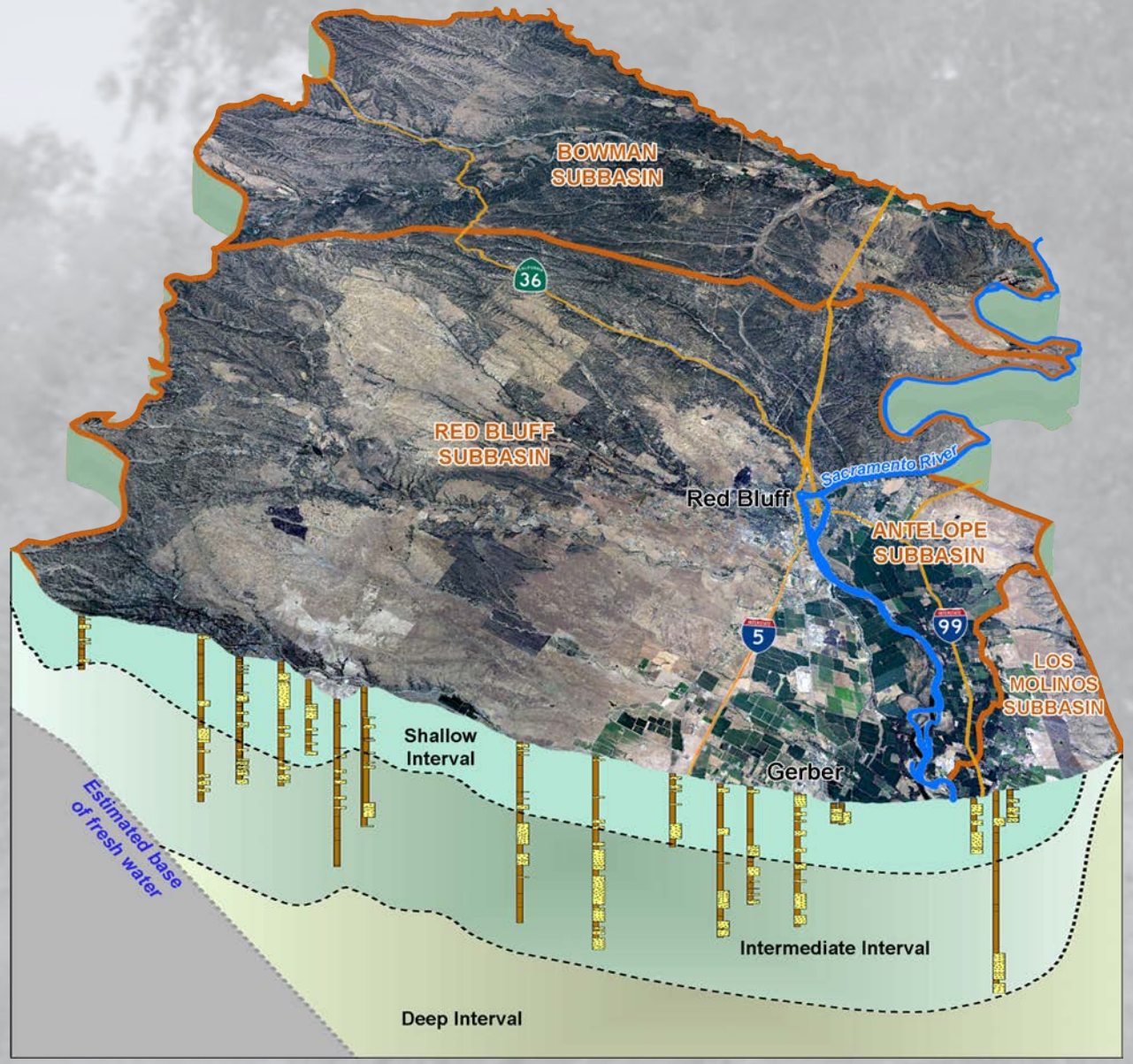
TEHAMA COUNTY
Flood Control and Water Conservation District

Public Webinar

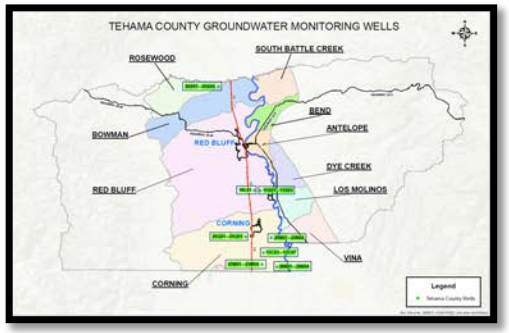
Progress Update On Development of the GSP for the Antelope Subbasin

December 9, 2020

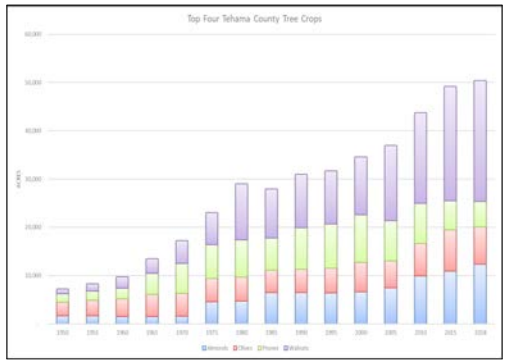


GSP Section Preparation

TEHAMA COUNTY
Flood Control and Water Conservation District









- A friendly, “good read”
- Supported by Technical Memorandums and other appendices
- Draft Sections: Periodic Review in Advance of Full Draft GSP Delivery

Tehama County Subbasins Groundwater Sustainability Plans

TEHAMA COUNTY
Flood Control and Water Conservation District

Describe the Basin Conditions
Plan Area, Subbasin Setting & Water Supplies

What water sources are used in the basin and what are the basin conditions related to those uses?

Define Basin Sustainability
Sustainable Management Criteria & Monitoring

What is sustainable groundwater management?

Develop Projects/Management Actions & Implementation Plans

How can we ensure groundwater sustainability?

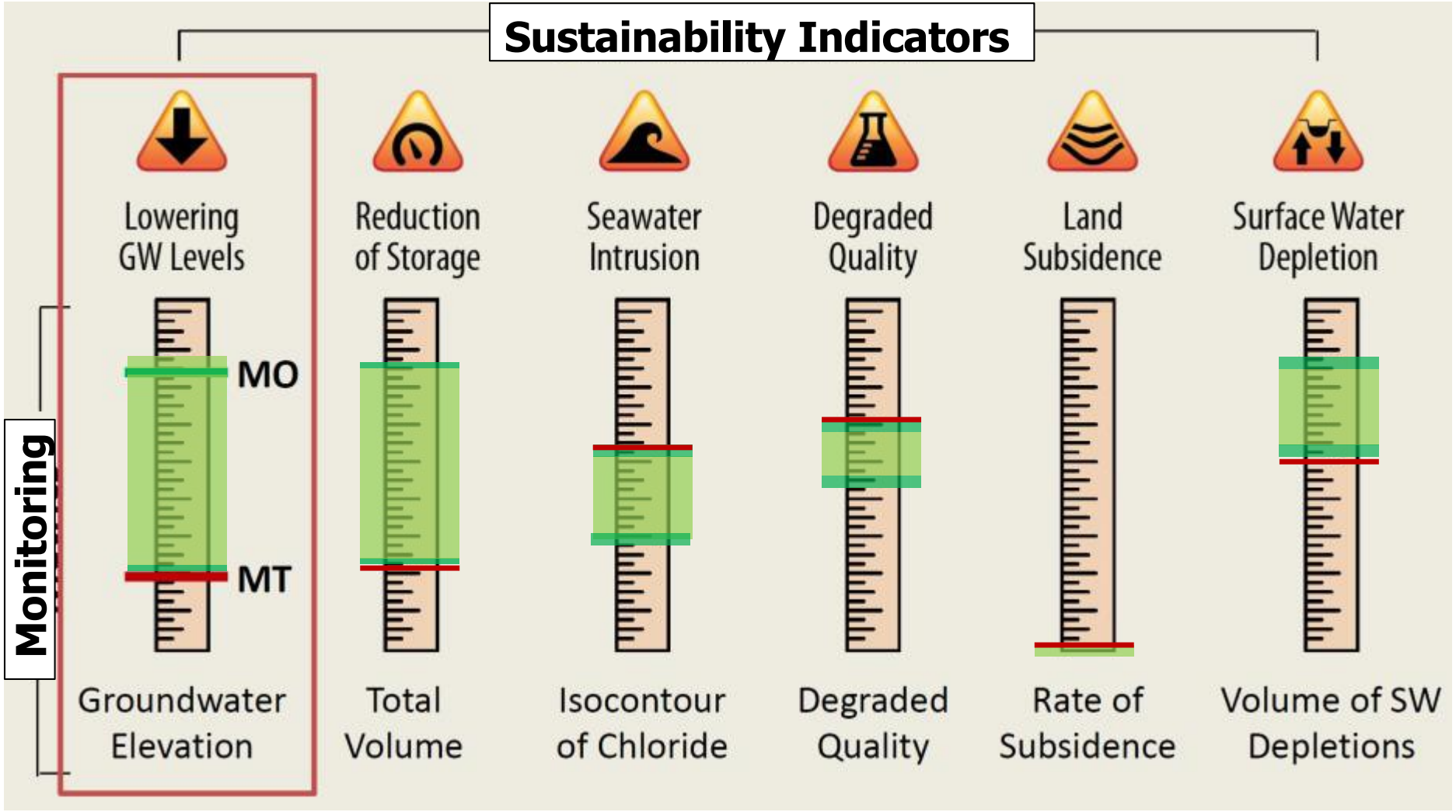
Develop & Adopt GSPs
Submit GSP to DWR: January 31, 2022

Will this plan meet our sustainability goals?

SGMA Terms Explained

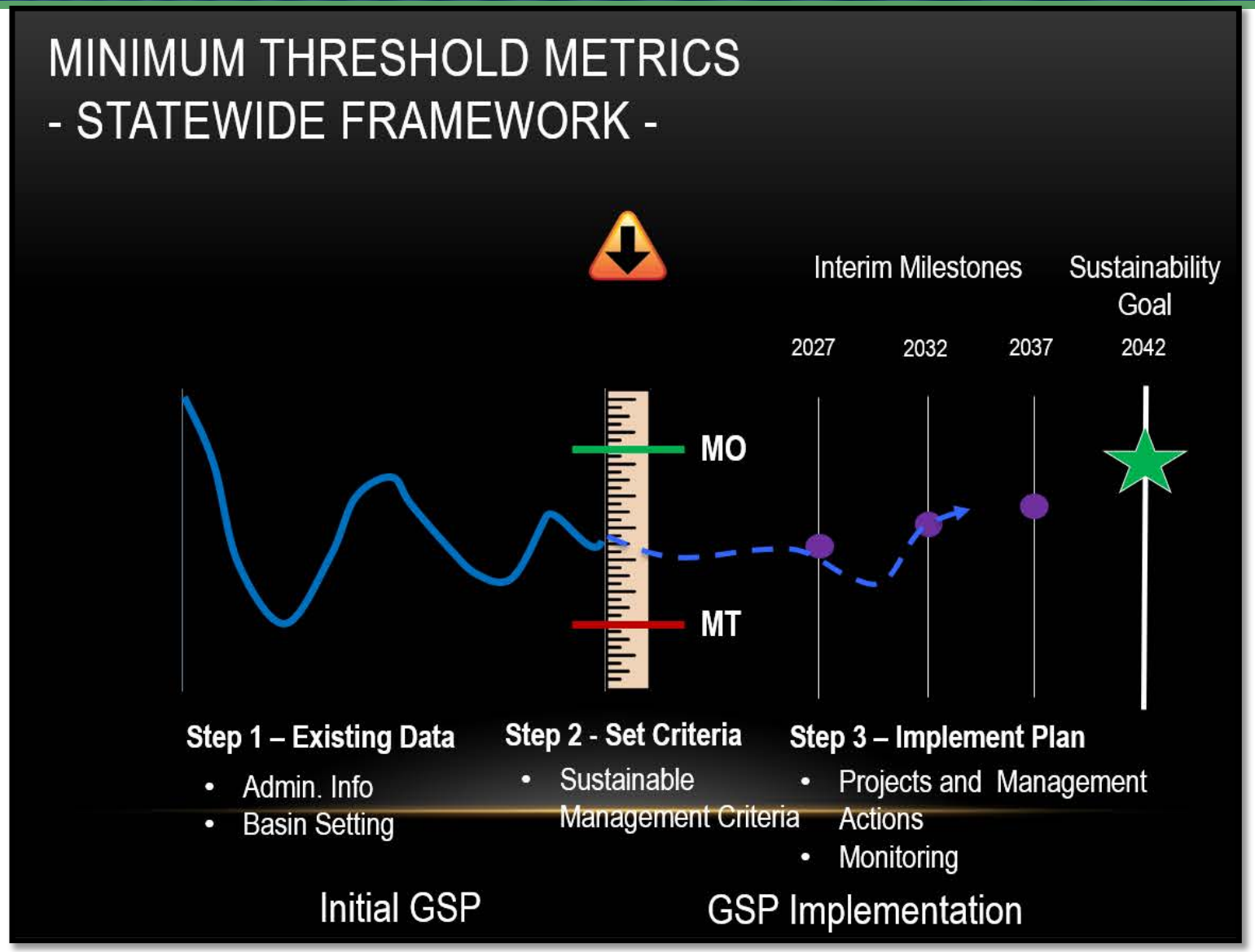
TEHAMA COUNTY
Flood Control and Water Conservation District

Sustainable Management Criteria for
all applicable Sustainability Indicators



SGMA Terms Explained

TEHAMA COUNTY
Flood Control and Water Conservation District



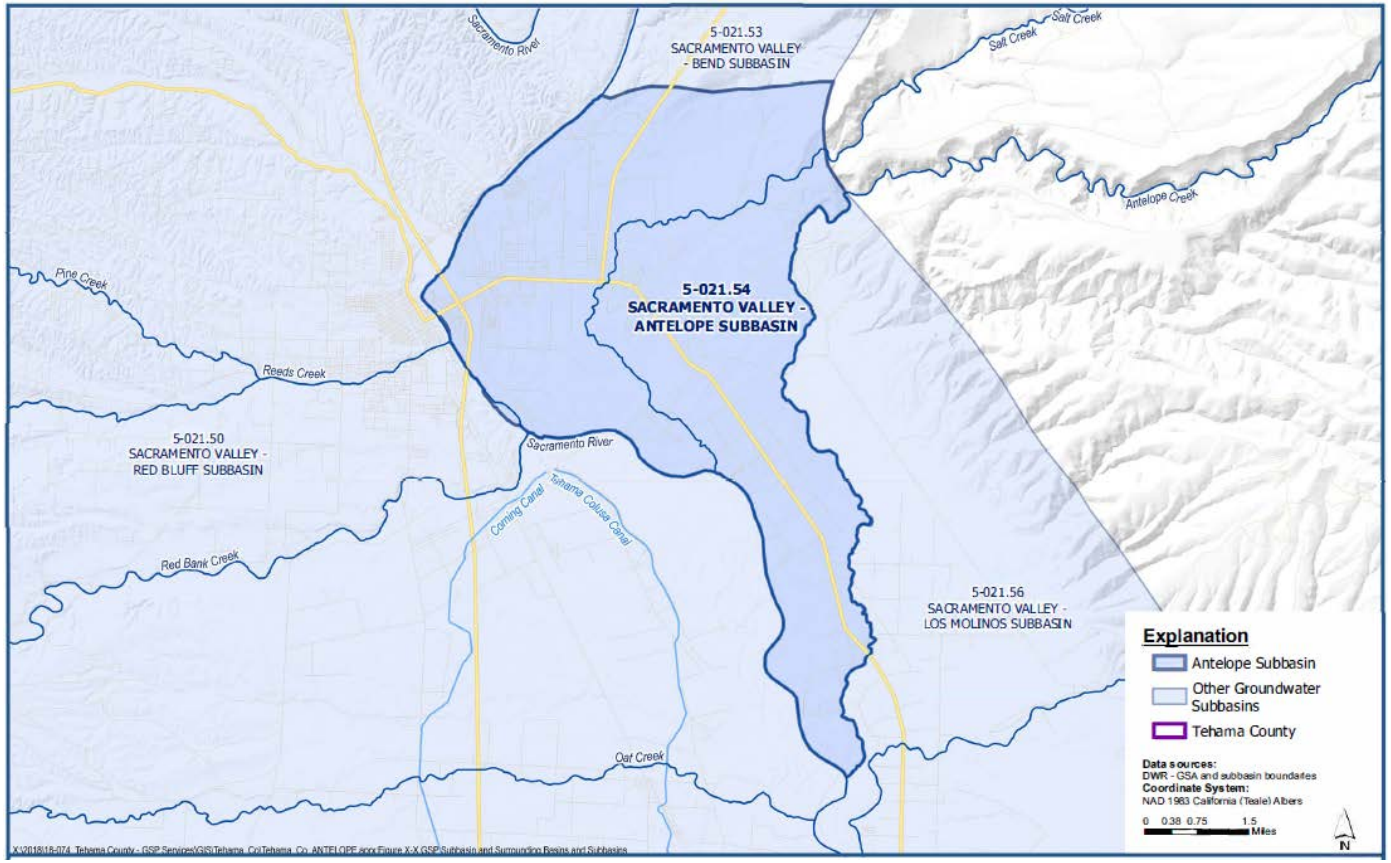
Presentation Outline

Introduction
- Antelope Subbasin
- Sustainability Goal

Plan Area
- General Area
- Existing Land Use Designation
- Existing Land Use
- Existing Water Sources & Users
- Density of Wells
- Existing Monitoring Networks – Water Level
- Existing Monitoring Networks – Water Quality
- Existing Monitoring Networks – Land Subsidence
- Well Construction Policies
- Well Abandonment Policies
- Notice and Communication

Basin Setting
- Cross-sections
- Topography info
- Surficial geology
- Soil characteristics
- Existing recharge areas
- Surface water bodies
- Current and Historical Groundwater Conditions
  - Elevation data
  - Groundwater quality
  - Land Subsidence

Water Budget Information



GSP Development – Technical Foundation

TEHAMA COUNTY
Flood Control and Water Conservation District

Groundwater Sustainability Plan (GSP)

1. Administrative Information

2. Basin Setting

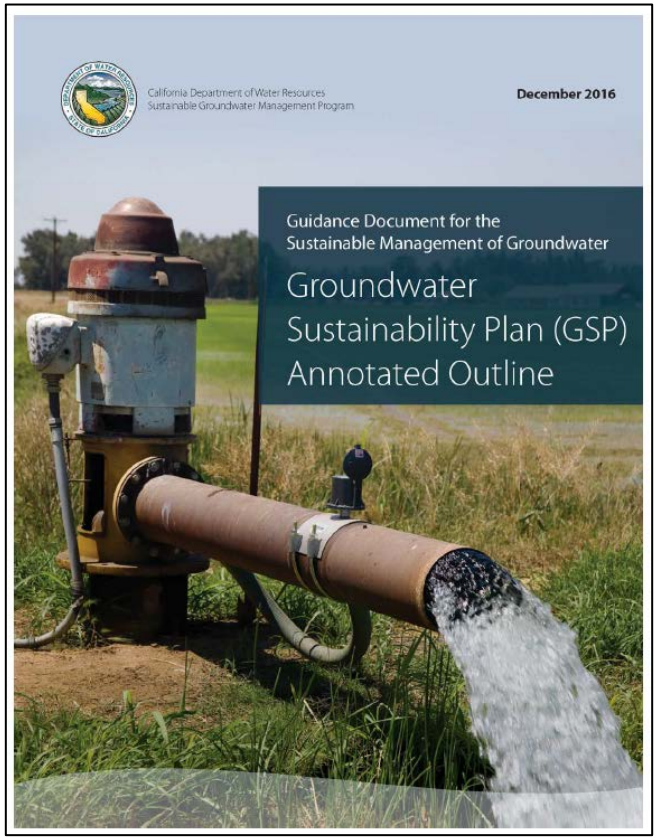
- Hydrogeologic Conceptual Model
- Groundwater Conditions
- Water Budgets

3. Sustainable Management Criteria

- Sustainability Goal
- Undesirable Results
- Minimum Thresholds
- Measurable Objectives
- Monitoring Network
- Representative Monitoring
- Assessment & Improvement
- Reporting Monitoring Data

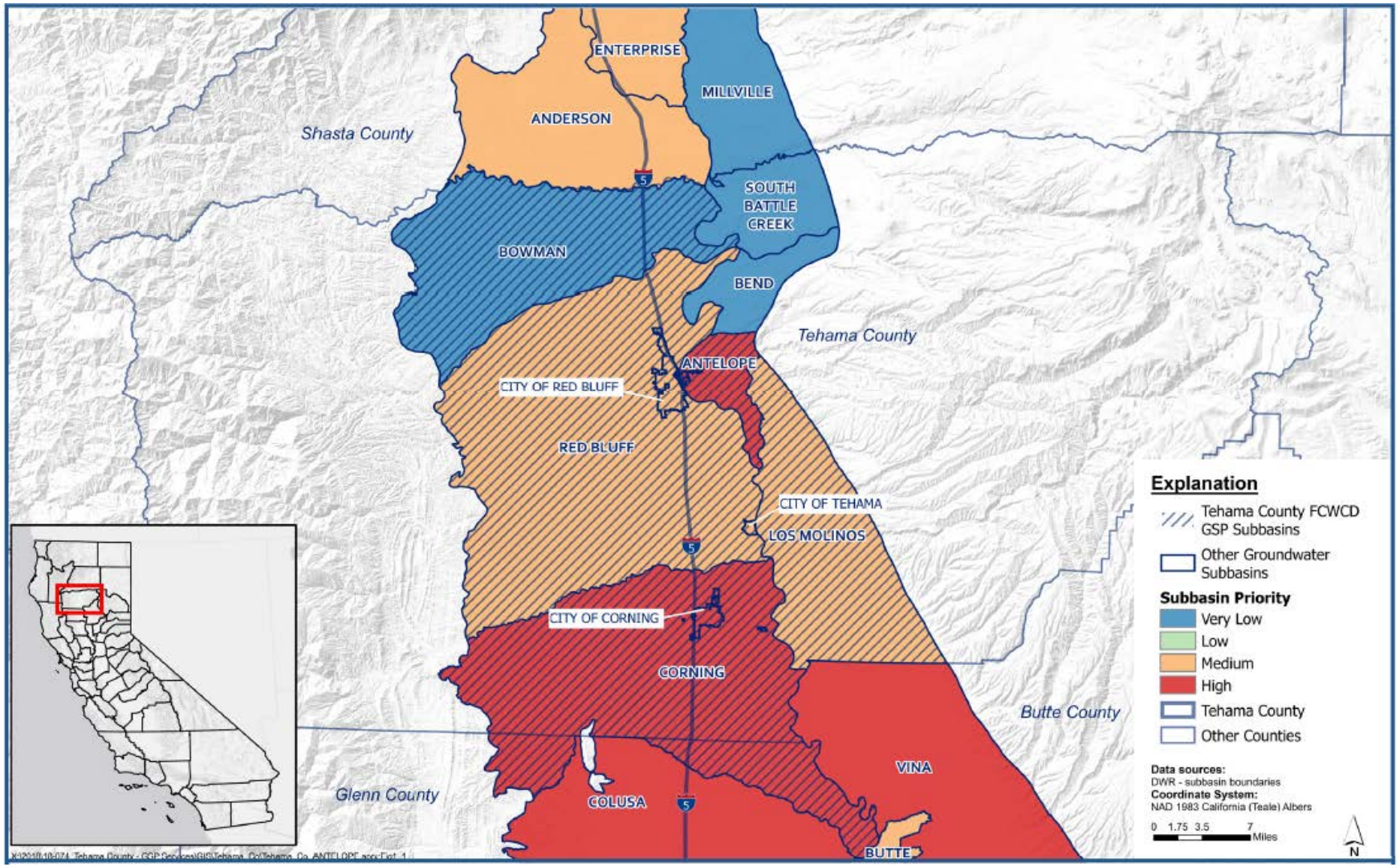
4. Projects and Management Actions

5. GSP Implementation



Antelope Subbasin

TEHAMA COUNTY
Flood Control and Water Conservation District



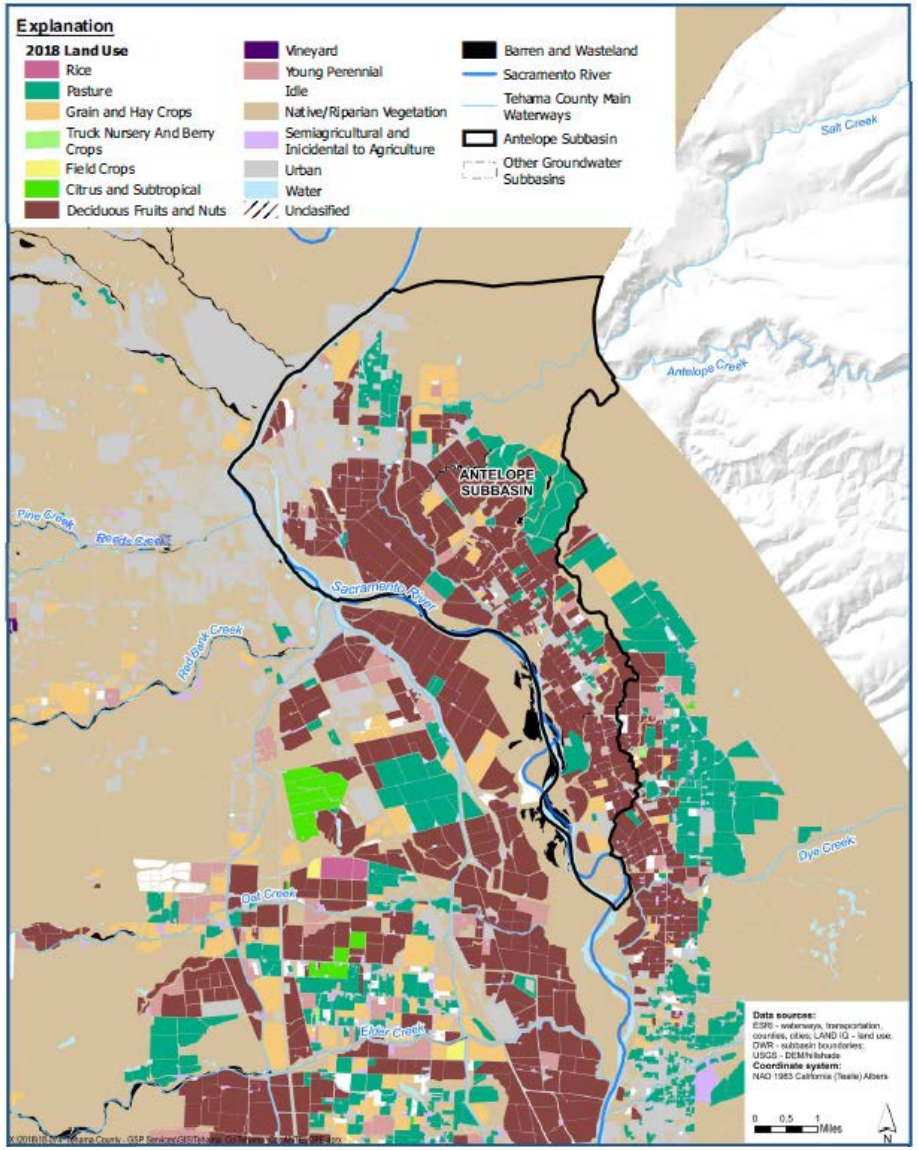
Sustainability Goal (Draft)

TEHAMA COUNTY
Flood Control and Water Conservation District

"The Tehama County Flood Control and Water Conservation District (FCWCD) will manage groundwater resources responsibly and sustainably in order to maintain acceptable standards and prevent undesirable groundwater levels, groundwater quality, groundwater storage, depletion of surface water resources, and subsidence while recognizing the importance of maintaining groundwater supplies and quality for the beneficial users of groundwater within the Subbasin over the 50-year-planning and implementation horizon."

