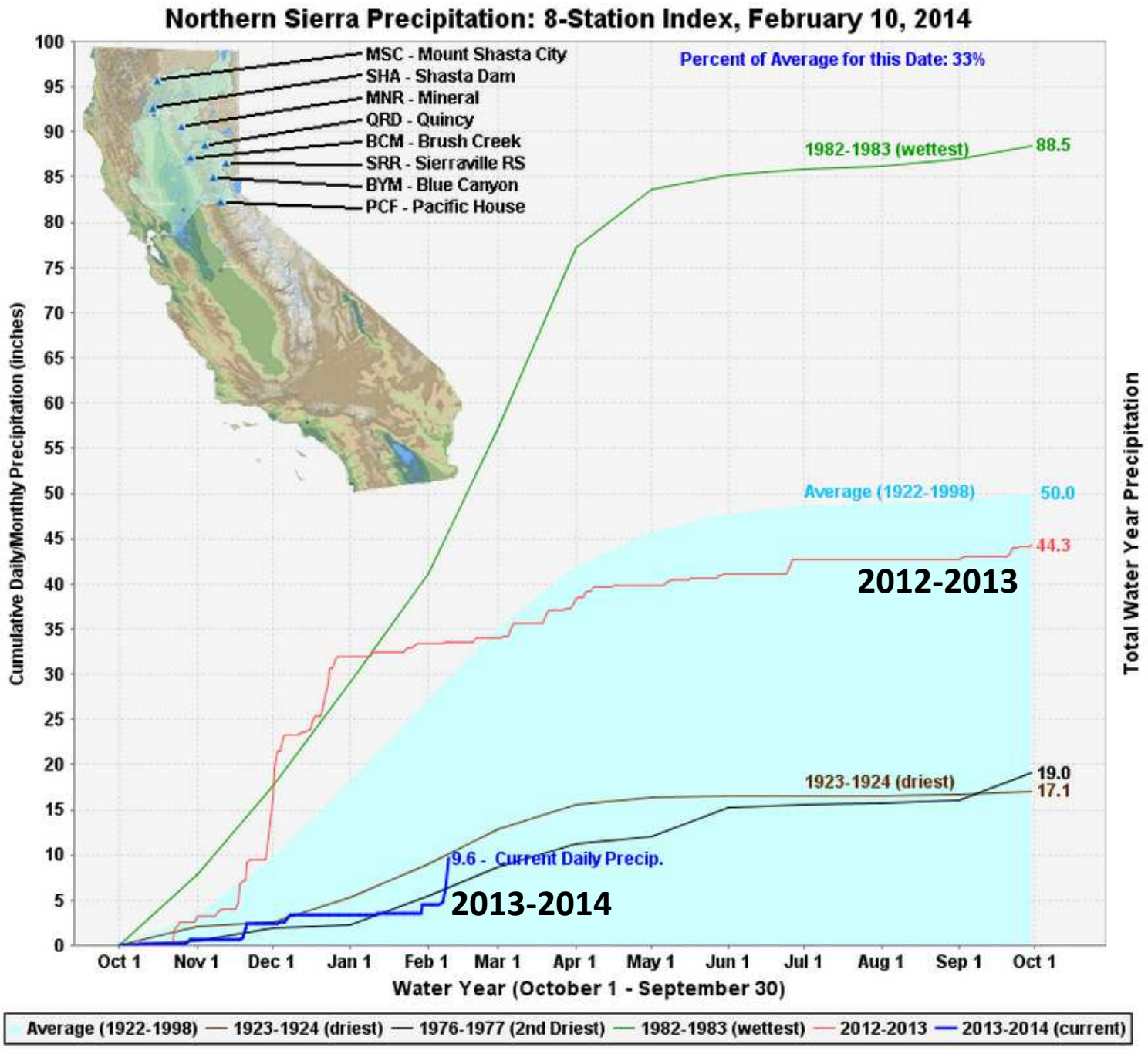
Groundwater Conditions in Butte County

Christina Buck, PhD
Water Resources Scientist
Dept. of Water & Resource Conservation

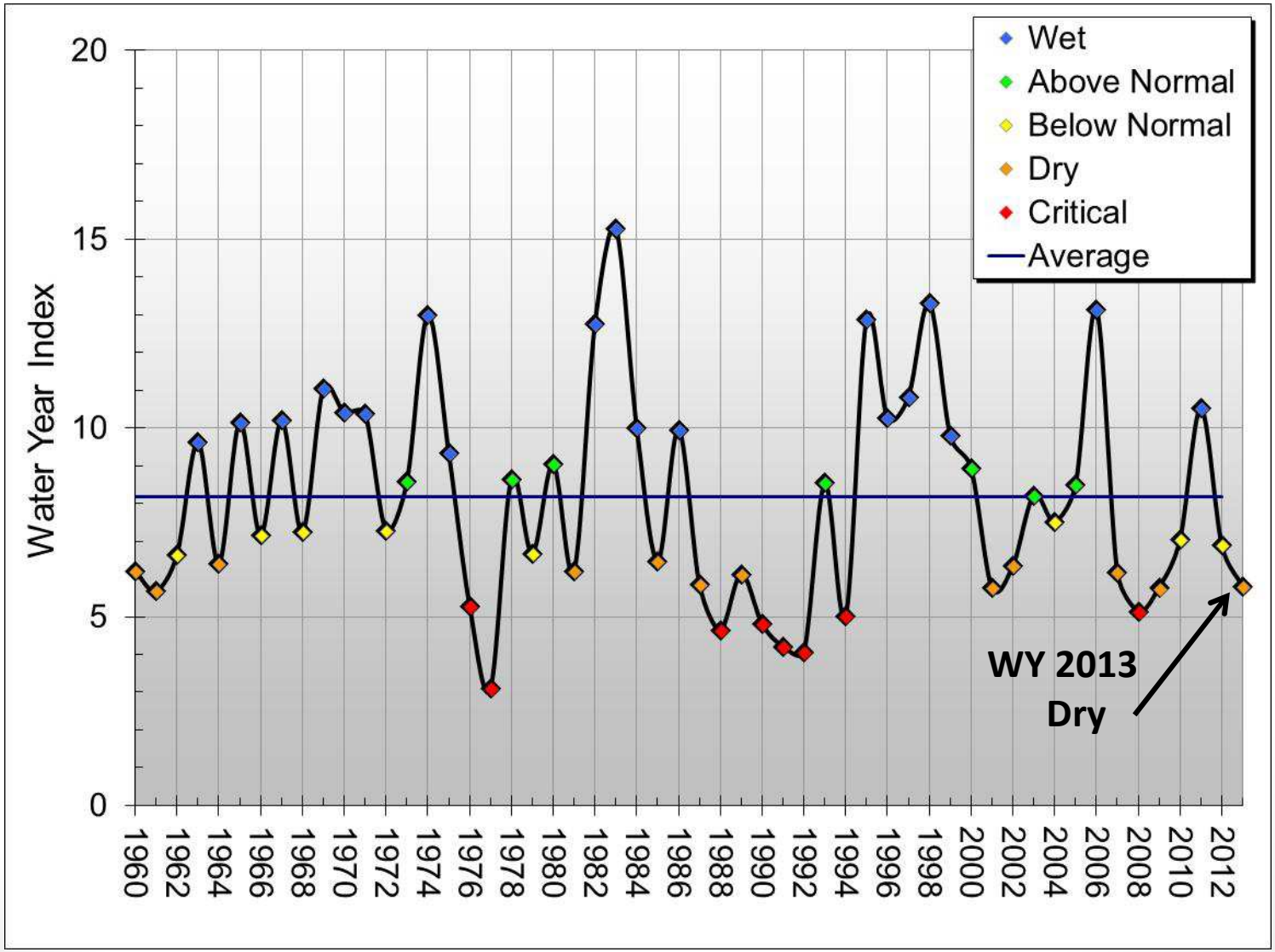
Durham Groundwater Meeting
February 10, 2014

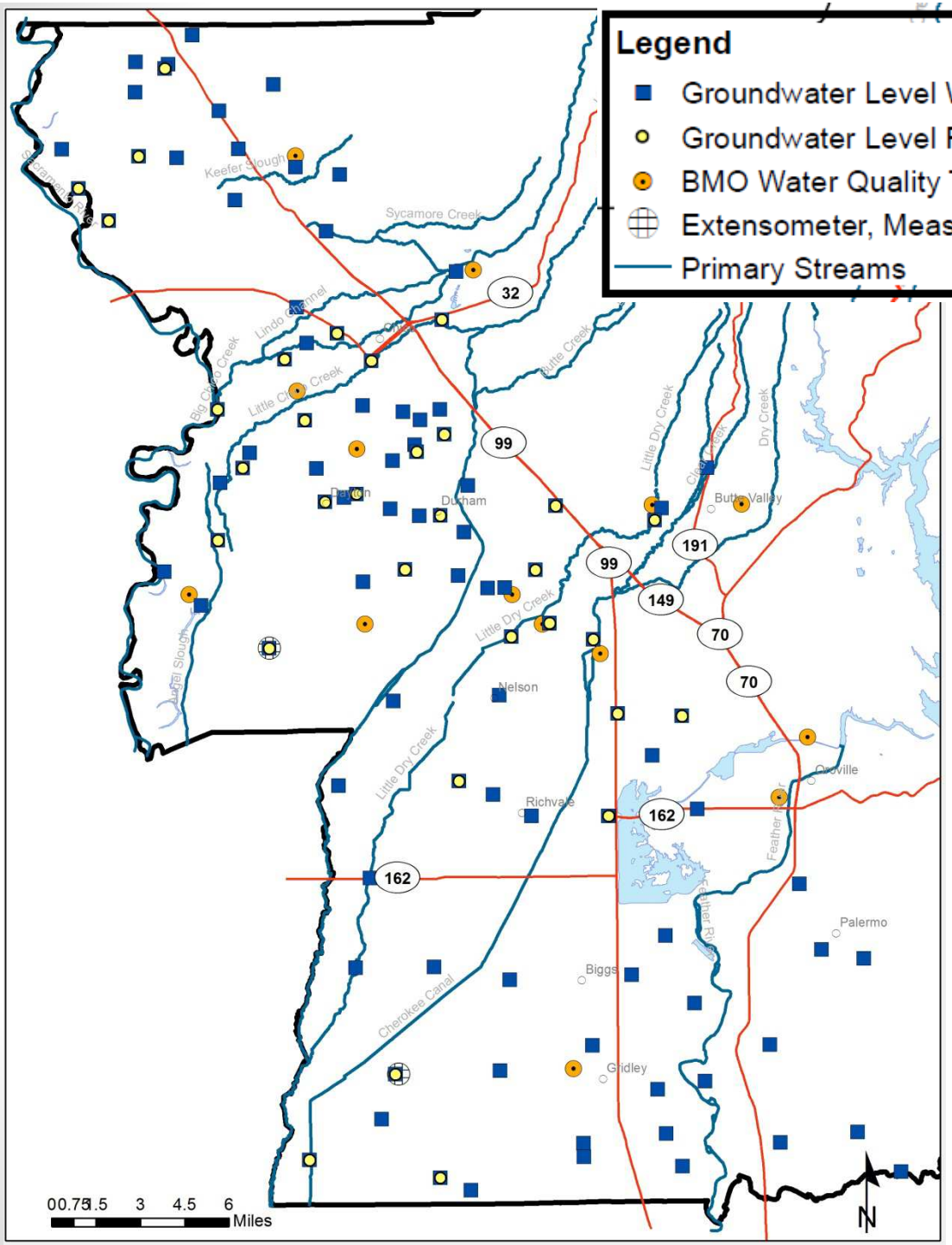
Understanding the Basin

- Ongoing monitoring of groundwater levels tracks the result of hydrologic variability and groundwater use
- Research and modeling helps identify the inputs (hydrology, demands, geology, basin dynamics, etc.)


Northern Sierra Precipitation: 8-Station Index, February 10, 2014
MSC - Mount Shasta City
SHA - Shasta Dam
MNR - Mineral
QRD - Quincy
BCM - Brush Creek
SRR - Sierraville RS
BYM - Blue Canyon
PCF - Pacific House
Percent of Average for this Date: 33%
1982-1983 (wettest)
88.5
Average (1922-1998)
50.0
44.3
2012-2013
1923-1924 (driest)
19.0
17.1
9.6 - Current Daily Precip.
2013-2014
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Water Year (October 1 - September 30)
Average (1922-1998)
1923-1924 (driest)
1976-1977 (2nd Driest)
1982-1983 (wettest)
2012-2013
2013-2014 (current)

Sacramento Valley Water Year Type Index





Monitoring Network

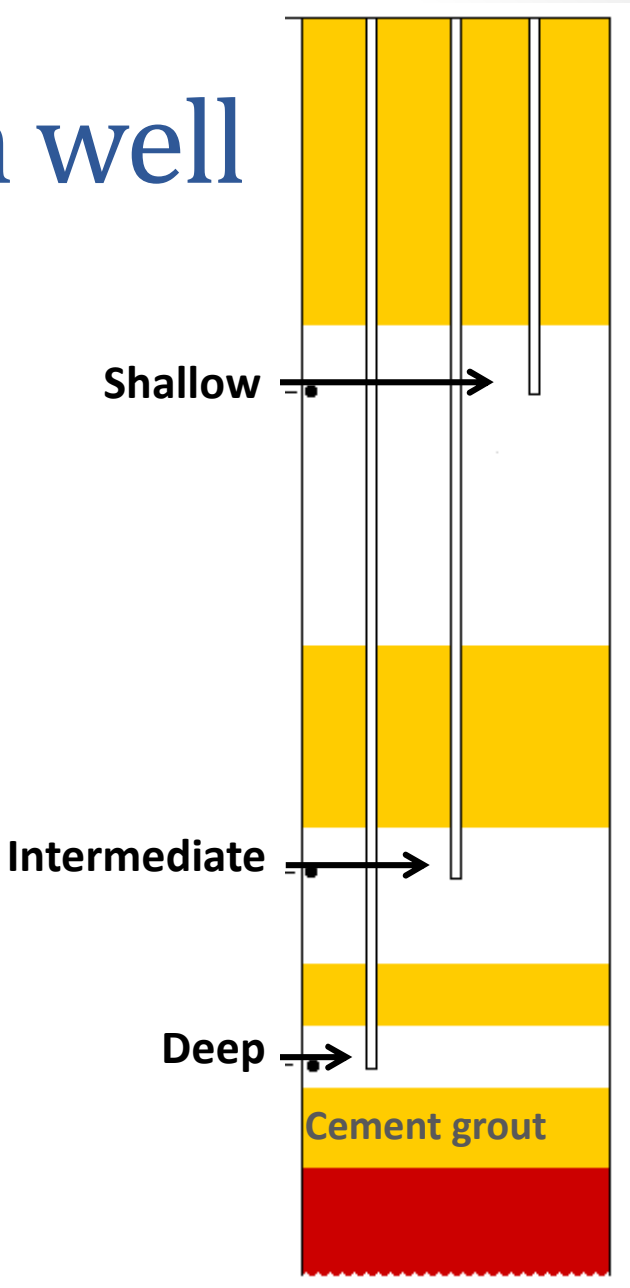
- 125 BMO wells
- 59 equipped with a data logger
- 77 assigned spring/fall alert levels
- 69 additional wells since 2000
- Data online (CASGEM and Water Data Library)

Domestic well

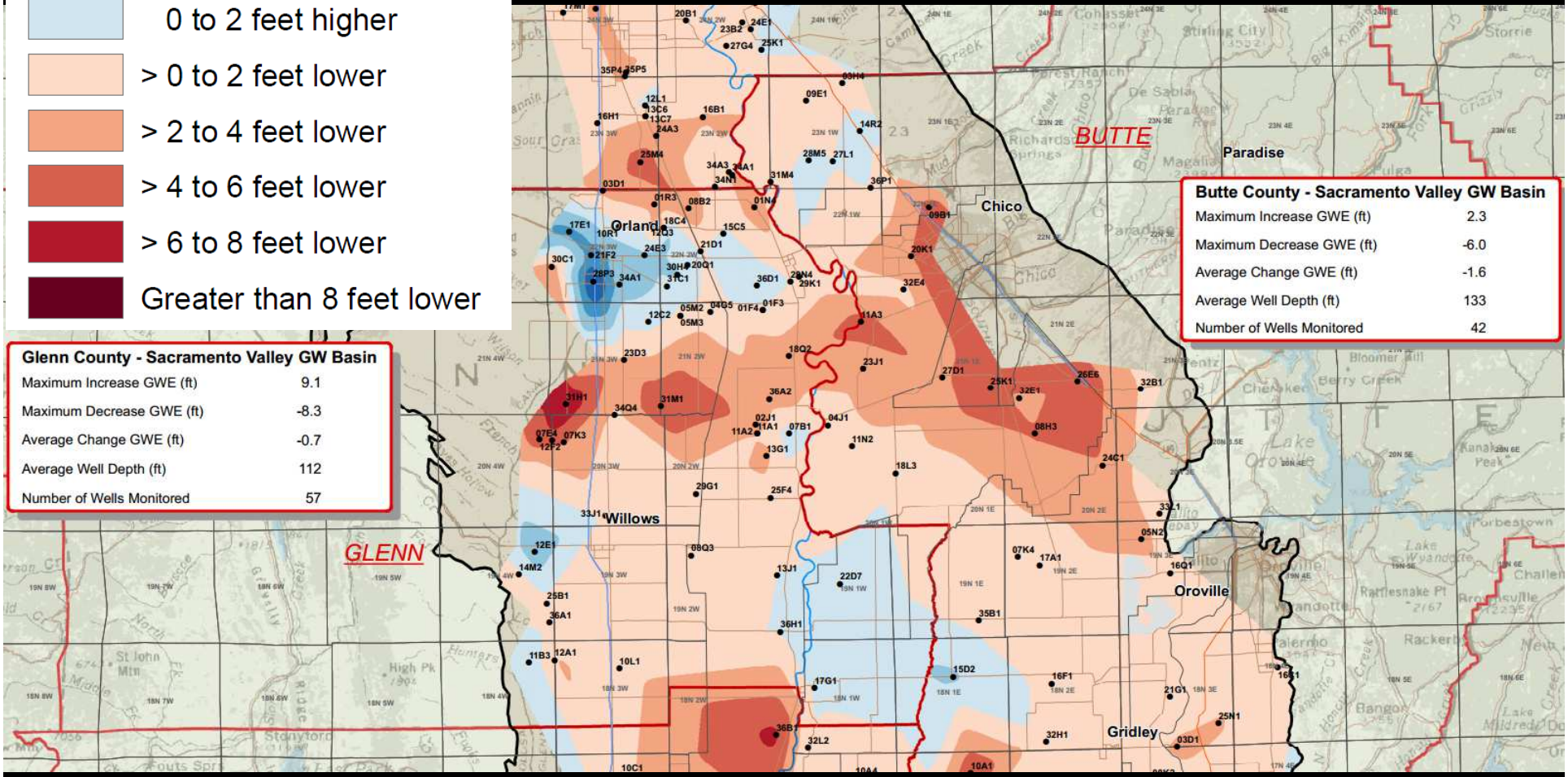
Irrigation well

Multi-completion well

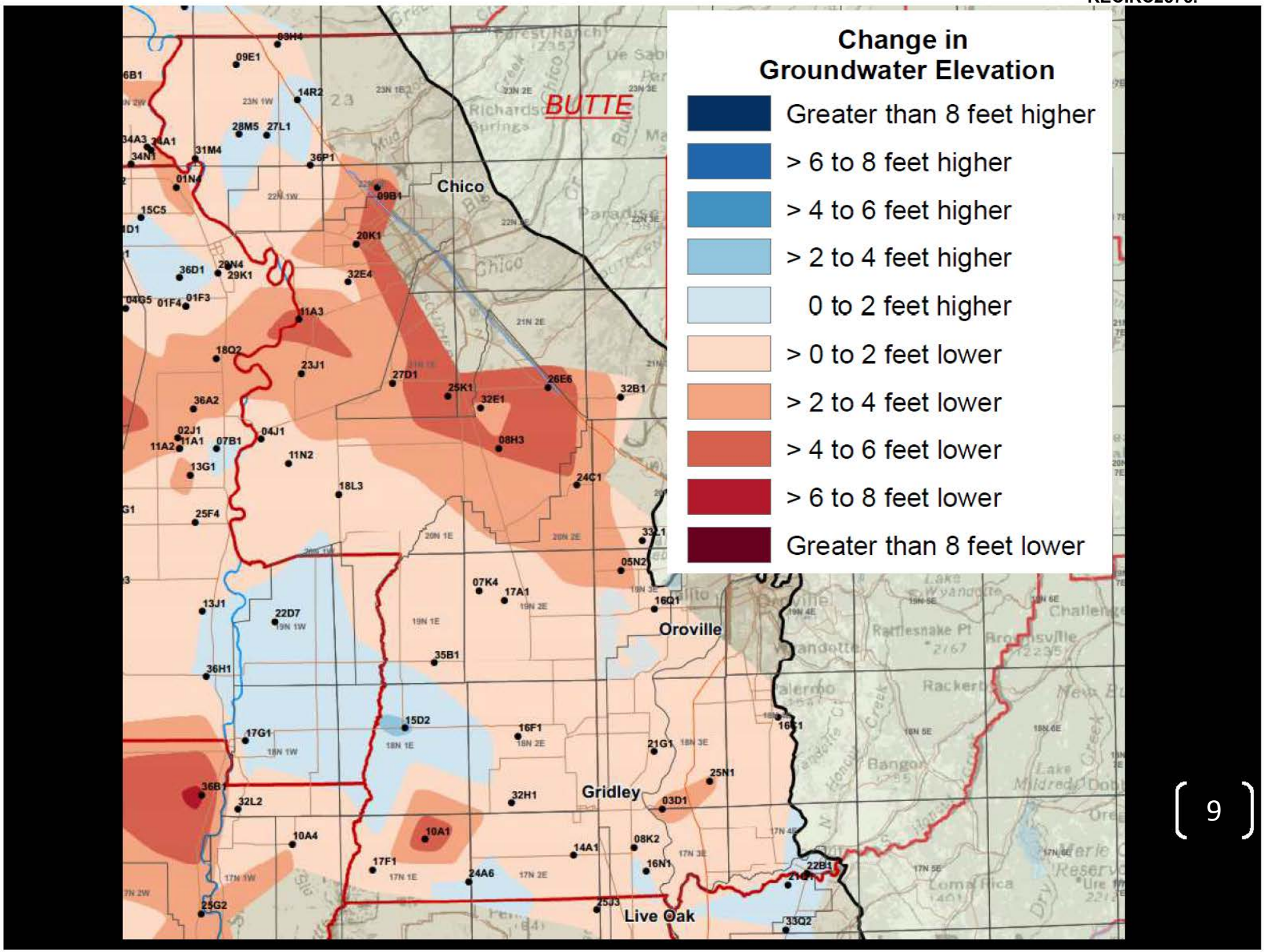
Multi-completion well



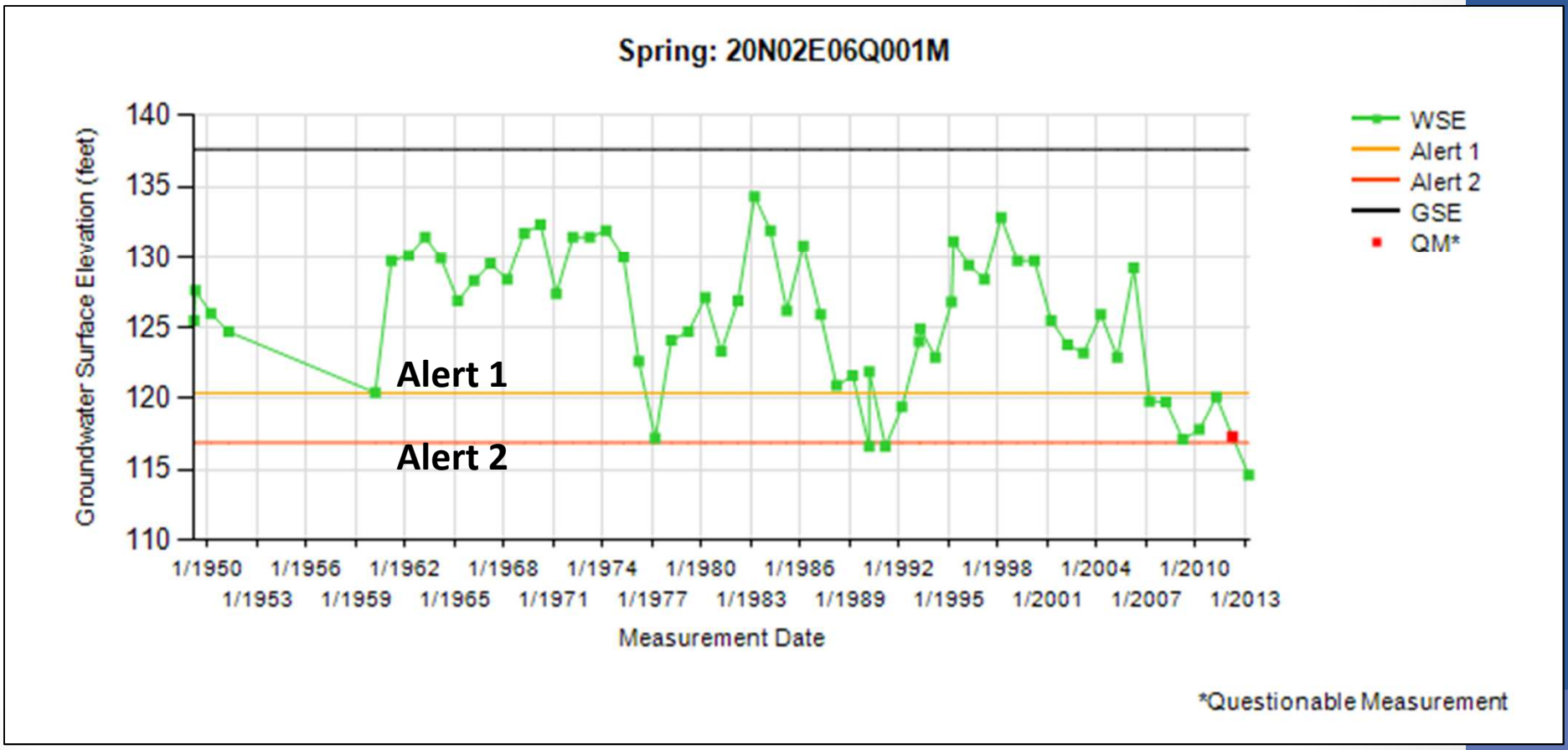
Change in Groundwater Elevation Map Spring 2012 to Spring 2013 Shallow Aquifer Zone (<200 ft.)



Produced by Department of Water Resources Northern Region Office


Change in
Groundwater Elevation
Greater than 8 feet higher
> 6 to 8 feet higher
> 4 to 6 feet higher
> 2 to 4 feet higher
0 to 2 feet higher
> 0 to 2 feet lower
> 2 to 4 feet lower
> 4 to 6 feet lower
> 6 to 8 feet lower
Greater than 8 feet lower
BUTTE
Chico
Oroville
Gridley
Live Oak

Water Level Graphs & Alert Levels



Well in Durham/Dayton Sub-inventory Unit

BMO Alert Stage Frequency

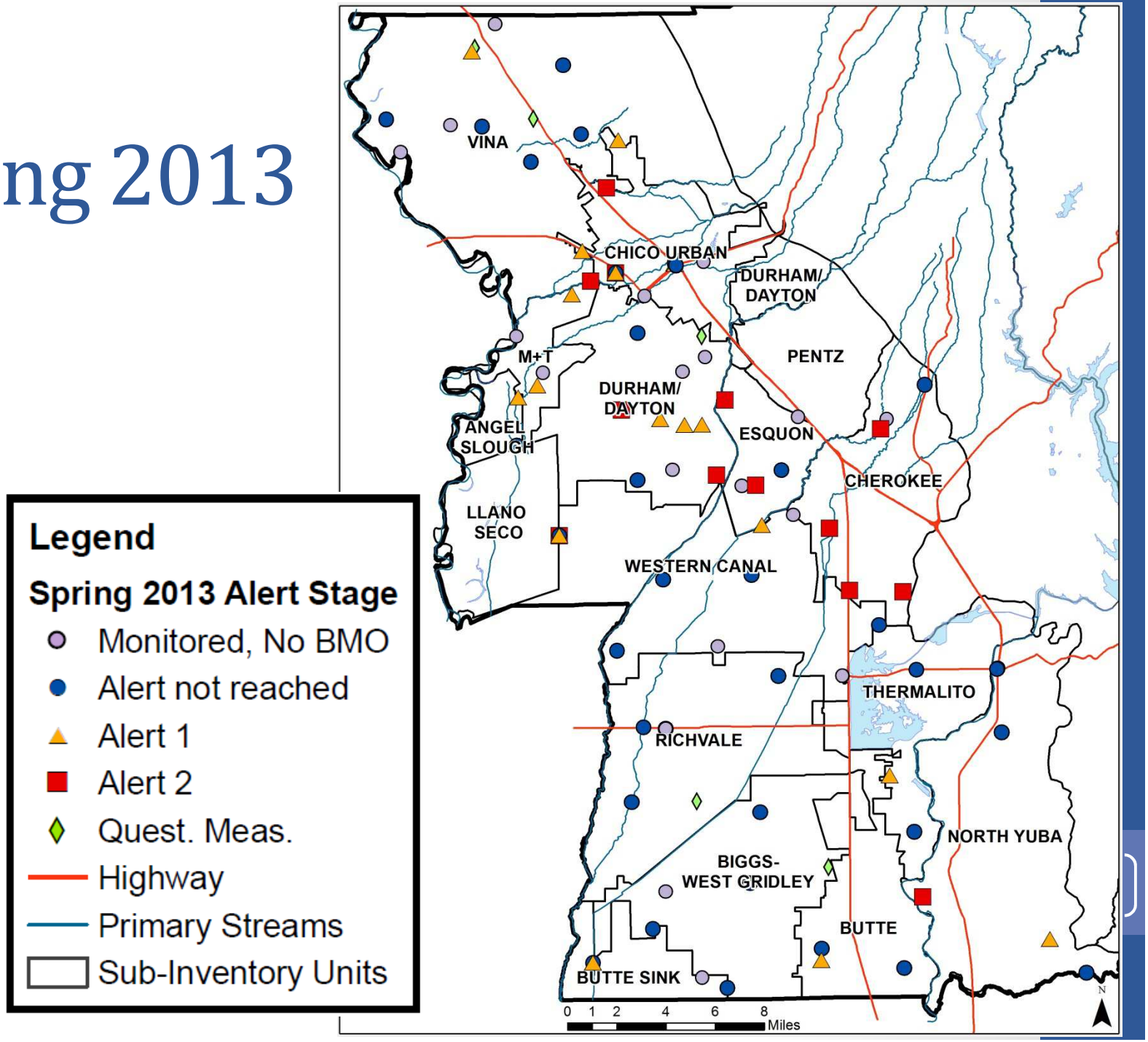
Spring: March 2013

	2008	2009	2010	2011	2012	2013
Alert 1	26	31	25	24	25	20
Alert 2	0	6	3	0	4	15

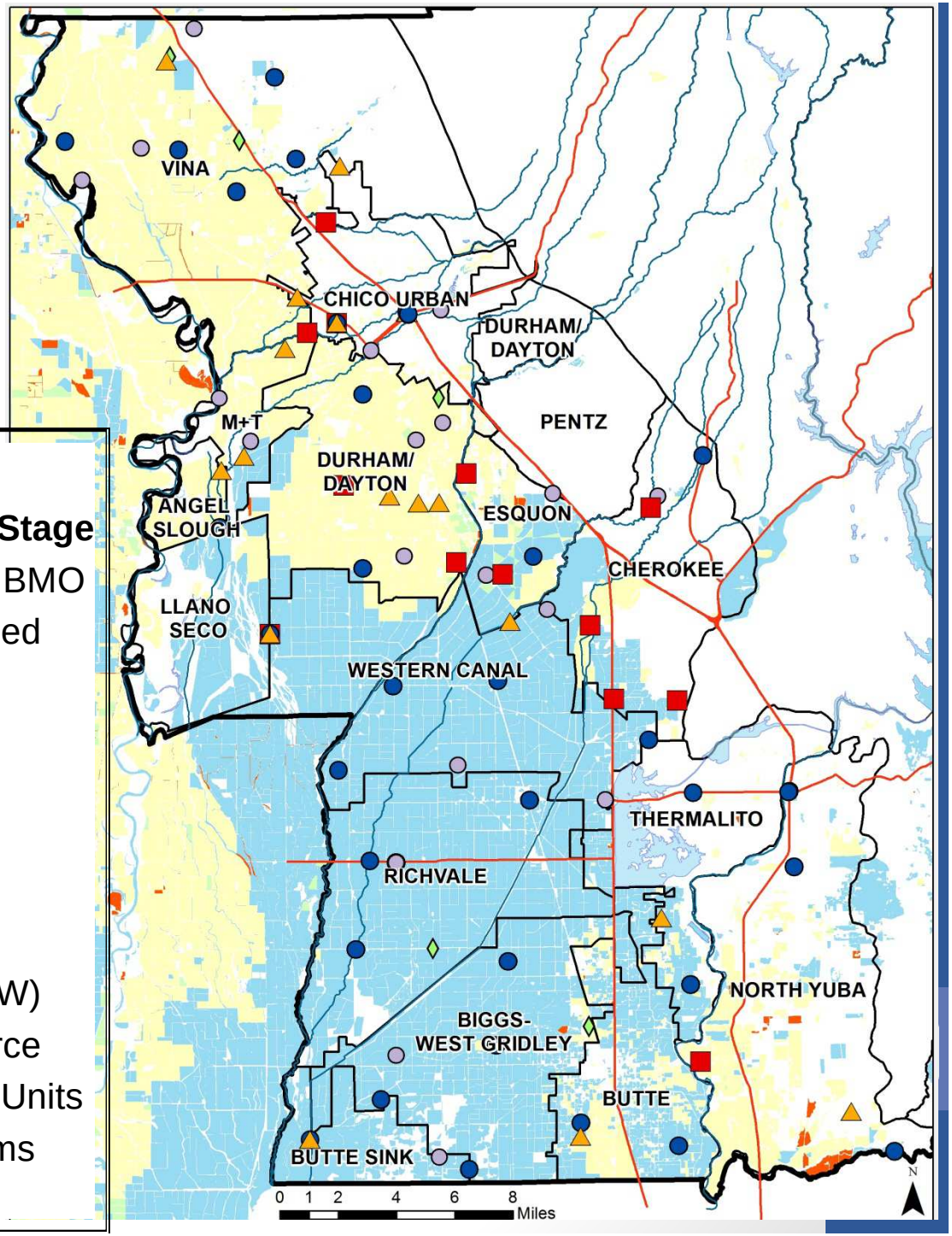
Fall: October 2013

	2008	2009	2010	2011	2012	2013
Alert 1	27	29	24	7	26	23
Alert 2	2	1	2	2	6	16

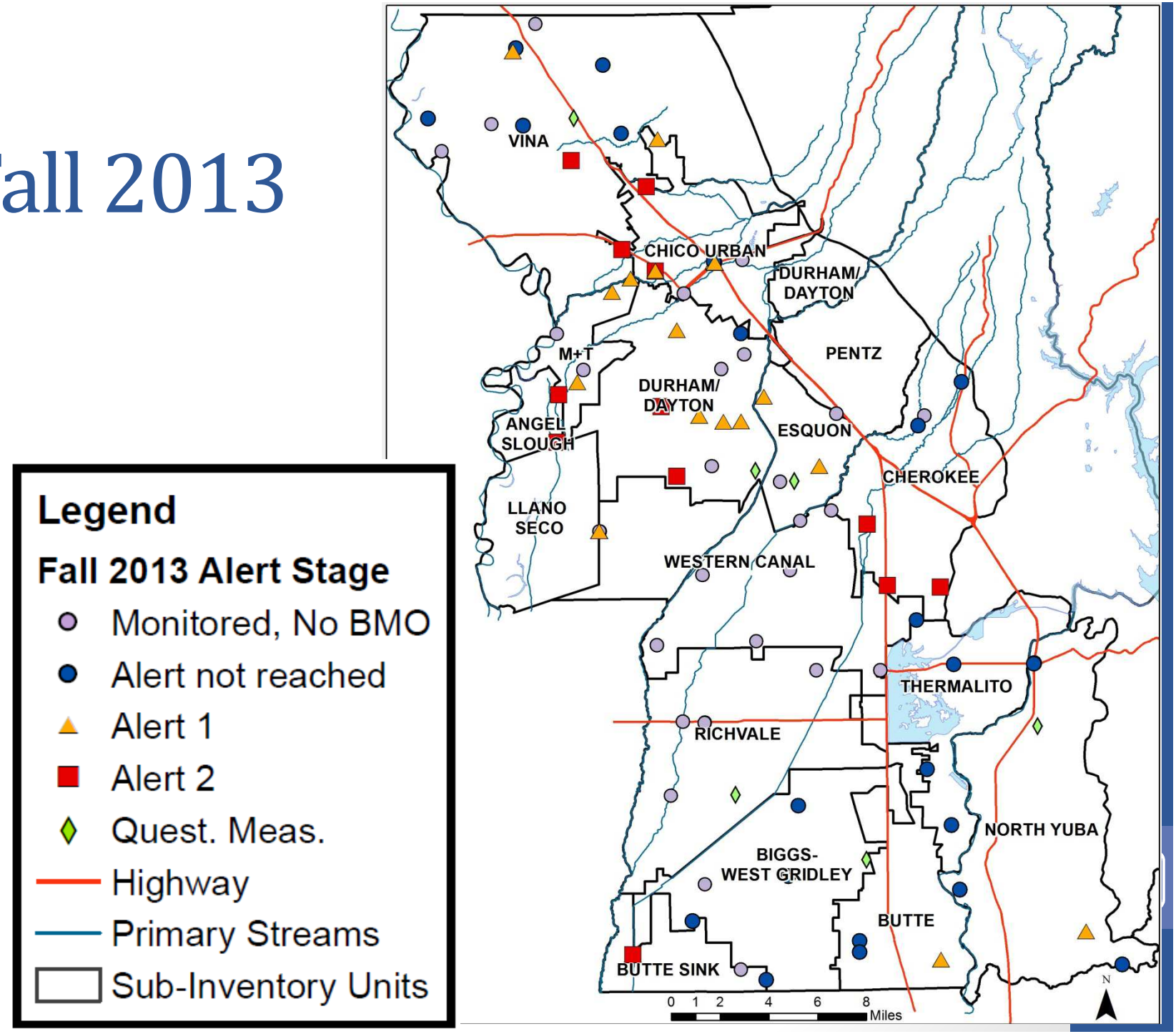
Spring 2013


VINA
CHICO URBAN
DURHAM/
DAYTON
PENTZ
M+T
DURHAM/
DAYTON
ANGEL
SLOUGH
ESQUON
CHEROKEE
LLANO
SECO
WESTERN CANAL
THERMALITO
RICHVALE
NORTH YUBA
BIGGS-
WEST GRIDLEY
BUTTE
BUTTE SINK
0 1 2 4 6 8
Miles
N
Legend
Spring 2013 Alert Stage
Monitored, No BMO
Alert not reached
Alert 1
Alert 2
Quest. Meas.
Highway
Primary Streams
Sub-Inventory Units

