Shasta Valley Groundwater Basin Boundary Modification

Sustainable Groundwater Management Act (SGMA)

* September 2014 – Governor Brown signs legislation requiring groundwater resources be managed by local agencies
* Governor emphasized "groundwater mgmt best accomplished locally"
* SGMA establishes requirements for how groundwater basins will be managed over the long-term – through Groundwater Sustainability Agencies and Groundwater Sustainability Plans (GSP)
* Requires agencies of high & medium priority basins to halt overdraft & bring groundwater basins into balance

Groundwater Sustainability Plan (GSP)

* 6 Undesirable Results that must be assessed & managed through minimum thresholds
  * Groundwater storage reduction
  * Chronic lowering of groundwater levels
  * Water quality degradation
  * Interconnected surface water depletion
  * Land subsidence
  * Seawater intrusion

Groundwater Sustainability Plan (GSP)

* Multiple requirements must be implemented into the GSP based on DWR determined BMP's
  * Hydrogeologic Conceptual Model
  * Groundwater model
  * Water budget and balance
  * Establish minimum thresholds & measureable objectives for 6 sustainability factors
  * Management areas
  * Planning & Implementation horizon

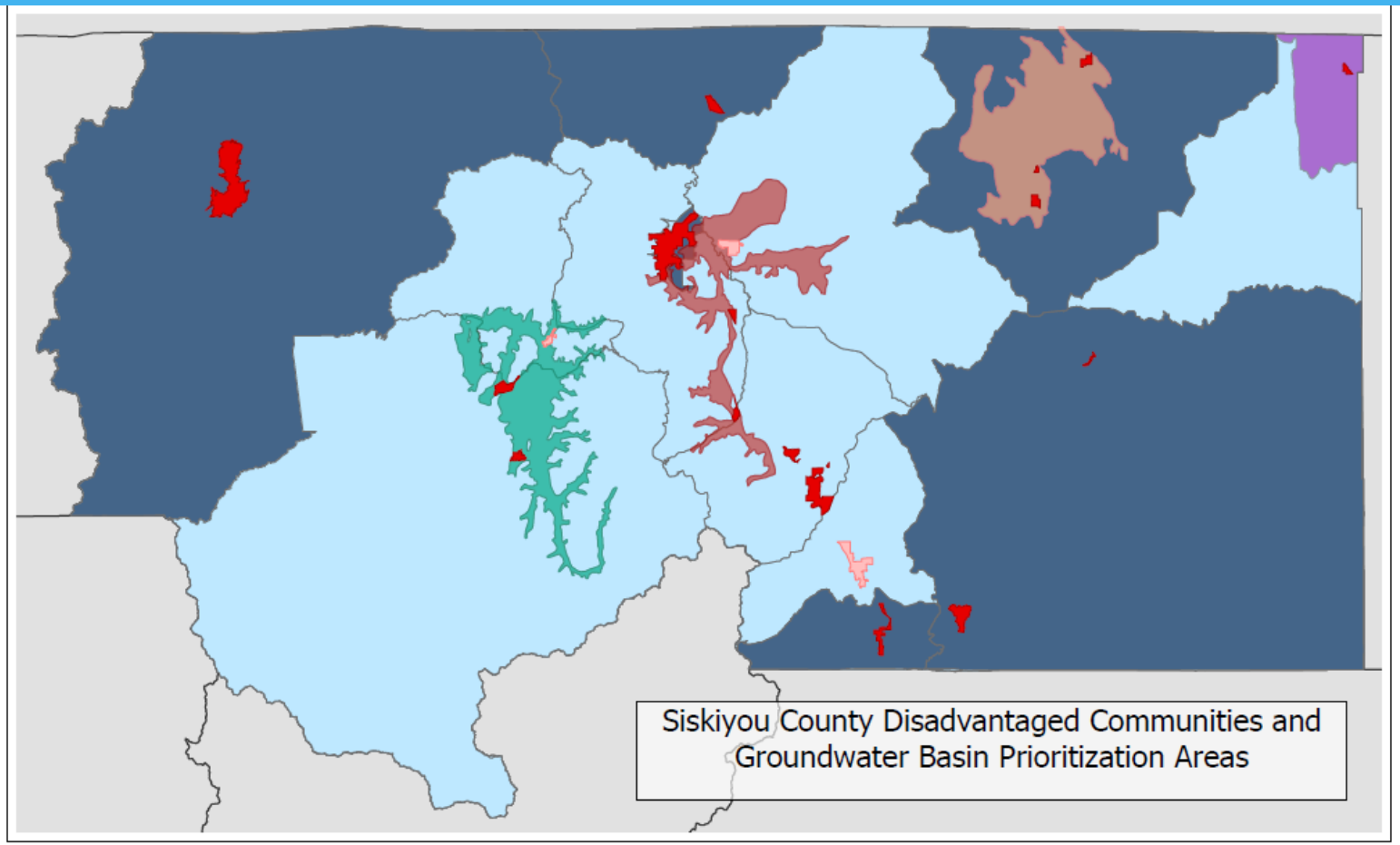
Groundwater Sustainability Plan (GSP)

* Monitoring Network – wells, surface flows, water quality, subsidence, data collection & storage
* Recharge, banking, conjunctive use opportunities
* Achieve sustainability no later than 2042
* May, but not required to address undesirable results prior to 1/1/15
* Developed from consulting assistance through RFP process

SGMA & Residential Use

* “de minimis” extractor
* “means a person who extracts, for domestic purposes, two acre-feet or less per year”. – SGMA definition
* 10725.8 – Measuring devices & reporting does not apply
* 10730 – A “GSA” shall not impose a fee pursuant to this subdivision on a de minimis extractor unless the agency has regulated the users pursuant to this part

