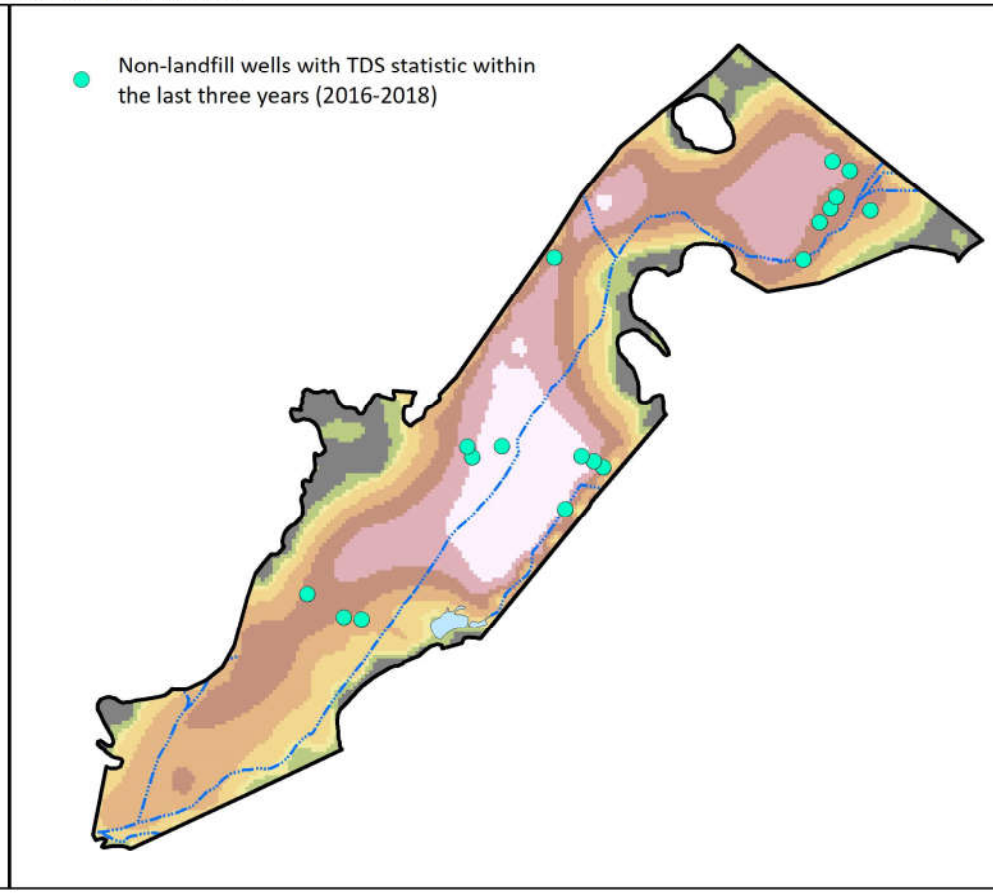


2018 Ambient TDS (mgl)
(TDS objective is 560 mgl)

266 - 300	>450 - 560	>650 - 750
>300 - 450	>560 - 650	>750 - 890

Riverside-A Groundwater Management Zone





2018 Ambient TDS (mgl)
(TDS objective is 560 mgl)

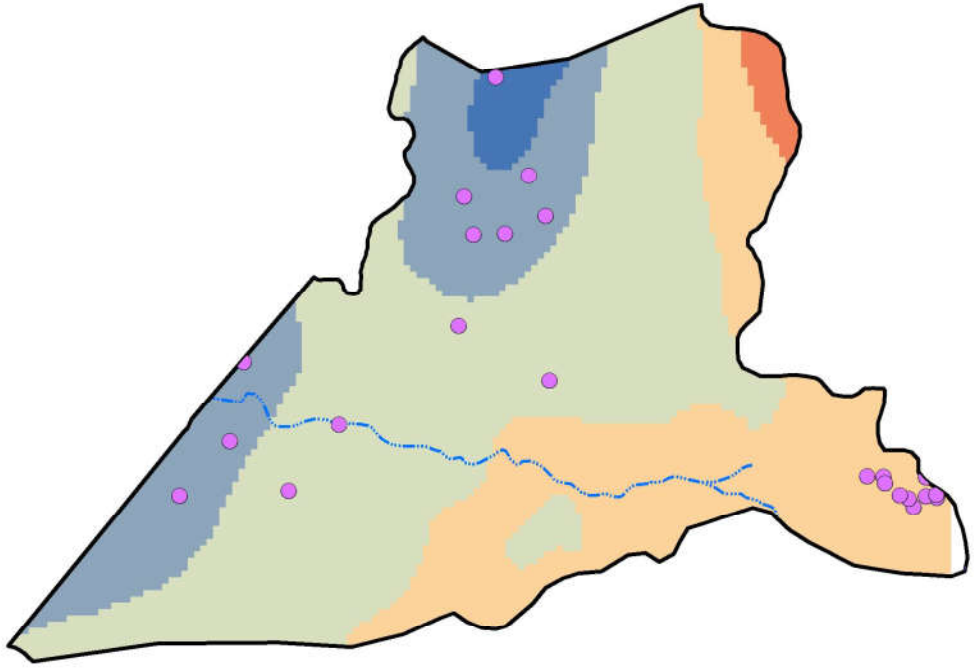
266 - 300	>450 - 560	>650 - 750
>300 - 450	>560 - 650	>750 - 890

2018 Groundwater Storage (af)

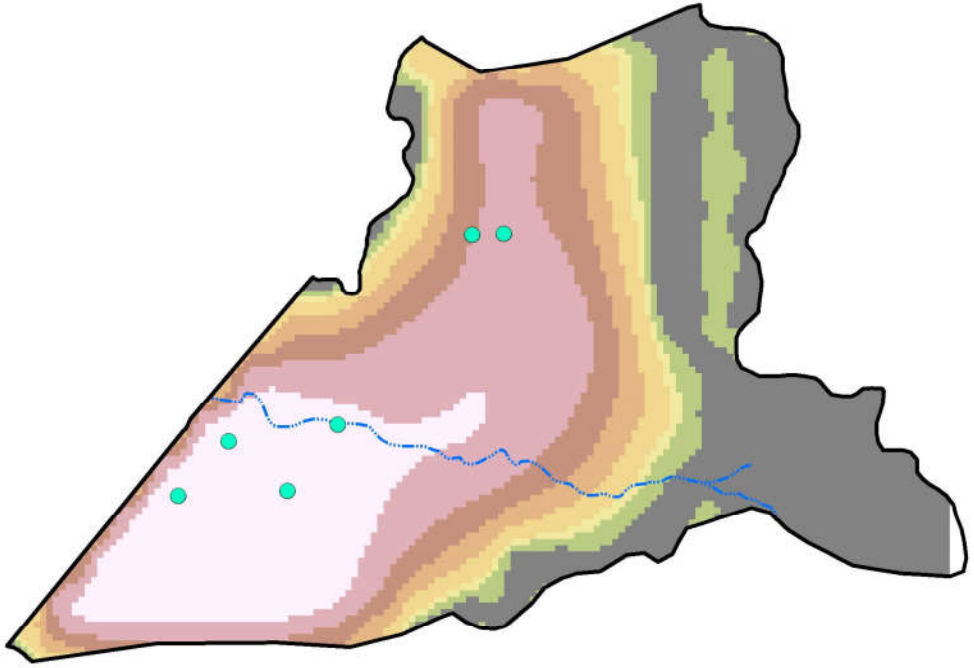
0 - 1	>50 - 100	>300 - 600	>1,000 - 1,500
>1 - 50	>100 - 300	>600 - 1,000	>1,500 - 2,380

Riverside-F Groundwater Management Zone

All wells with TDS statistic used in the 2018 ambient water quality



Non-landfill wells with TDS statistic within the last three years (2016-2018)



