

Tackling Technical and Policy Aspects of SGMA in Butte County

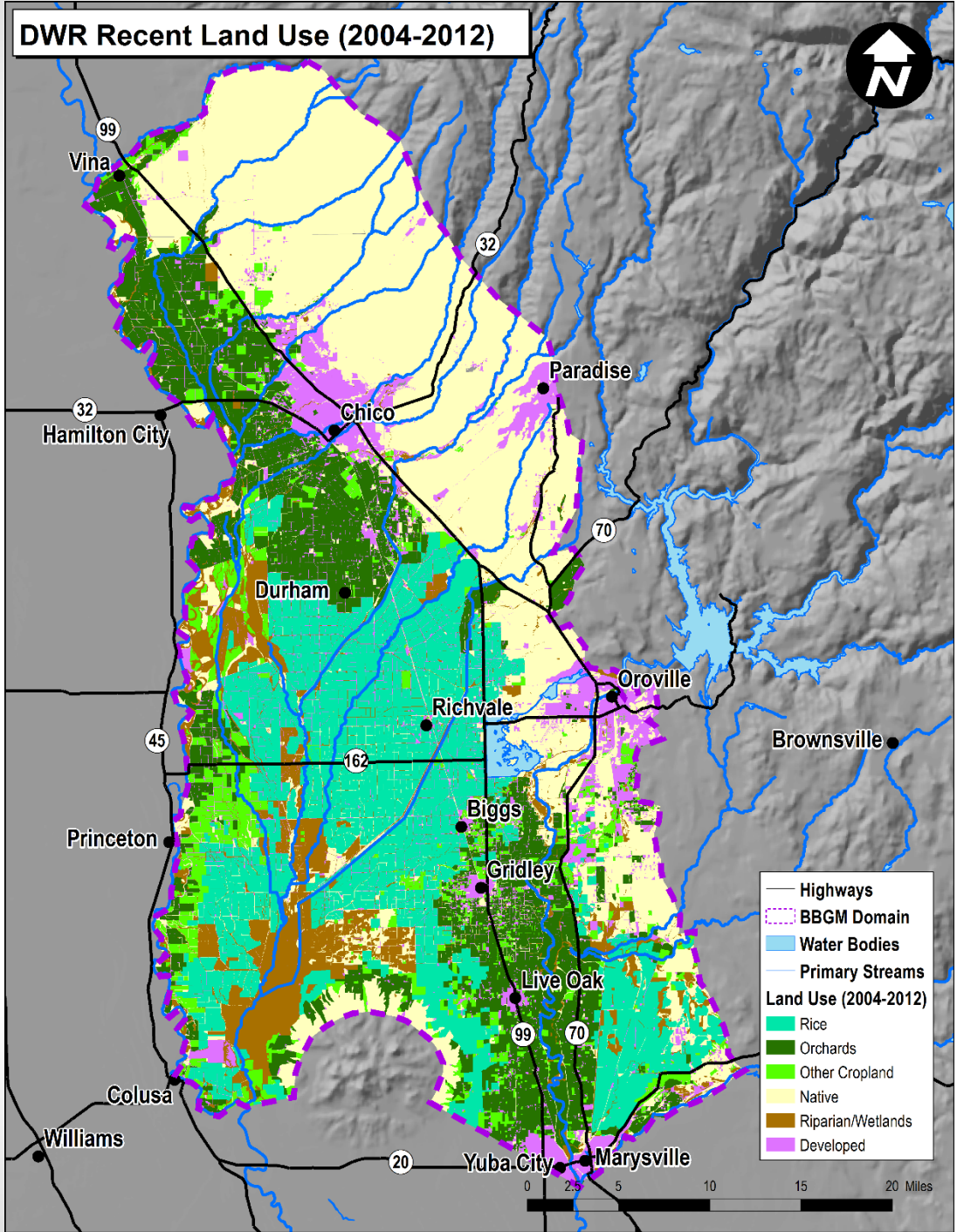
Christina Buck
CWEMF Annual Meeting
April 12, 2016



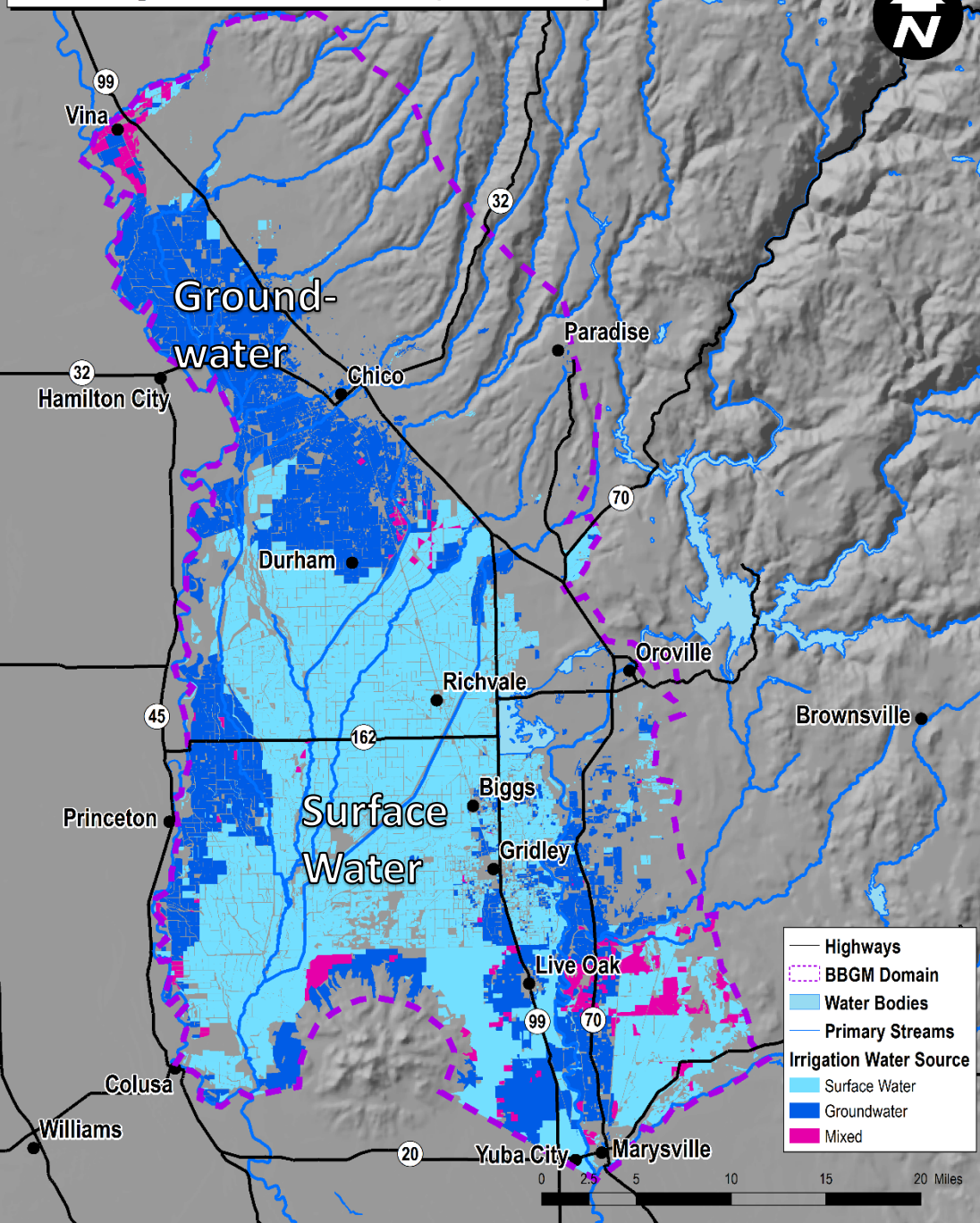
DWR Recent Land Use (2004-2012)



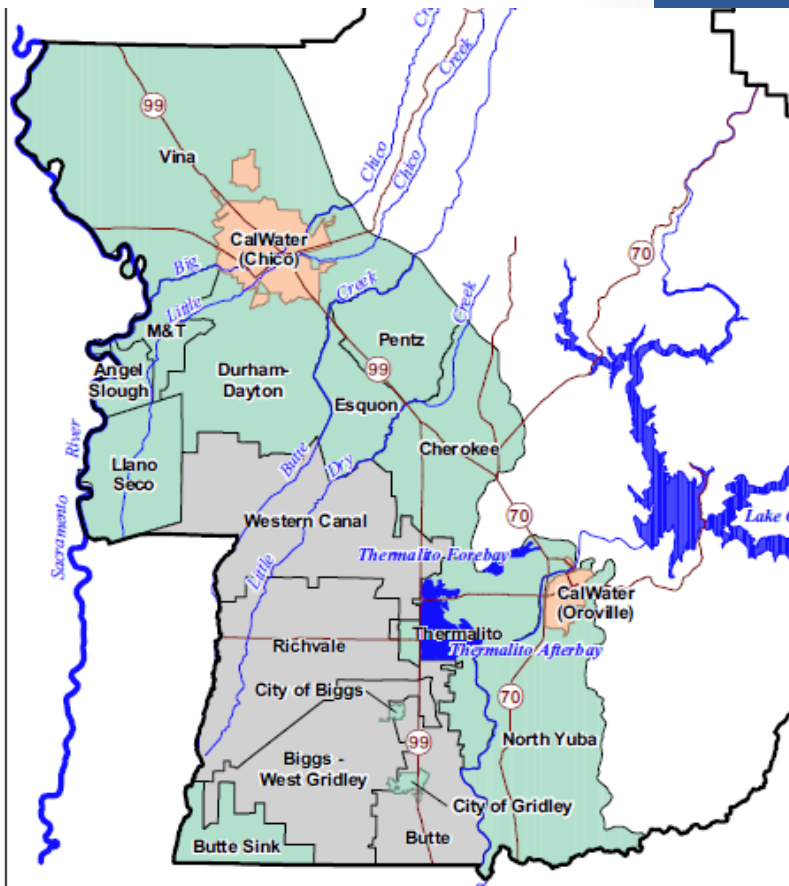
Land Use



DWR Irrigation Water Source (2004-2012)

