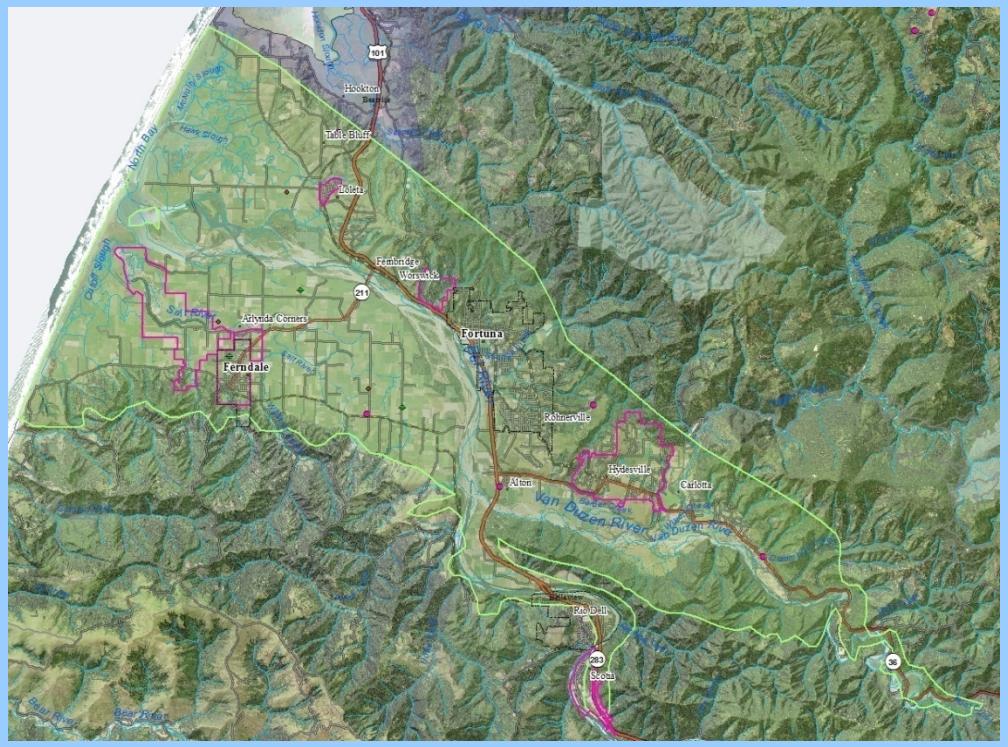
Groundwater Sustainability Plan Alternative for the Eel River Valley Groundwater Basin



Humboldt County Farm Bureau

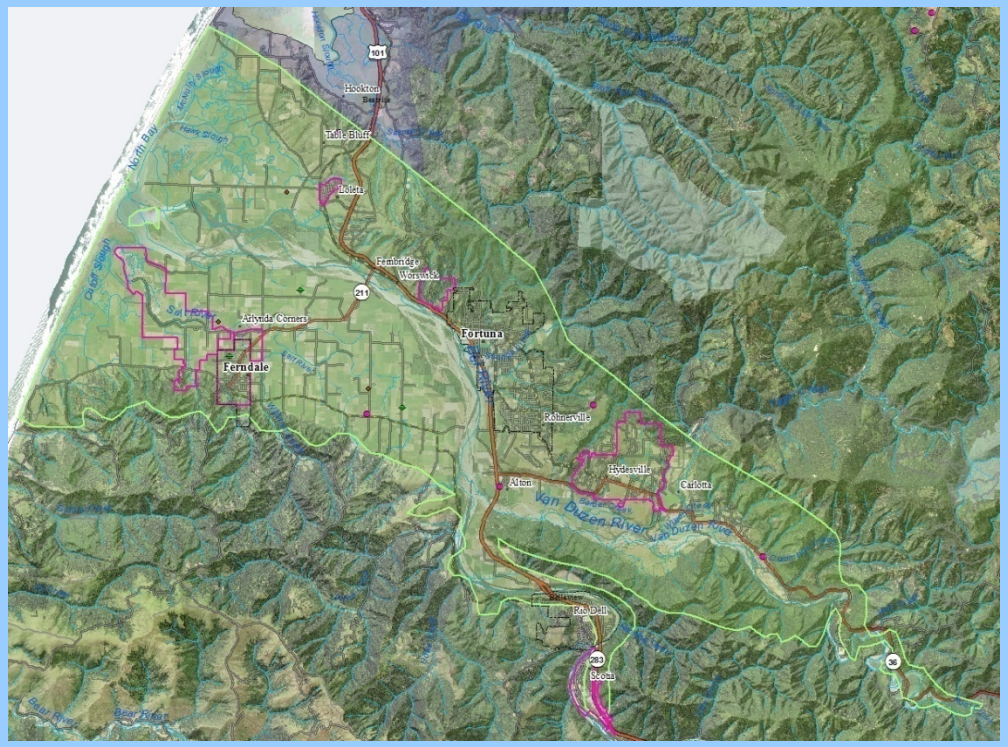
May 3, 2018

Humboldt County
Public Works Department
Hank Seemann, Deputy-Director

Department of Public Works

http://humboldtgov.org/groundwater

Groundwater Sustainability Plan Alternative for the Eel River Valley Groundwater Basin



With assistance from:

Agricultural producers
Municipal water suppliers
Department of Water Resources
Eel River Valley Groundwater Working Group
Fisch Drilling
SHN Consulting Engineers and Geologists
Thomas Gast and Associates
Palmer Environmental Consulting Group
Humboldt County Resource Conservation District
UC-Cooperative Extension
USDA-NRCS
Humboldt County Farm Bureau
Don and Cheryl Laffranchi
Pat Higgins
David Sopjes
Eric Stockwell

Department of Public Works

http://humboldtgov.org/groundwater

State groundwater policy established by the Sustainable Groundwater Management Act (2014)

Water Code Section 113: It is the policy of the state that groundwater resources be managed sustainably for long-term reliability and multiple economic, social, and environmental benefits for current and future beneficial uses. Sustainable groundwater management is best achieved locally through the development, implementation, and updating of plans and programs based on the best available science.

Sustainable groundwater management: the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results

Undesirable results means one or more of the following effects caused by groundwater conditions occurring throughout the basin: [*next slide*]

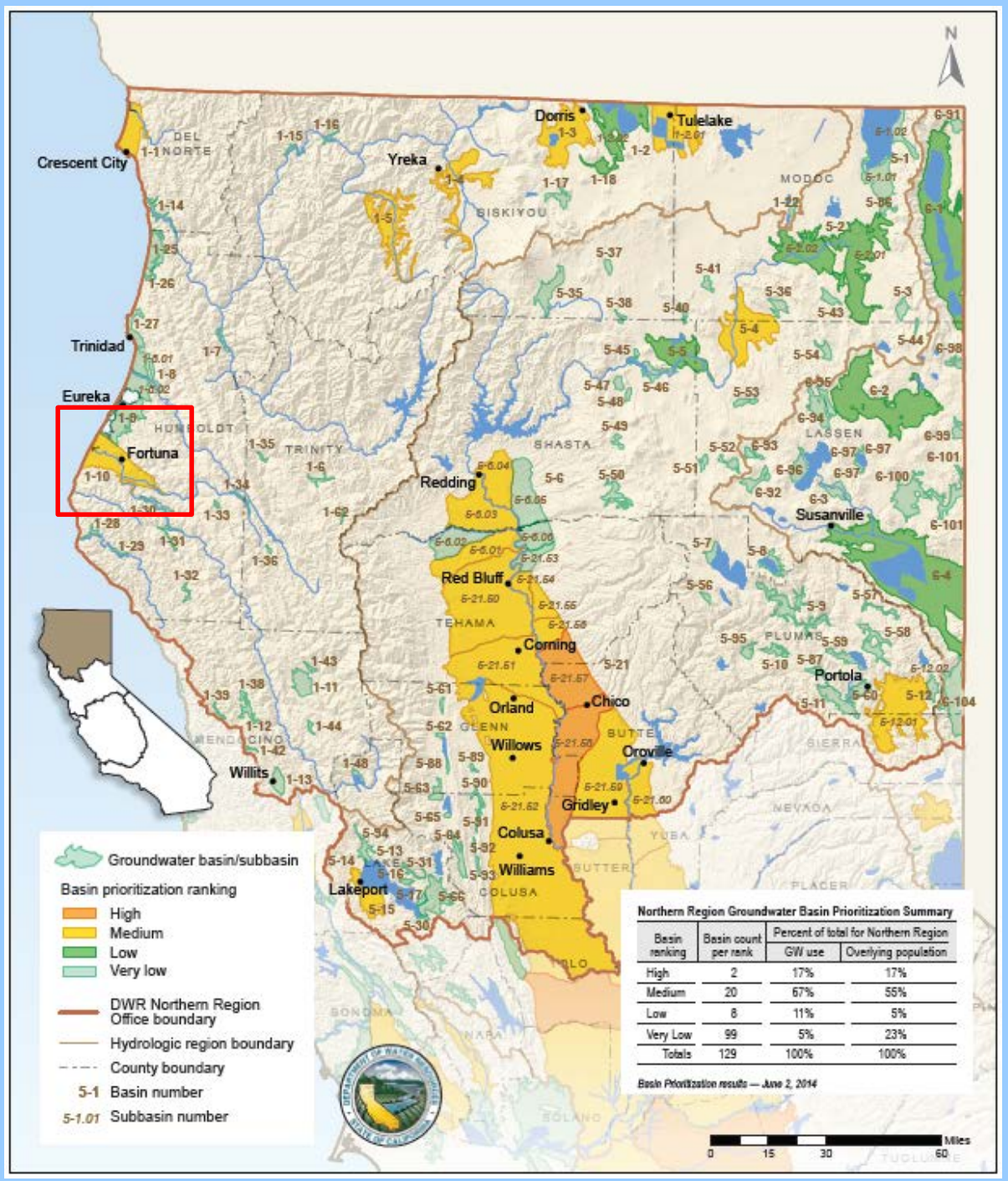
Six Sustainability Indicators

1	Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
2	Significant and unreasonable reduction of groundwater storage
3	Significant and unreasonable seawater intrusion
4	Significant and unreasonable degraded water quality
5	Significant unreasonable land subsidence
6	Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

SGMA compliance – three potential pathways

1. DWR changes prioritization level of Eel River Valley groundwater basin from Medium to Low
   - 8 criteria; currently 2.82 points above medium-priority threshold
   - Improved data were acquired on irrigated acreage, groundwater reliance
   - If priority level changes, SGMA activities are optional
2. Groundwater Sustainability Plan Alternative
   - Based on demonstration that basin has been managed sustainably for the last 10 years (no undesirable results)
   - Submitted on December 30, 2016; DWR to review in 2017
   - Requires annual reporting and five-year updates
   - “Local agency” can make submittal; GSA not required
3. Groundwater Sustainability Agency / Sustainability Plan
   - GSA required to prepare, adopt, implement a GSP
   - GSAs need to be established by June 30, 2017 (Plans due January 2022)
   - GSA is public agency, has powers and authorities

Ranking of Groundwater Basin Importance – Northern California



Northern Region Groundwater Basin Prioritization Summary

Basin ranking	Basin count per rank	Percent of total for Northern Region	
		GW use	Overlying population
High	2	17%	17%
Medium	20	67%	55%
Low	8	11%	5%
Very Low	99	5%	23%
Totals	129	100%	100%

Basin Prioritization results — June 2, 2014

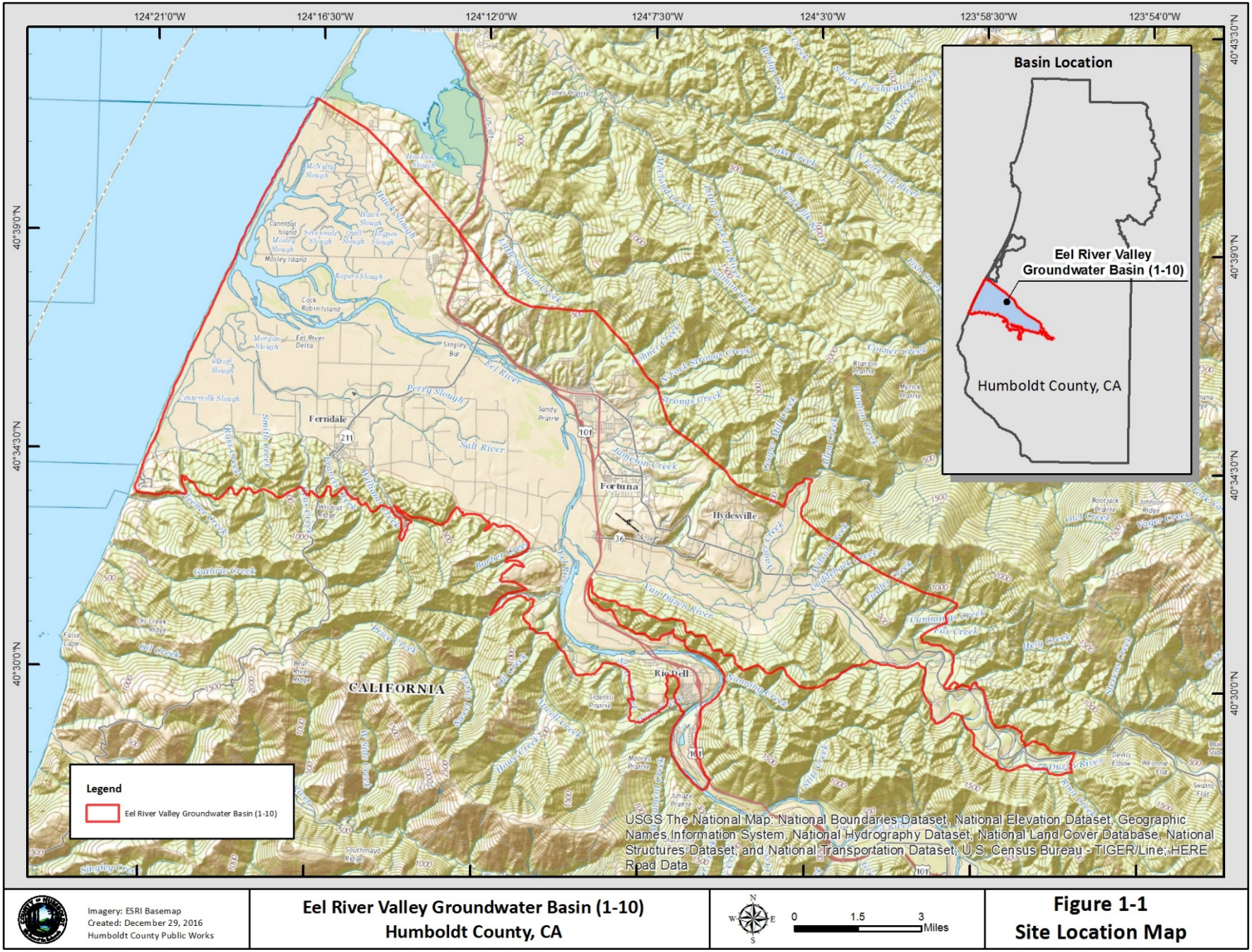
Eight criteria:

1. Population density
2. Population growth
3. Public supply wells
4. Total wells
5. Irrigated acreage
6. Groundwater reliance
7. Documented impacts
8. Other information

Table 3. Data Component Ranking Ranges for CASGEM Groundwater Basin Ranking

Ranking	Ranking Value	Data Components and Ranking Ranges						
		Population		PSW Density	Total Well Density	Irrigated Acreage	Groundwater Reliance	
		Density	Projected Growth				GW Use	% of Total Supply [1]
		per sq.-mi	%	per sq.-mi	per sq. mi	ac/sq.-mi	ac-ft/acre	%
Very Low	0	x < 7	x < 0	x = 0	x = 0	x < 1	x < 0.03	x < 0.1
Low	1	7 ≥ x < 250	0 ≥ x < 6	0 > x < 0.1	0 > x < 2	1 ≥ x < 25	0.03 ≥ x < 0.1	0.1 ≥ x < 20
Moderately Low	2	250 ≥ x < 1000	6 ≥ x < 15	0.1 ≥ x < 0.25	2 ≥ x < 5	25 ≥ x < 100	0.1 ≥ x < 0.25	20 ≥ x < 40
Medium	3	1000 ≥ x < 2500	15 ≥ x < 25	0.25 ≥ x < 0.5	5 ≥ x < 10	100 ≥ x < 200	0.25 ≥ x < 0.5	40 ≥ x < 60
Moderately High	4	2500 ≥ x < 4000	25 ≥ x < 40	0.5 ≥ x < 1.0	10 ≥ x < 20	200 ≥ x < 350	0.5 ≥ x < 0.75	60 ≥ x < 80
High	5	x ≥ 4000	x ≥ 40%	x ≥ 1.0	x ≥ 20	x ≥ 350	x ≥ 0.75	x ≥ 80%