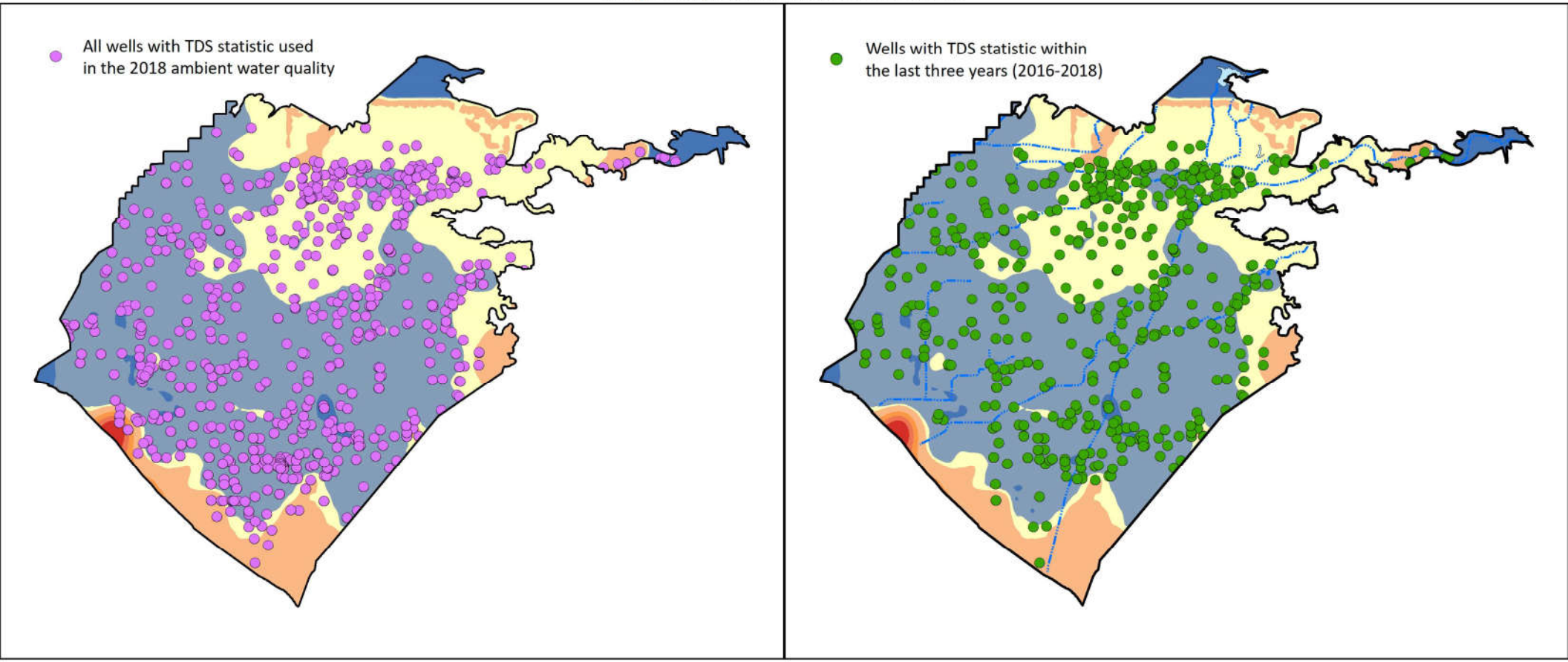
2018 Ambient TDS (mgl)
(TDS objective is 720 mgl)

244 - 300	>500 - 720	>800 - 850
>300 - 500	>720 - 800	

2018 Groundwater Storage (af)

0 - 1	>50 - 100	>300 - 600	>1,000 - 1,500
>1 - 50	>100 - 300	>600 - 1,000	>1,500 - 2,390

Orange County Groundwater Management Zone

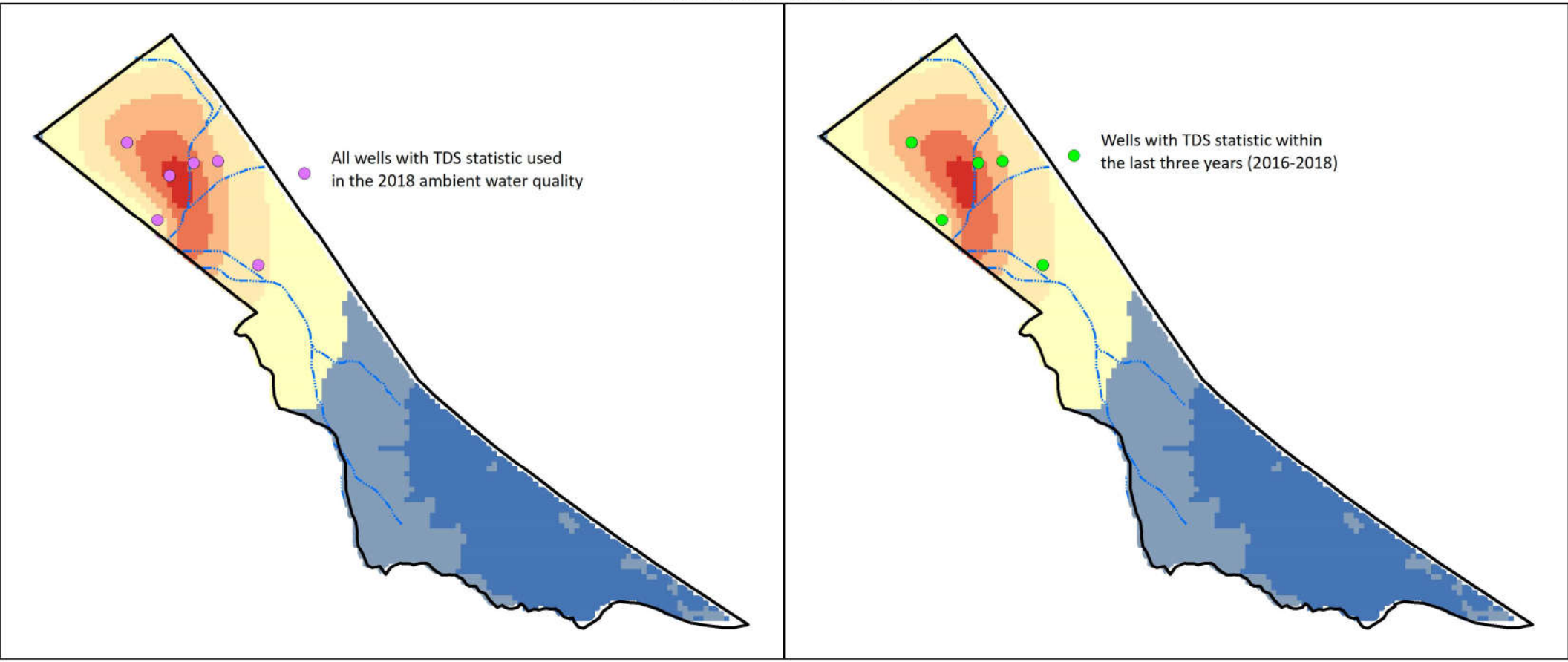


Questions for Consideration in Ongoing Methods and Data Collection

- What is a data gap?

- Should we limit the area of analysis to exclude areas with no data and/or limited aquifer volume?