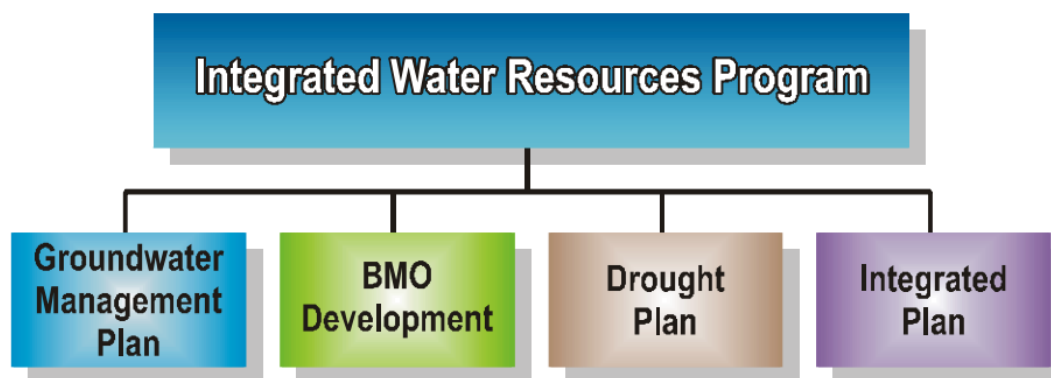


Agricultural Water Source



Pre-SGMA: County Water Policies/Ordinances

- Groundwater Conservation Ordinance (Chapter 33)
- Well Spacing Ordinance
- Basin Management Objectives Ordinance (Chapter 33A)
- Groundwater Management Plan
- Drought Preparedness and Mitigation Plan
- Water Element in General Plan 2030



Analysis and Planning

- 2000- Annual Groundwater Status Report
- 2001 Water Inventory and Analysis Report
- 2004 Ag and Urban Water Demand Forecast
- 2005 Integrated Water Resources Plan
- 2005 Groundwater Management Plan
- 2008 Butte Basin Groundwater Model Update
- 2010 Watershed Modeling (WEHY model)
- 2010-2013 Lower Tuscan Aquifer Investigation
- 2014 Northern Sacramento Valley Integrated Regional Water Management Plan
- 2016- Inventory and Analysis and Model Update

Butte County Department of Water and Resource Conservation
Groundwater Status Report
2015 Water Year

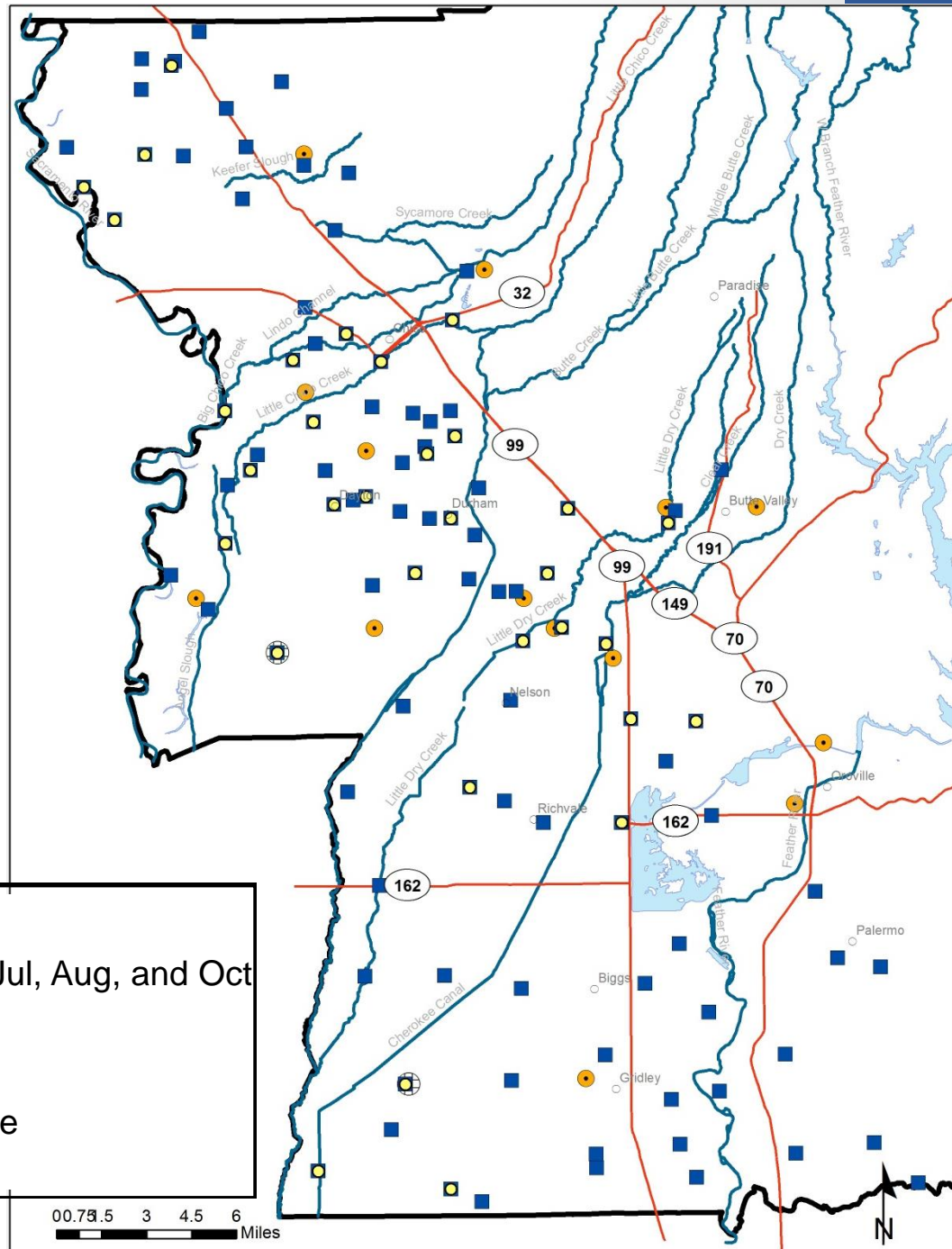
Submitted February 2016

Groundwater Level Monitoring

- Manually 4x/year: Mar, Jul, Aug, Oct
- Hourly data (59 wells)
- 69 additional wells since 2000
- Data available online

Legend

- ⌋ Groundwater Level Well- Measured Mar, Jul, Aug, and Oct
- Groundwater Level Recorded Hourly
- ! BMO Water Quality Trend Monitoring Well
- @ Extensometer, Measures Land Subsidence
- Primary Streams



BMO Program: Spring 2015 Alert Stage Map

Legend

Spring 2015 Alert Stage

- ◊ Monitored, No BMO
- Alert not reached
- ▲ Alert 1
- Alert 2
- ◆ Quest. Meas.
- No Meas.