Spring 2013 with Water Source

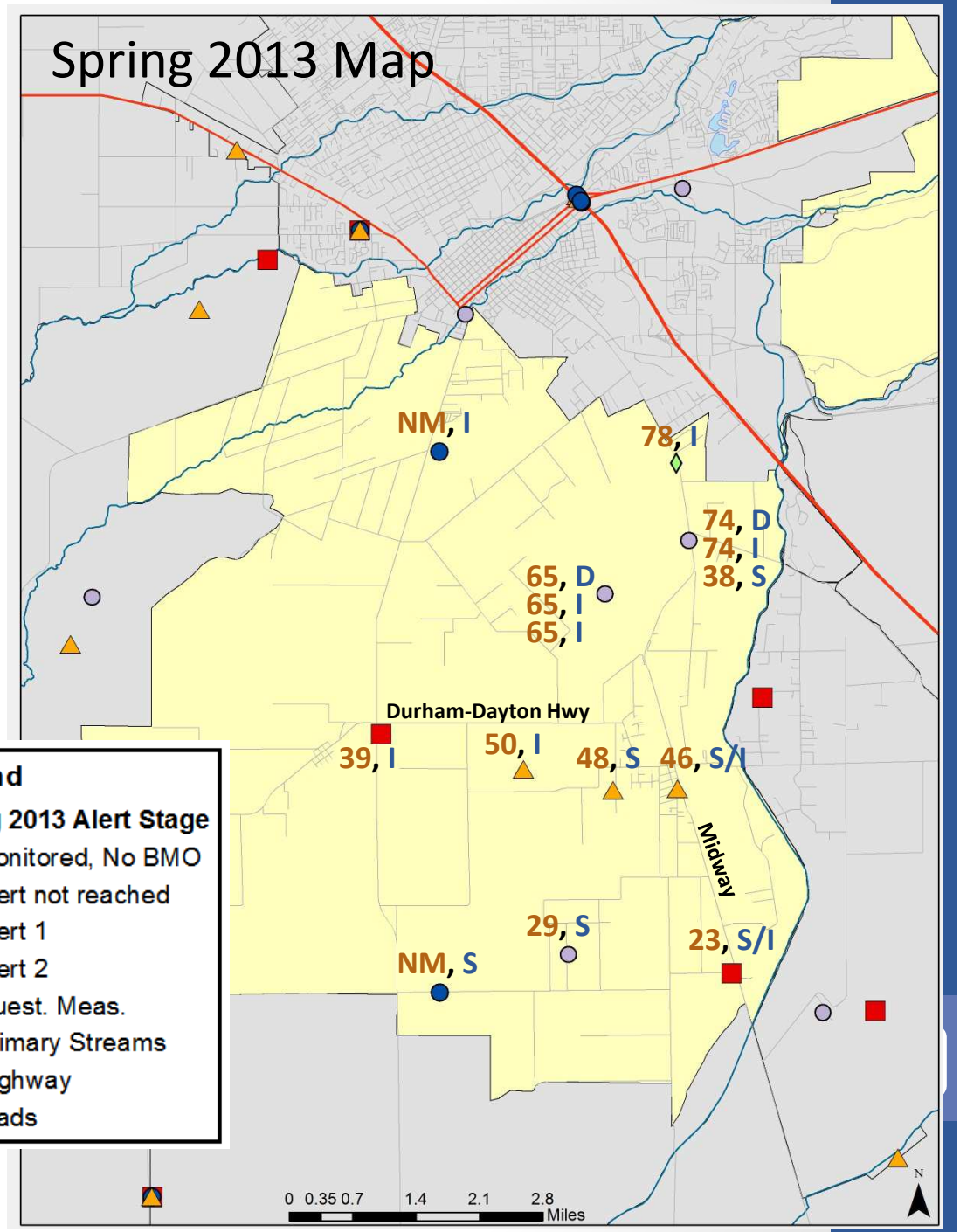


Fall 2013


RECIRC2575.
VINA
CHICO URBAN
DURHAM/
DAYTON
M+T
PENTZ
DURHAM/
DAYTON
ANGEL
SLOUGH
ESQUON
CHEROKEE
LLANO
SECO
WESTERN CANAL
THERMALITO
RICHVALE
NORTH YUBA
BIGGS-
WEST GRIDLEY
BUTTE
BUTTE SINK
0 1 2 4 6 8
Miles
N
Legend
Fall 2013 Alert Stage
Monitored, No BMO
Alert not reached
Alert 1
Alert 2
Quest. Meas.
Highway
Primary Streams
Sub-Inventory Units

Durham Dayton Area

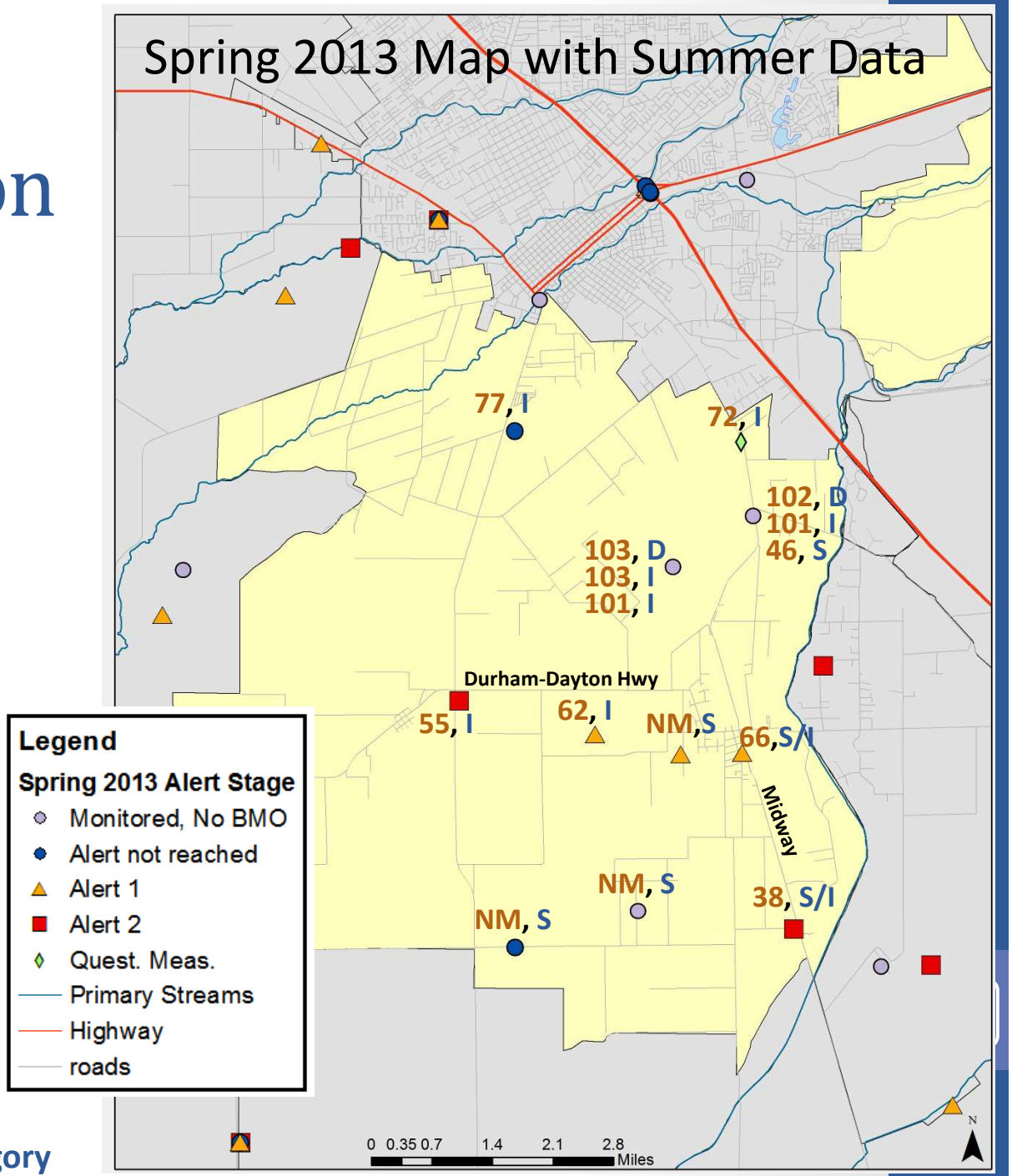
- 15 monitoring wells
  - 2 multi-completion wells
  - 8 wells with data loggers
  - 7 added since 2000, no alert stage set
- Spring 2013
  - 3 Alert 1; 2 Alert 2
- Fall 2013
  - 4 Alert 1; 2 Alert 2



Spring 2013 data
Depth to Water (ft), Well Depth Category

Durham Dayton Area

- 2013 Summer Depth to Water (feet)

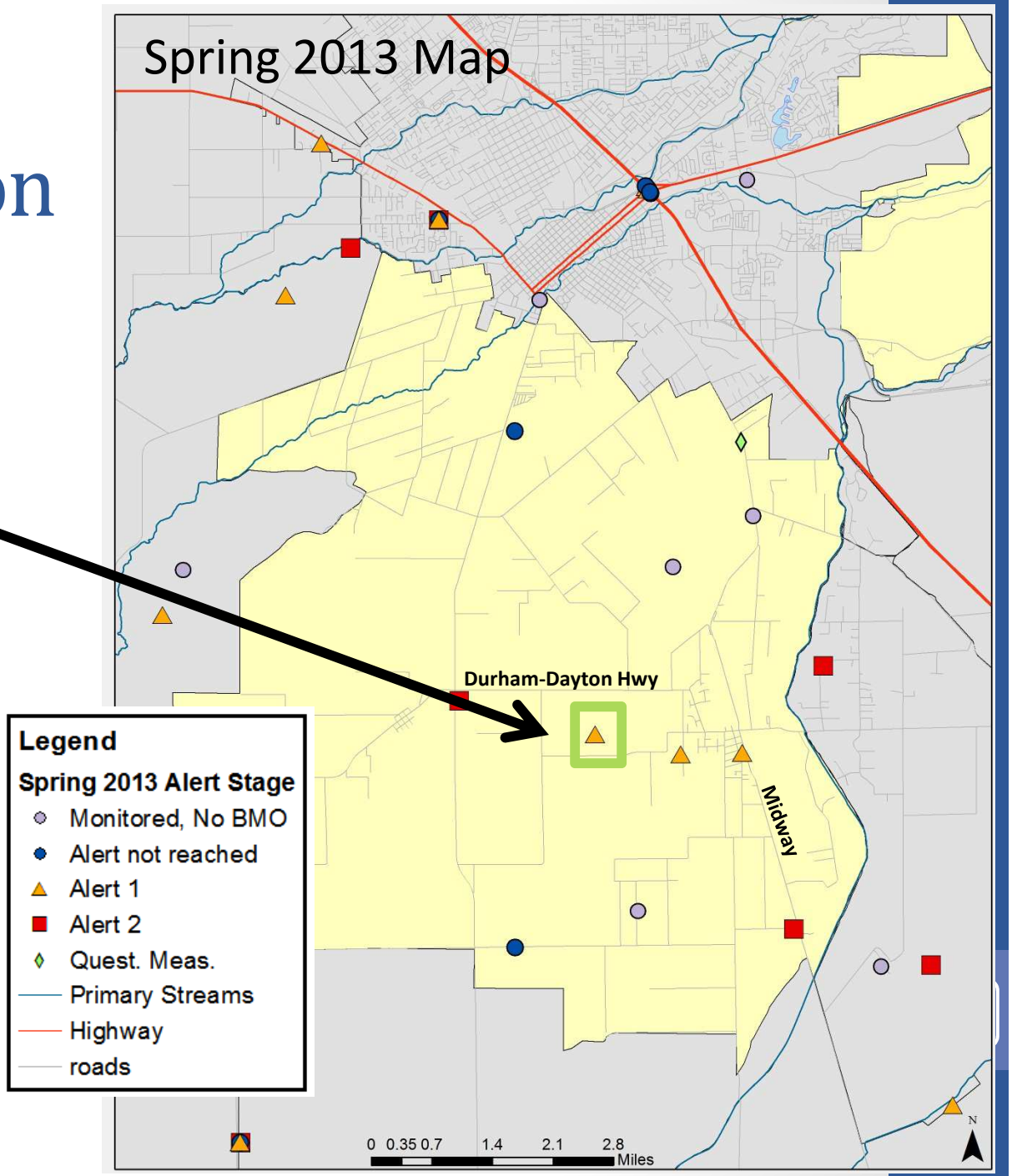


SUMMER 2013 data

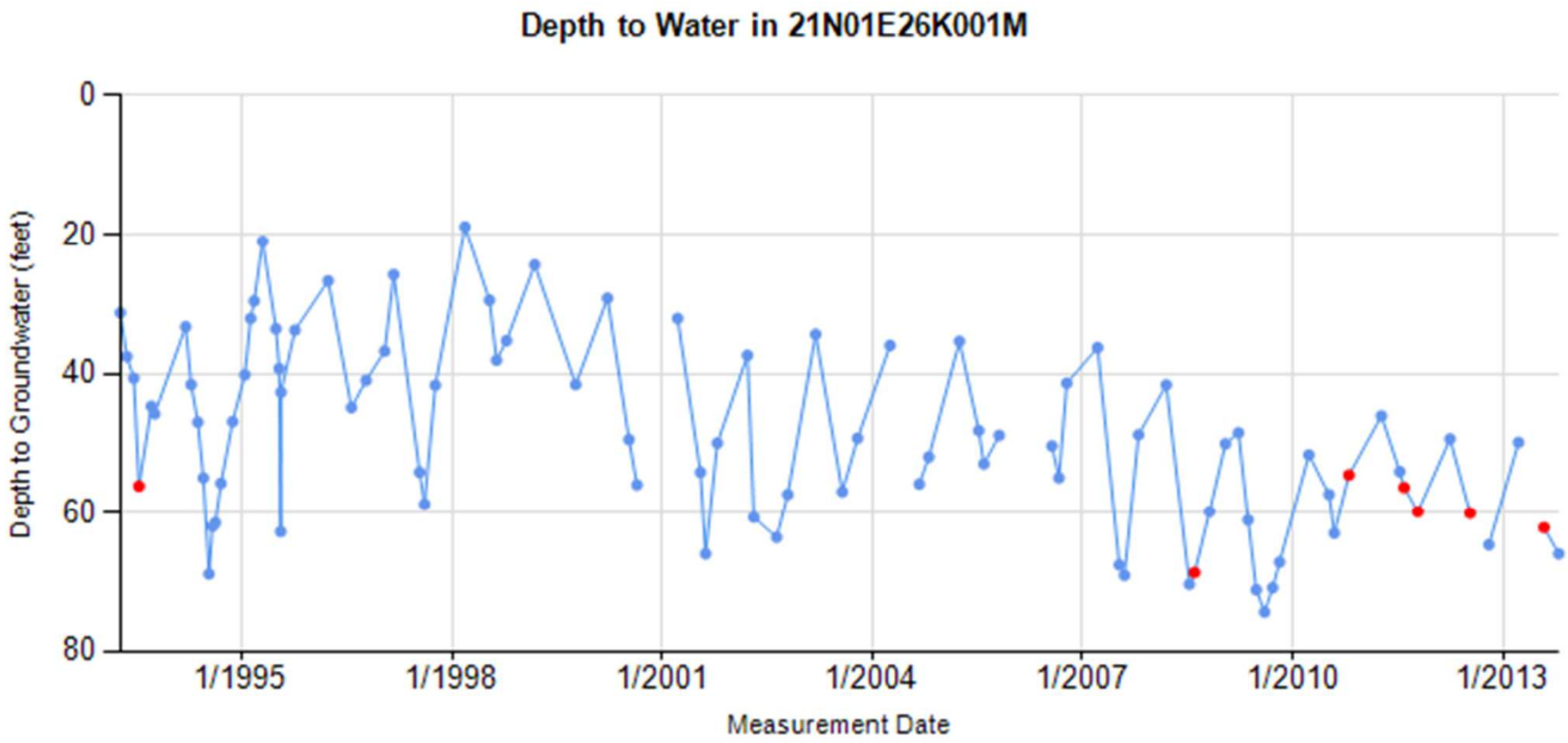
Depth to Water (ft), Well Depth Category

Durham Dayton Area

- A peek at the data….



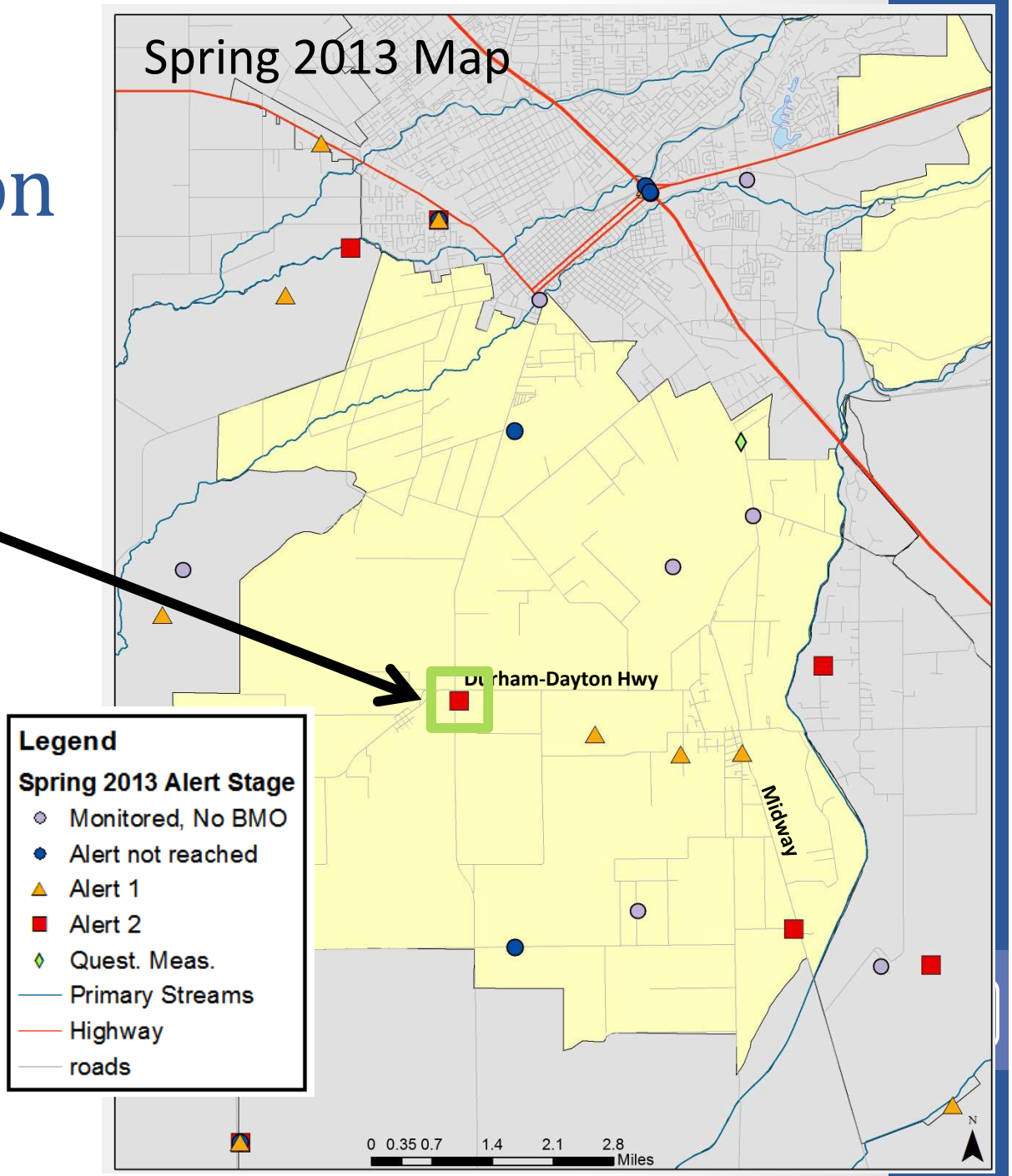
Groundwater Level Trends



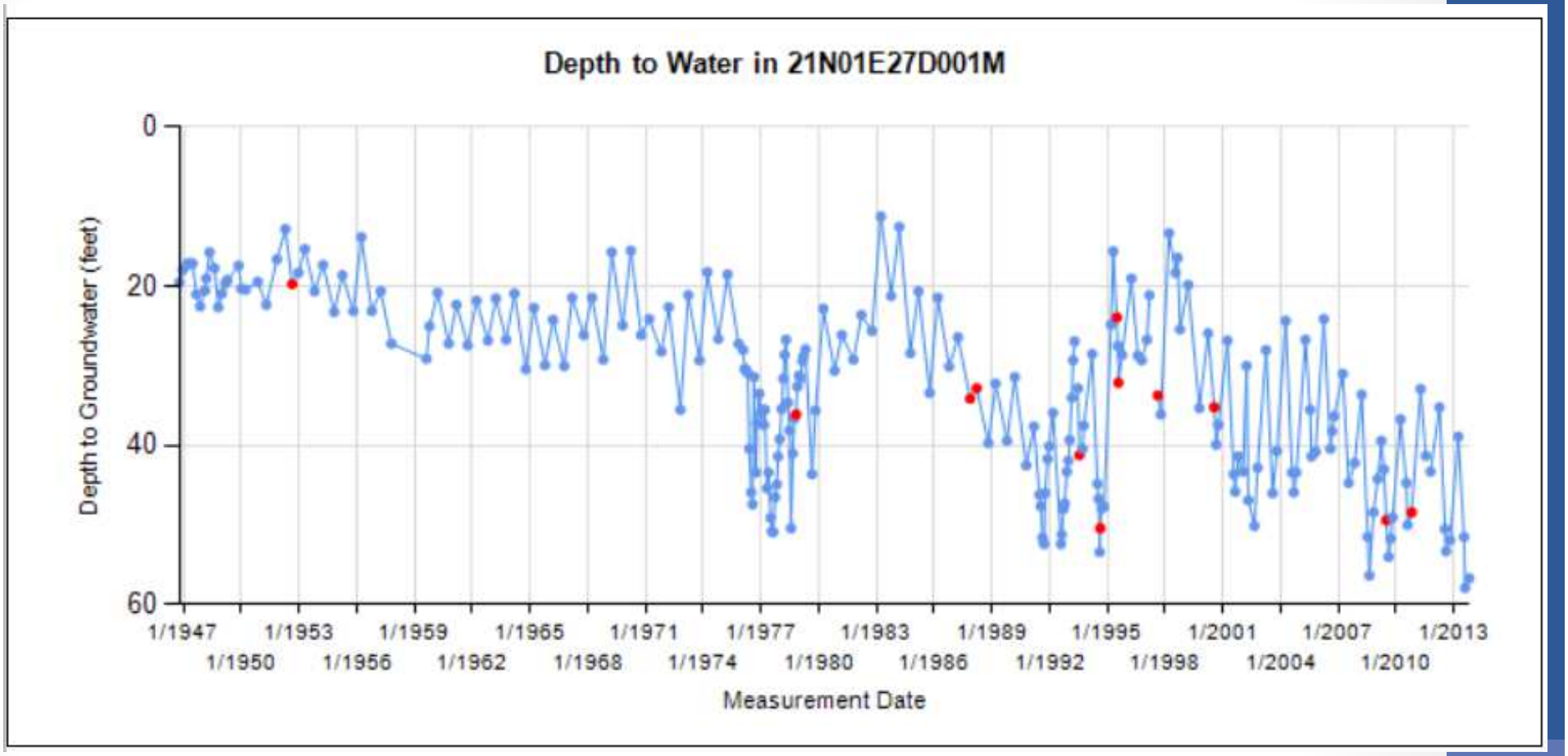
Irrigation, Intermediate (200-600 ft.) well in Upper Tuscan Formation.
Record begins in 1993
Spring and Fall Alert 1

Durham Dayton Area

- A peek at the data….



Groundwater Level Trends



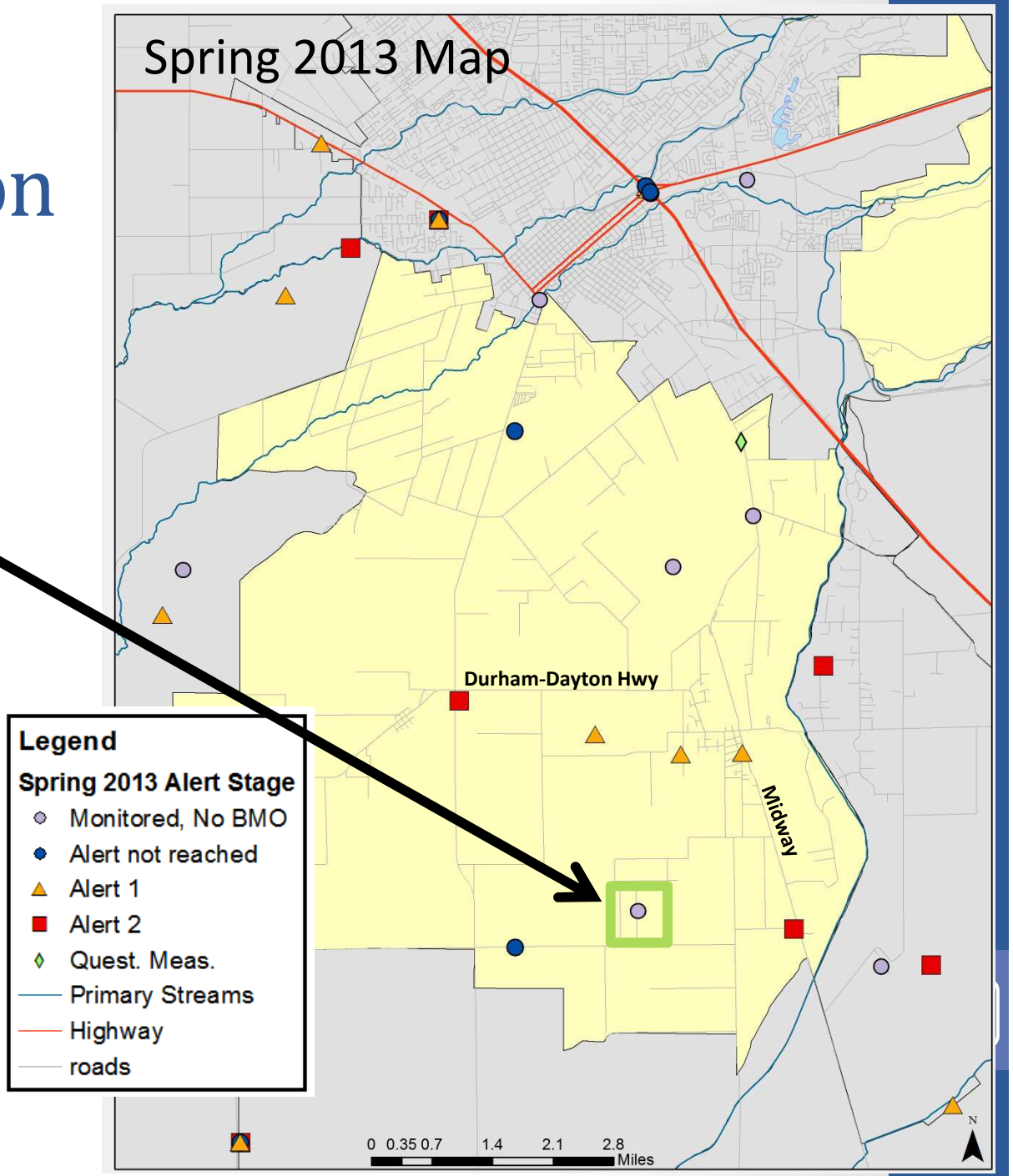
Domestic, shallow (<200 ft.) well in Modesto Formation.

Record begins in 1947

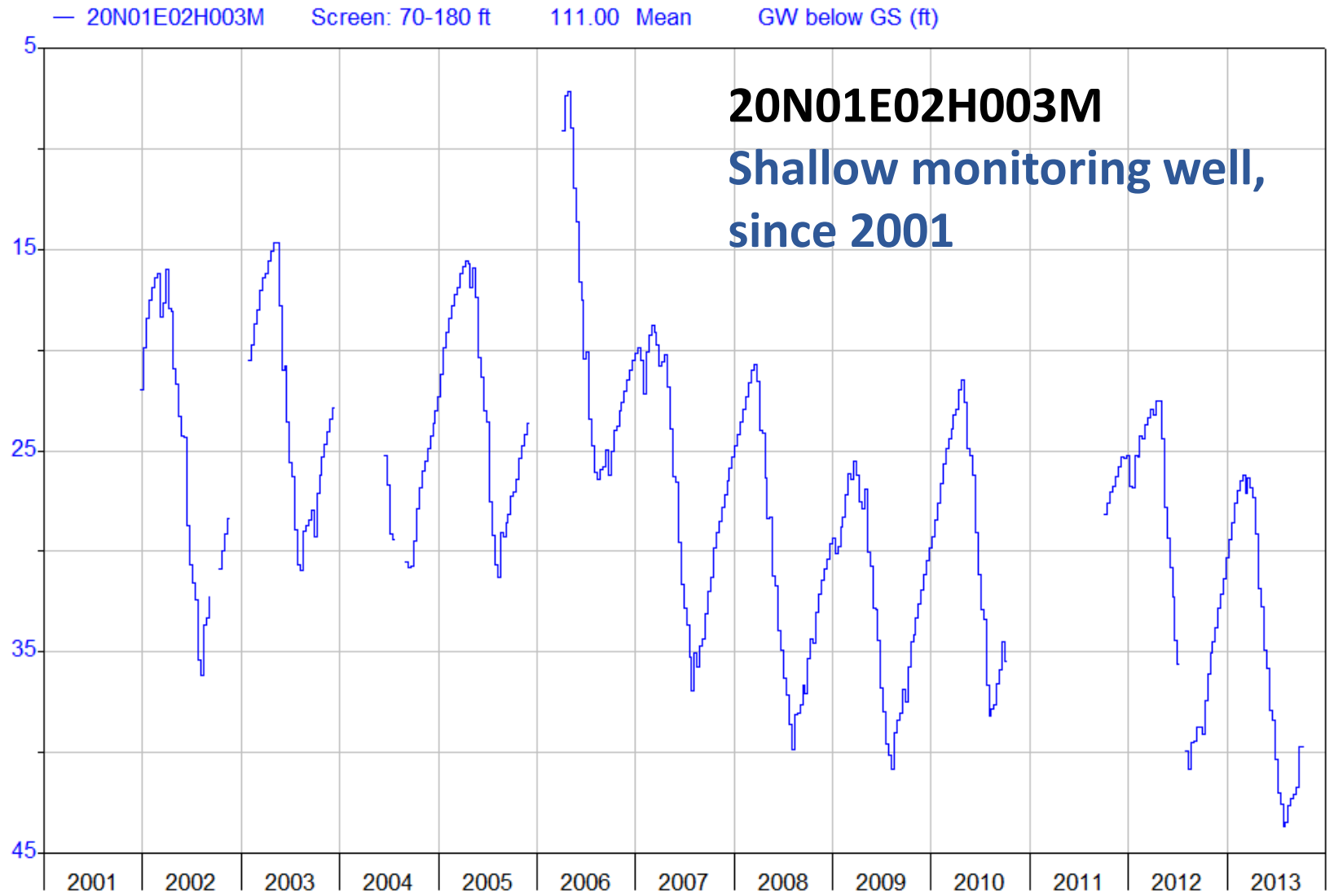
Spring and Fall Alert 2

Durham Dayton Area

- A peek at the data….

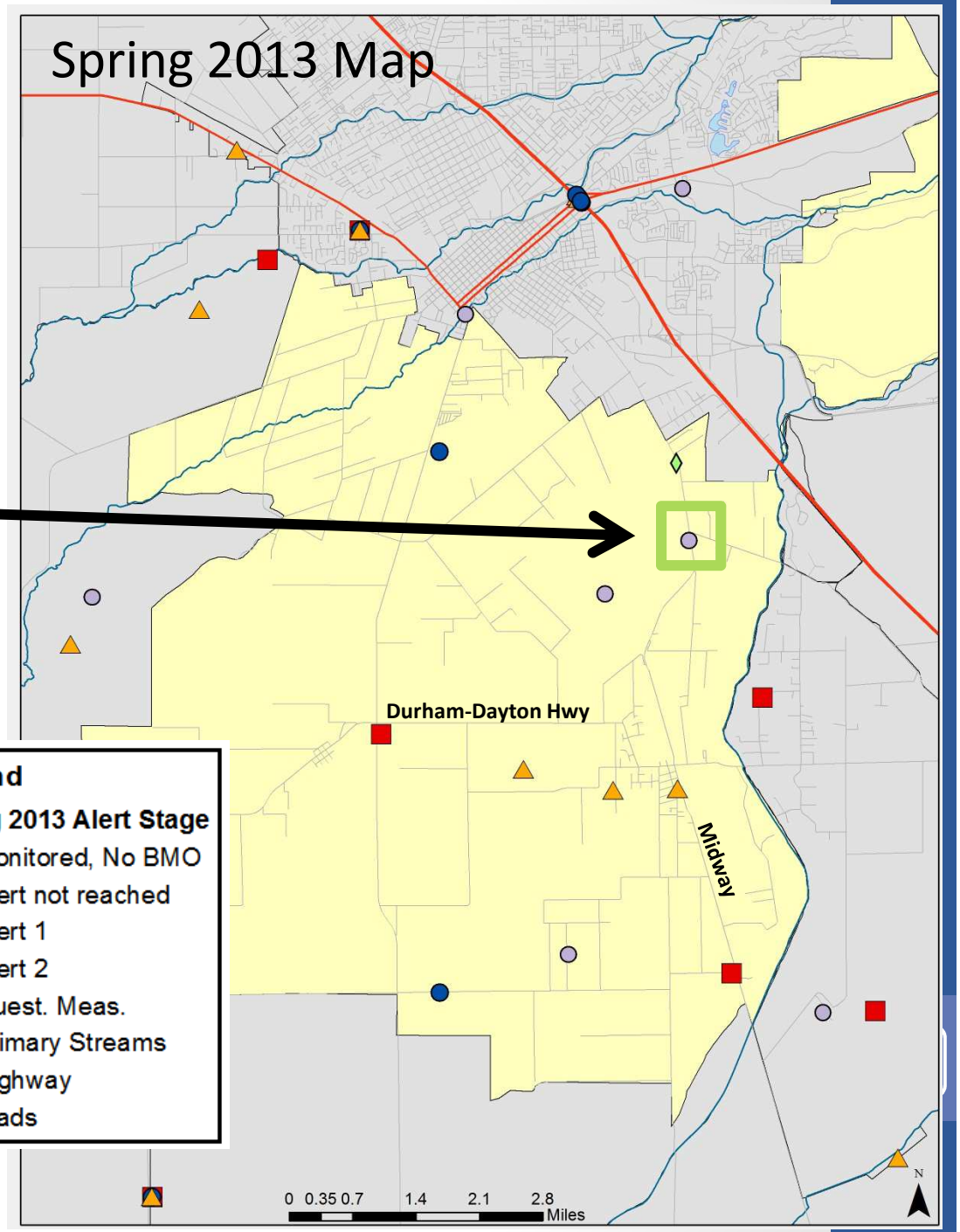


Logger Data


— 20N01E02H003M Screen: 70-180 ft 111.00 Mean GW below GS (ft)
5
15
25
35
45
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
20N01E02H003M
Shallow monitoring well, since 2001

Durham Dayton Area

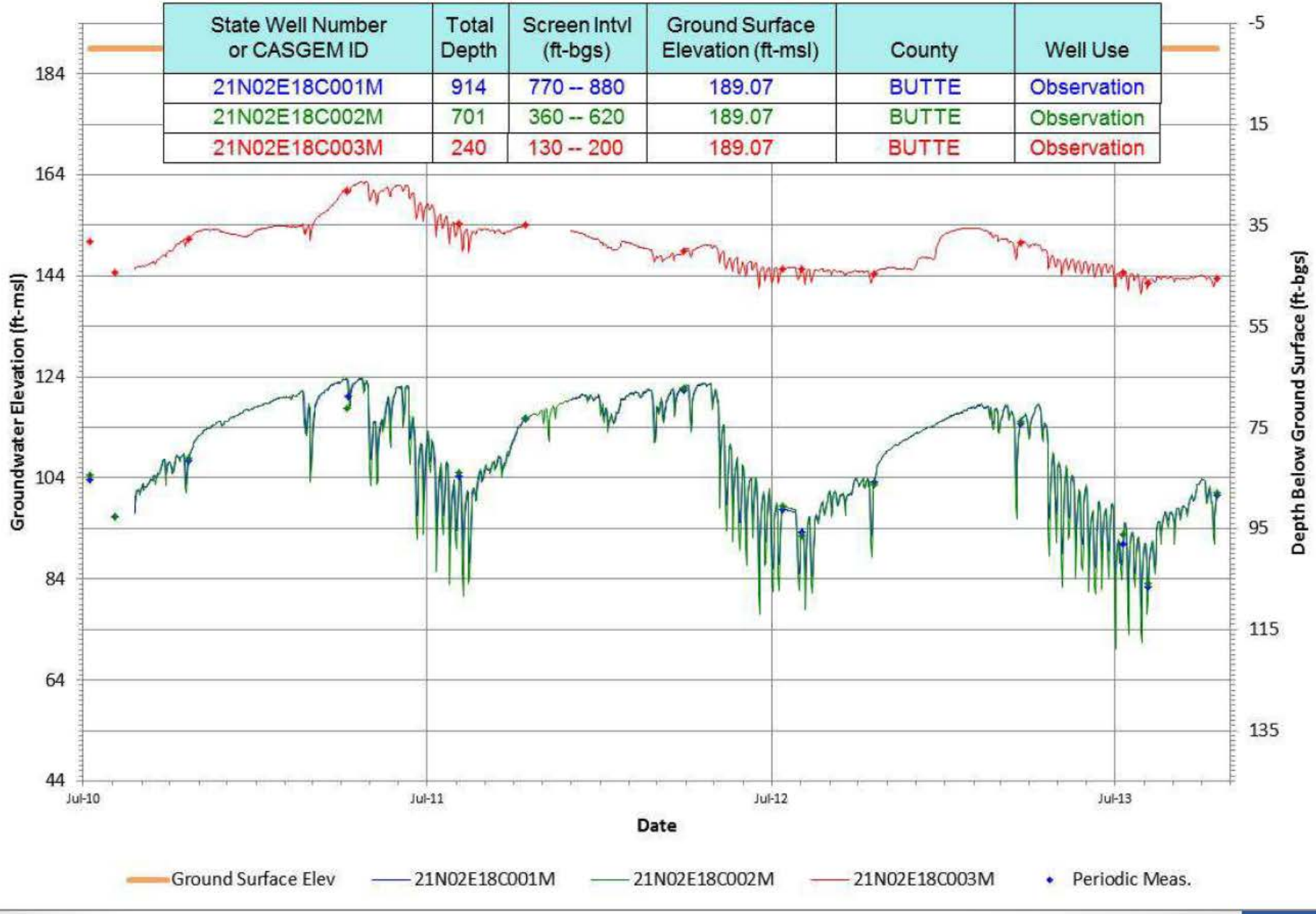
- A peek at the data….