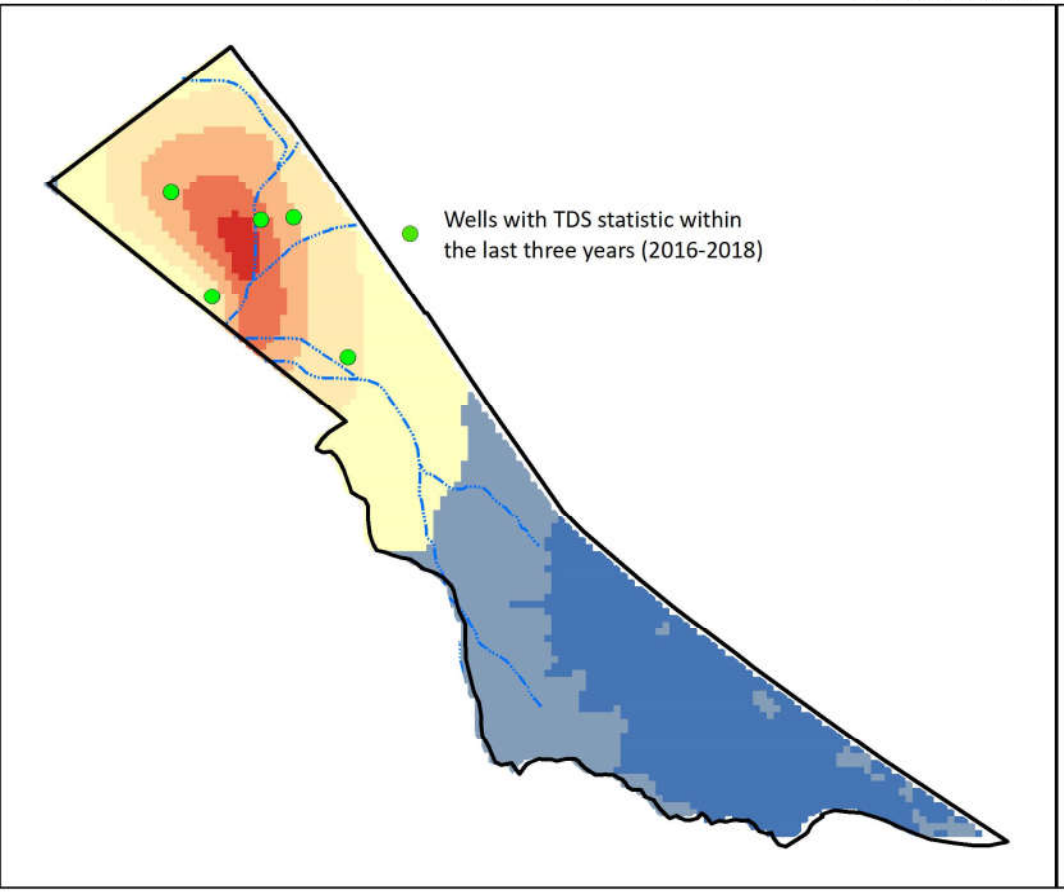
Colton Groundwater Management Zone

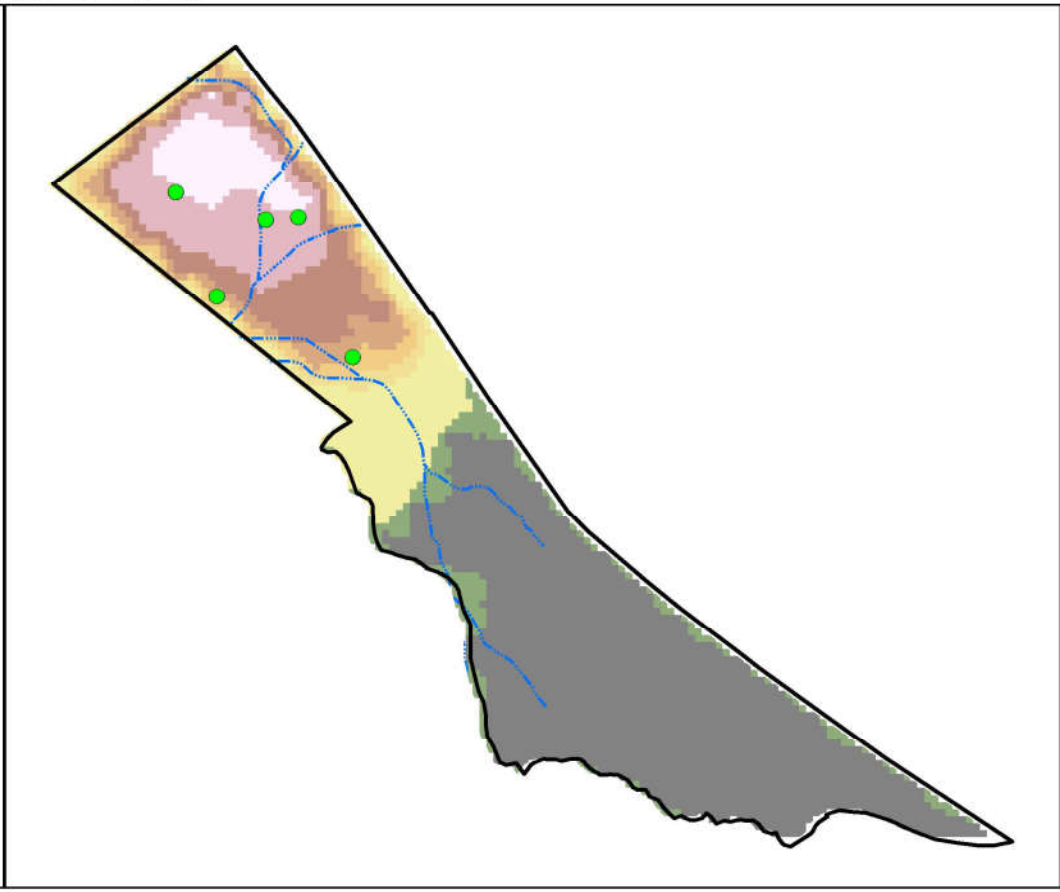


2018 Ambient TDS (mgl)
(TDS objective is 410 mgl)

398 - 400	>410 - 450	>500 - 550	>600 - 640
>400 - 410	>450 - 500	>550 - 600	

Colton Groundwater Management Zone





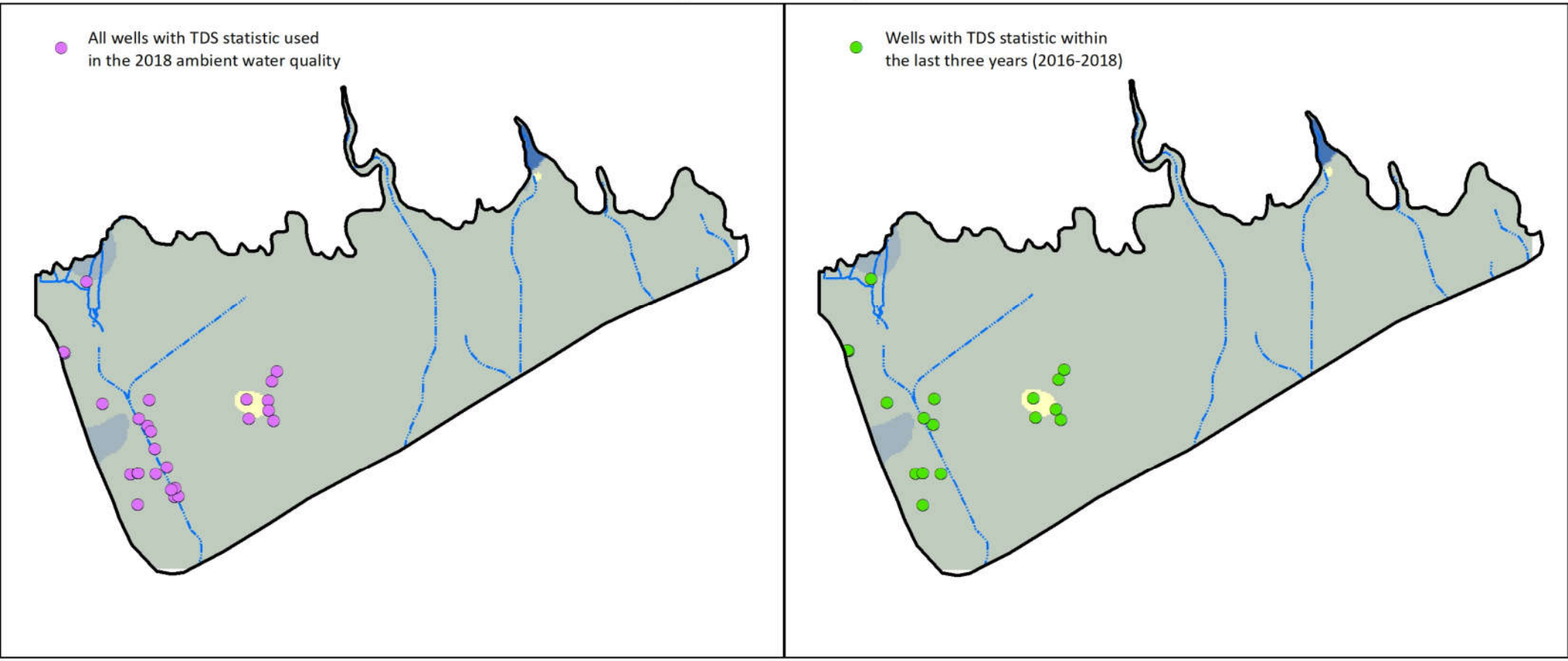
2018 Ambient TDS (mgl)
(TDS objective is 410 mgl)