Disadvantaged Communities



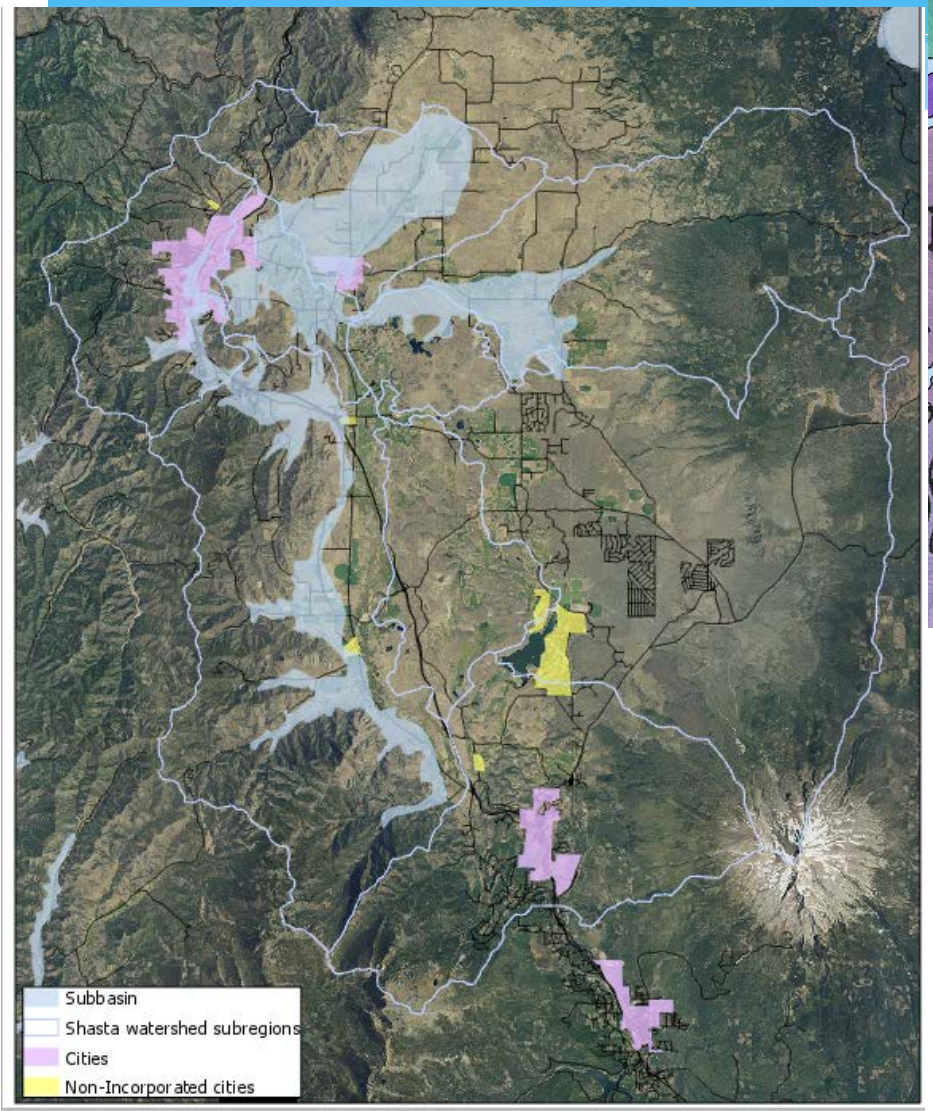
Potential Results from boundary change

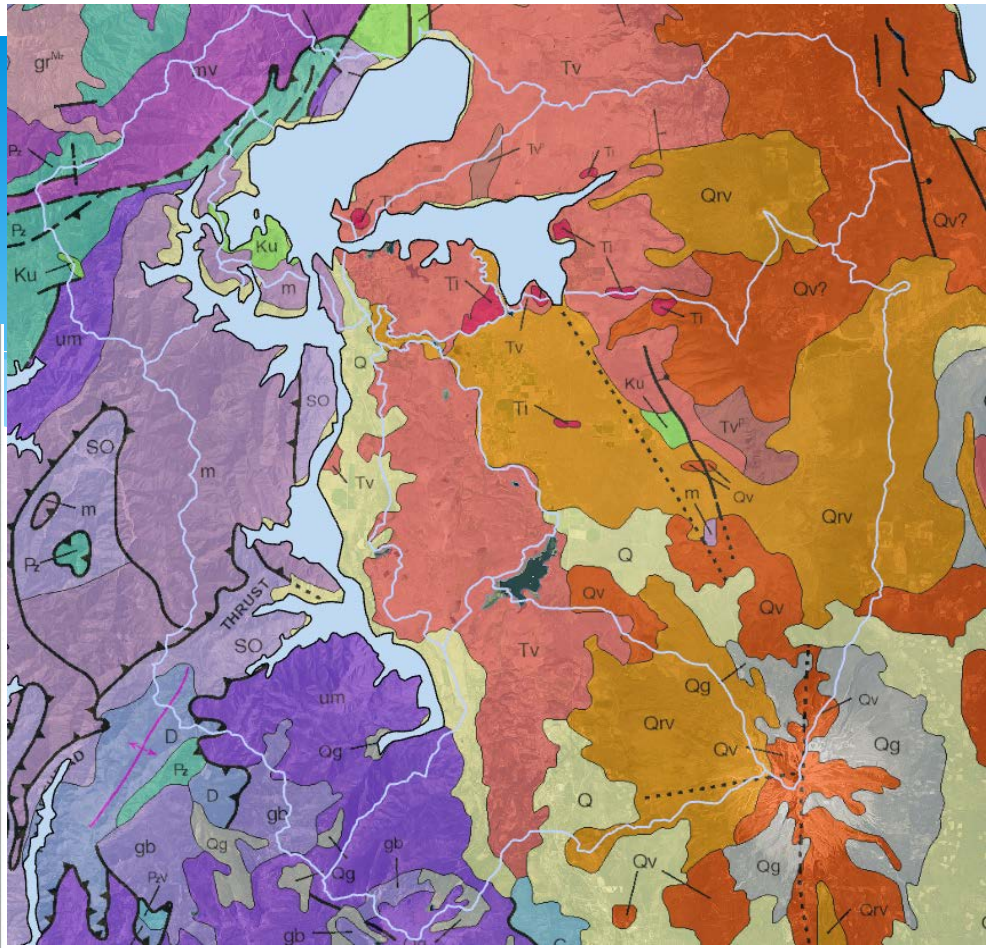
* Inclusion in locally controlled plan, built on local knowledge, studies, & input
* Reliable water availability knowledge & planning based on GSP
* Recharge benefits – within basin boundary
  * Legislation language
* Project & funding opportunities – Grant & GSP related projects can only apply within the basin boundary
* Seat at table & input to GSA & GSP development
* A "process" is in place to determine overdraft regions or negative groundwater supplies, & develop strategy to improve