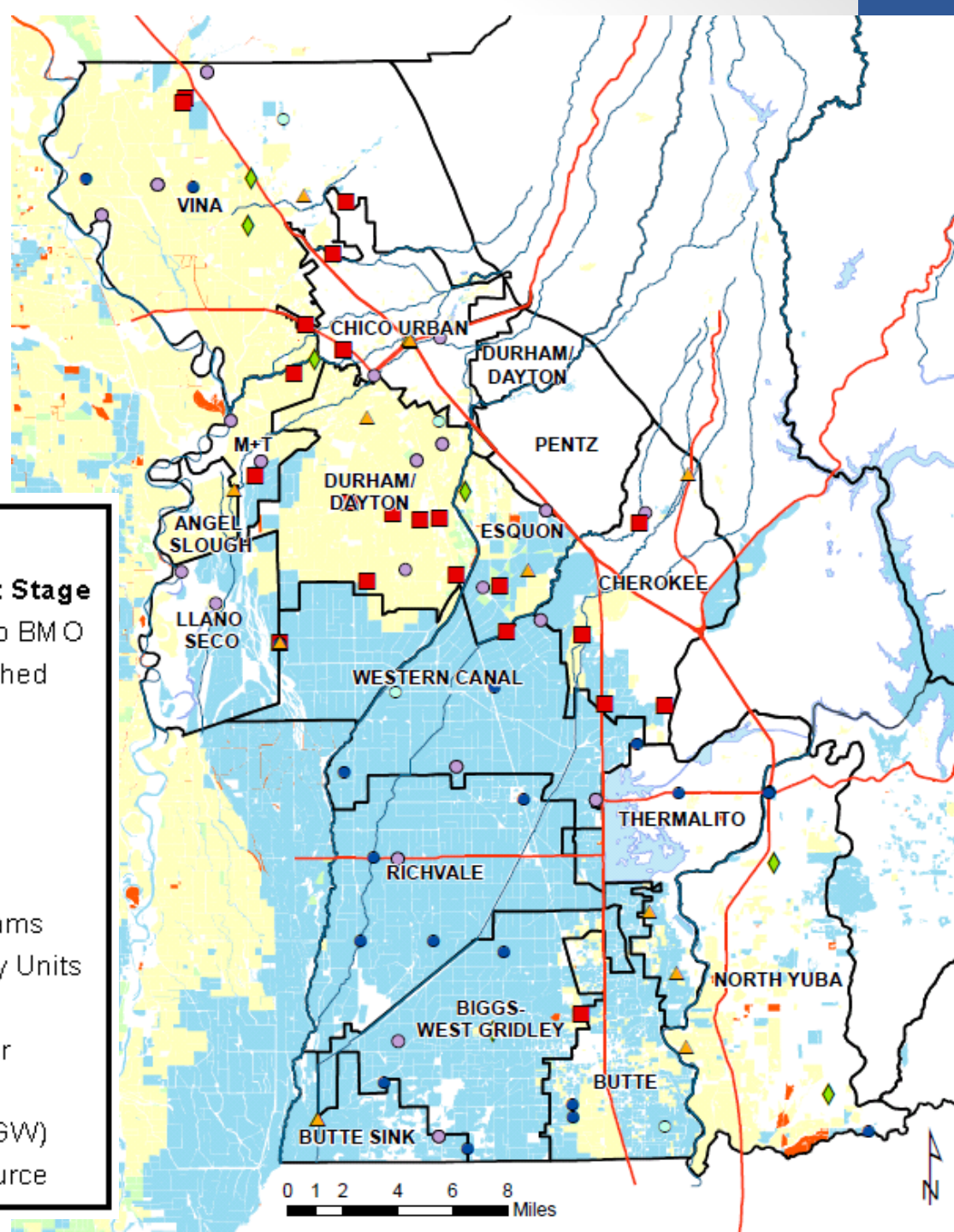
— Highway

— Primary Streams

□ Sub-Inventory Units

Water Source

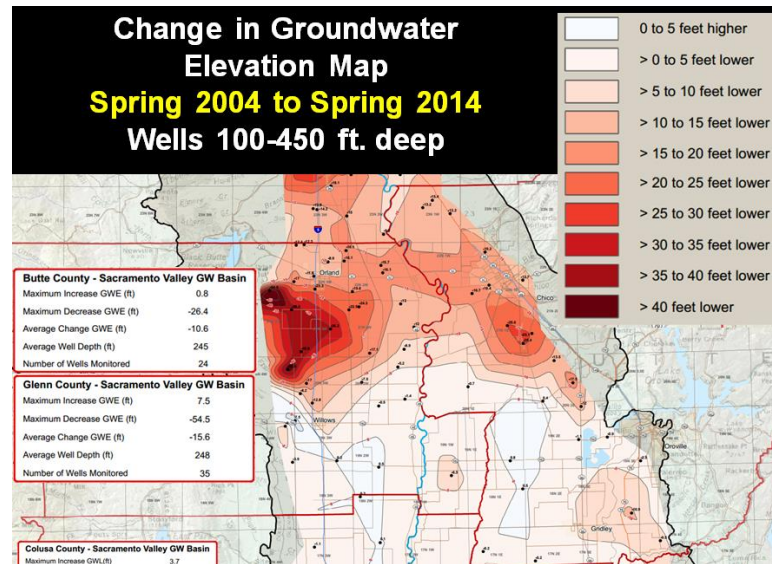
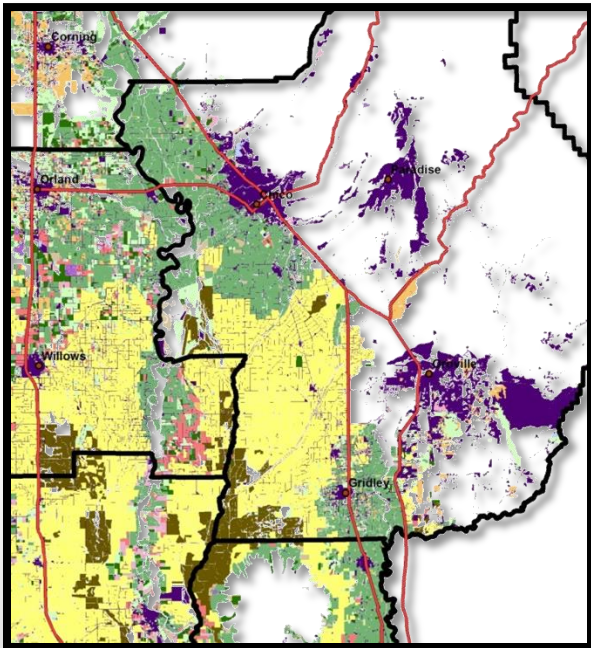
- Surface Water
- Groundwater
- Mixed (SW&GW)
- Unknown Source



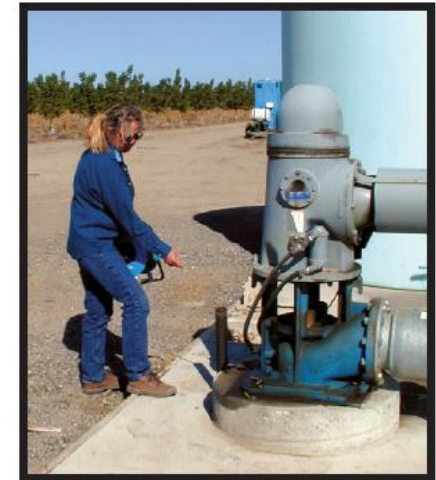
DWR Northern Region Office

- Located in Red Bluff
- Provide technical support and tools for the Northern Sacramento Valley

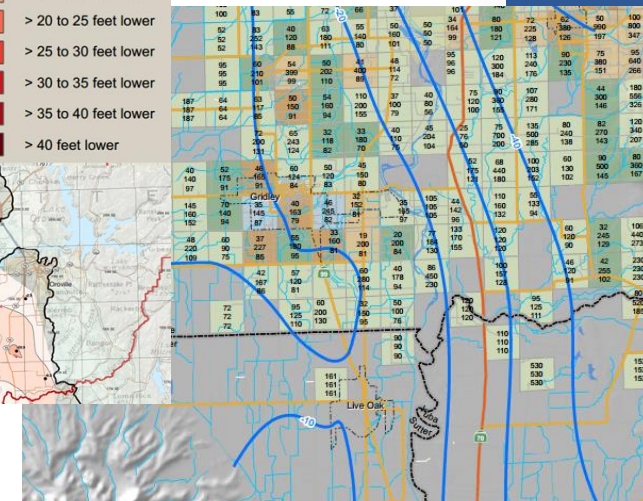
Land Use Surveys



Groundwater Contour, Change, and Well Distribution Maps



Monitoring



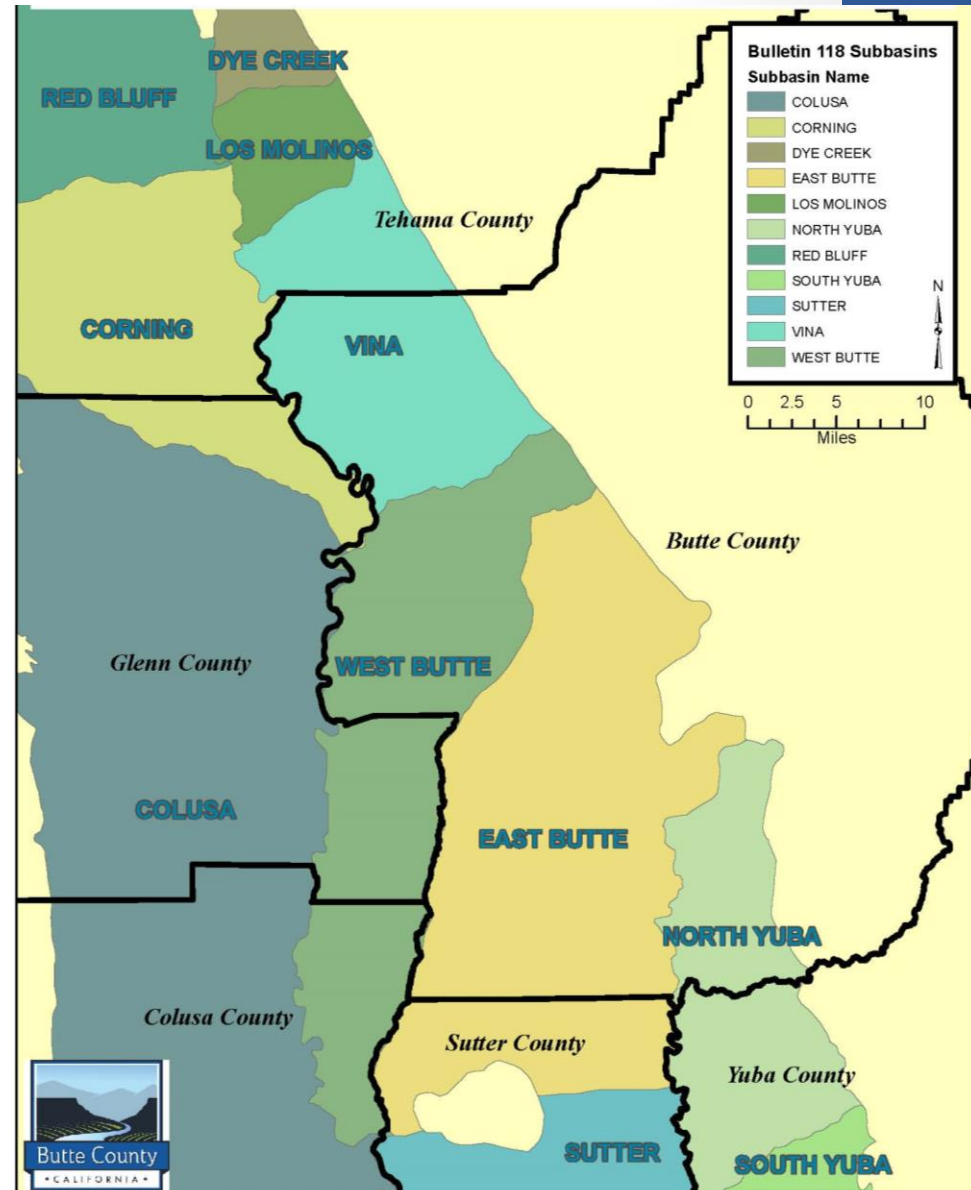
BUTTE COUNTY DOMESTIC WELL DEPTH SUMMARY
with Depth to Groundwater Contours for Wells Screened
at Depths Less Than 150 Feet

SGMA- Near term actions

- Establish basin boundaries and governance
- Strengthen understanding of the basin
- Track state implementation to avoid unintended consequences
- Continue collaborative local dialogue

SGMA: Who will do what?