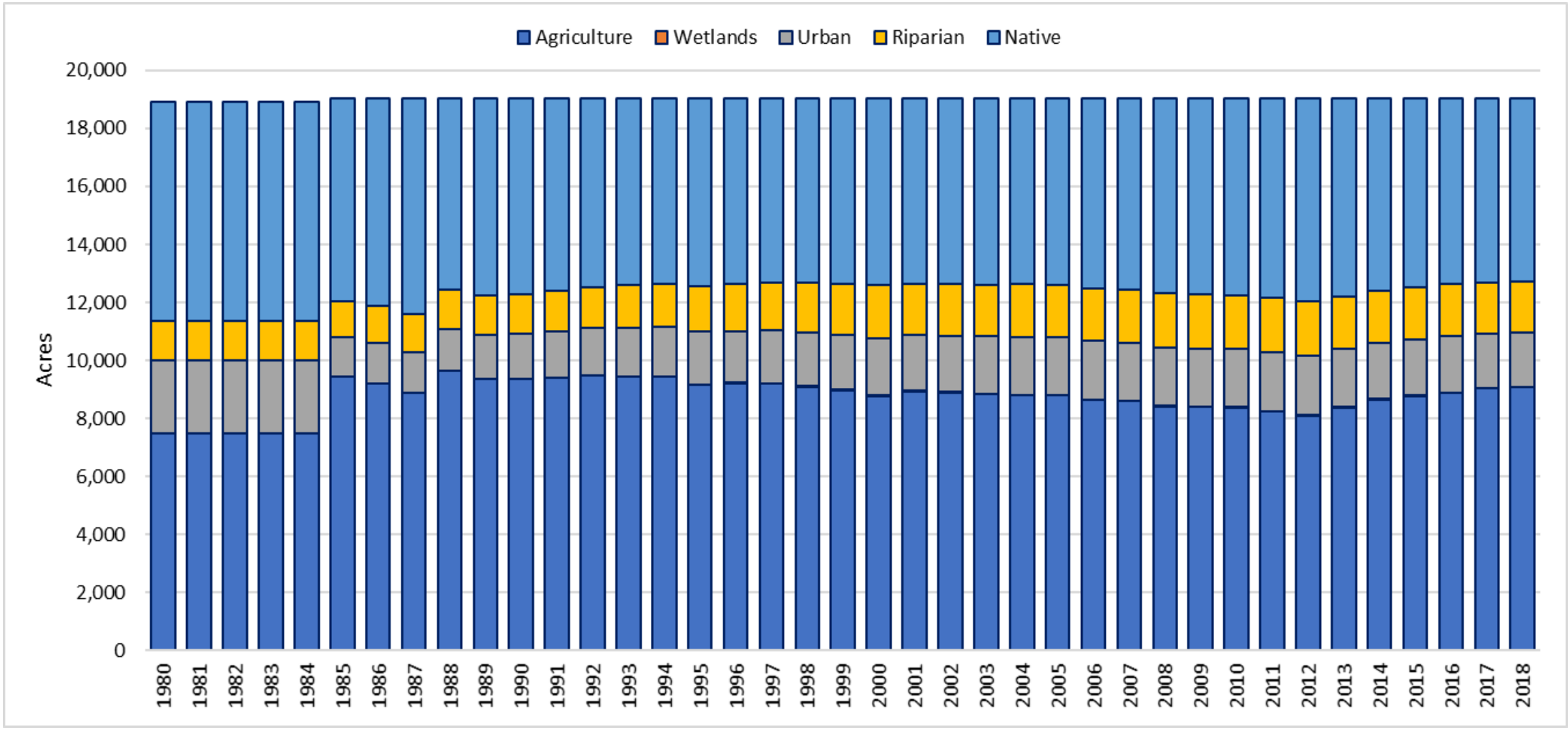
Existing Land Use Designation

TEHAMA COUNTY
Flood Control and Water Conservation District



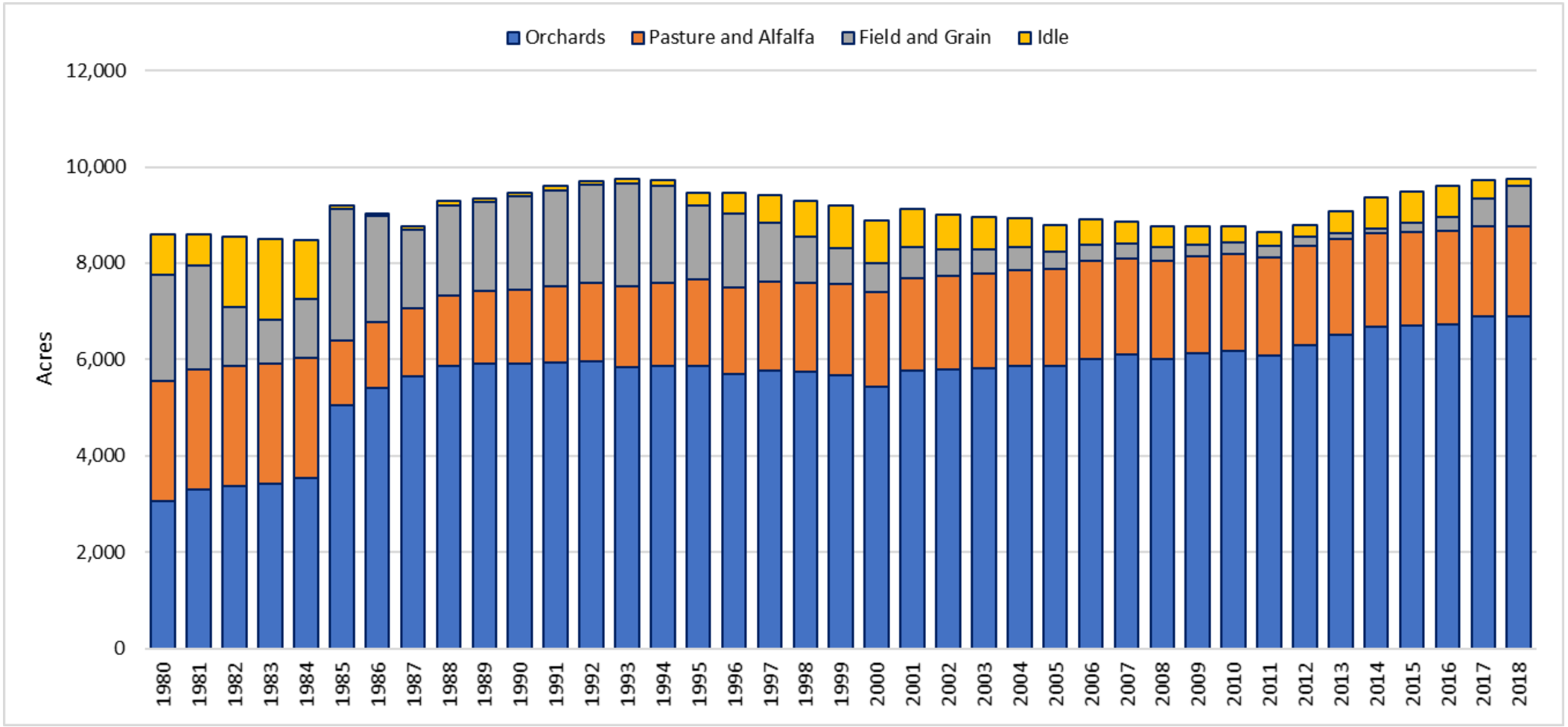
Existing Land Use

TEHAMA COUNTY
Flood Control and Water Conservation District



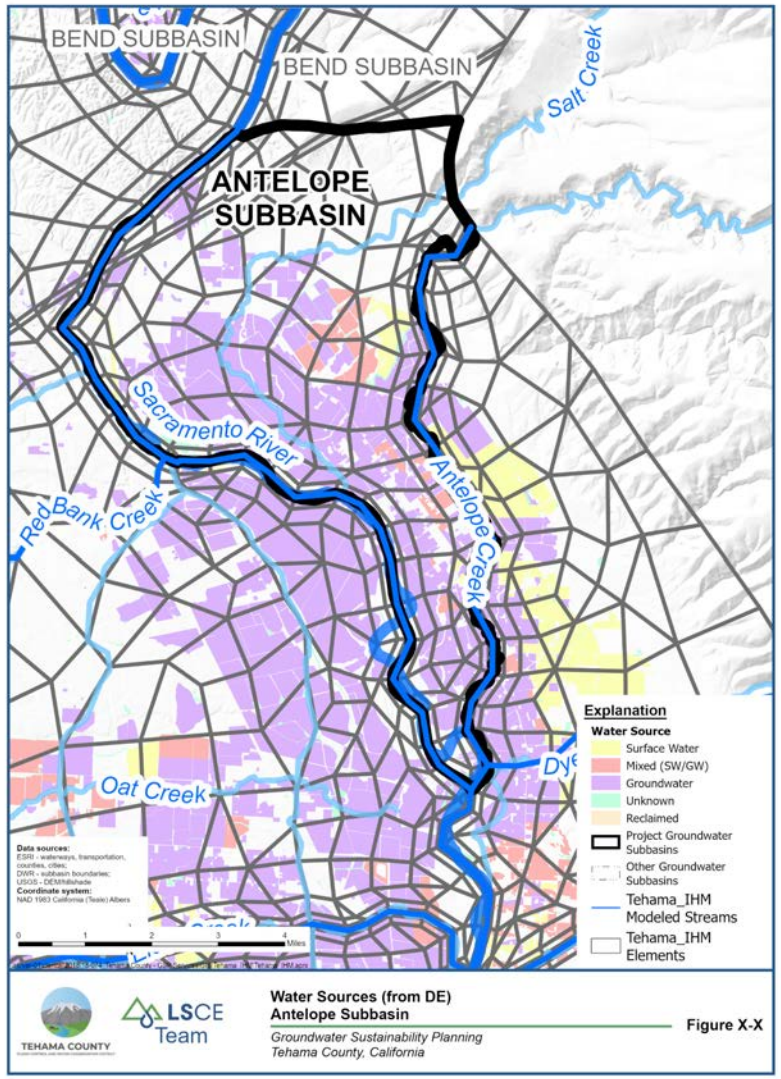
Existing Land Use

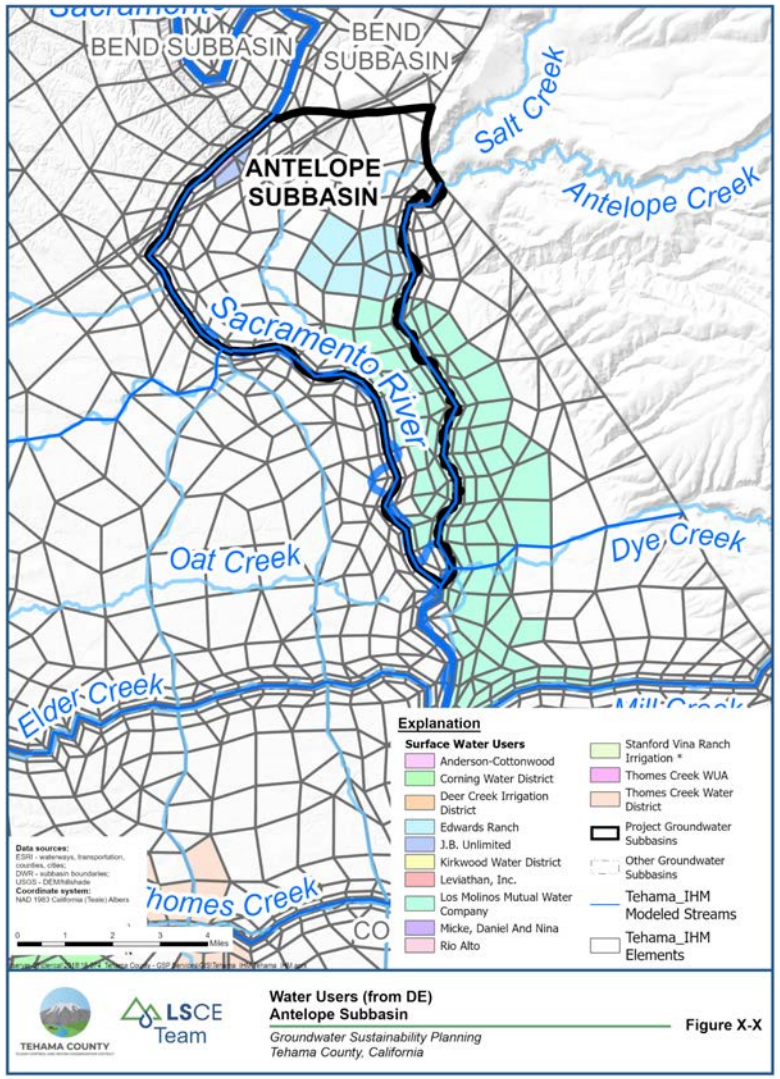
TEHAMA COUNTY
Flood Control and Water Conservation District



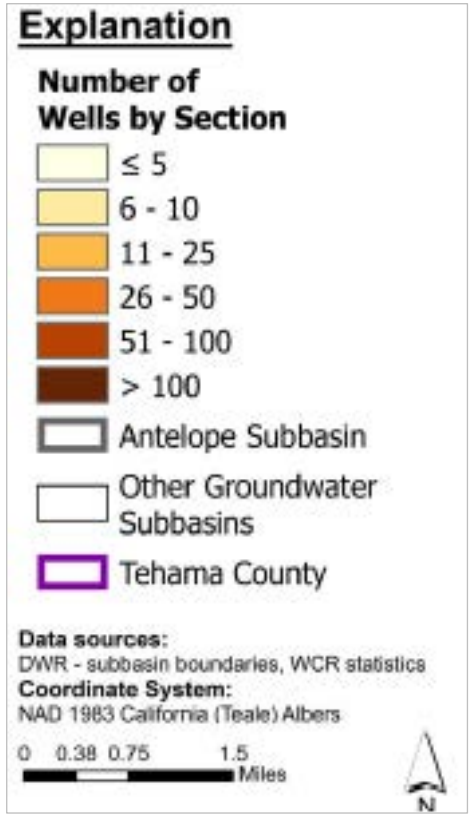
Existing Water Sources & Users

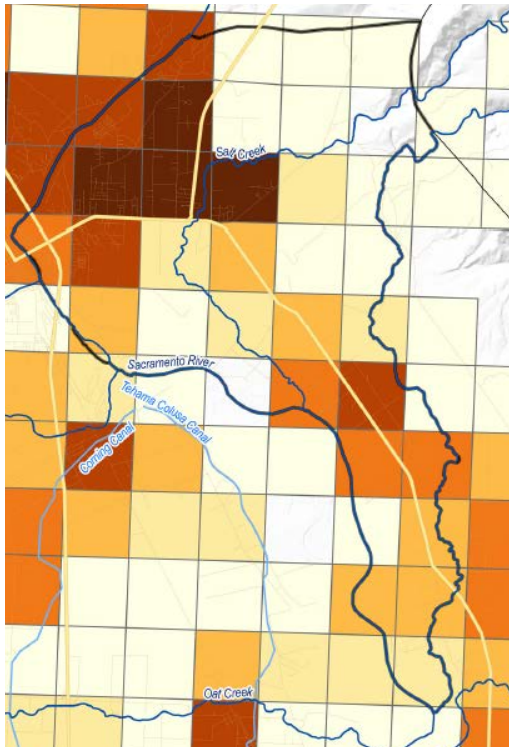
TEHAMA COUNTY
Flood Control and Water Conservation District



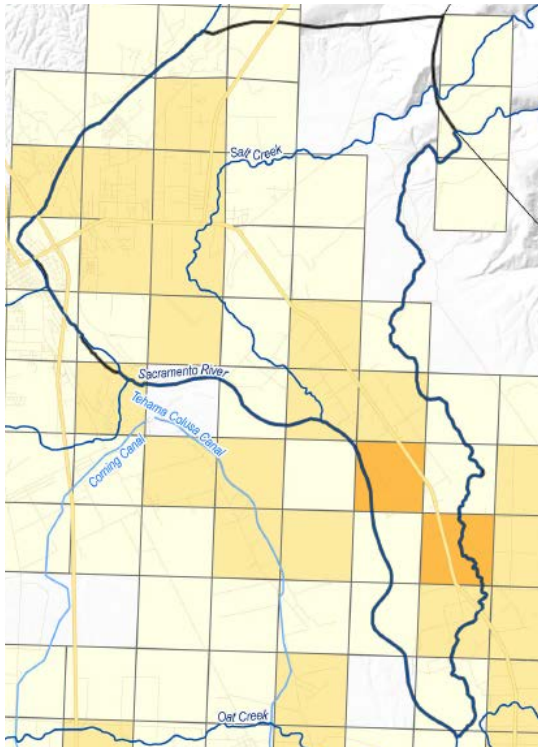


Density of Wells





Domestic



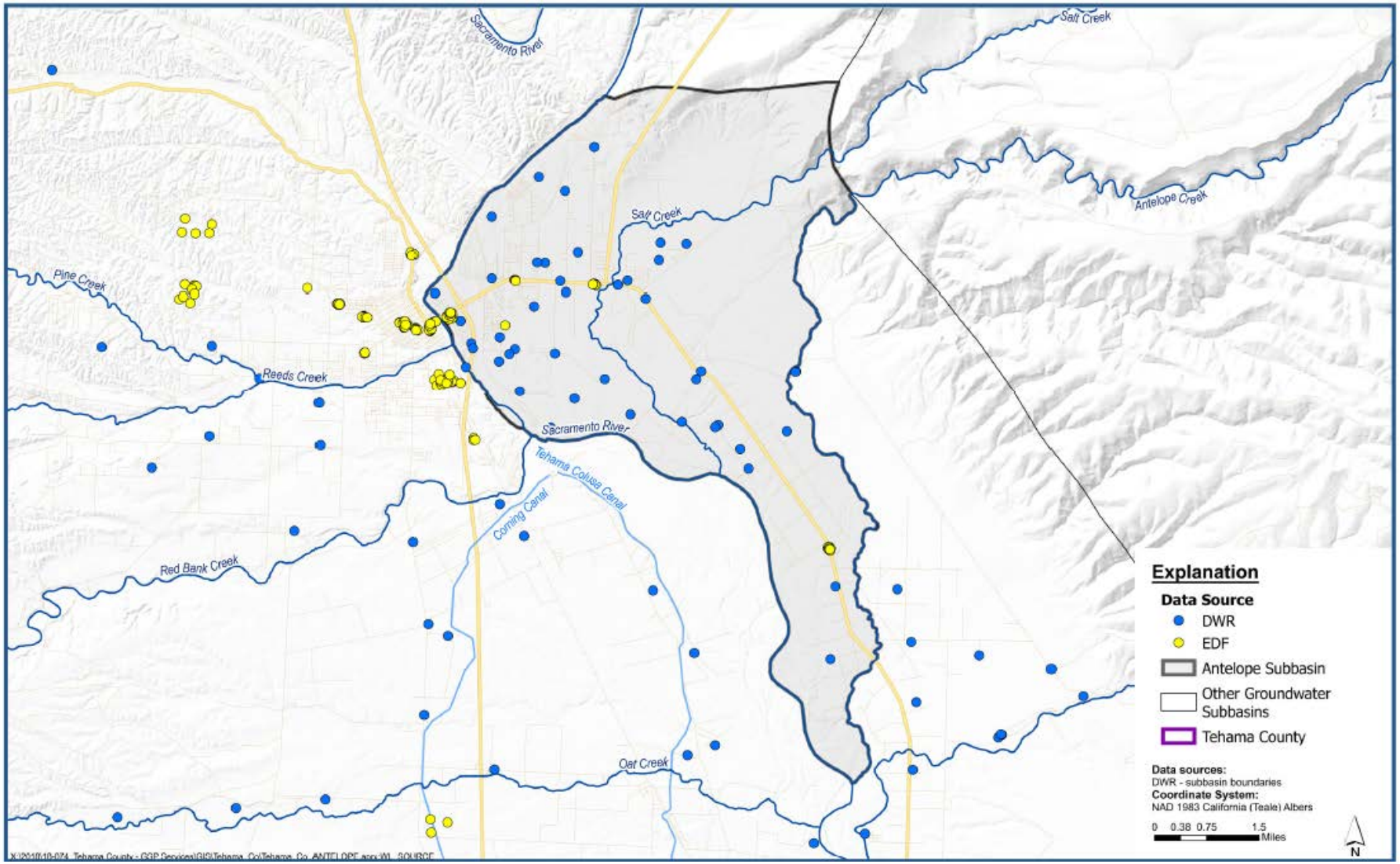
Production



Public Supply

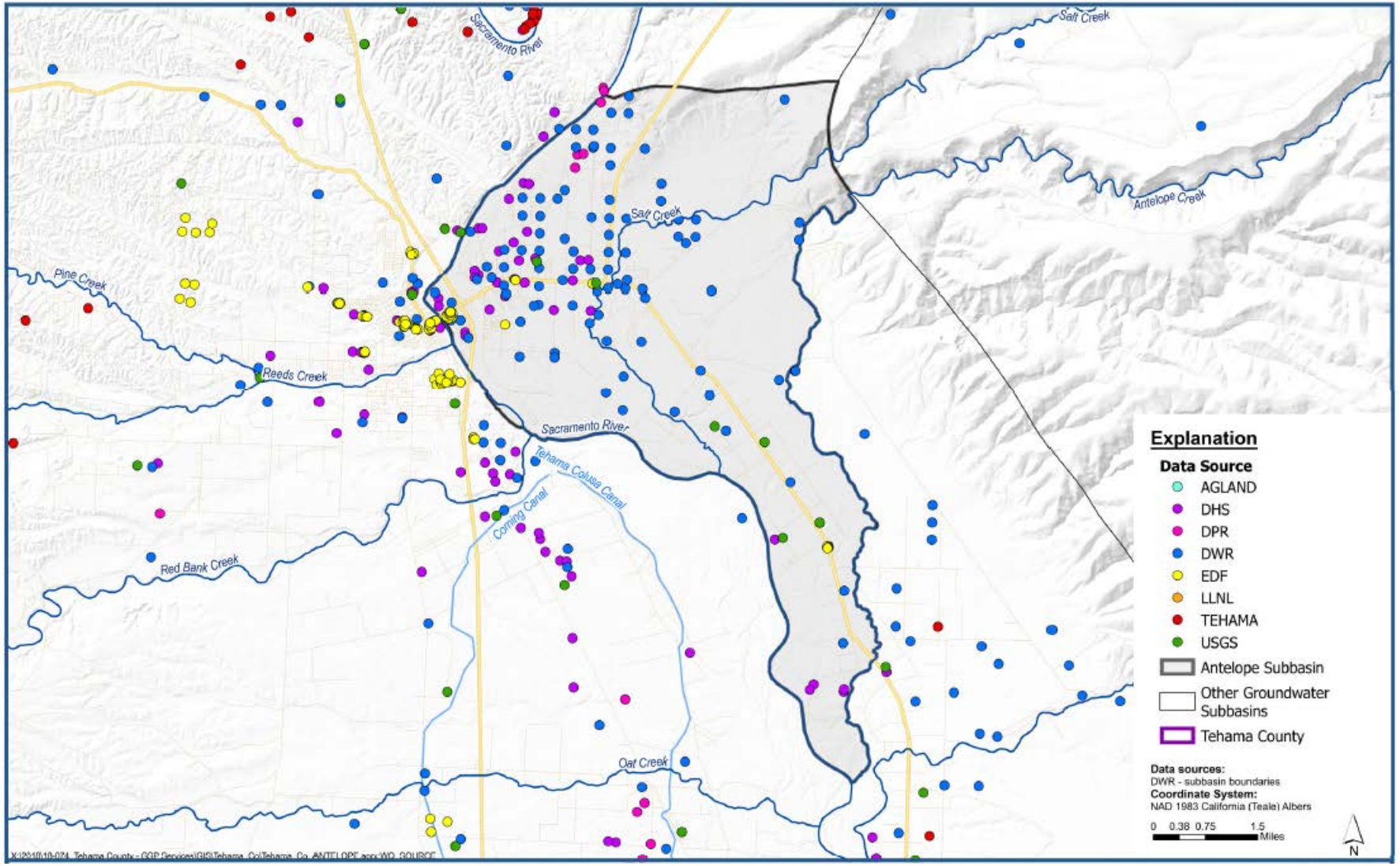
Existing Monitoring Networks – Water Level