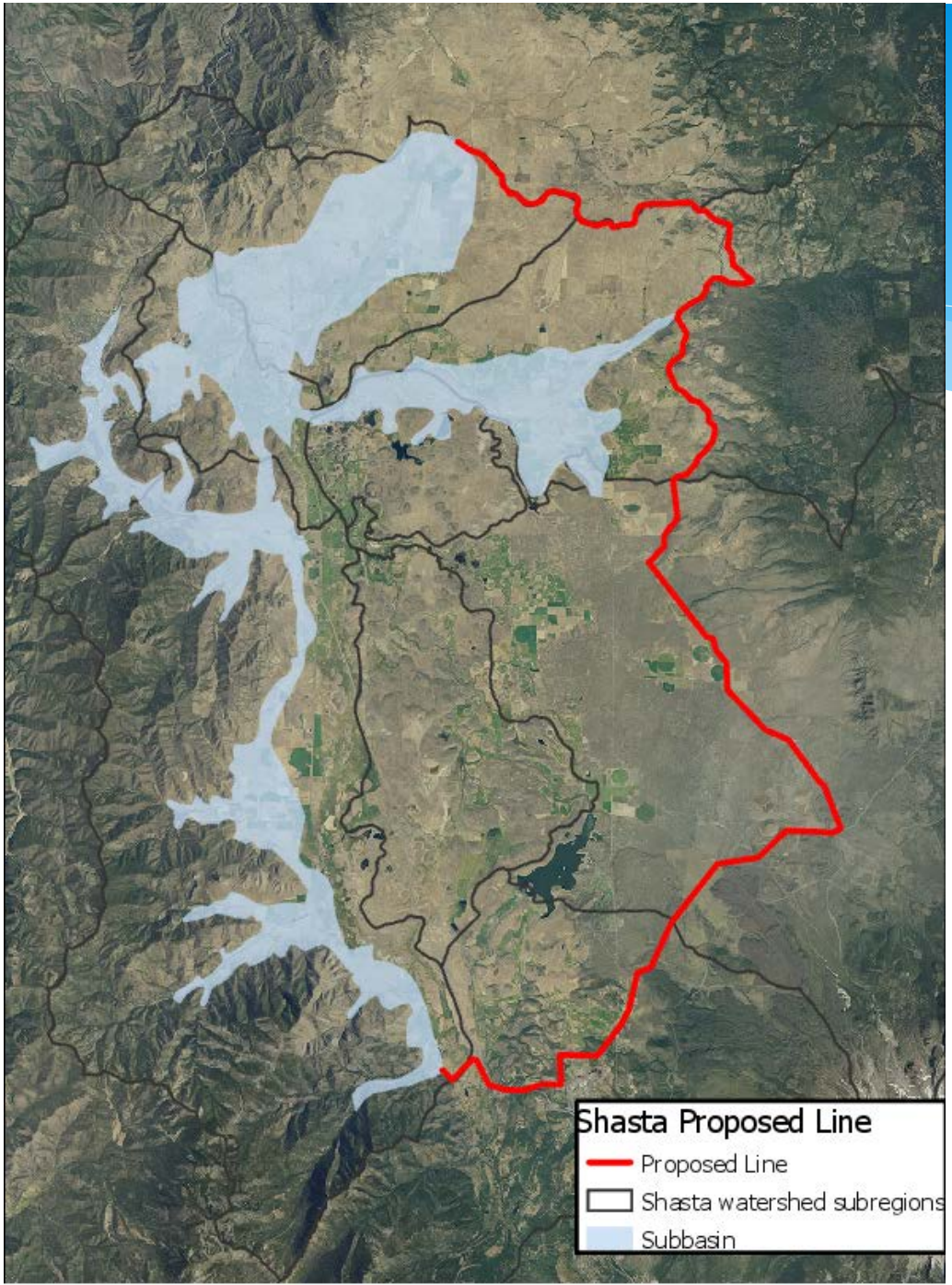
Potential Results from boundary change

* More regulation & oversight
* Potential for additional fees, costs, etc…
  * Public process
* Worst case scenarios around California - potential restrictions, shut-offs, or capping
  * **Not expected in Siskiyou County**
* Potential data & access intrusion
* Does not modify, determine or authorize surface water or groundwater rights

Current boundary







Proposed boundary

* Pluto's cave region provides abundant groundwater
* Shasta River connection
* Over 52% of groundwater irrigation use
* Encompasses large use area
* Covers remaining water use in Gazelle/Grenada subregion

Bulletin 118 (2003)

The following geologic units are not located within the basin boundary but serve as significant groundwater storage and recharge areas within Shasta Valley. Groundwater has also been developed in these areas.

Holocene Plutos Cave Basalt. The Plutos Cave Basalt covers about 50 square miles in the southeastern part of the valley and forms a small segment of the basin boundary south of Little Shasta Valley. The flow is composed of black, vesicular olivine-rich augite basalt. The unit provides abundant water to wells and springs for irrigation and domestic uses with well yields up to 4,000 gpm, averaging 1,300 gpm. The groundwater appears to be present in the lava tubes, fractures and contacts between individual flows. Contacts between flows are vesicular and fractured. The unit may be as thick as 400 feet near the source at the south end of the valley.

Pleistocene Debris Landslide Deposit. The debris avalanche of ancestral Mount Shasta forms the basin boundary to the east from south of Gazelle to north of Grenada. The deposit covers about 180 square miles and consists of

Hydrogeologic Information

Water-Bearing Formations

The primary water-bearing formation in the basin is Quaternary alluvium. Though the basin boundary is defined by alluvial deposits, the groundwater body of the entire valley appears to be hydrologically continuous with all geologic units (Mack 1960) including Plutos Cave basalt, the volcanic rocks of the western Cascades, and the ancestral Mount Shasta debris avalanche. A brief description of these units is provided below.

Justification for revising the boundary

* “g-water body of valley appears to be hydrologically continuous with all geologic units (Mack 1960), including Plutos Cave basalt, volcanic rocks of the western Cascades, & Debris Flow” – Bulletin 118 (2004)
* “Basalt is highly vesicular & fractured, contains lava tubes, and transmits large volumes of g-water” – Ward (2011)

Justification for revising the boundary

* Probably the greatest significance of the volcanic debris avalanche is the role it plays in regulating and redirecting the natural flow of groundwater to the Shasta River. The avalanche deposits resulted in a barrier to the subsequent flow and deposition of the Pluto's Cave basalt. The juxtaposition of the less permeable avalanche deposits with the more permeable Pluto's Cave basalt impedes the flow of groundwater from the basalt, giving rise to numerous springs (including Big Springs) along the line of contact between the formations. (Ward, 2011)

Supporting Technical Reports

* "*Geology & Groundwater Features of Shasta Valley, Siskiyou County California*" Mack (1960)
* "*Shasta Valley, Siskiyou County Groundwater Data Needs Assessment*" DWR/Ward (2011)
* "*Managing Groundwater for Environmental Stream Temperature*" Buck (2013)
* "*Shasta Valley Groundwater Basin*" Bulletin 118 (2004)
* "*Template for components that would be desirable in order to prepare a groundwater management plan for the Shasta Valley Siskiyou County, California*" Davids Engineering, Inc. (2012)