398 - 400	>410 - 450	>500 - 550	>600 - 640
>400 - 410	>450 - 500	>550 - 600	

2018 Groundwater Storage (af)

0 - 1	>50 - 1,200	>1,600 - 2,000	>2,400 - 2,800	>3,200 - 3,410
>1 - 50	>1,200 - 1,600	>2,000 - 2,400	>2,800 - 3,200	

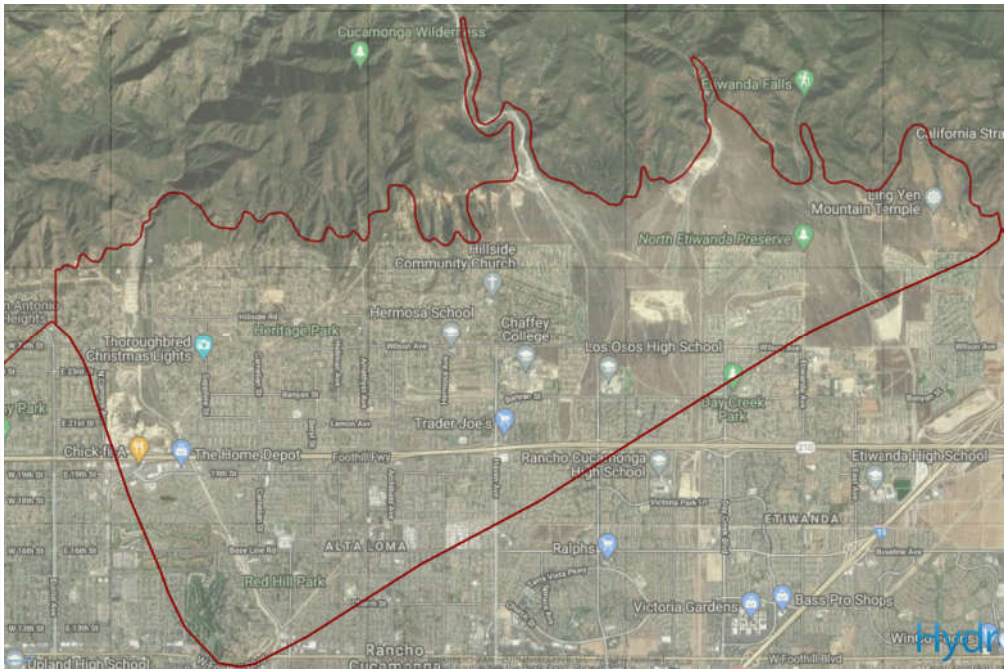
Cucamonga Groundwater Management Zone

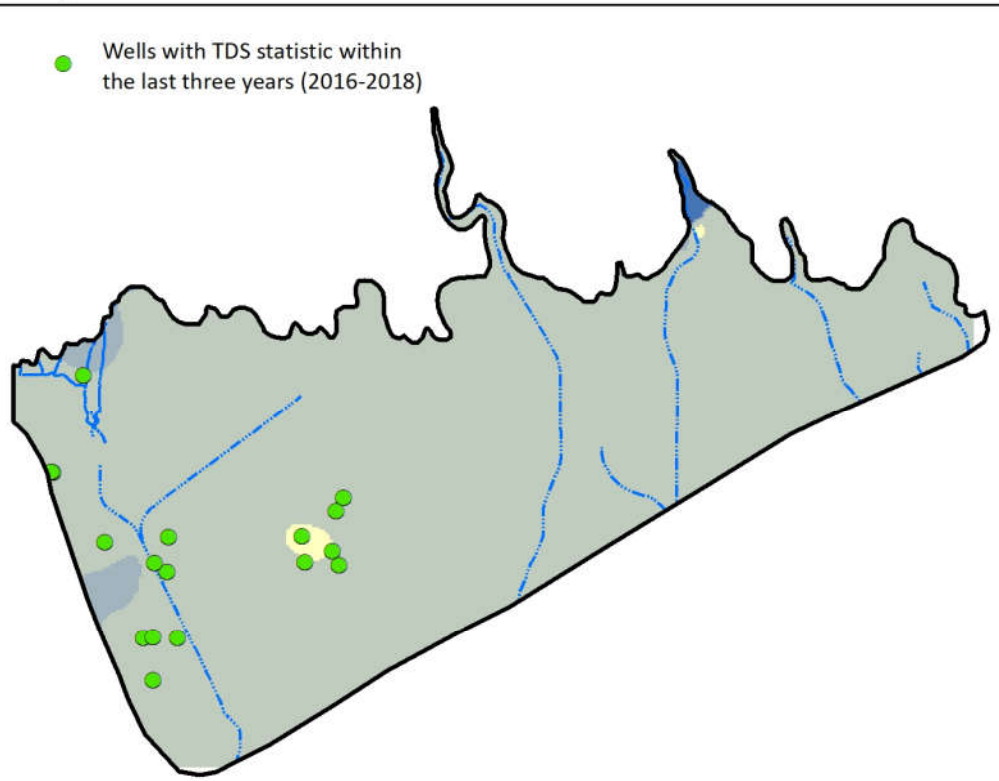


2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 380 mgl)