Note:
Population growth is percent growth from 2010 to 2030.
[1] Percent of total water supply (groundwater and surface water) that is provided by groundwater.
x = component data value



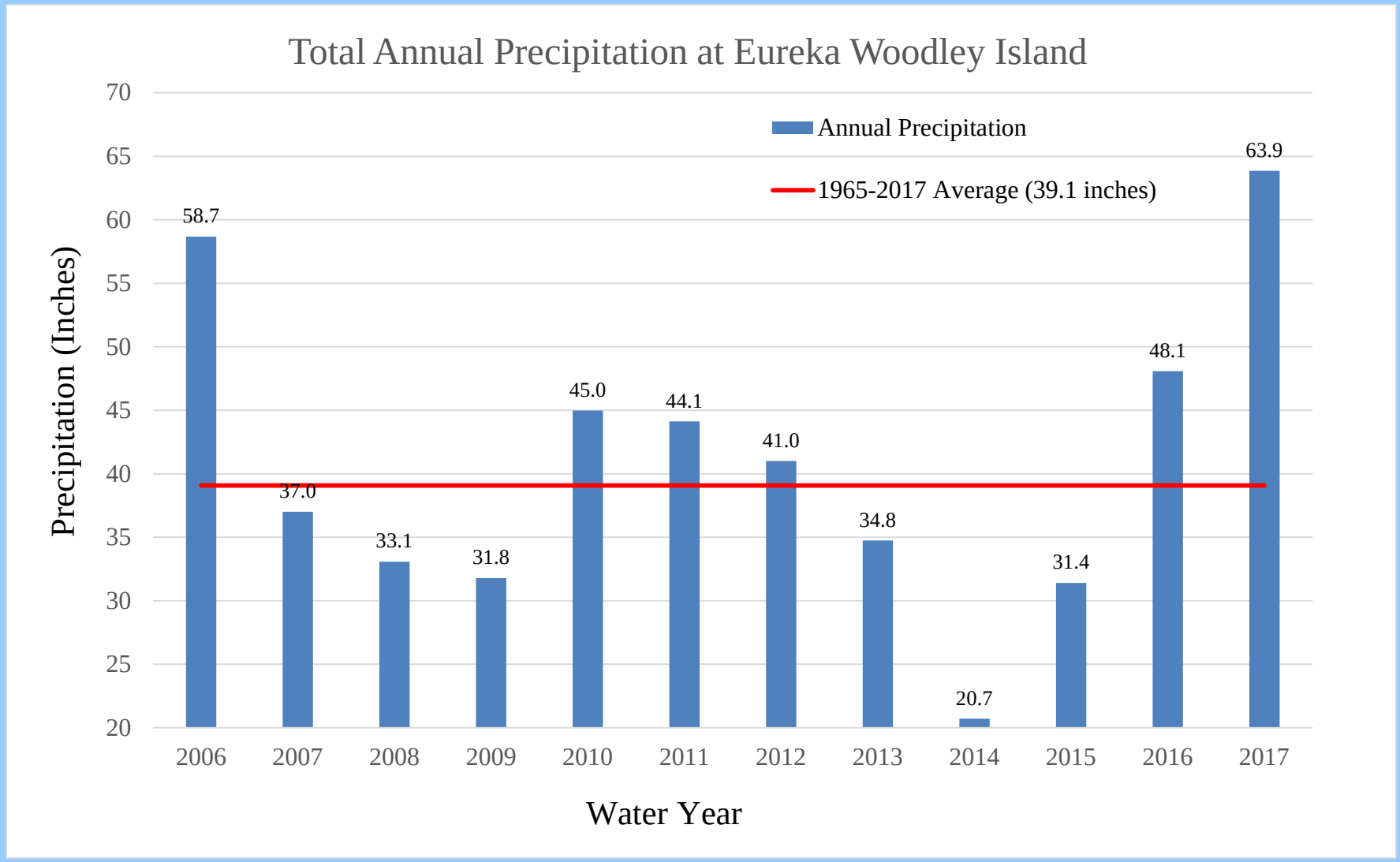
Imagery: ESRI Basemap
Created: December 29, 2016
Humboldt County Public Works

Eel River Valley Groundwater Basin (1-10)
Humboldt County, CA

0 1.5 3 Miles

Figure 1-1
Site Location Map

Source: David Sopjes (August 29, 2014)

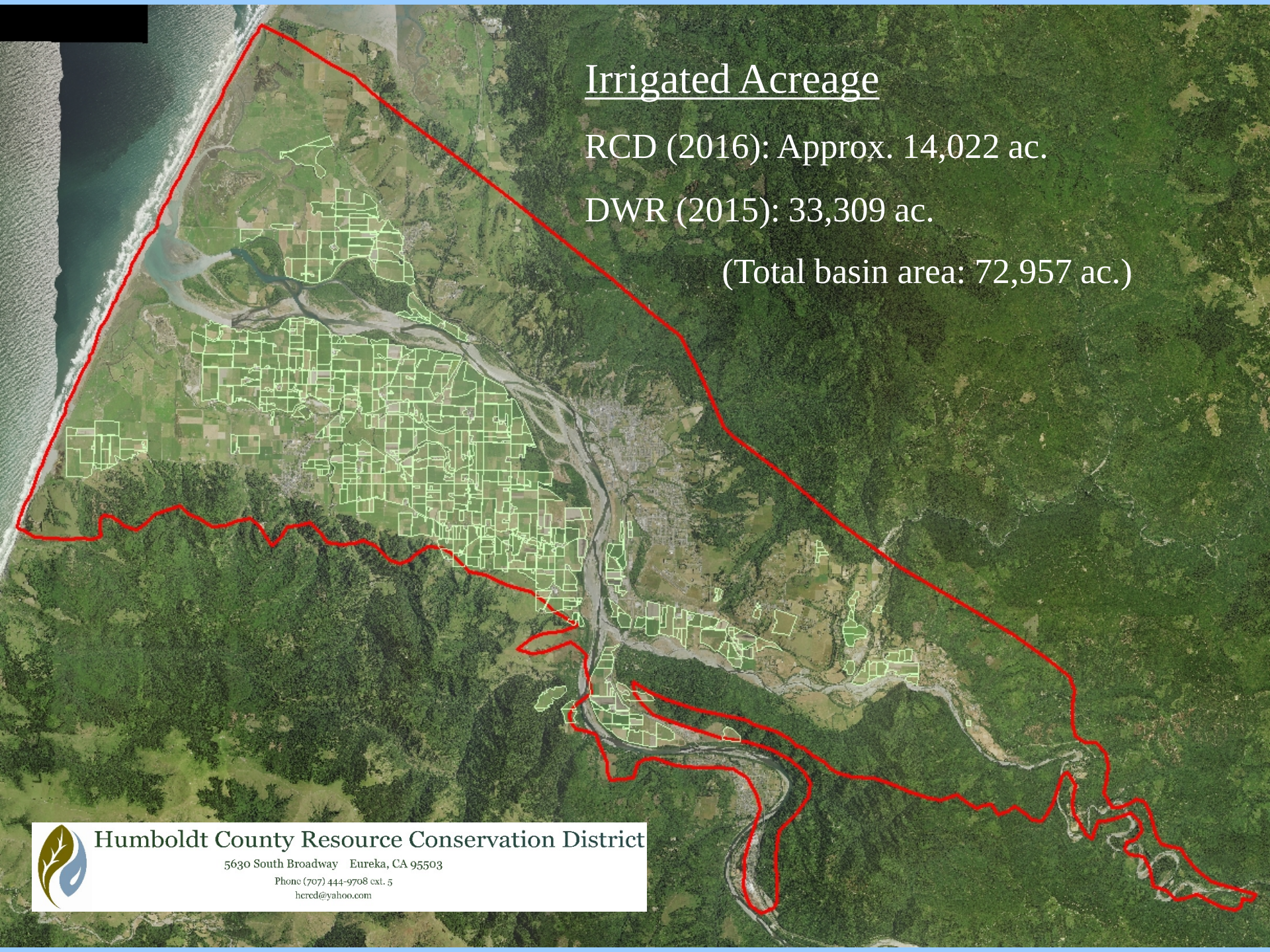

Total Annual Precipitation at Eureka Woodley Island
Annual Precipitation
1965-2017 Average (39.1 inches)
Precipitation (Inches)
70
65
60
55
50
45
40
35
30
25
20
58.7
37.0
33.1
31.8
45.0
44.1
41.0
34.8
20.7
31.4
48.1
63.9
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Water Year

Source: Jason Buck (January 11, 2017)

Eel River Valley Groundwater Working Group

Working Group Members (as of Sept. 12, 2016)

Ben Dolf	Dave Fisch	Frances Tjarnstrom	John Vevoda	Merritt Perry	Tom Gast
Bob McPherson	Dave Rodrigues	Jay Russ	Joseph Alexandre	Michael Wheeler	Tracy Boobar
Brad Job	Denver Nelson	Jeff Dolf	Katherine Ziemer	Patrick Sullivan	Troy Hubner
Chad Lake	Doreen Hansen	Jeff Stackhouse	Kevin Farmer	Ryan Rice	Yana Valachovic
Cheryl Laffranchi	Emily Afriat-Hyman	Jill Demers	Lee Mora	Stuart Dickey	
Clif Clendenen	Estelle Fennell	John Corbett	Marcus Drumm	Summer Daugherty	

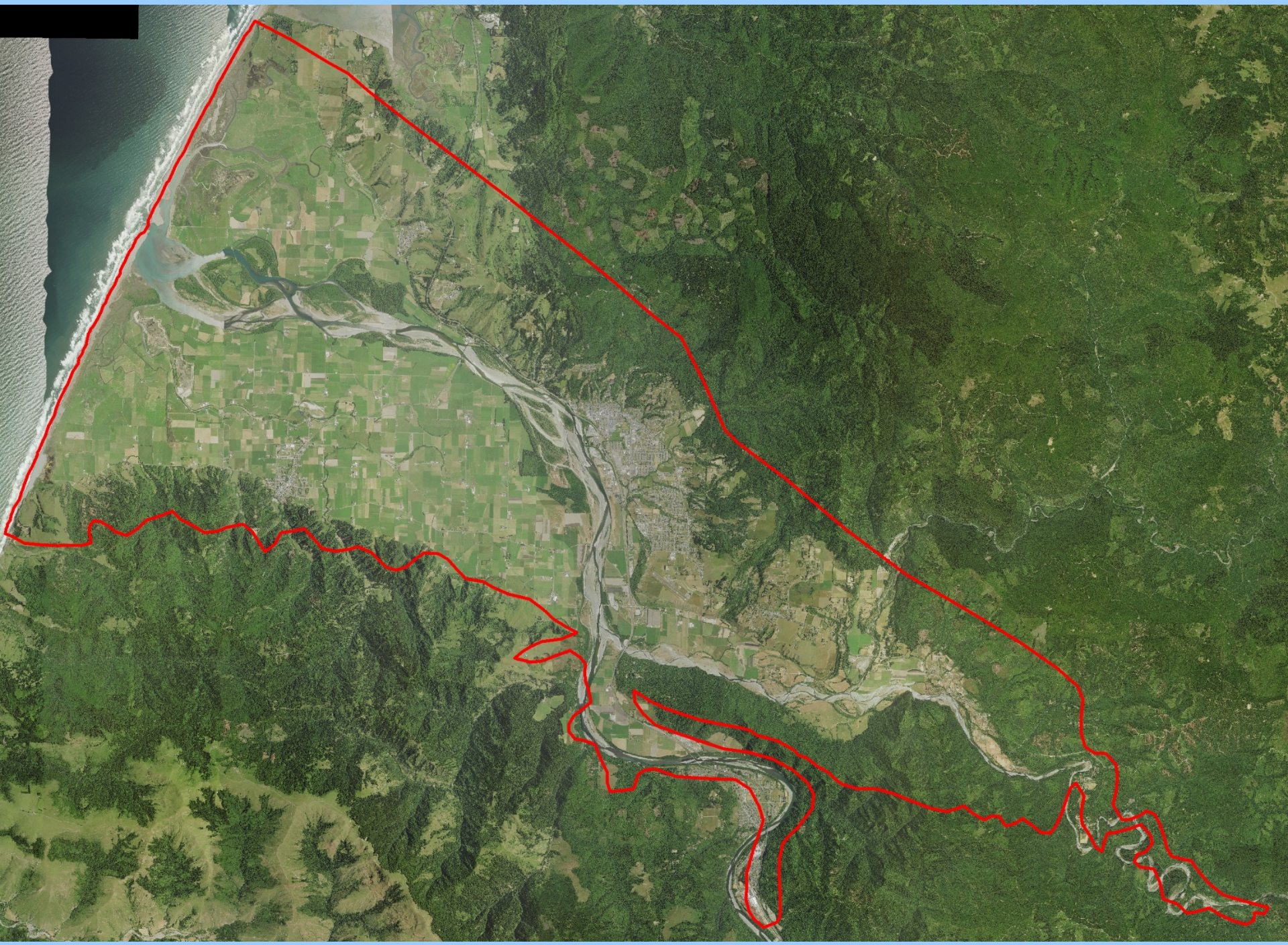


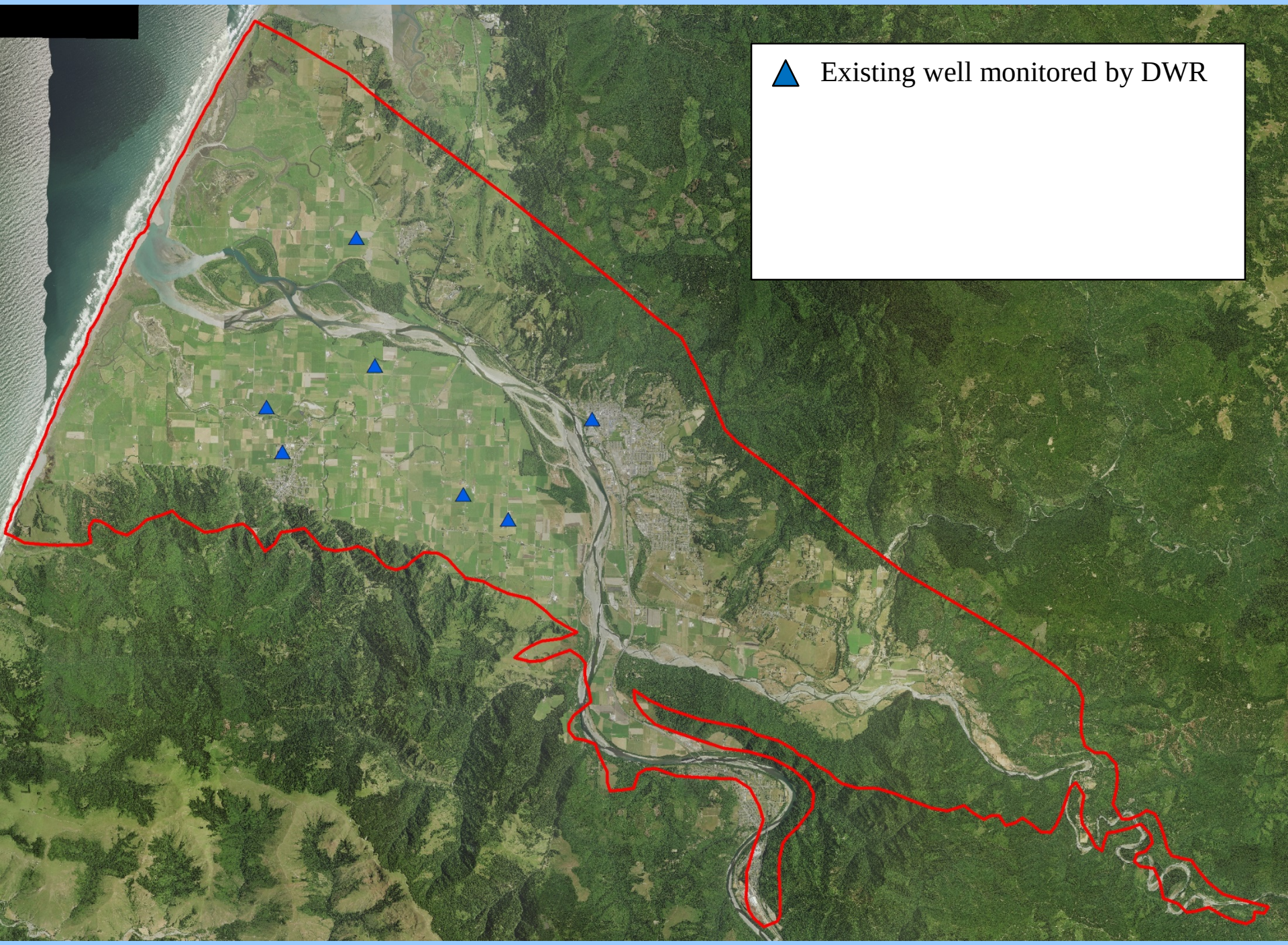
Humboldt County Resource Conservation District
5630 South Broadway Eureka, CA 95503
Phone (707) 444-9708 ext. 5
hcrcd@yahoo.com