- Portions of 4 sub-basins
- Butte County passed resolution to be a GSA- October 2015
- All GSA eligible agencies within Butte County have elected to be GSAs- about 15



SGMA GSA Assessment

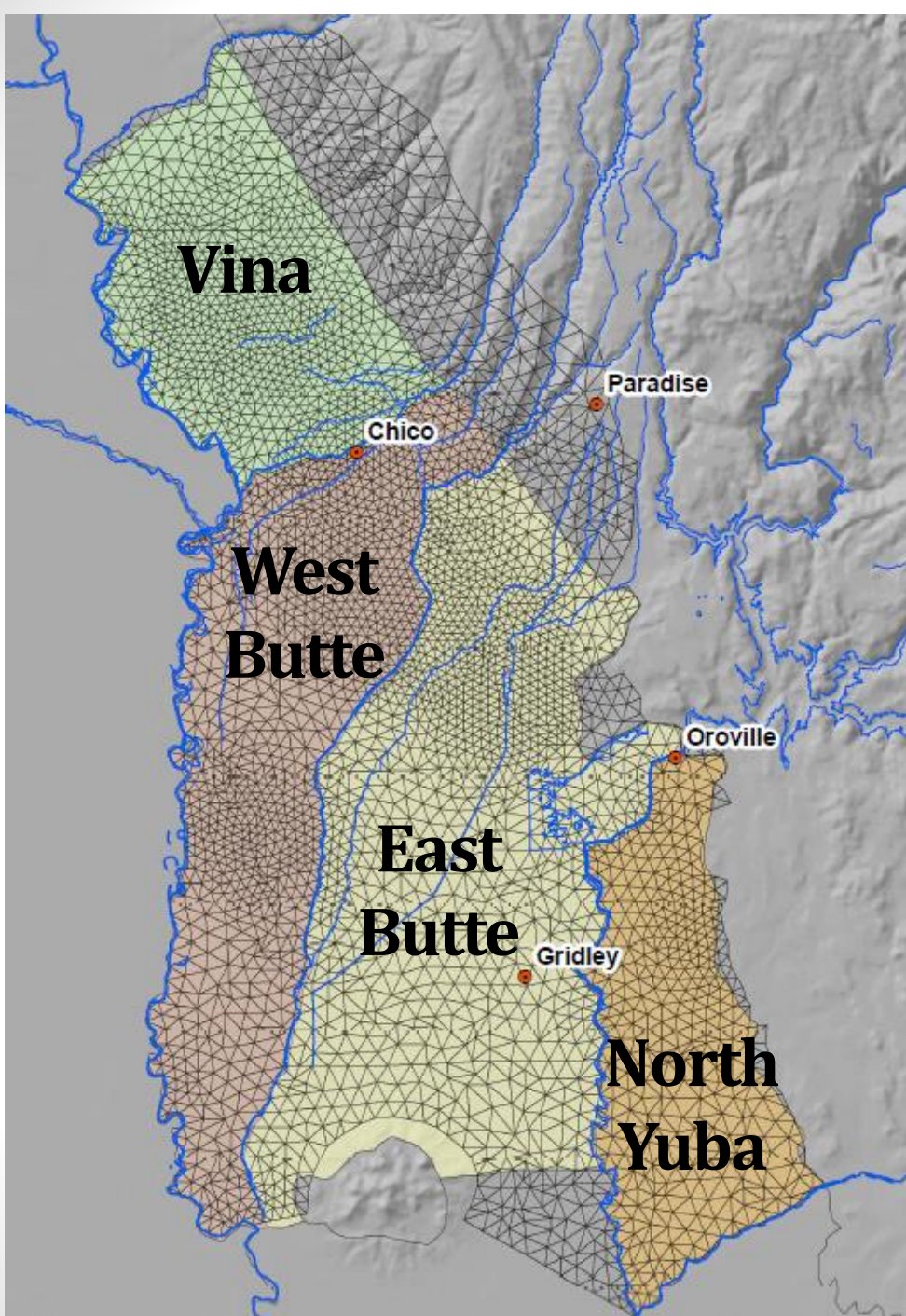
- Assessment of Stakeholder Perspectives on SGMA Implementation Options
 - County funded
 - Series of interviews, meetings, calls
 - Final report
- Participants included
 - Eligible local agencies under SGMA (~15)
 - County supervisor, Water Commission
 - Water Purveyors
 - Farm Bureau leadership
 - Independent groundwater pumpers
 - Environmental/Conservation organizations
 - Adjacent counties

SGMA GSA Assessment

- Assessed
 - Awareness of groundwater conditions
 - Spectrum of understanding of SGMA knowledge
 - Interests related to water resource management
 - Interests related to GSA formation
 - Governance: Three basic GSA models
 - I. Single GSA
 - II. Multiple GSAs
 - III. Hybrid