Figure 5. Surface geology of the Shasta Valley hydrologic sub-areas

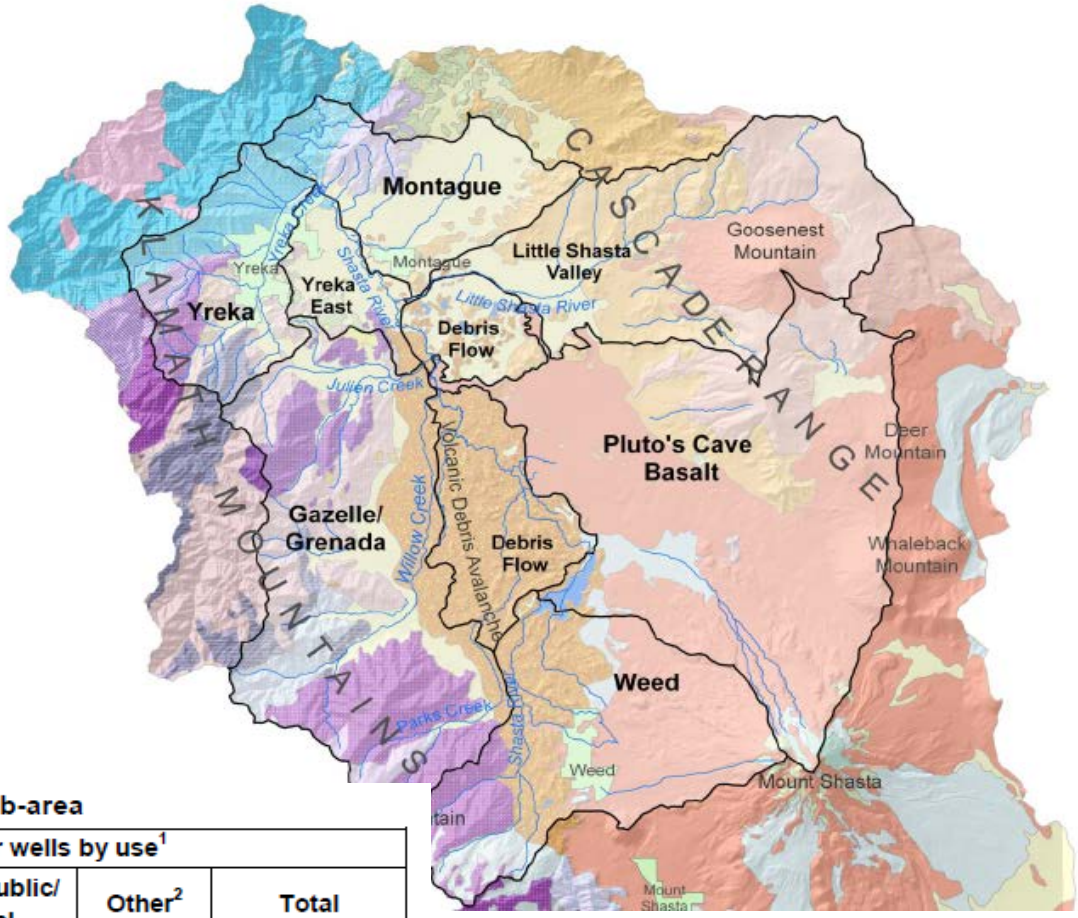


Table 2. Well types by hydrologic sub-area

Hydrologic sub-area	Number of groundwater wells by use[1]				
	Domestic	Irrigation	Municipal/public/ industrial	Other[2]	Total
Debris Flow	36	7	1	3	47
Gazelle/Grenada	329	91	10	41	471
Little Shasta Valley	31	18	0	13	62
Montague	212	16	2	21	251
Pluto's Cave Basalt	295	41	2	28	366
Weed	471	7	11	35	524
Yreka	294	14	3	15	327
Yreka East	169	3	2	6	180
Total	**1,837**	**197**	**31**	**162**	**2,228**

1 Through December 2003

2 Other use types include livestock wells, test wells, or unknown.

Figure 10. Sources of applied irrigation water

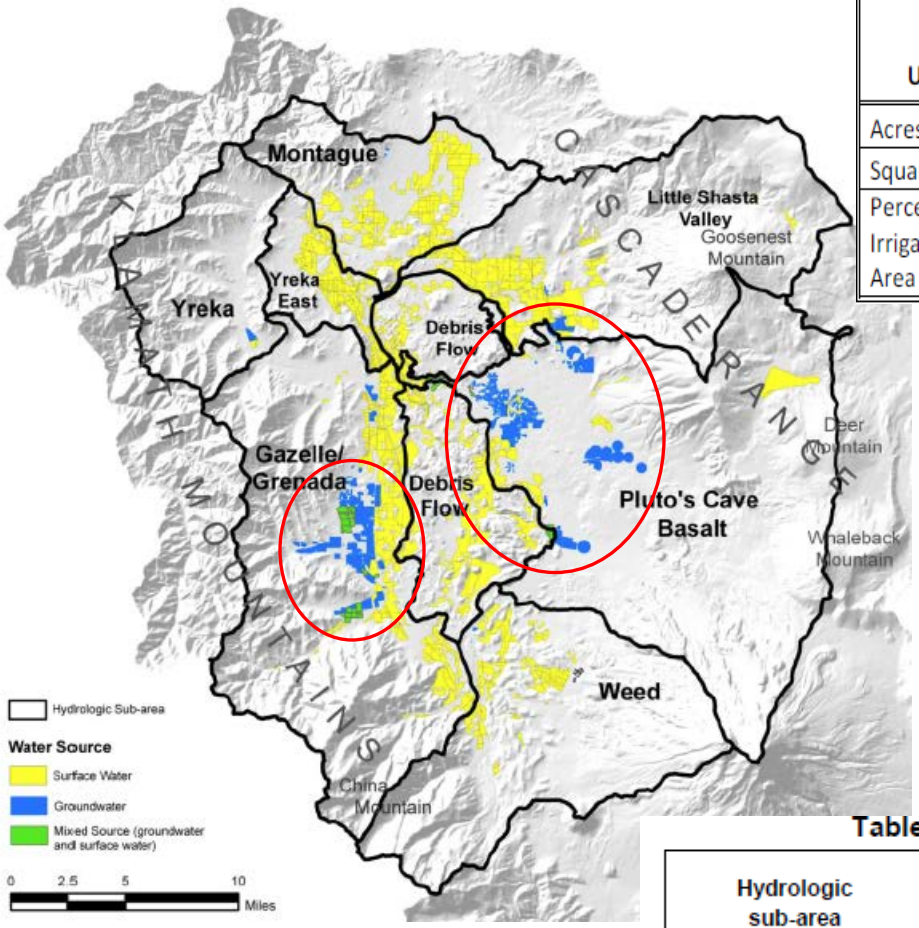


Table 3. Summary of Water Source for 2010 DWR Land Use Survey

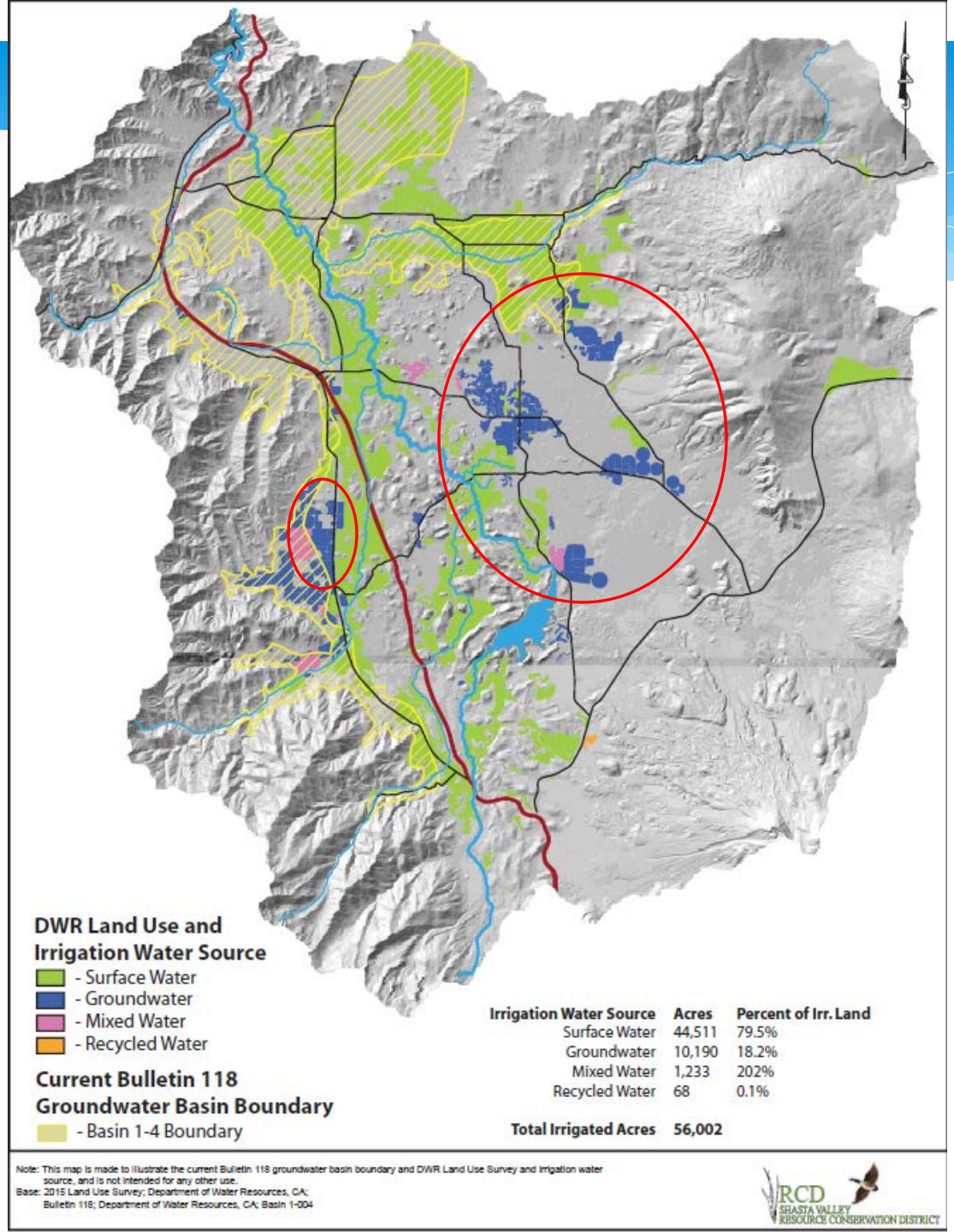
Units	Water Source					Totals
	Surface Water (SW)	Mixed (SW/GW)	Groundwater (GW)	Unknown	Reclaimed	
Acres	53867	145	9498	131	52	63693
Square Miles	84.17	0.23	14.84	0.20	0.08	100
Percent Irrigated Area	84.6%	0.2%	14.9%	0.2%	0.1%	100.0%