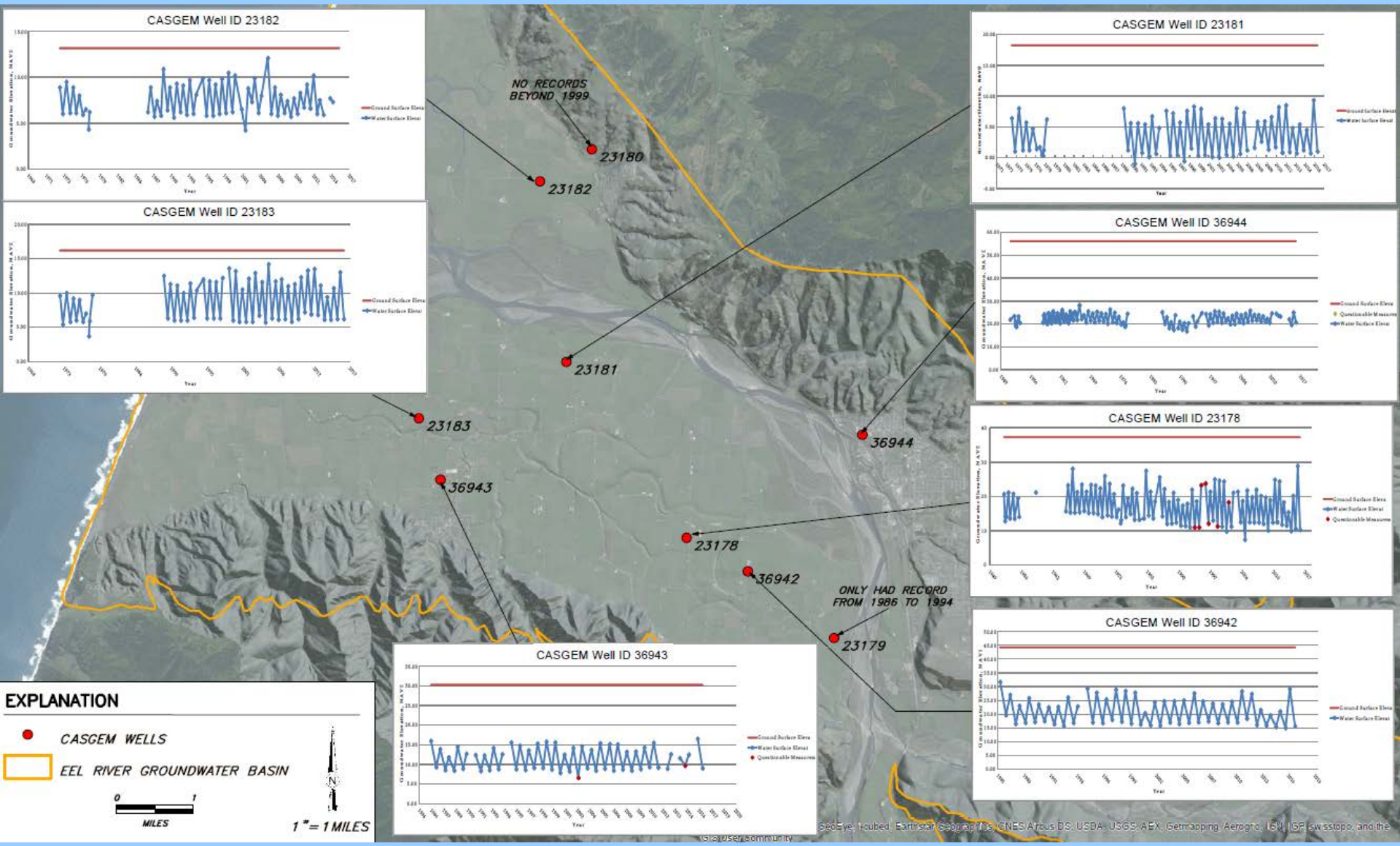
Agricultural Irrigation Groundwater Use for the Eel River Valley

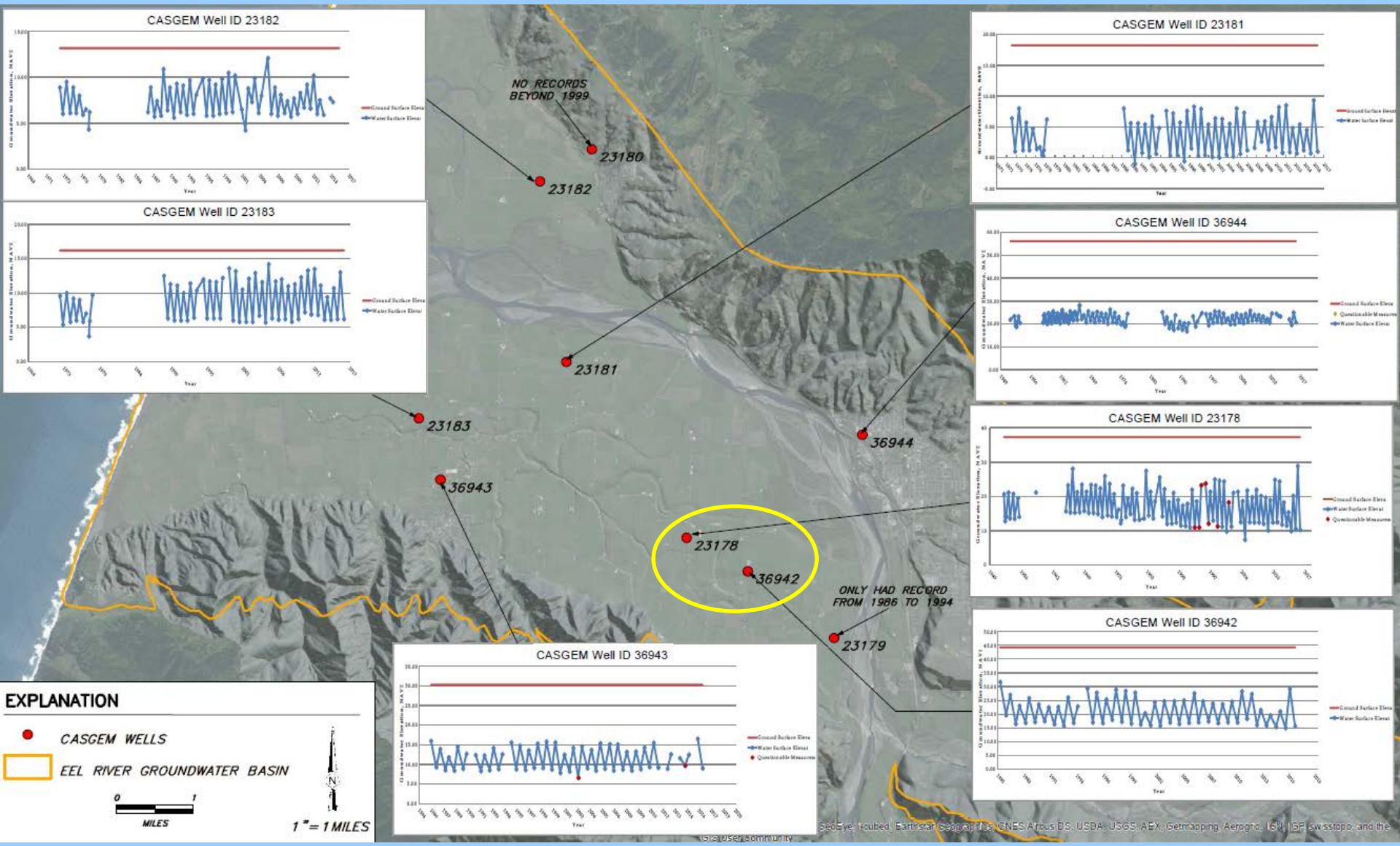
Source	Irrigated Land (Acres)	Water Use Volume (Acre-feet)	Water Use Rate (Acre-feet per acre)
DWR (1968)	11,700	18,800	1.0 to 1.7
USGS (1978)	17,300	17,300	1.0
DWR (2003)	-	49,000	-
DWR (2012)	26,800	24,400	0.9 (implied)
RCD (2016)	13,558	10,265 to 16,680 (varies seasonally)	0.8 to 1.2

- RCD (2016) grouped grazed pasture, hay production, alfalfa production
- USDA (2013) provides state-wide average water use rates for California: ranges from 2.0 to 3.8 acre-feet per acre depending on land use




Existing well monitored by DWR


CASGEM Well ID 23182
CASGEM Well ID 23183
CASGEM Well ID 23181
CASGEM Well ID 36944
CASGEM Well ID 23178
CASGEM Well ID 36942
CASGEM Well ID 36943
NO RECORDS BEYOND 1999
23180
23182
23181
23183
36944
36943
23178
36942
ONLY HAD RECORD FROM 1986 TO 1994
23179
EXPLANATION
CASGEM WELLS
EEL RIVER GROUNDWATER BASIN
0
1
MILES
1 " = 1 MILES
N
Ground Surface Elevation
Water Surface Elevation
Questionable Measurement
Year
Groundwater Elevation, NAVD
GIS User Community


CASGEM Well ID 23182
CASGEM Well ID 23183
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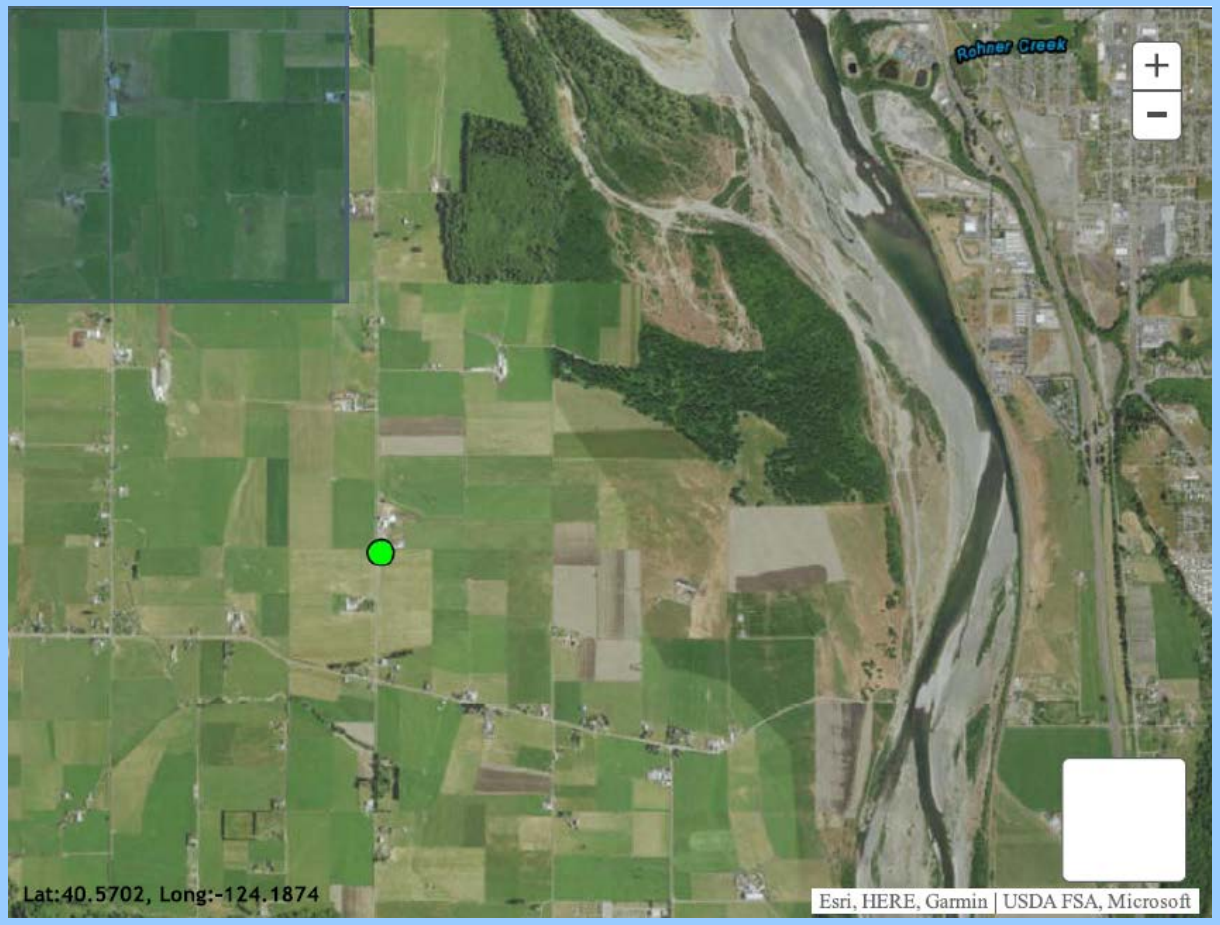
CASGEM Well ID 36944
CASGEM Well ID 23178
CASGEM Well ID 36942
CASGEM Well ID 36943
NO RECORDS BEYOND 1999
23180
23182
23181
23183
36944
36943
23178
36942
ONLY HAD RECORD FROM 1986 TO 1994
23179
EXPLANATION
CASGEM WELLS
EEL RIVER GROUNDWATER BASIN
MILES
1 " = 1 MILES
Ground Surface Elevation
Water Surface Elevation
Questionable Measurement
Year
Groundwater Elevation, NAVD