TEHAMA COUNTY
Flood Control and Water Conservation District



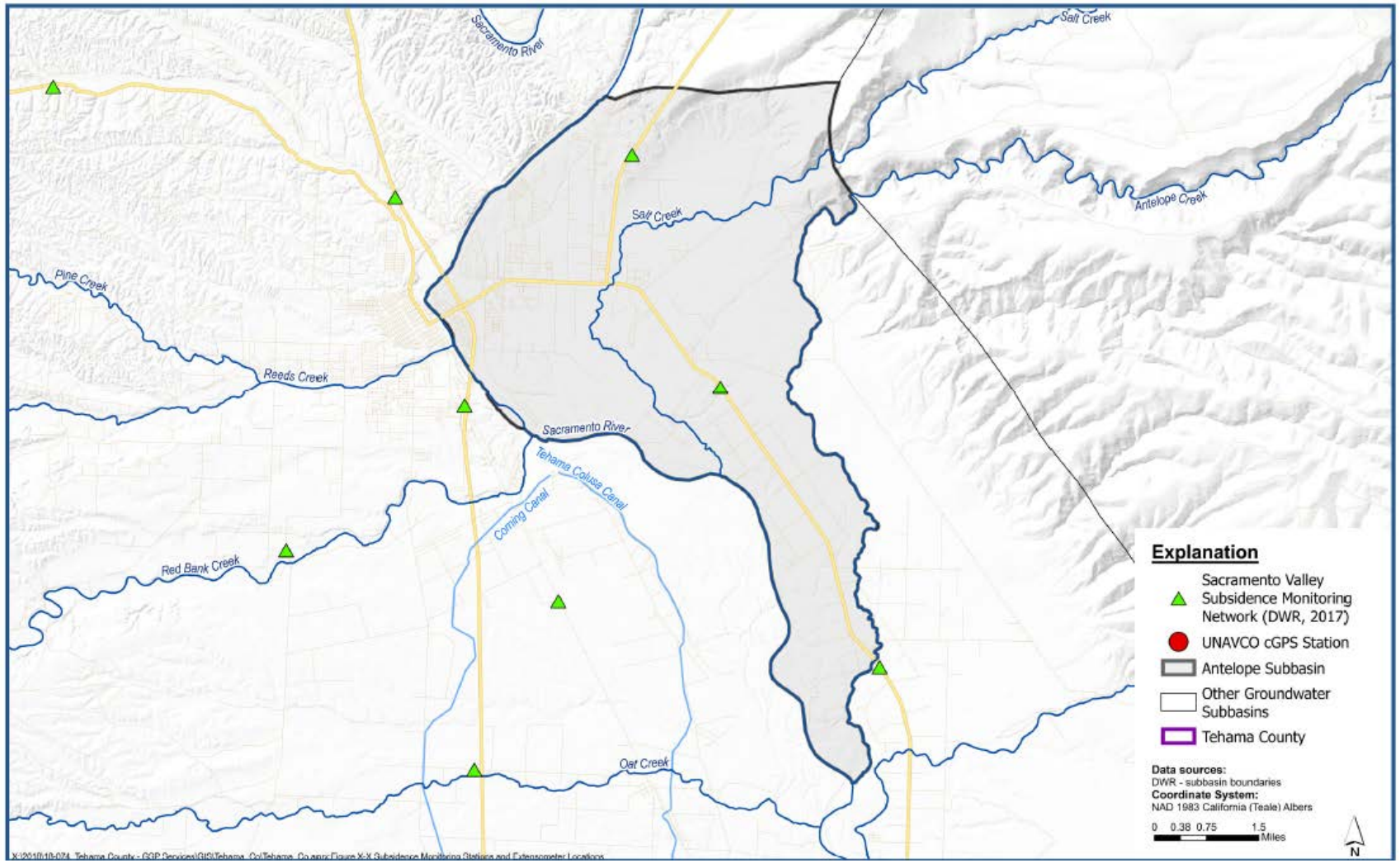
Existing Monitoring Networks – Water Quality

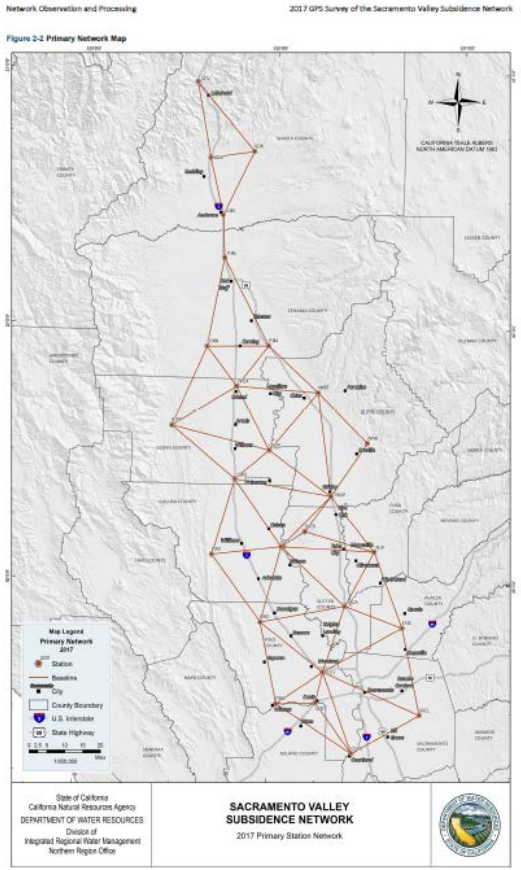
TEHAMA COUNTY
Flood Control and Water Conservation District



Existing Monitoring Networks – Subsidence

TEHAMA COUNTY
Flood Control and Water Conservation District

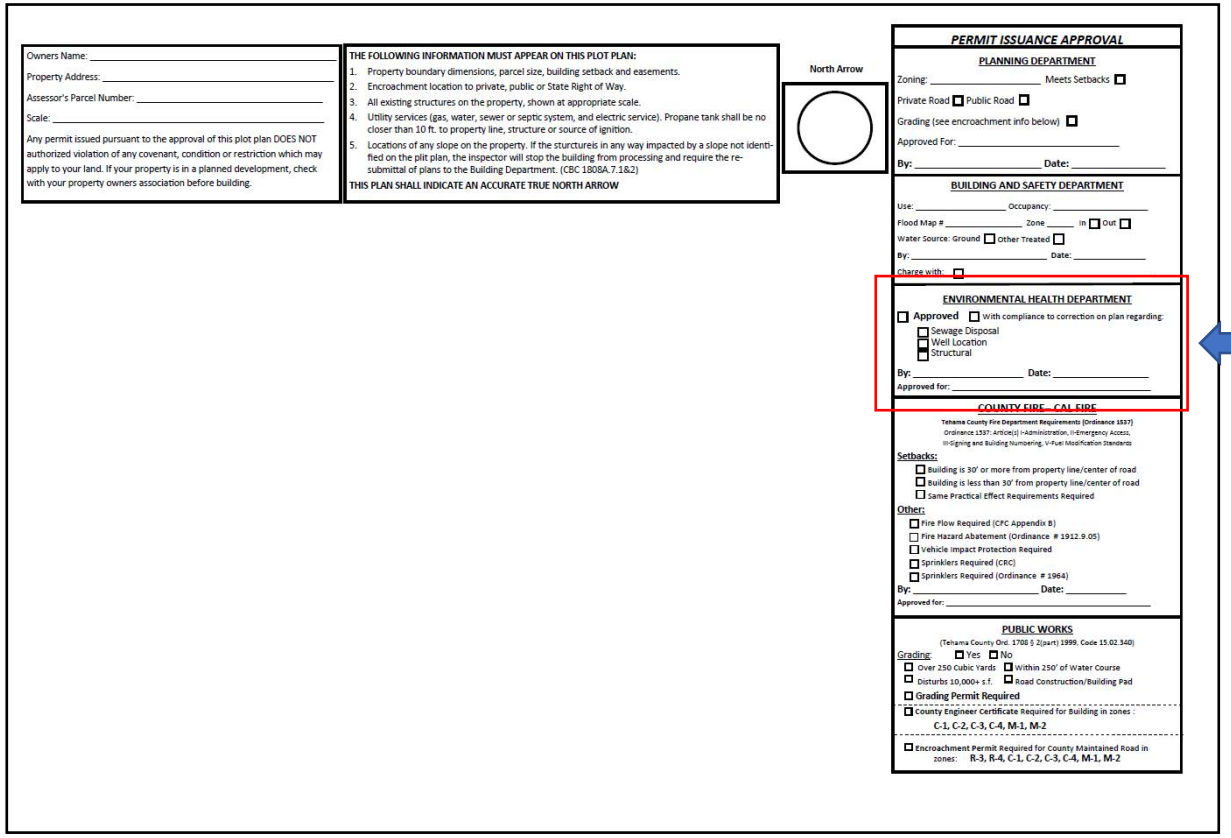




Well Construction Policies

TEHAMA COUNTY
Flood Control and Water Conservation District

Well Permitting



Owners Name: _____

Property Address: _____

Assessor's Parcel Number: _____

Scale: _____

Any permit issued pursuant to the approval of this plot plan DOES NOT authorized violation of any covenant, condition or restriction which may apply to your land. If your property is in a planned development, check with your property owners association before building.

THE FOLLOWING INFORMATION MUST APPEAR ON THIS PLOT PLAN:

1. Property boundary dimensions, parcel size, building setback and easements.
2. Encroachment location to private, public or State Right of Way.
3. All existing structures on the property, shown at appropriate scale.
4. Utility services (gas, water, sewer or septic system, and electric service). Propane tank shall be no closer than 10 ft. to property line, structure or source of ignition.
5. Locations of any slope on the property. If the sturctureis in any way impacted by a slope not identified on the plit plan, the inspector will stop the building from processing and require the re-submittal of plans to the Building Department. (CBC 1808A.7.1&2)

THIS PLAN SHALL INDICATE AN ACCURATE TRUE NORTH ARROW

North Arrow

PERMIT ISSUANCE APPROVAL

PLANNING DEPARTMENT

Zoning: _____ Meets Setbacks ☐

Private Road ☐ Public Road ☐

Grading (see encroachment info below) ☐

Approved For: _____

By: _____ Date: _____

BUILDING AND SAFETY DEPARTMENT

Use: _____ Occupancy: _____

Flood Map # _____ Zone _____ In ☐ Out ☐

Water Source: Ground ☐ Other Treated ☐

By: _____ Date: _____

Charge with: ☐

ENVIRONMENTAL HEALTH DEPARTMENT

☐ Approved ☐ With compliance to correction on plan regarding:

- ☐ Sewage Disposal
- ☐ Well Location
- ☐ Structural

By: _____ Date: _____

Approved for: _____

COUNTY FIRE - CAL FIRE

Tehama County Fire Department Requirements (Ordinance 1537)
Ordinance 1537: Article(s) I-Administration, II-Emergency Access, III-Signing and Building Numbering, V-Fuel Modification Standards

Setbacks:

- ☐ Building is 30' or more from property line/center of road
- ☐ Building is less than 30' from property line/center of road
- ☐ Same Practical Effect Requirements Required

Other:

- ☐ Fire Flow Required (CFC Appendix B)
- ☐ Fire Hazard Abatement (Ordinance # 1912.9.05)
- ☐ Vehicle Impact Protection Required
- ☐ Sprinklers Required (CRC)
- ☐ Sprinklers Required (Ordinance # 1964)

By: _____ Date: _____

Approved for: _____

PUBLIC WORKS

(Tehama County Ord. 1708 § 2(part) 1999, Code 15.02.340)

Grading: ☐ Yes ☐ No

- ☐ Over 250 Cubic Yards ☐ Within 250' of Water Course
- ☐ Disturbs 10,000+ s.f. ☐ Road Construction/Building Pad
- ☐ Grading Permit Required

☐ County Engineer Certificate Required for Building in zones : C-1, C-2, C-3, C-4, M-1, M-2

☐ Encroachment Permit Required for County Maintained Road in zones: R-3, R-4, C-1, C-2, C-3, C-4, M-1, M-2

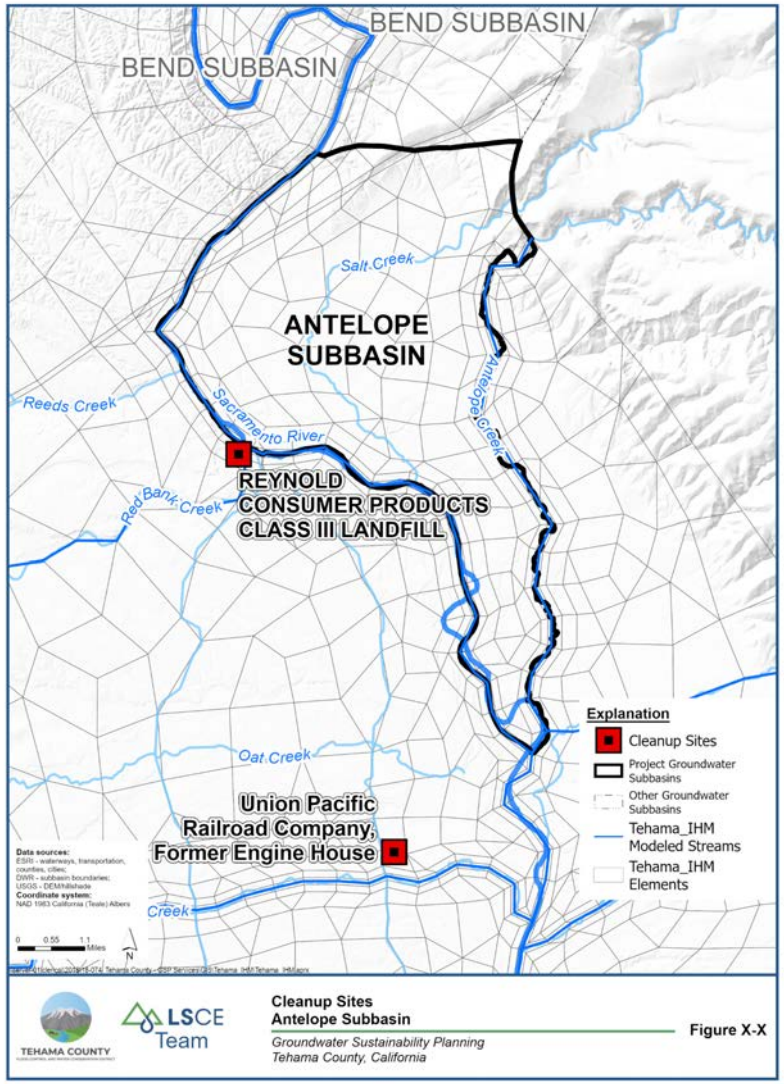
Well Permits are reviewed by the Tehama County Environmental Health Department and DWR

Additional Review may be Required by the Tehama County:

- Planning Department (Zoning)
- Building Department (Flood Hazard Areas)
- Fire Department (Parcels created after January 1992)
- Department of Drinking Water (Public Supply Wells)

Migration of Contaminated Groundwater

TEHAMA COUNTY
Flood Control and Water Conservation District

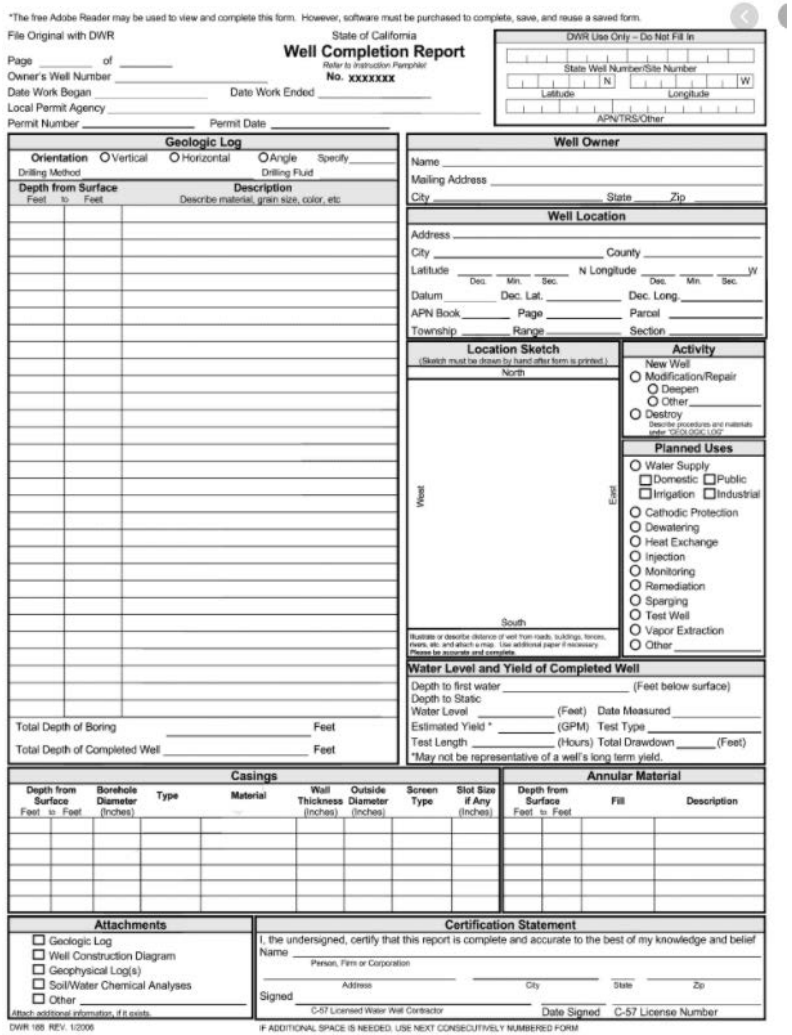


Well Construction Policies

Well Permitting

Tehama County Code of Ordinances Section 9.42 includes requirements for:

- Well Location
- Annular Seal
- Surface Construction Features
- Well Labeling
- Disinfection and Sanitary Requirements
- Sealing off Strata
- Casing
- Well Development, Redevelopment, and Conditioning
- Water Quality Testing
- Large Diameter Shallow Wells
- Driven Wells
- Rehabilitation, Repair, or Deepening of Wells
- Inspection
- Well Driller's Report
- Well Maintenance



*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. xxxxxxx

Page ____ of ____

Owner's Well Number ____

Date Work Began ____ Date Work Ended ____

Local Permit Agency ____

Permit Number ____ Permit Date ____

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify ____

Drilling Method ____ Drilling Fluid ____

Depth from Surface (Feet to Feet) | Description (Describe material, grain size, color, etc)

Total Depth of Boring ____ Feet

Total Depth of Completed Well ____ Feet

Well Owner

Name ____

Mailing Address ____

City ____ State ____ Zip ____

Well Location

Address ____

City ____ County ____

Latitude ____ (Deg. Min. Sec.) N Longitude ____ (Deg. Min. Sec.) W

Datum ____ Dec. Lat. ____ Dec. Long. ____

APN Book ____ Page ____ Parcel ____

Township ____ Range ____ Section ____

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North / West / East / South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity

New Well

○ Modification/Repair
○ Deepen
○ Other ____

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply
☐ Domestic ☐ Public
☐ Irrigation ☐ Industrial

○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other ____

Water Level and Yield of Completed Well

Depth to first water ____ (Feet below surface)

Depth to Static

Water Level ____ (Feet) Date Measured ____

Estimated Yield * ____ (GPM) Test Type ____

Test Length ____ (Hours) Total Drawdown ____ (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface (Feet to Feet) | Borehole Diameter (Inches) | Type | Material | Wall Thickness (Inches) | Outside Diameter (Inches) | Screen Type | Slot Size if Any (Inches)

Annular Material

Depth from Surface (Feet to Feet) | Fill | Description

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other ____

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name ____ (Person, Firm or Corporation)

Address ____ City ____ State ____ Zip ____

Signed ____ (C-57 Licensed Water Well Contractor) Date Signed ____ C-57 License Number ____

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

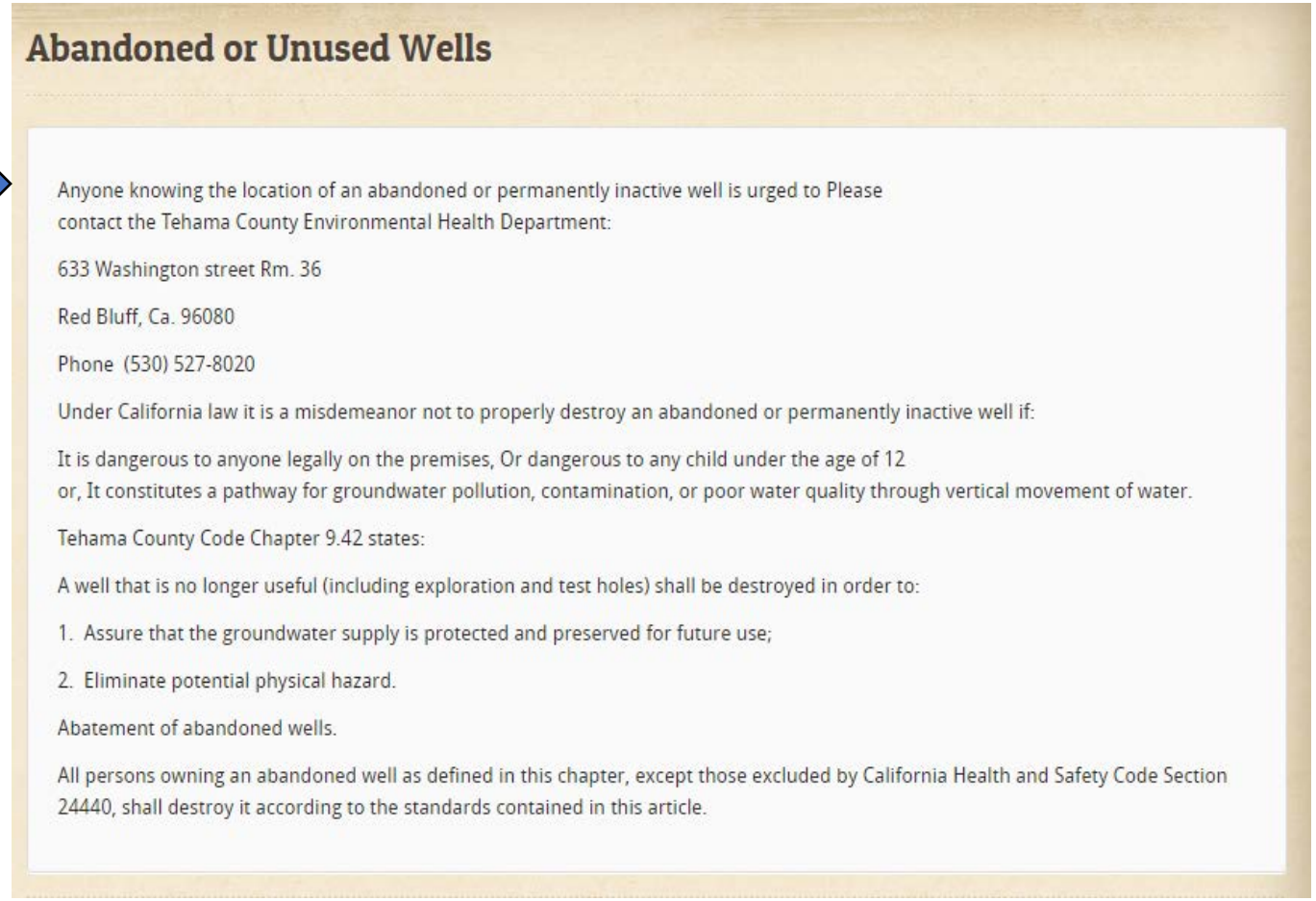
Well Abandonment Policies

TEHAMA COUNTY
Flood Control and Water Conservation District

Managed by the Tehama County Department of Environmental Health

Destruction Requirements are provided in Section 9.42 of the Tehama County Code of Ordinances for:

- Preliminary Work
- Filling and Sealing Conditions
- Placement of Material



Abandoned or Unused Wells

Anyone knowing the location of an abandoned or permanently inactive well is urged to Please contact the Tehama County Environmental Health Department:

633 Washington street Rm. 36

Red Bluff, Ca. 96080

Phone (530) 527-8020

Under California law it is a misdemeanor not to properly destroy an abandoned or permanently inactive well if:

It is dangerous to anyone legally on the premises, Or dangerous to any child under the age of 12
or, It constitutes a pathway for groundwater pollution, contamination, or poor water quality through vertical movement of water.