Clustered Well Hydrograph

Period Of Record: 07/08/2010 to 10/17/2013

State Well Number or CASGEM ID	Total Depth	Screen Intvl (ft-bgs)	Ground Surface Elevation (ft-msl)	County	Well Use
21N02E18C001M	914	770 -- 880	189.07	BUTTE	Observation
21N02E18C002M	701	360 -- 620	189.07	BUTTE	Observation
21N02E18C003M	240	130 -- 200	189.07	BUTTE	Observation



Issued Well Permits

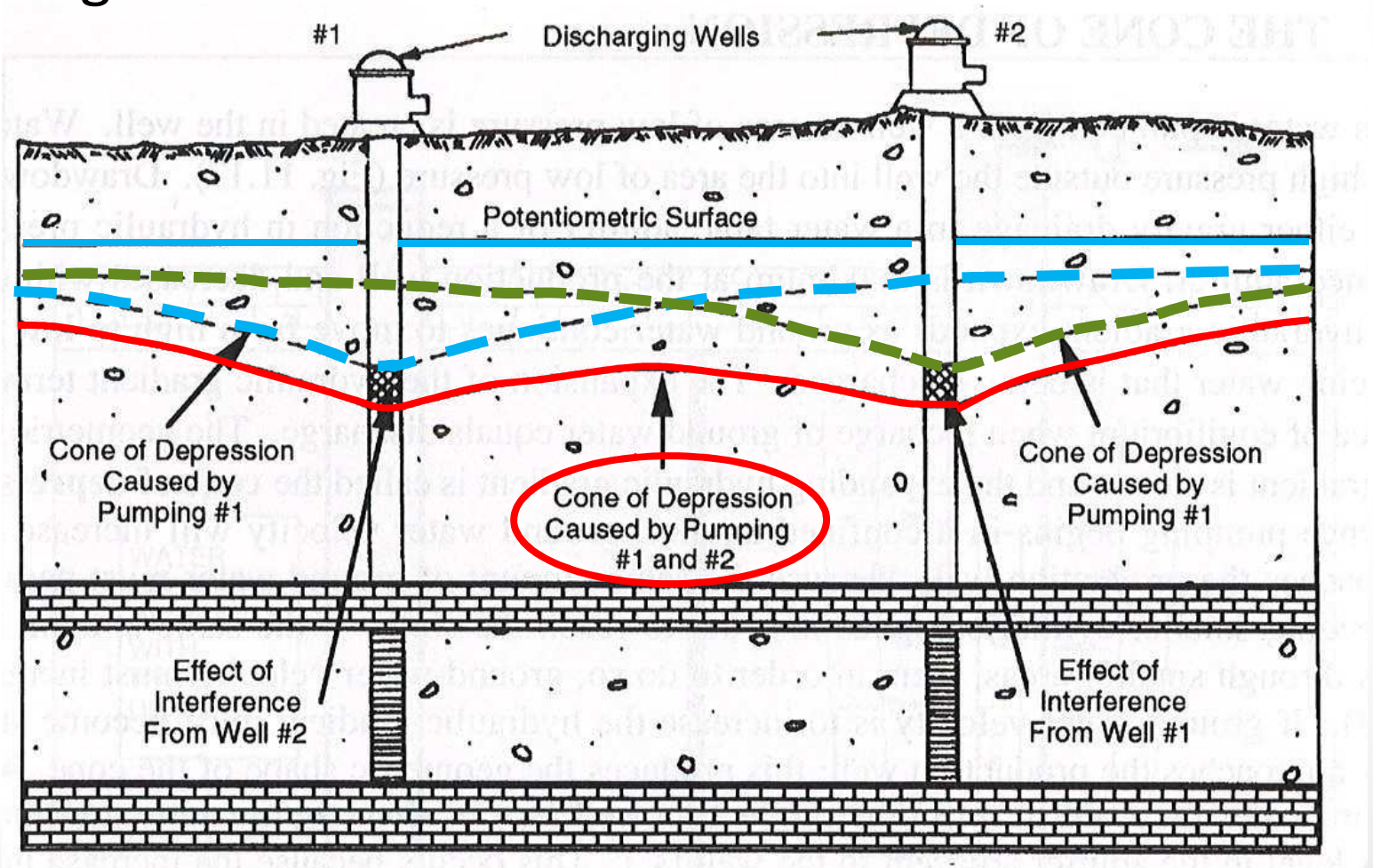
Well Type	2009	2010	2011	2012	2013
Small Diameter	97	82	53	63	125
Large Diameter	28	6	15	19	29
Well Deepening	16	8	5	12	8

- Number of well permits issued by Butte County Environmental Health, not necessarily wells actually drilled.
- Over 14,000 wells exist in the county
- 2009 was the last year of the last 3 year drought

Given the conditions….
What can I do?

What can I do?

1. Coordinate agricultural pumping with your neighbors



Credit: Kasenow 2010

What can I do?

2. Well Owners, Be Prepared
    - Have your well log on hand (a.k.a. well completion report). Available from Butte County Dept. of Environmental Health
    - Have a licensed well driller give your system an annual check up
    - **Wellowner.org** for basic groundwater information and well maintenance
        - Also has contractor locator tool

What can I do?

3. Be aware of groundwater conditions near you
    - Online Water Data Library for monitoring data
    - Come check out our table in the back
    - Know information about your well's construction (total depth, screening intervals, depth of pump)

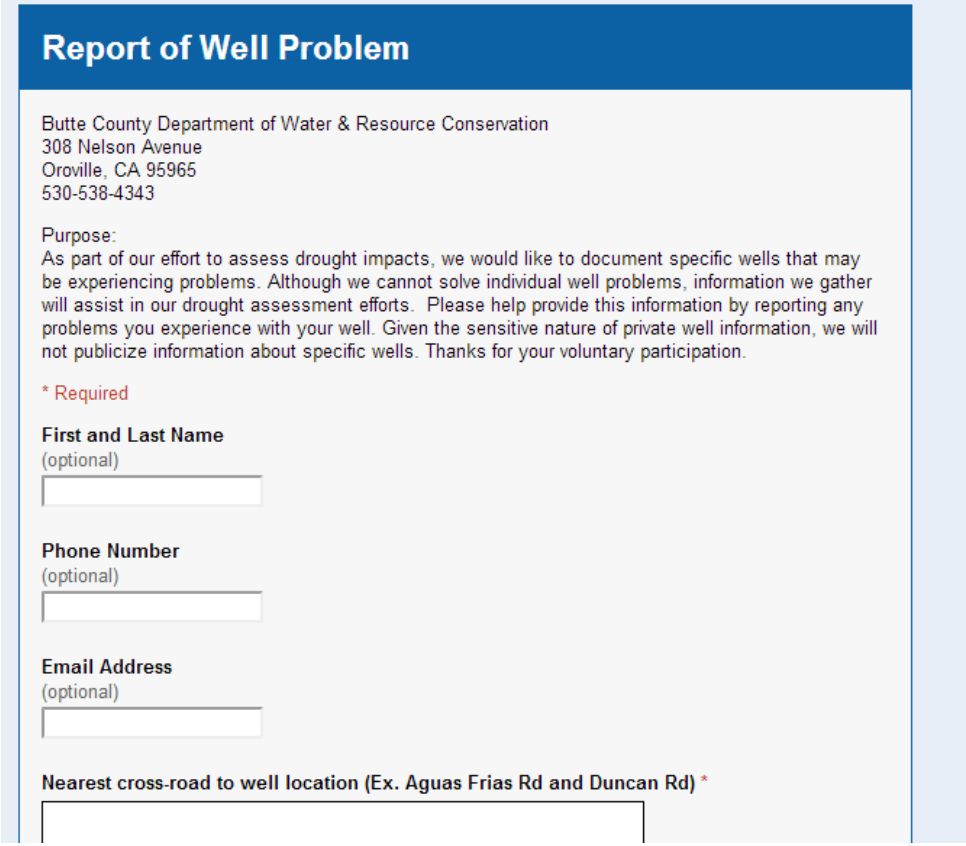
What can I do?

4. Use Water Wisely!
   - **SaveOurH2O.org**
   - Ways to save water Indoors and Outdoors

If you do run into trouble…

Help us document the impacts of the drought!

Fill out the online form. This will help us keep track of where and what the problems are.



Report of Well Problem

Butte County Department of Water & Resource Conservation
308 Nelson Avenue
Oroville, CA 95965
530-538-4343

Purpose:
As part of our effort to assess drought impacts, we would like to document specific wells that may be experiencing problems. Although we cannot solve individual well problems, information we gather will assist in our drought assessment efforts. Please help provide this information by reporting any problems you experience with your well. Given the sensitive nature of private well information, we will not publicize information about specific wells. Thanks for your voluntary participation.

* Required

First and Last Name
(optional)

Phone Number
(optional)

Email Address
(optional)

Nearest cross-road to well location (Ex. Aguas Frias Rd and Duncan Rd) *

Recap

- 2013 was a dry year in the Sacramento Valley and Statewide. Off to a very dry start for 2014.
- Groundwater levels generally declined over last several years, especially in groundwater dependent areas where they are at or near historical lows in many monitoring wells
- For local conditions, see spring/fall hydrographs in BMO reports or on Water Data Library
- Be prepared! Have your well log on hand and use water wisely

Questions?

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Butte County
Dept. of Water & Resource Conservation
cbuck@buttecounty.net
538-6265

AQUALLIANCE
DEFENDING NORTHERN CALIFORNIA WATERS

california water impact network

April 2, 2014

Mr. Brad Hubbard
United States Bureau of Reclamation
2800 Cottage Way, MP-410
Sacramento, CA 95825
bhubbard@usbr.gov

Ms. Frances Mizuno
San Luis & Delta Mendota Water Authority
842 6th Street
Los Banos, CA 93635
frances.mizuno@sldmwa.org

Subject: Comments on the *Draft Environmental Assessment/Initial Study 2014 San Luis & Delta Mendota Water Authority Water Transfers*

Dear Mr. Hubbard and Ms. Mizuno:

AquAlliance submits the following comments and questions for the Bureau of Reclamation ("Bureau") and the San Luis Delta Mendota Water Authority's ("SLDMWA") ("Agencies") *Draft Environmental Assessment* ("EA") and *Initial Study* ("IS") ("EA/IS"), for the *2014 San Luis & Delta Mendota Water Authority Water Transfers* program ("Project"). We include by reference the comments and documents submitted by AquAlliance's Executive Director for the *2009 Drought Water Bank* ("DWB"), the *2010-2011 Water Transfer Program***,** and the *2013 Water Transfer Program* with other items in Appendix A that disclose the environmental impacts associated with these types of serial "temporary" transfers.

I. Lead Agency

SLDMWA is not the proper Lead Agency for the Project. California Environmental Quality Act ("CEQA") Guidelines section 15367 and Section 15051 require that the California Department of Water Resources, as the operator of the California Aqueduct and who has responsibility to protect the public health and safety and the financial security of bondholders with respect to the aqueduct, is the more appropriate lead agency. In *PCL v DWR*, the court found that DWR's attempt to delegate lead agency authority impermissibly insulated the department from "public awareness and possible reaction to the individual members' environmental and economic values."[1] DWR clearly has approval authority for parts of the Project and is guiding the transfer process as noted on page 3-41: "Potential sellers will be required to submit well data for Reclamation and, where appropriate, DWR review, as part of the transfer approval process. Required information is detailed in the *DRAFT Technical Information for Preparing Water Transfer Proposals* (Reclamation and DWR 2013) and Addendum (Reclamation and DWR 2014) for groundwater substitution transfers."

[1] *Planning and Conservation League et al. v Department of Water Resources* (2000) 83 Cal.App.4th 892, 907, citing Kleist v. City of Glendale (1976) 56 Cal. App. 3d 770, 779.

Additionally, the EA/IS p 1-2 says: "Other transfers not involving the SLDMWA and its Participating Members could occur during the same time period. The Tehama-Colusa Canal Authority (TCCA) is releasing a separate EA/IS to analyze transfers from a very similar list of sellers to the TCCA Member Units. These two documents reflect different potential buyers for the same water sources; that is, the sellers have only the amounts of water listed in Section 2 available for transfer, but the water could be purchased by SLDMWA or TCCA members." This is another reason that DWR should be the lead agency: environmental review of transfers should be unified and comprehensive, and cumulative across both geography and over time.

II. Document Presentation

Document Identification

A foundational requirement under the National Environmental Policy Act ("NEPA") and CEQA is disclosure. This begins with the proper identification of the document that is circulated for public review. The title page of the environmental review document provided for the proposed Project states that it is a *Draft Environmental Assessment/Initial Study 2014 San Luis & Delta Mendota Water Authority Water Transfers*. The headers on alternate pages throughout the document and the appendices identify the document with: *2014 San Luis & Delta-Mendota Water Authority Water Transfers Draft Environmental Assessment/Initial Study*. From these titles, the Bureau appears not to be a party to the document.

The Notice of Intent that was mailed to AquAlliance, but was not available on the Bureau's web site (http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=16681), asserts that SLDMWA plans to adopt a Mitigated Negative Declaration and refers the reader to the Bureau's web site provided above for the EA/IS. In addition, the CEQA cover sheets that were initially attached to the EA/IS when it was first released on the Bureau's web site, but are now absent from the site, also asserted the intent to adopt a Mitigated Declaration. Included in the CEQA cover sheets are two pages signed by Frances Mizuno on March 11, 2014 entitled *MITIGATED NEGATIVE DECLARATION FOR 2014 SAN LUIS & DELTA-MENDOTA WATER AUTHORITY WATER TRANSFERS* that refers the reader to the Bureau's web site for the EA/IS, but, as stated above, these four cover pages are no longer available on the Bureau's web site (http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=16681). Lastly, to add to the confusion, there is no mention of a Mitigated Negative Declaration anywhere in the EA/IS.

As discussed above, there is an absence of clarity regarding 1) the intent to adopt a Mitigated Declaration under CEQA and 2) the ownership of the NEPA/CEQA document. On March 14, 2014, the day after the formal release of the EA/IS on the Bureau's web site, the cover pages that informed the reader that SLDMWA intended to adopt a Mitigated Negative Declaration vanished. What has been available for public review since that date is confusing and deficient. It must also be emphasized that the NEPA/CEQA document is only available at the Bureau's web site. Next, regarding the lead agencies for the NEPA/CEQA document, we acknowledge that page 1-1 reveals the lead agency roles of the Bureau and SLDMWA, but we find that the lack of clear, dual ownership in the document's title and page headers confusing and deficient for the public.

Document Navigation

The Index fails to provide details for Chapter 3 with the CEQA check list headings and pages making the document less than user-friendly.

III. Purpose and Need

The Bureau's *Reclamation's NEPA Handbook* (2012) states, "The need for an accurate (and adequate) purpose and need statement early in the NEPA process cannot be overstated. This statement gives direction to the entire process and ensures alternatives are designed to address project goals." (p.11-1) While "need" is disclosed in section 1.2 (p. 1-3), there is no coherent discussion of that "need" that would establish how SLDMWA members find themselves in the current situation. Merely stating that, "As a result of the significantly reduced allocation, the SLDMWA is in need of water for irrigation, primarily of permanent crops to prevent the long term impacts of allowing these crops to die," lacks context, specificity, and rigor. First, the hydrologic conditions described on page 1-3 apply to the entire state, including the region where buyers are sought, not just the areas served by SLDMWA as presented here. Second, SLDMWA has chronic water shortages due to its contractors' junior position in water rights, risks taken by growers to plant permanent crops, and serious long-term overdraft in its service area. Where is this divulged? Third, SLDMWA or its member agencies have sought to buy and actually procured water in many past water years to make up for poor planning and risky business decisions. which violates CEQA's prohibition against segmenting a project to evade proper environmental review?[2]

In reference to the Bureau, the EA/IS states, "Reclamation's need is to approve the transfer of Base Supply or Project Water that may require the use of CVP facilities, consistent with state and federal law, the Sacramento River Settlement Contract, and the Interim Guidelines for Implementation of the Water Transfer Provisions of the Central Valley Project Improvement Act (Title XXXIV of Public Law 102-575). This "need" statement, highlights the conflicts in the Bureau's mission, deficiencies in planning for 2014, and the inadequacy of the EA/IS that should provide, among other things, the following background.

- During Bureau meetings held in 2013[3], the Bureau and DWR knew full well that 2013 was a dry year and that reservoir levels at the dams were exceedingly low[4]. Despite that awareness, the same federal and state agencies continued to export almost 2,400,000 AF of water to South State interests between June and December 2013. (*Id at p. 8*)
- In 2011 the Bureau gave away approximately 450,000 AF of additional storage water and DWR exported more than 826,000 AF of water above what it disclosed it could in 2013.[5]
- After taking the above actions, the Bureau (p. 1-3) and DWR are diminishing water allocations to senior water rights holders in and north of the Delta and yet asking some of the same water districts to actually sell water.

[2] Laurel Heights Improvement Association v. Regents of the University of California, 1988, 47 Cal.3d 376
[3] http://www.usbr.gov/mp/Waters_Supply_Meetings/About.html
[4] Bureau WY 2013 Handout (4)
[5] http://calsport.org/news/wp-content/uploads/St-Bd-Drought-Wkshp.pdf

The Proposed Action Alternative is poorly specified and needs additional clarity before decision makers and the public can understand the human and environmental consequences of the *2014 Water Transfers*. The EA describes the Proposed Action Alternative as one reflecting the Bureau's intention to approve transfers of Central Valley Project water from willing sellers who contract with the Bureau ordinarily to use surface water on their croplands. Up to 195,126 AF of CVP water are offered from these sellers, according to Table 2-1. (EA/IS p. 2-3). In contrast to the EA/FONSI for the 2009 Drought Water Bank (p. 3-88), the Project EA/IS contains no "priority criteria" to determine water deliveries and simply acknowledges that CVP river water will be transferred to San Luis & Delta Mendota Water Authority contractors. The EA/IS fails to indicate how much water has been requested by the buyers of CVP or non-CVP water, which is also in contrast to the 2009 DWB EA/FONSI and DWR's addendum for the 2009 DWB. Potential buyers of non-CVP water are also not disclosed. These significant omissions eliminate the public's ability to consider, assess, and comment on possible impacts in the receiving areas. This denial of information further obfuscates the need for the Project.

The Bureau and SLDMWA's draft environmental review of the Project does not comply with the requirements of NEPA[6] or CEQA[7] for the reasons described below.

IV. An EIS/EIR is Required

The Bureau must prepare an environmental impact statement ("EIS") and DWR, as the proper lead agency (not SLDMWA), must prepare an environmental impact report ("EIR") on this proposal. The current project is similar to the 2009 Drought Water Bank project that allowed up to 600,000 acre-feet (AF) of surface water transfers, up to 340,000 AF of groundwater substitution, and significant crop idling. At that time, DWR staff conceded that the 2009 Drought Water Bank project would have significant environmental impacts. The 2009 Drought Water Bank (2009 DWB) was a water transfer program very similar to the current proposal. Litigation of the 2009 DWB disclosed internal DWR emails showing DWR staff's view that the 2009 DWB would have significant impacts on the environment.[8] (See Supplemental Administrative Record ("Suppl. AR") 2007 [email from Curt Spencer stating: "Without an air override, we face a limited water supply, See Suppl. AR 2020, 203.)[9] DWR staff were also concerned the proposed addendum would not meet CEQA's requirements because the mitigation measures for impacts on the giant garter snake were based on an expired 2003 biological opinion. (See Suppl. AR 2010, 2014, 2022, 2044, and 2056.) Other concerns included the adequacy of the mitigation measures to protect the giant garter snake given the lack of up to date scientific information on the species (see Suppl. AR 2026, 2028, and 2034). Indeed, even after invoking the emergency exemption, DWR continued to express concerns regarding the project's potentially significant environmental impacts and whether these impacts would be mitigated. (See Suppl. AR 2064, 2066, and 2070 [emails discussing concern re air impacts]; Suppl. AR 2054 [email planning

[6] 42 U.S.C. §4321 *et seq*
[7] Public Resources Code §21000 *et seq*
[8] DWR E-mail Regarding 2009 Drought Water Bank.
[9] Pages of the Suppl AR are attached hereto as Exhibit __.

"CEQA analysis [that] will focus on the emissions impacts associated with the increased use of diesel [ground water] pumps."].)

The proposed Project also mirrors the *2010-2011 Water Transfer Program* that sought approval for 200,000 AF of CVP related water and assumed NEPA coverage for additional non-CVP transfer water up to 195,910 AF and the *2013 Water Transfer Program* that sought approval for 37,505 AF of CVP water made available by groundwater substitution and NEPA coverage for an additional 92,806 AF of North State water from groundwater substitution and 65,000 AF from reservoir storage.

NEPA requires federal agencies to prepare a detailed EIS on all "major Federal actions significantly affecting the quality of the human environment . . . ."[10] and CEQA has similar requirements and criteria. NEPA regulations promulgated by the Council on Environmental Quality identify factors that the Bureau must consider in assessing whether a project may have significant environmental effects, including:

> (1) "The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks." 40 C.F.R. §1508.27(b)(5).
> (2) "The degree to which the effects on the quality of the human environment are likely to be highly controversial." *Id.* §1508.27(b)(4).
> (3) "Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate on a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts." *Id.* §1508.27(b)(7).
> (4) "The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration." *Id.* §1508.27(b)(6).
> (5) "The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973." *Id.* §1508.27(b)(9).

Here, the Bureau and the state agency have failed to take a hard look at the environmental impacts of the Project. As elucidated below, there are substantial questions about whether the Project's proposed water transfers will have significant effects on the region's environment, biology, and hydrology. There are also substantial questions about whether the Project will have significant adverse environmental impacts when considered in conjunction with the other related water projects underway, planned, and proposed in the region. The Bureau and the state agency simply cannot, consistent with NEPA, allow these foreseeable environmental impacts to escape full analysis in an EIS of the proposed Project. AquAlliance's comments below will further highlight the EA/IS deficiencies in disclosure, analysis, and justification for its conclusions.

[10] 42 U.S.C. §4332(2)(C).

The EA/IS Violates NEPA and CEQA Rules Against Segmenting Environmental Review of Projects

It is noteworthy that the Bureau and the state agency assert that the Project is not part of a "Program" as it has for past water transfers (p. 1-2) and that a draft Findings of No Significant Impact ("FONSI") has not been provided with the release of the EA/IS as is the Bureau's custom.

The Bureau and DWR have known for over a decade that programmatic environmental review was and is necessary for water transfers from the Sacramento Valley. The following examples highlight the Bureau and DWR's deficiencies in complying with NEPA and CEQA.

- The Sacramento Valley Water Management Agreement was signed in 2002, and the need for a programmatic EIS/EIR was clear at that time it was initiated but never completed.[11]
- In 2000, the Governor's Advisory Drought Planning Panel report, *Critical Water Shortage Contingency Plan* promised a program EIR on a drought-response water transfer program, but was never undertaken.
- Twice in recent history, the state readily acknowledged that CEQA review for a major drought water banking program was appropriate.
- Last, but not least, is the attempt by the Bureau and SLDMWA to analyze the 10-Year Plan, which also has failed to materialize since the scoping period in January 2011.

The Bureau's most recent transfer approvals include:

- In 2009, the Bureau approved a 1 year water transfer program under which a number of transfers were made. Regarding NEPA, the Bureau issued a FONSI based on an EA.
- In 2010, the Bureau approved a 2 year water transfer program (for 2010 and 2011). No actual transfers were made under this approval. Regarding NEPA, the Bureau again issued a FONSI based on an EA.
- In 2013, the Bureau approved a 1 year water transfer program, again issuing a FONSI based on an EA. The EA incorporates by reference the environmental analysis in the 2010-2011 EA.

These Water Transfer approvals are "programmatic" in the sense that they cover a large geographic area, and applicants for specific water transfers must still obtain additional approvals (from the Bureau and from the SWRCB) before executing any specific water transfer. The additional approvals include:

[11] The Bureau and DWR actually began a joint Programmatic EIS/EIR to facilitate water transfers from the Sacramento Valley and the interconnected actions that are integrally related to the transfers, but never completed it. The Bureau has impermissibly broken out this current segment of the overall Program for piecemeal review in the present draft EA. See 68 Federal Register 46218 (Aug 5, 2003) (promising a Programmatic EIS on these related activities, "includ[ing] groundwater substitution in lieu of surface water supplies, conjunctive use of groundwater and surface water, refurbish existing groundwater extraction wells, install groundwater monitoring stations, install new groundwater extraction wells…" *Id.* At 46219. See also http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=788 (current Bureau website on "Short-term Sacramento Valley Water Management Program EIS/EIR").

- A specific authorization from the Bureau, based on an application defined by a document entitled: "Draft Technical Information for Water Transfers in 2013."
- A specific approval from the State Water Board of a petition for change in place or purpose of use under Water Code § 1725 et seq).

In sum, the Bureau and the state have approved water transfer programs (either 1-year or 2-year programs) in 5 out of the last 6 years. Therefore, it is clear that the need for such programs in the future (to the extent a need exists at all), is virtually certain. Therefore, to avoid violating the rules under both NEPA and CEQA against segmenting environmental review of projects, the Bureau and state are required to include future water transfers in the current environmental analysis, either as (1) part of the project description, as reasonably foreseeable future activities associated with the project, and/or as part of the assessment of cumulative impacts. The EA/IS fails to do so,

V. Chapter 2, Alternatives

The most fundamental deficiency of the EA/IS is the lack of alternatives considered, which, once again, continues the Bureau's failure to comply with NEPA and DWR's failure to comply with CEQA. NEPA's implementing regulations call analysis of alternatives "the heart of the environmental impact statement," 40 C.F.R. §1502.14, and they require an analysis of alternatives within an EA. *Id.* §1408.9. The statute itself specifically requires federal agencies to:

> study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning available uses of resources.

42 U.S.C. §4332(2)(E). CEQA has parallel requirements for alternatives to be analyzed in an EIR. Here, because the Bureau's EA considers only the proposed Project and a "No Action" alternative, the EA violates NEPA.

The case law makes clear that an adequate analysis of alternatives is an essential element of an EA, and is designed to allow the decision-maker and the public to compare the environmental consequences of the proposed action with the environmental effects of other options for accomplishing the agency's purpose. The Ninth Circuit has explained that "[i]nformed and meaningful consideration of alternatives … is … an integral part of the statutory scheme."[12] An EA must consider a reasonable range of alternatives, and courts have not hesitated to overturn EAs that omit consideration of a reasonable and feasible alternative.[13]

Here, there are only two alternatives presented: the No Action and the Proposed Action. The lack of *any* alternative action proposal is unreasonable and is by itself a violation of NEPA's requirement to consider a reasonable range of alternatives. 42 U.S.C. § 4332(2)(E).

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[12] *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir. 1988) (holding that EA was flawed where it failed adequately to consider alternatives).

[13] *See People ex rel. Van de Kamp v. Marsh*, 687 F.Supp. 495, 499 (N.D. Cal. 1988); *Sierra Club v. Watkins*, 808 F.Supp. 852, 870-75 (D.D.C. 1991).

2.2 Proposed Action/Proposed Project

Pages 2-3 to 2-6 present the sellers and the amounts of water that may be transferred under two different scenarios: Current Hydrologic Conditions and Improved Conditions. Table 2-1, *The Maximum Potential Transfer by Seller (Acre Feet)* indicates that the total under current hydrologic conditions may be 91,313 and under improved conditions may be 195,126. This is straight forward. However, when attempting to determine how much water may come from fallowing or groundwater substitution during two different time periods, April-June and July-September, the reader is left to guess.

The numbers in the "totals" row of Table 2-2 presumably should add up to 91,313. Instead, they add up to 110, 789. The numbers in the "totals" row of Table 2-3 presumably should add up to 195,126. Instead, they add up to 249,997. Both Tables 2-2 and 2-3 have a footnote stating: "These totals cannot be added together. Agencies could make water available through groundwater substitution, cropland idling, or a combination of the two; however, they will not make the full quantity available through both methods. Table 2-1 reflects the total upper limit for each agency."

This "explanation" is no explanation at all. As a result, the reader cannot know how much water is expected to be generated by groundwater substitution versus crop idling. This amount of uncertainty regarding potential sources of the water and the nature of the Project is confusing and impairs the public's ability to assess its environmental impacts.

The following paragraph is found on page 2-9:

> An objective in planning a groundwater substitution transfer is to ensure that groundwater levels recover to their seasonal high levels under average hydrologic conditions. Because groundwater levels generally recover at the expense of stream flow, the wells used in a groundwater substitution transfer should be sited and pumped in such a manner that the stream flow losses resulting from pumping are primarily during the wet season, when losses to stream flow minimally affect other legal users of water. For the purposes of this EA/IS, the stream flow losses are assumed to be 12 percent of the amount pumped for transfer. The quantity of water available for transfer would be reduced by these estimated stream flow losses.

The EA's use of "average hydrologic conditions" as the baseline for assessing degree of impact and effectiveness of mitigation measures is unlawful for several reasons. "Average hydrologic conditions" is undefined. The EA asserts elsewhere that hydrologic conditions in 2014 are not "average." The assumption that "[s]tream flow losses are assumed to be 12 percent of the amount pumped for transfer" is unsupported for any location, including the locations where groundwater substitution transfers will occur. The suggestion that "the wells used in a groundwater substitution transfer should be sited and pumped in such a manner that the stream flow losses resulting from pumping are primarily during the wet season" is not embodied in any enforceable condition or mitigation measure. Since there is no guarantee this suggestion will be honored, it does not support a FONSI for impacts related to stream flow losses. Also, the EA/IS considers

the effects of stream flow losses on other water users, and fails to assess the effect of stream flow losses (either below or above the 12% threshold) on other environmental values and resources, such as:

Page 2-11, bullet one states that, "Historical amounts of idled land vary year-to-year by close to 20 percent, which indicates that the local economy has adjusted to similar amounts of crop idling." What data support this assertion? Where is it presented in the EA/IS? If it is presented in the EA/IS, why is not cited with the above quotation? If GCID planned to idle about 15 percent of the district's rice land with a 75 percent CVP allocation, it is fair to conclude that it would more than double with what is currently proposed at a 40 percent allocation. (EA/IS p. 4-5). The impacts from increased fallowing due to decreased CVP allocations, let alone in combination with the proposed transfers, are not presented here.

As the Agencies well know, the overall economy and the environment are supposed to be protected from unreasonable effects according to California Water Code Section 1810 and the CVPIA. Page 2-11, bullet two states that, "Cropland idling has not generally resulted in economic impacts outside of the historical variations." What data support this assertion? How is "generally" defined in this context? What data are used to evaluate economic impacts from fallowing if there are unusual conditions? Where are these issues presented in the EA/IS? If they are presented in the EA/IS, why are they not cited with the above quotation? If the Agencies have data that support the quoted assertion, although it is not cited or presented in the EA/IS for public review, aren't the current, unusually dry conditions (presented in Section 1.2, *Need for Proposal and Project Objectives*) combined with unprecedented cuts to CVP water deliveries a time when unusually significant impacts might occur? Over a decade ago David Gallo assessed the impacts on local economies from fallowing and concluded that the costs ranged from $157 - $170 per acre foot of water sold.[14] This is what should have been analyzed and evaluated in the EA/IS, or better yet, in what the Agencies know is necessary: an EIS/EIR (EA/IS p.1-4).

In Chapter 2, Alternatives, page 2-11, bullet three states that, "Water Code Section 1745.05(b) requires a public hearing under some circumstances in which the amount of water from land idling exceeds 20 percent of the water that would have been applied or stored by the water supplier absent the water transfer in any given hydrologic year. Third parties would be able to attend the hearing and could argue to limit the transfer based on its economic effects." With water deliveries potentially cut to 50 percent for senior SWP contractors and 40% for senior CVP contractors, what is the potential to exceed the 20 percent figure, particularly when cropland idling transfers are added to the cumulative impacts? Is a public hearing scheduled? How will potentially affected and interested parties receive notice of a hearing? It is noticeable that the EA/IS bullet language fails to disclose where a public hearing might be held and before what governmental body.

[14] Gallo, David. Estimating Third Party Impacts From Water Transfers Through Riceland Fallowing: A Suggested Approach.

Section 2.3, *Recent Environmental Documents*, proudly touts the production of the *2010/2011 Water Transfer Program* Environmental Assessment. Although discussion of the document's failings are not disclosed here, AquAlliance presented many of them in our comments on the EA/FONSI and filed litigation to challenge it. During the litigation the Bureau decided to initiate the 10-Year Water Transfer Program (600,000 AF per year) with scoping meetings for an EIS/EIR in concert with SLDMWA. Despite the acknowledgment that an EIS/EIR is necessary for the repetitious water transfers, the release of the EIS/EIR has been delayed year-after-year while the Bureau continues to pursue one-year, so-called "temporary" transfers.

Mitigation and Monitoring

Where are the data that are referenced on page 2-12? "As part of the monitoring plans required by the EA/IS, the transferring parties have collected monitoring data starting pre-transfer. To date (through January 2014), the available monitoring data indicates that the groundwater aquifer is recovering to pre-transfer levels, as described in the EA. Final monitoring reports that describe the monitoring data will be available in May 2014." If the public doesn't have access to the "pre-transfer" data and the Agencies will not have final reports until May 2014, how can the public adequately comment and how can the Agencies reach a conclusion? This gaping hole in the assessment of the impacts from the 2013 water transfers indicates at a minimum that the 2014 Project EA/IS was circulated prematurely.

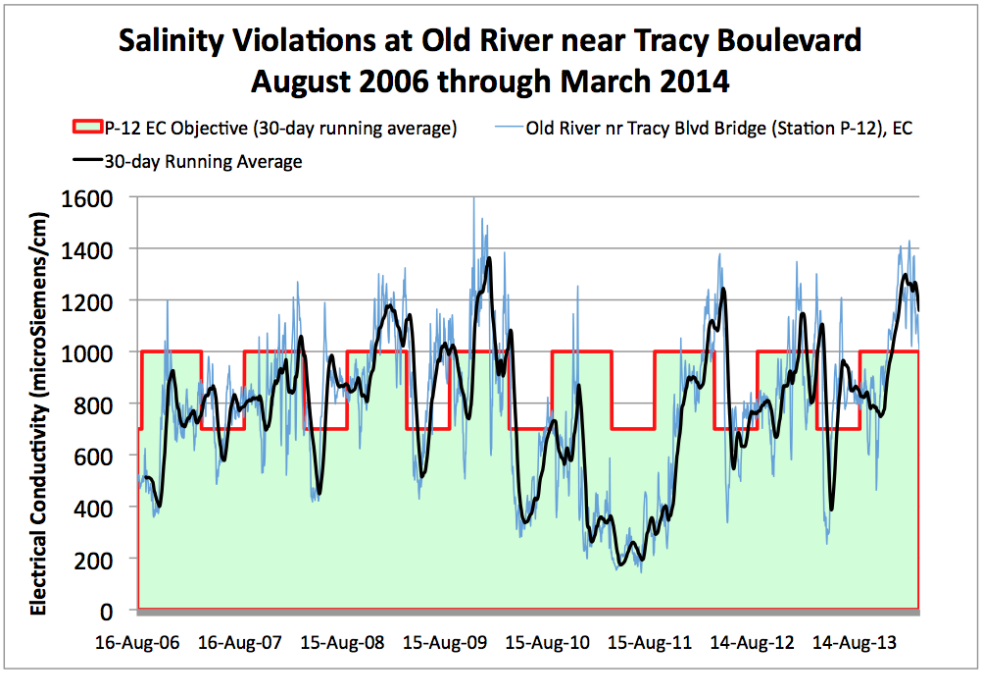
In light of the EA/IS's deficit in presenting groundwater conditions in the Sacramento Valley after the 2013 groundwater substitution transfers or historic trends, we attach the most current DWR maps that illustrate the serious condition of the groundwater basins in the Sacramento Valley. These DWR maps[15] present a very different picture than what is supplied in Appendix F's attempt at modeling. There is a clear and significant downward trend in regional groundwater levels.

- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2012 to Fall 2013, Shallow Aquifer Zone
- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2012 to Fall 2013, Intermediate Aquifer Zone
- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2012 to Fall 2013, Deep Aquifer Zone
- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2004 to Fall 2013, Shallow Aquifer Zone
- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2004 to Fall 2013, Intermediate Aquifer Zone
- Northern Sacramento Valley Change In Groundwater Elevation Map Change in Deep Fall 2004 to Fall 2013, Deep Aquifer Zone

[15] http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm#Level%20Monitoring%20Reports%20and%20Maps

Environmental Commitments

Page 2-12 (also p. A-1) attempts to assure the public that, "Carriage water will be used to maintain water quality standards in the Delta." With that promise in mind, the Bureau and DWR have a record of violating these standards. [16]



Source: California Data Exchange Center, Station OLD.

On what basis should decision-makers or the public rely on the promises made by the Bureau and DWR, let alone the buyer, SLDMWA, which facilitates some of the most destructive practices in California: growing permanent crops in a desert, creating massive amounts of polluted water and soil,[17] and crying foul when the spigot is dry?

Page 2-12 continues with assurances that, "Well reviews and monitoring and mitigation plans will be implemented to minimize potential effects of groundwater substitution on nearby surface and groundwater water resources. Well reviews, monitoring and mitigation plans will be coordinated and implemented in conjunction with local ordinances, basin management objectives, and all other applicable regulations." The Agencies are asking the public to trust that this will happen and that the mitigation and monitoring plans will be adequate. The public has no mechanism to verify how well this has or hasn't been handled in the past and isn't presented with an opportunity for this year. Mitigation and Monitoring Plans must be available concurrently

[16] Stroshane chart and table 2014, Salinity Violations at Old River Near Tracy Blvd. August 2006-August 2013.
[17] According to the December 2000 United States Geological Survey Open File Report 00-416, even if irrigation of drainage problem areas were halted today, it would take 63 to 300 years to drain contaminated water from the Western San Joaquin Valley's aquifer underlying contaminated soils in WWD. The USGS report reiterates the findings in the Rainbow Report [USGS, Gilliom et.al. 1989] that the drainage problem area in 1990 was 450,000 acres. If irrigation continues without a resolution, the problem area will be 950,000 acres in 2040.

with NEPA and CEQA documents, so the public, knowledgeable about the areas where transfer sales are proposed, may evaluate and provide comments on their efficacy. This has been a repeated failure by the Bureau and DWR.

Geology and Soils (2.5.4)

Page 2-17 states, "There are some earthquake faults in the region but earthquakes are generally associated with coastal California, west of the Central Valley." This casual statement fails to disclose significant history and information that is easily available.[18] The major faults in the region should, at minimum, be disclosed.

VI. Chapter 3 - Environmental Impacts

Biological Resources (IV)

a) Check list item "a" fails to include the National Marine Fisheries Service ("NMFS") as a jurisdictional agency over species that may be affected by the Project (p.3-11) although they are referenced in the discussion on pages 3-12 to 3-13. This lack of clarity and consistency contributes to difficulty reviewing the EA/IS.

b) On page 3-13, the EA/IS continues its discussion to support the finding of *Less Than Significant Impact* for, "[a]ny species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service," with NMFS excluded as noted above (p.3-11). The EA/IS concludes that, "The incremental effects of transfers on special status fish species in the Delta from water transfers would be less than significant." What data and analysis support this conclusion and where is the material found? Analysis conducted by Thomas Cannon contradicts the *Less Than Significant Impact* finding with disturbing results from the summer of 2013.[19] His research reveals that summer water transfers are devastating, especially in dry years when the low salinity zone is in the western Delta and smelt are stuck within the Delta and threatened by warm water, which has been made available for transfer by either fallowing or groundwater substitution, and predators,

c) The Bureau and DWR, not SLDMWA, should prepare an EIR because the Project will likely have significant environmental effects on the Giant Garter Snake (*Thamnophis gigas*)("GGS"), a listed threatened species under the federal Endangered Species Act and California Endangered Species Act. 40 C.F.R. §1508.27(b)(9).