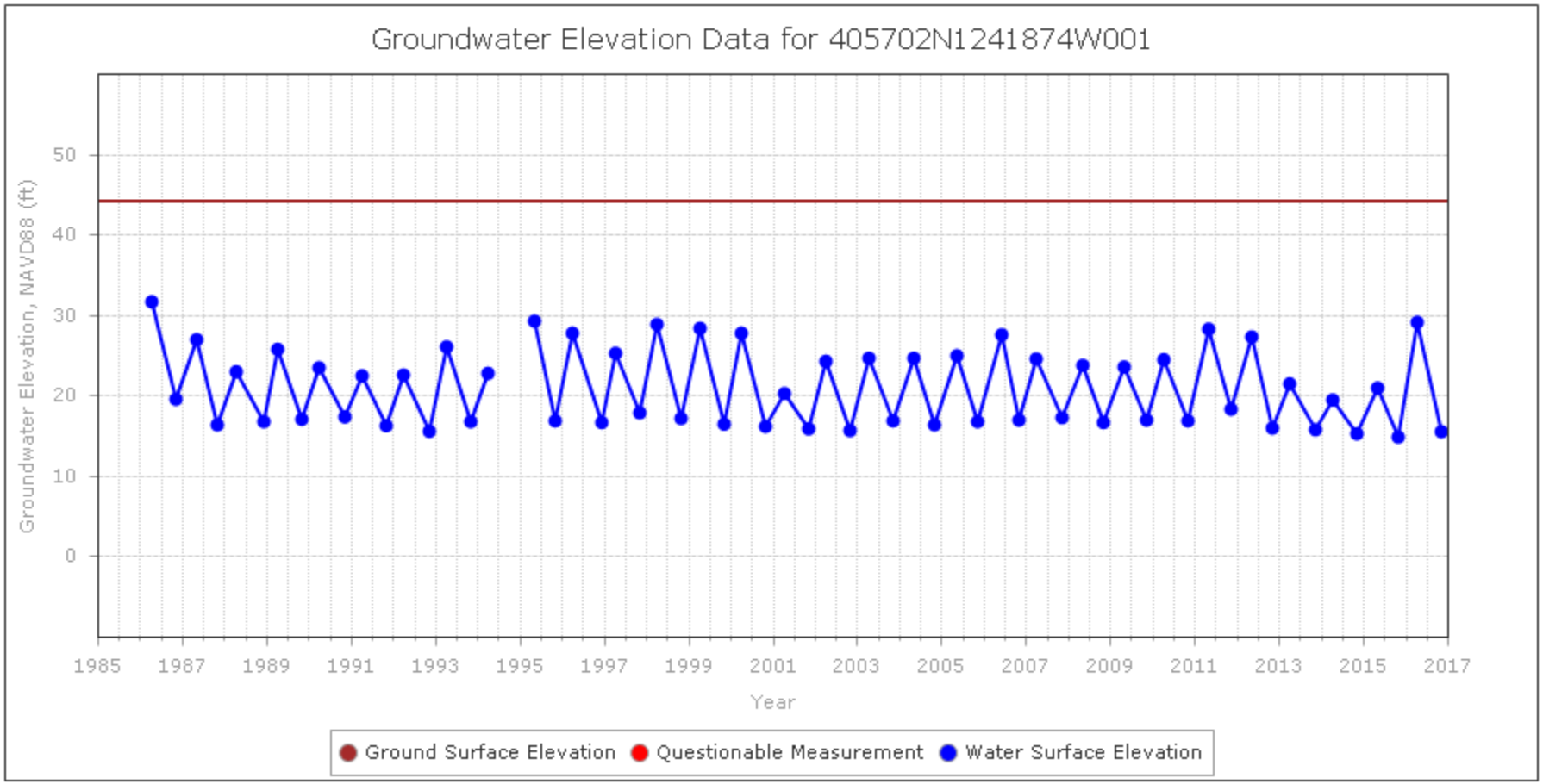
Well No. 36942

(Pleasant Point Road)



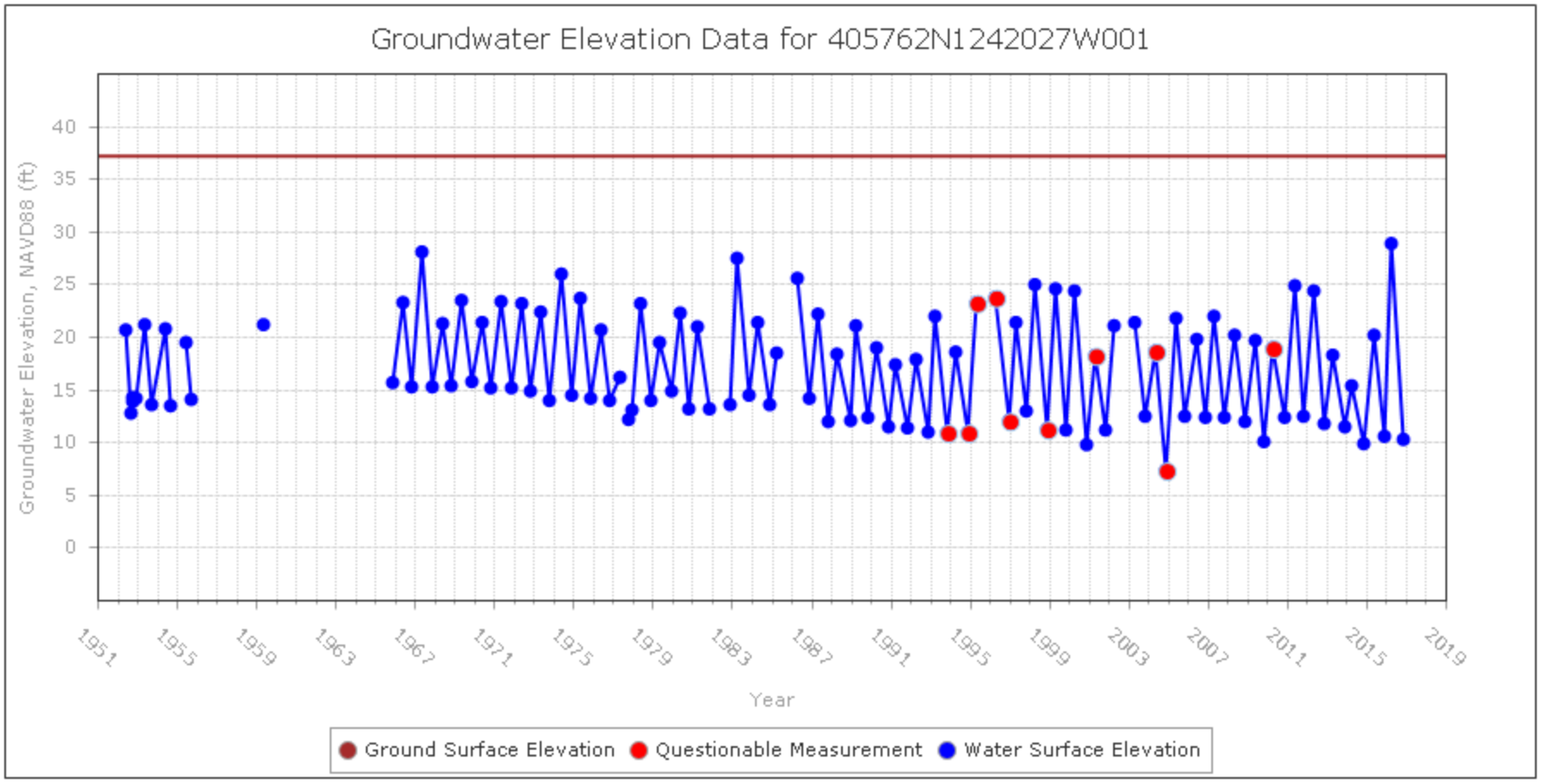
Well No. 36942

(Pleasant Point Road)

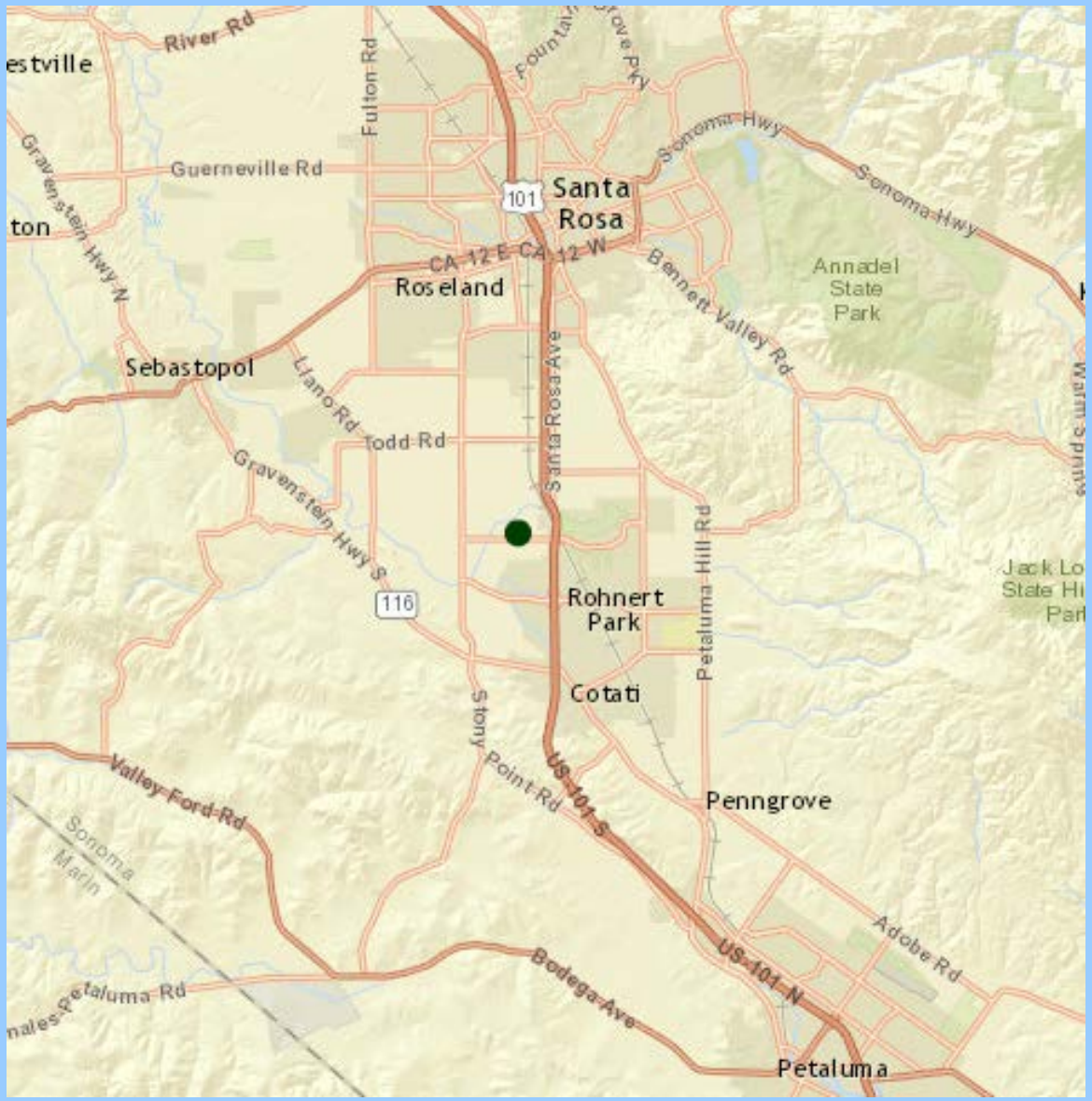


Well No. 23178

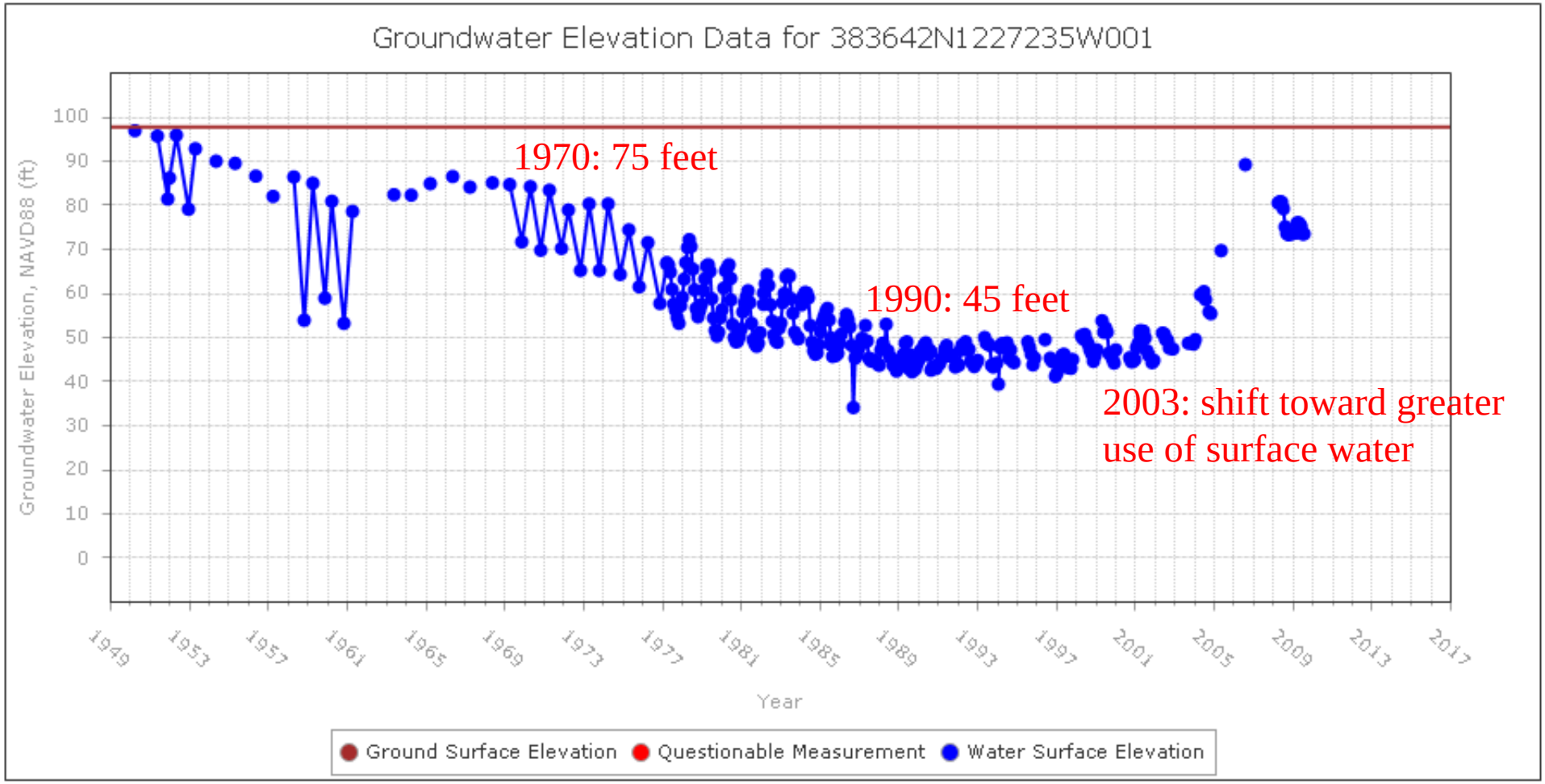
(Waddington Road)