	Surface	Ground	Total Acres
	53,867	9,498	63,693
	84.6%	*14.9%*	
Gazelle/Grenada	9,578	4,272	14,682
	20.9%	*41.6%*	*25.5%*
Pluto's Cave	3,484	5,355	9,063
	7.6%	*52.1%*	*15.7%*
Total	45,859	10,277	57,567

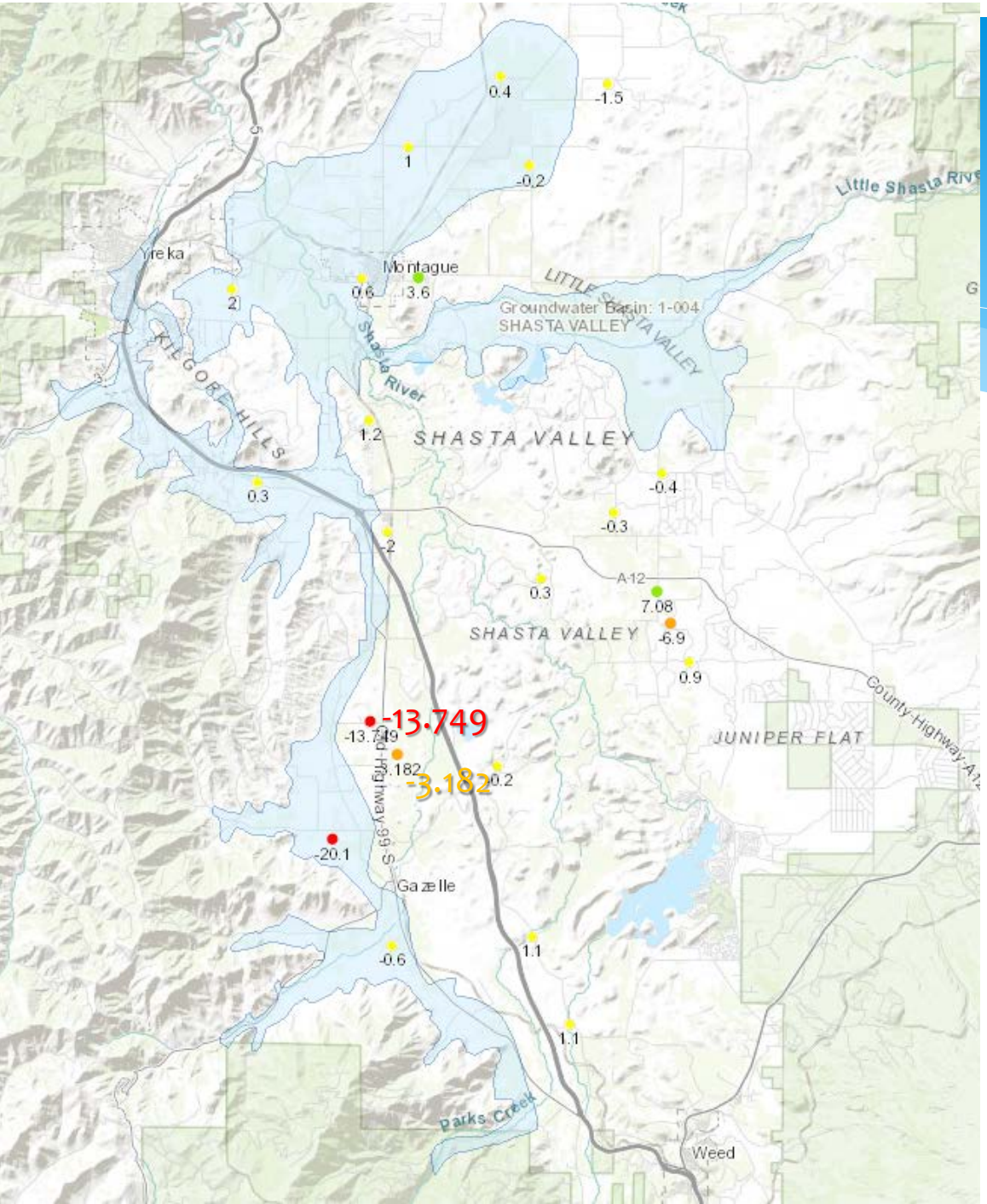
Table 7. Irrigation water source by hydrologic sub-area in 2000

Hydrologic sub-area	Irrigated acreage by water source (acres)				
	Surface water	Groundwater	Mixed sources*	Reclaimed water	Total
Debris Flow	8,516	138	177	-	8,831
Gazelle/Grenada	9,578	4,272	832	-	14,682
Little Shasta Valley	8,152	312	-	-	8,464
Montague	7,922	19	-	130	8,071
Pluto's Cave Basalt	3,484	5,355	224	-	9,063
Weed	3,580	29	-	68	3,677
Yreka	87	99	-	-	186
Yreka East	4,540	53	-	-	4,593
Total	**45,859**	**10,277**	**1,233**	**203**	**57,567**

* Mixed sources represent a combination of surface water or groundwater.


DWR Land Use and
Irrigation Water Source
- Surface Water
- Groundwater
- Mixed Water
- Recycled Water
Current Bulletin 118
Groundwater Basin Boundary
- Basin 1-4 Boundary
Irrigation Water Source Acres Percent of Irr. Land
Surface Water 44,511 79.5%
Groundwater 10,190 18.2%
Mixed Water 1,233 202%
Recycled Water 68 0.1%
Total Irrigated Acres 56,002
Note: This map is made to illustrate the current Bulletin 118 groundwater basin boundary and DWR Land Use Survey and irrigation water source, and is not intended for any other use.
Base: 2015 Land Use Survey; Department of Water Resources, CA;
Bulletin 118; Department of Water Resources, CA; Basin 1-004
RCD
SHASTA VALLEY
RESOURCE CONSERVATION DISTRICT