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[18] "Detailed analyses of this seismicity and focal mechanisms indicate that active geologic structures include blind thrust and reverse faults and associated folds (e.g., Dunnigan Hills) within the CRSB boundary zone on the western margin of the Sacramento Valley, the Willows and Corning faults in the valley interior, and reactivated portions of the Foothill fault system. Other possibly seismogenic faults include the Chico monocline fault in the Sierran foothills and the Paskenta, Elder Creek and Cold Fork faults on the northwestern margin of the Sacramento Valley." http://archives.datapages.com/data/pacific/data/088/088001/5_ps0880005.htm

[19] *Summer 2013: The demise of Delta smelt under D-1641 Delta Water Quality Standards*

The draft EA/IS fails to comprehensively describe or analyze the species, its baseline condition (that should at a minimum start with the CalFed ROD's approval in 2000), movements, habitat requirements, critical habitat, or recovery plan. Is the GGS part of any draft of final HCPs or NCCPs? The Agencies' *Environmental Commitments* are described on pages 2-12 to 2-14 (repeated verbatim in Appendix A) and seem to be the extent of what the Agencies' deem to be their responsibilities under NEPA and CEQA.

We would like to remind the Agencies that flooded rice fields and irrigation canals in the Sacramento Valley can be used by the giant garter snake for foraging, cover and dispersal purposes. The snake gives birth from July to September, months that the Project would be implemented. The Agencies must explain to decision-makers and the public just how the multiple strains of past and Project fallowing and groundwater substitution transfers, cuts in CVP and SWP deliveries, and recently past and existing dry conditions in the area of origin could significantly increase the potential impact to GGS habitat and the species itself. GGS depend on more than only rice fields in the Sacramento Valley.[20] "The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of: (1) adequate water during the snake's active period, (early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat…" (Id at p. 3) What analysis has occurred that removes GGS from consideration for potential significant impacts? How will the Project affect streams, wetlands, and emergent, herbaceous wetland vegetation? How will it be monitored? Crafting an *Environmental Commitment* to provide Reclamation with "[a]ccess to the land to verify how the water transfer is being made available and to verify that the actions to protect the GGS are being implemented," doesn't pass the blush test (2-13). As AquAlliance has stated repeatedly in previous water transfer comments, an *independent*, third-party monitor, with no financial ties to the Agencies, DWR, or any buyers and sellers is the only acceptable and credible monitor. See AquAlliance comments for the *2010/2011 Water Transfer Program* and the Bureau's *2013 Water Transfer Program*.

Hydrology and Water Quality (IX)

The draft EA does not provide sufficient evidence to support its conclusion that the Project will not have significant hydrological impacts.

a) The EA/IS lacks detailed information, such as the most basic conditions in the local and regional environment in the area of origin, which has also experienced multi-year dry conditions and significantly lower precipitation. This essential background description is found neither in the *Background* section of Chapter 1 or in this section of Chapter 3, *Hydrology and Water Quality*. Without disclosing current site specific, local, and

[20] **Programmatic Consultation with the U.S. Army Corps of Engineers**
404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California

regional conditions, it is impossible to evaluate the potential environmental impacts that should be made available to decision-makers and the public before the Bureau reaches a conclusion. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

b) Item "a" considers if the Project will "Violate any water quality standards or waste discharge requirements?" and concludes that there will be a *Less than Significant Impact*.

- Proposed Action. 1) The EA/IS fails to disclose historic and ongoing degradation of water quality that has been caused by the CVP in the Delta and the SLDMWA import area.[21][22] [23]2) It also fails to consider that groundwater extractions may mobilize PCE, TCE, and nitrate plumes under the City of Chico[24] (p.4) or in other Sacramento Valley communities and the potential risks to human health and the environment. The EA/IS fails to even *disclose* the existence of all the hazardous waste plumes in the area of origin where groundwater substitution may occur. These are just more examples of the issues that should be considered and evaluated in an EIS/EIR.

c) Item "b" discussed on pages 3-27 - 3-42 is considered a *Less than Significant Impact*. There are significant faults with the finding and the material that supports it in the EA/IS.

- No Action Alternative. Why do Figures 3-1, 3-2, and all the hydrographs in Appendix F end at 2002? Extending the timeline and using actual well monitoring data, not simply modeling, would provide valuable information for the Agencies, decision-makers, and the public. Figures 3-1, and 3-2 provide "[b]aseline modeling trends," but present only a picture of possible groundwater responses when there is genuine historical and current data[25] that are ignored. The exercise in modeling actually obfuscates the demonstrable responses that have occurred during all measure of hydrologic conditions.
- No Action Alternative. "In the Sacramento Valley, reductions in supply have historically resulted in increased groundwater pumping and decreased groundwater levels; however, the water levels have rebounded quickly after the dry period." This conclusory statement fails to provide the decision-makers and the public with important factual data. For example, a summary of conditions in the Durham area of Butte County find that while water levels may recover after dry periods with intense use, wells aren't returning to previous levels, but moving

[21] SWRCB D-1641, "The source of much of the saline discharge to the San Joaquin River is from lands on the west side of the San Joaquin Valley which are irrigated with water provided from the Delta by the CVP, primarily through the Delta-Mendota Canal and the San Luis Unit." "The USBR, through its activities associated with the in the San Joaquin River Basin, is responsible for significant deterioration of water quality in the Southern Delta."
[22] Drainage Problem area in 1990 was 450,000 acres. If no resolution, problem area will be 950,000 acres in 2040 (Rainbow Report)
[23] If no more irrigation of the western San Joaquin Valley were to occur and the San Luis Drain were completed, it would still take 63-300 years to drain the accumulated Se from the aquifer at a rate of 43,500 lbs./year. (USGS Open File Report 00-416)
[24] 2005. California GAMA Program: Groundwater Ambient Monitoring and Assessment Results for the Sacramento Valley and Volcanic Provinces of Northern California
[25] http://www.water.ca.gov/waterdatalibrary/

steadily in a downward trajectory.[26] Additionally, even the Yuba River area, often touted by state and federal agencies as a successful conjunctive use program, takes 3-4 years to recover from groundwater substitution in the south sub-basin[27] although the Yuba County Water Agency analysis fails to determine how much river water is sacrificed to achieve the multi-year recharge rate. (pp. 21, 22). More examples of what the EA/IS fails to provide are found in the most current DWR maps listed above in our comments regarding Chapter 2 that demonstrate the serious condition of the groundwater basins in the Sacramento Valley.

- No Action Alternative "Figures 3-1 and 3-2 show baseline groundwater trends (in addition to modeling results for the Proposed Action) at the groundwater table and in the deep aquifer, respectively, in the Sacramento Valley near Sycamore Mutual Water Company." There is a noticeable absence of information north of Chico on either side of the Sacramento River (recall that Figures 3-3 and 3-4 stop before the northern Butte County line); south and east of Chico east of the Sacramento River in general; and west of Interstate 5. There may not be planned groundwater substitution transfers in some of this area, but that is no reason not to provide tangible data for this part of the common Tuscan groundwater basin. For examples of existing conditions see Table 1 below that is based on data provided by DWR. In addition, grave concern was expressed in the minutes of a December 2013 Glenn County Water Advisory Committee: "The report emphasized that despite the small upward trend in water levels observed on an annual basis in some areas, there is a general decline observable in the long term data across the majority of the region, particularly in the Northwestern portion of Glenn County."

Table 1. Example of wells of concern in Butte and Tehama counties

3 yrs data multi completion. ~1mile west of Butte Creek Country Club, declining trend
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=24664
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=24665
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=24440
3 yrs data multi, ~6miles SW of Chico, declining trend
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=48992
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=48990
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=48991
4yr data multi, ~6miles WSW of chico, declining
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=38214
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=24975
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=24974

[26] Buck, Christina 2014. *Groundwater Conditions in Butte County*.
[27] 2012. *The Yuba Accord, GW Substitutions and the Yuba Basin*. Presentation to the Accord Technical Committee.

11 yrs, irrigation, ~8miles NW of Chico, declining trend
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=25770

12 yrs, cana-pine creek, -10'
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=25770

>40 yr data Near 99 and ~6miles E of Corning, dipping below 60' shallow aquifer (valley oak depth)
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=19988

Near Deer Creek ~10miles NE of Corning, 14 years, declining trend, monitoring well multi
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=19993
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=34741

Multi comp monitoring well, ~10miles NE Corning, 14 years, declining below valley oak roots, near deer creek
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=19047
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=19046
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=19045

Multi comp monitoring, 13 yrs, ~8miles SE of Durham, Declining toward valley oak limits if trend continues
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=35608
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=17160
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=17161

~2.5 miles NW of Thermal to Forebay, 14 yrs, 10-20' decline
http://www.water.ca.gov/waterdatalibrary/groundwater/hydrographs/brr_hydro.cfm?CFGRIDKEY=16799

- No Action Alternative. "Appendix F, Groundwater Modeling Results, contains hydrographs at additional locations throughout the valley." As noted above, presenting only modeling when historic records exist, conceals factual material and presents a false picture. The Agencies must produce the data from decades of well monitoring to provide a genuine look at the groundwater basins, both the Sacramento *and* Redding, More discussion was presented above.
- No Action Alternative. "The groundwater basin is likely to experience groundwater level declines similar to those that occurred during historic droughts (such as 1976- 1977 and 1987-1992), caused by increased pumping to address reduced surface water supplies. In the San Joaquin Valley, reductions in supply would also lead to increased groundwater pumping, but the groundwater historically has not recovered during subsequent dry years." (p. 3-27). The EA/IS fails to provide any scientific research and analysis that leads to its conclusory

assertion that conditions in the Sacramento Valley groundwater basins will perform as they did during droughts between 38 and 22 years ago. As in much of California, the population has increased in the Sacramento Valley and the amount of irrigated agricultural has as well, placing greater demands on the groundwater basins. As noted above, the San Joaquin Valley groundwater basins are a casualty of very flawed state and federal policy combined with exuberance to place profit over human health, safety, and the environment.

- Proposed Action. The environmental checklist for Hydrology impacts, at section IX.b, finds that the Project impact to "Substantially deplete groundwater supplies ... such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level" is 'less-than-significant."
- This conclusion is, however, the result of failing to proceed in the manner required by law: (1) in assessing the significance of this impact, (2) in developing specific mitigation measures to reduce this impact; (3) in assessing the effectiveness of such mitigation measures; and (4) in adopting such mitigation measures. This conclusion is also unsupported by substantial evidence in the record. In addition, there is substantial evidence that this impact is significant. Therefore, CEQA requires preparation and certification of an EIR and NEPA requires preparation and certification of an EIS before Project approval.
- **The EA/IS fails to discharge the lead agencies' duty to find out and disclose all that they reasonably can. (14 CCR § 14144.)**

  With respect to Sacramento Valley groundwater, the EA/IS states: "In the Sacramento Valley, reductions in supply have historically resulted in increased groundwater pumping and decreased groundwater levels; however, the water levels have rebounded quickly after the dry period." (Page 3-27.) The EA/IS makes this assertion based on modeling results, while ignoring contrary empirical information. For example, a summary of conditions in the Durham area of Butte County find that while water levels may recover after dry periods with intense use, wells aren't returning to previous levels, but moving steadily in a downward trajectory.[28] Significantly more material is found in our comments on the *2013 Water Transfer Program*.

  In another example, even the Yuba River area, often touted by state and federal agencies as a successful conjunctive use program, takes 3-4 years to recover from groundwater substitution in the south sub-basin.[29] The Yuba River analysis, however, fails to determine how much river water is sacrificed to achieve the groundwater recharge rate mentioned (pp. 21, 22). It is highly likely that the Yuba River becomes a losing stream due to excess use of the groundwater. More examples of what the EA/IS fails to provide are found in the most current DWR

[28] Buck, Christina 2014. *Groundwater Conditions in Butte County*.
[29] 2012. *The Yuba Accord, GW Substitutions and the Yuba Basin*. Presentation to the Accord Technical Committee.

maps listed above in our comments regarding Chapter 2 that demonstrate the serious condition of the groundwater basins in the Sacramento Valley.

- In short, the EA/ IS fails to disclose all that it reasonably can. "If the local agency has failed to study an area of possible environmental impact, a fair argument may be based on the limited facts in the record. Deficiencies in the record may actually enlarge the scope of fair argument by lending a logical plausibility to a wider range of inferences." *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 311.
- **There is substantial evidence that this impact is significant.**

  The EA/IS concedes the Project may cause impacts to the groundwater basin from groundwater substitution transfers, including (1) increased groundwater pumping costs due to increased pumping depth; (2) decreased yield from groundwater wells due to reduction in the saturated thickness of the aquifer; (3) decrease of the groundwater table to a level below the vegetative root zone, which could result in environmental effects; and 4) third-party impacts to neighboring wells. (P. 3-29.) But the EA/ IS deems these impacts less-than-significant. In a confusing twist, however, the EA/ IS concedes there are uncertainties surrounding how this Project will affect specific locations, stating: “uncertainty of how groundwater levels could change, especially during a very dry year,” in the Redding basin (p. 3-30) and “[t]he model results may not reflect all specific local conditions throughout the Sacramento Valley” (p. 3-37); and that, as a result, mitigation measures will be employed, stating: "Therefore, minimization measures described below would include development of monitoring and mitigation plans to monitor and address potential groundwater level changes that could affect third parties or biological resources." (P. 3-37.)
- This is confusing because the agencies cannot require mitigation measures unless impacts are deemed significant. (See e.g., 14 CCR § 15041(a).) This gives rise to an inference that the Project may cause these impacts to be significant, thus requiring an EIS/EIR.
- Further, the EA/IS unlawfully defers the development of specific mitigation measures until after project approval because there is no basis for assuming they will be effective, there are no objective criteria to judge whether they are successful in avoiding significant impacts, and nothing about them is definitive enough to be enforceable. In short, there is no reason to assume the “minimization measures” and the mitigation and monitoring plans that the EA/IS references will reduce these impacts to "less-than-significant"
- Proposed Action. The Redding Groundwater Basin discussed on pages 3-29 to 3-30 is not included in Figures 3-3 and 3-4. SacFEM modeling may not have been done for the Redding Groundwater Basin, but it would have been beneficial for readers to have the entire area of origin depicted in the only maps provided for the Project.

- Proposed Action. In addition, the Anderson Cottonwood Irrigation District ("ACID") that is located in the Redding Groundwater Basin is going at the groundwater substitution transfers somewhat blind. It has not benefited from any modeling, but has instead, "[t]ested operation of these wells in the past at similar production rates and has observed no substantial impacts on groundwater levels or groundwater supplies (Anderson-Cottonwood ID 2013)." In attempting to review the reference from p. 5-1 for the: *Initial Study and Proposed Negative Declaration for Anderson-Cottonwood Irrigation District's 2013 Water Transfer Program. Available at: http://www.andersoncottonwoodirrigationdistrict.org/library.html or at: http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=13310*, we found that the only environmental documents at the ACID web site relate to a 2011 Bureau EA/FONSI for the *Anderson-Cottonwood Irrigation District Integrated Regional Water Management Program – Groundwater Production Element Project* and the Bureau's web site is for the EA/FONSI for the 2013 Water Transfer Program. The public has been obstructed from reviewing the referenced material to evaluate the efficacy of the findings in the Bureau/SLDMWA EA/IS that, "[g]roundwater substitution transfers are unlikely to have significant effects on groundwater levels." (p. 3-30).
- Proposed Action. Table 3-8 fails to include ACID and Tule Basin Farms in the table. The last three listed *Potential Sellers* are not listed in alphabetical order with the other possible sellers.
- Proposed Action. Groundwater/Surface Water Interaction. The EA/IS acknowledges the potential for impacts and assumes a "[1]2 percent depletion factor to prevent any adverse impacts associated with surface water-groundwater interaction…" (p.3-39) This number is not supported with any documentation or analysis and runs counter to modeling done by CH2M HILL in a memo to DWR in 2010. "The effect of groundwater substitution transfer pumping on stream flow, when considered as a percent of the groundwater pumped for the program, is significant. The impacts were shown to vary as the hydrology of the periods following the transfer program varied. The three scenarios presented here estimated effects of transfer pumping on stream flow when dry, normal, and wet conditions followed transfer pumping. Estimated stream flow losses in the five-year period following each scenario were 44, 39, and 19 percent of the amount of groundwater pumped during the four month transfer period."[30] Even with this modeling information in hand since 2010, the Agencies and DWR continue to use a 12 percent deduction for stream flow. The results of the model run are the best predictions available to date and suggests caution above all else, even though they are preliminary and the model subject to modification.[31] By adhering to a 12 percent loss for stream flow, it is clear that the Bureau, SLDMWA, and DWR are

[30] Lawson 2010. *Groundwater Substitution Transfer Impact Analysis, Sacramento Valley*.
[31] WRIME 2011. *Peer review of Sacramento valley Finite Element Groundwater Model (SacFEM)*

not erring on the side of caution and may be causing considerable legal injury to other users and the environment.

- The base map for Figures 3-3 and 3-4 lacks clarity. It is difficult to discern the approximate locations of wells # 1 through 6, 9, 15, 16, 19, 20, 21, 22, 28, and 30.
- This Project is part of serial, so-called "temporary" water transfers[32] and is also part of a much larger Program that was introduced by the Agencies on page 1-4, *Long Term Water Transfers*. As noted above, the Project and the *Long Term Water Transfers* reach back much further and are components of the following programs, plans, and studies:
    i. CalFed Bay-Delta Program, Record of Decision (August 2000)
    ii. Sacramento Valley Water Management Agreement (Phase 8), (October 2001)
    iii. Sacramento Valley Integrated Regional Water Management Plan (2006)
    iv. Sacramento Valley Regional Water Management Plan (January 2006)
    v. Stony Creek Fan Conjunctive Water Management Program
    vi. Draft Initial Study for 2008-2009 Glenn-Colusa Irrigation District Landowner Groundwater Well Program
    vii. Regional Integration of the Lower Tuscan Groundwater Formation into the Sacramento Valley Surface Water System Through Conjunctive Water Management (June 2005) (funded by the Bureau)
    viii. Stony Creek Fan Aquifer Performance Testing Plan for 2008-09
    ix. Annual forbearance agreements (2008 had an estimated 160,000 acre feet proposed).
    x. The Delta Stewardship Council's Plan and EIR approved in 2013.
    xi. The Bay Delta Conservation Plan and EIS/EIR currently out for public review and comment.
- **Proposed Action. Land Subsidence.** The first paragraph on subsidence on page 3-39 is actually a useful summary of the hazards presented by the Project. The subsequent material also highlights the potential significant, adverse impacts, such as:
    i. "Land subsidence has not been monitored in the Redding Groundwater Basin. However, there would be potential for subsidence in some areas of the basin if groundwater levels were substantially lowered. The groundwater basin west of the Sacramento River is composed of the Tehama Formation; this formation has exhibited subsidence in Yolo County and the similar hydrogeologic characteristics in the Redding Groundwater Basin could allow subsidence."

[32] AquAlliance 2014. *Past Water Transfers from the Sacramento Valley Through the Delta*.

ii. Most areas of the Sacramento Valley Groundwater Basin have not experienced land subsidence that has caused impacts to the overlying land. However, portions of Colusa and Yolo counties have experienced subsidence; historically land subsidence occurred in the eastern portion of Yolo County and the southern portion of Colusa County, owing to groundwater extraction and geology. As much as four feet of land subsidence due to groundwater withdrawal has occurred east of Zamora over the last several decades.

The EA/IS then concludes that there will be a *Less Than Significant Impact* by using the "guidance" set forth in the *DRAFT Technical Information for Preparing Water Transfer Proposals* (Bureau and DWR 2013) and Addendum (Bureau and DWR 2014) to, "[m]inimize potential effects to other legal users of water; to provide a process for review and response to reported third party effects; and to assure that a local mitigation strategy is in place prior to the groundwater transfer." In addition, "Reclamation's transfer approval process and groundwater minimization measures set forth a framework that is designed to avoid and minimize adverse groundwater effects. Reclamation will verify that sellers adopt these minimization measures to minimize the potential for adverse effects related to groundwater extraction."

Even if minimizing subsidence is possible in the Sacramento Valley where groundwater substitution is planned, which we will argue it is not (see below), minimizing an impact is not *avoiding* an impact. The mere acknowledgment that minimizing will be necessary to avoid potentially adverse impacts, points once again to the need for an EIS/EIR. The EA/IS, the *Draft Technical Information for Water Transfers* in 2013, and the 2014 Addendum don't appear to weigh the significance of avoidance of impacts, pre-Project mitigation, during-Project mitigation, or post-Project mitigation. This fails to create objective standards and merely defers responsibility to the "willing sellers," a broadly unsuspecting public, and a voiceless environment.

There is substantial evidence that this impact is significant.
As noted above, the EA/IS concedes the Project may cause land subsidence impacts in both the Redding Groundwater Basin, where it says previous subsidence has not been a problem (p. 3-39), and the Sacramento Groundwater Basin (p. 3-40), where it says previous subsidence from groundwater pumping has been a problem.

Regardless of these different histories, both are purportedly required to develop so-called mitigation and monitoring plans to deal with the assessment of whether pumping will cause significant subsidence and to develop mitigation measures to reduce this impact.

Again, because agencies cannot require mitigation measures unless impacts are deemed significant, this requirement indicates the Project may cause significant subsidence impacts, thereby requiring an EIS/EIR.

Further, the EA/IS unlawfully defers the assessment of whether pumping will cause significant subsidence. The EA/IS unlawfully defers the development of mitigation measures to reduce this impact until after project approval, but there is no basis for assuming they will be effective, there are no objective criteria to judge whether they are successful in avoiding significant impacts, and nothing about them is definitive enough to be enforceable. In short, there is no reason to assume the "minimization measures" and the mitigation and monitoring plans that the EA/IS references will reduce this impact to "less-than-significant"

The following evidence, however, demonstrates that the Project's subsidence impacts may be significant. AquAlliance has provided expert opinion on the issue of subsidence monitoring repeatedly during past water transfer environmental review. Despite its credibility, the findings of Dr. Kyran Mish, Presidential Professor, School of Civil Engineering and Environmental Science at the University of Oklahoma, have been ignored. Dr. Mish relates: "It is important to understand that *all* pumping operations have the potential to produce such settlement, and when it occurs with a settlement magnitude sufficient enough for us to notice at the surface, we call it *subsidence*, and we recognize that it is a serious problem (since such settlements can wreak havoc on roads, rivers, canals, pipelines, and other critical infrastructure)."[33] Dr. Mish further explains that "[b]ecause the clay soils that tend to contribute the most to ground settlement are highly impermeable, their subsidence behavior can continue well into the future, as the rate at which they settle is governed by their low permeability." *Id.* "Thus simple real-time monitoring of ground settlement can be viewed as an *unconservative* measure of the potential for subsidence, as it will generally tend to underestimate the long-term settlement of the ground surface." *Id.* (emphasis added).

- Proposed Action. The environmental checklist for Hydrology impacts, at section IX.d, finds "No Impact" with respect to, "Substantially alter the existing drainage pattern of the site or area" is "Not Significant." But the text of the EA/IS contradicts this check box, and finds that Project could have land subsidence impacts that could " alter drainage patterns" (pp. 3-39-3-40.). By sowing confusion rather than clarity, the EA/IS fails to inform.

  This conclusion is, however, the result of failing to proceed in the manner required by law: (1) in assessing the significance of this impact, (2) in developing specific mitigation measures to reduce this impact; (3) in assessing the effectiveness of such mitigation measures; and (4) in adopting such mitigation measures. This conclusion is also unsupported by substantial evidence in the record. In addition, there is substantial evidence that this impact is significant.

[33] Mish, Kyran 2008. *Commentary on Ken Loy GCID Memorandum*. White Paper. University of Oklahoma.

> Therefore, CEQA requires preparation and certification of an EIR and NEPA requires preparation and certification of an EIS before Project approval.

Minimization Measures (pp. 3-40, 3-41)

The *Draft Technical Information for Water Transfers* in 2013 and the 2014 Addendum contain *minimal* objectives and requirements elements of the monitoring and mitigation component of the Project. "Water transfer proponents transferring water via groundwater substitution transfers must establish a monitoring program capable of identifying any adverse transfer related effects before they become significant." However, the reader (and possibly the sellers) are left wondering what exactly is "a monitoring program capable of identifying any adverse transfer related effects before they become significant," since there are no standards or particular guidance to manage and analyze the very complex hydrologic relationships internal to groundwater and the connection to surface waters.

Certainly the public has no idea or ability to comment, which fails the full-disclosure mandate in NEPA and CEQA. Page 38 of the *Draft Technical Information for Water Transfers* in 2013 briefly lists "Potentially significant impacts identified in a water transfer proposals [that] must be avoided or mitigated for a proposed water transfer to continue, including:

- Contribution to long-term conditions of overdraft;
- Dewatering or substantially reducing water levels in nonparticipating wells;
- Degradation of groundwater quality that substantially impairs beneficial uses or violates water quality standards; and
- Affecting the hydrologic regime of wetlands and/or streams to the extent that ecological integrity is impaired.

The *Draft Technical Information for Water Transfers* in 2013 continues with suggestions to curtail pumping from lower bowls and pay higher energy costs to ease the impacts to owners of third-party wells (p. 38-39). While this bone thrown at mitigation is appreciated, the glaring omissions are notable. The *Draft Technical Information for Water Transfers* in 2013 completely fails to mention, even at a very general level, how individual well owners who may be harmed by the Project, will determine and prove where the impacts to their wells are coming from and that water quality and health could become a significant impact for impacted wells, users, and streams. The onus for coping with and disclosing potential impacts is deflected onto the nonparticipating public, species, and environment. How does this meet the requirements of NEPA and CEQA? Since wetlands and streams would require human observation or adequate monitoring to report an impact, how will, "Affecting the hydrologic regime of wetlands or streams to the extent that ecological health is impaired," be avoided or mitigated without standards and requirements from the Bureau and DWR? (*Draft Technical Information for Water Transfers* p. 38) There also appears to be no consideration for species monitoring, just "practices" or "conservation measures" to "minimize impacts to terrestrial wildlife and waterfowl," (*Id* pp. 16, 20, 22-24).

Another example of the inadequacy of the proposed monitoring is that the draft EA/IS fails to include any coordinated, programmatic plan to monitor stream flow of creeks and rivers located in proximity to the "willing sellers" that will evacuate more groundwater than has been used

historically. The potential for immediate impacts would be very close to water sellers' wells, but the long term impacts could be more subtle and geographically diverse. What precautions has the Bureau and DWR made for the cumulative impacts that come not only from this one-year Project, but in combination with the water sales from the last dozen years and those that are planned by the Bureau into the future (see list in g, iv below)? Bureau and DWR water transfers are not just one- or two-year transfers, but many serial actions in multiple years by the agencies, sellers, and buyers without the benefit of comprehensive environmental analysis under NEPA and CEQA.

As discussed above, adequate monitoring is vital to limit the significant risks posed by the Project to the health of the region's groundwater, streams, and fisheries (more discussion below). Moreover, to the extent this Project is conceived as an ongoing hardship program that will provide knowledge for future groundwater extraction and fallowing, its failure to include adequate monitoring protocols is even more disturbing and creates the risk of significant long-term, perhaps irreversible impacts from the Project.

One glaring omission in the EA/IS is the failure to disclose that the Project, when implemented under the State Water Resources Control Board's ("SWRCB") Temporary Urgency Change Petition Order(s), will exacerbate impacts in the area of origin, which is already suffering from dry conditions. Mismanaging storage in Shasta and Oroville dams, either intentionally or incompetently in the past three years (see above), created a scenario where the federal and state agencies plead hardship to some of the most senior water rights holders in California. Potentially cutting senior SWP contractors to 50 percent and senior CVP contractors to 40 percent allocations (EA/IS p. 2-2), portends dire consequences for local and regional groundwater that would not have been necessary without failures by the federal agency circulating this EA/IS and the 'hidden' state agency that should be the lead agency for the Project: DWR.[34]

Mandatory Findings of Significance (XVIII)

The EA/IS fails to disclose that the Project is likely to have a cumulatively significant impact on the environment (p. 3-53). In assessing the significance of a project's impact, the Bureau must consider "[c]umulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement." 40 C.F.R. §1508.25(a)(2). A "cumulative impact" includes "the impact on the environment which results from the incremental impact of the action when added to *other past, present and reasonably foreseeable future actions* regardless of what agency (Federal or non-Federal) or person undertakes such other actions." *Id.* §1508.7. The regulations warn that "[s]ignificance cannot be avoided by terming an action temporary or by breaking it down into small component parts." *Id.* §1508.27(b)(7).

An environmental impact statement should also consider "[c]onnected actions." *Id.* §1508.25(a)(1). Actions are connected where they "[a]re interdependent parts of a larger action and depend on the larger action for their justification." *Id.* §1508.25(a)(1)(iii). Further, an

[34] http://calsport.org/news/wp-content/uploads/St-Bd-Drought-Wkshp.pdf

environmental impact statement should consider "[s]imilar actions, which when viewed together with other *reasonably foreseeable or proposed agency actions*, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography." *Id.* §1508.25(a)(3).

Here, as detailed below, instead of assessing the cumulative impacts of the proposed action as part of the larger program that even the Bureau has at least twice recognized should be subject to a programmatic EIS (but for which no programmatic EIS has been completed), the Bureau again attempts to breaks this program into component parts and approve it through an inadequate EA and has joined with the improper CEQA lead agency to play lip service to CEQA. Further, the Bureau has failed to take into account the cumulative effects of other groundwater and surface water projects in the region, the development of "conjunctive" water systems, and the planned integration of Sacramento Valley groundwater into the state water system.[35]

The draft EA/IS briefly mentions that the Project is part of the *Long-Term Water Transfers* (p. 1-4). However, it fails to adequately describe that Program and how the Project relates to the Program, and further fails to describe the numerous other programs of which this Project is a small component part (see list of programs, plans, and studies above in section VI). It is clear that that this Project is an "interdependent part of a larger action," and that it "depend[s] on the larger action for [its] justification." 40 C.F.R. §1508.25(a)(1)(iii). This is exactly the sort of segmentation that NEPA prohibits. Instead, NEPA requires that "[p]roposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." 40 C.F.R. §1502.4.

- Item "a" asserts that the proposed Project would have a *Less Than Significant* impact to all species within the region and local areas of water transfer is without any apparent scientific basis. (EA/IS p. 3-54). This conclusory assertion certainly does not constitute sufficient analysis of the potential impact of the Project on endangered, threatened, or special status species as described above. At a minimum, such conclusions rely on an improperly segmented and overly narrow view of the proposed action, which does not consider the larger project (p. 1-4) as described above or the cumulative impacts as also described above.

[35] *U.S. Bureau of Reclamation September 2006. Grant Assistance Agreement with Glenn Colusa Irrigation District*. "GCID shall define three hypothetical water delivery systems from the State Water Project (Oroville), the Central Valley Project (Shasta) and the Orland Project reservoirs sufficient to provide full and reliable surface water delivery to parties now pumping from the Lower Tuscan Formation. The purpose of this activity is to describe and compare the performance of three alternative ways of furnishing a substitute surface water supply to the current Lower Tuscan Formation groundwater users to eliminate the risks to them of more aggressive pumping from the Formation and to optimize conjunctive management of the Sacramento Valley water resources."

VII Conclusion

The 2014 water transfer Project clearly has the potential to affect the human and natural environments, both within the Sacramento Valley as well as in the areas of conveyance and delivery. It is entirely likely that injuries to other legal users of water will occur, including those entirely dependent on groundwater in the Sacramento Valley, if this project is approved. Groundwater, groundwater basins, and aquatic and terrestrial habitat that are essential for fishery and wildlife resources are also likely to suffer great harm. And the economic effects of the proposed Project are at best poorly disclosed and will reverberate through the communities in the Sacramento Valley.

Taken together, the Bureau, SLDMWA, and DWR treat these serious issues carelessly in the EA/IS, the *Draft Technical Information for Water Transfers in 2013*, the 2014 Addendum, and in DWR's specious avoidance of acting as the CEQA lead agency. In so doing, the Agencies and DWR deprive decision makers and the public of their ability to evaluate the potential environmental effects of this Project and violate the full-disclosure purposes and methods of both the National Environmental Policy Act and the California Environmental Quality Act.

Sincerely,

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References

Anderson Cottonwood Irrigation District 2014. Web page copy from April 1, 2014.

Anderson, Michael. 2009. *Future California Droughts in a Climate Change World*.

AquAlliance 2014. Table of impacted wells in Butte and Tehama counties.

AquAlliance 2014. Past Water Transfers from the Sacramento Valley Through the Delta, 2001-2013**.**

AquAlliance, California Sportfishing Protection Alliance, and California Water Impact Network *Testimony on Water Availability Analysis for Trinity, Sacramento, and San Joaquin River Basins Tributary to the Bay--Delta Estuary*. 2012.

AquAlliance 2011. Comments on the *Draft Environmental Assessment/Initial Study and Finding of No Significant Impact/Mitigated Negative Declaration for the Anderson-Cottonwood Irrigation District Integrated Regional Water Management Program – Groundwater Production Element Project*.

AquAlliance 2011. Scoping comments for the 10-Year Water Transfer Plan.

AquAlliance et. al 2010. Comments on the *2010/2011 Water Transfer Program*.

Bacher, Dan. 2013. *Bay-Delta salmon population just one fifth of mandated goal*. http://www.indybay.org/newsitems/2013/05/15/18736849.php

Buck, Christina 2014. *Groundwater Conditions in Butte County.*

Bureau of Reclamation. 1993. *Interim Guidelines for Implementation of the Water Transfer Provisions of the Central Valley Project Improvement Act (Title XXXIV of Public Law 102-575)*.

Bureau of Reclamation, et al. 2003. *Environmental Water Account*, Draft EIS/EIR.

Bureau of Reclamation 2006. Sacramento Valley Regional Water Management Plan. p. 5-8 to 5-10.

Bureau of Reclamation 2009. Drought Water Bank Environmental Assessment.

Bureau of Reclamation 2013. Water Year Handout.

Butte Basin Water Users Association 2007. *2007 Butte Basin Groundwater Status Report* p. 23 and 30.

Butte Basin Water Users Association 2008. *2008 Butte Basin Groundwater Status Report*

Butte County 2007. Summary of Spring 07 Levels.

Butte County Department of Water and Resource Conservation 2003. *Urban Water Demand Forecast*.

Butte County DWRC June 2007. *Tuscan Aquifer Monitoring, Recharge, and Data Management Project*, Draft.

Butte County DWRC 2013. *Groundwater Status Report, 2012 Water Year*.

a) Esquon Subinventory Unit report
b) Pentz Subinventory Unit report
c) Vina Subinventory Unit

California State Water Resources Control Board 2009. *GAMA Domestic Well Project, Tehama County Focus Area*.

California Water Impact Network, et al 2011. Complaint for Declaratory and Injunctive Relief.

Cannon, Thomas 2013. *SUMMER 2013: The demise of Delta smelt under D-1641 Delta Water Quality Standards*.

CH2Mhill 2006, *Sacramento Valley Regional Water Management Plan*, Figure 1-4.

Dudley, Toccoy et al. 2005. *Seeking an Understanding of the Groundwater Aquifer Systems in the Northern Sacramento Valley: An Update.*

Dudley, Toccoy 2007. Letter to Lester Snow as presented to the Butte County Board of Supervisors as part of agenda item 4.05.

DWR 2008. Addendum to the Environmental Water Account Environmental Impact Statement/Environmental Impact Report

DWR 2009. Addendum to the Environmental Water Account Environmental Impact Statement/Environmental Impact Report.

DWR 2009. E-mail correspondence regarding the 2009 *Drought Water Bank*.

Fleckenstein, Jan; Anderson, Michael; Fogg, Graham; and Mount, Jeffrey 2004. *Managing Surface Water-Groundwater to Restore Fall Flows in the Cosumnes River*, Journal of Water Resources Planning and management, opening page of article.

Friend, Scott 2008. *City of Chico General Plan Update Existing Conditions Report;* Pacific Municiple Consulting.

Gallo, David circa 2000. *Estimating Third Party Impacts From Water Transfers Through Riceland Fallowing: A Suggested Approach*.

Glenn County. Board of Supervisors. 2001. California Ordinance No. 1115, Ordinance Amending the County Code, Adding Chapter 20.03, Groundwater Management.

Glenn County. Management Plan: Development of a Locally Driven Groundwater Management Plan Ordinance #1115 amended by ordinance 1237 (2912). Accessed May 15, 2013 at: http://www.glenncountywater.org/management_plan.aspx.

Glenn County Water Advisory Committee 2013. Minutes from December 2013.

Glenn-Colusa Irrigation District 2008-2009. *Initial Study And Proposed Negative Declaration Landowner Groundwater Well Program*.

Governor's Advisory Drought Planning Panel 2000. *Critical Water Shortage Contingency Plan*.

Hennigan, Barbara 2007. Testimony, Monterey Agreement hearing in Quincy, California. (http://www.water.ca.gov/environmentalservices/docs/mntry_plus/comments/Quincy.txt).
Hennigan, Robert 2010. Personal communication with Barbara Vlamis on January 17, 2010.

Hoover, Karin A. 2008. *Concerns Regarding the Plan for Aquifer Performance Testing of Geologic Formations Underlying Glenn-Colusa Irrigation District, Orland Artois Water District, and Orland Unit Water Users Association Service Areas, Glenn County, California*. White Paper. California State University, Chico.

Lawson, Peter 2010. *Groundwater Substitution Transfer Impact Analysis, Sacramento ValleyI.*

Lippe, Gaffney, Wagner LLP. 2009. Letter to DWR regarding the Drought Water Bank Addendum.

Maslin, Paul E., et. al, 1996. *Intermittent Streams as Rearing Habitat for Sacramento River Chinook Salmon: 1996 Update*.

Mish, Kyran 2008. *Commentary on Ken Loy GCID Memorandum*. White Paper. University of Oklahoma.

Msangi, Siwa and Howit, Richard E. 2006. *Third Party Effects and Asymmetric Externalities in Groundwater Extraction: The Case of Cherokee Strip in Butte County, California.* International Association of Agricultural Economists Conference, Gold Coast, Australia.

Natural Resources Defense Council and Golden Gate Salmon Association. 2012. *Salmon Doubling Index: Natural Production of Sacramento-San Joaquin Basin Chinook Salmon, Expressed as Percentage of the CVPIA Salmon Doubling Goal, from 1992 to 2011*. http://goldengatesalmonassociation.com/wp-content/uploads/2012/06/Salmon-Graph-11-12-12.jpg

Sacramento County Water Agency. 2011. *Ground Water Management Plan.*

Scalmanini, Joseph C. 1995. *VWPA Substatiation of Damages*. Memo. Luhdorff and Scalmanini Consulting Engineers.