- Recommendations
 - GSA formation process
 - Public education and outreach

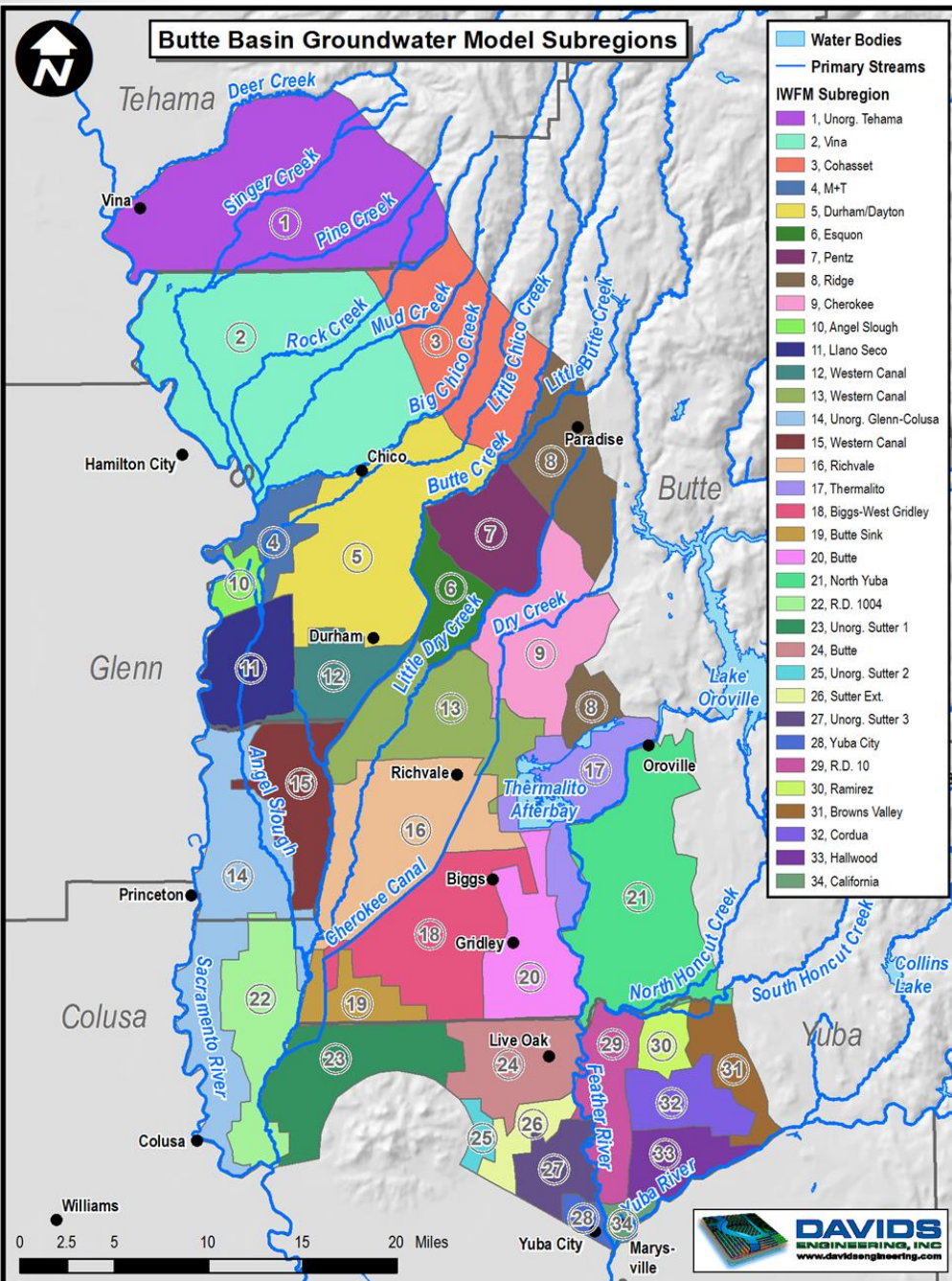
Butte Basin Groundwater Model



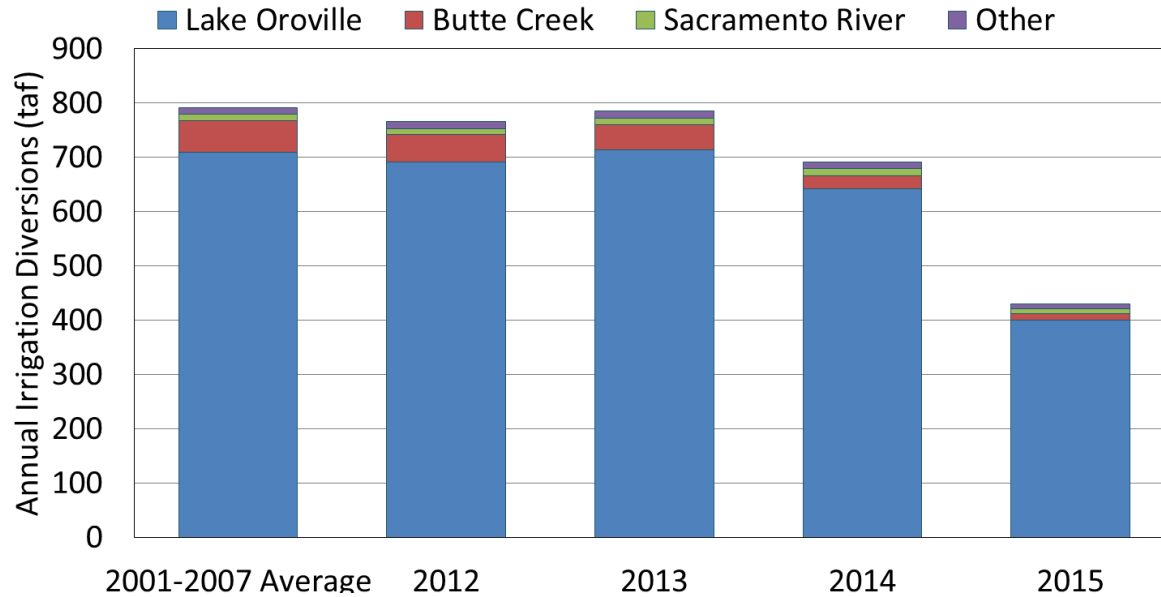
- IWFM-2015 (v. 4.0 IDC)
- 1970-2014, daily
- 1,265 square miles
- 7,200+ Individual elements 15-670 acres (Avg. 112 acres)
- Boundaries:
 - Deer Creek,
 - Sacramento River,
 - North side of Sutter Buttes/Yuba River
 - Eastern foothills

Current Update Objectives

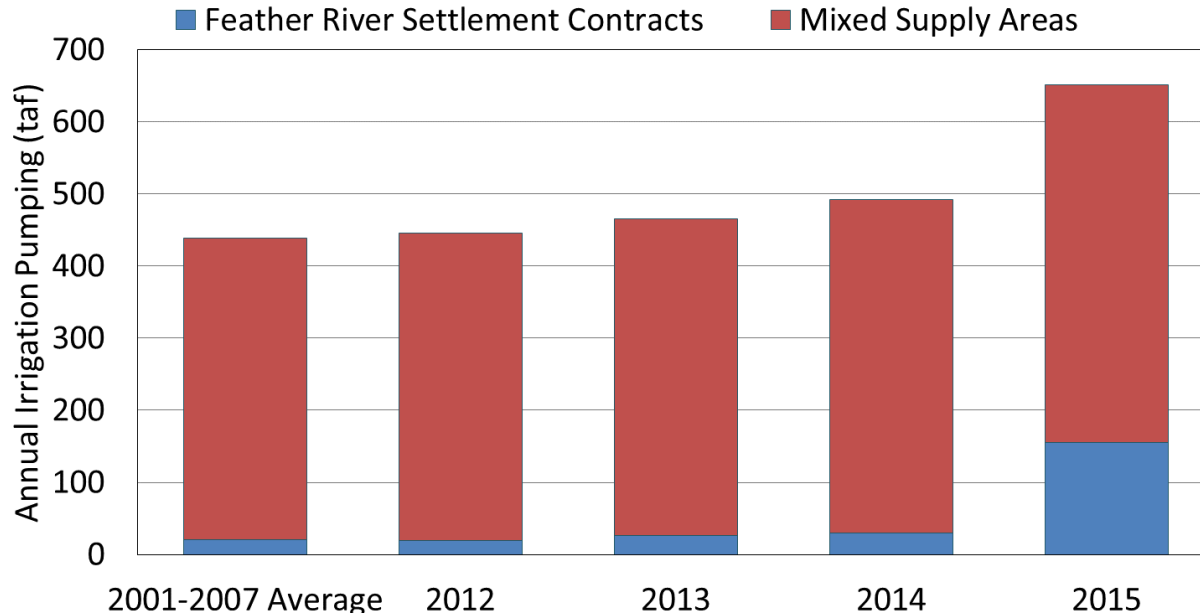
1. Identify how **water demands** have changed over the past decade (what areas & likely drivers)
2. **Develop water budgets** for each sub-region to inform the local conversation on resource use and sustainability
3. **Develop forecast scenarios** for urban/ag demands and climate change hydrology scenarios
4. Maintain BBGM as useful and productive tool