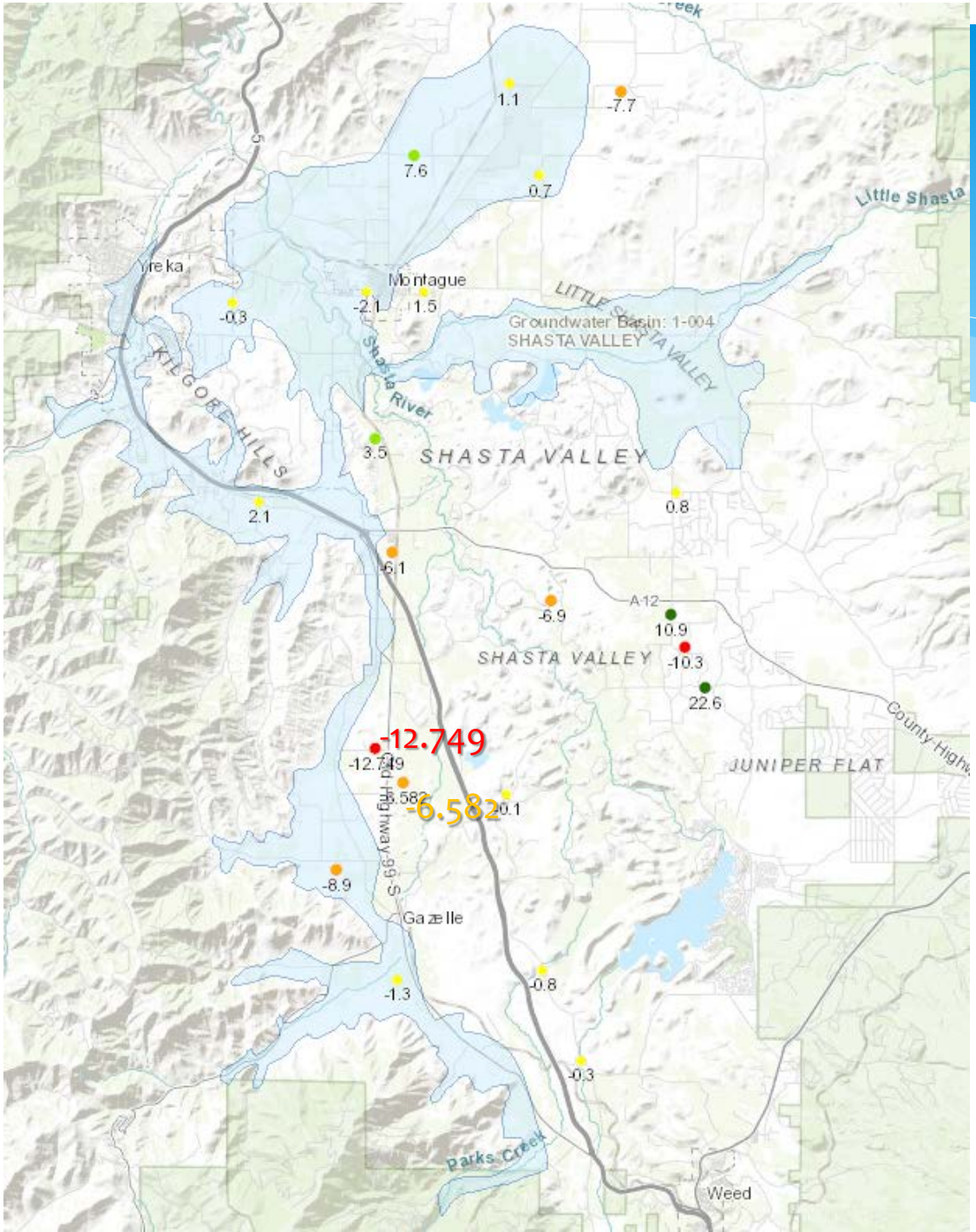
Spring 07-17 depth change



- Increase > 10 feet
- Increase 10 to 2.5 feet
- Change +/- 2.5 feet
- Decrease 2.5 to 10 feet
- Decrease > 10 feet

DWR SGMA Data and Tools Webpage
https://www.water.ca.gov/Programs/Groundwater-Management/Data-and-Tools

Fall 07-17 depth change



- Increase > 10 feet
- Increase 10 to 2.5 feet
- Change +/- 2.5 feet
- Decrease 2.5 to 10 feet
- Decrease > 10 feet

DWR SGMA Data and Tools Webpage
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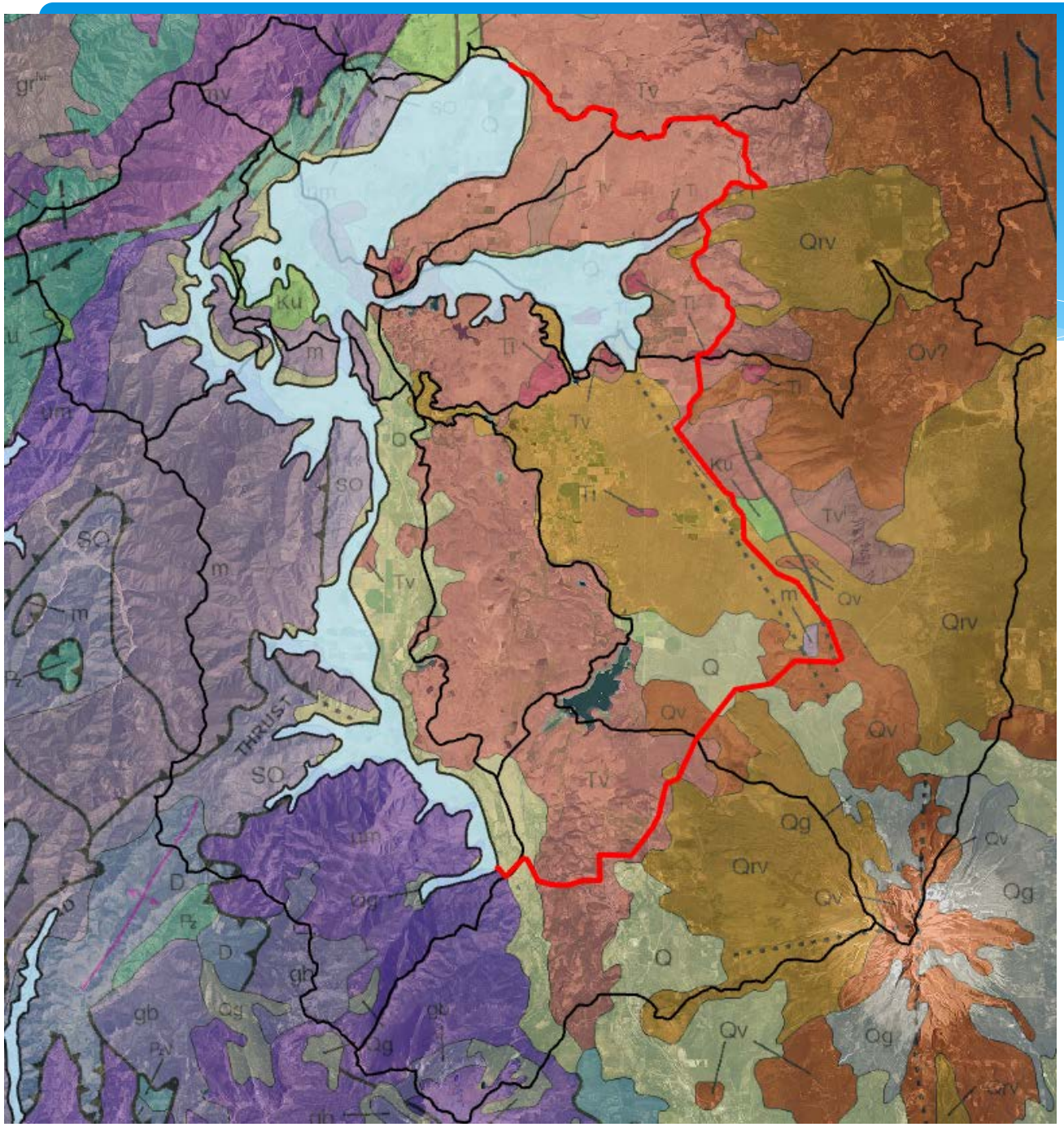
Proposed boundary