Tehama County Code Chapter 9.42 states:

A well that is no longer useful (including exploration and test holes) shall be destroyed in order to:

1. Assure that the groundwater supply is protected and preserved for future use;

2. Eliminate potential physical hazard.

Abatement of abandoned wells.

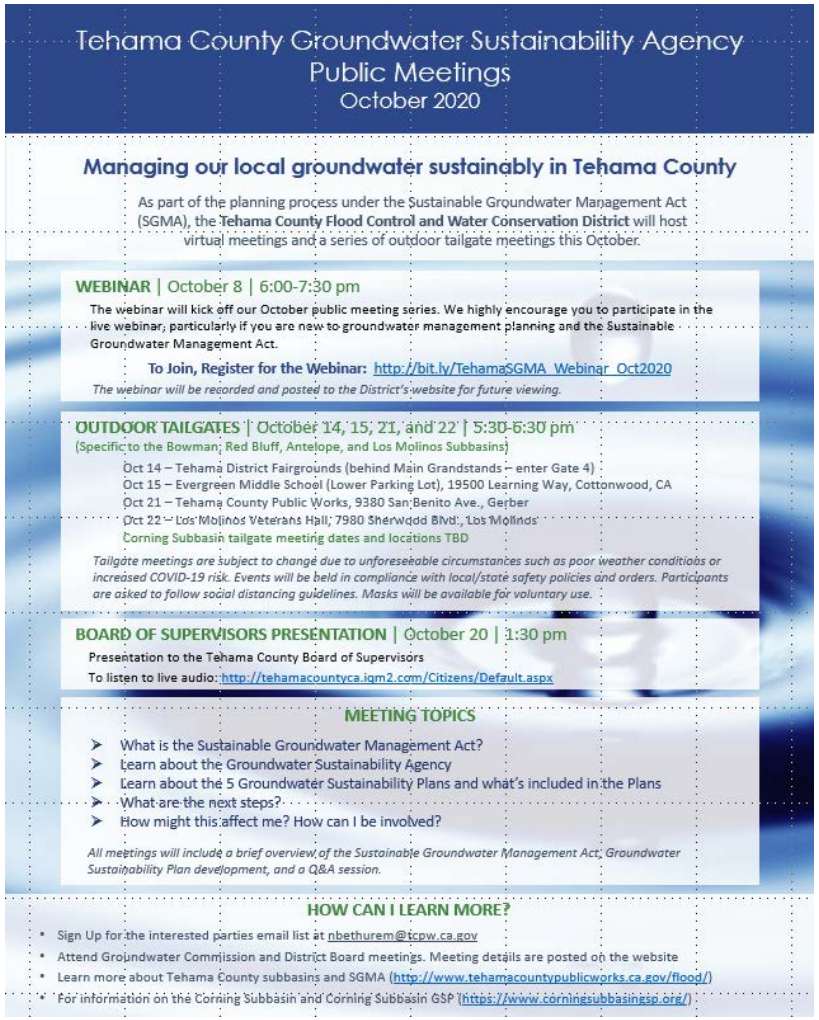
All persons owning an abandoned well as defined in this chapter, except those excluded by California Health and Safety Code Section 24440, shall destroy it according to the standards contained in this article.

https://www.co.tehama.ca.us/env-health-header/abandoned-or-unused-wells

Notice and Communication

TEHAMA COUNTY
Flood Control and Water Conservation District

- Beneficial uses and users of groundwater were identified and are encouraged to be involved in GSP development
- **Public Hearings** are held prior to adoption of fees and GSP elements
- Tehama County **Website** hosts GSP and GSA information: https://tehamacountywater.org/
- Tehama County Groundwater Commission **Meetings** are open to the public and held on the **4th Wednesday of each Month**



Tehama County Groundwater Sustainability Agency
Public Meetings
October 2020

Managing our local groundwater sustainably in Tehama County

As part of the planning process under the Sustainable Groundwater Management Act (SGMA), the **Tehama County Flood Control and Water Conservation District** will host virtual meetings and a series of outdoor tailgate meetings this October.

WEBINAR | October 8 | 6:00-7:30 pm

The webinar will kick off our October public meeting series. We highly encourage you to participate in the live webinar, particularly if you are new to groundwater management planning and the Sustainable Groundwater Management Act.

To Join, Register for the Webinar: http://bit.ly/TehamaSGMA_Webinar_Oct2020

The webinar will be recorded and posted to the District's website for future viewing.

OUTDOOR TAILGATES | October 14, 15, 21, and 22 | 5:30-6:30 pm

(Specific to the Bowman, Red Bluff, Antelope, and Los Molinos Subbasins)

Oct 14 – Tehama District Fairgrounds (behind Main Grandstands – enter Gate 4)
Oct 15 – Evergreen Middle School (Lower Parking Lot), 19500 Learning Way, Cottonwood, CA
Oct 21 – Tehama County Public Works, 9380 San Benito Ave., Gerber
Oct 22 – Los Molinos Veterans Hall, 7980 Sherwood Blvd., Los Molinos
Corning Subbasin tailgate meeting dates and locations TBD

Tailgate meetings are subject to change due to unforeseeable circumstances such as poor weather conditions or increased COVID-19 risk. Events will be held in compliance with local/state safety policies and orders. Participants are asked to follow social distancing guidelines. Masks will be available for voluntary use.

BOARD OF SUPERVISORS PRESENTATION | October 20 | 1:30 pm

Presentation to the Tehama County Board of Supervisors
To listen to live audio: http://tehamacountyca.iqm2.com/Citizens/Default.aspx

MEETING TOPICS

- What is the Sustainable Groundwater Management Act?
- Learn about the Groundwater Sustainability Agency
- Learn about the 5 Groundwater Sustainability Plans and what's included in the Plans
- What are the next steps?
- How might this affect me? How can I be involved?

All meetings will include a brief overview of the Sustainable Groundwater Management Act, Groundwater Sustainability Plan development, and a Q&A session.

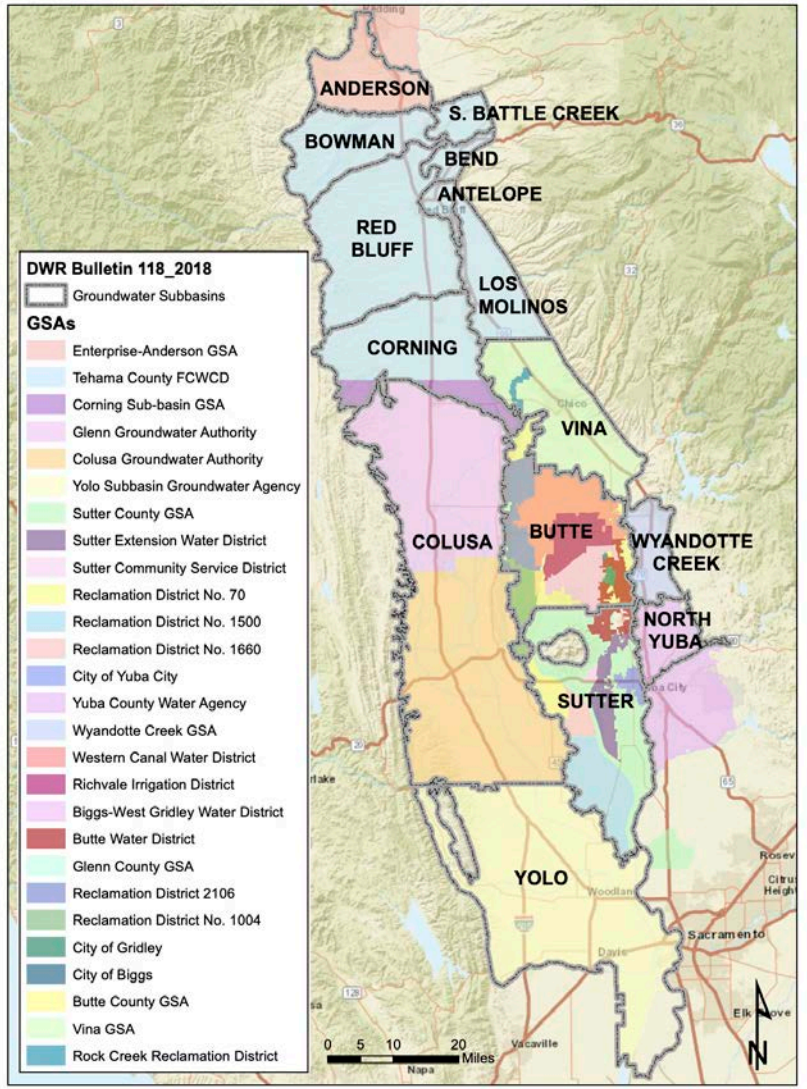
HOW CAN I LEARN MORE?

- Sign Up for the interested parties email list at nbethurem@tcpw.ca.gov
- Attend Groundwater Commission and District Board meetings. Meeting details are posted on the website
- Learn more about Tehama County subbasins and SGMA (http://www.tehamacountypublicworks.ca.gov/flood/)
- For information on the Corning Subbasin and Corning Subbasin GSP (https://www.corningsubbasingsp.org/)

Inter-basin Coordination

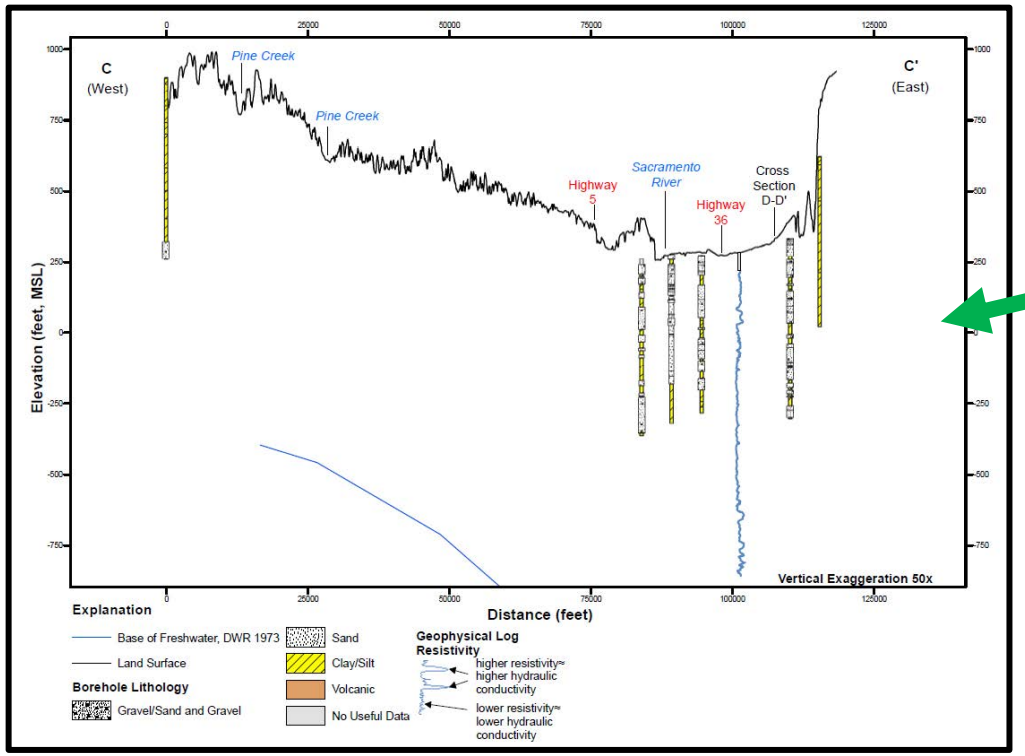
TEHAMA COUNTY
Flood Control and Water Conservation District

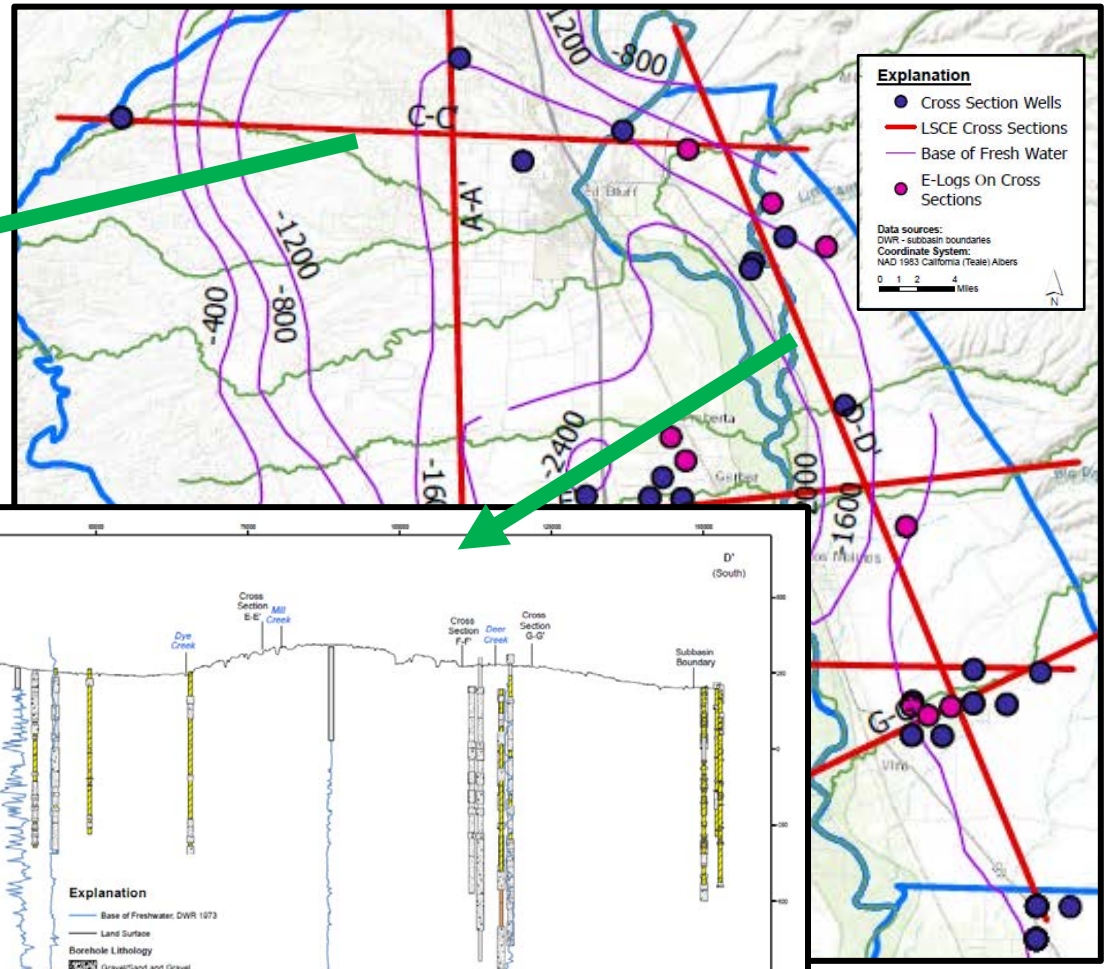
- Northern California Water Agencies
  - November 3, 2020
    - Groundwater Quality
    - Interconnected GW/SW white paper
  - December 1, 2020
    - Groundwater Dependent Ecosystems
    - Subsidence
- Corning Subbasin
  - November 12, 2020
    - Land Use Changes
    - GDEs along Thomes Creek
    - SMCs
    - Projects and Management Actions
    - DMS development for the GSPs and the County
    - Modeling/water budgets
- Northern Sacramento Valley
  - December 1, 2020
    - Interbasin Flow
    - Surface water/groundwater interaction