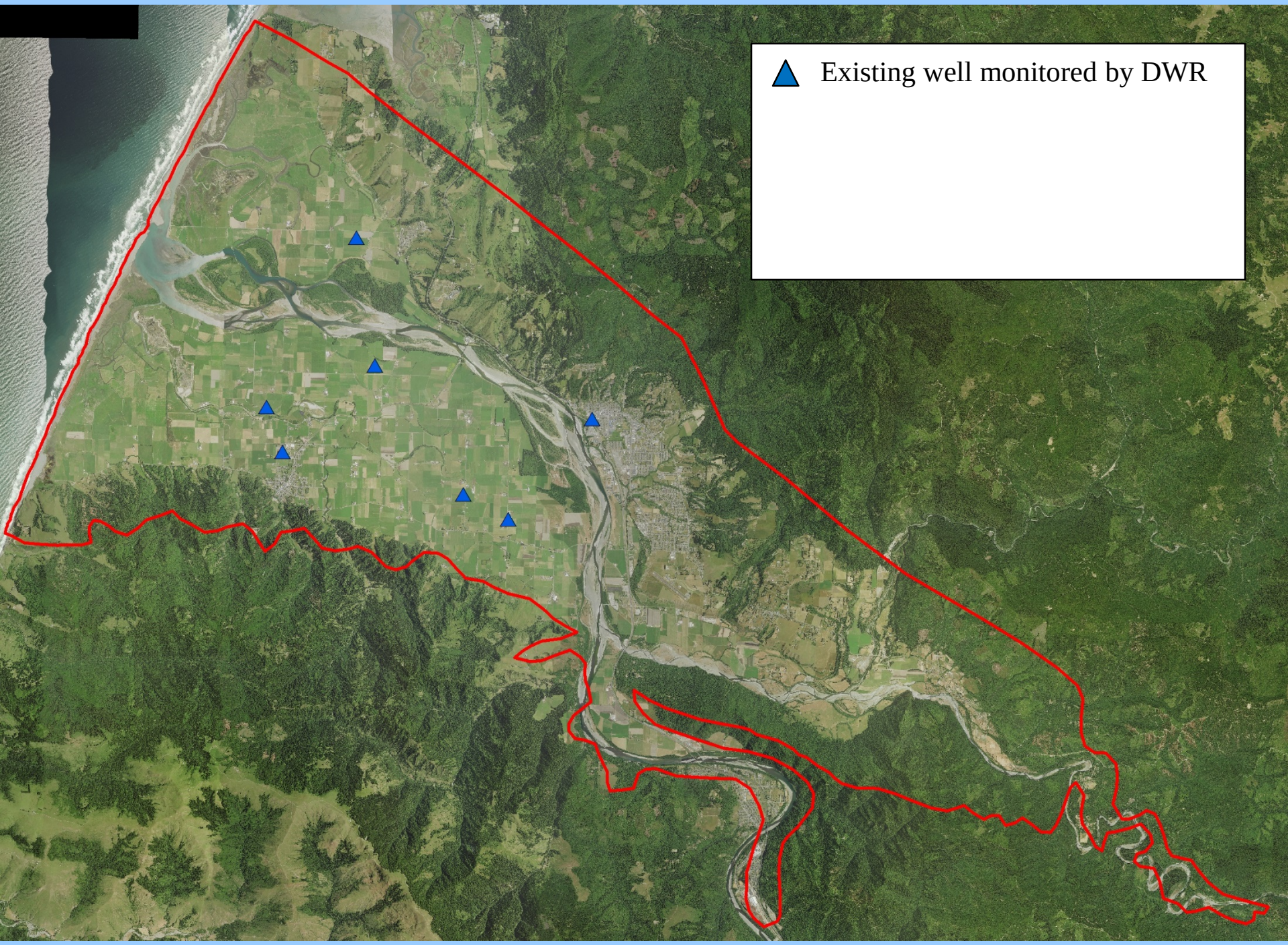


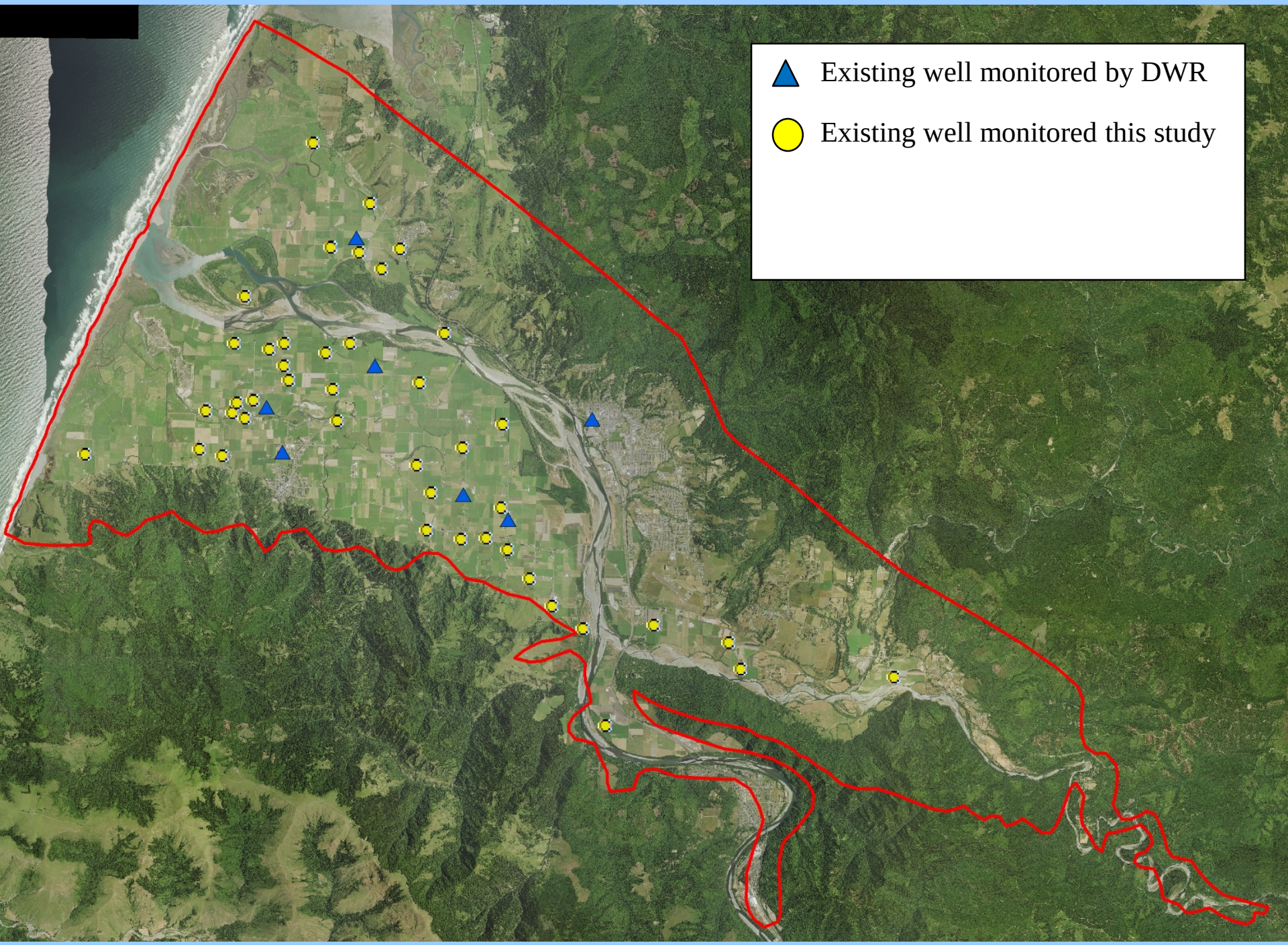
Example of overdraft:
Well near Rohnert Park in Santa Rosa Plain Watershed



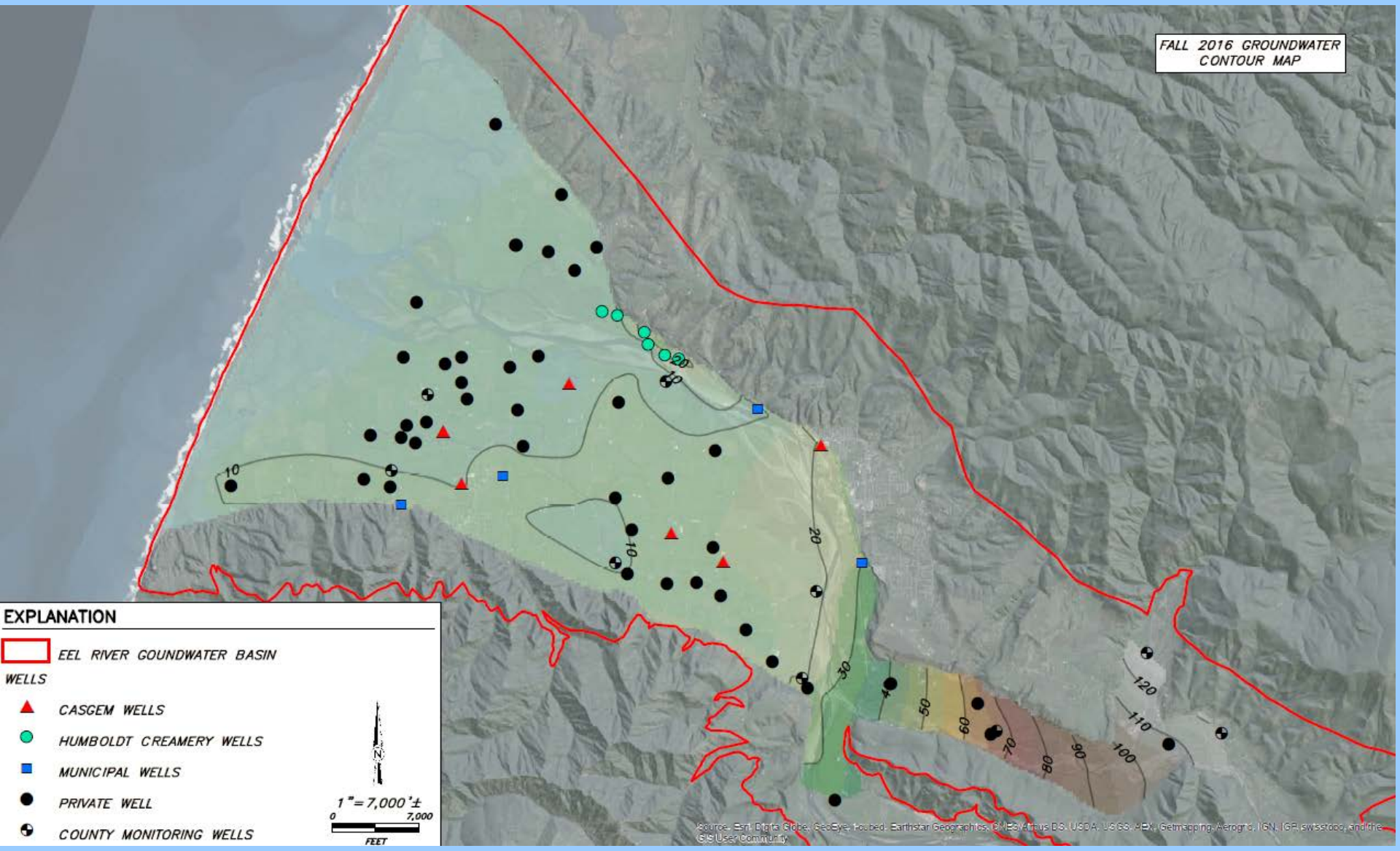
Example of overdraft:
Well near Rohnert Park in Santa Rosa Plain Watershed