QUATERNARY DEPOSITS

Qs	Extensive marine and nonmarine sand deposits, generally near the coast or desert playas
Q	Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated
Qls	Selected large landslides
Qg	Glacial till and moraines. Found at high elevations mostly in the Sierra Nevada and Klamath Mountains
Qoa	Older alluvium, lake, playa, and terrace deposits
QPc	Pleistocene and/or Pliocene sandstone, shale, and gravels deposits; mostly loosely consolidated

QUATERNARY VOLCANIC ROCKS

Qrv	Recent (Holocene) volcanic flow rocks; minor pyroclastic deposits
Qrv^{p}	Recent (Holocene) pyroclastic and volcanic mudflow deposits
Qv	Quaternary volcanic flow rocks; minor pyroclastic deposits
Qv^{p}	Quaternary pyroclastic and volcanic mudflow deposits

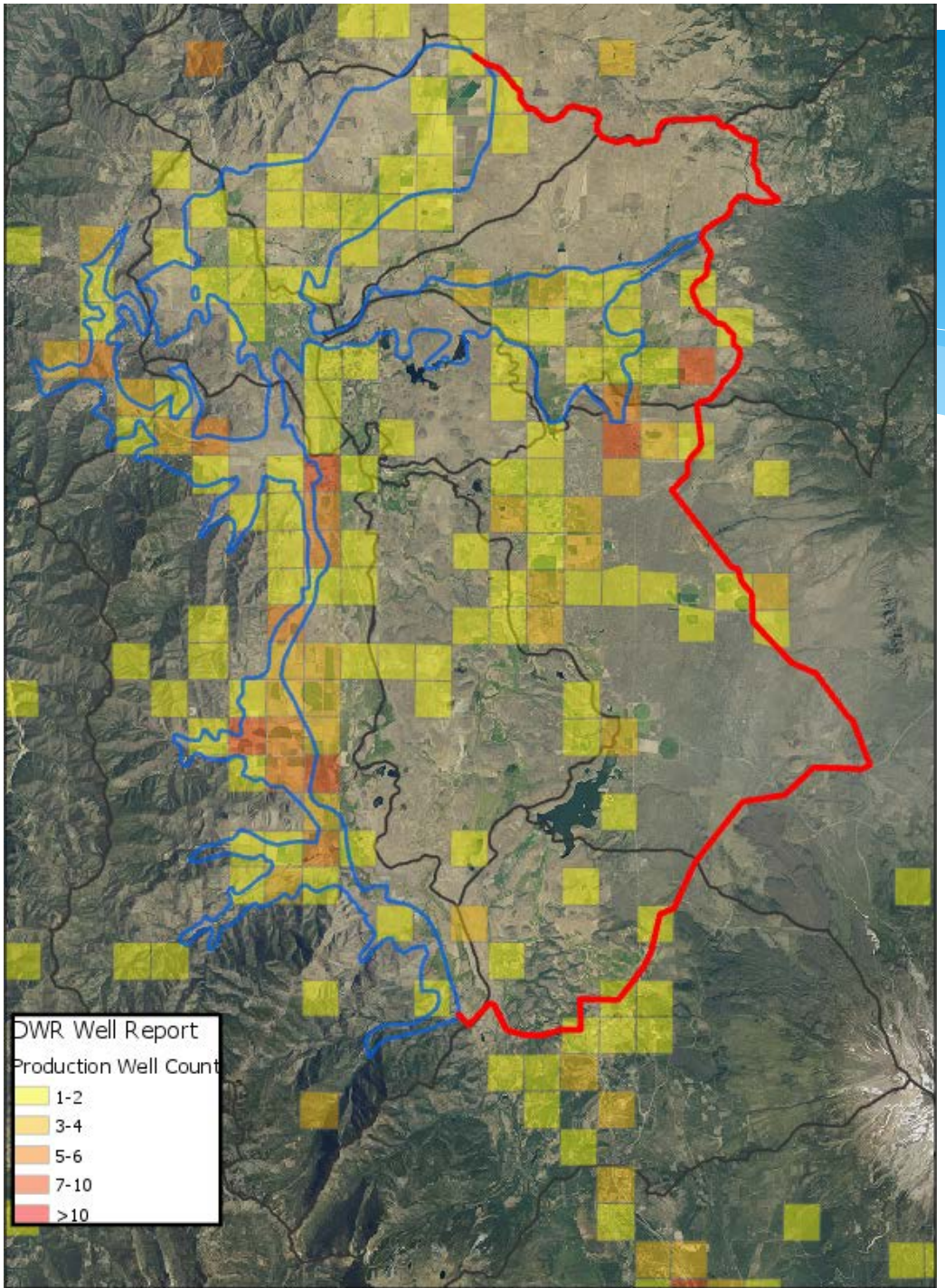
TERTIARY VOLCANIC ROCKS

Tv	Tertiary volcanic flow rocks; minor pyroclastic deposits
Tv^{p}	Tertiary pyroclastic and volcanic mudflow deposits.
Ti	Tertiary intrusive rocks; mostly shallow (hypabyssal) plugs and dikes