Shasta County Water Agency. 2007. *Redding Basin Water Resources Management Plan Environmental Impact Report*.

Shutes, Chris et al. 2009. *Draft Environmental Assessment DeSabla – Centerville Project (FERC No. 803)*. Comments. California Sportfishing Protection Alliance.

Spangler, Deborah L. 2002. *The Characterization of the Butte Basin Aquifer System, Butte County, California*. Thesis submitted to California State University, Chico.

State Water Resources Control Board. 2005. California *GAMA Program: Groundwater Ambient Monitoring and Assessment Results for the Sacramento Valley and Volcanic Provinces of Northern California*.

State Water Resources Control Board. 2008. *Hydrogeologically Vulnerable Areas***.** http://www.waterboards.ca.gov/gama/docs/hva_map_table.pdf

Staton, Kelly 2007. *Glenn-Colusa Irrigation District Aquifer Performance Testing Glenn County, California*. California Department of Water Resources.

The Bay Institute. 2012. *Fresh Water Flows in the Central Valley A primer on their importance, status, and projected changes under the BDCP*.

The Natural Heritage Institute, et al. 2012 *Feasibility Investigation of Re-Operation of Shasta and Oroville Reservoirs in Conjunction with Sacramento Valley Groundwater Systems to Augment Water Supply and Environmental Flows in the Sacramento and Feather Rivers*.

USFWS 1999. Draft Recovery Plan for the Giant Garter Snake.

USFWS 2006. Giant Garter Snake Five Year Review: Summary and Evaluation.

USFWS 2008 Biological Opinion for Conway Ranch.

USFWS 2009 Biological Opinion for the Drought Water Bank.

Vlamis, Barbara 2006.Comments on the Supplemental Environmental Water Account EIR/EIR.

Vlamis, Barbara 2009. Letter to DWR regarding the Drought Water Bank Addendum from Lippe Gaffney Wagner LLP, 2009.

Vlamis, Barbara 2009. Letter to DWR regarding the 2009 Drought Water Bank Addendum.

Vlamis, Barbara, et al 2008. Letter to DWR regarding the 2009 Drought Water Bank Addendum.

WRIME 2011. *Peer review of Sacramento Valley Finite Element Groundwater Model (SacFEM)*.

2014 Sacramento Valley Water Transfers

US Bureau of Reclamation Transfers	North-to-South Transfers			North-to-North Transfers		
	Max Current Conditions	Max Improved Conditions	G/W Substitution	TCCA Max Current Conditions	TCCA Max Improved Conditions	TCCA G/W Substitution
Anderson-Cottonwood Irrigation District	2,400	4,800	4,800	2,400	4,800	4,800
Canal Farms				722	860	860
Conaway Preservation Group	20,340	26,639	26,639	20,340	26,639	26,639
Eastside Mutual Water Company	1,053	2,000	2,000	1,053	2,000	2,000
Glenn-Colusa Irrigation District	0	16,500	0	51,168	102,168	26,168
Maxwell Irrigation District	4,000	7,500	4,700	4,000	7,500	4,700
Natomas Central Mutual Water Company	0	30,000	30,000		30,000	30,000
Pelger Mutual Water Company	1,600	4,000	4,000	1,600	4,000	4,000
Pleasant Grove-Verona Mutual Water Company	7,000	12,000	12,000	7,000	15,000	15,000
Princeton-Codora-Glenn Irrigation District	3,000	3,000	0	8,000	8,000	5,000
Provident Irrigation District	3,000	3,000	0	8,000	8,000	5,000
Reclamation District 108	15,000	27,500	7,500	15,000	35,000	15,000
Reclamation District 1004	12,900	12,900	5,400	12,900	12,900	5,400
River Garden Farms		6,000	6,000		6,000	6,000
Roberts Ditch ID				1,776	3,330	3,330
Sycamore Mutual Water Company	10,000	14,000	8,000	10,000	14,000	8,000
T&P Farms				620	840	840
Te Velde Revocable Family Trust	1,520	5,387	5,344	1,520	5,387	2,925
		175,226	116,383			
Feather River Area of Analysis						
Garden Highway Mutual Water Company	~~3,500~~	~~7,500~~	~~7,500~~	3,500	3,500	3,500
Goose Club Farms and Teichert Aggregate	~~6,000~~	~~6,000~~	~~2,000~~	6,000	6,000	2,000
Tule Basin Farms		~~6,000~~	~~6,400~~			
Sub-Total Bureau Transfers	**~~91,313~~**	**~~194,726~~**	**~~132,283~~**	**155,599**	**295,924**	**171,162**

State Water Project Feather River Transfers	North-to-South Transfers			North-to-North Transfers		
	Max Current Conditions	Max Improved Conditions	G/W Substitution	TCCA Max Current Conditions	TCCA Max Improved Conditions	TCCA G/W Substitution
Biggs West Gridley WD		32,190				
Butte WD	5,350	11,055	5,350			
Cordua ID		12,000	12,000			
Garden Highway Mutual		3,500	3,500			
Gilsizer Slough		5,300	5,300			
Goose Club Farms		8,000	2,000			
Plumas MWC		3,500	3,500			
Richvale ID		21,120				
South Sutter WD		20,000				
Sutter Extension WD	4,000	15,000	4,000			
Tule Basin Farms		6,400	6,400			
Western Canal WD		35,442				
Yuba County WA	30,000	30,000	30,000			
Sub-Total State Transfers	**39,350**	**203,507**	**72,050**			
Grand Totals (FED&STATE North to South transfers)		**378,733**	**188,433**			

All Transfers ("Improved Conditions") 674,657

All Groundwater Transfers ("Improved Conditions") 359,595

Sources:

EA, 2014 Tehama-Colusa Canal Authority Water Transfers, Bureau of Reclamation, March 2014

EA, 2014 San Luis & Delta Mendota Water Authority Transfers, Bureau of Reclamation, March 2014

AQUALLIANCE

DEFENDING NORTHERN CALIFORNIA WATERS

July 30, 2015

Glenn-Colusa Irrigation District
Thaddeus Bettner, General Manager
344 East Laurel Street
Willows, CA 95988

Re: Comments on the Draft Environmental Impact Report for the Glenn Colusa Irrigation District 10-Wells Project (Groundwater Supplemental Supply Project SCH# 2014092076)

Dear Mr. Bettner:

AquAlliance submits the following comments and questions on the Draft Environmental Impact Report ("DEIR") for the Glenn Colusa Irrigation District ("GCID") 10-Wells Project (Groundwater Supplemental Supply Project) ("Project"). These comments represent the comments of AquAlliance and its members. The Project proposes to install five new production wells and continue operating five additional production wells during dry and critically dry years for 8.5 months from approximately February 15-Marh 15 and April 1-November 15. The annual, maximum, cumulative total pumping is 28,500 acre-feet ("af") and is more water than the annual use of the Chico district of California Water Service Company that serves over 100,000 people.[1]

Unfortunately, the Project description fails to disclose details that are necessary for the public to review and comment. Moreover, there are no alternatives presented to the public beyond the No Project Alternative. The repeated use of conclusory statements leads to an absence of impacts in the EIR that are not supported by evidence. The DEIR as written fails to make a technically persuasive case for the 10 wells, and therefore the proposed Project should be rejected until the lead agency/Project proponent, GCID, can more effectively present scientific principles and analysis instead of mere assertions of negligible impact to third-parties and the environment. The recirculation of a new Draft EIR will be required because of the extreme deficiencies in the DEIR currently out for public review. The deficiencies in the DEIR cannot and will not be evaded by responses to comments in a Final EIR.

We include by reference all other letters submitted in response to this DEIR and submit comments and attachments created for AquAlliance by Kit Custis, AquAlliance's comments and attachments to the 10-Year Water Transfer Program, and an electronic copy of the report *Hydrostratigraphy and Pump-test Analysis of the Lower Tuscan/Tehama Aquifer, Northern Sacramento Valley, CA* that was hand delivered to the GCID office on July 28, 2015.

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[1] California Water Service Company *2010 Urban Water Management Plan Chico-Hamilton City District*, p. 32.

I. Legal Requirements Under CEQA

Under CEQA, the project must include "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment..."[2] To comply with CEQA's standards for completeness, the project description must address "not only the immediate environmental consequences of going forward with the project, but also all 'reasonably foreseeable consequence[s] of the initial project'."[3] As courts have recognized for decades, "an accurate, stable and finite project description" is "the sine qua non of an informative and legally sufficient EIR."[4] Reliance on a "curtailed, enigmatic or unstable definition of the project" stands as the paradigm of legal error under CEQA, because it "draws a red herring across the path of public input."[5] An "EIR may not define a purpose for a project and then remove from consideration those matters necessary to the assessment whether the purpose can be achieved."[6] CEQA requires "interactive process of assessment of environmental impacts and responsive project modification which must be genuine."[7]

A lawful project description under CEQA helps the lead agency "develop a reasonable range of alternatives to evaluate in the EIR [that] will aid the decision-makers..."[8] However, "a lead agency may not give a project's purpose an artificially narrow definition...." [9] A "curtailed or distorted project description may stultify the objectives of the reporting process."[10] In Inyo III, the court rejected the Los Angeles Department of Water and Power's attempt in its EIR to "narrow the city's obligation—and the scope of this lawsuit—down to the relatively small flow of underground water destined for in-valley use."[11] That narrow definition evaded the county's warning that EIR simply assumed the "filling of the second aqueduct," and the State Board's warning that the narrow definition diverted attention "from the impacts of the major project which is the importation of additional water to Los Angeles."[12] The "selection of a narrow project as the launching pad for a vastly wider proposal frustrated CEQA's public information aims The department's calculated selection of its truncated project concept was not an abstract violation of CEQA," but rather, a failure to proceed "in a manner required by law."[13] The "impermissibly truncated" and inconsistent project definition in the EIR also unlawfully skewed the lead agency's assessment of the "no project" alternative and project alternatives.[14]

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[2] 14 Cal. Code Regs., § 15368; see also Nelson v. County of Kern (2010) 190 Cal.App.4th 252, 271.
[3] Communities for a Better Environment v. City of Richmond (2010) 184 Cal.App.4th 70, 82 (quoting Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 428; Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376, 391, fn. 2 (Laurel Heights I).
[4] County of Inyo v. City of Los Angeles (Inyo III) (1977) 71 Cal.App.3d 185, 199.
[5] Id. at 199.
[6] County of Inyo v. City of Los Angeles (Inyo V) (1981) 124 Cal.App.3d 1, 9.
[7] County of Inyo v. City of Los Angeles (Inyo VI) (1984) 160 Cal.App.3d 1178, 1183; see Id. at 1186 (project cannot be defined to set up "a CEQA turkey shoot").
[8] 14 Cal. Code Regs, §15124(b); see also In Re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings (In Re Bay-Delta) (2008) 43 Cal.4th 1143, 1166 (lead agency "may structure its EIR alternatives analysis around a reasonable definition of underlying purpose and need").
[9] Id.
[10] Inyo III, 71 Cal.App.3d 185, 192; see also Inyo VI, 160 Cal.App.3d at 1186 .
[11] Inyo III, 71 Cal.App.3d at 196.
[12] Id. at 198.
[13] Id. at 200 (quoting Pub. Res. Code, § 21168.5.
[14] Id. at 200-206.

In Communities for a Better Environment, the court held that the City of Richmond's EIR for a refinery project "fails as an informational document," in part because the EIR's project description "is inconsistent and obscure as to whether the Project enables the Refinery to process heavier crude."[15] The court noted that conflicting information in the EIR, and in 10-K statements filed with the Securities and Exchange Commission, contradicted the benign account provided in the EIR. The substantial evidence test was "not relevant" to assessment of violations of CEQA's information disclosure provisions. If the EIR does not "adequately apprise all interested parties of the true scope of the project for intelligent weighing of the environmental consequences, informed decision-making cannot occur under CEQA and the final EIR is inadequate as a matter of law.[16]

Project Definition in DEIR

Fundamental Purpose

The DEIR simply states that the Project "is proposing to install and operate five new groundwater production wells and operate five existing groundwater wells to augment District surface water supplies during dry and critically dry water years." (p. 2-1) The wells are proposed to operate "as needed during dry and critically dry years" until they reach a "maximum cumulative total annual pumping volume of 28,500 ac-ft." (Id.)

A complete and accurate description of the existing and affected environmental setting is critical for an adequate evaluation of impacts to it. *See e.g. San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal.App.4th 713; *Galante Vineyards v. Monterey Peninsula Water Mgmt. Dist.* (1997) 60 Cal.App.4th 1109, 1122; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 955; *Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal.App.4th 74, 94.

As discussed, below, and in the expert reports created by Kit Custis on behalf of AquAlliance, the DEIR fails to comport with these standards.

Relationship to Past Projects and Plans

The Project is part of larger GCID projects, plans, grants, and agreements to transfer water (aka conjunctive use) and is also integrally related to other inter-connected actions by GCID, the California Department of Water Resources ("DWR"), the U.S. Bureau of Reclamation ("Bureau"), and others in the Sacramento Valley, and has the potential to have significant and far-reaching environmental impacts. However, the DEIR fails to make these connections that illustrate GCID's pursuit of conjunctive use projects.

For example, the broader history of the existing wells and GCID's delay in analyzing their planned long-term use for transfers and non-overlying water projects is not revealed. First, GCID was sued in 2007 over the claim that installing the wells (7 at the time) was exempt from CEQA because they were planned just for "research," despite the fact that GCID and local partners engaged in the Stony Creek Fan Project ("SCFP"). The SCFP's aquifer performance testing was hardly research, but preparation to enter the emerging water market as described in the 2005 Lower Tuscan grant proposal: "...this [conjunctive water use] program would provide

[15] 184 Cal.App.4th at 89.
[16] Id. at 83 (citations omitted).

opportunities to benefit from water transfers through the state and federal water projects. Overall program recovery would occur through groundwater substitution from wells tapping the lower Tuscan Formation aquifer system. These wells could be operated in the Butte Basin in conjunction with the SWP [State Water Project – Oroville] or in eastern Glenn and Colusa County in conjunction with the CVP [Central Valley Project– Shasta]."[17] The district's attempt to now evaluate impacts from these wells in this DEIR cannot be limited to this project's artificially limited project description, but rather, must evaluate the whole of the impacts of operating these wells. Similarly, and as discussed further below, the DEIR should not simply assume that the construction of new wells will not foreseeably result in environmental impacts greater than those contemplated by this project's artificially narrow project description.

Also omitted from the DEIR is the assurance in the Bureau's 2009 Environmental Assessment for the *Glenn-Colusa Irrigation District Stony Creek Fan Aquifer Performance Testing Plan* that use of the wells in any way beyond "research" required additional analysis. The Findings of No Significant Impact document for that project states, that: "The data and information compiled during implementation of this aquifer testing plan would be used as input prior to longer term use of the wells and would require future environmental review." (U.S. Bureau of Reclamation, p. 10) In addition, the Glenn-Colusa Irrigation District Stony Creek Fan Aquifer Performance Testing Plan ("APT") response to comments claimed: "The APT is a two-year program and the test production wells would not be used after conclusion of the program unless there is a subsequent decision to do so that is supported by the appropriate level of environmental review. This commitment is confirmed in the SCF APT itself, the notice of exemption issued by GCID in the related CEQA review process (See Appendix A), the EA (page 15), as well as briefs filed in the Superior Court litigation and the Court's ruling in that case." (p.7)

Despite the promises and legal commitments, GCID waited until 2015 to produce this DEIR while using the wells for multiple purposes: "GCID first pumped these wells in 2007, at 547 ac-ft for that year. In 2008 and 2012, the wells were pumped at less than 500 ac-ft; and in 2009, a dry year, GCID pumped 1,405 ac-ft. In 2010, no groundwater was pumped. GCID entered into two water transfer agreements, in 2011 and 2013, and pumped 6,300 and 5,000 ac-ft, respectively, in those years to supply the water transfer programs (GCID, 2013)." (DEIR p. 3-15). What is not disclosed in the DEIR is that GCID planned to sell 85,000 af to San Luis Delta Mendota Water Authority ("SLDMWA") in 2008 by fallowing no more than 20 percent of the district's irrigated acreage, crop shifting, and "[2],500 acre-feet that could be transferred would be made available by groundwater substitution attributable to pumping from two GCID-owned electric wells."[18] The contribution the existing five and newly-proposed five wells would provide to these and similar projects cannot be circumscribed by an artificial label on the project description, but instead, must be considered in conjunction.

It is clearly a significant omission that the DEIR doesn't disclose what transpired in 2014 or what is planned for 2015. What is known by AquAlliance to date is:

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[17] Glenn Colusa Irrigation District and the Natural Heritage Institute, June, 2005. Proposition 50 planning grant proposal to create the Lower Tuscan IRWMP entitled: *Regional Integration of the Lower Tuscan Groundwater Formation into the Sacramento Valley Surface Water System Through Conjunctive Water Management.*

[18] GCID 2008. *Initial Study and Proposed Negative Declaration for Option Agreement Between Glenn-Colusa Irrigation District, San Luis & Delta-Mendota Water Authority and the United States Bureau of Reclamation for 2008 Operations, and Related Forbearance Program*, pp. 2-3.

- After GCID"s General Manager, Thad Better, assured the public at a 2014 Chico water forum that the GCID wells weren't being used, it turned out that GCID had the 5 wells running to help landowners flood their fields and pumped 459 af. [19]
- The 5 wells were also used to transfer 4,512 af to the Tehama Colusa Canal Authority in 2014.[20]
- In 2015 GCID is selling water again to Tehama Colusa Canal Authority by allowing their members to use personal wells - 15,269 acre-feet (af) of which 11,494 af will be made available by pumping groundwater.
- GCID also committed to sell 55,283 af of Sacramento River water to San Luis Delta Mendota Water Agency south of the Delta in 2015.
- On June 16, 2015 GCID turned on its existing five production wells while issuing a Notice of Exemption (NOE) based on an "emergency." To provide some history about these wells, they were installed eight years ago under a previous exemption that asserted that they were necessary for "research." The 2015 NOE claims that because of the 25% cut-back to their river water that was made clear in April, and new requirements to withhold additional water to attempt to save the 2015 winter-run salmon, they are facing emergency conditions. However, the most recent conditions could be foreseen by GCID, a water district that is in constant contact with the regulatory agencies and was fully aware of the serious hydrologic conditions and obliteration of the winter, fall, and spring salmon runs in 2014. There is no limit in time or volume in the NOE for the 5 wells.

GCID's failure to disclose its commitment to implement the SVWMA and its participation in repeated transfers, even when it claims in-district emergencies, proves that a shell game is operating. More of this will be discussed below.

Project Goals and Objectives

The fundamental purpose of the 10-Wells Project gives rise to more specific project objectives on page 1-5:

- Increase system reliability and flexibility
- Offset reductions in GCID Settlement Contract allotments during the irrigation season in drought years
- Periodically reduce Sacramento River diversions to benefit migrating fish
- Protect and maintain agricultural production in times of water shortage to minimize economic disruption

Below are specific comments and questions about the objectives presented.

1) "Increase system reliability and flexibility"
What "system" will receive "reliability and flexibility" from the 10-Wells Project? The vagueness of the objective leaves the reader unsure of the need for the Project. The Project is depicted as a "Supplemental Supply Project," however GCID is simultaneously selling river water to buyers north and south of the Delta in 2015.[21] The 10-Wells Project claims shortages yet in practice

[19] Bettner, Thad e-mail to Barbara Vlamis June 2, 2014.
[20] Bettner, Thad letter to Jim Brobeck June 30, 2014.
[21] Bureau of Reclamation, 2015. *2015 Transfer Proposals as of May 19, 2015* obtained by AquAlliance through the Freedom of Information Act.

GCID has enough to sell water. It is in this way that groundwater is actually connected to water transfers, even if the Project's stated use is for district needs.

2) "Offset reductions in GCID Settlement Contract allotments during the irrigation season in drought years" The DEIR fails to address how GCID has specifically managed reductions in the past and that recent dam operations, or dam mismanagement is more likely, are part of the shell game to push CVP districts toward groundwater.[22] This objective directs the reader to the Alternatives that were considered and rejected, two of which make for shared sacrifice during extremely rare CVP reductions. The DEIR can't have it both ways – either reductions are rare or they are regularly expected and, therefore, the additional stress of the 10-Wells Project to the hydrologic system is against the best interests of even GCID and certainly its neighbors. If CVP reductions are planned to be much more regular, this must be disclosed and analyzed in the DEIR.

3) "Periodically reduce Sacramento River diversions to benefit migrating fish"
How will fish benefit from the extraction of 28,500 af of groundwater that has not been historically needed when it is well documented that groundwater loss comes at the expense of stream flow? "Groundwater pumping can alter how water moves between an aquifer and a stream, lake, or wetland by either intercepting groundwater flow that discharges into the surface-water body under natural conditions, or by increasing the rate of water movement from the surface-water body into an aquifer."[23]

4) "Protect and maintain agricultural production in times of water shortage to minimize economic disruption"
This is another laudatory goal that fails the sniff test. GCID's 2008 Negative Declaration for a project to transfer 85,000 af to San Luis Delta Mendota Water Authority by fallowing no more than 20 percent of the district's irrigated acreage determined that it would have "no impact" on "human beings, either directly or indirectly." The ability to absorb an 85,000 af loss of water during a Critical water year was GCID's legal position in the 2008 CEQA document, so why would the district possibly need 28,500 af from the existing and proposed wells to minimize economic disruption now and into the future? [24] In addition, the district regularly supports crop

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[22] Restore the Delta Protest Petition to the State Water Resources Control Board, July 22, 2015. "While we concede that DWR and the Bureau have in the near term diligently petitioned for temporary urgency changes reasonably promptly given natural conditions of drought in California and the Central Valley watershed of the Delta, the Board's authority to evaluate the temporary urgency change petition, and the petitioners' exercise of due diligence with respect to the substance of the petition, does not end with natural conditions. Instead, the California Constitution, Article X, Section 2, and the Public Trust Doctrine, as well as California Water Code sections 850546, 850217, and 850238 require the Board to consider whether the petitioners have also exercised due diligence in reasonably using and diverting water, as well as protecting public trust resources." (p. 5.)

[23] U.S. Geological Survey web site regarding groundwater depletion: http://ga.water.usgs.gov/edu/gwdepletion.html

[24] GCID 2008. *Initial Study and Proposed Negative Declaration for Option Agreement Between Glenn-Colusa Irrigation District, San Luis & Delta-Mendota Water Authority and the United States Bureau of Reclamation for 2008 Operations, and Related Forbearance Program.* "No Impact. The negative declaration assesses the potential impacts of the proposed Project. There would be no construction activities associated with the proposed Project. Typical farming practices with the idling of land in GCID would comply with applicable health and safety requirements. The potential increase in farmed acreage within the SLDMW A service area is within annual variability and could provide a minor beneficial effect on human economic activity. Therefore, the proposed Project would not cause substantial adverse effects on human beings, either directly or indirectly."

idling water transfers during dry and critical years, which the DEIR admits thwarts agricultural production. The district's on-again off-again support of this goal is arbitrary. Moreover, the project itself supports crop idling transfers by providing alternative water sources for the district in dry and critical years.

In 2010, a Below Normal water year, the *Glenn-Colusa Irrigation District 2010 Water Transfer to San Luis & Delta-Mendota Water Authority Draft Initial Study and Negative Declaration* had GCID planning to sell 20,000 af using groundwater substitution and didn't even *mention* impacts to the economy or humans. This pattern was repeated again in 2013, a Dry water year, when the water transfer CEQA document failed to mention, let alone consider, impacts to the economy or humans.[25] Clearly, GCID has through time demonstrated a lack of concern for impacts to the economy and humans, yet minimizing "economic disruption" has been elevated to an objective in the DEIR. The use of this goal obscures the district's historic behavior in feathering its own cap at the expense of the region's water and economy, which misleads the public.

In short, science and law should now converge to prevent GCID from framing the 10-Wells Project in a manner that forecloses meaningful alternatives and consigns the Sacramento Valley's future to fairy tales. As presented in the DEIR, the approach to project definition includes significant errors and omissions.

Key Problems with the GCID Project

GCID May Not Avoid Consideration of the Significant Environmental Impacts By Improperly Segmenting the Proposed Activities

The Project is part of GCID's multi-decade involvement in planning and implementing a much larger project, the Sacramento Valley Water Management Agreement ("SVWMA"), which still requires programmatic CEQA review. The SVWMA is not disclosed in the DEIR and has been gradually implemented by GCID and other parties absent the programmatic CEQA document (see Cumulative Impacts). The DEIR further fails to describe the numerous other programs of which this Project is a small component part. The review in the DEIR violates CEQA's prohibition against segmenting a project to evade proper environmental review (*Laurel Heights Improvement Association v. Regents of the University of California*, 1988, 47 Cal.3d 376).

The Project is a direct link to implementing the SVWMA and other subsequent plans and programs. Please consider the following:

- The SVWMA was signed in 2002 and the need for a programmatic EIS/EIR was clear and initiated, but never completed.[26] GCID is a signatory.

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[25] *Notice Of Preparation Initial Study And Proposed Negative Declaration Glenn-Colusa Irrigation District 2013 Water Transfer To San Luis & Delta-Mendota Water Authority.*

[26] Perhaps even more telling, the Bureau actually began its own Programmatic EIS to facilitate water transfers from the Sacramento Valley, and the interconnected actions that are integrally related to it, but never completed that EIS and now has impermissibly broken out this current segment of the overall Program for piecemeal review in the present draft EA. See 68 Federal Register 46218 (Aug 5, 2003) (promising a Programmatic EIS on these related activities, "includ[ing] groundwater substitution in lieu of surface water supplies, conjunctive use of groundwater and surface water, refurbish existing groundwater extraction wells, install groundwater monitoring stations, install new groundwater extraction wells..." Id. At 46219. See also

- Sacramento Valley Integrated Regional Water Management Plan (2006). GCID serves on the Joint Powers Authority and has been implementing the SVWMA through state grants and federal appropriations and agreements. (see more in Cumulative Impact section below).
- The Sacramento Valley Water Management Plan prepared by the Sacramento River Settlement Contractors in cooperation with the Bureau. (2006). GCID is a Settlement Contractor. "[t]o examine the potential for groundwater production and recharge within a gravely strata located in Glenn County, the Stony Creek Fan. GCID's Conjunctive Use Program is being developed in conjunction with the Stony Creek Fan Program and build upon data contain [sic] though this investigation and the Sacramento Valley Water Management Program." (p. 2-56).
- The Stony Creek Fan Partnership Orland Project Regulating Reservoir Feasibility Investigation. GCID is one of the partners. (Id.)
- GCID's Stony Creek Fan Aquifer Performance Testing Plan to install seven production wells in 2009 that will extract 26,530 AF of groundwater as an experiment.
- GCID's Lower Tuscan Conjunctive Water Management Program (Bureau provided funding). "GCID shall define three hypothetical water delivery systems from the State Water Project (Oroville), the Central Valley Project (Shasta) and the Orland Project reservoirs sufficient to provide full and reliable surface water delivery to parties now pumping from the Lower Tuscan Formation. The purpose of this activity is to describe and compare the performance of three alternative ways of furnishing a substitute surface water supply to the current Lower Tuscan Formation groundwater users to eliminate the risks to them of more aggressive pumping from the Formation and to optimize conjunctive management of the Sacramento Valley water resources."[27]
- GCID's water transfers in 2008 and in 2010.
- GCID's participation in the California Drought Water Bank for 2009. "In 2009, GCID transferred 6,585acre-feet to the California Department of Water Resources (DWR), as part of the 2009 Drought Water Bank. GCID made the transfer water available through crop idling."[28]
- The Bureaus of Reclamation's 2010/2011 Water Transfer Program of 395,910 af of CVP and non-CVP water with 154,237 AF of groundwater substitution (EA/FONSI p. 2-4 and 3-107). GCID was prepared to participate by selling 40,000 af of which 20,000 would have been available from groundwater substitution. (Final EA at p. 2-4)
- "One-year GCID transfer of surplus Base Water Supply and US Bureau of reclamation Project Water during calendar year 2011 to 8,200 acres of Colusa Drain Mutual Water Company, comprised of previously cultivated, agricultural land outside, but contiguous to

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http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=788 (current Bureau website on "Short-term Sacramento Valley Water Management Program EIS/EIR").

[27] U.S. Bureau of Reclamation Assistance Agreement, 2006.

[28] Glenn-Colusa Irrigation District 2010 Water Transfer to San Luis & Delta-Mendota Water Authority Initial Study and Negative Declaration p. 1-2.

existing GCID boundaries, or otherwise, conveniently served with water from the Colusa Basin Drain when water is available within the Basin." [29] 6,300 af was transferred using groundwater substitution from GCID's wells for the first time. [30]

- In 2012 GCID's Critical Year Groundwater Well Program would pump 12,000 af. The Bureau planned water transfers of 76,000 af of CVP water all through ground water substitution.[31]
- In 2014 GCID planned to sell water north and south of the Delta.
    - Buyer Tehama Colusa Canal Authority sought 7,852 af with 4,154 af from groundwater substitution.
    - SLDMWA sought15,951 af.
- The 10-Year Water Transfers Program allows GCID to sell up to 91,000 af per year, including through groundwater substitution, from 2015-2024, to the San Luis Delta Mendota Water Agency.

The proposed project would facilitate additional water transfers that must be analyzed as part of the whole of the project. (See, *Citizens Association for Sensible Development of Bishop Area v. Com& of Invo* (1985) 171 Cal.App.3d 151, 165-166; *McQueen v. Board of Directors of the Midpeninsula Regional Open Space District* (1988) 202 Cal.App.3d 1136, 1144; *Laurel Heights Improvement Ass'n v. Regents of the University of California*, supra, 47 Cal.3d at pp.395-396.) The DEIR explains that GCID is a participant in the Long Term Water Transfer program ("LTWT") coordinated by and between the Bureau of Reclamation and the SLDMWA. (DEIR 3-76.) The DEIR notes that while the LTWT EIR originally evaluated GCID groundwater substitution transfers as part of the LTWT program, GCID now voluntarily seeks to convert all of its transfers under that program to cropland idling, while eliminating groundwater substitution, "originally shown at 25,000 ac-ft." (DEIR 3-76.) The DEIR explains that, "GCID elected to reduce the quantities from what was originally presented in the LTWT EIS/EIR in order to reduce potential conflicts between the proposed project and the LTWT." (DEIR 3-76.) In other words, to support and further the LTWT, GCID now proposes to pump a roughly equivalent amount of groundwater on its own, while still utilizing crop idling transfers as proposed under the LTWT. Moreover, nothing will prevent GCID from utilizing the existing or new wells to support groundwater substitutions under the LTWT. For each of these reasons, the direct, indirect, and cumulative impacts of GCID's participation in the LTWT should be considered here. See, AquAlliance, comments on the Long Term Water Transfer EIS/EIR, December 1, 2014.

Thus, while the DEIR provides no express explanation of why the proposed maximum groundwater pumping capacity of the project would be 28,500 ac-ft per year, the DEIR clearly explains that this project will be used to provide groundwater to the district in amounts almost identical to that which the district has voluntarily foregone in groundwater substitution under the LTWT. Nothing, however, under the LTWT nor under the proposed project affirmatively binds

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[29] http://www.ceqanet.ca.gov/DocDescription.asp?DocPK=651108

[30] Glenn Colusa Irrigation District Draft EIR Groundwater Supplemental Supply Project2015, p. 3-15.

[31] U.S. Bureau of Reclamation Memorandum to U.S. Fish and Wildlife Service January 24, 2012. *Section 7 Endangered Species Act Consultation with U.S. Fish and Wildlife Service (USFWS) for 2012 "North-to-South" Water Transfers.*

the district to these proposed amounts. Accordingly, and in order to avoid this shell game of simply taking the same groundwater under the pretense of a separate project under another name, these two projects must be evaluated together.

Indeed, GCID's participation in the LTWT itself belies the fundamental purposes of this proposed project, to provide additional water to the district in times of supposed shortages. In fact, the district proposes to sell off water rights under the LTWT during dry and critically dry years, and now proposes to pump an equivalent amount to offset the "shortage" it creates voluntarily by selling its water to south of delta users. As the DEIR states, these two projects are inextricably linked, and subject to the broad discretion of the GCID board to allocate water between the two on an annual basis.

The DEIR must evaluate higher rates of groundwater extraction than proposed by the DEIR.

The DEIR incompletely describes the project in the following, limited, terms:

> GCID is proposing to install and operate five new groundwater production wells and operate five existing groundwater wells to augment District surface water supplies during dry and critically dry water years (see Figure 2-1). The proposed project wells would be operated as needed during dry and critically dry water years to achieve a maximum cumulative total annual pumping volume of 28,500 ac-ft. Total capacity per well would be approximately 2,500 gallons per minute.

(DEIR 2-1.) The DEIR, however, provides no justification for limiting its analysis of the whole of the project to additional pumping of 28,500 ac-ft per year during dry and critically dry years. Nothing in the DEIR explains how or why groundwater extraction from these wells will be so limited.

What is the basis for the 28,500 ac-ft target? How, specifically, does this target amount of water satisfy each of the project objectives? What legal constraints, if any, are in place to ensure that no greater amounts could be withdrawn from these pumps? As the DEIR discloses in Table 3-4, the pumping capacities of the existing wells are far greater than the projected 2,500 gpm rate planned in the Project. (p. 3-15.)

Once constructed, additional operations of these pumps is entirely foreseeable. According to the DEIR at least, no further regulatory approvals would be needed to utilize the new and existing pumps in non-dry and critically dry years, and in amounts greater than 28,500 ac-ft per year (only construction approvals are referenced in the DEIR). The DEIR states that the pumps will be operated 24 hours a day and 7 days a week, but for only 8.5 months a year. Should the pumps be operated for the entire year, production increases to 40,300 ac-ft per year. Should the pumps be operated during any normal or wet year, the groundwater recovery anticipated by the DEIR would not be realized.

The DEIR states that "[a]ny future uses of groundwater facilities other than for supplementing GCID's water supply sources (for example, a water transfer) would require a separate evaluation and approval, at the time any such specific action is proposed, in compliance with NEPA and/or CEQA, as appropriate." (DEIR 2-3.) But this is simply not the case. As discussed above, five of

the wells included in the present project were constructed, and have been operated on numerous occasions for numerous reasons, without CEQA review. Similarly, the DEIR itself notes that "GCID can augment its surface water supply with a maximum of 5,000 ac-ft of groundwater available annually from existing District-owned wells." (DEIR 1-2.) Though the basis for the 28,500 af cap is not provided, it is evident that GCID intends to use its own wells to pump groundwater as needed and at any capacity.

The Supreme Court in *Laurel Heights I* held that an EIR must analyze future effects of a project where such effects are (1) reasonably foreseeable, and (2) significantly greater in scope or degree. 47 Cal.3d 376, 393-399. For example, in *Communities for a Better Environment v. City of Richmond*, 184 Cal.App.4th 70 (2010), the Court set aside an EIR for its failure to analyze Chevron's ability to process lower grade crude oil as a result of equipment upgrades, even where the proposed air district permit for the project could have prevented the throughput of lower grade and more polluting crude oil. As here, the project purpose stated in the *CBE* EIR was "to allow more flexibility in refining future crude supplies." But, as here, the "flexibility" Chevron achieved through its equipment upgrades allowed for more and different impacts than those put forth in the artificially limited project description. With no actual restrictions on the new infrastructure, the Court held the EIR to be inadequate, stating, "[f]ar from being an informative document, the EIR's conclusions call for blind faith in vague subjective characterizations." Such is the case with the project description at hand, which claims a maximum groundwater extraction of 28,500 ac-ft per year in dry and critically dry years only, while providing no binding requirements or even practical limitations that would so limit future groundwater extraction from these new wells, once constructed, to the proposed project amounts.

Nor may GCID simply rely on the DEIR's proposed mitigation measures to truncate review of the project's impacts. The Court in *Stanislaus Natural Heritage Project v. County of Stanislaus*, 48 Cal.App.4th 182 (1996), overturned an EIR where the lead agency failed to fully analyze future water supply impacts based on a mitigation measure designed to avoid such future impacts. The court rejected this as insufficient under CEQA, holding that the whole of the project must be evaluated, and only then may the efficacy of mitigation measures be considered. (205-206.)

In contrast, in *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, the Court of Appeal upheld an EIR that considered only a 20 year lifespan for a project, where the facility at issue obtained only a 20 year contract and permit to operate. Any future decision to extend the plant operation would require a new permit approval, and therefore, subsequent CEQA review. (739.) Here, in contrast, no future, binding, limitations, such as an expiring contract or regulatory permit, might limit GCID's future uses of the newly constructed pumps to the stated project timing and amount.

In sum, the DEIR is premised on an improperly "curtailed" and "distorted" project description. (*County of Inyo* v. *City of Los Angeles* (1977) 71 Cal. App.3d 185, 192.) Since "[a]n accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient EIR" (*id.* at p. 193), even were the FEIR deemed to be adequate in all other respects, the selection and use of a "truncated project concept" violated CEQA and mandates the conclusion that the County did not proceed "in a manner required by law.'" (*Id.* at p. 200)

Any need for additional groundwater pumping can only be the result of either increased demand, decreased supplies, or a combination of the two. However, the DEIR fails to provide any quantitative information on these project drivers. Based on historic climatic variation, the DEIR simply projects forward that "it is anticipated that GCID could operate the proposed project approximately 16 times in a 40-year period." (DEIR 2-3.) But the DEIR fails to provide any substantial evidence to support this future baseline projection. Over the prior 40 year period used to project the scope of the project going forward, haven't demands increased while supplies have simultaneously diminished? Indeed, the DEIR itself cites to decreasing supplies as a project driver, effectively rendering the past 40 years of pumping rates totally inapplicable to the 40 future years of project operations that the DEIR analyzes. The DEIR fails to make any adjustments to its projections, which rely on historic data, to account for present and future changes in demand and supply. As just one example, demands within Glenn County alone have increased significantly from 2000-2013 as agriculture is expanded or converted to tree crops.[32] Meanwhile, supplies are decreasing statewide, regionally, and locally, as a result of increasing average temperatures, and decreasing precipitation. See, AquAlliance, Comments on Long Term Water Transfer EIS/EIR, December 1, 2014, pp. 41-44. The EIR must make some good faith attempt to evaluate these and similar factors when projecting the scope of operation of the proposed project.

II. The DEIR Does Not Establish that GCID has Any Legal Right to Pump this Additional Groundwater.

The DEIR fails to meaningfully address whether GCID has a legal right to increase groundwater pumping, whether in its existing wells, or within the newly proposed wells, for distribution of this pumped groundwater throughout the district. In contrast to GCID's appropriative surface water rights, which it may allocate to a non-overlying use, any overlying right to pump groundwater is limited to the beneficial use of said groundwater upon the property of the overlying landowner within the same basin or watershed. (*California Water Service Co. v. Edward Sidebotham & Son* (1964) 224 Cal. App.2d 715, 725; see also, *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.) The DEIR does not demonstrate that GCID would, in fact, solely limit its use of extracted groundwater to lands it owns throughout the same basin or watershed. GCID was put on notice that construction of its five existing wells did not provide this right, and is reminded of that again here.