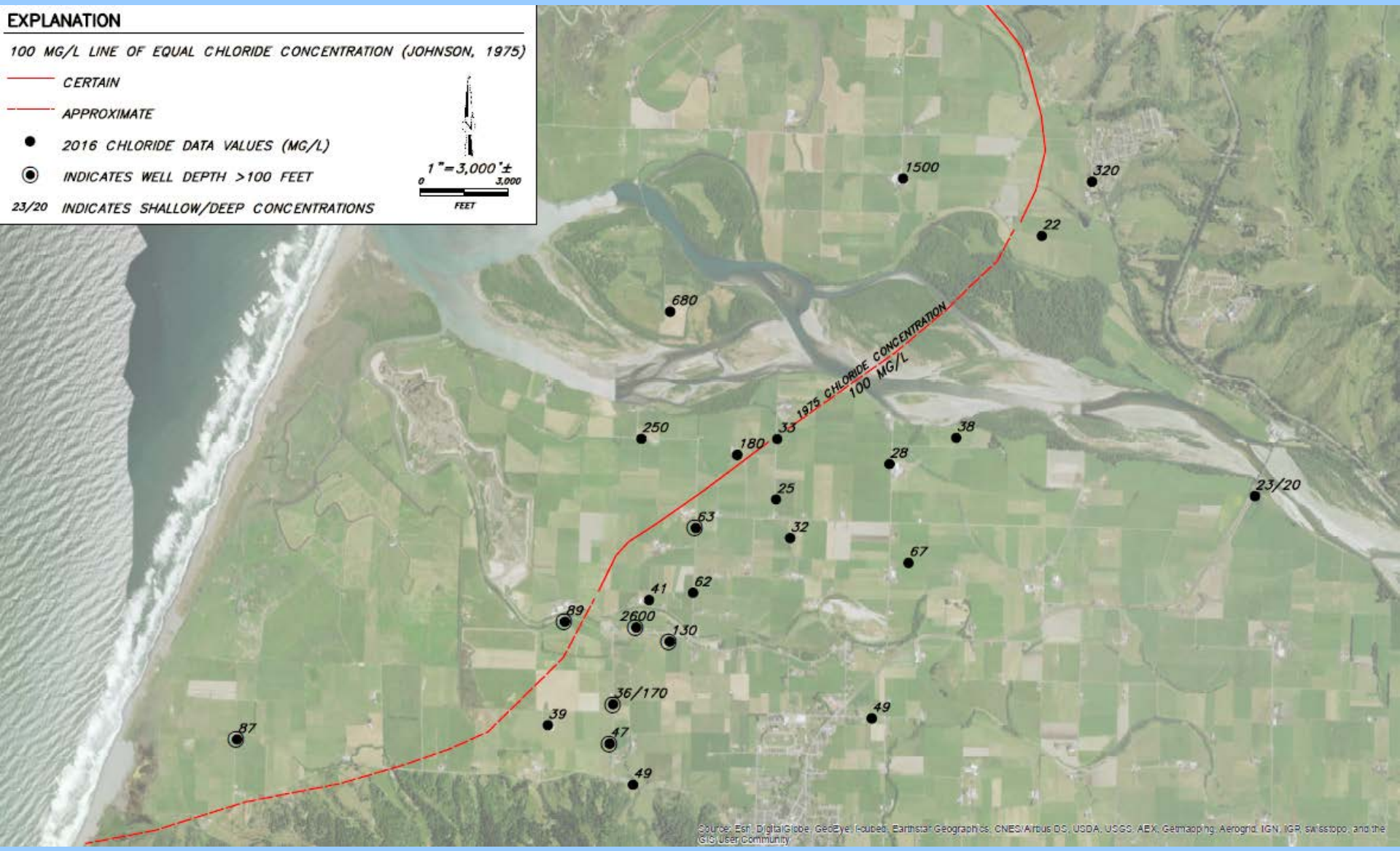

Existing well monitored by DWR

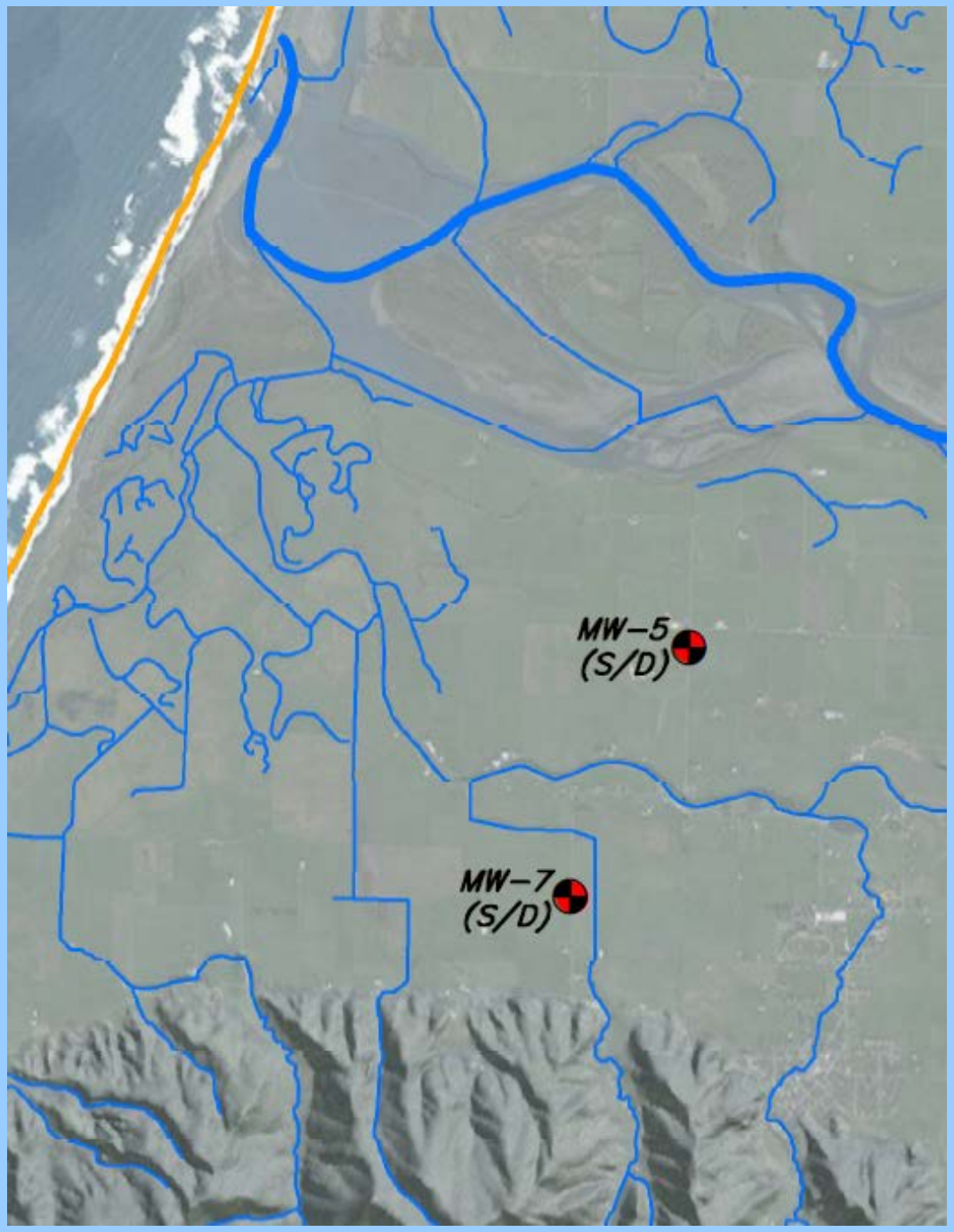

Existing well monitored by DWR
Existing well monitored this study

Groundwater contour map



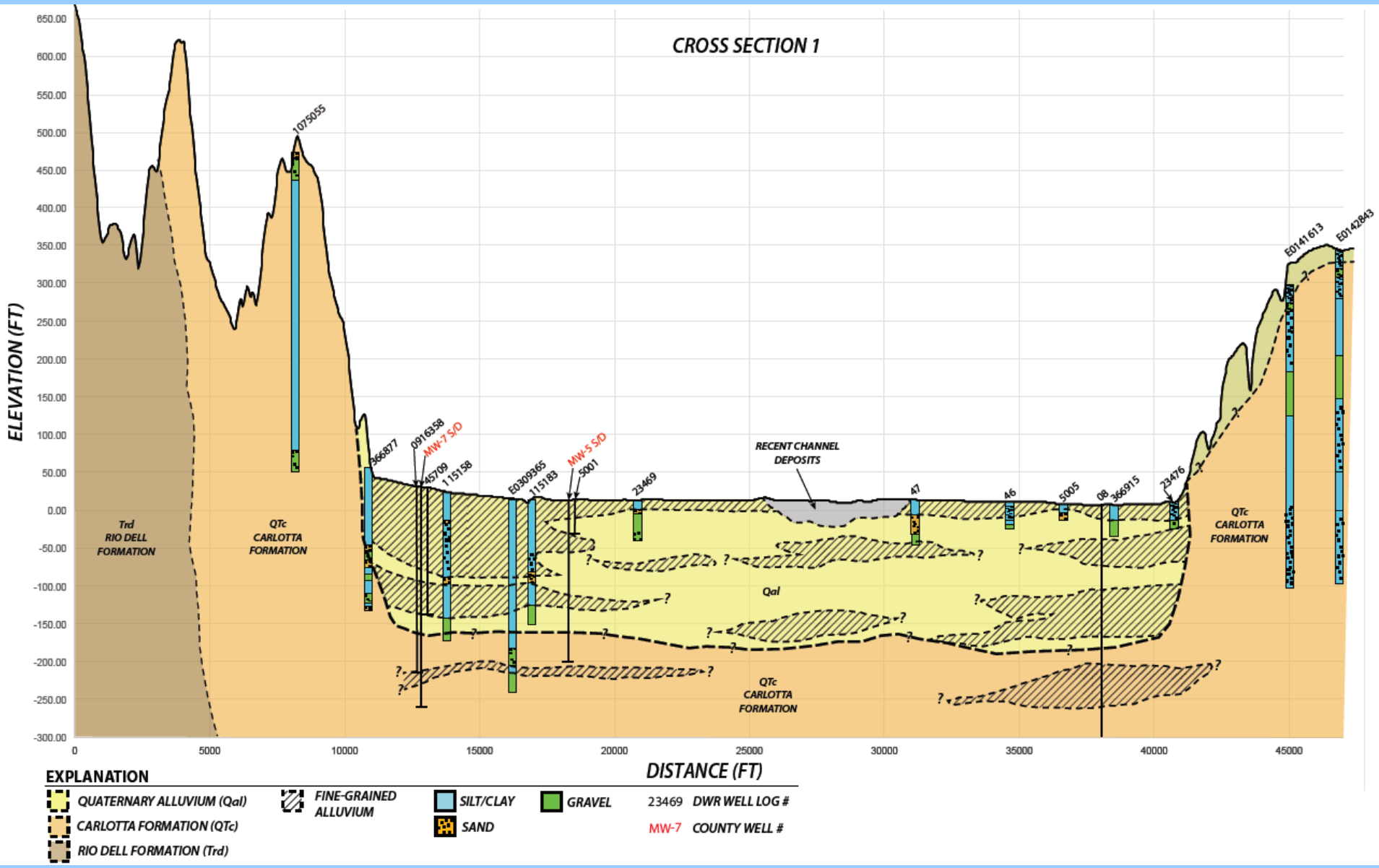
Monitoring for saltwater intrusion

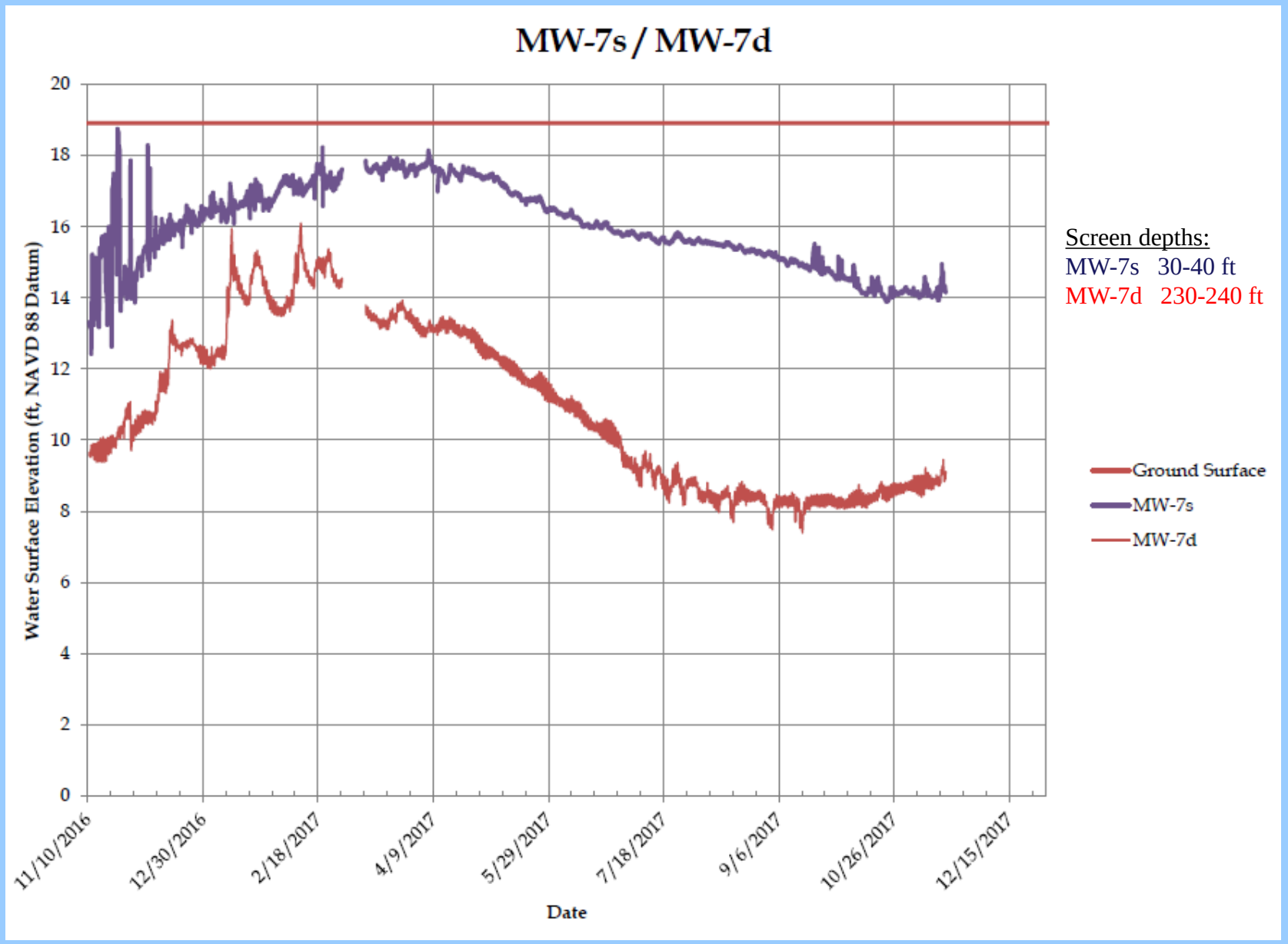




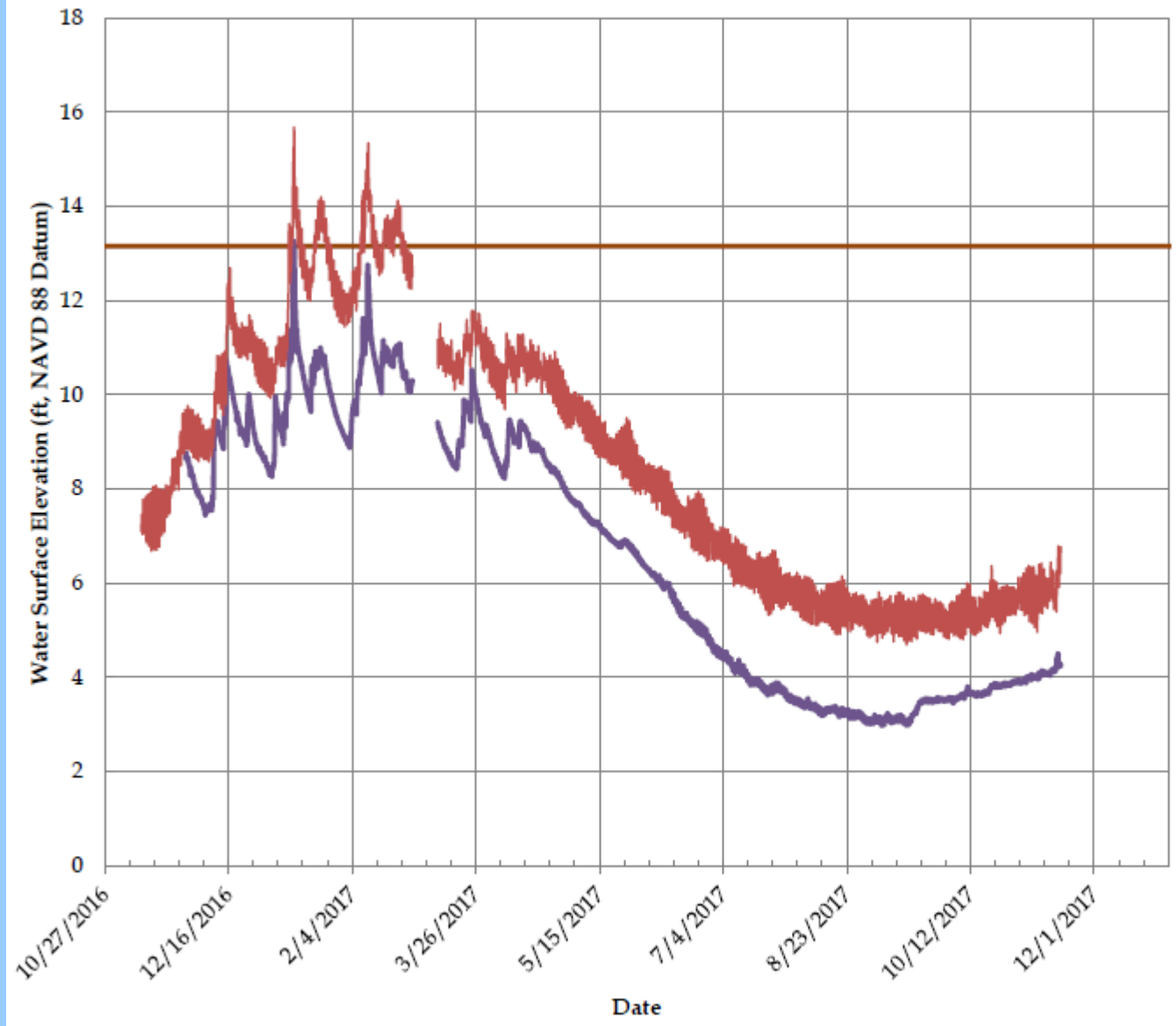
MW-7:
Meridian Road & Damon Lane

MW-5:
Dillon Road & Goble Lane


CROSS SECTION 1
ELEVATION (FT)
650.00
600.00
550.00
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
-50.00
-100.00
-150.00
-200.00
-250.00
-300.00
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
DISTANCE (FT)
1075055
366877
0916358
MW-7 S/D
45709
115158
E0309365
115183
MW-5 S/D
5001
23469
RECENT CHANNEL DEPOSITS
47
46
5005
08
366915
23476
E0141613
E0142843
Trd
RIO DELL FORMATION
QTc
CARLOTTA FORMATION
Qal
QTc
CARLOTTA FORMATION
QTc
CARLOTTA FORMATION
EXPLANATION
QUATERNARY ALLUVIUM (Qal)
CARLOTTA FORMATION (QTc)
RIO DELL FORMATION (Trd)
FINE-GRAINED ALLUVIUM
SILT/CLAY
SAND
GRAVEL
23469 DWR WELL LOG #
MW-7 COUNTY WELL #


MW-7s / MW-7d
Water Surface Elevation (ft, NAVD 88 Datum)
20
18
16
14
12
10
8
6
4
2
0
11/10/2016
12/30/2016
2/18/2017
4/9/2017
5/29/2017
7/18/2017
9/6/2017
10/26/2017
12/15/2017
Date
Screen depths:
MW-7s 30-40 ft
MW-7d 230-240 ft
Ground Surface
MW-7s
MW-7d