Surface Water Diversions

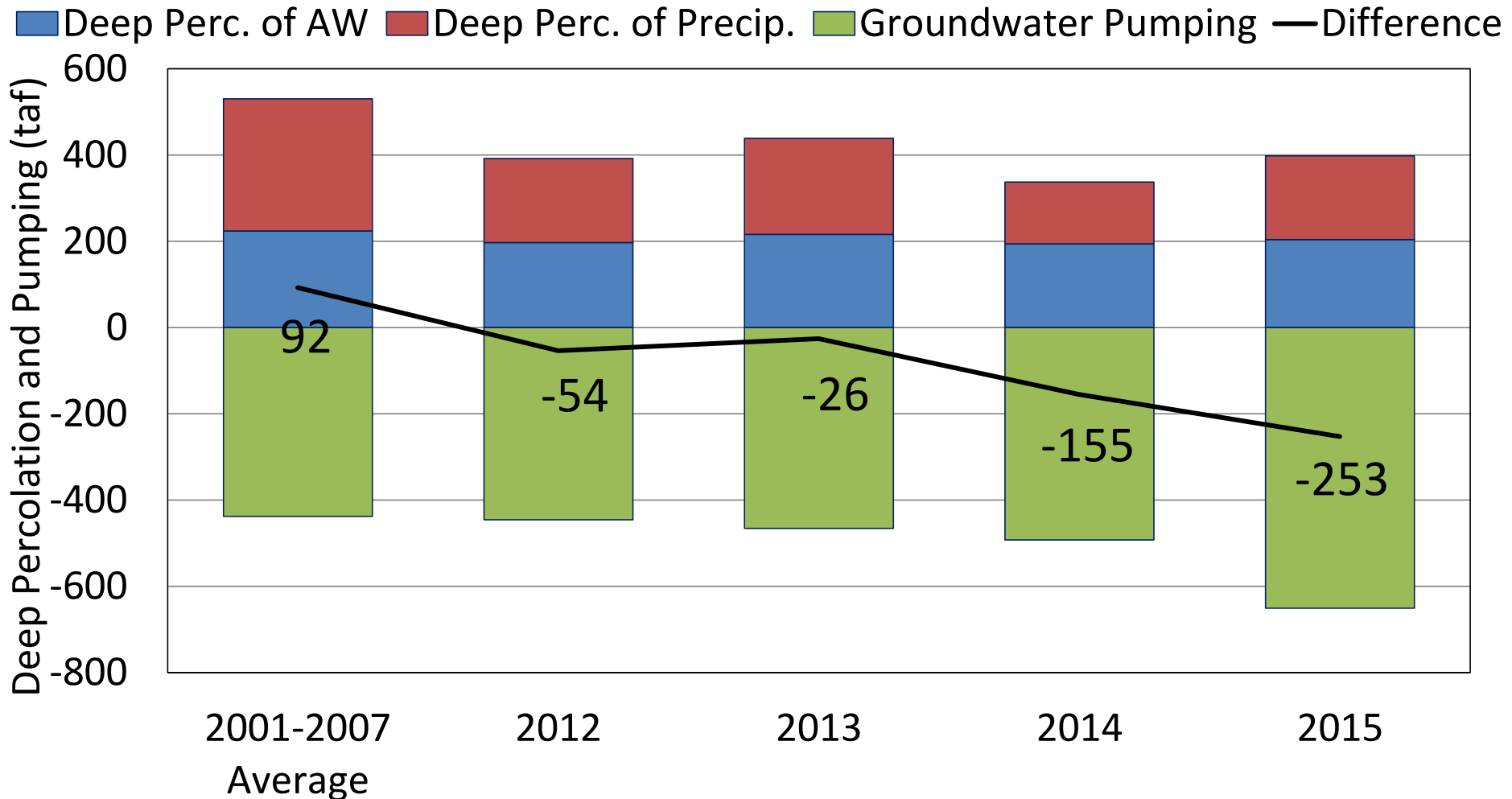


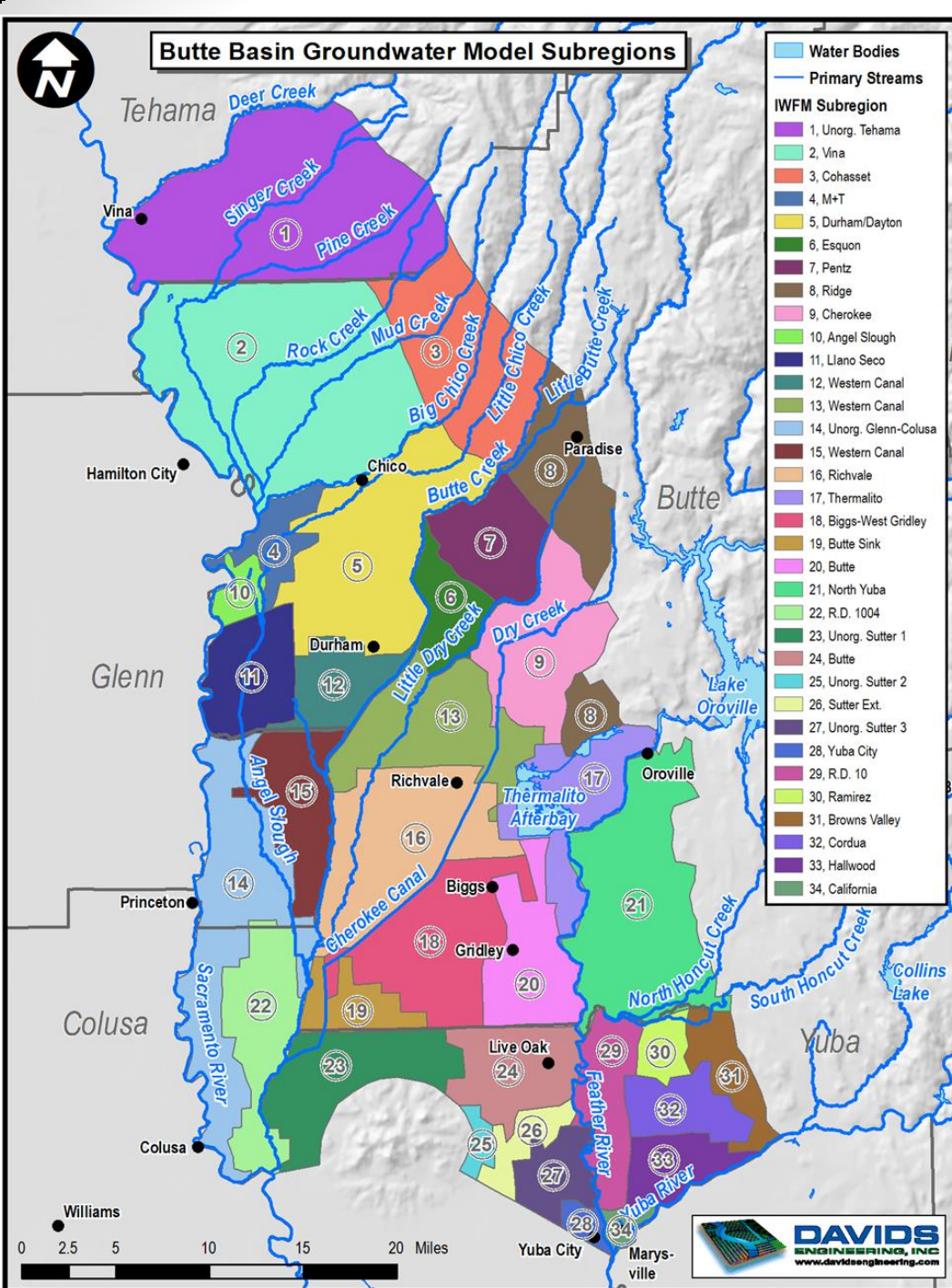
Groundwater Pumping



Deep Percolation & Groundwater Pumping

Butte County Valley Floor and Foothill Area



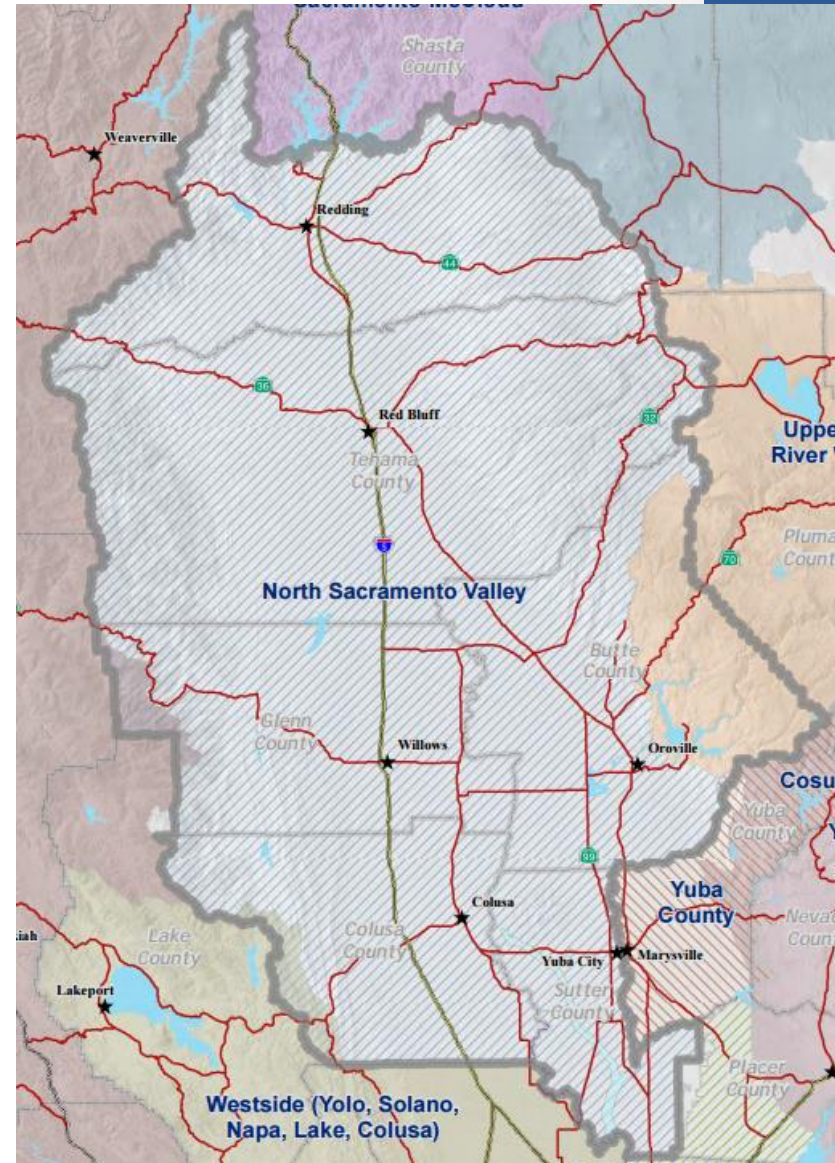


Inventory & Analysis Report, 2016

- County Funded
- Develop water budgets
- Assess sustainability
- Helpful for SGMA efforts
- Results for 4 subbasins and smaller subregions
- Final Report: June 2016

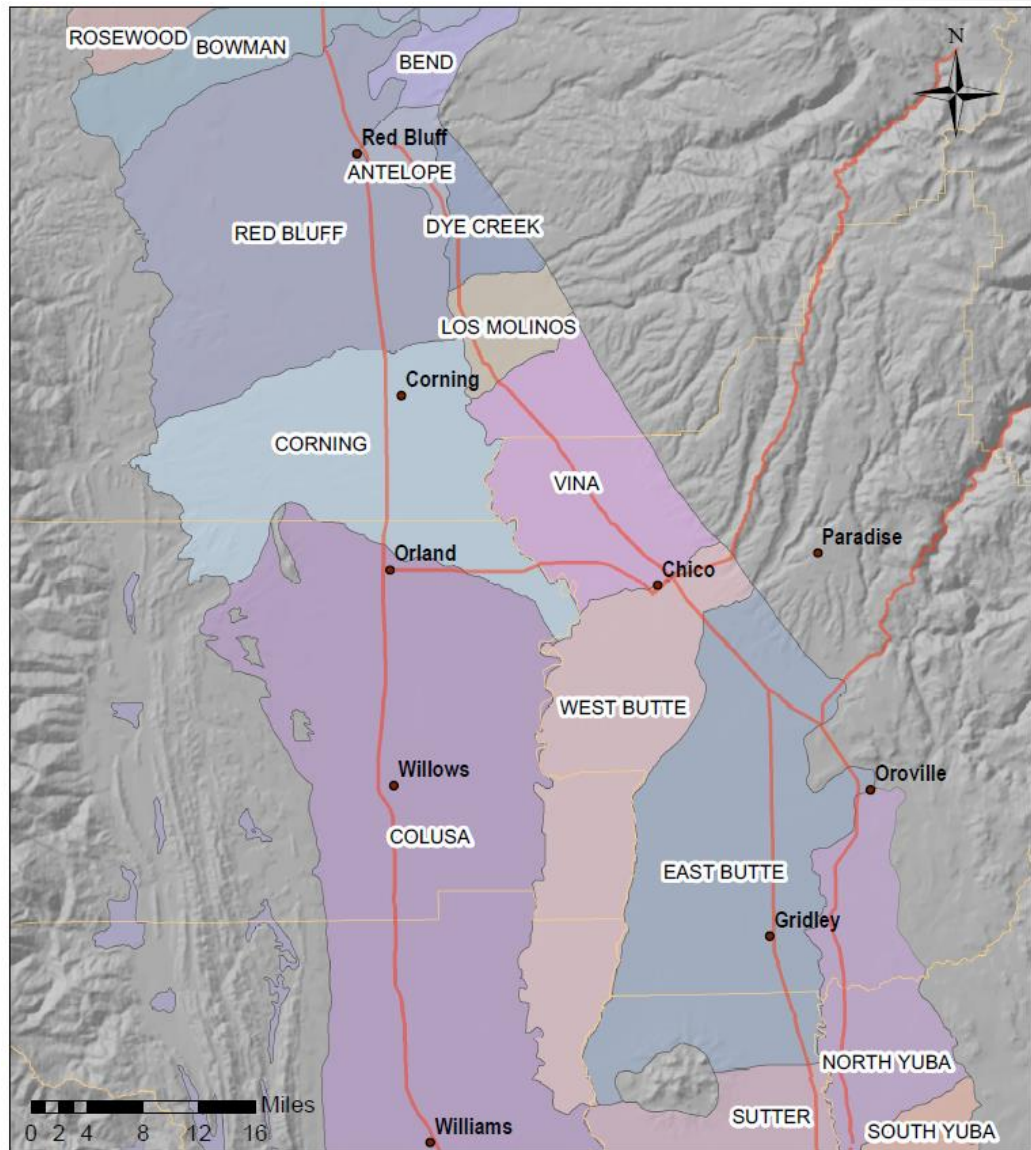
Interconnected sub-basins

- SGMA leaves assessment of interbasin interaction to DWR during GSP review
- As a region → better to start with common understanding of basin flows and consistent assumptions
- Northern Sacramento Valley Integrated Regional Water Management Plan (NSV IRWMP)
 - Board
 - Technical advisory committee