<100	>200 - 380	>480 - 610
>100 - 200	>380 - 480	

Cucamonga Groundwater Management Zone

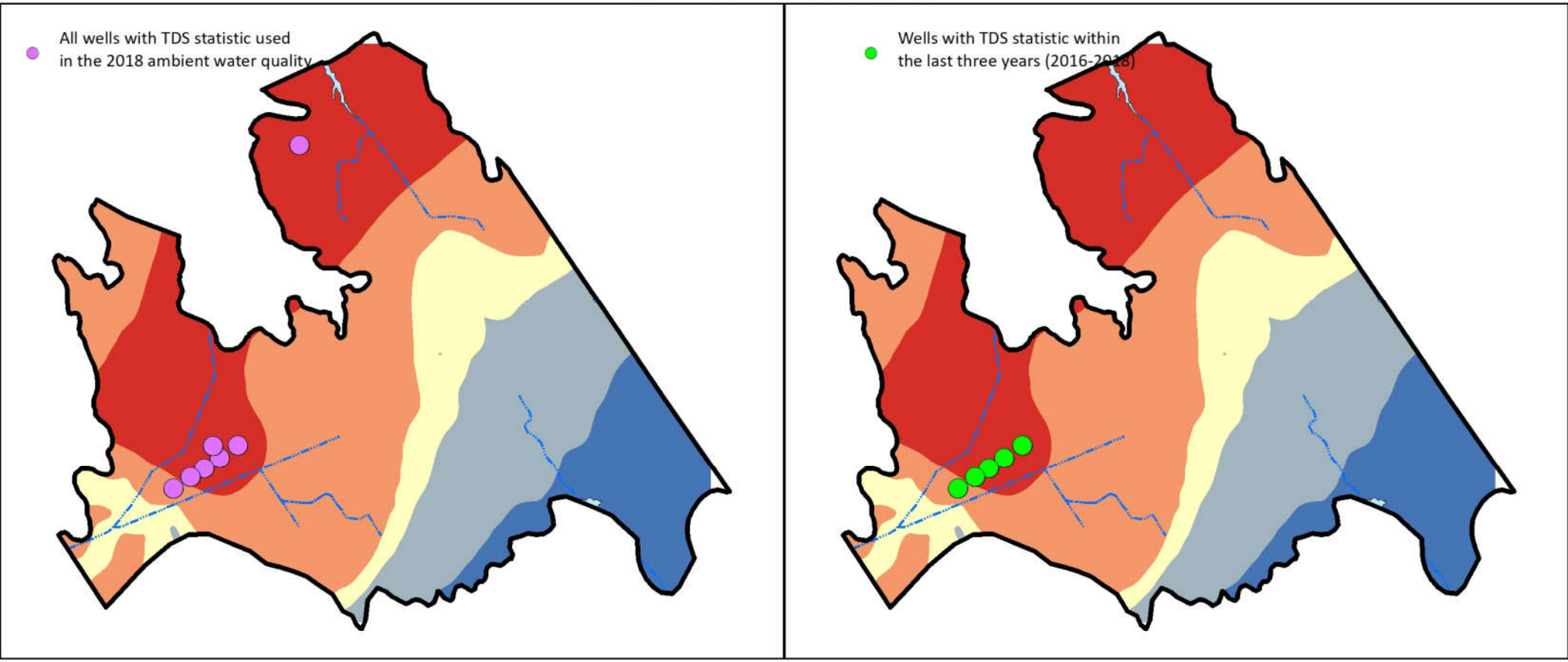




2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 380 mgl)

<100	>200 - 380	>480 - 610
>100 - 200	>380 - 480	

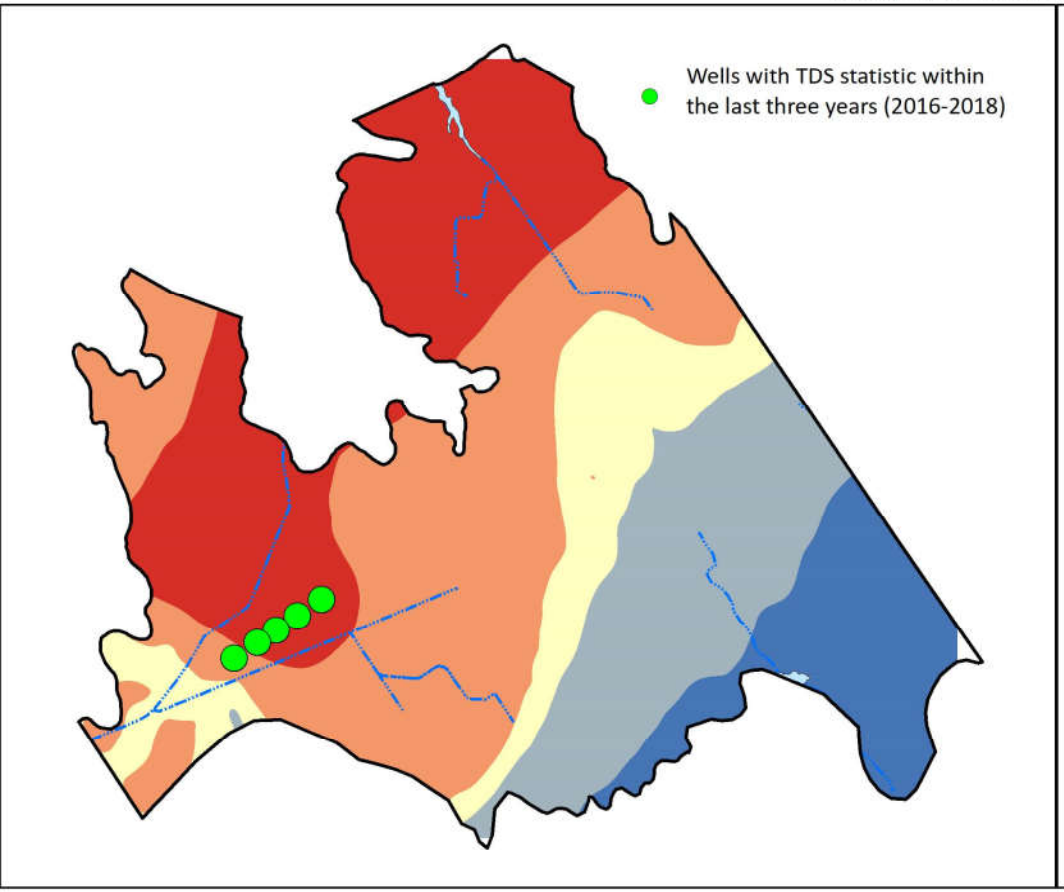
Arlington Groundwater Management Zone

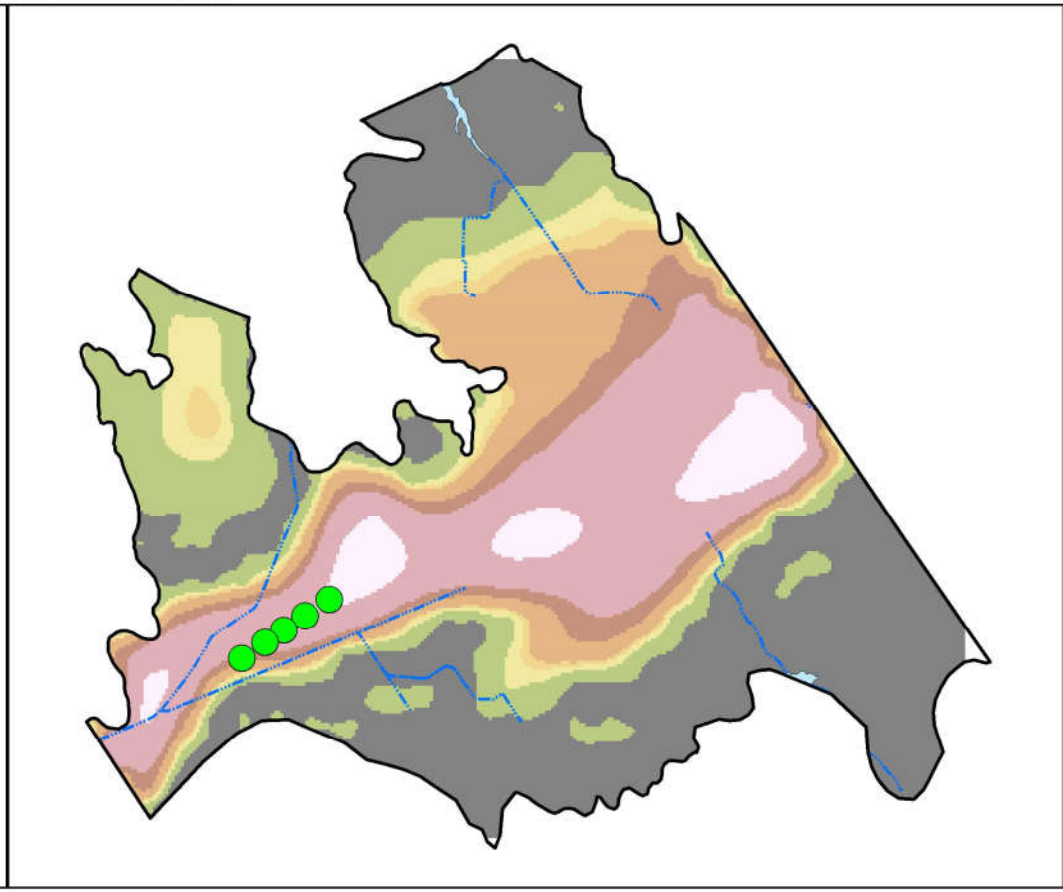


2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 980 mgll)