Geologic Cross-sections

TEHAMA COUNTY
Flood Control and Water Conservation District

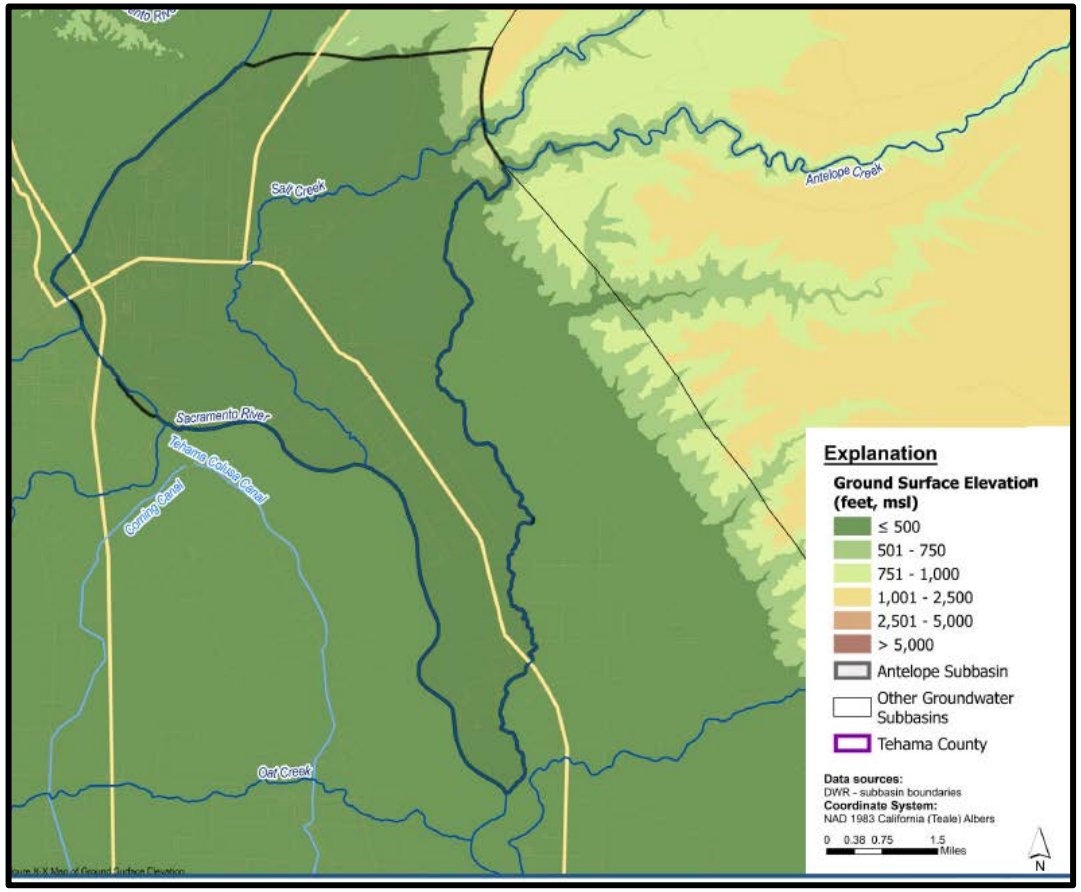




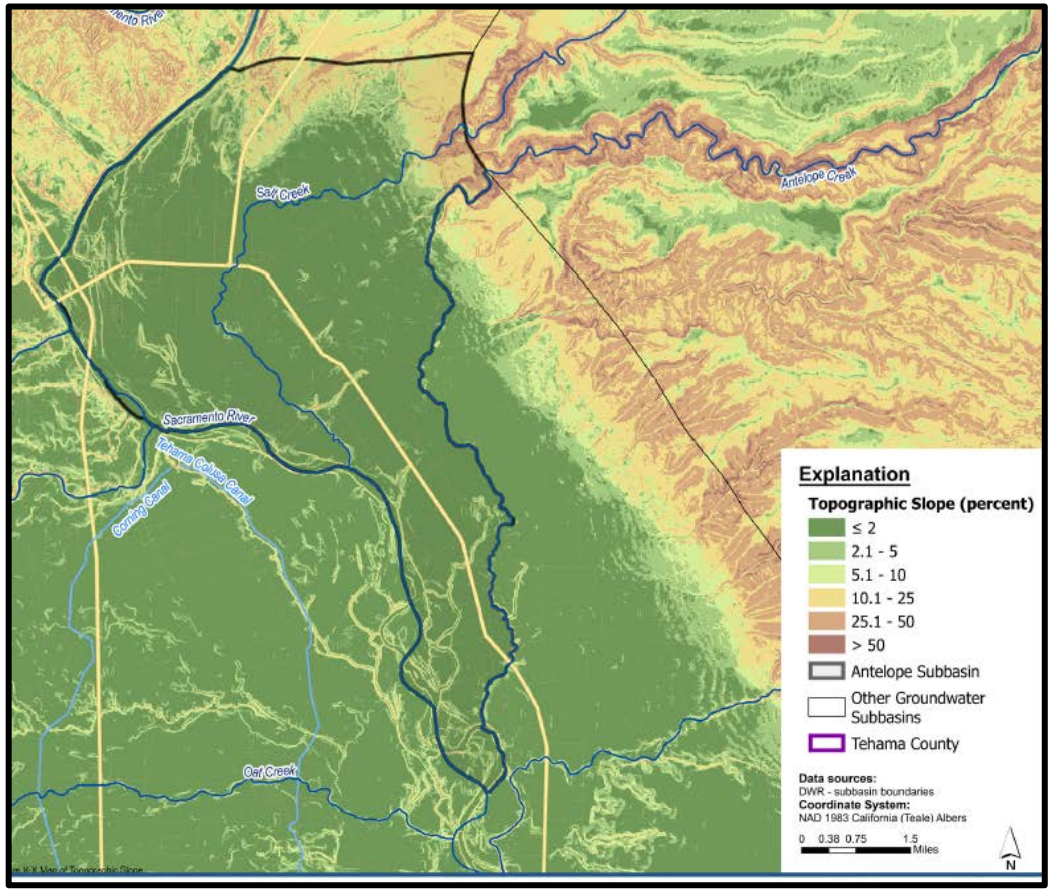
Topography

TEHAMA COUNTY
Flood Control and Water Conservation District

Ground Surface Elevation



Topographic Slope

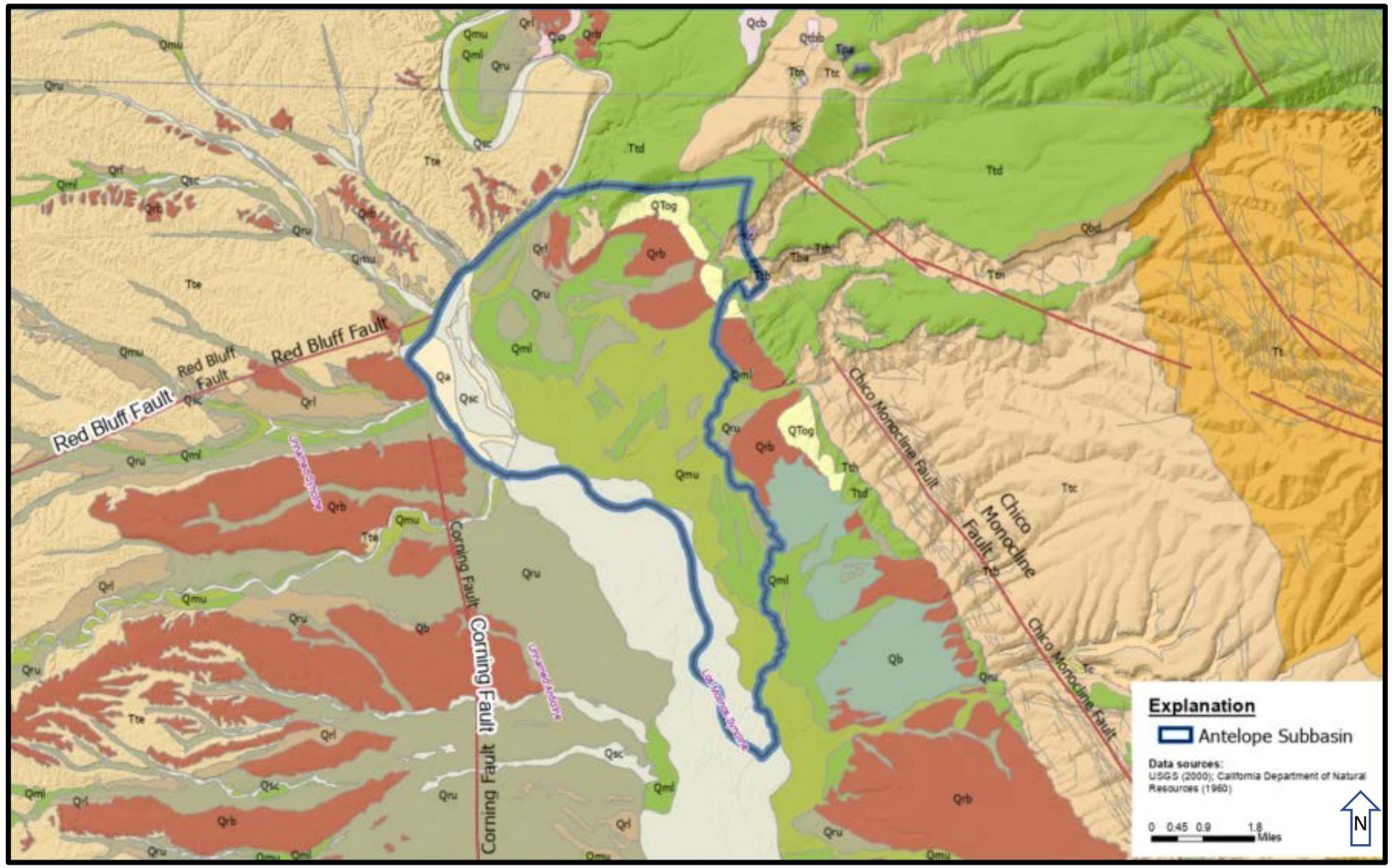


Surficial Geology

TEHAMA COUNTY
Flood Control and Water Conservation District

Lithology

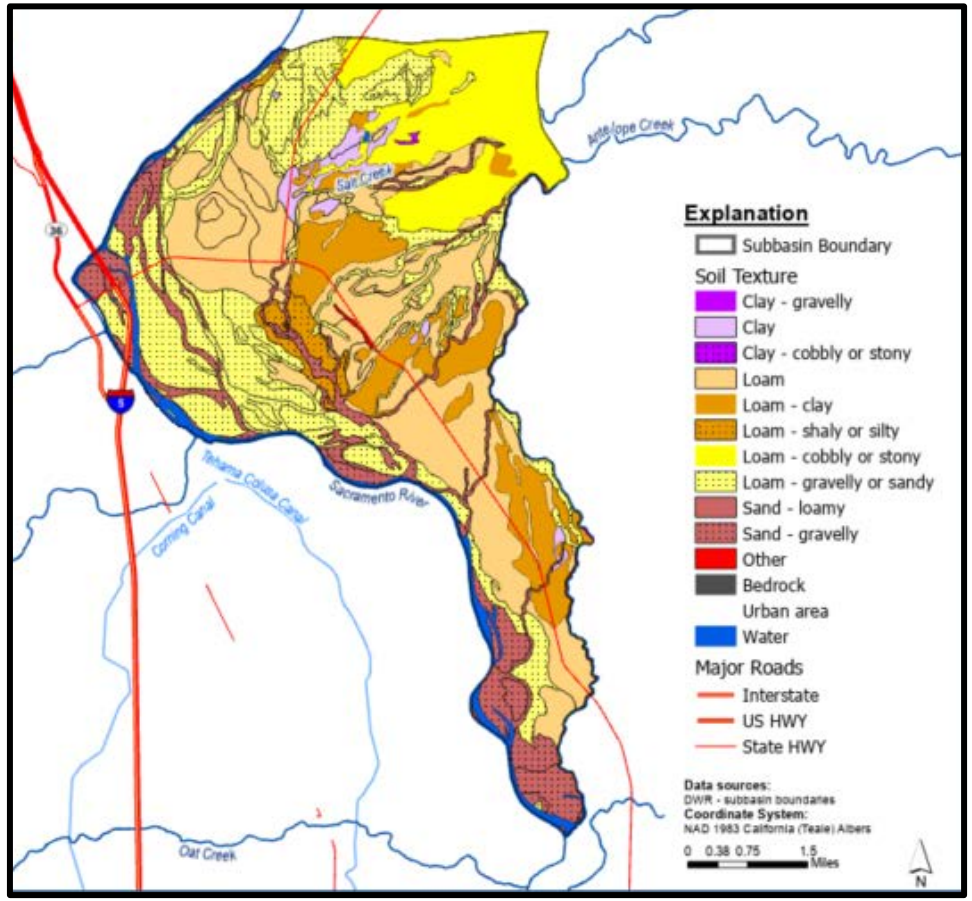
- Kc - Chico Formation
- Not Mapped
- QTog - Older Gravel Deposits
- Qa - Alluvium
- Qab - Andesite of Brokoff Mountain
- Qar - Rockland Ash Bed
- Qb - Basin Deposits, Undivided
- Qbbb - Cinder Blanket Deposit
- Qbbc - Cinder Cone Deposits
- Qbbf - Basalt Flow of Black Butte
- Qbd - Olivine Basalt of Devils Half Acre
- Qbdc - Olivine Basalt of Deer Creek
- Qbs 1 - Basalt of Shingletown Ridge
- Qbs 2 - Basalt of Shingletown Ridge
- Qbs 3 - Basalt of Shingletown Ridge
- Qbw
- Qcb - Basalt of Coleman Forbay
- Qdb - Basalt Flows of Digger Buttes
- Qeb - Basalt of Eagle Canyon
- Qic - Cinder Cone Deposits
- Qif 1 - Flank Fissure Flows
- Qif 2 - Flank Fissure Flows
- Qif 3 - Flank Fissure Flows
- Qip - Basalt Flows of Paynes Creek
- Qiu - Undifferentiated Basalt Flows of Inskip Hill
- Qls - Landslide Deposits
- Qml - Modesto Formation
- Qmu - Modesto Formation
- Qo - Overbank Deposits
- Qrb - Red Bluff Formation
- Qrl - Riverbank Formation
- Qru - Riverbank Formation
- Qsc - Stream Channel Deposits
- Qtbb - Basalt of Tuscan Buttes
- Tba - Basaltic Andesite of Antelope Creek
- Tbc - Olivine Basalt of Cohasset Ridge
- Tc - Channel Deposits
- Tl - Lovejoy Basalt
- Tmc - Montgomery Creek Formation
- Tpa - Platy Andesite
- Tt - Tuscan Formation
- Tta - Tuscan Unit A
- Ttb - Tuscan Unit B
- Ttc - Tuscan Unit C
- Ttd - Tuscan Unit D
- Tte - Tehama Formation
- Tth - Tuff of Hogback Road
- Ttn - Nomlaki Tuff Member
- pTms - Metamorphic, Intrusive, and Sedimentary Rocks
- t
- Qsc



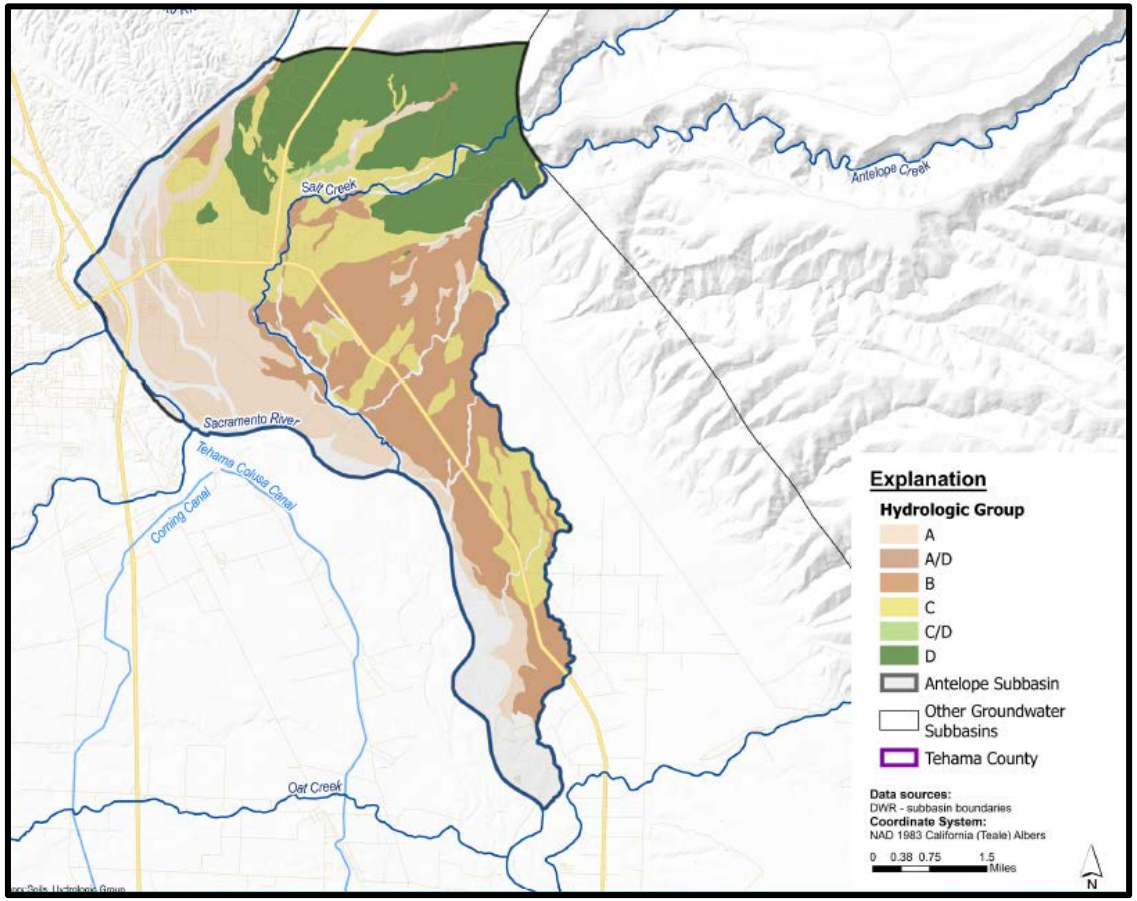
Characteristics of Soil

TEHAMA COUNTY
Flood Control and Water Conservation District

Soil Texture



Soil Hydrologic Groups

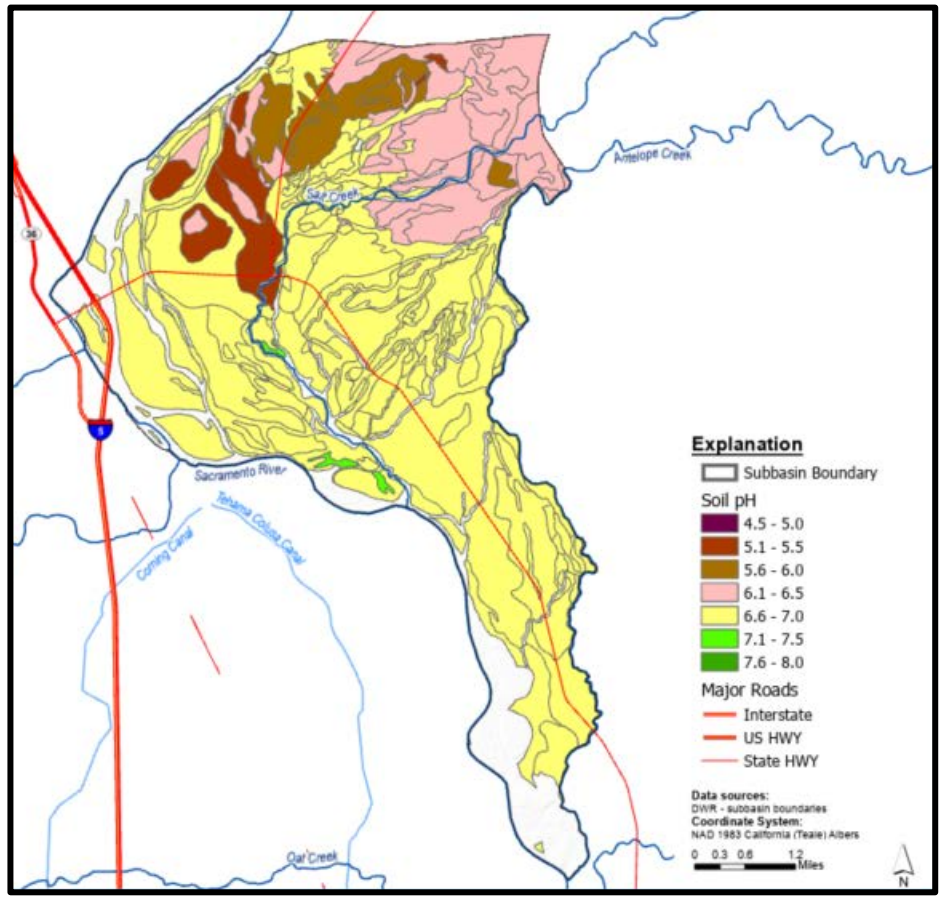


Group A - Low runoff potential
Group B – Moderate runoff potential
Group C – Moderately high runoff potential
Group D - High runoff potential

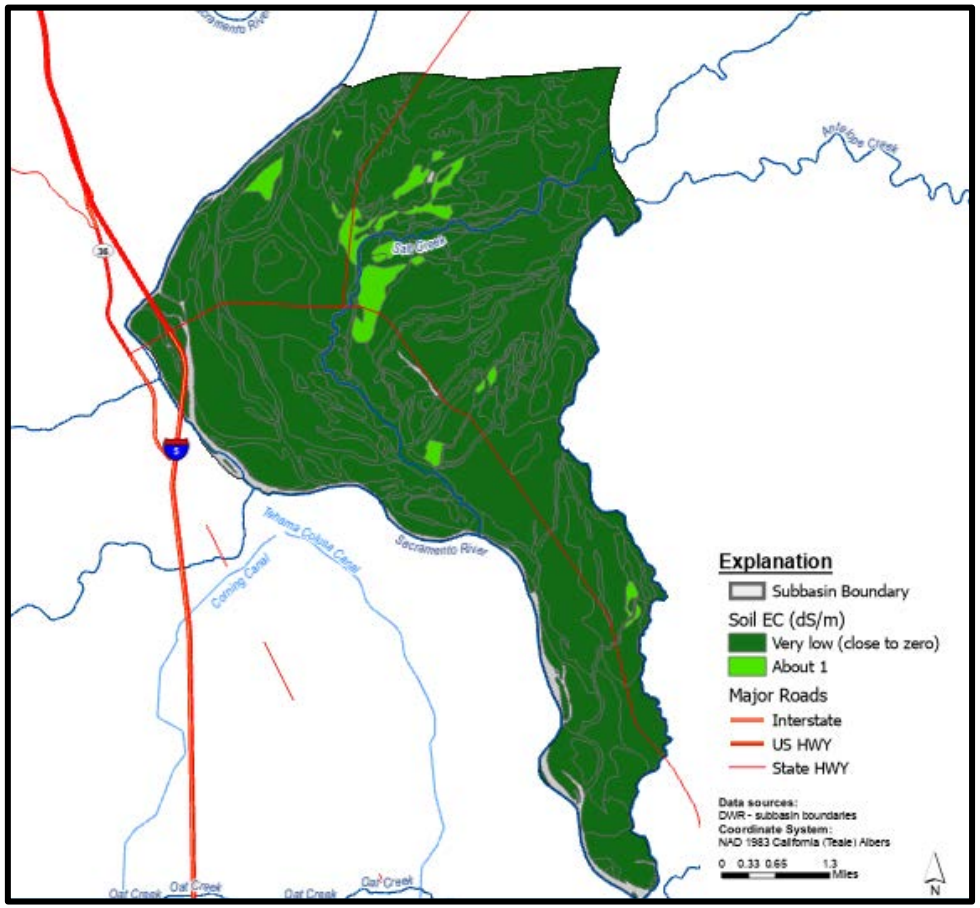
Characteristics of Soil

TEHAMA COUNTY
Flood Control and Water Conservation District

Soil pH



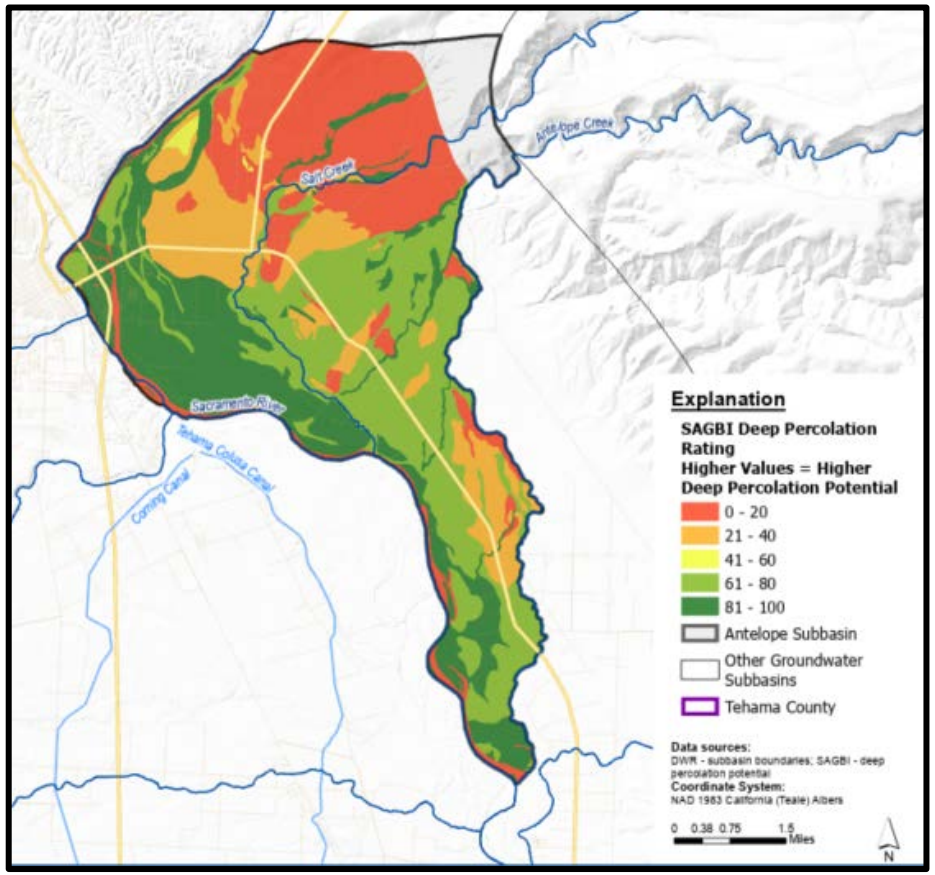
Soil Salinity (Electrical Conductance)



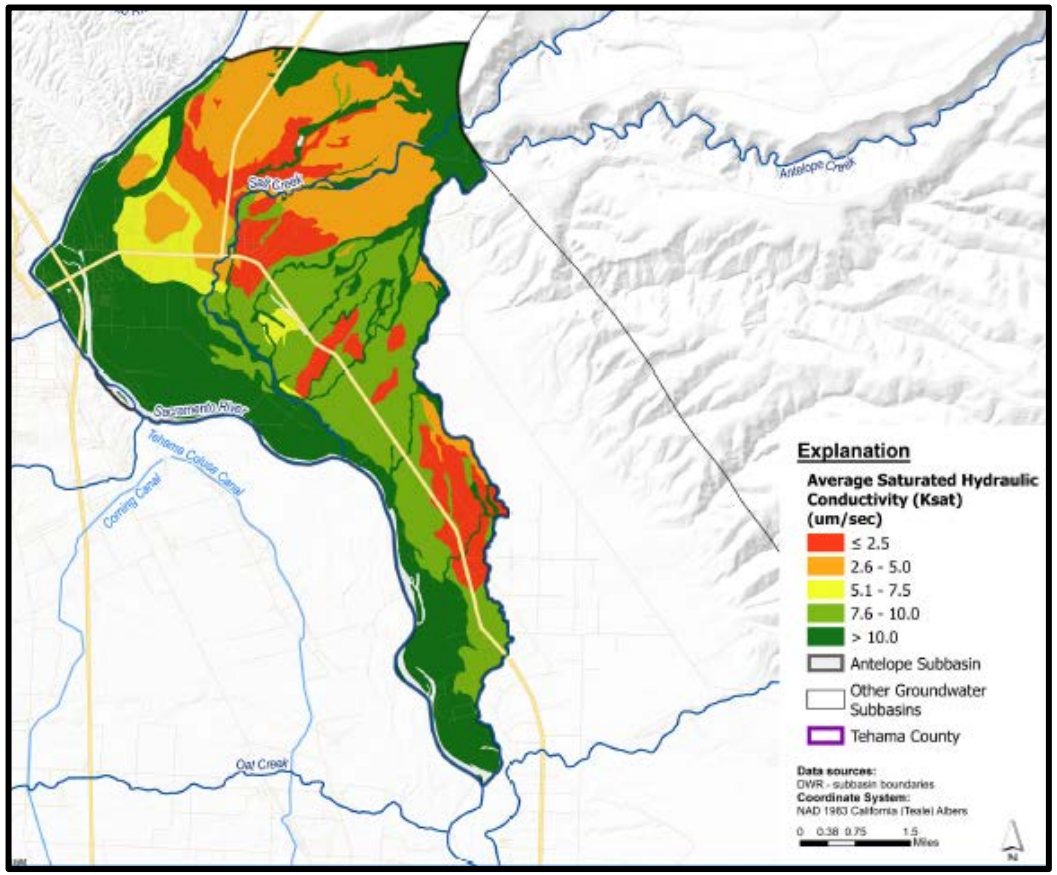
Groundwater Recharge Areas

TEHAMA COUNTY
Flood Control and Water Conservation District

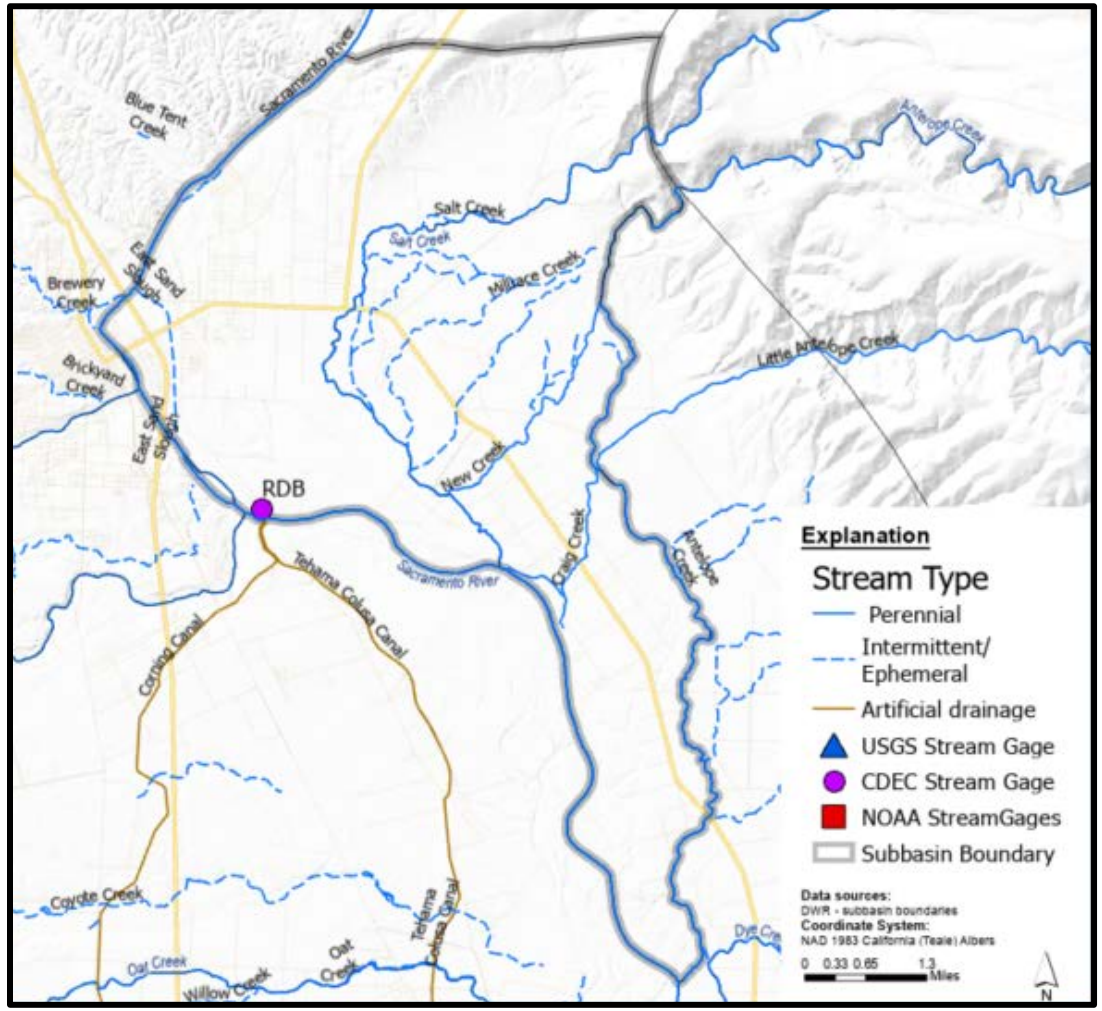
Deep Percolation Potential (SAGBI)