III. Hydrology

Groundwater Conditions

A complete and accurate description of the existing and affected environmental setting is critical for an adequate evaluation of impacts to it. *See e.g. San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal.App.4th 713; *Galante Vineyards v. Monterey Peninsula Water Mgmt. Dist.* (1997) 60 Cal.App.4th 1109, 1122; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 955; *Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal.App.4th 74, 94.

[32] AquAlliance 2015. Summary of Agriculture Reports 2000-2013. Based on actual reports found at: http://www.countyofglenn.net/govt/departments/ag/crop_reports.aspx

The 3.1.1 Environmental Setting section is deficient with its general description of the region's climate based on the work of Bertoldi in 1991. Even if the region experiences "typical years" in the future, it certainly has experienced shifting patterns since 2000. More current annual data and trends must be presented that reflects these changing conditions and specifically for Glenn County, where the wells are proposed for use and its surrounding counties.

The DEIR similarly provides limited groundwater elevation data of the Sacramento Valley groundwater basin in the subsection Groundwater Conditions. (pp. 3-7 to 3-10.) Table 3-2 provides groundwater level changes from the summer of 2004-2014. (DEIR p. 3-8.) DWR provides a number of additional groundwater level and depth to groundwater maps that the DEIR should use to help complete its description of the affected environment.[33]

AquAlliance's tables below illustrate maximum and average groundwater elevation decreases for Butte, Colusa, Glenn, and Tehama counties, all the counties believed to overly the Tuscan Aquifer, at three aquifer levels in the Sacramento Valley between the fall of 2004 and 2014.[34]

County Fall '04 - '14	**Deep Wells (Max decrease gwe)**	**Deep Wells (Avg. decrease gwe)**
Butte	-12.7 (-11.4)	-10.5 (-8.8)
Colusa	-59.5 (-31.2)	-59.5 (-20.4)
Glenn	-79.7 (-60.7)	-44.3 (-37.7)
Tehama	-34.6 (-19.5)	-10.9 (-6.6)

County Fall '04 - '14	**Intermediate Wells (Max decrease gwe)**	**Intermediate Wells (Avg. decrease gwe)**
Butte	-21.8	-6.5
Colusa	-39.1	-16.0
Glenn	-40.2	-14.5
Tehama	-20.1	-7.9

County Fall '04 - '14	**Shallow Wells (Max decrease gwe)**	**Shallow Wells (Avg. decrease gwe)**
Butte	-13.3	-3.2
Colusa	-20.9	-3.8
Glenn	-44.4	-8.1
Tehama	-15.7	-6.6

[33] http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm#Well%20Depth%20Summary%20Maps

[34] Id.

Below are the results from DWR's spring monitoring for Sacramento Valley groundwater basin from 2004 to 2014.

County Spring '04 - '14	Deep Wells (Max decrease gwe)	Deep Wells (Avg. decrease gwe)
Butte	-20.8	-14.6
Colusa	-26.9	-12.6
Glenn	-49.4	-29.2
Tehama	-6.1	-5.3

County Spring '04 - '14	Intermediate Wells (Max decrease gwe)	Intermediate Wells (Avg. decrease gwe)
Butte	-25.6	-12.8
Colusa	-49.9	-15.4
Glenn	-54.5	-21.7
Tehama	-16.2	-7.9

County Spring '04 - '14	Shallow Wells (Max decrease gwe)	Shallow Wells (Avg. decrease gwe)
Butte	-23.8	-7.6
Colusa	-25.3	-12.9
Glenn	-46.5	-12.6
Tehama	-38.6	-10.8

The additional DWR data in multiple counties that depend on the Tuscan Aquifer clearly present a more comprehensive picture of the conditions of the Sacramento Valley groundwater basin over time than what is provided in the DEIR. It also highlights significant data that is intentionally omitted from the DEIR. For Glenn County alone (all that is provided in the DEIR), the fall measurements indicate much more dramatic declines from summer measurements in the deep wells and all the spring levels punctuate the serious lack of groundwater recovery. Obfuscating basic and foundational material regarding existing conditions leaves the public and policy makers with a lack of confidence in the 10-Wells Project, the DEIR, and the lead agency, GCID. Therefore, the DEIR will need to be revised, once these data are obtained, and recirculated as a Draft EIR in order to ensure the public and relevant decision makers receive full disclosure of the existing conditions and trends that are used for analysis and the development of conclusions for the 10-Wells Project.

Groundwater Properties

The DEIR fails to discuss the pressurized condition of the down-gradient portion of the Tuscan formation, which underlies the Project area. Dudley finds significant importance in the pressurized state of the lower Tuscan aquifer located in the Butte Basin. "It is interesting to note that groundwater elevations up gradient of the Butte Basin, in the lower Tuscan aquifer system, are higher than the ground surface elevations in the south-central portion of Butte Basin. This creates an artesian flow condition when wells in the central Butte Basin are drilled into the lower Tuscan

aquifer."[35] The artesian pressure indicates recharge is occurring in the up-gradient portions of the aquifer located along the eastern margin of the Sacramento Valley several miles east of the project.

The DEIR fails to provide recharge data for the aquifers although GCID was provided this information seven years ago. Professor Karin Hoover, Assistant Professor of hydrology, hydrogeology, and surficial processes from CSU Chico, found in 2008 that, "Although regional measured groundwater levels are purported to 'recover' during the winter months (Technical Memorandum 3), data from Spangler (2002) indicate that recovery levels are somewhat less than levels of drawdown, suggesting that, in general, water levels are declining."[36] According to Dudley, "Test results indicate that the 'age' of the groundwater samples ranges from less than 100 years to tens of thousands of years. In general, the more shallow wells in the Lower Tuscan Formation along the eastern margin of the valley have the 'youngest' water and the deeper wells in the western and southern portions of the valley have the 'oldest' water," adding that "the youngest groundwater in the Lower Tuscan Formation is probably nearest to recharge areas."[37] "This implies that there is currently no active recharge to the Lower Tuscan aquifer system (M.D. Sullivan, personal communication, 2004)," explains Dr. Hoover. "If this is the case, then water in the Lower Tuscan system may constitute fossil water with no known modern recharge mechanism, and, once it is extracted, it is gone as a resource."[38] The DEIR must account for this feature in its description of existing conditions, and its projections of recharge rates.

Groundwater Depletion

The DEIR illegally defers formulation and evaluation of mitigation measure WR-1. (*See, e.g., POET, LLC v. State Air Resources Board* (2013) 218 Cal.App.4th 681; *Preserve Wild Santee v. City of Santee* (2012) 210 Cal.App.4th 260; *Sacramento Old City Association v. City Council* (1991) 229 Cal.App.3d 1011; CEQA Guidelines § 15126.4(a)(1)(B); *Defend the Bay v. City of Irvine* (2004) 119 Cal.App.4th 1261, 1275.) In relying on WR-1, the DEIR goes so far as to defer the environmental impact analysis that should be provided now, as part of the DEIR itself. Moreover, WR-1 fails to include clear performance standards, criteria, thresholds of significance, evaluation of feasibility, analysis of likelihood of success, and even facially permits significant impacts to occur. And importantly, WR-1 does not, in fact, reduce potentially significant impacts to less-than-significant levels, but rather, attempts to monitor for when significant effects occur.

WR-1 requires GCID "implement a groundwater monitoring program," but a monitoring program itself cannot prevent significant impacts from occurring. "The monitoring program will rely on DWR's CASGEM program and the District's monitoring network. The monitoring program will include semiannual measurements of groundwater levels at a network of wells throughout the Sacramento Valley. Many of the established observation wells (including multi-completion well clusters) are instrumented with data-logging pressure transducers to provide continuous

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[35] Dudley, Toccoy 2005. *Seeking an Understanding of the Groundwater Aquifer Systems in the Northern Sacramento Valley: An Update.*

[36] Hoover, Karin A. 2008. *Concerns Regarding the Plan for Aquifer Performance Testing of Geologic Formations Underlying Glenn-Colusa Irrigation District, Orland Artois Water District, and Orland Unit Water Users Association Service Areas, Glenn County, California.* White Paper. California State University, Chico.

[37] Dudley, Toccoy 2005. Id.

[38] Hoover, Karin A. 2008. Id.

groundwater level data." (EIR 3-40.) Although monitoring does not disclose or analyze impacts for CEQA purposes, the DEIR still fails to provide any of the most foundational information about its proposed "groundwater monitoring program," such as how many wells will be monitored, what is a sufficient number of wells, how many will be monitored semiannually, how many will be monitored continuously, where are the monitoring wells located, what strata are the wells monitoring, who will manage and report on the data, and how will the public have access to the data and reports?

To elaborate on the timing of monitoring, it is absolutely crucial. Common sense suggests that significant groundwater pumping could occur in less than six months – one of the periods planned for monitoring. And monitoring after transfer-related pumping can only show whether significant impacts have occurred; it cannot prevent them. Yet this is exactly what the EIR proposes: "A subset of the well network will be selected for groundwater level monitoring prior to (monthly), during (weekly), and after (weekly for 1 month and monthly thereafter) groundwater pumping for the proposed project. The monitoring network will incorporate a sufficient number of monitoring wells and adequate spatial distribution to evaluate groundwater levels prior to, during, and after project operations." (EIR 3-40.) Hence, WR-1 only requires elements of the mitigation plan to kick in after monitoring shows significant impacts are occurring, which are extremely likely to occur given the fact that monitoring alone amounts to no mitigation or avoidance measures. Additionally, the DEIR fails to provide any guidance on what constitutes "a sufficient number of monitoring wells." (Id.)

Compounding WR-1's inadequacy as a mitigation measure, the DEIR asserts that, "As part of the monitoring program, GCID will use data from DWR's existing monitoring programs to establish longer-term antecedent trends in groundwater levels within the basin." (p. 3-40). But this is exactly the kind of information that must be provided to the public in the DEIR. When would GCID finally establish these trends, how would they be disclosed to the public, and what would they possibly alter with the Project?

Even still, the proposed mitigation measure WR-1 doesn't mitigate significant impacts. The mitigation proposal includes the following requirements: 1) "Reduce or relocate pumping until natural recharge corrects the issue." This, of course, could take years[39] and really amounts to no mitigation of the significant impact at all. (See also, AquAlliance, comments on the Long Term Water Transfer EIS/EIR, pp. 19-22, 36, 47, 59-61, 66.) 2) How GCID would feasibly and legally "relocate" pumping is not explained. 3) "Reimburse third parties for significant increases in pumping costs due to an increase in lift." In what amount, at what time, as decided by whom? Monetary compensation is not always sufficient to cover damages to business operations. (*See* CEQA Guidelines § 15370; *Gray v. County of Madera* (2008) 167 Cal.App.4th 1099, 1122.) 4) "Lower the pump in third-party wells affected by the proposed project," may help an injured third-

[39] Custis, Kit 2015. "Although the DEIR doesn't provide an estimate of the stream depletion rate as a percentage of the stream flow, it appears from the maximum values listed in Table 3-6 that the depletion rates for the listed streams and rivers are less than 48% of the average stream flow. This would suggest that the time it takes until the aquifers pumped by the GCID well are 95% recharged by stream depletion may take decades. In fact, a report on the impacts from the 2009 groundwater substitution transfers simulating from 1976 to 2003 using the SACFEM groundwater model showed aquifer recovery following a single 1976 pumping event was only 60% after 30 years (Figure 4d in CH2MHill, 2010). This suggests that the impacts from a single year of GCID's groundwater extraction project and the impacts from reoccurring pumping events will continue for many years."

party, but like monetary damages may not sufficiently cover damages or be done in a timely manner with well companies months behind due to the existing dry conditions. Finally, "[o]ther actions as appropriate" is so vague as to be meaningless. (EIR 3-40.)

Mitigation measure WR-2 is similarly flawed with its reliance on monitoring and deferred analysis of impacts of the present project. WR-2 also assumes that subsidence impacts will take place quickly allowing GCID to determine exclusive culpability or deflect it to "regional conditions." (DEIR p. 3-41/42.) This simplistic view is not founded in science – more likely wishful thinking. The DEIR instead should disclose how long-term physical responses result from repeated lowering of groundwater. The following evidence demonstrates that the Project's subsidence impacts may be significant and it was first provided to GCID in 2008.[40]

Dr. Kyran Mish, former Presidential Professor, School of Civil Engineering and Environmental Science at the University of Oklahoma related: "It is important to understand that *all* pumping operations have the potential to produce such settlement, and when it occurs with a settlement magnitude sufficient enough for us to notice at the surface, we call it *subsidence*, and we recognize that it is a serious problem (since such settlements can wreak havoc on roads, rivers, canals, pipelines, and other critical infrastructure)."[41] Dr. Mish further explains that "[b]ecause the clay soils that tend to contribute the most to ground settlement are highly impermeable, their subsidence behavior can continue well into the future, as the rate at which they settle is governed by their low permeability." (Id.) "Thus simple real-time monitoring of ground settlement can be viewed as an *unconservative* measure of the potential for subsidence, as it will generally tend to underestimate the long-term settlement of the ground surface." (Id.) (emphasis added).

However, the DEIR asserts that, "If groundwater levels do not recover above historical lows within 6 months following cessation of project operation and project operations will not resume the next year, GCID will assume groundwater level drawdown is due to regional conditions and land subsidence monitoring may be stopped." (pp. 3-41 and 3-42.) This conclusory assertion falsely assumes that 1) Any water level above the *historic lows* avoids or offsets damage from non-reversible subsidence. 2) If groundwater recovers above historic lows, subsidence isn't occurring and therefore can't be attributed to the 10-Wells Project and 3) If groundwater levels don't recover above historical lows, when there is a planned one-year lapse in GCID's pumping, there are no impacts from GCID's pumping. However, the DEIR contains conclusions reached by the U.S. Geological Survey ("USGS") that affirm the long-term and gradual nature of subsidence that accrues from continuous groundwater depletion,: "These small changes accumulate over time and can lead to impacts such as changes in stream, canal, or levee elevations and slopes; damage to infrastructure such as roads, bridges, and utilities; damage to building foundations; and collapse of well casings (USGS, 2015b)." (p. 3-13.)

USGS also confirms that, "In many aquifers, ground water is pumped from pore spaces between grains of sand and gravel. If an aquifer has beds of clay or silt within or next to it (figure 2), the lowered water pressure in the sand and gravel causes slow drainage of water from the clay and silt beds. The reduced water pressure is a loss of support for the clay and silt beds. Because these beds

[40] Mish, Kyran 2008. *Commentary on Ken Loy GCID Memorandum*. White Paper. University of Oklahoma.
[41] Id.

are compressible, they compact (become thinner), and the effects are seen as a lowering of the land surface. The lowering of land surface elevation from this process is permanent. For example, *if lowered ground-water levels caused land subsidence, recharging the aquifer until ground water returned to the original levels would not result in an appreciable recovery of the land-surface elevation.*"[42] (emphasis added) It is quite clear that WR-2 is a completely inadequate mitigation measure for subsidence impacts.

The DEIR's evaluation of subsidence suffers from the same flaws as that of the Long Term Water Transfer Final EIS/EIR, and AquAlliance's April 8, 2015 comments on these deficiencies (pp. 2-5) are incorporated here.

Groundwater Quality

The DEIR fails to disclose the existence or extent of all the hazardous waste plumes in the Tuscan groundwater basin where GCID's wells are and will be located or in the Tehama formation that intermingles with the Tuscan in Glenn County. (*See e.g. San Joaquin Raptor/Wildlife Rescue Ctr. v. County of Stanislaus* (1994) 27 Cal.App.4th 713.) For example, the Orland dry cleaners plume is certainly within the incremental drawdown forecast in Figure 3-6. There is also no discussion of whether the increased groundwater extraction proposed by the Project may mobilize some of the PCE and TCE plumes under Chico since the pressurized condition of the down-gradient portion of the Tuscan formation, which underlies the 10-Wells Project area, benefits from recharge waters in the foothills and mountains to the east and north of Chico.[43] Toccoy Dudley et al support this finding of a pressurized lower Tuscan aquifer across the Sacramento River from GCID. "It is interesting to note that groundwater elevations up gradient of the Butte Basin, in the lower Tuscan aquifer system, are higher than the ground surface elevations in the south-central portion of Butte Basin. This creates an artesian flow condition when wells in the central Butte Basin are drilled into the lower Tuscan aquifer." [44] The artesian pressure indicates recharge is occurring in the up-gradient portions of the aquifer located along the eastern margin of the Sacramento Valley many miles into Butte County. This indicates that flow moves through the Chico plume areas toward the down-gradient portion of the Tuscan Aquifer where the existing GCID wells are located and new wells are proposed.

In addition, the DEIR fails to describe a significant saline portion of the aquifer stratigraphy of the project area. According to Toccoy Dudley, former Groundwater Geologist with the Department of Water Resources and former director of the Butte County Water and Resources Department, saline groundwater aquifer systems of marine origin underlie the various freshwater strata. The approximate contact between fresh and saline groundwater occurs at a depth ranging from 1,500 to 3,000 feet.[45]

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[42] U.S. Geological Survey (USGS). 2015a. "Land Subsidence from Ground-Water Pumping." Available at http://geochange.er.usgs.gov/sw/changes/anthropogenic/subside/. Retrieved July 24, 2015.

[43] DWR, 2009. Glenn-Colusa Irrigation District Test-Production Well Installation and Aquifer Testing, pp. 25-26.
[44] Dudley, Toccoy 2005. *Seeking an Understanding of the Groundwater Aquifer Systems in the Northern Sacramento Valley: An Update.*
[45] Id.

More recent research has documented threats of contamination. "The BFW [base of fresh water] boundary occurs primarily in late Tertiary to Quaternary unconsolidated sediments at depths near land surface to more than 3,500 feet below ground surface. The BFW is an uneven boundary that in some places reflects the major geologic structures underlying the Sacramento Valley, and in other areas, transgresses underlying geologic structures. In some areas, the BFW boundary is well above the base of post-Eocene marine strata. This is most likely caused by high artesian pressures and upward vertical gradients in deep aquifers in the Sacramento Valley, which have been documented in DWR monitoring wells. This suggests that migration of poor quality water into continental sediments that previously contained freshwater has occurred over geologic time. This finding has implications for brackish and saline water upconing beneath areas of prolonged groundwater pumping in the Sacramento Valley."[46]

Certainly the public has no idea of or ability to comment on the important water quality conditions not presented in the DEIR, which fails the full-disclosure mandate in CEQA. The 10-Wells Project must either be withdrawn or full disclosure must be presented in a recirculated DEIR. (See, e.g., *Laurel Heights Improvement Ass'n v Regents of Univ. of Cal.* (1993) 6 Cal.4th 1112; 14 Cal Code Regs., § 15088.5(a); 40 C.F.R. § 1502.9(c); *California v. Block* (9th Cir. 1982) 690 F.2d 753, 770.)

IV. Species Impacts

Aquatic Species

It is useful that the DEIR acknowledges the demise of four anadromous fish runs in Stony Creek (spring, fall, late-fall, and winter salmon). (pp. 3-43 - 3-44). The acknowledgement serves to illustrate the existing strains on the hydrologic system, both surface and ground, once supported these runs of salmon. We select one tributary mentioned as an example to elucidate many points. Stony Creek is simulated with the 10-Wells Project to have an average depletion of 1.8 cfs and a maximum of 11.6 cfs. The text that follows these figures in the 3.1 Water Resources section, states, "As shown in Table 3-6, the majority of the maximum streamflow depletions occur during or shortly following the drought of water years 1987–1992. During critically dry year types, it is expected that many of the surface streams within the drawdown area would naturally have minimal or no flow (for example, Stony Creek, Little Chico Creek, and Walker Creek). Furthermore, these streams do not substantially contribute supply to the CVP, SWP, or non-project water users." (p. 3-39).

The text is troubling for many reasons.

1) The conclusion that "many of the surface streams within the drawdown area would naturally have minimal or no flow," during critically dry years and therefore the impacts would be "less than significant" avoids serious consideration of the importance of underflow. "The DEIR's evaluation of impacts from stream depletion is also inadequate because it assumes that once a streambed becomes dry continued pumping of groundwater has no effect on surface flow. This

[46] Springhorn, Steven T., el al, May 2013. *Base of Fresh Groundwater in the Sacramento Valley, California*, Geological Society of America Abstracts with Programs. Vol. 45, No. 6, p.51. https://gsa.confex.com/gsa/2013CD/webprogram/Paper219191.html

assumption ignores the role that stream underflow plays on maintaining pools and riparian habitats. The assumption also ignores the fact that the depth to saturated ground water beneath a streambed will impact the volume and duration of flow needed to re-wet the channel at the beginning of the next rainy season. The deeper the depth of ground water, the more aquifer voids there are that need to be re-filled in order for the stream to sustain constant flow. In other words, a greater volume of water for a longer period of time is needed at the beginning of the rainy season to sustain surface flows."[47] (p. 11.)

2) "Furthermore, these streams do not substantially contribute supply to the CVP, SWP, or non-project water users." On what basis is this conclusion made? The DEIR does not say. How much water in the streams is backfilling over used groundwater? How does contributing, substantially or otherwise, "to the CVP, SWP, or non-project water users" constitute the only value from a stream?

3) If the simulations are correct and the "majority of the maximum streamflow depletions occur during or shortly following the drought of water years 1987–1992," how is that not a significant impact when streams may already have minimal or no flows even according to the DEIR? Dewatering streams, be they ephemeral or annual, no matter how low the flow can be essential for fish species. For example, according to research conducted by Dr. Paul Maslin, Mud Creek provides advantageous rearing habitat for out-migrating Chinook salmon (1996). Salmon fry feeding in Mud Creek grew at over twice the rate by length as did fry feeding in the main stem of the Sacramento River. *Id. The Recovery Plan For The Evolutionarily Significant Units Of Sacramento River Winter-Run Chinook Salmon And Central Valley Spring-Run Chinook Salmon And The Distinct Population Segment Of California Central Valley Steelhead* confirms this importance of small areas of refugia for out-migrating salmon in tributaries to the Sacramento River: "Non-natal rearing tributaries to the Sacramento River include freshwater rearing habitat. Some non-natal rearing areas potentially have a high value because they provide critical and improved growing conditions, particularly during high winter flow events on the Sacramento River."[48]

4) The 10-Wells Project will further deplete the hydrology in Glenn County and may also affect the hydrology in surrounding counties, streams, and the Sacramento River. Dewatering of salmon bearing streams that interface with the targeted Lower Tuscan Formation Aquifer would result in physical changes to these streams that may result in significant adverse impacts to biological resources. This effect has been observed in the Cosumnes River, where "[d]eclining fall flows are limiting the ability of the Cosumnes River to support large fall runs of Chinook salmon." This is a river that historically supported a large fall run of Chinook Salmon.[49] Indeed, "[a]n early study by the California Department of Fish and Game . . . estimated that the river could support up to 17,000 returning salmon under suitable flow conditions." (Id.), citing CDFG 1957 & USFWS 1995. But "[o]ver the past 40 years fall runs ranged from 0 to 5,000 fish according to fish counts by the CDFG (USFWS 1995)," and "[i]n recent years, estimated fall runs have consistently been below 600 fish, according to Keith Whitener." (Fleckenstein, et al. 2004). Indeed, "[f]all flows in

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[47] Custis, Kit, 2015. *Comments and Recommendations on Draft Environmental Impact Report for Glenn Colusa Irrigation District's Groundwater Supplemental Supply Project, June 2015* for AquAlliance.
[48] National Marine Fishery Service, 2014.
[49] Fleckenstein, Jan; Anderson, Michael; Fogg, Graham; and Mount, Jeffrey 2004. *Managing Surface Water-Groundwater to Restore Fall Flows in the Cosumnes River*, Journal of Water Resources Planning and management.

the Cosumnes have been so low in recent years that the entire lower river has frequently been completely dry throughout most of the salmon migration period (October to December)." (Id.)

Research indicates that "groundwater overdraft in the basin has converted the [Cosumnes River] to a predominantly losing stream, practically eliminating base flows...." (Id.) And "investigations of stream-aquifer interactions along the lower Cosumnes River suggest that loss of base flow support as a result of groundwater overdraft is at least partly responsible for the decline in fall flows." (Id.) Increased groundwater withdrawals in the Sacramento basin since the 1950s have substantially lowered groundwater levels throughout the county." (Id.) The DEIR fails to consider such broader ecological and hydrological impacts stemming from increased groundwater extraction during already dry and critical years.

5) Lower Stony Creek is designated as critical habitat for spring-run salmon and Central Valley steelhead (p. 3-44), yet the DEIR concludes that because Stony Creek is already impaired, "[p]otential drawdown effects on surface waters of lower Stony Creek are anticipated to have less-than-significant impacts on anadromous salmonids." (p. 3-53) The DEIR's empty conclusion, without any supporting data or analysis, is taken by GCID as a release from even offering a mitigation measure for struggling Stony Creek that is suffering death by a thousand cuts. However, the federal register for critical habitat provides a different view of the needs and potential of Stony Creek.

> "The CHART [Critical Habitat Analytical Review Teams] has evaluated the available information, particularly with regard to Stony Creek (HSA 550410), and concluded that this stream is occupied by both spring run Chinook and steelhead. Juvenile spring run Chinook have been consistently documented using Stony Creek as rearing habitat since 2001 (Corwin and Grant, 2004), as well as in previous years (Maslin and McKinney, 1994). Similarly, juvenile steelhead have been periodically documented rearing in Stony Creek (Corwin and Grant, 2004; Maslin and McKinney, 1994). The CHART also concluded that Stony Creek has PCEs that support both species. Water temperature monitoring from 2001 through 2004 has shown that temperatures in Stony Creek under current operations are generally suitable for adult and juvenile salmonids (below 65 °F) from mid-October through late May. Water temperatures have been found to be suitable for salmonid spawning and incubation (below 56 °F) from mid-November through early May (Corwin and Grant, 2004). Though successful steelhead spawning has not been documented recently in Stony Creek, habitat conditions under current operations are considered marginally suitable to support steelhead reproduction. Because of ongoing restoration actions and ESA section 7 consultations, progress is being made toward improving these habitat conditions, and we expect conditions to continue to improve into the future."[50]

We must be clear: any additional impairment by the 10-Wells Project is adverse modification of critical habitat, yet that is not addressed in the DEIR. Added to this significant lapse is the failure

[50] National Marine Fisheries Service, 2005. *Federal Register /Vol. 70, No. 170 / Friday, September 2, 2005 /Rules and Regulations, Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California.*

of the DEIR to disclose many relevant recovery recommendations[51] for Stony Creek that the 10-Wells Project clearly undermines. Examples include, but are not limited to:

- Improve water temperature conditions in Stony Creek by identifying and implementing projects that would increase stream flows and increase shaded riverine habitat.
- Implement projects to increase floodplain habitat availability in Stony Creek to improve juvenile rearing habitat.
- Monitor and evaluate sportfishing impacts in Stony Creek to ensure that the fishery allows for the recovery of steelhead; modify regulations as necessary. (Id.)

The DEIR assumes an average depletion of 0.5 cfs in Little Chico Creek and a maximum of 3 cfs. (p. 3-53) The DEIR assumes an average depletion of 0.3 cfs in Big Chico Creek and a maximum of 11.6 cfs. (Id.)

Big Chico and Little Chico Creeks are also listed as critical habitat for Central Valley steelhead (Oncorhynchus mykiss) and Central Valley Spring Run Chinook Salmon (Oncorhynchus tshawytscha), although the DEIR fails to point out the salmon critical habitat designation for Little Chico Creek. (pp. 3-48 to 3-49). Again, any additional impairment by the 10-Wells Project is adverse modification of critical habitat, yet that is not addressed in the DEIR. Recovery actions for Big Chico Creek that are undermined by additional strains on streamflow include, but are not limited to:

- Implement projects to increase Big Chico Creek floodplain habitat availability to improve habitat conditions for juvenile rearing
- Increase monitoring and enforcement in Big Chico Creek to ensure that the water quality criteria established in the Central Valley Water Quality Control Plan (Basin Plan) are met for all potential pollutants (SWRCB 2007).

Giant Garter Snake

Section 2-4 presents permits and approvals that are required for the 10-Wells Project. Noticeably absent are requirements for a permit from the California Department of Fish and Wildlife and from the U.S. Fish and Wildlife Service for impacts to the giant garter snake ("GGS"). However, the DEIR acknowledges the potential for construction impacts: "Additionally, the proposed well sites are located within 200 feet of rice fields and canals, both of which provide suitable habitat for giant garter snake (GGS). Though the construction sites do not directly provide suitable habitat for GGS, nor do the sites contain suitable winter hibernacula for the species, it is possible that, due to their close proximity to suitable habitat at all well locations, GGS could be present within the project construction areas during construction. Though the likelihood of impacts on GGS are low, any impact on GGS would be significant. Implementation of avoidance measures listed in MM BIO-4 would eliminate impacts to GGS." (DEIR p. 3-52)

[51] National Marine Fisheries Service, 2014. *Recovery Plan For The Evolutionarily Significant Units Of Sacramento River Winter-Run Chinook Salmon And Central Valley Spring-Run Chinook Salmon And The Distinct Population Segment Of California Central Valley Steelhead.*

It may be a good first step to prepare for "avoidance measures," but that does not eliminate the requirements under the California and federal Endangered Species Acts. The presence of wetlands in the Project area will require a permit from the U.S. Army Corps of Engineers (DEIR p. 3-50) that will lead to consultation with the U.S. Fish and Wildlife Service. GCID must also apply to the California Department of Fish and Wildlife for an incidental take permit.

Substantively regarding GGS, there is developing research that GGS may spend a great deal of time underground during the active season. "As for the probability of being in a terrestrial environment, much individual variation existed in the probability of being underground (logit-normal SD for individual-specific random intercept = 1.85 [1.63–2.12]). Predicting whether a given individual will be on the surface or underground is therefore fraught with uncertainty, despite high posterior precision of estimates of the behavior of an average Giant Gartersnake (Figs. 4 and 5)."[52]

This significant research must be considered if the 10-Wells Project moves forward. The DEIR also fails to acknowledge that there may be operational impacts to GGS. This must be developed and, if the Project goes forward, recirculated in a revised DEIR.

Additional Comments

The reader is referred to Figures 3.3 and 3.6 to view the potential drawdown effects on Stony Creek (DEIR p. 3-53) with Tehama-Colusa Canal mentioned as a reference point, however, it is not on either Figure.

As mentioned previously, the two-year and six-year scenarios leave out serious periods of drought or dry conditions, such as 2007-2010 and 2012-2015, a four-year drought that has been declared an emergency by Governor Brown multiple times. This is a serious omission undermining the description of baseline environmental conditions, analysis of supplies and demands associated with foreseeable project production, and exacerbated impacts of the project itself, that must be corrected in a recirculated DEIR.

Tables 3.1 and 3.6 are incapable of presenting data with which to simulate streamflow depletion because, as stated in the DEIR, there are "limitations of the available gaging data." (pp. 3-6 and 3-39). In an effort to locate existing data, AquAlliance checked the Big Chico Creek Near Chico (BIC) gage on July 24, 2015 and there is insufficient flow to even register a reading at this time.[53] In addition, the USGS no longer maintains a gage on Big Chico Creek.[54] Regarding Little Chico Creek estimated flows, Table 3-1 indicates that the period of record for DWR gage A04270 Taffee Road near Chico, CA was 1991-2002 and that gage A04280 Near Chico, CA was from 1975-1996 and that, "Data for this gage were downloaded in 2011; the data are no longer available from

[52] Halstead, Brian J., Shannon M. Skalos, Glenn D. Wylie, and Michael L. Casazza. 2015. Terrestrial ecology of semi-aquatic giant gartersnakes (Thamnophis gigas). Herpetological Conservation and Biology. In Press, PP. 10-11.

[53] California Department of Water Resources , California Data Exchange Center. http://cdec.water.ca.gov/cgi-progs/queryF?BIC&d=24-Jul-2015+13:37. "BRT" signifies discharge at stage below available rating table.

[54] https://water.usgs.gov/nsip/

original data source: DWR, 2015a," (footnote "e" p. 3-6). Stony Creek's flows are also based on distant years and 1955 -1990 and 1941-1973 (p. 3-6). It is impossible for the public to have any confidence in modeling results that are using such antiquated input data. The DEIR relies on only modeling to consider impacts from the Project when it must compile and present results from actual monitoring and reporting prior to recirculating a revised DEIR.

Shallow Groundwater Monitoring Framework

A comprehensive monitoring program was proposed in the mid-2000s and is still absolutely necessary. The Sacramento Valley Integrated Water Management Plan lead to a draft Framework for Sacramento Valley regional water resource monitoring that would also benefit shallow domestic-well owners. Starting on page five, it reads: "Habitat Monitoring; The long-term health of riparian vegetation, wetland species, and a number of other native habitat are commonly associated with maintaining a minimum range of groundwater levels and an appropriate level of interaction between surface water and groundwater resources. The lowering of groundwater levels due to the interception of groundwater underflow to surface water systems due to the increased groundwater extraction associated with conjunctive water management programs, have the potential to impact the native habitat areas," and that, "In order to identify potential habitat impacts associated with implementation of conjunctive water management alternatives, a program-specific network of shallow monitor monitoring wells should be developed to detect changes in water levels over the shallowest portion of the aquifer. The groundwater monitoring network should contain shallow monitoring wells that will record changes to the water table elevation in the vicinity of these sensitive habitat areas."[55] The Framework has many other valuable suggestions that were protective of the region's residents and environment. Unfortunately, the Framework was shelved, and the shallow monitoring network never got off the ground.

This Framework could have been operation for over seven years and it should definitely be in place prior to the 10-Wells Project and continue in perpetuity. It should also be presented in a recirculated Draft EIR as a viable mitigation measure, or project alternative

V. Climate Change

Once SB 97 was approved in California in 2007, analysis of greenhouse gas emissions became a part of the CEQA process[56] and that is reflected in the DEIR from an air quality and air pollution perspective. Unfortunately, the DEIR fails to discuss Climate Change, the result of greenhouse gas emissions and its impacts on the hydrology of the region or the Sacramento River watershed upon which GCID's river and stream water claims depend. This obvious omission is at the heart of the 10-Wells Project that claims the need for more water in a district with an exorbitant claim to water - 825,000 af per year.

The gross omission of any climate change analysis in the DEIR fails to accurately describe the existing climatological conditions into which the project may be approved, fails to accurately describe the diminution of water and natural resources over recent and future years as a result of

[55] McManus, Dan et al, 2007. *Sacramento Valley Water Resource Monitoring, Data Collection and Evaluation Framework*

[56] http://opr.ca.gov/docs/SB_97_bill_20070824_chaptered.pdf

climate change, fails to integrate these changing circumstances into any future baseline or cumulative conditions, and fails to completely analyze or support the DEIR conclusions regarding the project's potentially significant impacts. See, AquAlliance, comments on LTWT EIS/EIR, pp. 30, 40-45.

Both climate change and the 10-Wells Project have the potential to degrade the hydrology of the counties within GCID's district, surrounding counties, and flows in the Sacramento River. This must be remedied in a recirculated DEIR

VI. The EIR fails to analyze a reasonable range of alternatives.

As discussed in Sections I and II above, the DEIR fails to explain what is driving the suggested demand for more water, which leads to a failure to produce viable alternatives. The 10-Wells Project is being sold as an essential need for GCID without providing the context of the Sacramento Valley Water Management Agreement, climate change, demand from outside the Sacramento Valley, and GCID's regular participation in the water market. Additionally, there is no discussion of the Water Fix's premise (formerly the Bay Delta Conservation Plan) that Delta exports through the Twin Tunnels will not only increase in the wetter years, but they will also rise in drier years from water transfers.

The "no project alternative" itself does not constitutes a reasonable range of alternatives.

CEQA requires public agencies to identify in an EIR feasible alternatives that could avoid or substantially lessen a project's significant environmental effects. (Pub. Res. Code §§ 21002, 21002.1(a), 21100(b)(4), 21150.) CEQA's procedures require that an EIR must present a "reasonable range" of alternatives to the project that "foster meaningful public participation and informed decisionmaking." (Guidelines, § 15126.6(f), Guidelines, § 15126.6(a) citing *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553 (*Goleta Valley II*), and *Laurel Heights I, supra,* 47 Cal.3d 376.)

However, this does not mean that the "rule of reason" allows the lead agency to concoct an arbitrary assemblage of "alternatives" selected to make the agency's preferred project a foregone conclusion. The "rule of reason" requires that the action alternatives selected for substantive discussion in an EIR must satisfy specific, objective criteria that would allow the decision makers a reasoned choice. For example, each alternative must be capable of "feasibly attain[ing] most of the basic objectives of the Project." (Guidelines, § 15126.6(a), (f).) The Guidelines provide that,

> The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination.

(Guidelines, § 15126.6(c) [emphasis added.) Hence, alternatives rejected as infeasible are not considered to be among the reasonable range of alternatives required to be considered. Nor can it

be said that the no project alternative can be among the reasonable range of alternatives considered, as it is required to be evaluated regardless of whether it feasibly meets most of the project objectives, which it normally won't. Accordingly, an EIR that limits its substantive discussion to alternatives that the agency has already has determined are not feasible or will not attain the basic objectives of the project, fails to present a "reasonable range" of alternatives that fosters meaningful public participation or informed decisionmaking. (*Id.*)

Here, the DEIR has failed to satisfy CEQA's legal requirement to analyze a reasonable range of alternatives that would reduce or avoid the Project's significant impacts. Rather than evaluate the environmental benefits of any alternatives at all, the DEIR instead rejects out of hand a proper evaluation of any alternative mentioned in the EIR, discussing the environmental impacts of only the no project alternative and the proposed project alternative.

In addition, the DEIR eliminates from discussion alternatives that would not yield 28,500 ac-ft of water per year, but nothing in the project objectives indicates whether or why 28,500 ac-ft per year is a necessary project component. (DEIR 5-3.) Alternatives should only be eliminated if infeasible or do not meet most project objectives.

The DEIR fails to meaningfully evaluate the no project alternative.

The DEIR's discussion of the no project alternative is internally contradictory. On one hand, the DEIR states that, under the no project alternative, "[t]he five existing wells would be used as needed under GCID's discretion," such that "[a]s water shortages occur, GCID anticipates that groundwater pumping would increase both within the District's service area and in adjacent areas to meet future water demands." (DEIR 5-1.) On the other, the DEIR states that "[u]nder the No Project Alternative, GCID would not use its existing wells as part of a coordinated pumping program . . . to supplement water supplies to offset critical water year reductions." (DEIR 5-2.) In conjunction, this description renders the no project evaluation impossible to discern.

More troubling, the DEIR states that, under the no project alternative, the same project would still be built: "Under the No Project Alternative it is assumed that GCID would construct new wells on an as-needed basis for specific District use and that the existing wells included as part of the proposed project would be fully used as needed during years of shortages, once appropriate environmental analysis has been conducted." (DEIR 5-1.) Again, the DEIR's assessment that, under the no project alternative, the district's existing and proposed wells both would, and would not, be used, fails to support CEQA's fundamental purpose of informed environmental decision-making. The DEIR must evaluate the environmental consequences "as what would be reasonably expected to occur in the foreseeable future if the project were not approved." (Guidelines, § 15126.6(e)(2).) While the Guidelines do provide that, "If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, this "no project" consequence should be discussed," here, the DEIR does not suggest that substantially the same project would be proposed "by others," as the Guidelines allow for, but rather, the DEIR simply suggests that GCID itself would go forward with the same project. This does not comply with CEQA.