794 - 880 | 881 - 980 | 981 - 1,000 | 1,010 - 1,100 | 1,110 - 1,200

Arlington Groundwater Management Zone





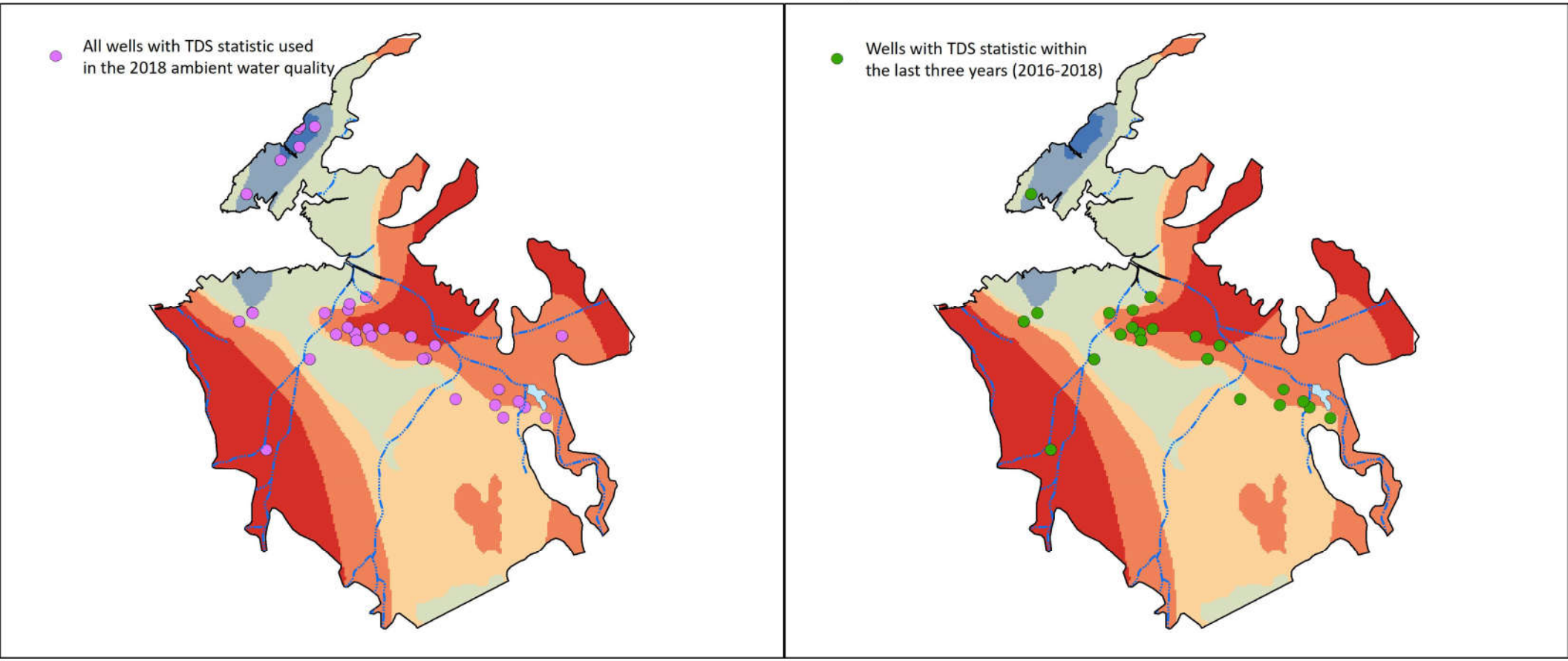
2018 Ambient TDS (mgl)
(TDS maximum benefit objective is 980 mgll)