Saturated Hydraulic Conductivity of Soil



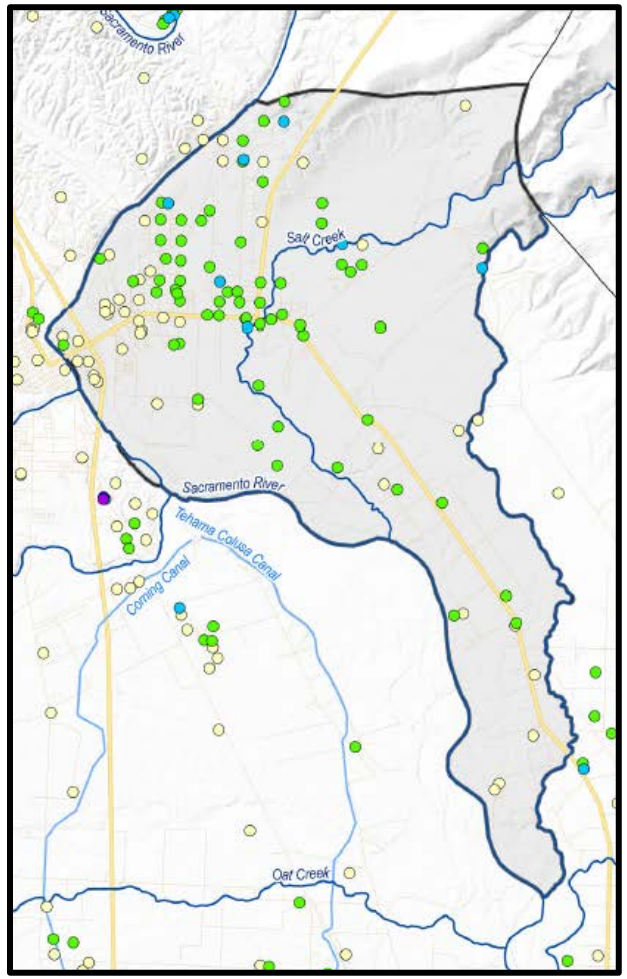
Surface Water Features



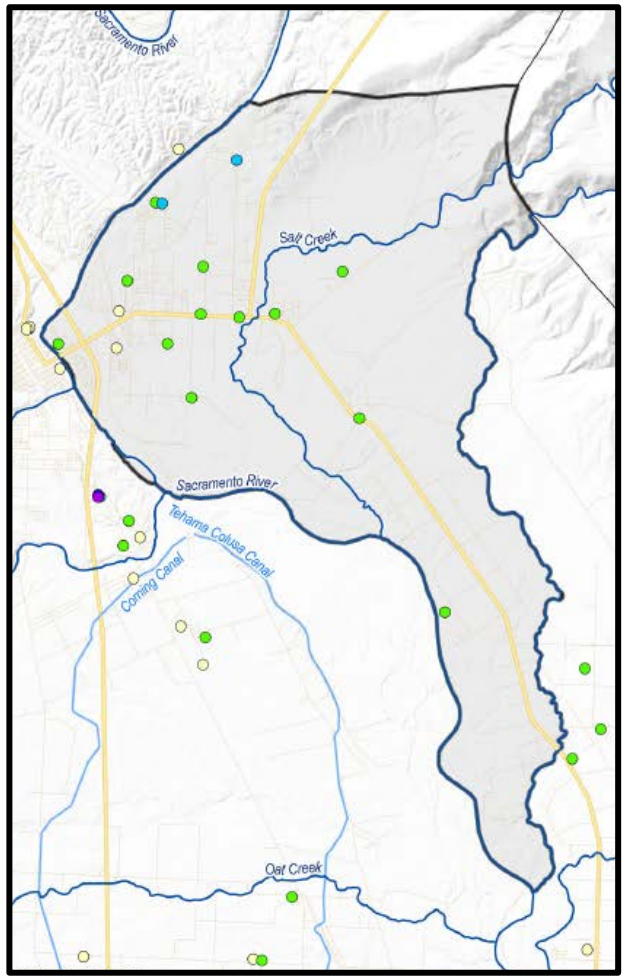
Groundwater Quality – Total Dissolved Solids (TDS)

TEHAMA COUNTY
Flood Control and Water Conservation District

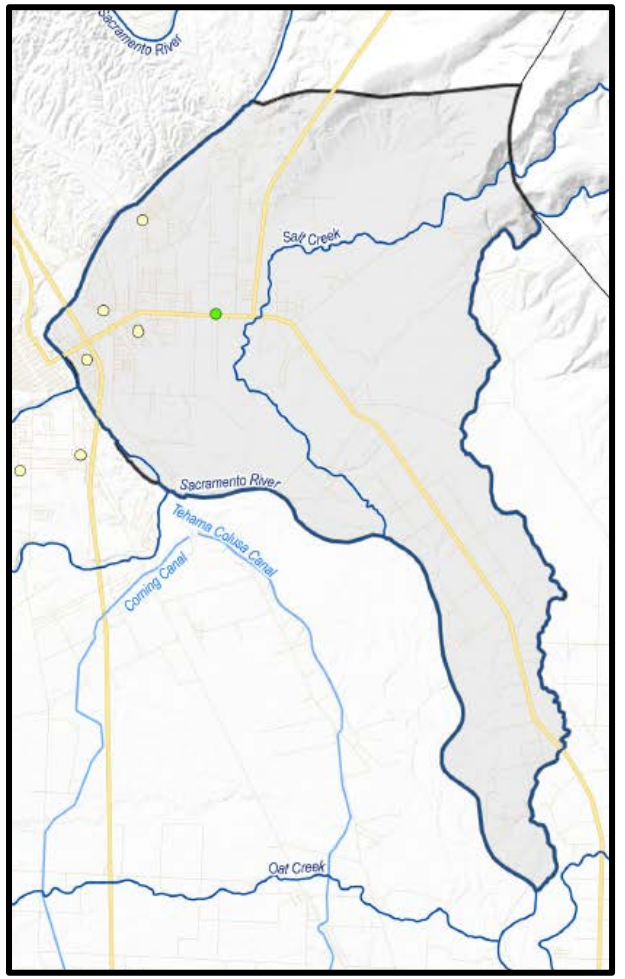
Maximum TDS Concentration (since 1950)



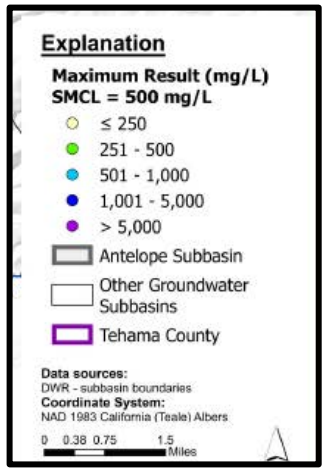
All Wells



Upper Aquifer Zone Wells



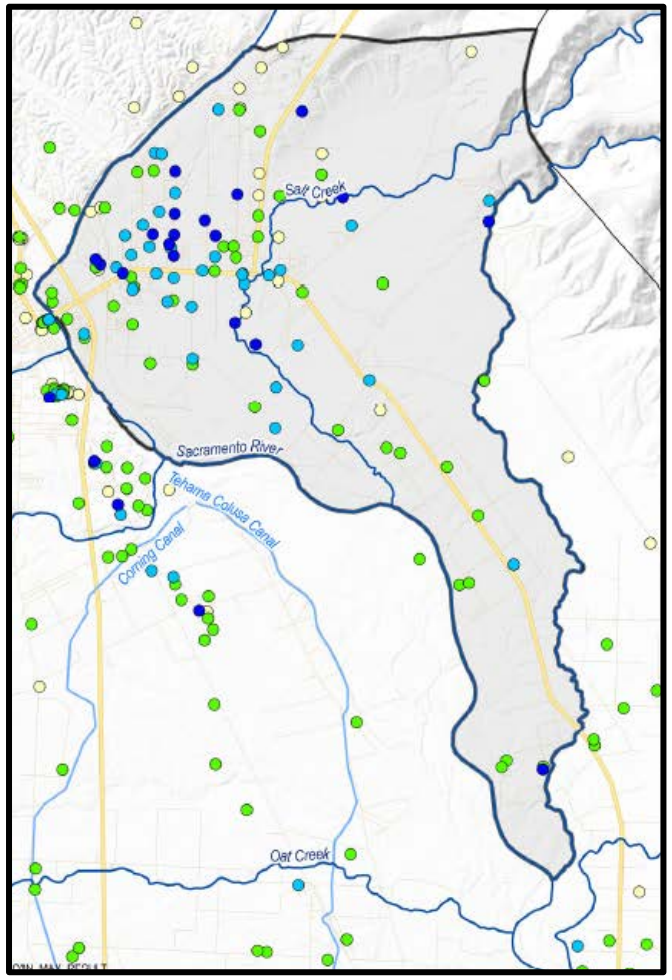
Lower Aquifer Zone Wells



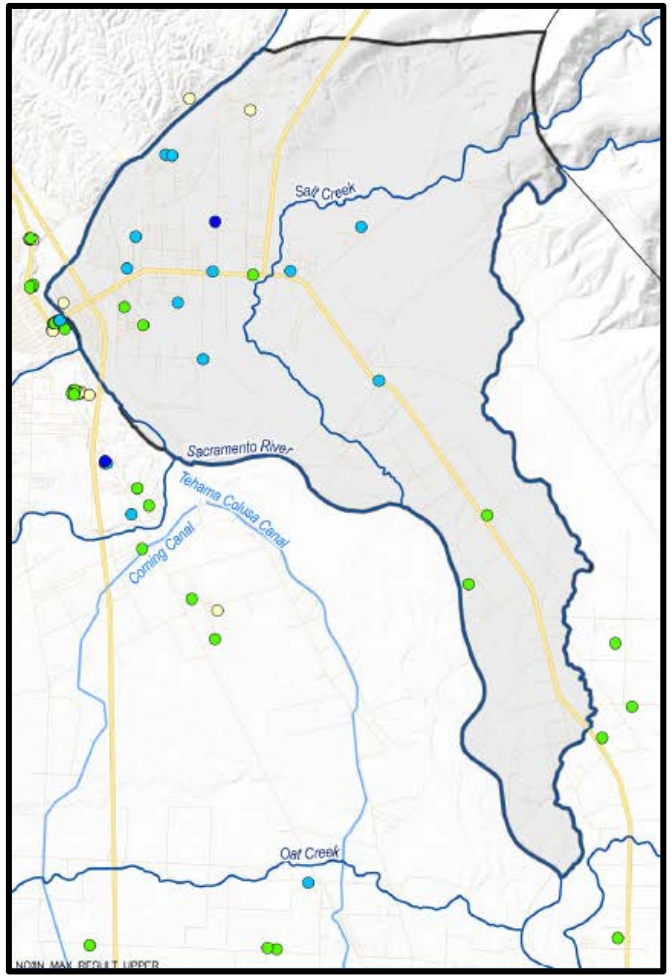
Groundwater Quality - Nitrate

TEHAMA COUNTY
Flood Control and Water Conservation District

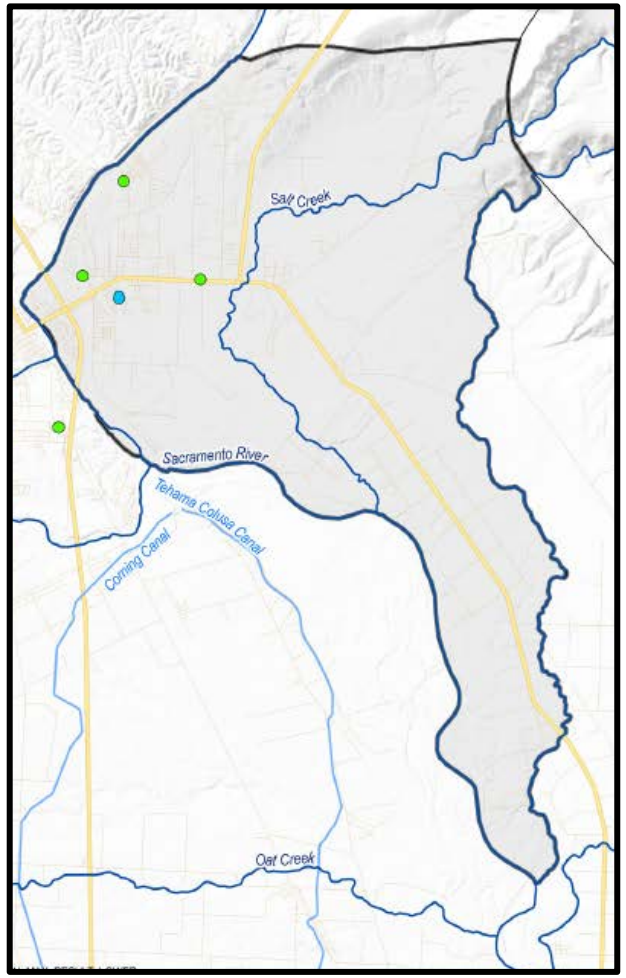
Maximum Nitrate Concentration (since 1950)



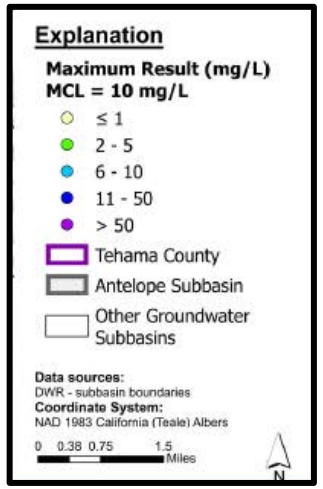
All Wells



Upper Aquifer Zone Wells



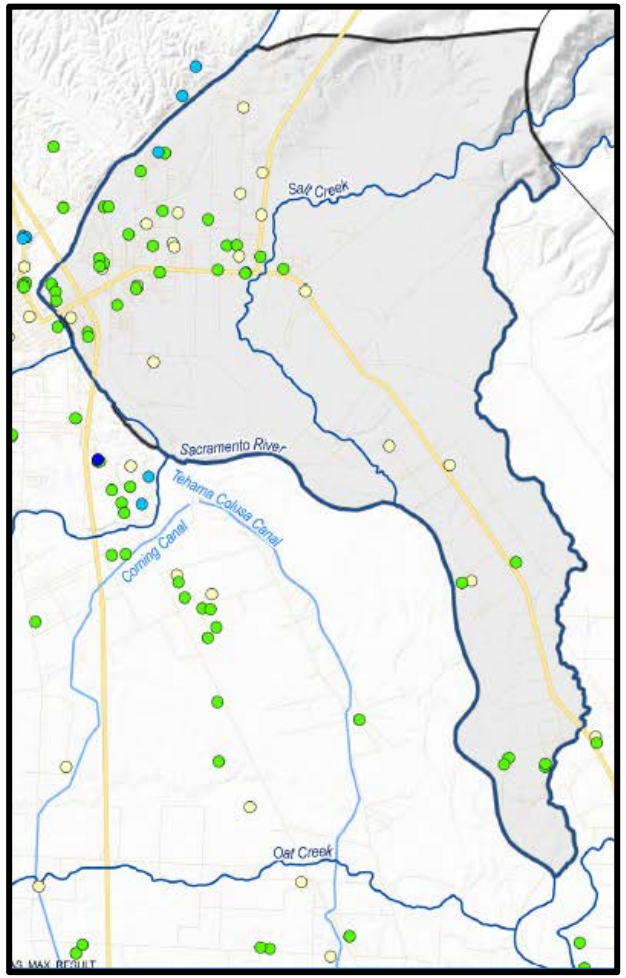
Lower Aquifer Zone Wells



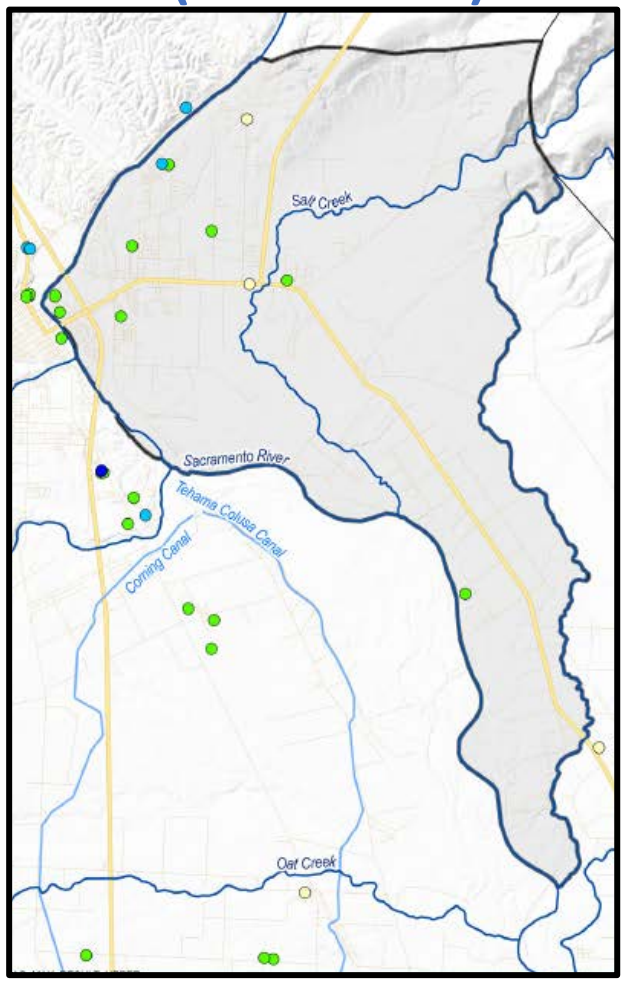
Groundwater Quality - Arsenic

TEHAMA COUNTY
Flood Control and Water Conservation District

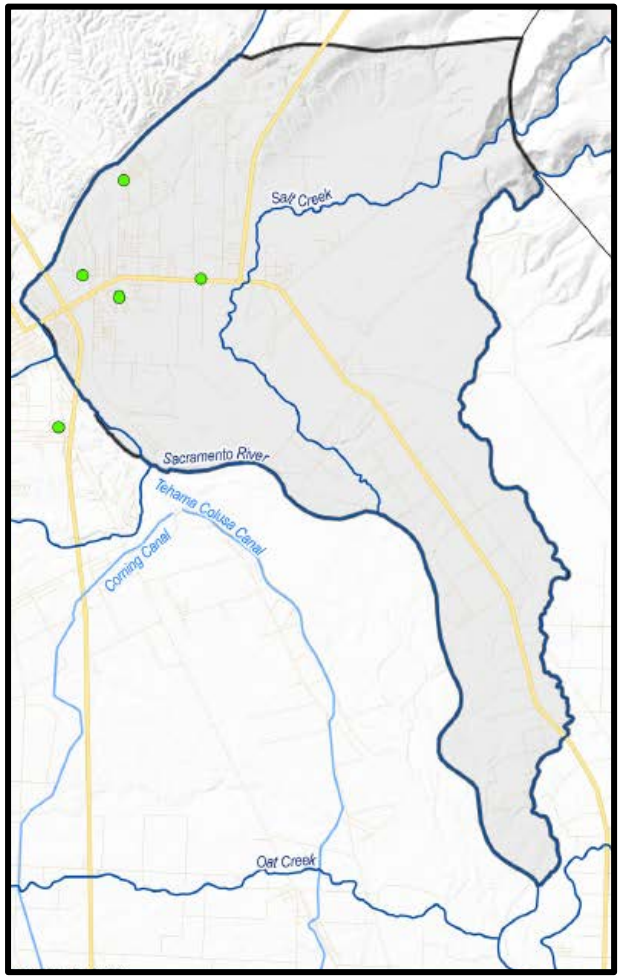
Maximum Arsenic Concentration (since 1950)



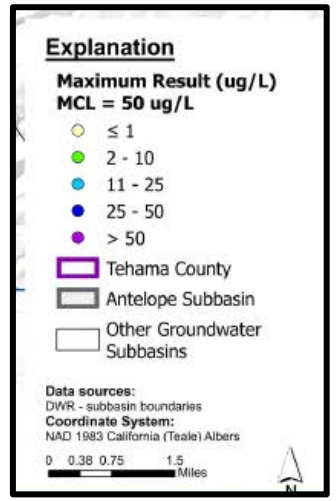
All Wells



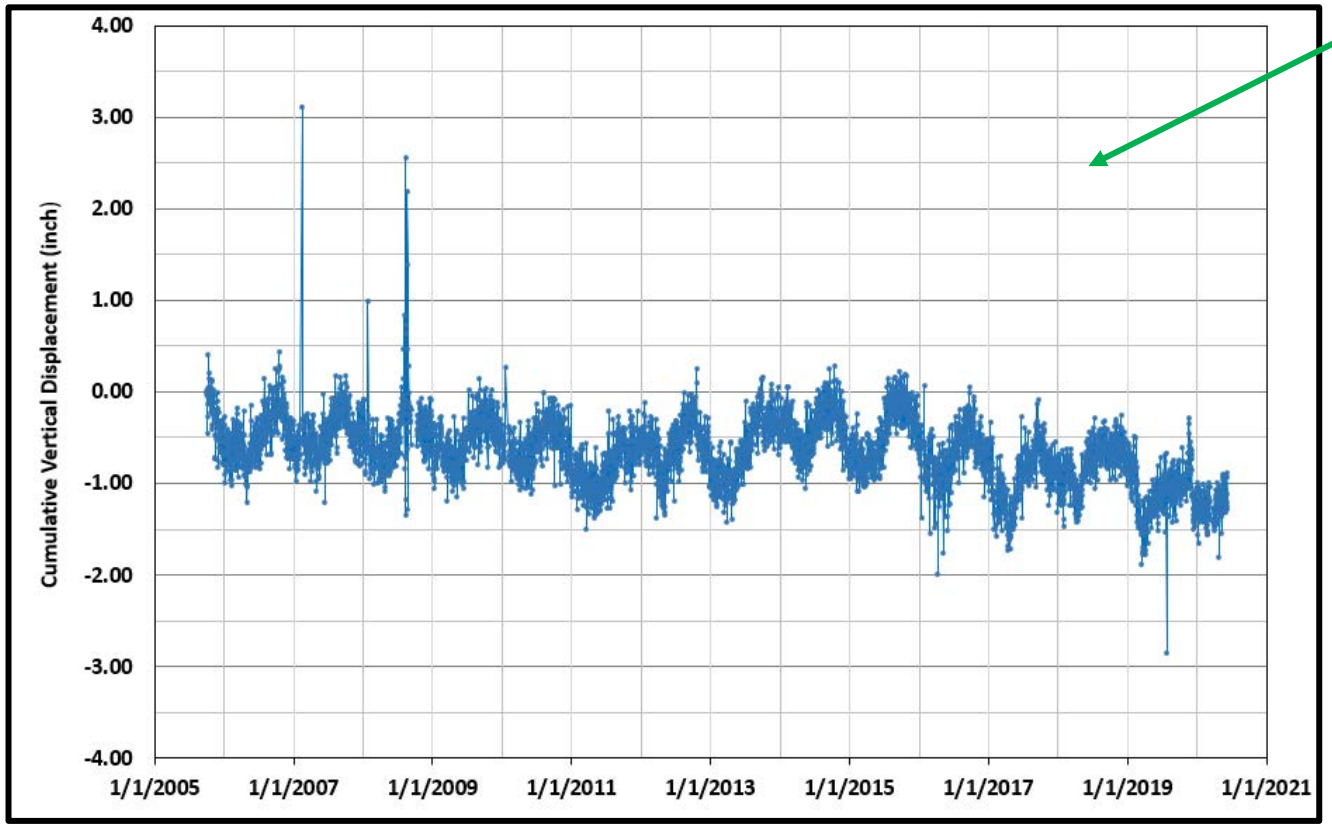
Upper Aquifer Zone Wells

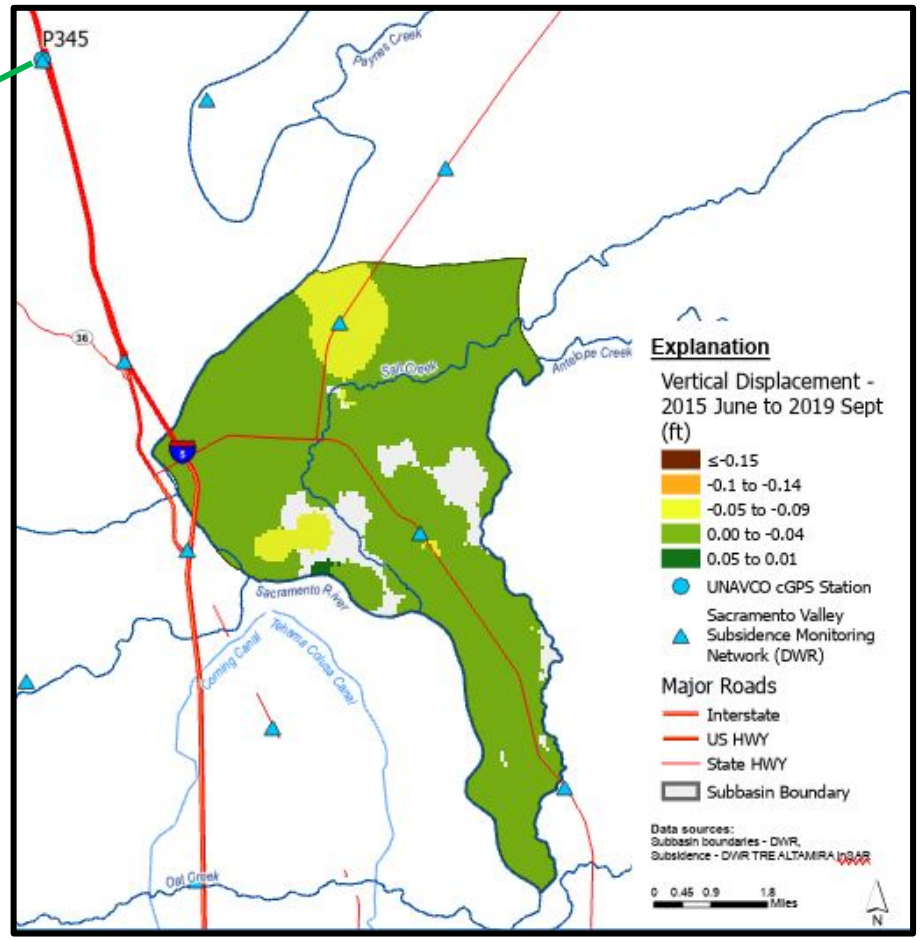


Lower Aquifer Zone Wells



Land Subsidence



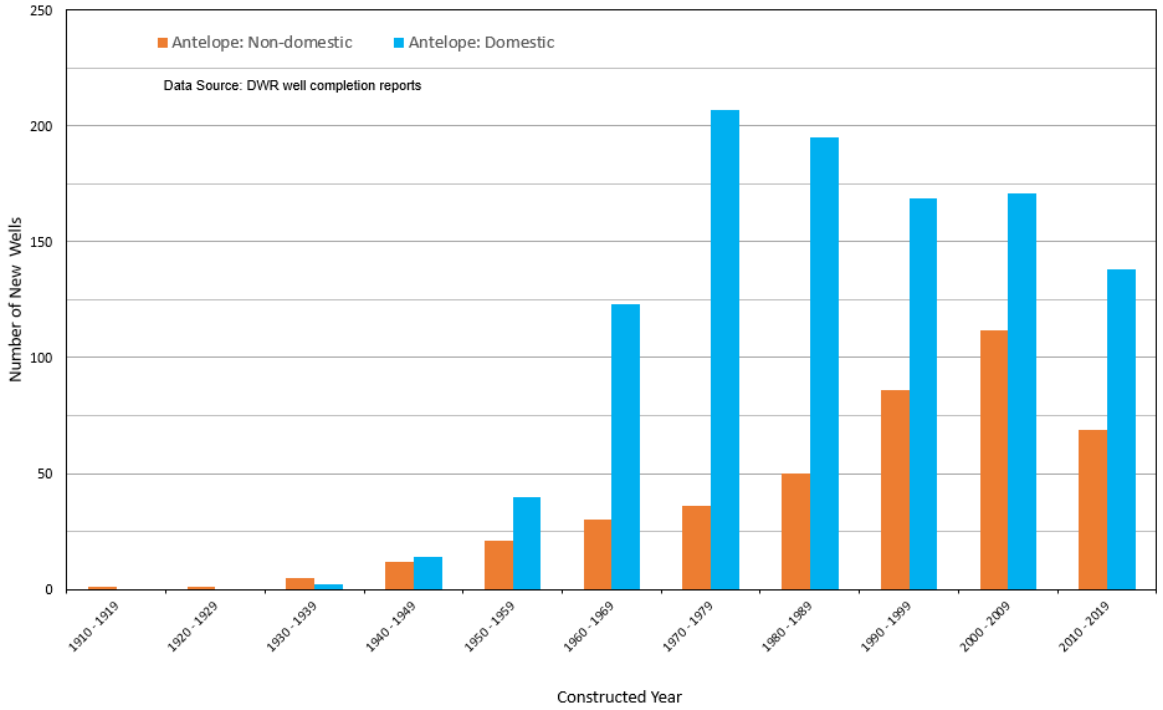


Cumulative Vertical displacement at P345 (since 10/02/2005)