In fact, through the no project alternative, the district could defend existing water rights in a way that would satisfy all of the project objectives. Recently past and current water management and

allocation decisions by state and federal water project operators and managers have reverberated through the past four year's dire supply conditions.[57] These decisions are not just artifacts of current natural conditions. Not only could the CVP and SWP been managed better in the recent past, but the sellers, like GCID, who are also the holders of very senior water claims, could have fought for themselves, their regions, and the environment in which they live, do business, and recreate. How could they do this, one might ask, and how would it apply to the 10-Wells Project?

This could meet three of the Project's objectives. If the objective is to increase reliability and flexibility for GCID and not, as we wonder in Section I above, the system that facilitates the expansion of the water market, protecting the senior claims to water would meet this objective. It would also provide more flexibility to, "Periodically reduce Sacramento River diversions to benefit migrating fish," and "Protect and maintain agricultural production in times of water shortage to minimize economic disruption." By virtue of its senior water claims, in 2015 alone GCID has proposed to sell 55,283 af to SLDMWA south of the Delta and 15,269 af to TCCA north of the Delta.

While it wouldn't "Offset reductions in GCID Settlement Contract allotments during the irrigation season in drought years," the DEIR acknowledges that this has been extremely rare.

In addition, the DEIR's discussion of biological impacts under the no project alternative contains no explanation of how impacts would be reduced at all, simply stating, in its entirety: "Under the No Project Alternative, GCID would continue to implement its current water management program. Resulting effects on biological resources would be similar to what is presently occurring within GCID's service area." (DEIR 5-2.) This fails to provide any "compar[ison of] the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved," as CEQA requires. (Guidelines, § 15126.6(e)(3)(B).)

<u>The EIR should evaluate an alternative that reduces or eliminates water transfers.</u>

As discussed above, GCID admits it desires to forego groundwater substitution water transfers as part of the LTWT Program, instead selling water through crop idling under the LTWT, and pumping a roughly equivalent amount of groundwater through this project as it originally proposed to use for groundwater substitution under the LTWT. Further, this DEIR proposes that groundwater pumping for this project will only occur during dry and critical years to help offset diminished supplies during those times. And, the LTWT similarly asserts that transfers will only occur during dry and critical years, to help offset diminished supplies during those times; where GCID plans to act as a willing seller of water claims, via crop idling, under the LTWT.

Considering these inextricably interconnected programs in tandem, then, a reasonable alternative to the proposed project would be to not participate in cropland idling and water transfers during

[57] California Sportfishing Protection Alliance, February 2014. Presentation to the State Water Resources Control Board. "In water year 2011, the Department of Interior used only 348.8 TAF of the 800 TAF of CVPI § 3406(b)(2) water. 'Interior decided to not bank the unused (b)(2) water from water year 2011.' In water year 2013, DWR exported more than 826,000 acre-feet of water beyond what it had informed its contractors it could deliver."

dry and critical years. Indeed, the DEIR itself provides strong reasoning for why this should be considered to be a potentially feasible alternative that would reduce or avoid significant environmental impacts. The DEIR, for example, rejects a potential alternative to *increase* crop idling as infeasible, stating that,

> Idling would counter the goals and objectives of the proposed project. Cropland idling would neither increase system reliability nor protect agriculture, and it has the potential to result in significant adverse impacts on land use, water quality, air quality, and wildlife.

(DEIR 5-4.) Because cropland idling is assuredly contrary to the proposed project's goals and objectives, and results in greater environmental impacts, an alternative to not voluntarily participate in the LTWT cropland idling program is, logically, wholly consistent with the proposed project's goals and objectives, and would lessen significant environmental impacts.

Accepting Shortages

When GCID experienced water cutbacks in the past, the entire State of California was also impacted by the multiple year dry conditions. This couldn't be more true in the current drought of 2012-2015. In the past, GCID and other districts in the Sacramento Valley lived within the means of less than 100% supply when times were hard. After all, fallowed fields can be replanted and shared sacrifice by hydrologic region benefits the whole.

VII. Growth Inducing Impacts

This Project has the potential to cause numerous growth-inducing impacts. Section 21100(b)(5) of CEQA requires that an EIR discuss the growth-inducing impacts of a proposed project. A project could have a growth inducing impact if it could:

- Foster economic or population growth, or construction of additional housing;
- Remove obstacles to population growth, for example, developing service areas in previously unserved areas, extending transportation routes into previously undeveloped areas, and establishing major new employment opportunities;
- Encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively.

The CEQA Guidelines, for example, provide an illustration of how a major expansion of a wastewater treatment plant that might remove wastewater treatment capacity as a constraint on growth in its service area. (CEQA Guidelines, § 15126.2(d).) The DEIR argues, contrary to the CEQA Guidelines, that "Except where supply limitations have been specifically identified as an impediment to development approvals, water supply reliability alone is not the determinative factor inducing growth in any region of California." (DEIR 4-1.) Nothing, however, in the Guidelines or statute suggest that a growth inducing impact is limited to "the determinative factor inducing growth," as if such a factor could ever even be objectively isolated. On the contrary, the removal of any growth limiting factor should be seen as inducing growth.

The DEIR concludes its analysis of growth inducing impacts by stating, "it is not expected that new agricultural opportunities would be of a significant magnitude to drive economic growth resulting in the demand for new housing above that anticipated by Glenn County's or Colusa County's general plans. Therefore, growth inducement is not expected as a result implementing the proposed project." (DEIR 4-1.) Not only does the DEIR not explain what "new agricultural opportunities" would occur, or what would actually constitute a "significant magnitude," but the DEIR also again relies on a false standard of significance by claiming that any such growth would not be meaningful if it was less than that contemplated by the Counties' general plans. (See, *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles* (2000) 83 Cal.App.4th 1252, 1265 (growth inducement must be discussed even where consistent with general plan.) CEQA nonetheless requires this EIR to incorporate the discussion from any general plan and/or general plan EIR that describes the growth this project would induce. (*Friends of the Eel River v. Sonoma County Water Agency* (2003) 108 Cal.App4th 859, 877; *Sierra Club v. West Side Irrig. Dist.* (2005) 128 Cal.App4th 690. It is unlikely these wells or their water supply capacity were evaluated by the respective general plan EIRs. Moreover, and perhaps most importantly, the DEIR only seems to contemplate here the arbitrary pumping levels proposed in the project description, not the actual capacity of these pumps on an annual basis. It is precisely this development of additional capacity, not analyzed by this DEIR, that serves to induce growth.

The Bureau, DWR, the SWRCB, and the Settlement Contractors have all participated in the creation and implementation of the SVWMA that extracts water from areas of origin north of the Delta for export. This opening up of supply on a finite water supply, has only fueled additional demand, which again fuels pursuit of more supply. This is the essence of the dog chasing its tail. As demonstrated above and below, installing wells has been a pivotal piece of the SVWMA and the SVIRWM. This is the essence of growth inducement: creating more capacity. The 10-Wells Project is producing the amount of water needed by a city of over 100,000 people.

Added to this is what we discussed previously: Table 3-4 illustrates that the pumping capacities of the existing wells are far greater than the projected 2,500 gpm rate planned in the Project. (DEIR p. 3-15.) Additionally, the DEIR uses loose language to define the capacities of the new wells: "Each well would have a target pumping capacity of 2,500 gallons per minute and would require a 100- to 250-horsepower pump motor." (p. 2-3.) Having existing infrastructure with greater capacity than proposed in the Project, installing new infrastructure with higher capacity than the proposed Project, and retaining the ability to use that infrastructure for longer periods of time, from the proposed 8.5 months to 12 months, provides GCID with pre-approved and pre-installed infrastructure for future demand.

VIII. Cumulative Impacts

CEQA requires evaluation of a project's incremental effects "viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects." (CEQA Guidelines § 15065(a)(3).) "[A] cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines § 15065(a)(3).)

An EIR must also discuss significant cumulative impacts. CEQA Guidelines §15130(a). Cumulative impacts are defined as two or more individual effects which, when considered

together, are considerable or which compound or increase other environmental impacts. CEQA Guidelines § 15355(a). "[I]ndividual effects may be changes resulting from a single project or a number of separate projects. CEQA Guidelines § 15355(a). A legally adequate cumulative impacts analysis views a particular project over time and in conjunction with other related past, present, and reasonably foreseeable future projects whose impacts might compound or interrelate with those of the project at hand. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. CEQA Guidelines § 15355(b). The cumulative impacts concept recognizes that "[t]he full environmental impact of a proposed . . . action cannot be gauged in a vacuum." *Whitman v. Board of Supervisors* (1979) 88 Cal. App. 3d 397, 408 (internal quotation omitted).

Following these standards, the DEIR must evaluate the cumulative impacts to water resources caused by the project in conjunction with the closely-related projects, below.

The Sacramento Valley Water Management Agreement

The DEIR omits discussion of the SVWMA. The close connection of the 10-Wells Project to the SVWMA is laid bare through documents associated with the [Sacramento Valley] Integrated Regional Water Management Program ("SVIRWMP"), which is discussed briefly. (DEIR p. 3-76.) The DEIR's Section 3.8.2.3 highlights the following districts that benefitted from funds garnered through the SVIRWMP: Browns Valley Irrigation District, Anderson-Cottonwood Irrigation District, Feather Water District, GCID, Natomas Central Mutual Water Company, Sutter Mutual Water Company, Meridian Farms Mutual Water Company, Pelger Mutual Water Company, Reclamation District 108, River Garden Farms Company, and Butte Water District. Moreover, the DEIR discloses that public money through Proposition 50 has been used for 11 implementation projects in the Sacramento Valley. However, the details of the projects are not disclosed. Instead, the DEIR asserts that, "Although several of the projects funded by this grant are generally similar in nature, each project has independent utility, and is implemented by each grantee as needed to supplement their current surface water supplies in various water-year types." Nevertheless, the SVWMA and the Sacramento Valley Regional Water Management Plan's documents unveil a very different picture.

In 2003, the Bureau published an NOI/NOP for a "Short-term Sacramento Valley Water Management Program EIS/EIR." (68 Federal Register 46218 (Aug 5, 2003).) As summarized on the Bureau's current website:

> The Short-term phase of the SVWM Program resolves water quality and water rights issues arising from the need to meet the flow-related water quality objectives of the 1995 Bay-Delta Water Quality Control Plan and the State Water Resources Control Board's Phase 8 Water Rights Hearing process, and would promote better water management in the Sacramento Valley and develop additional water supplies through a cooperative water management partnership. Program participants include Reclamation, DWR, Northern California Water Association, San Luis & Delta-Mendota Water Authority, some Sacramento Valley water users, and Central Valley Project and State Water Project contractors. SVWM Program actions would be locally-proposed projects and actions that include the development of groundwater to substitute for surface water supplies, conjunctive use of groundwater and surface water, refurbish existing groundwater

> extraction wells, install groundwater monitoring stations, install new groundwater extraction wells, reservoir re-operation, system improvements such as canal lining, tailwater recovery, and improved operations, or surface and groundwater planning studies. These short-term projects and actions would be implemented for a period of 10 years in areas of Shasta, Butte, Sutter, Glenn, Tehama, Colusa, Sacramento, Placer, and Yolo counties.[58]

The resounding parallels between the SVWMA NOI/NOP and the presently proposed project are not merely coincidence: they are a piece of the same program, and are closely-related activities that will result in similar effects upon the same environmental resources.

Page 2 of the SVIRWMP's *Proposal for Implementation Grant, Step 2 Attachment 5, Work Plan*[59] presents the centerpiece project, the Conjunctive Water Management Project. "A successful Conjunctive Water Management Project within the Sacramento Valley requires three critical activities that must proceed in unison. These include (1) groundwater production, (2) groundwater recharge, and (3) monitoring and assessment." What follows are the participating districts with the number of productions wells they sought:

- Anderson Cottonwood Irrigation District Groundwater Production Element 4 wells
- Browns Valley Irrigation District Water Groundwater Production Element 1 well
- Feather Water District Water Management Groundwater Production Element 1 well
- Glenn-Colusa Irrigation District Groundwater Production Element 8 wells
- Lewis Ranch Groundwater Production Element 1 well
- River Garden Farms Groundwater Production Element 2 wells
- Meridian Farms Groundwater Production Element 1 well
- Pelger Mutual Water Company Groundwater Production Element 1 well
- RD 108 Groundwater Production Element 5 wells

How are these districts' projects, including the Lead Agency GCID's, viewed as "generally similar in nature," but with "independent utility" when they are pursuing the specific goals of the SVWMA and the SVIRWMP? And let us be clear, those goals are *not* just for "supplemental supply" within their districts as suggested. The SVIRWMP elucidates that, "These elements were strategically formulated under the adopted Sacramento Valley Water Management Agreement (SVWMA, Phase 8, included in Attachment 4), which was executed in December 2002 by more than 40 Sacramento Valley water users, the Department of Water Resources, the Department of Fish and Game, the Bureau of Reclamation, the Fish and Wildlife Service, and various water users throughout the state. **Fifty percent of the Conjunctive Water Management Project capacity will be dedicated to meeting water quality standards in the Bay-Delta while the remaining 50 percent will be used to improve local and regional water supply reliability or to help meet other water needs in the state**." [emphasis added] [60]

The DEIR also fails to disclose how many of the SVWMA districts and/or the SVIRWMP Participating Entities have installed wells that have been used in water transfers and how many are

[58] http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=788
[59] Northern California Joint Exercises of Powers, June 2006.
[60] Id. p.2.

committed to participate in the 10-Year Water Transfer Program (aka Long-term Water Transfers)[61] or continuing transfers outside it.[62] In addition, where is the disclosure that the production wells above, added to others installed by SVWMA districts and SVIRWMP Participating Entities, have been used to facilitate the goals from the SVIRWMP quote immediately above?

The 10-Wells Project that is presented as a seemingly innocuous attempt to "augment District surface water supplies during dry and critically dry water years" (DEIR p. 2-1) is part of a much larger agreement and multiple planning efforts. GCID's past and current actions make it abundantly clear that the stated 10-Wells Project is just another attempt to obfuscate its involvement in implementing the SVWMA through massive public funds from SVIRWM grants and federal appropriations (see Section I).

The 10-Year Water Transfer Program (aka Long-Term Water Transfers)

The DEIR mentions the 10-Year Water Transfer Program ("10-Year Program") in section 3.8.2.1. It does *not* reveal that the 10-Year Program contains significant numeric figures that should be incorporated into the cumulative impact analysis, such as:

1. The EIS/EIR analyzed transferring up to 600,000 af per year from the selling districts. No matter what figure the Bureau transfers year-to-year, this program has the ability to transfer up to 600,000 af each year.
2. GCID may have provided internal direction to itself, subject to change, that counter numbers in the 10-Year Program's EIS/EIR (DEIR p. 3-76), but the 10-Year Program's Final EIS/EIR retained the original number and will allow the sale of up to 91,000 af per year from GCID in any given year. (p. ES-6 and p. 2-14.) A vote by the GCID Board of Directors is all it would take to reverse the internal commitment, a non-binding statement, and begin selling water at the 91,000 af per year threshold.

Annual Transfers

The DEIR fails to delineate the numerous transfers that have occurred in the recent past and those that are proposed outside the 10-Year Water Transfer Program. What should the public conclude from this glaring omission? GCID's failure to disclose their own repeated transfers and those from the region and Sacramento Valley is arbitrary and capricious.

The DEIR should disclose what level of monitoring has occurred during the past annual transfers. If monitoring transpired, was there comprehensive coordination of methods, data collection, and data analysis for both individual and all Sacramento Valley water transfers and are the products available to the public? This might shed light on the results of cumulative actions by numerous water sellers in the Sacramento Valley, including the lead agency, GCID. This material is not presented here nor is it in the public realm, to our knowledge.

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[61] U.S. Bureau of Reclamation and San Luis Delta Mendota Water Authority, 2015. Final EIS/EIR 10-Year Water Transfer Program (aka Long Term Water Transfers) p. ES-12. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=18361

[62] Id. p. 4-5.

As discussed above, the cumulative installation of well infrastructure, the repeated annual water transfers, participation in the 10-Year Water Transfer Program, and the increasing escalation of groundwater use by Sacramento Valley water districts involved in water sales do not exist in a vacuum. Instead, they are actually integrated, important parts of a broader program to develop regional surface and ground water resources into a conjunctive use system. GCID has planned for multiple decades to exploit groundwater, to "… integrate the Lower Tuscan Formation into the Central Valley water supply system…" and bank "…SWP and CVP contractual entitlements in the Lower Tuscan Formation…"[63]

The Project is also only one of several proposed and existing projects that affect the regional aquifers and surface waters. The existence of these numerous related projects makes an adequate analysis of cumulative impacts especially important.

IX. Additional Comments and Questions

Modeling

SacFEM has serious flaws yet is relied on exclusively for projections and impact analysis. Material produced for AquAlliance's comments on the 10-Year Water Transfer Program's EIS/EIR are equally relevant for the 10-Wells Project and is presented here. "One example of incorrect modeling assertions in the EIR/EIS is the characterization[1] of SacFEM2013 and its parent code MicroFEM as 'three-dimensional' and 'high-resolution'. In fact, the SacFEM2013 model provides only a linked set of two-dimensional analyses[2], and would more charitably be described as "two-and-a-half dimensional" instead of possessing a fully-3D modeling capability. This limitation is not an unimportant detail, as a general-purpose 3D groundwater model could be used to predict many important physical responses, e.g., the location of the phreatic surface within an unconfined aquifer. For the SacFEM2013 model, this prediction is part of the data instead of part of the computed solution, and hence SacFEM2013 apparently has no predictive capability for this all-important aquifer response."[64]

The relevant content from the *SACFEM2013: Sacramento Valley Finite Element Groundwater Flow Model User's Manual*[65] on this topic illustrates that the model is indeed being touted as having the capacity "[t]o generate a 3D surface defining the elevation of the base of fresh groundwater." (p. 3-5.) In addition, the DEIR states that, "SACFEM2013 was developed using the MicroFEM modeling code (MicroFEM, 2015), which is capable of simulating three-dimensional, transient, single-density groundwater flow in layered systems." (p. A-1.) Sadly, it is clear that the DEIR is relying on the very limited predictive capability of SacFEM for many of the most crucial conclusions for disclosing the significance of impacts from the 10-Wells Project.

This thin veneer is no substitute for actual, on the ground data from GCID's groundwater substitution transfers using the five existing wells. For example, "GCID pumped groundwater from July to September 2013 to make water available for transfer to the San Luis & Delta

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[63] U.S. Bureau of Reclamation Assistance Agreement, 2006, p. 5.
[64] Mish, Kyran D., 2014. Comments for AquAlliance on Long-Term Water Transfers Draft EIR/EIS, p. 3.
[65] "A complete description of the construction and calibration of SACFEM2013 is provided in SACFEM2013: *Sacramento Valley Finite Element Groundwater Flow Model User's Manual* (CH2M HILL and MBK Engineers, Inc., 2015)." (DEIR p. A-1.)

Mendota Water Authority (SLDMWA). Groundwater was pumped in lieu of diverting surface water under its pre-1914 water right and its Settlement Contract No. 14-06-200-855A-R-1 with the United States Bureau of Reclamation (USBR)."[66] The results of the groundwater substitution transfer are poorly discussed in the report, regularly using vague numeric approximations such as "recovered to within a few feet" and "generally recovered." However the exhibits highlight the serious effects from pumping 5,000 af in 2013. When Figure D-7 is contrasted with Figure D-8, it is clear that impacts were occurring as far as 3-4 miles away across the Sacramento River in Butte County were still drawing water to the cone of depression six months later. The hydrograph figures illustrate some conditions that are not in the text and contradict some of the report, such as:

- Figure C- 2. Production well GCID 2 experienced a precipitous collapse of 240 feet at the end of the transfer period, but appears to have almost recovered in March 2014.
- Figure C-10 Monitoring well 21N02W04G002M dropped over 50 feet at the end of the transfer period and in March 2014 was still approximately 13 feet below the March 2013 starting measurement.
- Figure C-13. Monitoring well 22N02W01N001M dropped over 90 feet at the end of the transfer period and in March 2014 was still approximately 10 feet below the March 2013 starting measurement.
- Figure C-14. Monitoring well 22N02W15C002M dropped over 50 feet at the end of the transfer period and in March 2014 was still approximately15 feet below the March 2013 starting measurement.

Actual data with additional, unbiased professional analysis would have better informed the public than what is provided with the DIEIR's reliance on modeling. "MicroFEM is a poor choice for such large-scale modeling. It is an old code that apparently utilizes only the simplest (and least accurate) techniques for finite-element modeling of aquifer mechanics, and MicroFEM (and hence SacFEM2013) embed serious limitations into the model that compromise the accuracy of the computed results." [67]

Maps must be provided to illustrate all wells in an expanded radius of the Project's wells

There is a profound gap in understanding regarding the potential areas of impact from GCID's existing and proposed 10 wells. (See CEQA Guidelines § 15124(a).) There also are no maps in the DEIR that indicate the number of domestic and production wells even in the area of impact assumed by SacFEM. We argue that maps with this information must be provided in a recirculated Draft EIR and that the radius of potential impact must be expanded. Drawing from the scientific analysis completed by professors Todd Greene and Karin Hoover,[68] we find that, "The importance of this new information on the hydrostratigraphy around the GCID wells is that the generally symmetrical pattern of drawdown that resulted from the SACFEM2013 modeling effort may not reflect the predominance of coarser-grained, water-rich zones on the east side of the wells. The results of the SACFEM2013 model show that the total area of the pumping impacts and the outer distance to the no-impact boundary is greater to the west in Glenn County, than east in Butte

[66] West Yost Associates, 2014. *2013 Final Water Transfer Report* for Glenn Colusa Irrigation District, p. 1.
[67] Mish, Kyran D., 2014. Comments for AquAlliance on Long-Term Water Transfers Draft EIR/EIS, p. 4.
[68] Greene, Todd J. and Karin Hoover, 2015. *Hydrostratigraphy and Pump-test Analysis of the Lower Tuscan/Tehama Aquifer, Northern Sacramento Valley, CA.*

County. In fact, no wells in Butte or Tehama counties are proposed for monitoring in mitigation measures WR-1 and WR-2, and obviously are not included in the Glenn County BMO monitoring program. This lack of monitoring in Butte County, when that area may be a major source of the water pumped by GCID's wells, may allow for impacts that are inadequately recognized and thus improperly mitigated."[69]

Seismicity

The DEIR fails to discuss in any way the possible seismic risks from the 10-Wells Project. Not only does the construction of five new wells suggest a potential for seismic impacts, but there is also potential for seismic shaking because of subsidence from Project operations that in turn may cause additional stress to existing structures. Lack of disclosure in the DEIR necessarily leads to an absence of analysis of the potential effects from the Projects' construction and excessive groundwater pumping on the numerous known earthquake faults running through and about Northern California. As recently detailed in a paper published by a well-respected British scientific journal, "[u]plift and seismicity driven by groundwater depletion in central California," excessive pumping of groundwater from the Central Valley might be affecting the frequency of earthquakes along the San Andreas Fault, and raising the elevation of local mountain belts. The research posits that removal of groundwater lessens the weight and pressure on the Earth's upper crust, which allows the crust to move upward, releasing pressure on faults, and rendering them closure to failure. The 10-Wells Project and the cumulative water transfer projects impact the volume of groundwater extracted as farmers are able to pump and then forego surface water in exchange for money. The drought has exacerbated the demands from the water transfer market that is the major goal of the SVWMA, which is being implemented through the SVIRWMP and the 10-Year Water Transfer Program and has also depleted the natural regeneration of groundwater supply due to the scarcity of precipitation.

Detailed analyses of this seismicity and focal mechanisms indicate that active geologic structures include blind thrust and reverse faults and associated folds (e.g., Dunnigan Hills) within the Coast Ranges-Sierran Block ("CRSB") boundary zone on the western margin of the Sacramento Valley, the Willows and Corning faults in the valley interior, and reactivated portions of the Foothill fault system. Other possibly seismogenic faults include the Chico monocline fault in the Sierran foothills and the Paskenta, Elder Creek and Cold Fork faults on the northwestern margin of the Sacramento Valley.[70]

This deficiency must be corrected and included in a recirculated Draft EIR.

X. Conclusion

GCID's examination of the proposed Project fails to comply with the most essential review and disclosure requirements of CEQA, thereby depriving decision makers and the public of the ability to consider the relevant environmental issues in any meaningful way (details above). Rather,

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[69] Custis, Kit, 2015. Comments and Recommendations on Draft Environmental Impact Report for Glenn Colusa Irrigation District's Groundwater Supplemental Supply Project, June 2015 for AquAlliance, p. 5.

[70] http://archives.datapages.com/data/pacific/data/088/088001/5_ps0880005.htm (Custis, Exhibit A 10-Year Water Transfer Program)

GCID has neglected to disclose significant information regarding the 10-Wells Project and cumulative impacts in violation of CEQA in what appears to be an ongoing effort to avoid disclosure of GCID's commitments to the SVWMA and implementation through the SVIRWM and the 10-Year Water Transfer Program. AquAlliance has demonstrated in 2010,[71] 2012,[72] 2013,[73] 2014,[74] and in 2015 that key questions have not been addressed, significant data gaps exist and the possible and very probable impacts are not disclosed, but summarily rejected without data and a scientific basis for the conclusions.

For the majority of the twentieth century, northern California supported family farming, healthy salmon runs, rich hydrologic watersheds, and a diverse environmental heritage. GCID members share in this heritage. We hope that GCID will not only recall the heritage of which it is a part, but actively participate in efforts to defend and restore the health of this region and its water legacy for future generations. That legacy continues to be in the crosshairs of water policies that have repeatedly failed in the San Fernando, Owens, and San Joaquin valleys of California. For all of the above-mentioned reasons, the 10-Wells Project should either be withdrawn or the DEIR should be withdrawn, revised, and recirculated after the release of the long-missing SVWMA programmatic EIR.

AquAlliance respectfully requests notification of any meetings that address this proposed GCID Project or any other GCID project that requires any consideration of CEQA. Please send AquAlliance any additional documents that pertain to this project, including a possible notice of determination through the U.S. Postal Service and e-mail.

Sincerely,

B. Vlamis

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[71] AquAlliance comments on the 2010/2011 Water Transfer Program's EA/FONSI
[72] AquAlliance's comments on water transfers by Western Canal WD and Butte Water District, 2012.
[73] AquAlliance's scoping comments on the Bureau and SLDMWA's North-to-South Water Transfer Program, 2013.
[74] AquAlliance comments on the 2014 Bureau and SLDMWA's North-to-South Water Transfer Program and the SLDMWA's 10-Year Water Transfer Program EIS/EIR.

July 29, 2015

To: Barbara Vlamis
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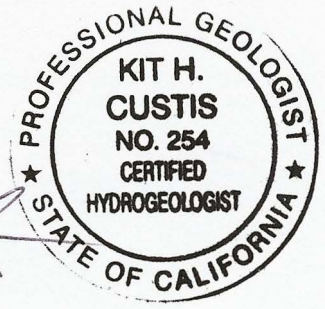

From: Kit H. Custis
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RE: Comments and Recommendations on Draft Environmental Impact Report for Glenn Colusa Irrigation District's Groundwater Supplemental Supply Project, June 2015

This letter provides comments and recommendations on the information provided in the June 2015 Draft Environmental Impact Report (DEIR) prepared by the Glenn Colusa Irrigation District (GCID). This document evaluates the potential impacts from the alternatives in a proposed groundwater extraction project that's intended to supplement GCID's surface water supplies during dry or critically dry water years. The proposed project would include the installation and operation of five new GCID groundwater production wells along with continued operation of five existing groundwater wells. The proposed project wells are located in the eastern portion of Glenn County along or near GCID's main service canal. The DEIR analyzed the impacts from pumping each well at a rate of approximately 2,500 gallons per minute (gpm) with a maximum cumulative total annual pumping volume of 28,500 acre-feet per year (AFY). The DEIR also briefly evaluated impacts of five alternatives that include: 1) no project, 2) pumping only the five existing GCID wells in conjunction with other landowner wells, 3) conservation, 4) cropland idling, and 5) water importation through transfers from outside GCID.

The DEIR evaluated a number of potential environmental impacts from the groundwater pumping of the ten GCID production wells using a finite element groundwater model, SACFEM2013. The potential impacts evaluated include: groundwater levels; surface water flow; water quality; biological resources, including vegetation, wildlife and fisheries; and the associated cumulative effects and impacts. The DEIR analyzed four water resource impacts (Section 3.1), and provided two mitigation measures to address impacts to third party wells, WR-1, and increases in land subsidence, WR-2. The following comments and recommendations along with tables and figures attached as Exhibits 1 through 31.

1. The amount and extent of groundwater elevation drawdown from the proposed pumping were estimated using the SACFEM2013 groundwater model, which simulated two pumping scenarios from the time period of 1970 to 2010. Two incremental drawdown scenarios of 2 and 6 years of continuous pumping were simulated, labeled the November 15, 1977 and November 15, 1992 scenarios, respectively. The results of the modeling suggest that under prolonged pumping conditions (more than 1 year) a "new dynamic equilibrium" would be established in the aquifer system such that there would be no appreciable difference in incremental drawdown under either a 2- or 6-year operational scenario (Impact WR-2,

Section 3.1.3.2). The DEIR doesn't elaborate on the meaning or significance of "a new dynamic equilibrium" other than in footnote 8 on page 3-18 where the dynamic hydrologic condition of cyclic drought and wet years is noted. My interpretation of the significance of a new dynamic equilibrium is that the groundwater elevations are fluctuating about a new central value. The critical issue is whether this new central value is stable or trending. As I discuss below, it appears that the current long-term condition for the groundwater elevations in the area of GCID's project is one of a downward trend rather that a new lowered steady-state condition, even without the groundwater extractions being proposed by GCID.

Because the November 15, 1992 forecasted drawdown boundary in the shallow aquifer from the 6-year operations scenario is the outer boundary of the GCID's project impacts, I have used that boundary throughout my review of the DEIR as the estimated of the minimal area to be impacted by the GCID groundwater extraction project. Although I'm using this outermost-impacts boundary for my review, it must be noted that the outer boundary is only estimated and is based on a model simulation that does not extend into the present time, and thus fails to consider the hydrogeologic conditions resulting from the current period of sustained drought. In addition, as I'll discuss below, the simplified SACFEM2013 model assumptions likely miss some of the complexity of the aquifer hydrostratigraphy, and therefore the shape and extent of the actual groundwater drawdown impacts from GCID's project pumping may differ significantly from the SACFEM2013 model's prediction.

2. The estimated outermost impact area from groundwater drawdown by the GCID project wells overlaps numerous county, irrigation district, and hydrogeologic jurisdictions. The outermost impact area extends across three counties, Glenn, Butte and Tehama counties (Exhibit 1). The outermost impact area extends across four and possibly as many as six irrigation/water districts in Glenn County and 3 in Butte County (Exhibit 2). Drawdown impacts will affect seven to nine of the Glenn County Basin Groundwater Management Plan Sub-Areas; Sub-Areas 4, 5, 8, 9, 10 11, 12 and possibly 6 and 13 (Exhibit 3). Finally, the outermost impact area extends into four Department of Water Resources (DWR) Bulletin 118 groundwater basins; Corning (5-21.51), Colusa (5-21.52), Vina (5-21.57), and West Butte (5-12.58) (Exhibit 4). The DEIR discusses in Section 1.2.1.6 the recently passed Sustainable Groundwater Management Act of 2014 and in Section 1.2.1.7 Glenn County's Groundwater Management Plan (Glenn County Code, Title 20, Chapter 0003 – Ordinance 1115 amended by Ordinance 1237), but doesn't discuss how these management laws will facilitate the needed regional management of the GCID production well impacts. How will water agencies outside Glenn County participate in mitigation monitoring or mitigation measures related to the project?

   I recommend the DEIR be revised to provide additional discussion and procedures on how to manage the impacts in all of the affected jurisdictions that are the result of GCID's groundwater extraction project. Specific processes and procedures for developing and implementing project mitigation measures should be provided that define how all of the agencies will interact, investigate and mitigate future impacts.

3. Exhibits 5, 6, and 7 were taken from DWR's Groundwater Information Center's GIS web site (https://gis.water.ca.gov/app/groundwater/) with the project's outermost impact bounty overlain to show the relative spring 2004 to spring 2014 groundwater elevation changes. Exhibit 5 shows the actual values of the spring 2011 to spring 2014 groundwater elevation

changes; Exhibit 6 shows the actual values of the spring 2013 to spring 2014 groundwater elevation changes; and Exhibit 7 shows the actual values of the spring 2004 to spring 2014 groundwater elevation changes. A review of the rate of groundwater change given in these exhibits shows that much of the drawdown since 2004 has occurred in the last 4 years. The DEIR in Table 3-2 and Figure 3-2 gives statistics and drawdown contours for the summer of 2004 to summer 2014, and summer of 2013 to summer 2014. Figure 3-2 doesn't show the locations or the forecasted impact areas from GCID's pumping; instead it leaves it up to the reader to interpret the relationships. These DEIR figures also indicate that a large percentage of the drawdown between 2004 and 2014 occurred in the last few years. Thus much of the drop in groundwater elevations has occurred after the time simulated by the SACFEM2013 model that terminates with model year 2010.

The SACFEM2013 forecasts that drawdown from the project will decrease groundwater elevations as much as 8 feet in the shallow aquifer, 30 feet in the intermediate aquifers and 55 feet in the deepest aquifers (Section 3.1.3.2, page 3-20). By the year 2020, when the Groundwater Sustainability Agencies are to begin managing groundwater basins being impacted by the GCID's project wells, the drop in groundwater levels in the area adjacent to the GCID wells may be greater than what has occurred in the last 10 years. Based on the statistics in Table 3-2, the forecasted maximum drawdown from the GCID project will lower groundwater levels over the next 10 years by another 40% in the shallow aquifer (8ft/19.1ft), 45% in the intermediate aquifer (30ft/66.9ft), and 150% in the deep aquifer (55ft/36.7ft). Note there is a problem with the maximum decrease statistic for the deep aquifer in that the decrease from 2013 to 2014 exceeds that from 2004 to 2014. Exhibits 8, 9 and 10 show contour maps of the changes from spring 2004 to spring 2014 in the shallow, intermediate and deep aquifer zones' groundwater elevations in northern Sacramento Valley along with the ten GCID project wells (DWR, 2014b). The locations of the GCID project wells suggest that the forecasted impact from pumping may join the two existing intermediate aquifer depressions, and expand to the existing shallow and deep aquifer zone depressions to the east and south. A plot of the GCID project wells onto Figure 3-2 would show a similar pattern.

I recommend the DEIR be revised to provide additional discussion on the existing conditions of the groundwater levels in the area of the project's anticipated impacts and the potential for the project's drawdown to expand the existing area and depth of the groundwater depressions in the shallow, intermediate and deep aquifer zones. Additional monitoring and mitigation measures should be provided that specifically address monitoring any expansion of the groundwater depressions and mitigating the project's impacts to the existing areas of groundwater depressions.

4. The DEIR relies in part on the Best Management Objectives (BMOs) given in the Glenn County Groundwater Management Plan (GCGWMP) for measurement, thresholds of significance, and mitigation measures from the project's groundwater drawdown impacts. The DEIR briefly discusses in Section 3.1.3.2 the BMOs' requirements for Sub-Areas 8 and 9, and 11, and notes that GCID is in Sub-Area 11, but there is no discussion of BMOs for Sub-Areas 4, 5 or 10, which may also be impacted by the GCID project's pumping. On page 3-19 in Section 3.1.2, the DEIR notes that Butte County has established BMOs, but that there are "*no locatable key wells with established groundwater level monitoring within the simulated 5-foot or greater cone of depression.*" No discussion is provided on how groundwater drawdown impacts will be monitored and mitigated in the Tehama County portion of the project's

impacts.

The discussion of mitigation measure WR-1 starting on page 3-40 introduces a second method for measuring groundwater impacts from the project's pumping. Mitigation measure WR-1 will use the existing DWR groundwater monitoring program data to *establish long-term antecedent trends in groundwater levels*. An unspecified number of DWR monitoring program wells will be used to *evaluate groundwater levels prior to, during, and after project operations*. Mitigation measure WR-1 doesn't provide any specific details on how the antecedent trends will be developed or what thresholds will trigger mitigation measures.

I recommend the DEIR be revised to provide additional discussion on how the two groundwater management and monitoring procedures, the Glenn County BMOs and mitigation measure WR-1 antecedent trends, will work together to ensure that the groundwater drawdown impacts from the project are adequately monitored and provide sufficient warning so that mitigation measures can be implemented to reduce the project's impacts to less than significant. I also recommend that the DEIR be revised to provide specific methodologies for selecting the DWR wells, calculating the antecedent trends, the groundwater trend thresholds that indicate project groundwater impacts and the specific mitigation measure based on the thresholds. The DEIR should identify the specific wells that will be used to monitor groundwater drawdown trends and include wells in Sub-Areas 4, 5, and 10 as well as Butte and Tehama counties.

5. The SACFEM2013 groundwater model utilized hydrogeologic input data that simplifies the complexity of the Sacramento Valley aquifer systems. For example, **Exhibits 11 and 12** are maps taken from the February 2015 SACFEM2013 User's Manual (CH2MHill and MBK Engineers, 2015; in Appendix M in the USBR/SLDMWA's March 2015 Long-Term Water Transfer EIS/EIR) that show the hydraulic conductivity distribution for model layers in the SACFEM2013 simulations. The location of the GCID project is shown by an overlay of the outermost impact boundary. Note that the model layers are numbered 1 to 7, shallowest to deepest, respectively. The general chevron shape of horizontal hydraulic conductivity contours beneath GCID's project shown in Exhibit 11 reflects the structural imprint from the underlying Glenn Syncline with values that are generally symmetrical about the current trace of the Sacramento River. That is, the SACFEM2013 model assumes the hydraulic conductivity values are generally similar at similar distances west or east of the river. A recently published study of the hydrostratigraphy of the areas surrounding GCID's wells suggest that the assumption of symmetrical hydraulic conductivity used in SACFEM2013 model may be too simplistic for the lower production aquifers.

   Greene and Hoover (2014) recently published the result of an investigation of the lower Tuscan/Tehama aquifer at depths of approximately 500 to 1500 feet in the vicinity of GCID's production wells. They combined well cuttings from four different wells along with geophysical well logs from 457 wells spanning 440 square miles to create a series of maps that delineate seven subsurface stratigraphic horizons that provide insight to the regional structure of the basin and the distribution of the water-rich, porous sand zones. In addition to the development of hydrostratigraphic maps, the study also analyzed results of four aquifer performance pump tests to evaluate previous interpretations of the hydraulic properties of the lower Tuscan/Tehama aquifer. Three of the pump test wells were existing GCID wells, GCID-2, GCID-3 and GCID-4, and the fourth, was located further to the west, is a Orland Artois Water District's well, OAWD-2, Exhibit 13. This lower Tuscan/Tehama aquifer study

produced a great amount of new information on the deeper aquifers. For this discussion on the impacts of using a simplified model of hydraulic conductivity in estimating the drawdown impacts from the GCID project, the results that are most relevant from the lower Tuscan/Tehama aquifer study are the complexity of the distribution of higher percentage sand zones, and the general occurrence and shape of zones with a higher percentage of sand, and greater thickness in east. Note that hydraulic conductivity can be correlated with the percentage of coarse-grained sediments (Figure C14 in Faunt, 2009) with higher a percentage of sand generally resulting in greater hydraulic conductivity.