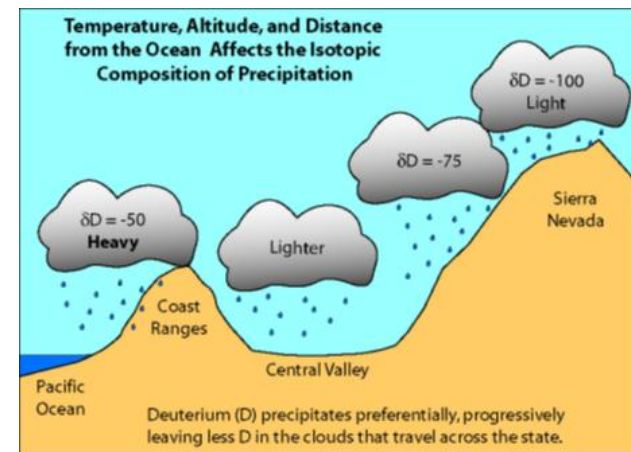
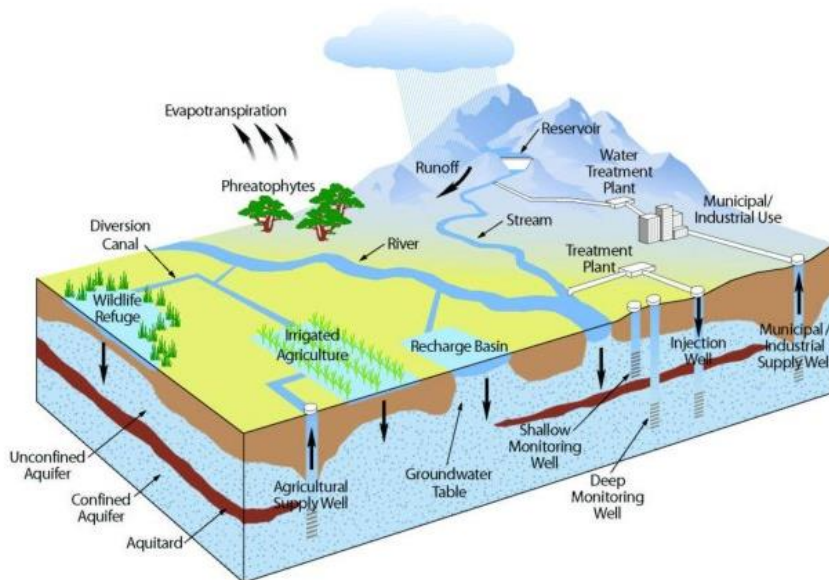
Interbasin Groundwater Flow Evaluation

- Funded by California Water Foundation grant
- 11 sub-basin in NSV region
- Technical Collaborators – assess existing modeling tools/approaches & provide recommendation
- NSV TAC as project advisory committee
- Completed mid-2017



Other special projects

- Stable Isotope **Recharge** Study
- Prop 1 Stressed Basins Grant- **Recharge** study





Questions?

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Water Resources Scientist
Water and Resource Conservation
Butte County

Groundwater Level Change Map

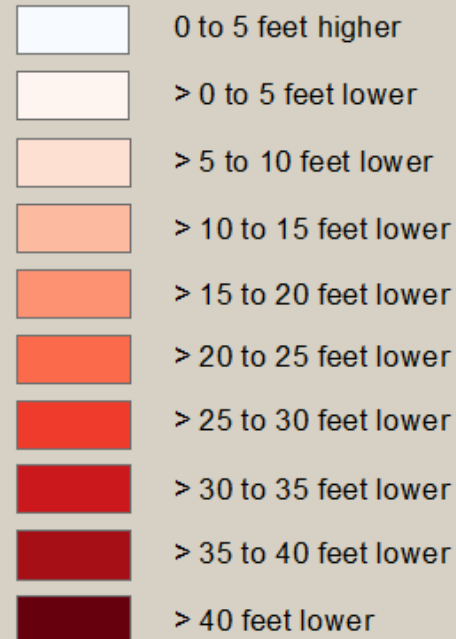
Fall 2015-2004
100-450 ft deep wells

Summary Results for Fall 2004 to Fall 2015 Change in Groundwater Elevation

Maximum Increase GWE (ft)	18.1
Maximum Decrease GWE (ft)	-58.0
Average Change GWE (ft)	-15.2
Average Well Depth (ft)	241
Number of Wells Monitored	166

Butte County - Sacramento Valley GW Basin

Maximum Increase GWE (ft)	3.1
Maximum Decrease GWE (ft)	-21.6
Average Change GWE (ft)	-8.9
Average Well Depth (ft)	207
Number of Wells Monitored	28

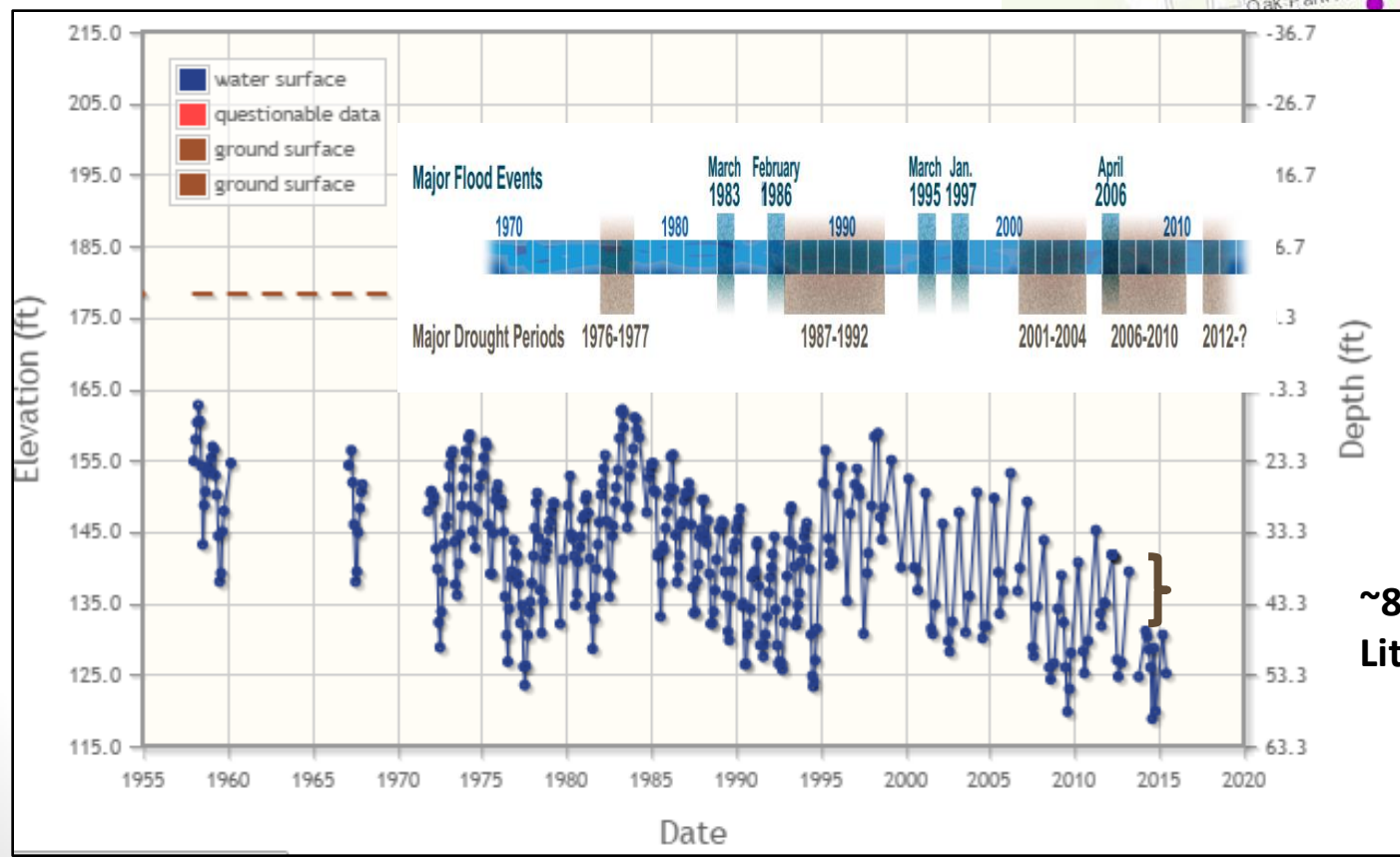
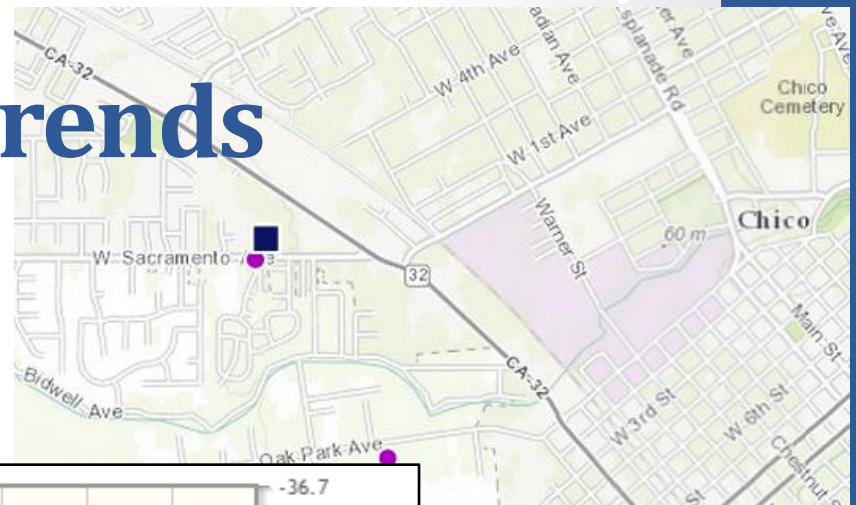