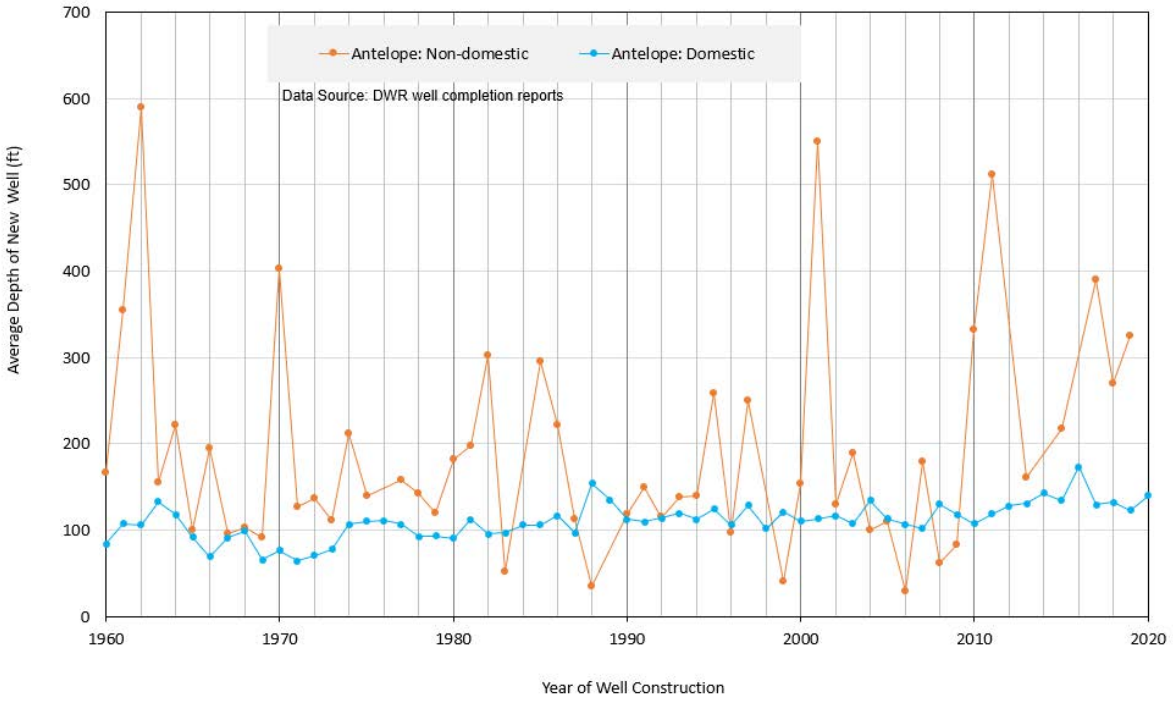
Groundwater Wells

TEHAMA COUNTY
Flood Control and Water Conservation District

Construction of Wells over Time



Number of new wells constructed in 10-years

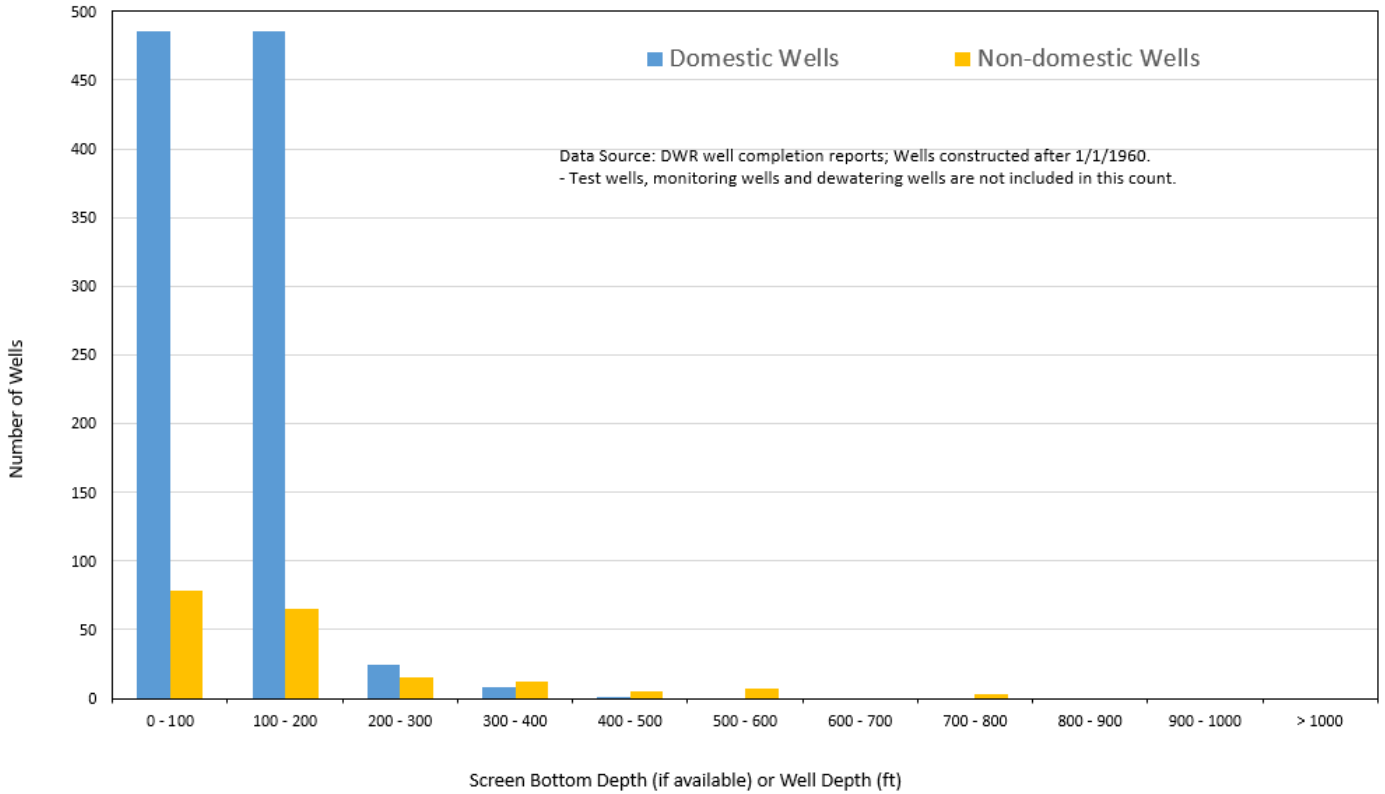


Average Depth of a new well

Groundwater Wells

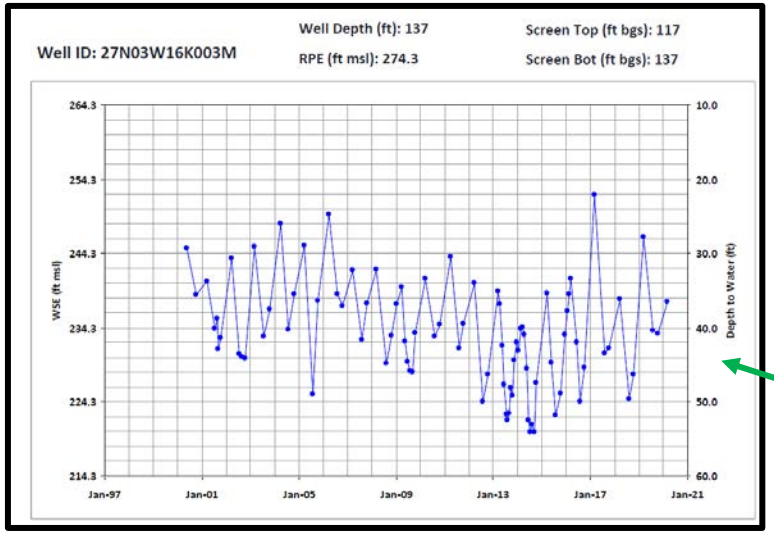
TEHAMA COUNTY
Flood Control and Water Conservation District

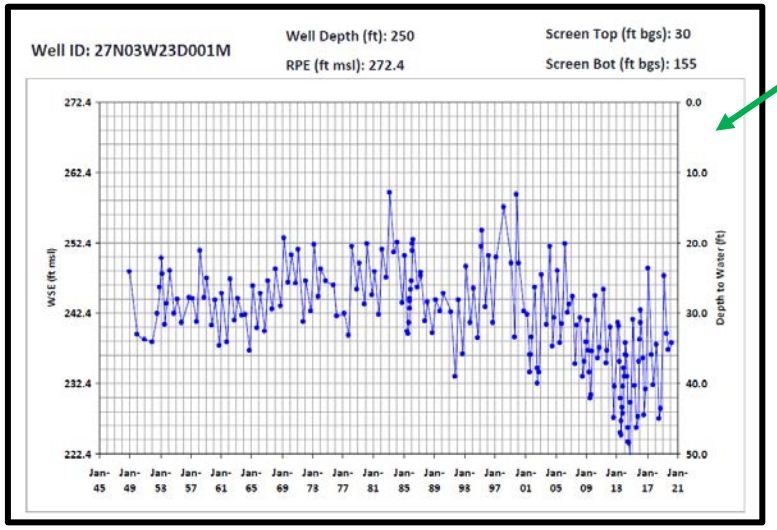
Number of Wells in Depth Ranges (constructed in or after 1960)

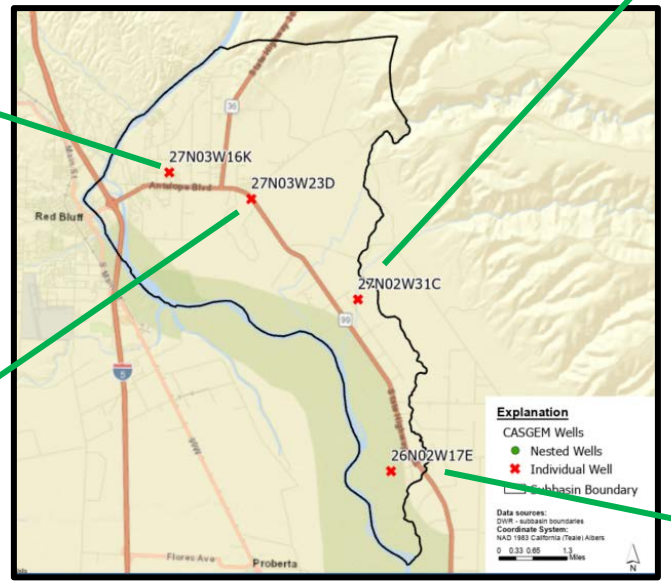


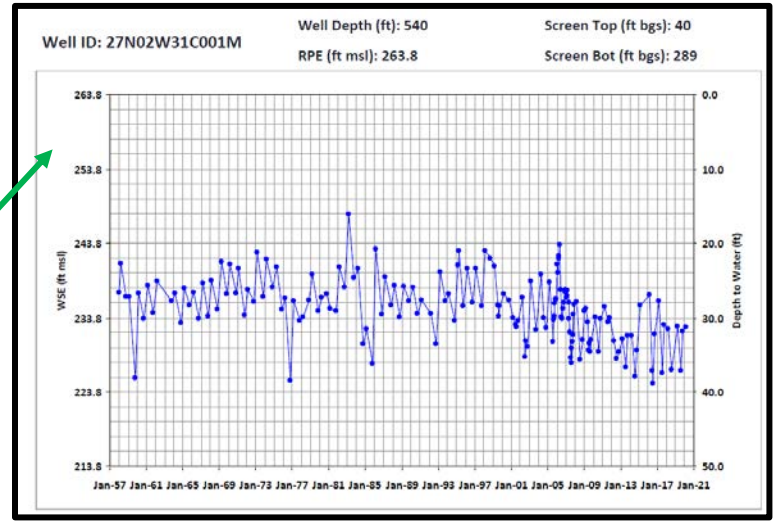
Groundwater Levels

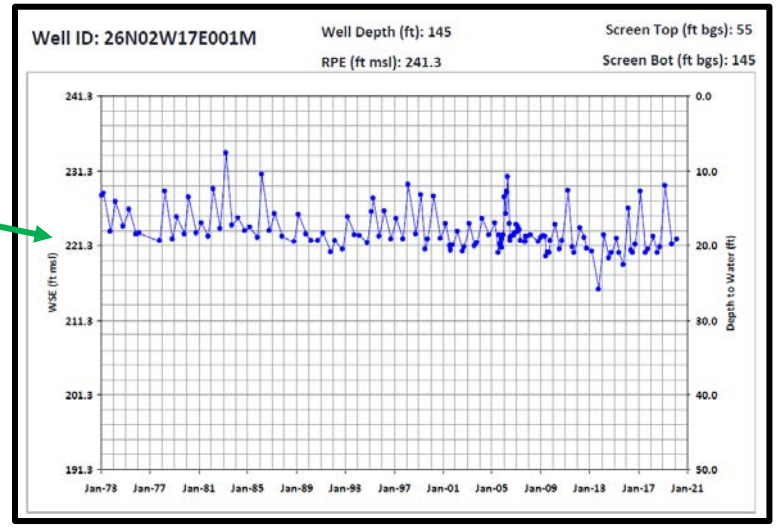
TEHAMA COUNTY
Flood Control and Water Conservation District







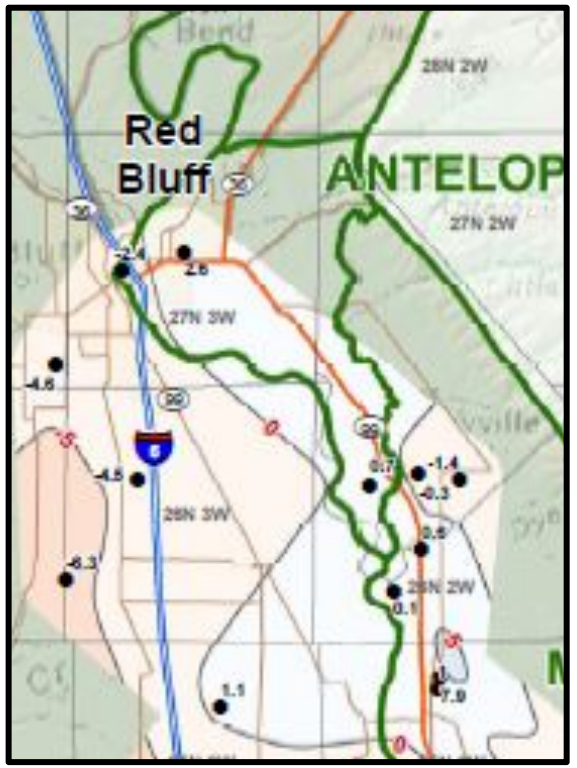




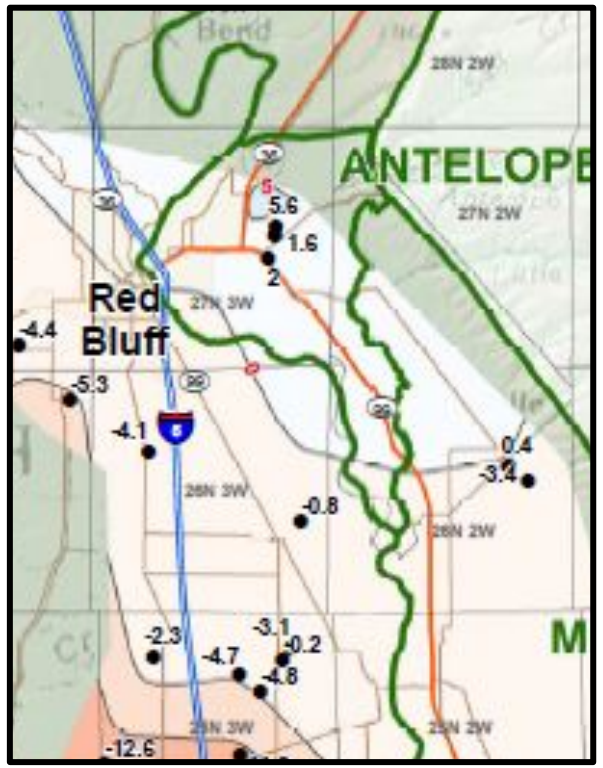
Groundwater Elevation Change

TEHAMA COUNTY
Flood Control and Water Conservation District

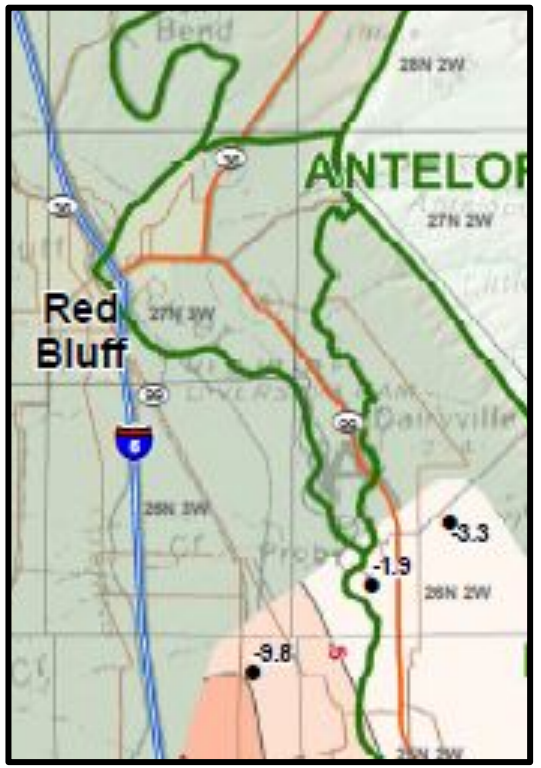
Spring 2011 to Spring 2019



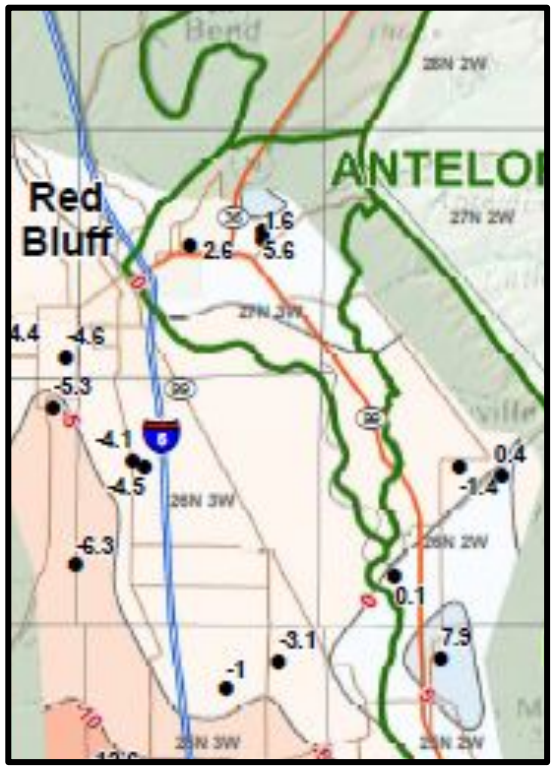
Shallow (less than 200 ft deep)



Intermediate (200 – 600 ft deep)



Deep (deeper than 600 ft)

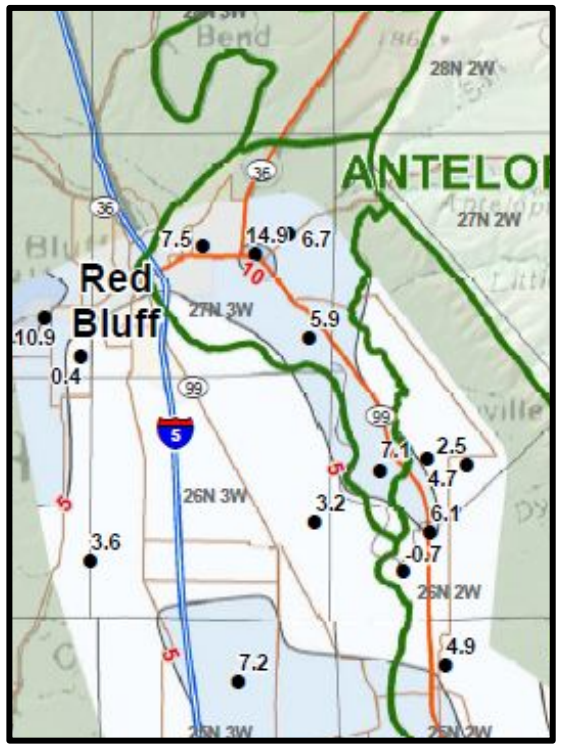


100 ft to 450 ft

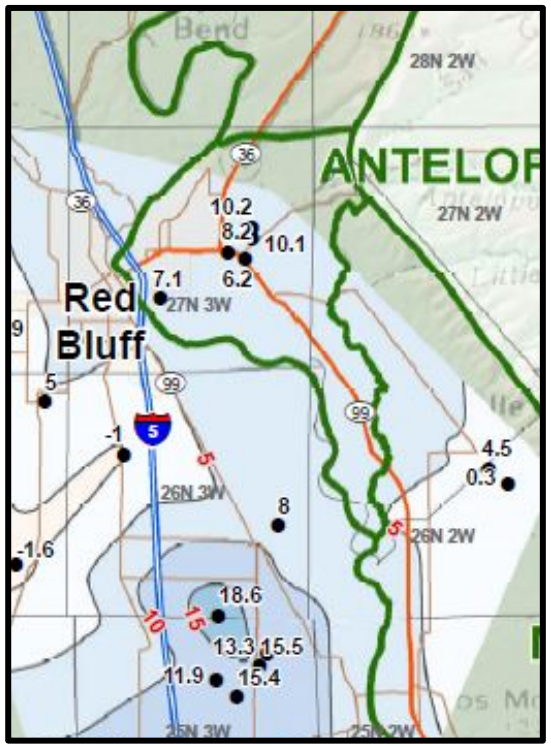
Groundwater Elevation Change

TEHAMA COUNTY
Flood Control and Water Conservation District

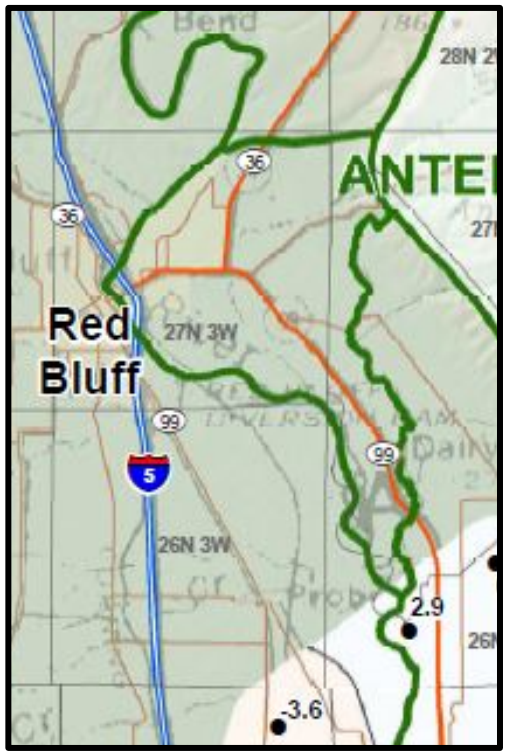
Spring 2015 to Spring 2019



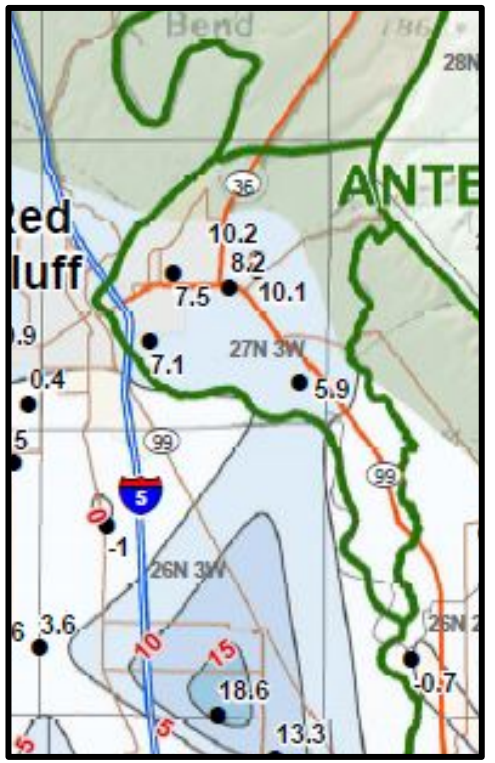
Shallow (less than 200 ft deep)