794 - 880	981 - 1,000	1,110 - 1,200
881 - 980	1,010 - 1,100	

2018 Groundwater Storage (af)

0 - 1	>80 - 100	>300 - 600
>1 - 50	>100 - 200	>600 - 900
>50 - 80	>200 - 300	

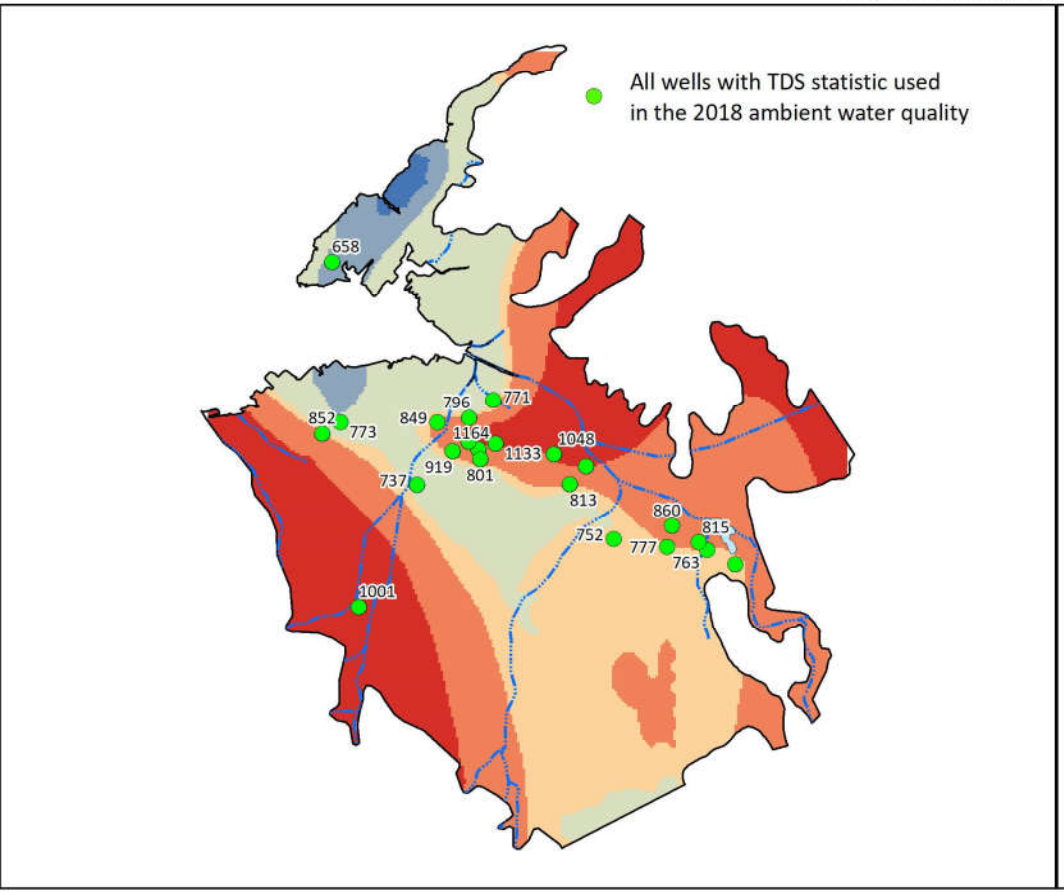
Temescal Groundwater Management Zone

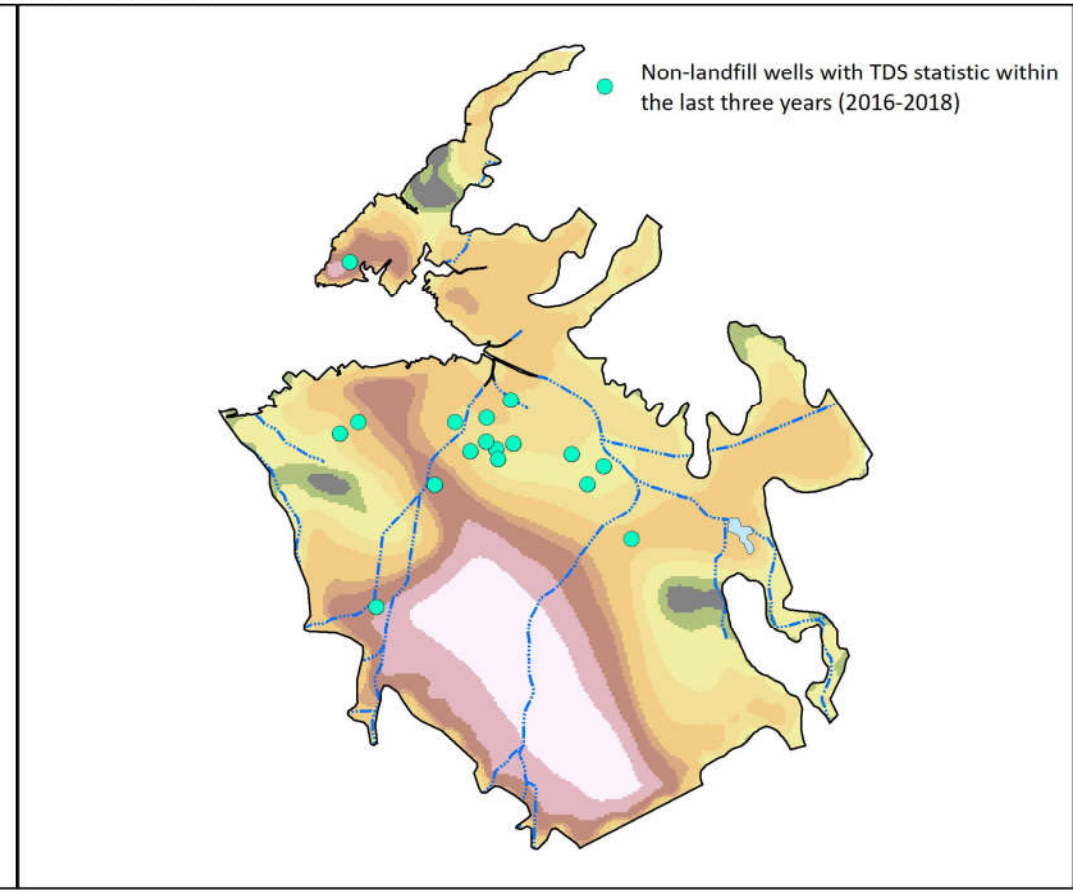


2018 Ambient TDS (mgl)
(TDS objective is 770 mgl)

445 - 500	> 600 - 770	> 800 - 900
> 500 - 600	> 770 - 800	> 900 - 1,025

Temescal Groundwater Management Zone





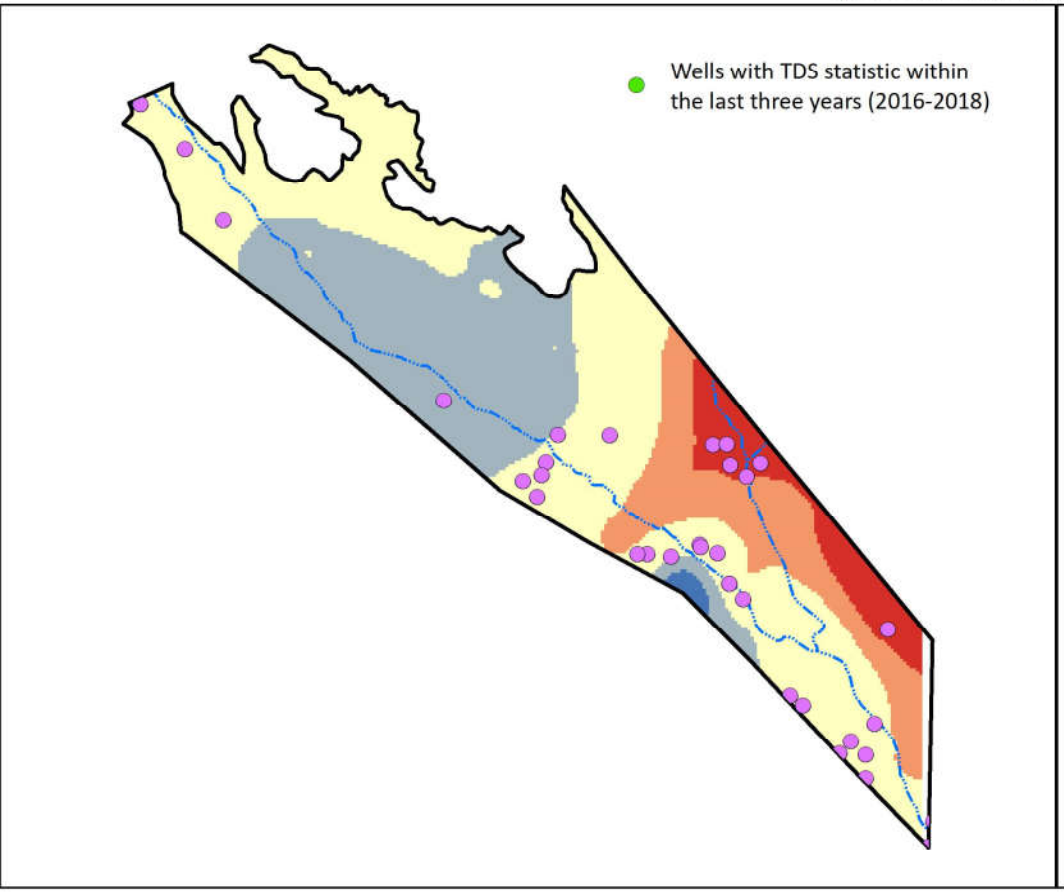
2018 Ambient TDS (mgl)
(TDS objective is 770 mgl)