MW-5s / MW-5d



Screen depths:
MW-5s 100-110 ft
MW-5d 200-210 ft

Ground Surface
MW-5s
MW-5d

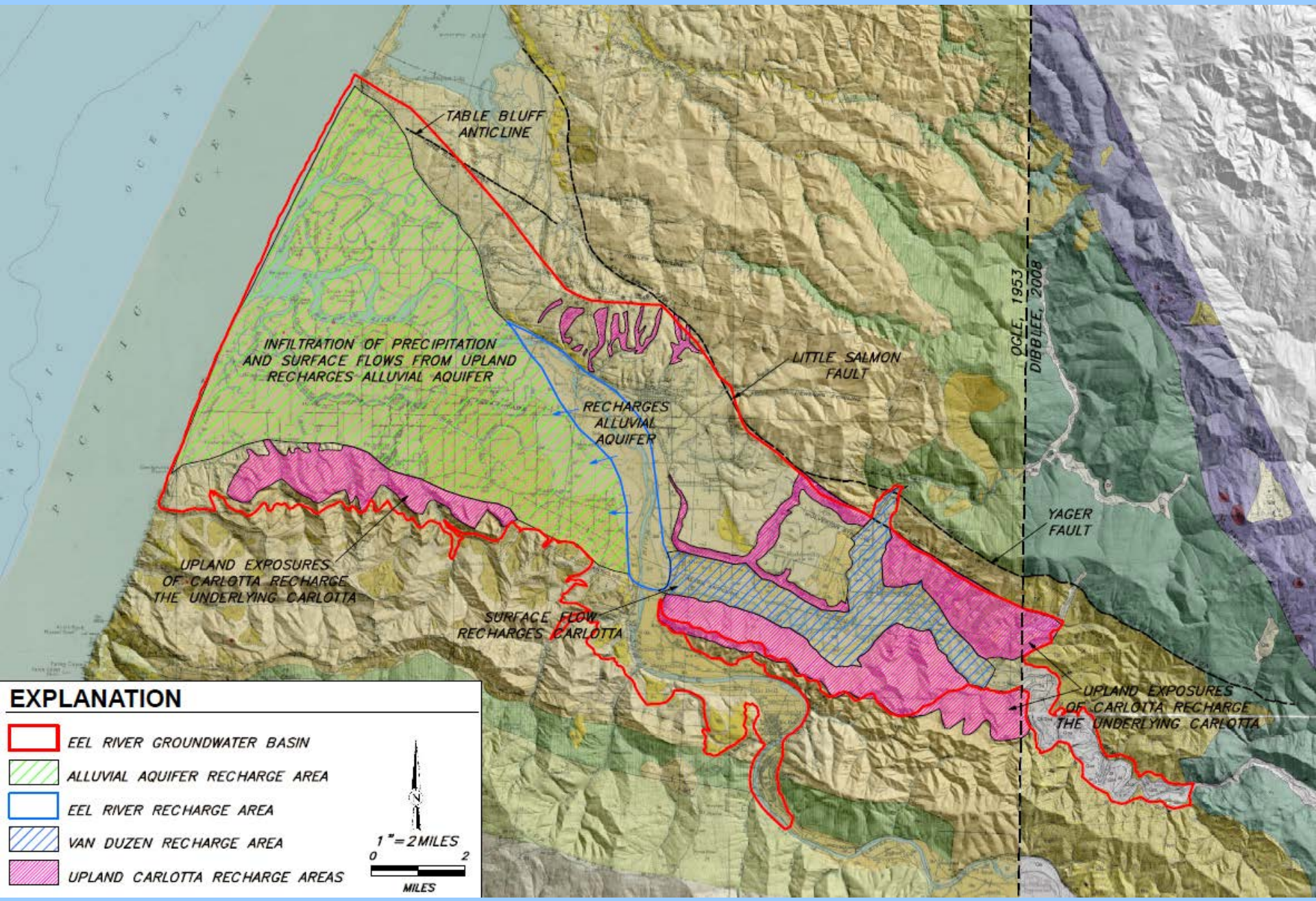
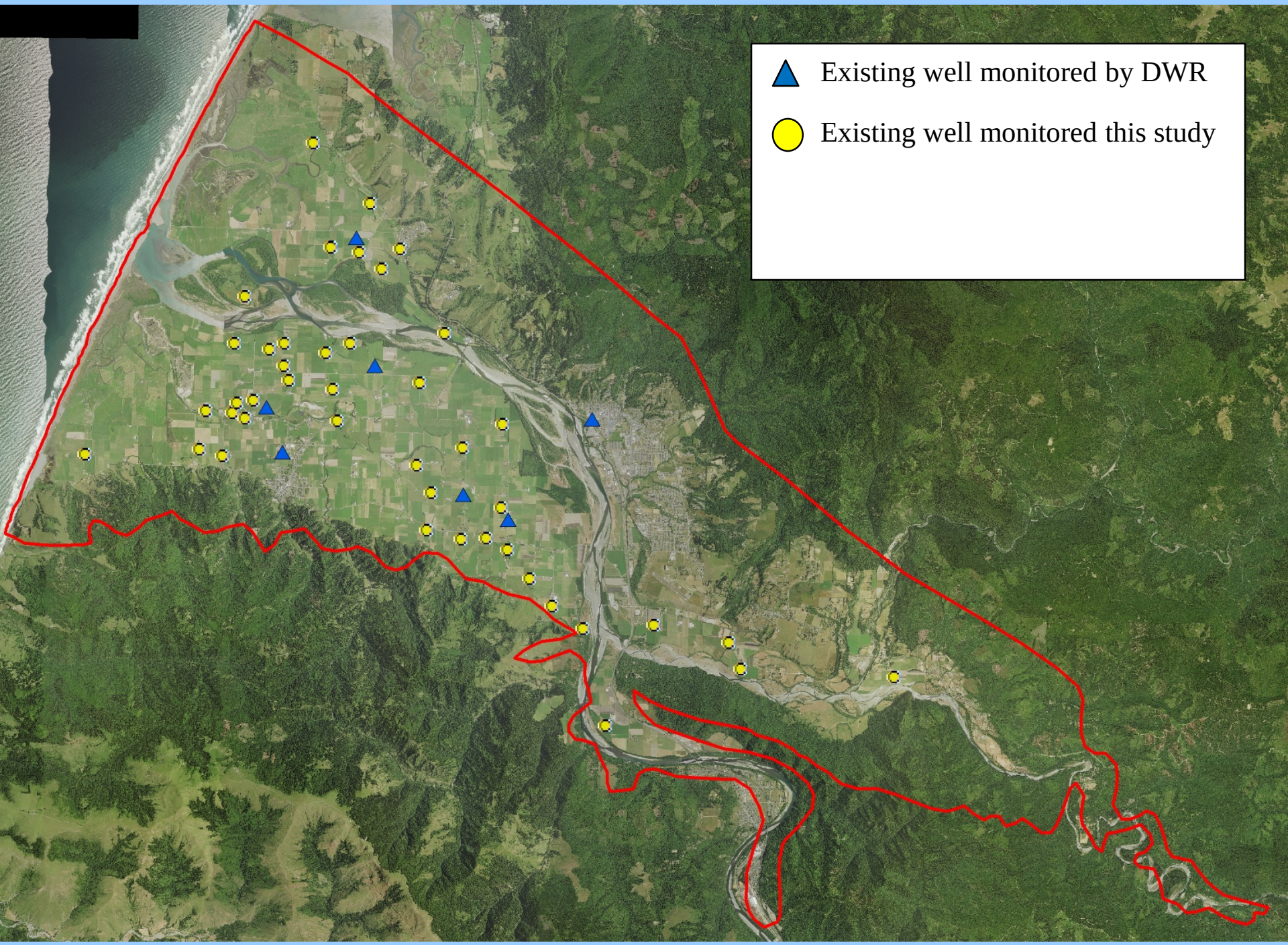
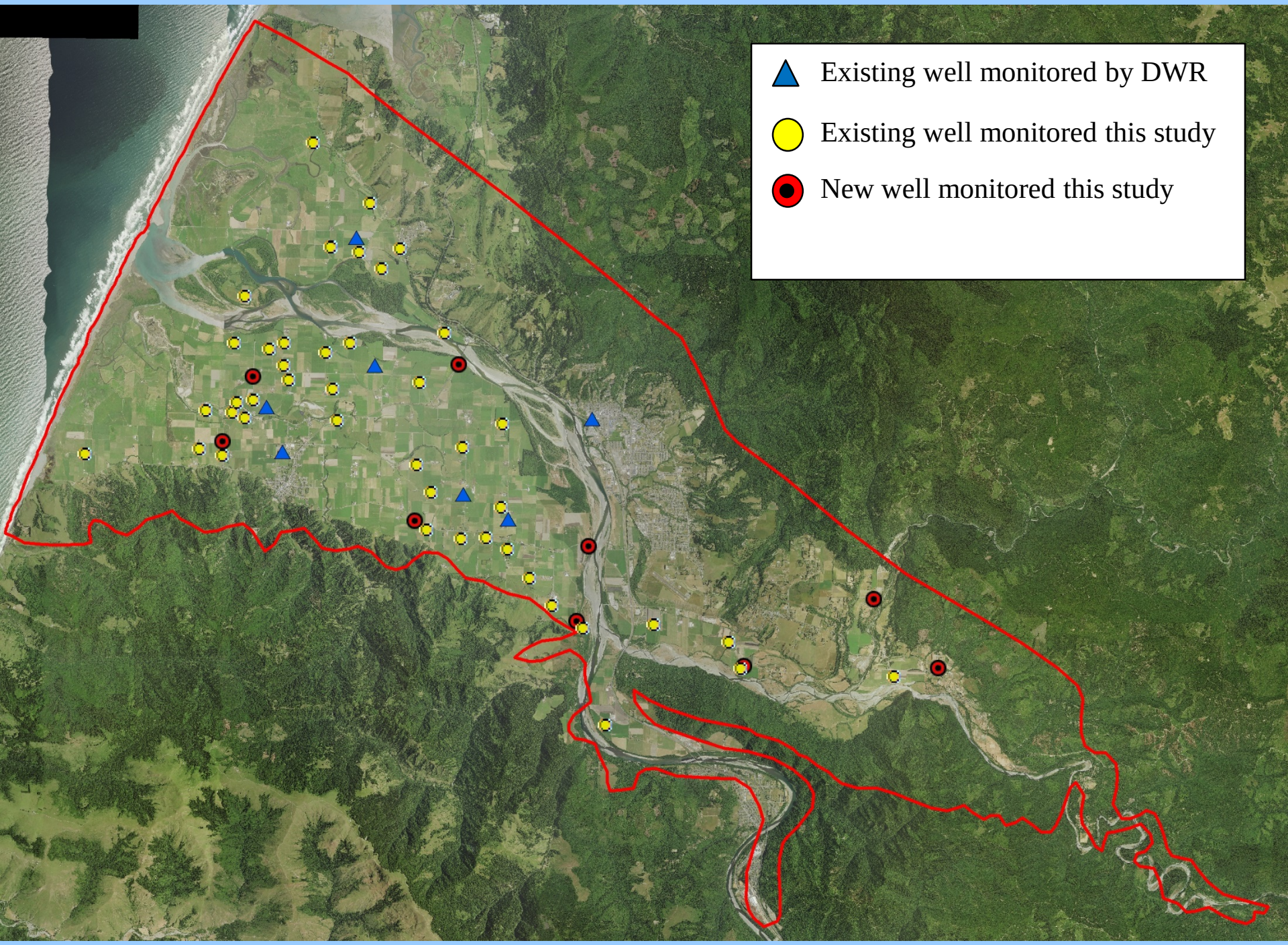
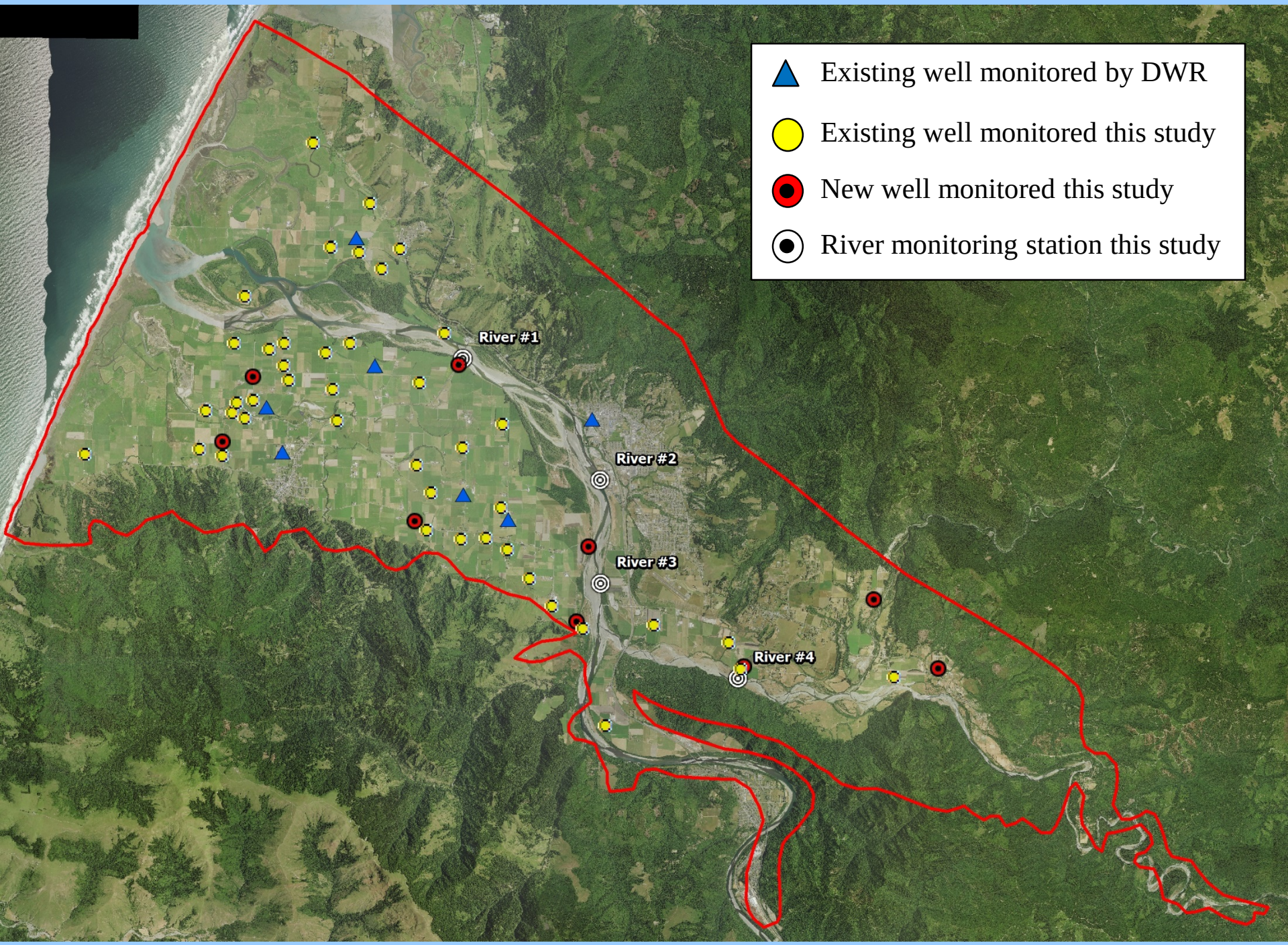


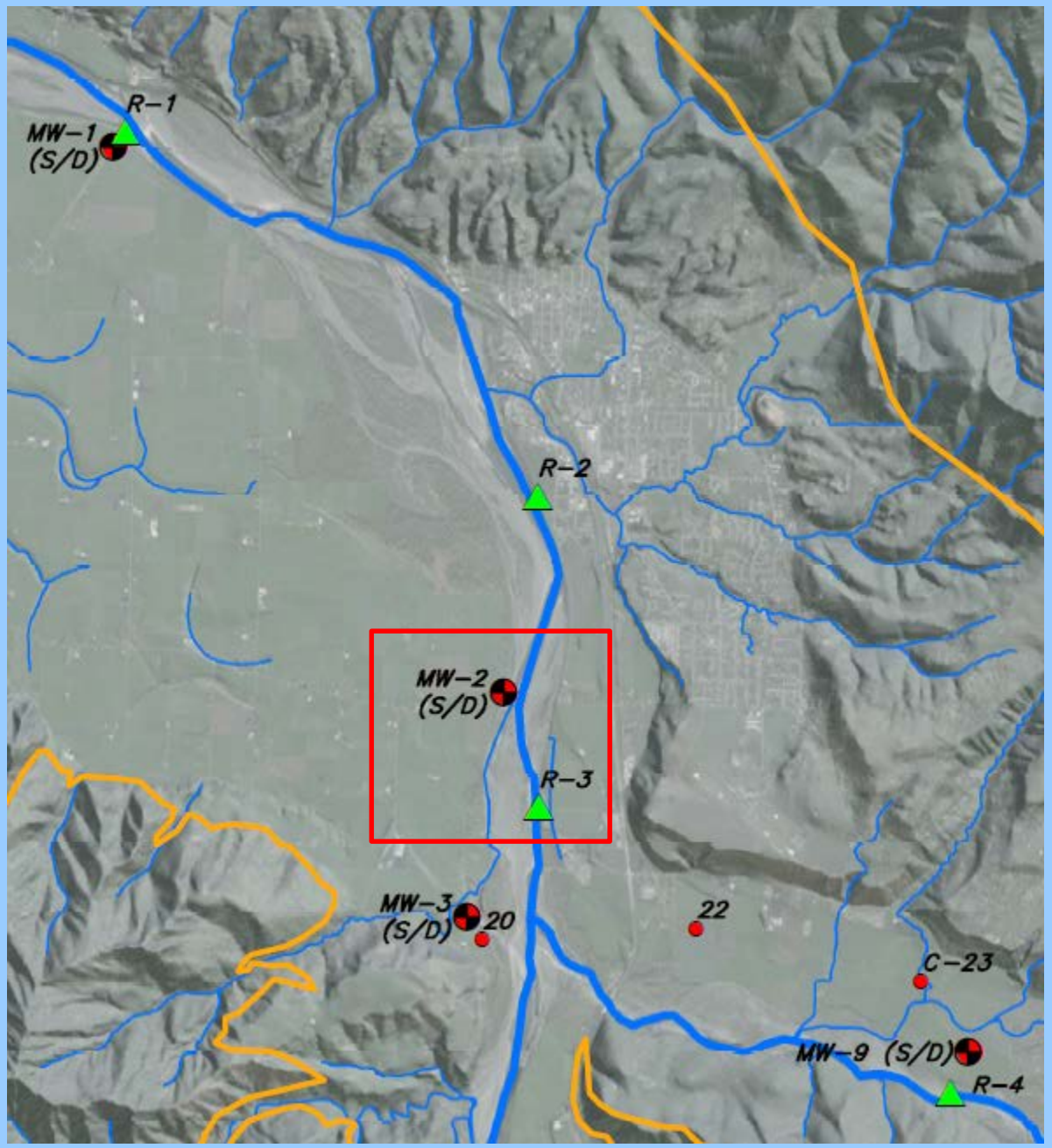
TABLE BLUFF ANTICLINE
INFILTRATION OF PRECIPITATION AND SURFACE FLOWS FROM UPLAND RECHARGES ALLUVIAL AQUIFER
RECHARGES ALLUVIAL AQUIFER
LITTLE SALMON FAULT
OGLE, 1953
DIBBLEE, 2008
YAGER FAULT
UPLAND EXPOSURES OF CARLOTTA RECHARGE THE UNDERLYING CARLOTTA
SURFACE FLOW RECHARGES CARLOTTA
UPLAND EXPOSURES OF CARLOTTA RECHARGE THE UNDERLYING CARLOTTA
EXPLANATION
EEL RIVER GROUNDWATER BASIN
ALLUVIAL AQUIFER RECHARGE AREA
EEL RIVER RECHARGE AREA
VAN DUZEN RECHARGE AREA
UPLAND CARLOTTA RECHARGE AREAS
N
1" = 2 MILES
0
2
MILES