Intermediate (200 – 600 ft deep)



Deep (deeper than 600 ft)



100 ft to 450 ft

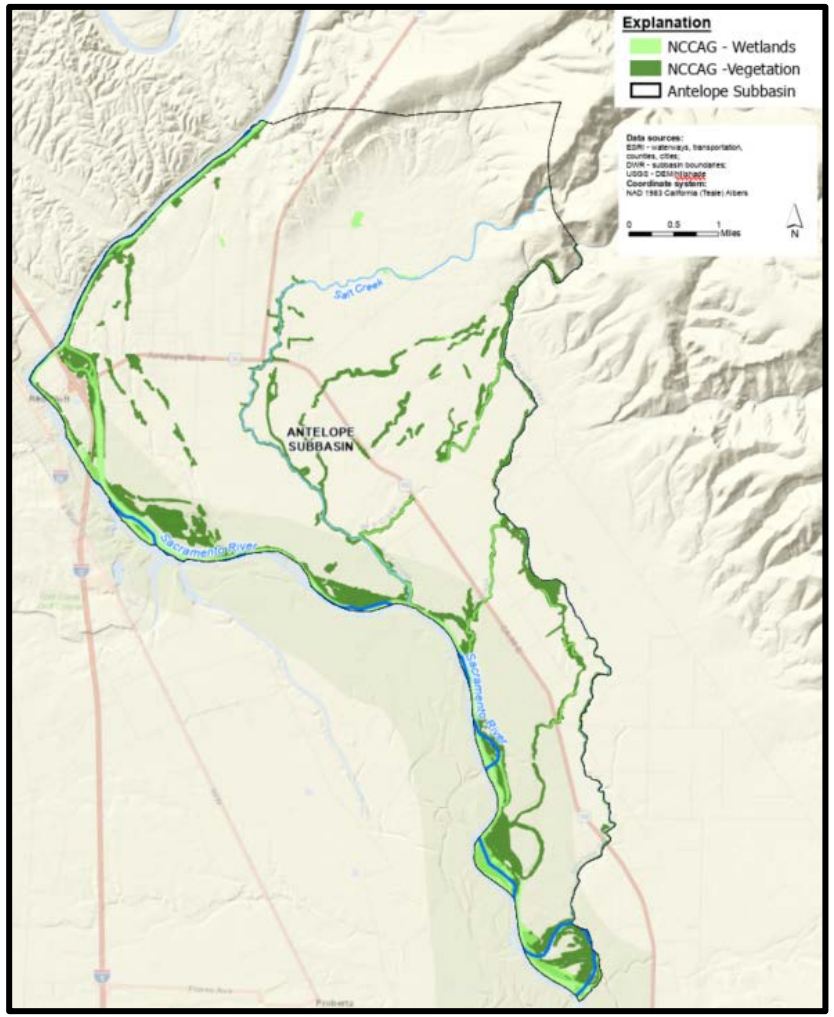
Introduction :
What Are Groundwater Dependent Ecosystems?

- GDE definition from SGMA: “ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.”

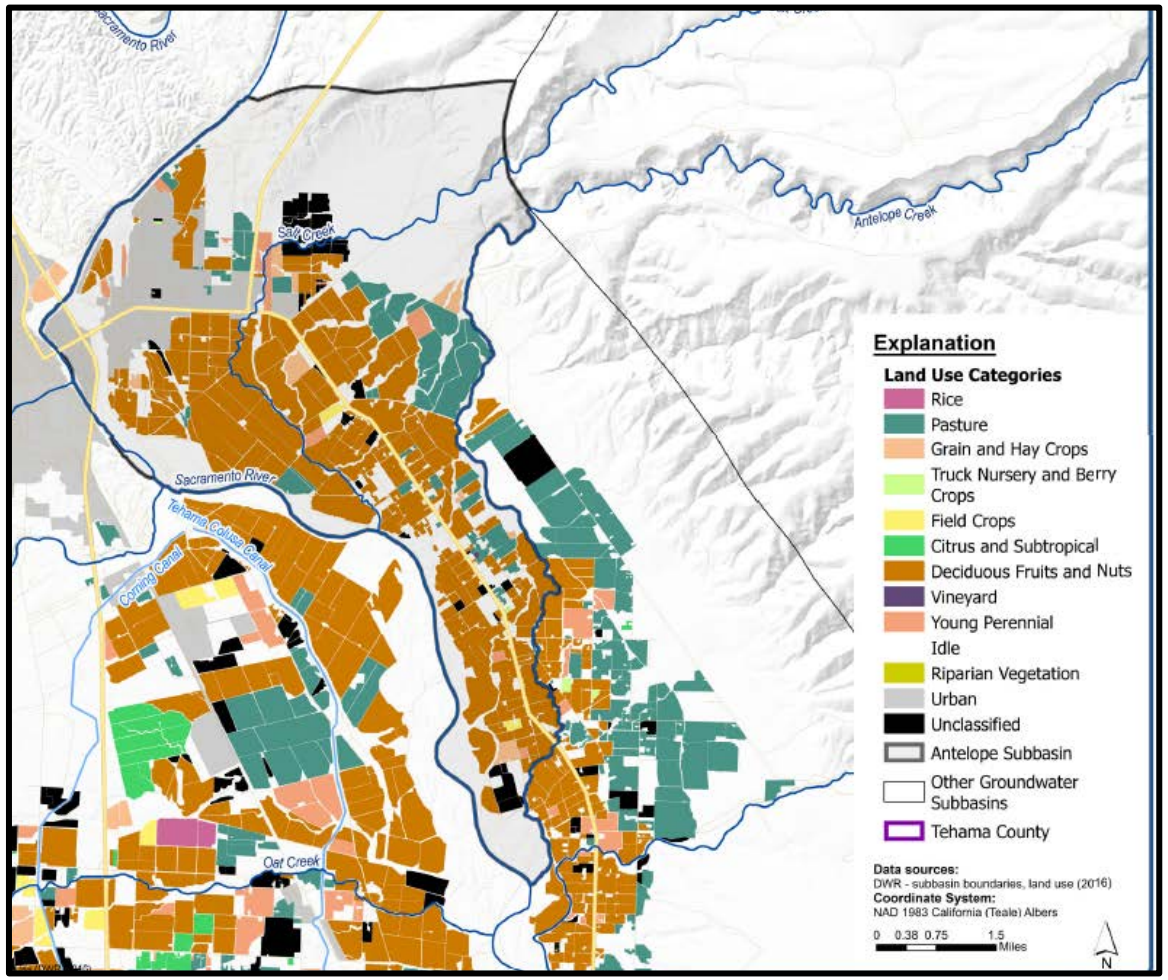


Sacramento River

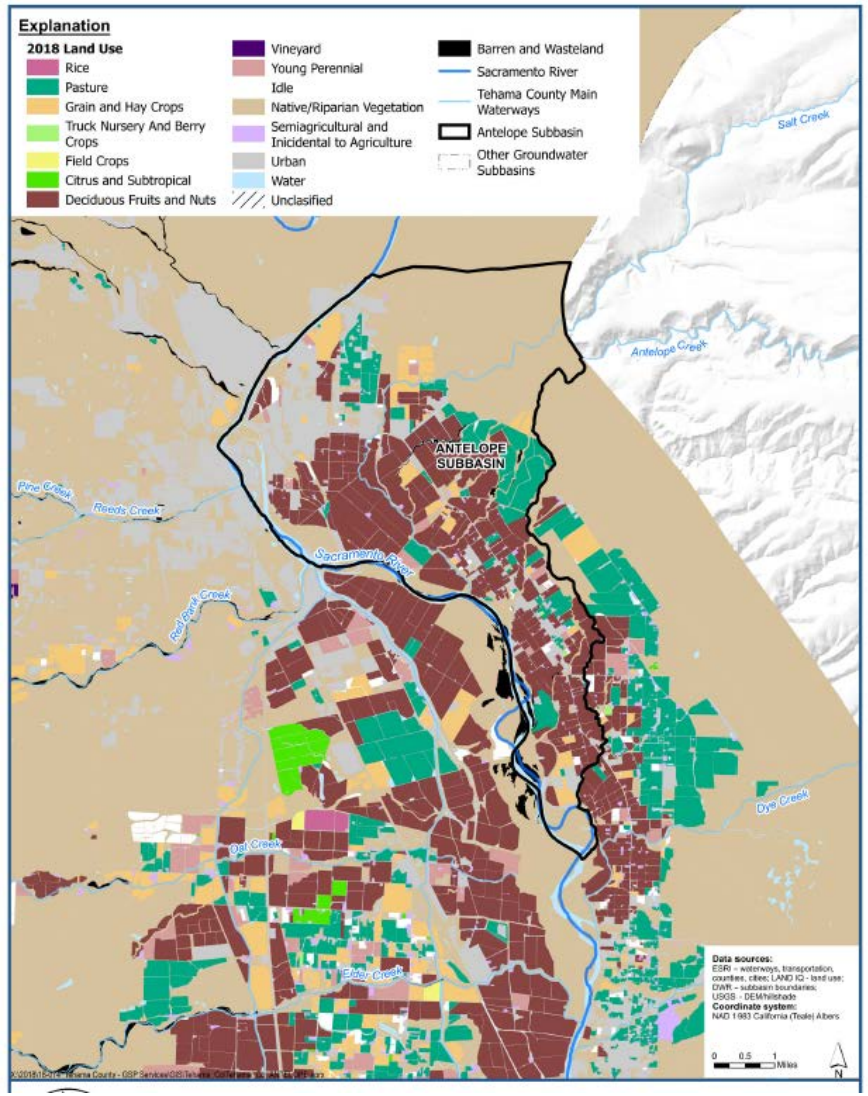
Groundwater Dependent Ecosystems



Land Use - 2016



Land Use - 2018 (LandIQ)



Account for Water with a "Budget"

Inflows

- Precipitation;
- SW inflow & infiltration;
- Intentional recharge (ponds, ditches, etc.);
- Applied water, net recharge (e.g., irrigation);
- Unintentional recharge (leaky pipelines);
- Subsurface inflows from outside basin.

Outflows

- GW extraction by wells;
- GW discharge to SW/springs;
- Evapotranspiration; and
- Subsurface outflow from basin.

Inflows **–** ***Outflows*** **=** **Δ** ***S***

Change in GW Storage

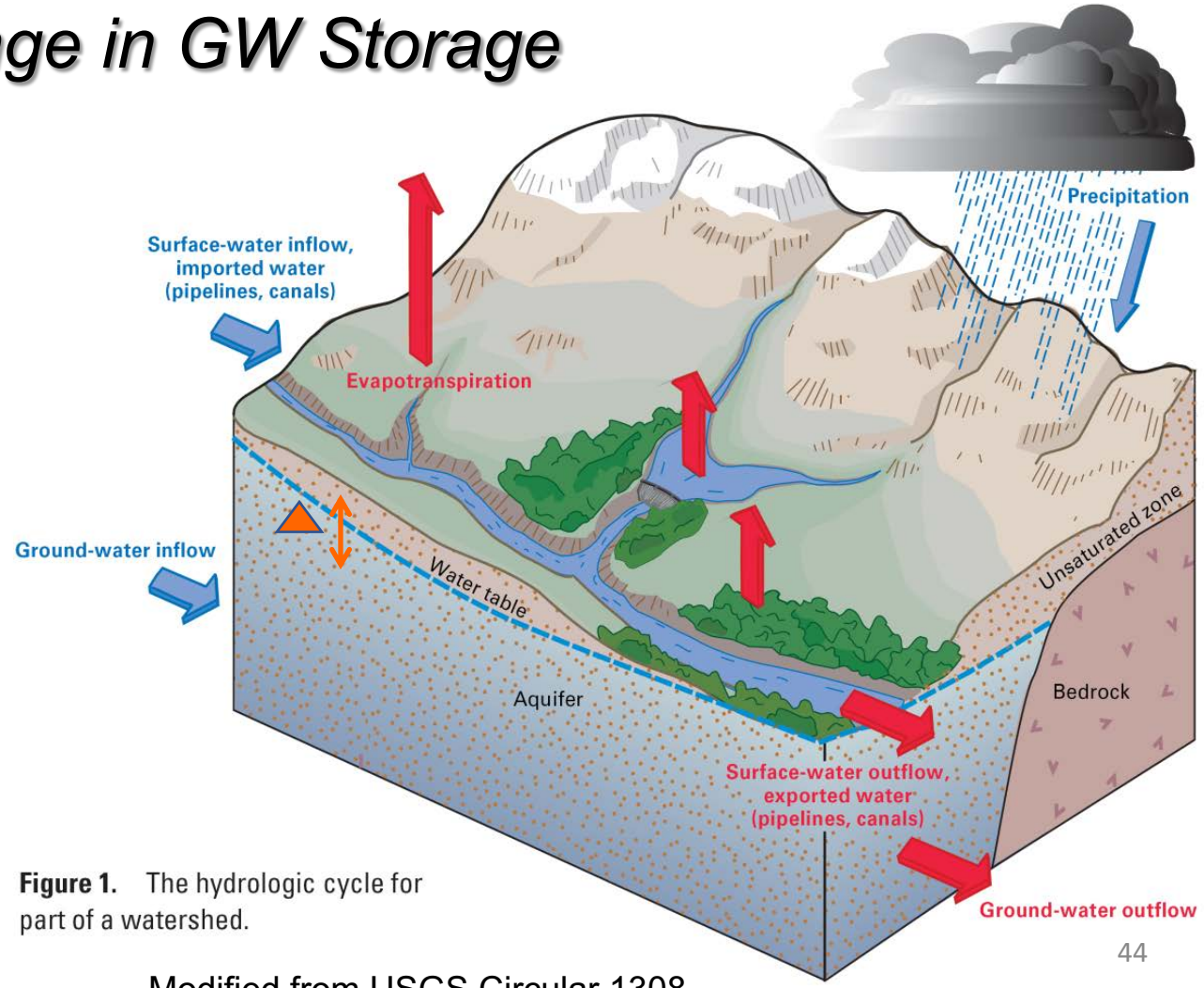


Figure 1. The hydrologic cycle for part of a watershed.

Modified from USGS Circular 1308

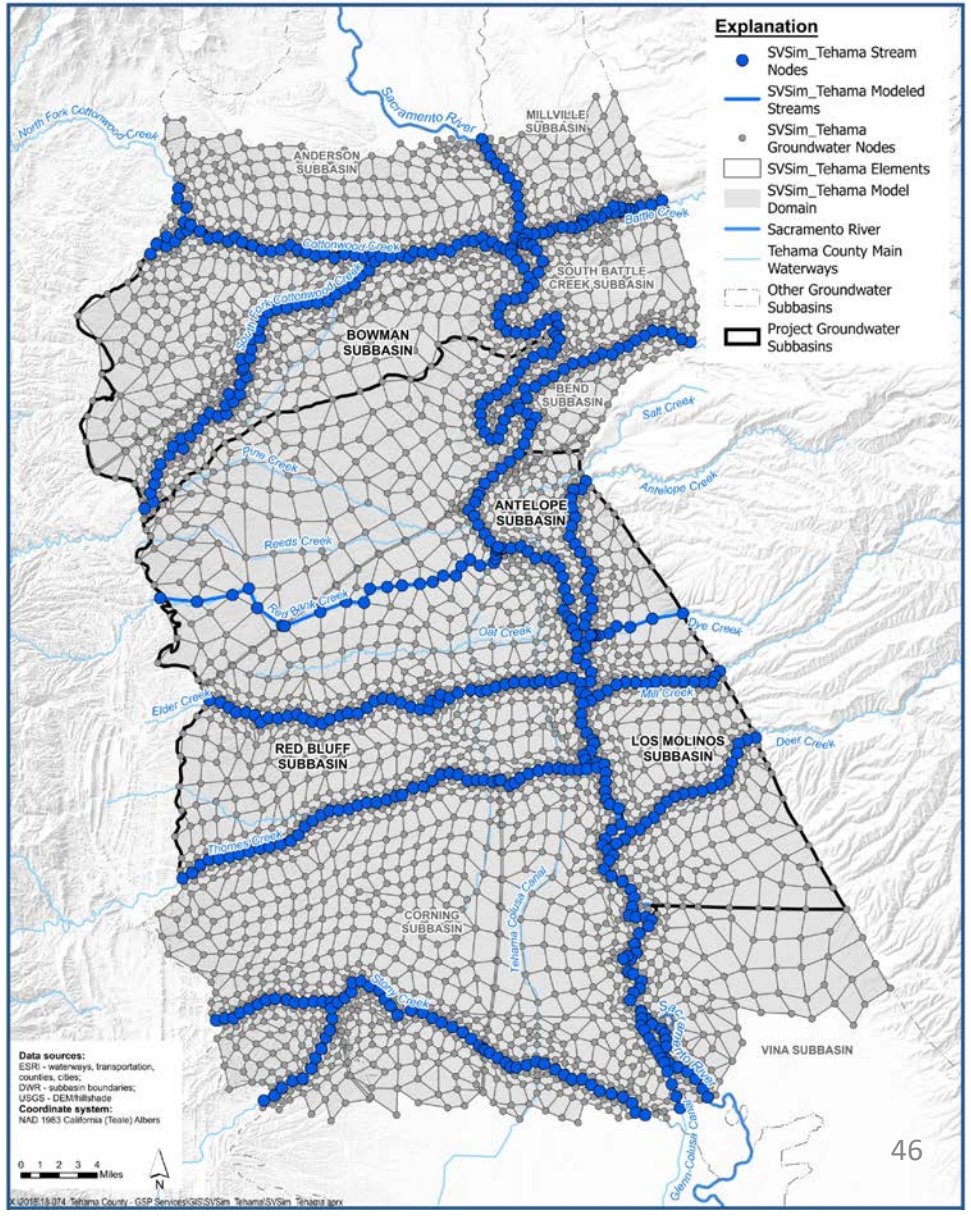
Tehama County Integrated Hydrologic Model:
Water Budgets

Water Budget	Analysis Period	Hydrology	Land Use	Water Supplies
Historical Simulation	**1990-2018**	**Historical**	**Historical**	**Historical**
Current Conditions	1971-2018	Historical	TBD (2016/2018)	TBD (Current)
Future Conditions (No Climate Change)	1971-2018	Historical	Current, adjusted based on Tehama County General Plan	Current and projected Ag/Urban Demands
Future Conditions, 2030 Climate Change	1971-2018	Historical, Adjusted based on 2030 climate change	Current, adjusted based on General Plan	Current, adjusted based on climate change
Future Conditions, 2070 Climate Change	1971-2018	Historical, adjusted based on 2070 climate change	Current, adjusted based on General Plan	Current, adjusted based on climate change

Tehama County Integrated Hydrologic Model:
Model Development

Model Domain

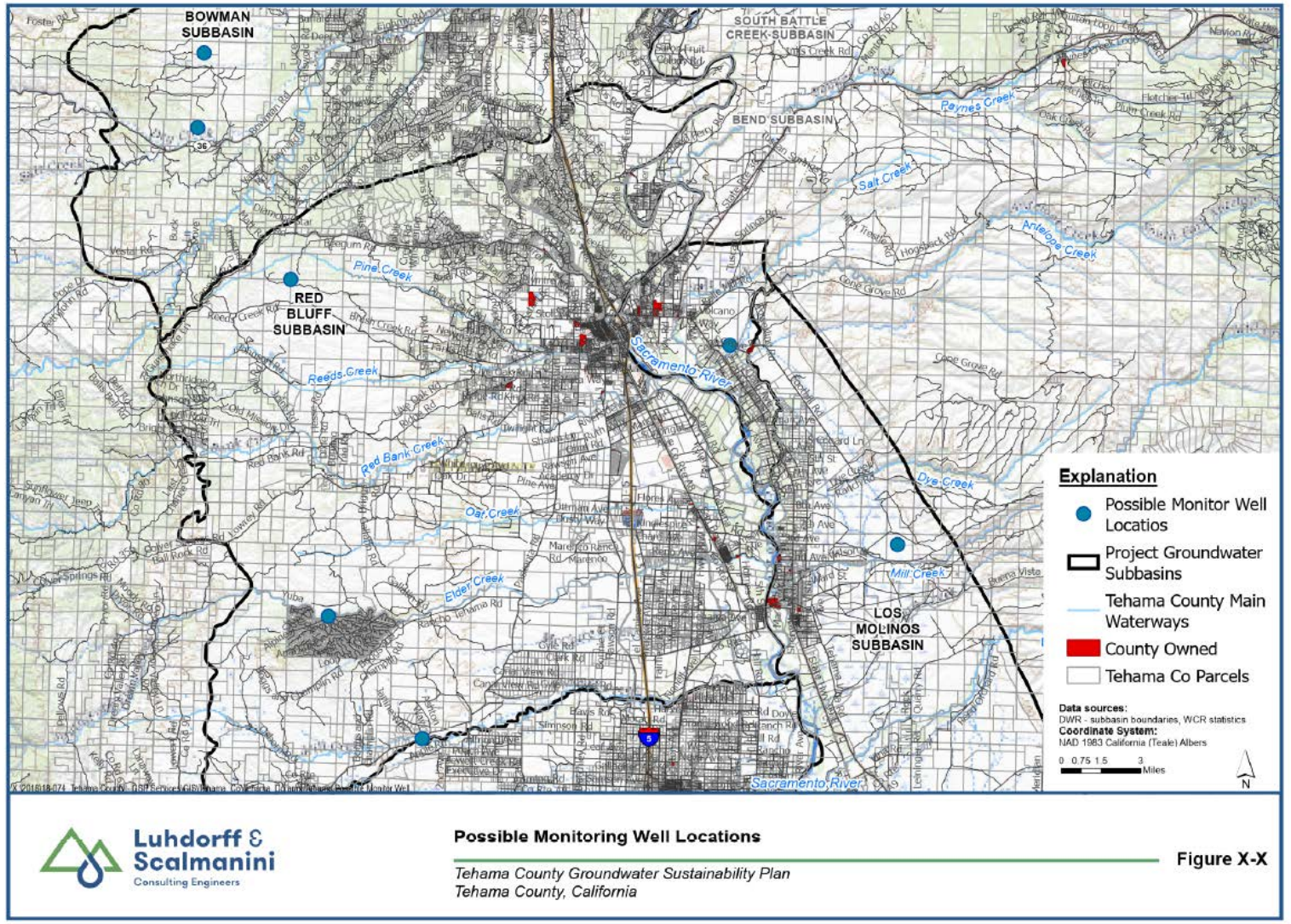
Total Acreage	942,227
Nodes	5,209
Elements	5,398
Min. Element Size (ac)	*0.7*
Max. Element Size (ac)	*2,122*
Avg. Element Size (ac)	*175*
Streams	13
Stream Nodes	599
Layers	9



Data Gaps/Technical Support (TSS) Discussion

TEHAMA COUNTY
Flood Control and Water Conservation District

- Identified Monitoring Well Locations
  - County Owned Parcels



What's Next?

TEHAMA COUNTY
Flood Control and Water Conservation District

1. Calibrate Groundwater Flow Model
2. Develop Monitoring Network
3. Develop Sustainable Management Criteria
4. Finalize New Monitoring Well Locations
5. Additional Webinars Planned for Spring/Summer 2021