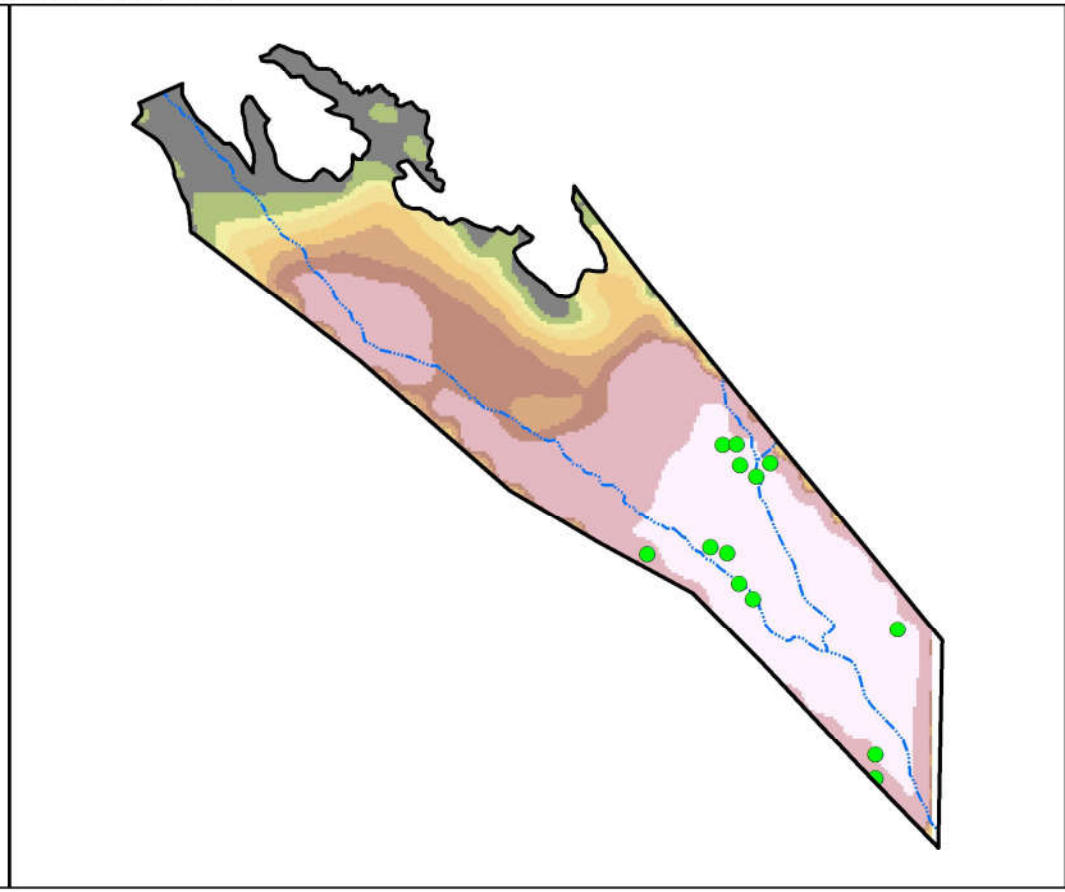
445 - 500	> 600 - 770	> 800 - 900
> 500 - 600	> 770 - 800	> 900 - 1,025

2018 Groundwater Storage (af)

0 - 1	>200 - 400	>1,000 - 1,500
>1 - 50	>400 - 800	>1,500 - 2,000
>50 - 200	>800 - 1,000	>2,000 - 2,610

Lytle Creek Groundwater Management Zone





2018 Ambient TDS (mgl)
(TDS objective is 260 mgl)

> 120 - 160 | > 190 - 260
> 160 - 190 | > 260 - 300 | > 300 - 370

2018 Groundwater Storage (af)

< 1 | > 50 - 100 | > 250 - 500 | > 750 - 1,000
> 1 - 50 | > 100 - 250 | > 500 - 750 | > 1,000 - 3,000 | > 3,000 - 8,100

Questions for Consideration in Ongoing Methods and Data Collection

- Should we update the physical model of the groundwater basins if improved hydrogeologic characterizations are available since 2004?
  - storage properties – bottom of the aquifer, specific yield, aquifer layering

- If we update the physical model, do we need to go to the effort to re-compute the historical water quality?
  - If yes, why?
  - Remember the double-edged sword – what are the consequences of such an approach?

Which GMZs have Updated Aquifer Characterizations?

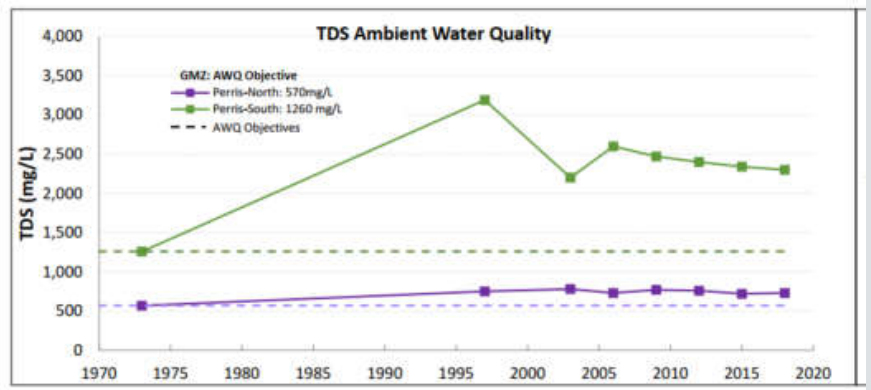
- Beaumont Basin
- Bunker Hill-A/B, Lytle
- Chino Basin
- Cucamonga Basin
- Elsinore Basin
- Rialto/Colton
- San Jacinto Upper Pressure
- Orange County
- Where else?

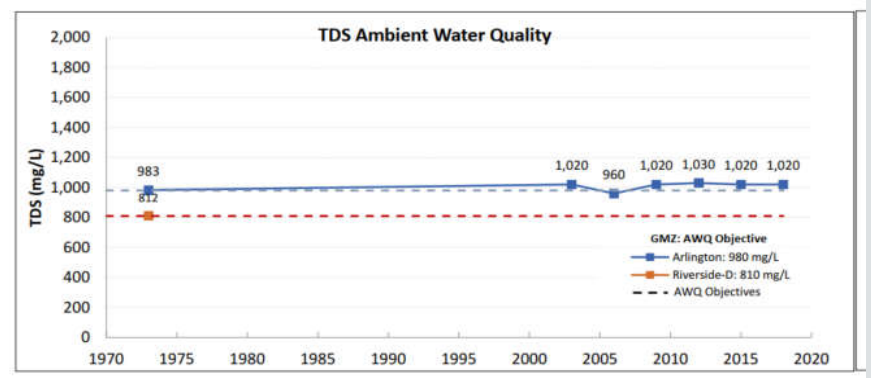
Questions for Consideration in Ongoing Methods and Data Collection

- Who should be responsible to pay for filling data gaps?
- Who should be responsible to pay for updating physical models?
- Who should be responsible to perform the technical work to fill data gaps and update physical models?
    - Entire Task Force?
    - Overlying agencies?
    - Agencies whose discharges affect GMZ?

Questions for Consideration in Ongoing Methods and Data Collection

- How do we prioritize our efforts to improve physical models and data collection?
  - Do we need to (or is it even possible) fill all the data gaps all at once?
  - Do we need to update the physical models all at once?
- Should we continue to perform full ambient water quality recomputation process in all GMZs?
- Can we prioritize based what we know from history of analysis and regulatory compliance challenges?
  - ***The case for prioritization***





What questions and ideas do you have?

Next Workshop

Date	Workshop Topic
August 2021	Overview of Recycled Water Policy – SNMP Monitoring and Analysis Requirements
October 2021	Critical Analysis of SAR SNMP Ambient Water Quality and Alternative Methods to Comply Pt. 1: What Have We Learned in 17 years of Implementation?
December 2021	Critical Analysis of SAR SNMP Ambient Water Quality and Alternative Methods to Comply Pt. 2: Consideration of Alternative Methods
January 2022	**Critical Analysis of SAR SNMP Ambient Water Quality and Alternative Methods to Comply Pt. 3: The Case for Prioritization and Levels of Analysis**
February 2022	Groundwater Monitoring for SNMP Compliance Pt. 1: Defining Key Wells, Data Gaps, and Responsible Parties
March 2022	Groundwater Monitoring for SNMP Compliance Pt 2: Database Management and Five-year Assessments
April 2022	Draft Work Plan Review
May 2022	Discuss Comments on Draft Work Plan
June 2022	Final Work Plan Review

THANK YOU

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WE SUPPORT OUR COMMUNITIES

WE ARE WATER FOCUSED

WE TAKE PRIDE IN WHAT WE DO

WE DO WHAT'S RIGHT

WE STRIVE TO BECOME OUR BEST

WE BELIEVE IN QUALITY

WE LISTEN

WE SOLVE HARD PROBLEMS

WE SEE THE BIGGER PICTURE

WE TAKE OWNERSHIP

WE COLLABORATE

WE HAVE FUN

WE ARE WEST YOST

WEST YOST
Water. Engineered.