Existing well monitored by DWR
Existing well monitored this study


Existing well monitored by DWR
Existing well monitored this study
New well monitored this study

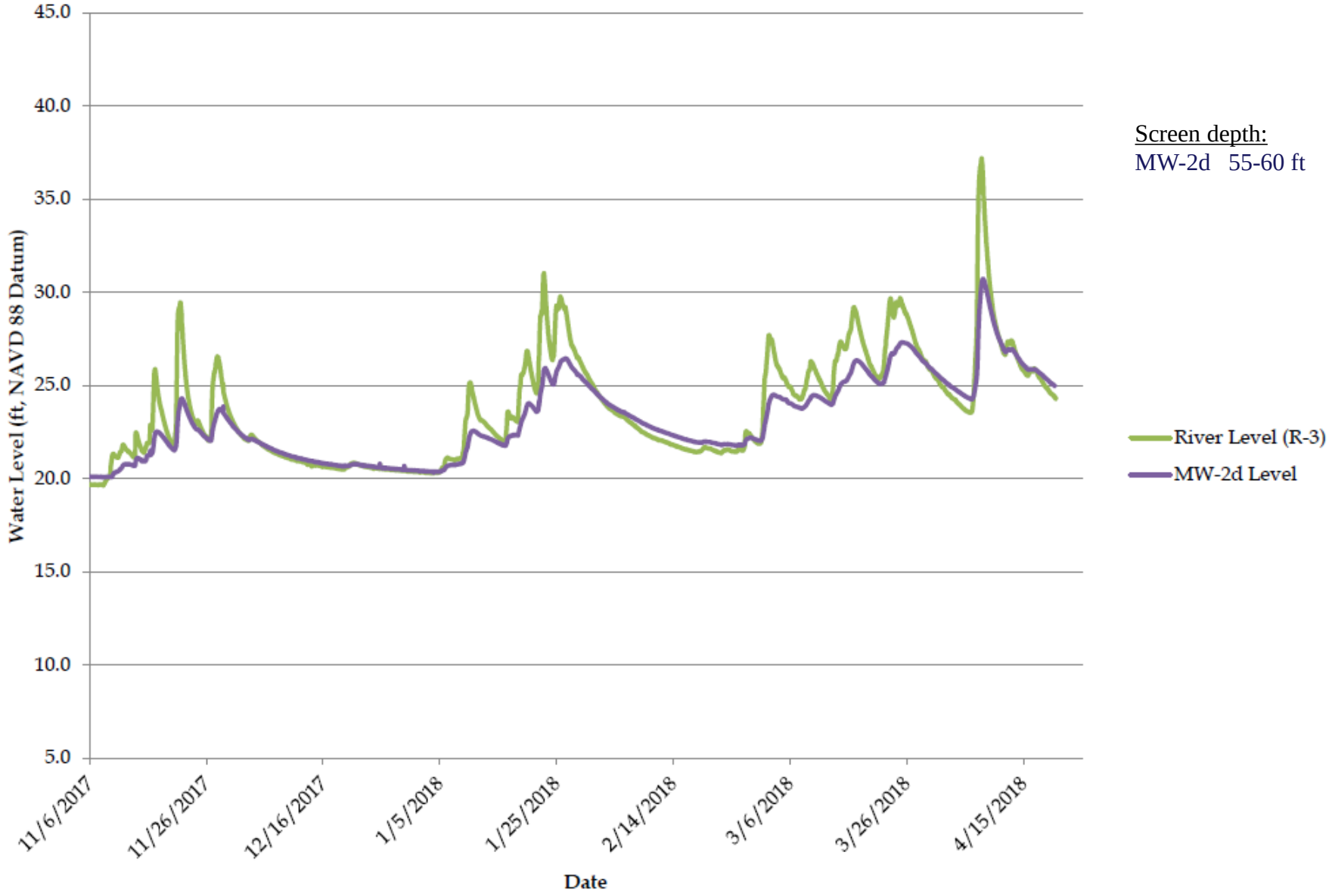

Existing well monitored by DWR
Existing well monitored this study
New well monitored this study
River monitoring station this study
River #1
River #2
River #3
River #4

MW-2/R-3


R-1
MW-1
(S/D)
R-2
MW-2
(S/D)
R-3
MW-3
(S/D)
20
22
C-23
MW-9 (S/D)
R-4

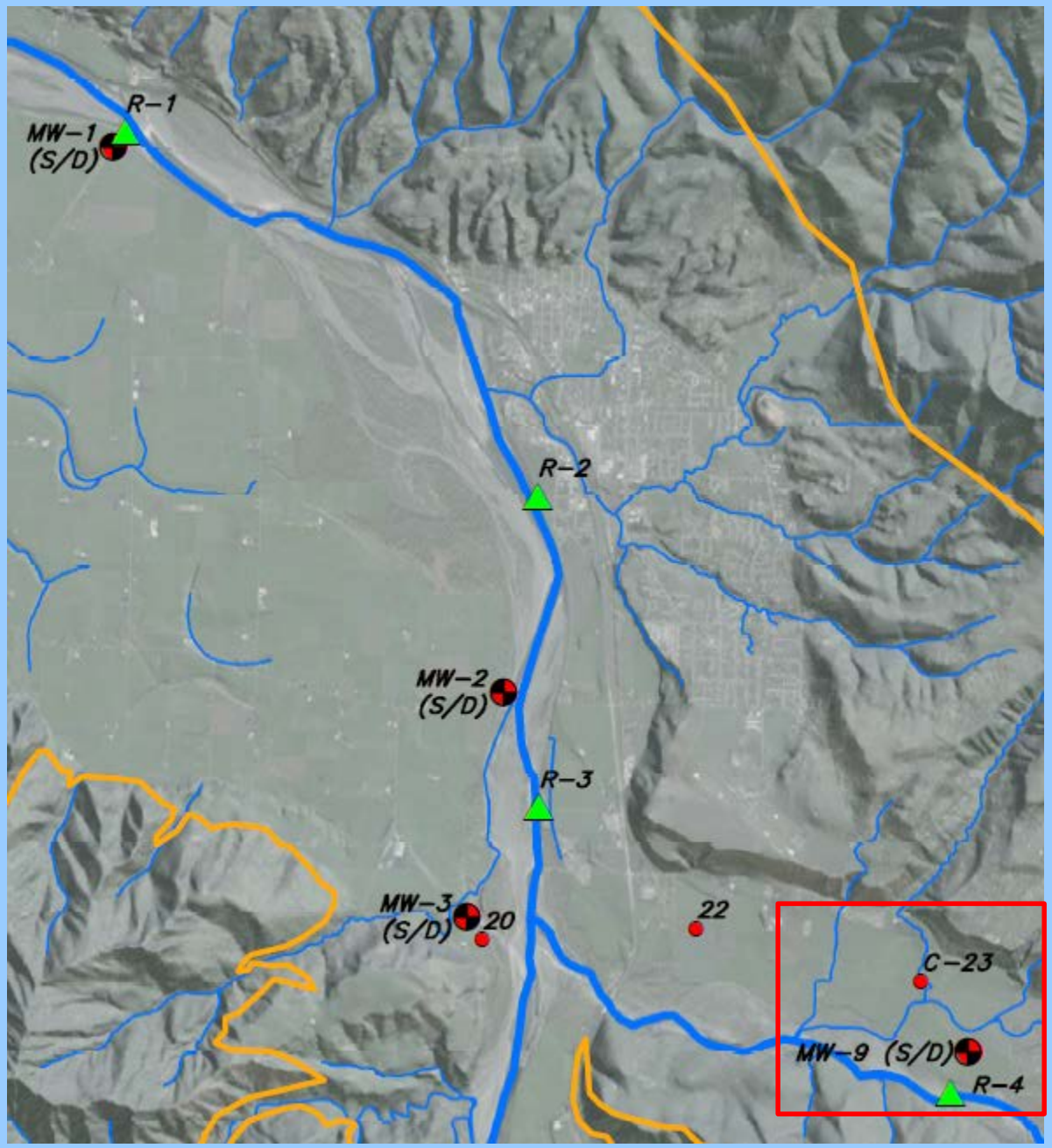

MW-2s/2d
River #3
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

MW-2 versus Eel River - 2017/2018 Wet Season



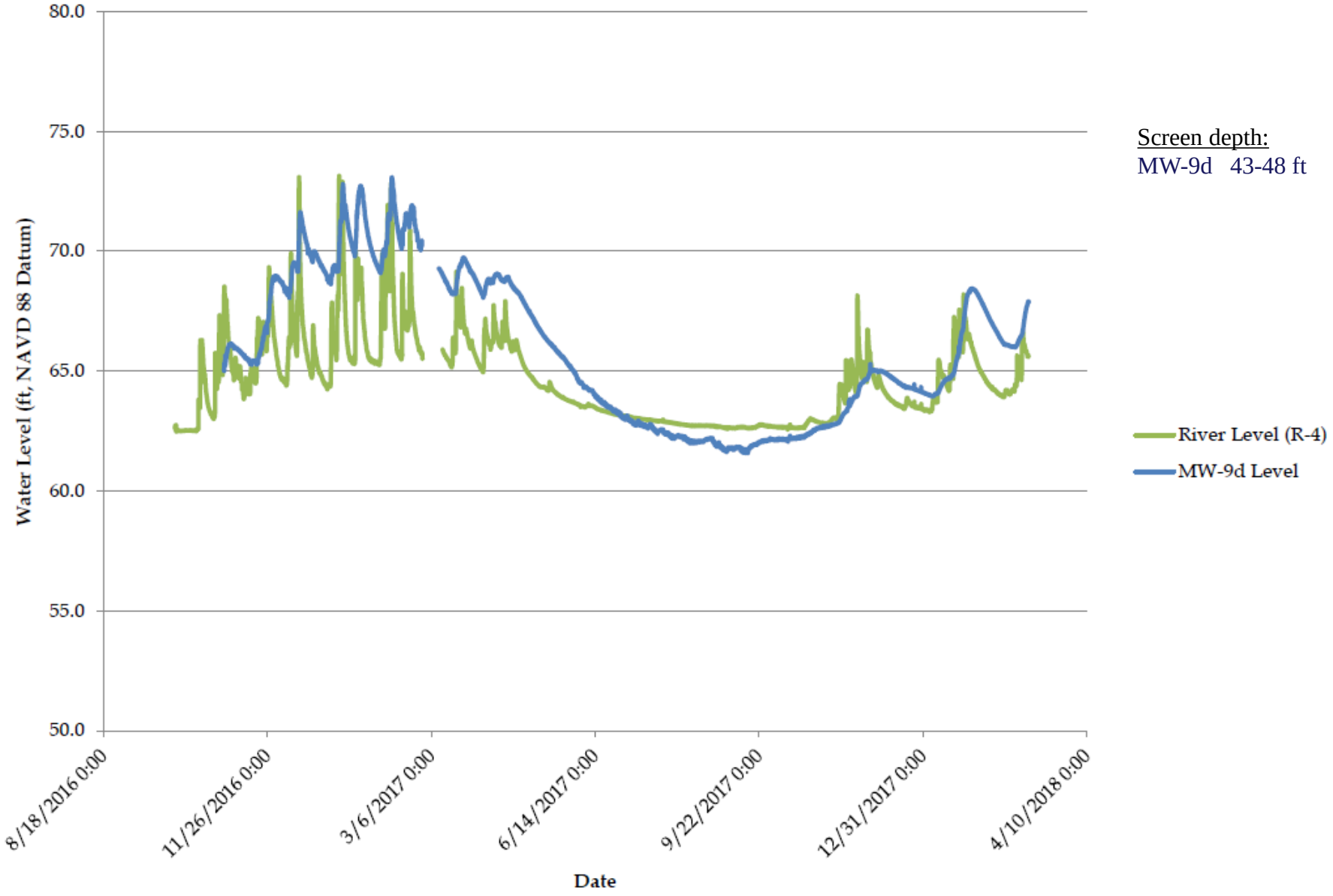
Screen depth:
MW-2d 55-60 ft

MW-9/R-4


R–1
MW–1
(S/D)
R–2
MW–2
(S/D)
R–3
MW–3
(S/D)
20
22
C–23
MW–9 (S/D)
R–4


MW-9s/9d
River #4
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

MW-9 versus Van Duzen River



Screen depth:
MW-9d 43-48 ft

Six Sustainability Indicators (1 of 2)

Sustainability Indicator / Undesirable Result		Evidence
1	Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply	1. Long-term groundwater level data collected by DWR 2. Recent groundwater level data collected by stakeholders
2	Significant and unreasonable reduction of groundwater storage	Same as above
3	Significant and unreasonable seawater intrusion	The position of the seawater/freshwater transition zone mapped in 2016 is comparable to the extent measured by USGS in 1975.

Six Sustainability Indicators (2 of 2)

Sustainability Indicator / Undesirable Result		Evidence
4	Significant and unreasonable degraded water quality	1. State Water Board data for salts and nutrients 2. Absence of large-scale contamination affecting water supplies
5	Significant unreasonable land subsidence	Stable groundwater levels
6	Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water	1. Stable groundwater levels over several decades. 2. Groundwater use represents 4-5% of annual recharge. 3. Groundwater levels were not significantly different in Fall 2014 when the Lower Eel went subsurface. 4. The Lower Eel maintains deep pools. 5. Primary causes of low-flow conditions are flood deposits, upstream diversions 6. No flow-study to define flow requirements for beneficial uses

Conclusions

1. Groundwater is a highly important resource in the Eel River Valley
2. Current and historical groundwater levels are stable
3. No evidence of undesirable results caused by groundwater use; initial data and analysis support demonstration of sustainable use over last 10 years
4. Late-summer low-flows in the Lower Eel and Van Duzen Rivers are a concern
   - Key watershed issues: upstream diversions, sediment deposits, forest composition
   - Groundwater use may have an affect on summer low-flow, but no evidence that groundwater use is causing undesirable results as defined by SGMA
5. Groundwater Sustainability Plan Alternative is appropriate for SGMA compliance
   - GSP Alternative was submitted to DWR on December 30, 2016
   - Comment period ended on April 1, 2017
   - Draft results of basin re-prioritization process will be released by DWR in May/June 2018
   - DWR to decide on acceptance of GSP Alternative by end of 2018