Groundwater Level Trends

Chico Urban Area

Intermediate depth: screened 200-279 ft

Record begins in 1958



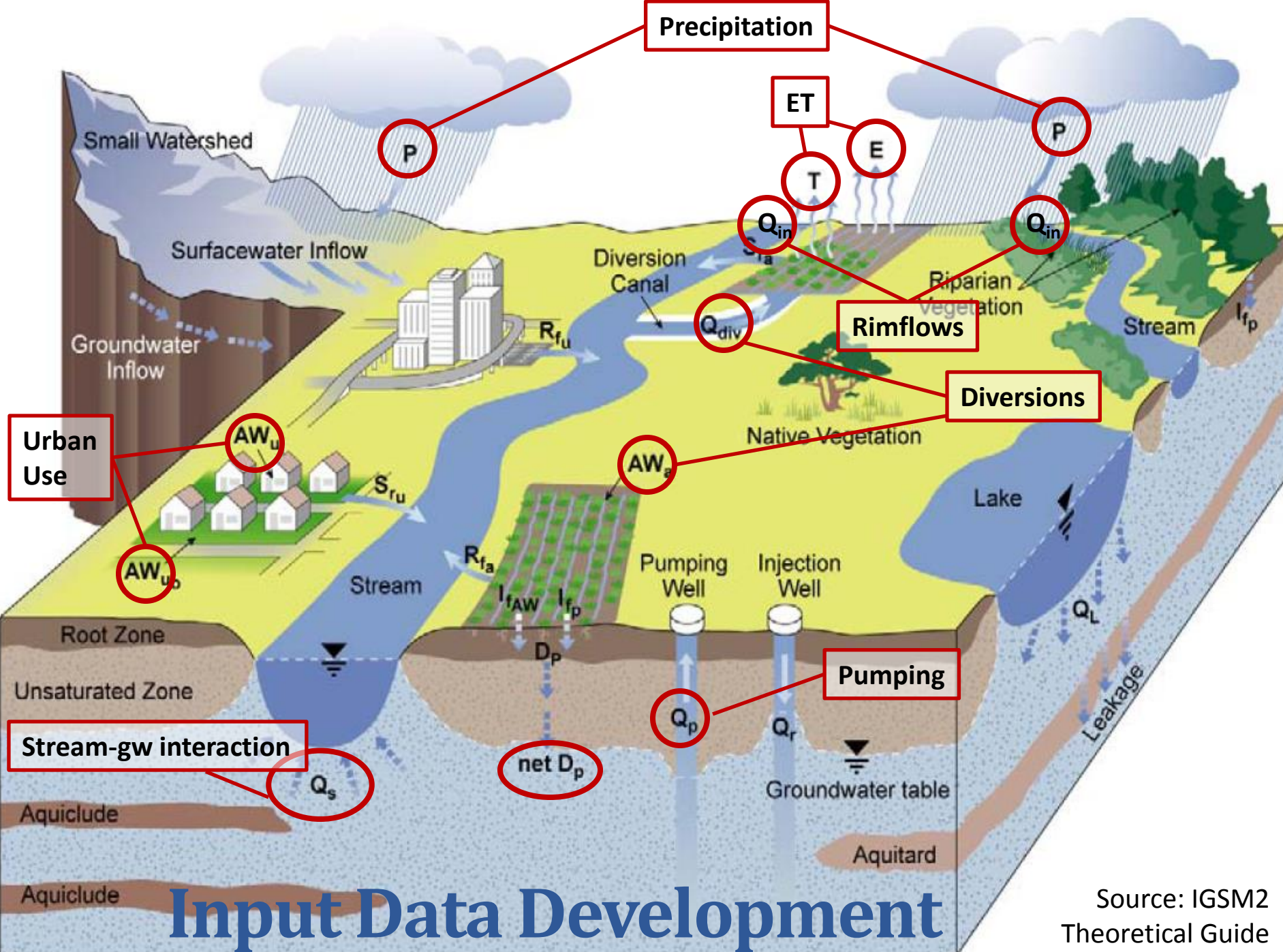
~8 feet 2013 → 2014
 Little change 2014 → 2015

Refinements

- Increased planting density → incremental increase in Almond ET
- Changing irrigation practices → Adjust target soil moisture fraction over time to increase irrigation efficiency from 70% in 1970s to 85% in 2010s
- Laser leveling rice fields → adjust ponding depth inputs for decreased water demand
- Less rice straw burning, more flooding → shift acreage from rice non-decomp land use to flooded decomp

Potential Future Refinements

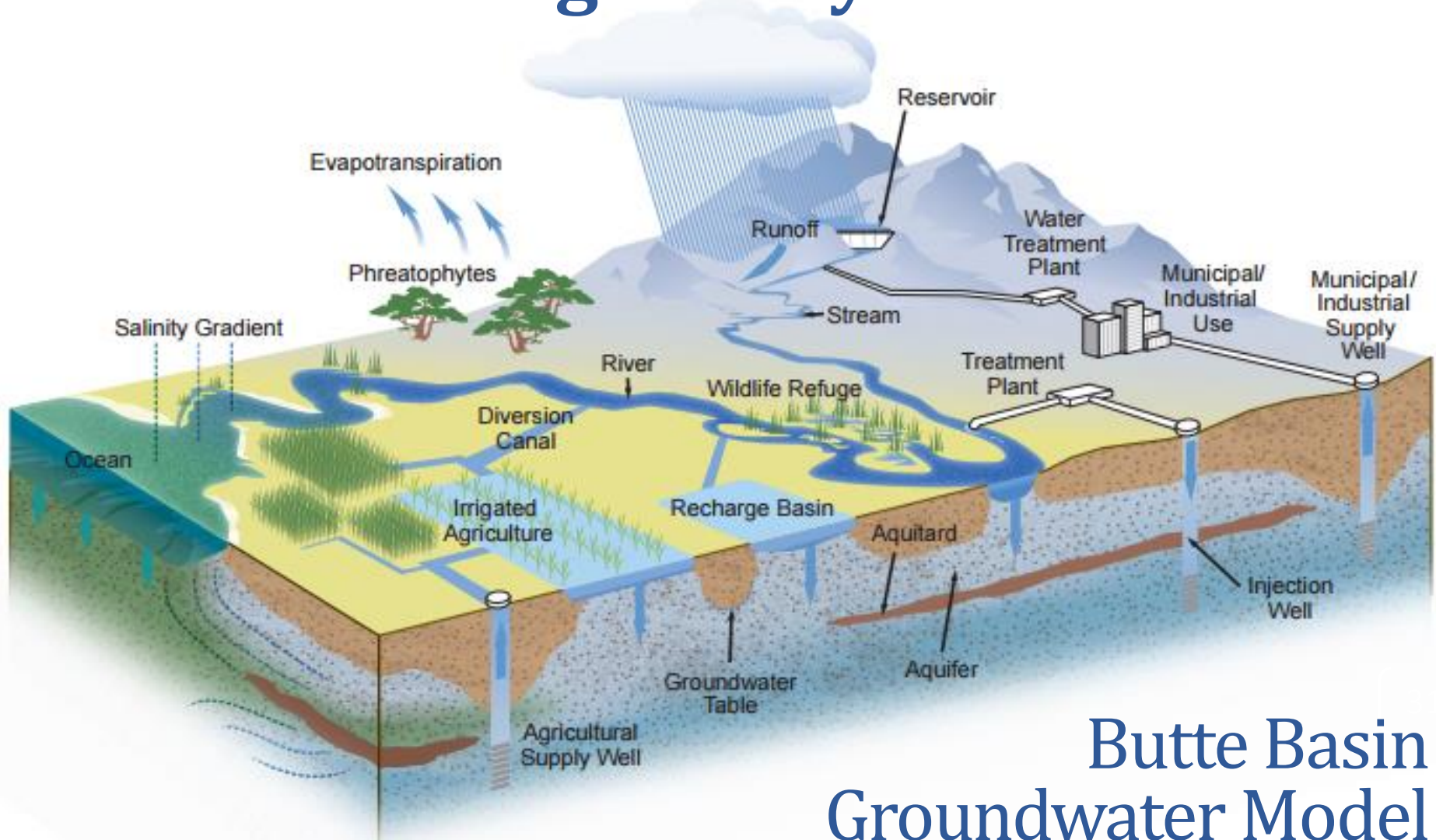
- Rural residential groundwater use
- Frost protection pumping



Input Data Development

Source: IGSM2
Theoretical Guide

Accounting for how water moves into and through the system



Butte Basin
Groundwater Model