MESOZOIC SEDIMENTARY AND METASEDIMENTARY ROCKS

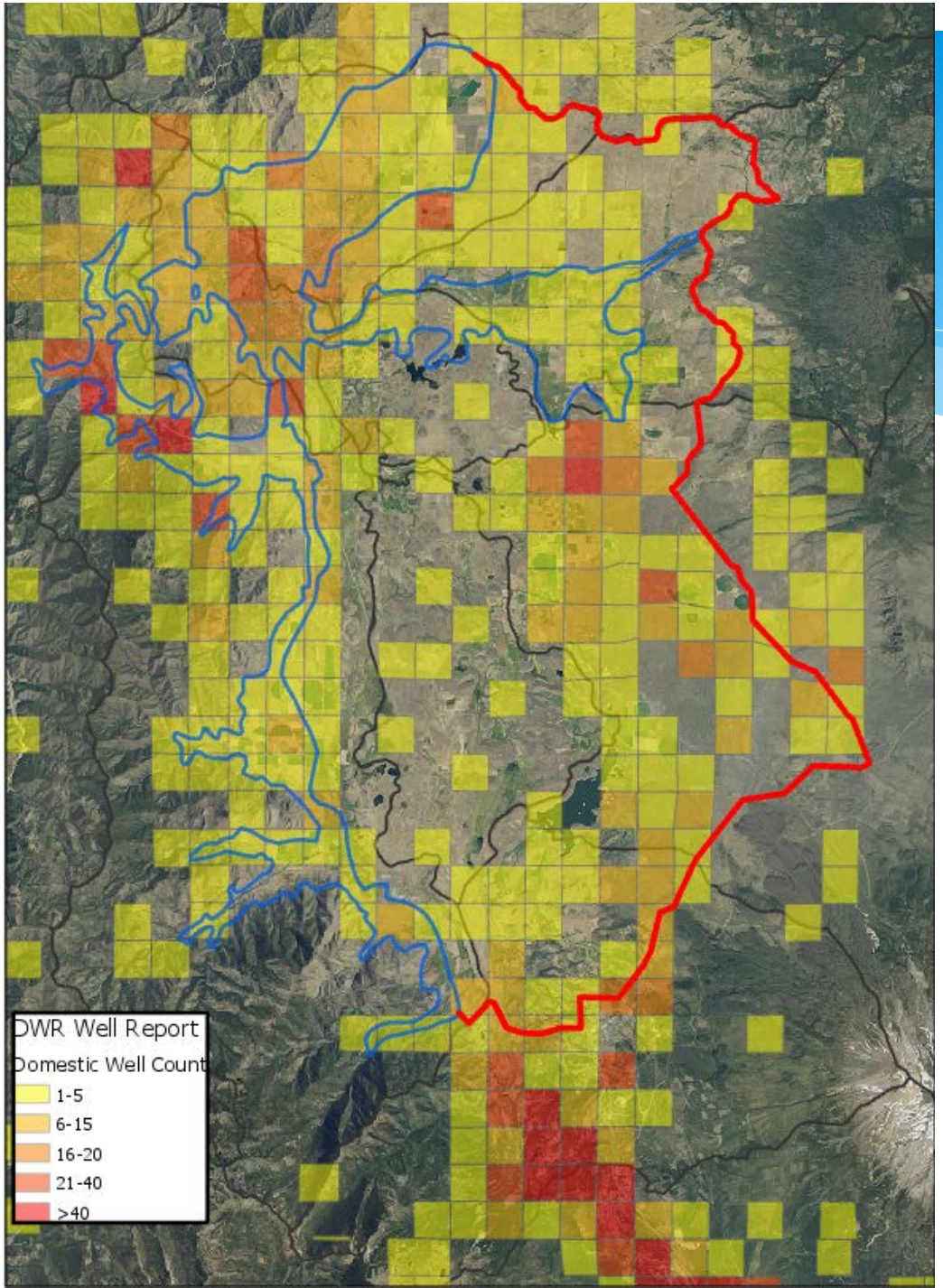
Ku	Upper Cretaceous sandstone, shale, and conglomerate

California Geological Survey, Geologic Data Map No. 2



Proposed boundary

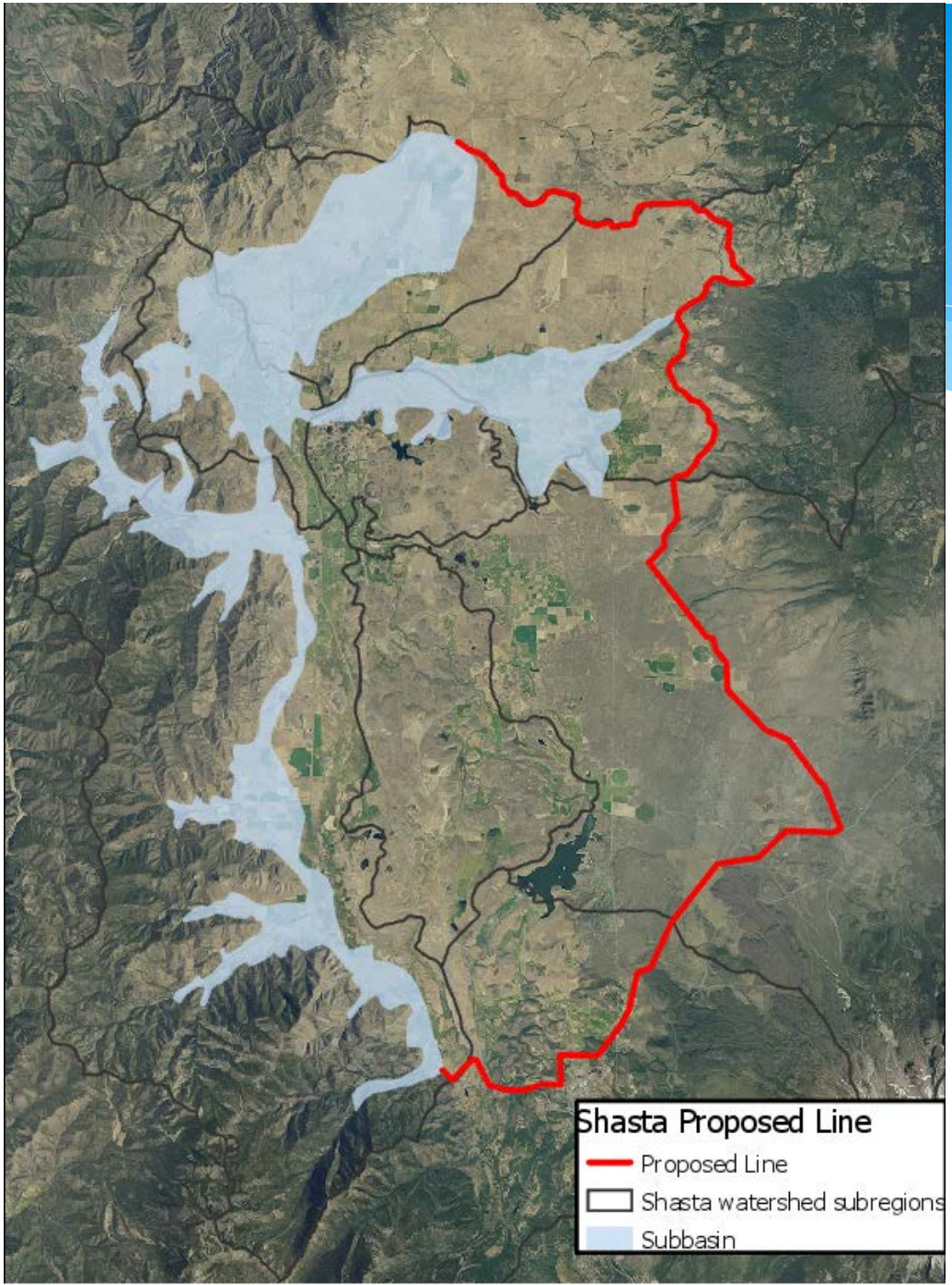
DWR Production Well Count
per Township Range and Section



Proposed boundary

DWR Domestic Well Count
per Township Range and Section

Proposed boundary



Process to submit Proposed Basin Boundary Modification

* Public outreach & accompanying documentation – **On-going**
* Provide comment & subsequent recommendation to the GSA board of directors – **Flood Control directed continued research**

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* Information gathering & boundary line development - **Currently**
* Public meetings regarding proposed draft line – **5/31**

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* Groundwater advisory committee recommendation - **June**
* Notify DWR by writing, of intent to modify - **June**
* GSA decision & approving resolution - **June**
* Submit application

Timeline for Boundary Adoption

* Notification of Intent to DWR –
* Public outreach workshop – May 31
* Public Hearing – June 12th
* Resolution approving GSA to submit application – June 12th
* Finalize application June 13th to 30th
* Submit Application – June 30 (or when ready)
* 30-day public comment – June 30-July 30
* Draft release – Fall 2018?
* Final modifications release – Fall/Winter 2018
* Basin adopted under Bulletin 118 – 2020?

Public comment

* GSA welcomes all comments from public
  * Letters/email of support or opposition
* Send to:

  mparker@co.siskiyou.ca.us

  Subject – Shasta Groundwater Basin Boundary
* Public Hearing

* Official comment during DWR review period (6/30-7/30)