Exhibits 14-A to 14-B show five hydrostratigraphic maps for the LT-3 to LT-4, and LT-4 to LT-5 zones. The five maps include the upper and lower structural maps for the surfaces of the two bounding zones. In addition, three other types of maps are provided for the two intervals: 1) an isopach map that depicts the thickness of the interval; 2) a total sand thickness map; and 3) a sand fraction map (0 to 1 with 1 being 100% porous sand). Zones LT-3, LT-4 and LT-5 were selected for my comment letter because the GCID wells are generally screened across some or all of these zones (Exhibits 15-A, 15-B and 15-C). The pump test analysis of the four wells found that the aquifer hydraulic properties differ from west to east. Greene and Hoover interpreted that the differences in transmissivity and storativity found with the pumped well tests reflect the differences in sand composition, thickness, and distribution in the vicinity of the OAWD-2 well from those in the GCID wells as a possible result of a sharp western boundary of the sandy-braided depositional system that generally aligns with the Glenn Syncline and today's Sacramento River and underlies the three GCID wells tested, Exhibit 13.

Three features that are clearly shown in these hydrostratigaphic maps are: 1) the distribution of fine and coarse-grained sediments is not symmetrical about the Glenn Syncline, in that finer-grained sediments predominate in the west and coarser-grained in the east, 2) areas of coarser-grained sediments can be localized with the deposition pattern appearing to reflect an ancient northwest-to-southeast oriented braided stream system, similar to today's river, and 3) the thickness of the coarser-grained sediment is greater to the east of the GCID wells.

The importance of this new information on the hydrostratigraphy around the GCID wells is that the generally symmetrical pattern of drawdown that resulted from the SACFEM2013 modeling effort may not reflect the predominance of coarser-grained, water-rich zones on the east side of the wells. The results of the SACFEM2013 model show that the total area of the pumping impacts and the outer distance to the no-impact boundary is greater to the west in Glenn County, than east in Butte County. In fact, no wells in Butte or Tehama counties are proposed for monitoring in mitigation measures WR-1 and WR-2, and obviously are not included in the Glenn County BMO monitoring program. This lack of monitoring in Butte County, when that area may be a major source of the water pumped by GCID's wells, may allow for impacts that are inadequately recognized and thus improperly mitigated. It should also be noted that a recent draft report on the finding from the 2004 and 2008 GPS network subsidence studies found one sampling point, designated "WILD," in the easternmost Glenn County to have subsided an average of -0.38 feet (Ehorn, 2015).

I recommend the DEIR be revised to provide additional discussion on the SACFEM2013 model and why its assumptions about the distribution aquifer properties, hydraulic conductivity, transmissivity, storage coefficient, thickness, etc., are sufficiently representative to produce a reasonable estimate of the amount and extent of changes in groundwater levels as a result of the GCID

project's pumping. Specifically, the DEIR should address how SACFEM2013 models the complexity of the hydrostratigraphy identified by Greene and Hoover (2014) in the intermediate and deeper aquifers beneath the project area.

6. The DEIR discusses the potential impact from land subsidence that is due to the project's groundwater extraction in section 3.1.1.3, starting on page 3-13. Table 3-3 lists five extensometers that are near the project's wells. Exhibit 16 shows the locations of these extensometers along with the GCID pumping wells. The DEIR also mentions that DWR has a continuous global positioning system (GPS) network for periodic monitoring of changes in ground elevation. A baseline GPS survey was performed in 2004. The DEIR doesn't mention that DWR and the U.S. Bureau of Reclamation conducted a second survey jointly in 2008 (DWR/USBR, 2008). The DEIR doesn't provide any specific information on the results of the GPS subsidence monitoring, but includes use of these GPS measurements in mitigation measure WR-2 as an option for monitoring subsidence impacts. In fact, the DEIR doesn't reference or discuss the results from what DWR presented earlier this year to the Glenn County Water Advisory Committee on the results of the 2004 to 2008 GPS subsidence-monitoring program (Ehorn, 2015), which identified and area of subsidence east of the GCID wells. I'll discuss this report again in my comment no. 10 on mitigation measure WR-2.

   Although the 2014 DWR report titled, "*Summary of Recent, Historical, and Estimated Potential for Future Land Subsidence in California,"* is cited (DWR, 2014a), the DEIR doesn't provide any of the report's maps, which show that there is a high potential for land subsidence in Glenn County (see Figure ES-1). The DEIR Section 3.1.1.3 discusses the five extensometers in the GCID project area and Table 3-3 listing recent subsidence data. The land subsidence at an extensometer between Orland and Willows (21N02W33M001M) is said to be -0.05 feet, but that the land has remained stable since 2009, although Table 3-3 lists the subsidence for this station at -0.08 feet in October 2014. Exhibit 17A is the graph of the land subsidence for extensometer 21N02W33M001M taken from DWR's Groundwater Information Center GIS web site. This graph shows that land subsided approximately 0.02 feet between 2009 and 2010 (-0.06 ft to -0.08 ft). Coincidentally, this subsidence occurred during the year when GCID pumped 1,405 acre-feet (AF) of ground water using one or more the existing wells (page 3-15). In 2011 and 2013, GCID pumped 6,300 AF and 5,000 AF, respectively, using the existing wells without the increase in subsidence seen in 2009. Because the DEIR doesn't provide information on which of the existing wells were pumped during 2009, 2011 and 2013, there is uncertainty about the impact of the GCID's pumping on land subsidence. Exhibit 17B is a map of the land subsidence values determined by comparing the DWR 2004 and the DWR/USBR 2008 GPS surveys that was presented to the Glenn County Water Advisory Committee on February 10, 2015 (Ehorn, 2015). The results of the GPS surveys found an area of land subsidence several miles east of the GCID well no. E3 at the station designated "WILD" that averaged -0.38 feet. This information is now 7 years old and pre-dates the GCID groundwater extractions of 2009, 2011 and 2013. Note that the 7-year delay by DWR/USBR between collecting the GPS subsidence data and reporting the results is too long to be used in mitigation monitoring measure WR-2. GCID would need to conduct and analyze the GPS or land surveys at regular intervals to effectively monitor the subsidence from GCID's pumping. The results from the 2008 study suggest that additional subsidence surveys in the area of "WILD" GPS station to document current rates of land subsidence appear to be warranted. **Therefore, I recommend that the monthly GPS or land surveys given as an option in Step 2 of WR-2 be implemented at the start of the GCID's project**.

Exhibit 18, also taken from the 2014 DWR subsidence report, shows the percentage of wells with groundwater levels at or below the historical spring low by DWR Bulletin 118 groundwater basin. The Colusa basin in Glenn County is shown as having greater than 30% but less than 50% of the wells with groundwater levels below the historical spring low. The West Butte and Vina basins in Butte County and the Corning basin in Tehama County are shown as having greater than 50% of the wells with water levels at or below the historical spring low. The DEIR doesn't acknowledge this current information or it's importance in accessing the existing and potential land subsidence within and surrounding the project's impact area. In fact, the DEIR's analysis of land subsidence in the project area, Impact WR-4, on page 3-39 states that:

> *The proposed project would not be anticipated to cause a substantial permanent land subsidence due to lowering of groundwater levels, because the production wells would only be pumped in years of drought, and water levels would recover during wetter years. The possible exception would be during multiyear droughts, when water levels would take longer to recover and could result in minimal subsidence. However, based on historical hydrology, severe multiyear drought conditions are anticipated to occur infrequently (this hydrologic condition has occurred twice in the past 110 years [DWR, 2015e]). Although not expected, minimal subsidence could occur as a result of project pumping that may result in damage to surrounding infrastructure and would be considered significant.*

I recommend the DEIR be revised to provide additional discussion on subsidence in and adjacent to the project's impact area. Specific information is needed regarding why DWR has categorized the Corning sub-basin as having a high potential for future subsidence. Information is also needed regarding the conditions at each of the three existing extensometers lying within or adjacent to the project's impact area. Specifically, what are the conditions at extensometer 21N02W33M001M and how does the subsidence relate to past groundwater extractions by GCID. Information is needed on the cause of subsidence measured at the "WILD" GPS station from 2004 to 2008. Information is needed on what measures GCID will take to assess the current rates of land subsidence in area of the "WILD" GPS station and other areas that are subsiding. Analysis is needed on the potential for the project's pumping to increase the number of wells whose groundwater level might fall below the historical low. Specific mitigation measures should be given on how the project's pumping will minimize the known areas of subsidence in the future.

7. The following comments are on stream depletion resulting from the extraction of groundwater, and in particular, the GCID project analysis in the DEIR. I have a number of comments and have divided them into subject areas to facilitate review.

a. General Comments on the DEIR

Three sections of the DEIR discuss the issue of depletion of surface water resources due to pumping the GCID wells. A general discussion on surface water-groundwater interaction in the Sacramento Valley Groundwater Basin is given on page 3-11. The discussion notes that drought conditions or groundwater production near gaining streams can result in losing streams with surface flows recharging the groundwater system. The DEIR states that if a stream dries up, it no longer provides a source of recharge to the underlying aquifer system.

This discussion doesn't provide any specific information on the GCID production well project's impacts to surface water resources.

The second section on the GCID project's impacts to surface water resource starts on page 3-38 in the Impact WR-3 section (DEIR Section 3.1.3.2, Operational Impacts). The DEIR states that Figure 3-4 shows several streams that flow across the maximum forecasted area of shallow drawdown of 1-foot or greater. I think the more appropriate figure might be Figure 3-6. Table 3-6 summarizes the SACFEM2013 simulated reductions in stream flow as maximum and average reductions. This stream flow impact analysis was focused on impacts on supplies to the Central Valley Project, State Water Project, or other non-project water users. The WR-3 impacts section concludes that:

> *Because the magnitude of streamflow reduction along the length of the streams is small and because many of the streams are anticipated to be dry during drought conditions, surface water supplies would not be substantially depleted because of drawdown resulting from project operations, and impacts on streams would be less than significant.*

The third section of the DEIR discusses the impacts of the GCID pumping on biological resources, and in particular, fisheries, starting on page 3-52 in the Impact Bio-4 section (DEIR Section 3.2.3.2, Operational Impacts). The analysis discusses forecasted losses in flow in three major streams, Stony Creek, Big Chico Creek and Little Chico Creek, with the losses listed in Table 3-6. The basic conclusion regarding GCIS project's pumping impacts to these three streams is that because they currently don't support habitat for anadromous salmonids the effects of the project's drawdown will be less than significant for these species. For warm water and resident fish species, the DEIR concludes that they are adapted to variable flows, and will survive in the deep pools or upper reaches not affected by the project. I'll have to defer to the fisheries biologist regarding the habitat value of these streams, but I will comment on the adequacy of the modeling forecast of stream depletion and the information provided on depletion rates and timing.

b. Uncertainty in Calculation of Stream Depletion by SACFEM2013

The stream depletion from GCID's pumping was calculated with the SACFEM2013 model using a number of approximations and assumptions. The description of the stream depletion modeling procedures is provided in the SACFEM2013 User's Manual (CH2MHill and MBK Engineers, 2015) in Appendix M of the March 2015 Final Long-Term Water Transfer Environmental Impact Statement/Environmental Impact Report prepared by the U.S. Bureau of Reclamation and San Luis & Delta-Mendota Water Authority. The specific assumptions, formulas, and methods for modeling impacts of GCID's pumping on surface waters are given in the discussion of Head-dependent Flux Boundaries, Section 3.2.4.1 of the SACFEM2013 User's Manual.

To accurately model the exchange between surface water and shallow groundwater, accurate information is needed on at least the following parameters: 1) the elevations of the ground surface and stream bed; 2) the length of the stream bed; 3) the variations in the quantity of stream flow with water year type; 4) the variations in the depth of the surface water flows throughout the year and along the length of channel; 5) the wetted width of the flows in the creek; 6) the vertical hydraulic conductivity of the streambed sediments; and 7) the thickness of the streambed sediments. The values for these parameters used in the SACFEM2013 model were developed using various methods of approximation and estimation. Neither the

User's Manual nor the DEIR indicate what field measurements were taken to validate the stream depletion model parameter estimations, and no references are given for independent field studies.

As an example, the methodology for developing the ground and streambed elevations used in the model is an example of model parameter uncertainty. The ground and streambed elevations were calculated using the USGS 30-meter digital elevation model (DEM) and the SACFEM2013 model grid (User's Manual pages 3-19 to 3-20). The statistics of maximum, minimum and mean elevations were developed for each model node from DEM values in the area that contributes flow to the node. The ground surface was assumed to be equal to the mean DEM value, while the streambed was initially assumed to be the minimum value. When the results of the initial streambed elevations looked unrealistic, a polynomial trend line through to the minimum values was used for the streambed elevation.

The other model parameter values used for calculating stream depletion are developed by making assumptions (pages 3-14 to 3-35 in User's Manual) and these estimates likely have large ranges of uncertainty resulting in a large margin of error in the model results. All of the following page numbers refer to the SACFEM2013 User's Manual.

- The model used a uniform vertical hydraulic conductivity (Kv) based on assumptions of streambed deposit size expected for the given stream size (page 3-19; no references cited).
- Streambeds draining from the Sierra Nevada were generally assigned lower streambed Kv values, and west side streams were assigned higher values (page 3-19; no references cited).
- The wetted stream width was calculated at two and occasionally more locations from aerial photos on each stream.
- Transient stream stage was developed from historical stream gauge data. Unfortunately, the vertical datum for these records is often different and couldn't be related to a standard datum so it isn't possible to making a consistent datum for all stage and flow data (page 3-20). Some gauge reports give only flow and not stage, and rating curves were not readily available. *To utilize as much of the available gage data as possible while addressing the issue of multiple or unknown vertical datums, historical stage data were assumed to approximate stream depth above the streambed elevation. Historical stream depths were then added to estimated streambed elevations to determine water surface elevations for input into SACFEM2013* (page 3-20).
- Ungauged or incomplete stream stage and flow records were estimated using data from nearby or similar gauged streams (page 3-31).
- In the absence of any additional data, the stream stage from one gauge was assumed to be at a uniform depth along the length of the stream (page 3-31). Factors that might change the stream stage such as watershed area, diversions, return flows, channel geometry, and others weren't considered due to the effort required in collecting this information.
- For streams with multiple gauges, the stage was set equal to the gauge record with the stage between gauges interpolated based on stream distance (page 3-31).

Finally, after all of the parameters were estimated, the model stream depletion was calculated only every 1,640 feet along the channel length. While this is acceptable for a regional model, it may not produce sufficient accuracy when individual projects are evaluated. An accurate estimate of stream depletion is critical to assessing the potential impacts from the GCID's

groundwater extraction project because the SACFEM2013 stream depletion estimates are used in combination with the assertions that the reaches of the surface waters potentially impacted by the pumping have no fisheries habitat value. This leads the DEIR to reason that monitoring and mitigation measures are unnecessary for protection of fisheries resources.

Because of the uncertainty in the parameters used, it is likely that the SACREM2013 modeled estimate of stream depletion resulting from GCID's groundwater extraction project has a large margin of error. The DEIR doesn't provide any information on the range of stream depletion values that would result from using different, but equally valid parameters in the SACFEM2013 model simulations. In addition, it isn't clear from the DEIR discussion how the combined stream depletion from groundwater extractions by GCID's and third parties wells is calculated. That is, how the baseline stream depletion was affected by GCID's project stream depletions. Yet the DEIR concludes that there isn't a need for stream channel or fisheries monitoring, or any channel flow or fisheries mitigation measures.

Because of uncertainty in the estimate of stream depletion that would result from GCID's groundwater extractions, I recommend that monitoring be added to the DEIR that requires prior to the beginning of each pumping season, the streams and rivers potentially impacted by GCID's pumping be surveyed to determine whether there are fisheries resources needing protection. If fisheries or other biological resources needing protection are found, then repeated field surveys should be conducted throughout the pumping season. I also recommend that a mitigation measure be added to the DEIR that requires a plan for rescuing fish that become stranded or endangered. This rescue plan should be developed in conjunction with Federal and State wildlife agencies. Implementation of the rescue plan should be carried out whenever flows in the streams drop to a level that threatens the fisheries or other resources.

c. Surface Water-Groundwater De-coupling

The accuracy of stream elevation is important because the SACFEM2013 model de-couples the stream from the ground water whenever the groundwater elevation is below the elevation of the stream and assigns a value to seepage based on the head difference between the stream stage and channel bed (equation 5 on page 3-14 in User's Manual). The User's Manual doesn't cite any reference for why this is the most appropriate estimate of seepage when the groundwater elevation drops below the streambed. Bouwer (1978) discusses seepage rates from streams and canals (pages 268 to 279) and identifies three basic conditions. Bouwer describes a condition "C" that requires a "clogging layer" along the channel's wetted perimeter. In this condition, the depth of the water table has no effect on seepage rate when the top of the capillary fringe is below the channel bottom. The User's Manual is silent on whether the presence of a clogging layer was required for stream de-coupling to be activated.

d. Seepage Rate Calculations

The analysis of stream flow impacts due to pumping the GCID wells is also inadequate because the DEIR doesn't provide specific information on:

1) How the *average* seepage rate was actually calculated. Over what duration was the average calculated; the annual period of pumping, a complete year, 6 years, 16 years, or all 41 modeled years (Table 3-6 footnote c)?
2) The timing of the *maximum* seepage rate isn't given relative to the beginning of pumping. Does it occur annually, or after several years of pumping?
3) The duration of stream depletion that continues following cessation of a single pumping event isn't stated. That is, how long will a single season of GCID's extraction continue to impact surface flow and by how much?
4) Whether stream depletion from a the number of pumping events, whether consecutive or not, is cumulative and how does this change the value and timing of maximum seepage rate?
5) The cumulative impacts to surface water flows from the combined pumping of the ten GCID and other wells in Glenn, Butte and Tehama counties, particularly other irrigation and production wells. The DEIR notes that there are 175 private production wells throughout the GCID district (page 3-15) and more than 3,000 known domestic, irrigation, and miscellaneous wells within Glenn County (page 3-19). However, the groundwater diversion rates and volumes for these wells are unstated as well as their seepage impacts.
6) No references are provide as to why it can be assumed that once a section of streambed becomes dry, groundwater pumping no longer impacts surface water resources. This validity of this assumption is important in part because the biological impact assessment assumes that warm and resident fish will survive in the deep pools that need to be fed by stream channel underflow.

e. Importance of Underflow to Stream Resources

The DEIR's evaluation of impacts from stream depletion is also inadequate because it assumes that once a streambed becomes dry continued pumping of groundwater has no effect on surface flow. This assumption ignores the role that stream underflow plays on maintaining pools and riparian habitats. The assumption also ignores the fact that the depth to saturated ground water beneath a streambed will impact the volume and duration of flow needed to re-wet the channel at the beginning of the next rainy season. The deeper the depth of ground water, the more aquifer voids there are that need to be re-filled in order for the stream to sustain surface flows. In other words, a greater volume of water for a longer period of time is needed at the beginning of the rainy season to sustain surface flows.

f. Cumulative Stream Depletion and Recovery Time

Stream depletion is additive. Cyclic pumping year after year will continue to add up (Bredehoft, 2011). The concept of a long-term average value of stream flow loss from pumping implies that cyclic pumping by the GCID wells will be cumulative. Wallace and others (1990) analyzed the effects of cyclic pumping and the duration for the groundwater aquifer to recover 95% of the pumped water by recharge from surface water bodies. They found, with some specific correction factors, that cyclic pumping could be evaluated as a time-weighted pumping average. That is, to achieve an instantaneous time-weighted average pumping rate, the volume of water pumped is divided by the total time of interest. For example, pumping at a rate of 1,000 gallons per minute for 6 consecutive months is effectively pumping at 500 gallons per minute for a full year.

The time needed for recovery of the loss in groundwater storage due to pumping, by recharge from surface water, is dependent on the hydraulic characteristics of the pumped aquifer and stream bed, and the distance between the well and stream (Jenkins, 1968; and Miller and others, 2007). Wallace and others (1990) calculated that the time needed to recover 95% of the water pumped from an aquifer is approximately 127 times the stream depletion factor (SDF), which is calculated as the square of the distance between the well and stream (a^2) times the storativity (S) divided by the transmissivity (T) (SDF = a^2 * S/T). The stream depletion factor, SDF, has units of time, such as days or years. Jenkins (1968) noted that for ideal aquifers when the pumping duration is equal to the value of the SDF (pumping duration / SDF = 1.0), the volume of water taken from the stream is 28% of the total volume of water pumped by the well. In addition, the instantaneous rate of stream depletion when the pumping time equals the SDF value is equal to 48% of the total pumping rate. Although the DEIR doesn't provide an estimate of the stream depletion rate as a percentage of the stream flow, it appears from the maximum values listed in Table 3-6 that the depletion rates for the listed streams and rivers are less than 48% of the average stream flow. This would suggest that the time it takes until the aquifers pumped by the GCID well are 95% recharged by stream depletion may take decades. In fact, a report on the pumping impacts from the 2009 Sacramento Valley groundwater substitution transfers using the SACFEM model with a simulation period from 1976 to 2003 showed aquifer recovery following a single 1976 pumping event was only 60% after 30 years (Figure 4d in CH2MHill, 2010). This suggests that the impacts from a single year of GCID's groundwater extraction project and the impacts from reoccurring pumping events will continue for many years.

The ten GCID wells don't pump in isolation; they are part of a wide area of agriculture that relies in part on the use of groundwater, particularly during dry and critically dry water years when surface water deliveries are reduced. The DEIR doesn't provide much specific information on how much groundwater is pumped by third parties in the Glenn, Butte Colusa and Tehama counties, but the 2013 Water Plan (DWR, 2013) indicates that negative changes in groundwater supply in the Sacramento River hydrologic region ranged from 1,211,000 to 2,049,000 AFY from 2001 to 2010 (Table SR-13 on page SR-62).

I recommend the DEIR be revised to provide additional discussion and analysis of the long-term impacts to surface water bodies within and adjacent to the project area of impact. This analysis should include the duration of impacts to surface water bodies from the project's groundwater extraction and the cumulative depletion and impacts from all of the groundwater extractions currently being done in the portions of Glenn, Butte and Tehama counties that are impacted by the project. The DEIR should provide specific monitoring requirements to assess whether the extent and rate of the anticipated impacts to surface water bodies are remaining within the levels predicted by the modeling effort. I also recommend that an emergency plan be prepared that will facilitate the rescue of any fisheries resources or other biological resource should the flows in the streams potentially impacted by GCID's project drop to a level that threatens the resources. In addition, the DEIR should provide specific mitigation measures to correct any impacts to surface water resources that exceed anticipated levels to a level of less than significant.

8. **Exhibit 3** provides a map of the Glenn County Groundwater Management Plan Sub-Areas with the BMO groundwater monitoring wells listed for each Sub-Area, and the outermost impact boundary for the GCID project. The DEIR states on page 3-37 that the SACFEM

2013 model forecasted drawdown from the 6 years of the project's pumping at six "key" wells in Sub-Areas 8 and 9 and nine "key" wells in GCID's Sub-Area 11 were reviewed to evaluate potential impacts to third party wells and concluded on page 3-38 that no impacts due to drawdown would occur. This conclusion seems to conflict with the summary of BMO exceedances given in Table A-3 of Appendix A. Table A-3 gives the forecasted exceedances of Stage 1, 2 and 3 alert levels at key BMO wells due to GCID's project pumping for the 41-year simulation period of the SACFEM2013 model. Table A-3 indicates that the model found a number of additional exceedances of BMO Stage thresholds as a result of GCID's pumping. Remembering that the SACFEM2013 model simulation ended in 2010 and doesn't evaluate the current groundwater levels, thus the number of additional BMO Stage exceedances given in Table A-3 is likely low. Apparently, the approach being taken by the DEIR is that project's pumping will create known impacts to groundwater levels, exceedance of BMO Stage threshold, but then be mitigated by actions that might be taken as required by mitigation measure WR-1. I will discuss mitigation measure WR-1 further in my comment no. 9.

The DEIR doesn't list the "key" wells that were reviewed in assessing pumping impacts, presumably they are the ones listed in the GCGWMP for each Sub-Area. Figures 3-9a and 3-9b present hydrographs showing simulated groundwater elevations versus time from water years 1970–2010, but no information, tables or graphs are provided that show how the forecasted drawdowns affect the current groundwater levels in the key monitoring wells. That is, what groundwater elevations are anticipated from future pumping starting with today's groundwater levels? Have actual recent groundwater levels in these key monitoring wells already dropped below a BMO Stage threshold? This is a critical issue that needs to be addressed because of the current extended period of drought and the historical drop in groundwater levels in the Glenn and Butte counties (Exhibits 5 through 10 and 18). If groundwater levels in some of the "key" wells are already below a BMO Stage threshold, then actions and mitigation measures required by the GCGWMP should be currently implemented and mitigation measure in WR-1 and perhaps WR-2 would need to be implemented when the GCID project is approved. Immediate implementation of the DEIR mitigation measures would likely change the project description and thereby alter the monitoring and mitigation requirements. In particular, some of the optional mitigation measures might need to be mandatory.

Although the DEIR selects 15 key wells to monitor the project's drawdown impacts, these wells are but a few of the wells being monitored by DWR or other agencies within the project's outermost impact area. Exhibit 19 is a table of the 15 key wells listed for Sub-Areas 8, 9 and 11 in the GCGWMP. Exhibit 20 is a map of these 15 BMO wells, the GCID project wells, and the outermost impact boundary. Exhibits 21, 22, 23 and 24 show the locations taken from DWR's CASGEM web site of all the active CASGEM wells, monitoring wells, irrigation wells, and residential wells in the vicinity of the project, respectively (http://www.water.ca.gov/groundwater/casgem/online_system.cfm). It should be noted that GCID for the 2013 groundwater substitution transfer program that pumped from the five existing GCID wells utilized only three of the nine Sub-Area 11 monitoring wells (20N02W11A001M, -2M and -3M), and none of Sub-Areas 8 and 9 wells, but instead used 35 of the observation wells, which are listed in Exhibit 25A (West Yost, 2014) and 25B. The DEIR doesn't however propose for mitigation measures WR-1 and WR-2 to use any of the 2013 GCID monitored wells that sample groundwater within the outermost impact area, even though some are located closer to the existing GCID Sub-Area 11 wells (Exhibit 26).

Exhibit 27 is a map plotted on a Google Earth image that shows the locations of the ten GCID project pumping wells and a selection of other observation, irrigation and residential wells that occur within or near the outermost impact area. Exhibit 28 is a table that lists the location, well identification and groundwater monitoring start and end dates for the selected wells shown in Exhibit 27. Exhibits 29-O-1 to 29-O-20D provide the well information, hydrographs and recent groundwater level measurements in the selected wells plotted in Exhibit 27 that taken from DWR CASGEM and Water Data Library web sites. Most of the wells listed in Exhibit 28 are closely spaced groups of wells that sample at multiple depths. Of particular importance are wells that lie within Butte County. Even though these Butte County wells may not be part of a formal BMO monitoring program, they can still be used to monitor the impacts from the project's groundwater extractions. Most of the wells in Exhibit 29 show a drop in groundwater level since 2010. Because the SACFEM2013 model simulation ended in 2010, the model's results likely don't reflect recent conditions and thus are not representative of current groundwater conditions in the area being impacted by GCID's groundwater extraction project.

The groundwater level data for most of the wells listed in Exhibit 28 were measured only in the last 15 years. However, nine of the wells have measurements extending back to 1976 or earlier, which is important because they provide a long-term record. The nine wells are: O-3A, O-3B, I-4, I-6, I-7, I-11, I-14, I-17 and R-19. A review of the hydrographs for these wells in Exhibit 29 finds that there is an overall downward trend in groundwater level since the mid-1990s. This is consistent with the recent drop in groundwater levels shown in Exhibits 5 through 10 and 18. DEIR mitigation measure WR-1 will *establish longer-term antecedent trends in groundwater level in the basin* (page 3-40). These nine wells should be used in this analysis. WR-1 also requires that recent antecedent trends be established along with the historical lows in groundwater elevation. WR-1 doesn't elaborate on how the longer-term antecedent trends will be compared to or used with recent antecedent trends, or what thresholds will be use to indicate impacts from GCID's pumping that would require implementation of a mitigation measure.

I recommend the DEIR be revised to provide additional information on the GCID project's groundwater-monitoring program. Specific information on the wells used to monitor the project's impacts, including establishing antecedent trends and historical lows. The DEIR should discuss why these wells are most representative and how additional wells might be used if they yield more representative information. The DEIR should provide information on the historical groundwater levels measured in the project's proposed monitoring wells, including graphs and tables, and should document past and current (2015) conditions. The DEIR should provide a complete documentation of the methodology for assessing and determining thresholds for implementing mitigation measures or other corrective actions.

9. Mitigation measure WR-1 described in Section 3.1.4 on page 3-40 is intended to reduce potential impact to third-party wells as a result of pumping GCID's wells. The description of the groundwater-monitoring program for mitigation measure WR-1 indicates that *long-term antecedent trends in groundwater levels within the basin* and *historical low groundwater elevations* will be established using DWR's existing monitoring program data. A subset of DWR's wells will be used for measurements one month before pumping starts, weekly during pumping, and one month after pumping stops. The number of wells selected and their spatial distribution will be adequate to evaluate groundwater levels prior, during and after pumping.

The volume of groundwater pumped by the GCID wells will be continuously measured along with pH, temperature and electrical conductivity (EC).

The DEIR defines in Section 3.1.2 that potential impact from pumping the GCID's project wells would be considered significant if *the depletion of aquifer volume or lowering of local groundwater levels such that the yield of existing wells is substantially reduced and not capable of supporting existing land uses or planned uses for which permits have been granted.* Footnote 5 on page 3-16 defines well yield *as the maximum sustainable pumping rate that can be supplied by a well without inducing a decline in water levels that exceeds the available drawdown. Available drawdown is defined as the height of the column of water between the static water level and the total depth of the well or the depth of the pump intake.* If a third party believes that the pumping of GCID's project wells have affected the operation of his well, then according to mitigation measure WR-1 *he can submit a report* to the GCID. The third party report will then be reviewed and GCID in coordination with the WAC (Water Advisory Committee) or GSA (Groundwater Sustainability Agency), or both, to *determine whether potential impacts are the result of District pumping, other groundwater production in the basin, or natural climatic conditions*. WR-1 proposes that GCID **may** do one of the following four actions if it is determined that GCID's project pumping has cause an impact to a third party's well:

- *Reduce or relocate pumping until natural recharge corrects the issue*
- *Lower the pump in third-party wells affected by the proposed project*
- *Reimburse third parties for significant increases in pumping costs due to an increase in lift*
- *Other actions, as appropriate*

While mitigation measure WR-1 has a number of good concepts for evaluating the impacts of pumping GCID's project wells, it doesn't actually require that GCID mitigate any impacts. GCID is defining the standard of significant impact as well-yield being both substantially reduced **and** not capable of supporting existing permitted planned land uses. Again, the third party appears to bear the burden to demonstration that there is **substantial** reduction in well yield, suggesting historical metering or well testing is required, **and** that they can't continue with the existing land uses at any level, because of the wording *not capable of supporting*. It appears that by this standard increases in water production costs, like electricity or pump maintenance, and reductions in land productivity are considered an acceptable third-party impacts. In addition, WR-1 likely requires that the third party create a technical report not just a letter of complaint, which likely will require hiring a licensed professional engineer and/or hydrogeologist to collect and analyze the data, make findings, and recommendations with the third-party paying all of these costs. Finally, GCID is a party to the decision to accept the third party's report, which would triggering the requirement that GCID possibly implement one of the four actions intended to remedy the injury.

The WR-1 mitigation investigation, review and dispute resolution process doesn't seem to be impartial. The burden of cost of this mitigation measure, that is bringing a complaint, is placed solely on the third party. This seems to conflict with the analysis that determined that 136 wells out of 3,000 investigated wells are located within the forecasted drawdown of 5 feet or greater (DEIR page 3-37; Appendix A pages A-9 and A-10). It would seem that the owners of these wells should and told of there is a potential for impact. It would also seem that these well owners shouldn't have to prove that GCID's pumping impacted their well.

There doesn't' appear to be any design in the WR-1 or BMO monitoring programs that is intended to collect or analyze data to address the potential for impacts to any specific third

party, such as the 136 known wells, even though a number of existing areas of impacts to groundwater supply are already known from publications by DWR and others. GCID isn't required to investigate its potential impacts, even when the groundwater levels in the area of potential impacts drop to elevations that have obvious detrimental effects on third party wells. The DEIR doesn't provide the locations of 3,000 wells investigated for potential impacts from GCID's pumping (Appendix A), so there is no method for comparing whether the wells investigated for the GCID's forecasted drawdown impacts cover the entire GCID project's impact area or lie within areas of known groundwater drawdown. The DEIR leaves it to an interested third party to determine what wells they have already investigated. Information on the locations of the 3,000 wells is needed to evaluate the adequacy of the DEIR's third party well investigation. DWR (2014c) has already published well depth summary maps for both domestic and production wells that give the range of the number of wells in each section within Glenn, Butte, Colusa and Tehama counties and the minimum, maximum and average well depths for wells in each section (http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm). The locations of the 3,000 wells investigated should be placed on these well summary maps to demonstrate the thoroughness of the study. Additional analysis of the potential impacts from the GCID project's pumping could be made by adding together the existing summer depths to groundwater (likely to be the annual lowest), the GCID project's projected drawdown, and an estimate of the drop in water level at each third party well during pumping (derived from the well's specific capacity or calculated from the aquifers' transmissivity and storage coefficient). This cumulative increase in groundwater depth could then be compared to the information on the 3,000 wells, such as the well's screen interval depth, and the statistics in DWR's well depth summary maps. Exhibits 30 and 31 are maps made by cropping the DWR domestic and production well depth summary maps of Glenn County with an overlay of the GCID's outermost impact area boundary (DWR, 2014c).

In WR-1's impact dispute resolution process, GCID assigns to itself, rather than an independent and neutral party, the role of deciding if it has impacted a third party's well. If the mitigation process were impartial, I would think that GCID's only role would be rebutting the third party's report. In an impartial process, the determination of the responsible party would be delegated to a knowledgeable, independent and neutral party, like when a dispute is mitigated or arbitrated. Arbitrations are an effective method of resolving conflict. I've personally participated in arbitrations where a knowledgeable, independent and neutral party, in my case the non-profit JAMS (http://www.jamsadr.com/), presided over the dispute resolution as an alternative to filing a civil suit. My experience is that this process works effectively at resolving problems.

In addition to the problem with making the finding of third party impacts, the WR-1 groundwater-monitoring program doesn't address how the existing BMO's monitoring requirements will be utilized. The evaluation of the trends in groundwater elevations is critical to understanding the impacts from GCID's pumping and the overall condition of the groundwater basins. There is however a conflict with the BMO methodologies for Sub-Areas 8, 9 and 11, as well as the other Sub-Areas, because the BMO Stage thresholds are generally based on an average groundwater elevation and the variation from this average. There is a fundamental problem when the data, in this case groundwater elevations, has a trend rather than cycling around a consistent average value. There is no consistent "average" value in data that are trending. A slope of a regression line and variance from that regression line can be calculated, but this isn't a fixed "average" value. This issue of the "new dynamic

equilibrium" is also discussed in my comment no. 1. The BMOs for Sub-Areas 8 and 11 use the deviation from the "average" to establish Stage thresholds, while Sub-Area 9 uses a regression between groundwater elevation and the sum of the surface water deliveries and precipitation (see August 21, 2001 GCGWMP Cover Report for methodologies). The lack of specifics on how the WR-1 and BMO groundwater-monitoring program will be integrated may have a significant effect on whether any third party can prevail in a complaint of GCID pumping impacts. The BMOs don't actually require that specific actions be taken when Stage Alerts are triggered. BMO actions are given as "may" or "should" be undertaken and specific conservation measure are considered voluntary. Similarly, mitigation measures in WR-1 "may" be implemented by aren't required even when it is determine that GCID's pumping has resulted in an impact to a third party well (page 3-40). With multiple, and apparently conflicting, thresholds of significance and multiple mitigation actions, all of which are voluntary, there is uncertainty whether the measures given in WR-1 for mitigating impacts to third party wells from drawdown due to the GCID project can be effective.

I recommend that in addition to resolving how the County BMOs and mitigation measure WR-1 will facilitate monitoring of the project's impacts (also see my comment no. 4), the DEIR be revised to provide additional discussion on the procedures for how a third party should proceed if a groundwater level threshold of significance is exceeded. The DEIR should discuss and provide an example of the types of data that would be needed to document impacts to a third party's well that's resulted from groundwater extractions by GCID's wells. The DEIR should provide information on how the antecedent trends in groundwater levels will be calculated and how these trends will be used to assess impacts from GCID's pumping. The DEIR should provide maps and additional analysis that shows which of the 136 wells is anticipated to be potentially impacted by GCID's pumping. The DEIR should calculate the potential drawdown impacts to third party wells using recent summer groundwater levels and the estimated pumping drawdowns at the third party wells along with the forecasted GCID drawdown. The DEIR should document that all of the wells within the forecasted outermost impact area were evaluated for potential drawdown impacts from GCID's pumping. I also recommend that the DEIR consider the use of an independent, neutral party for arbitrating any third party disputes of GCID project impacts.

10. Mitigation for potential land subsidence due to the project's groundwater extractions is given in mitigation measure WR-2 starting on page 3-41. Mitigation measure WR-2 has five progressive steps that rely on groundwater level measurements, the DWR extensometer and GPS network measurements, and possibly GPS or land elevation benchmark surveys specific to GCID. Each of these five steps have land subsidence thresholds that trigger actions. For example, progression from Step 1, groundwater level monitoring, to Step 2, ground surface elevation monitoring, is based on groundwater levels falling below historical low elevations. Mitigation measure WR-2 is silent on the fact that DWR finds that the groundwater levels in 30% or more of the wells within the four DWR Bulletin 118 basins that will be impacted by the project's extractions already are below the historical low elevations (Exhibit 18). This fact suggests that at the start of GCID's project mitigation measure WR-2 should begin with Step 2 and undertake active measurement of the changes in land surface elevation.

    Step 3 has three actions that **may** be taken when the amount of land subsidence is greater than 0.2 feet from the pre-operation level. Monitor, with the possible reduction or termination of pumping; investigate relocating pumping; or investigate infrastructures'

tolerances to subsidence. The reduction in subsidence resulting from termination or reduction in pumping is obvious. However, the relocation of pumping should trigger a new or supplemental CEQA process because the new pumping is a separate yet to be analyzed project that likely has new set of impacts. The investigation of infrastructures susceptible to subsidence should be done before, not after, subsidence has begun, and those structures that are most vulnerable should be part of the Step 2 monitoring program.

Steps 4 and 5 deal with subsidence from *non-project* pumping. Step 4 offers coordination with *non-project* pumpers and if the project's pumping is proven to have caused damage to infrastructures, then GCID will repair or replace each. Coordination with *non-pumpers* is a critical action. However, the assumption that subsidence can be attributed to a single pumper in an area of regional subsidence seems unrealistic. It also ignores the complexities of groundwater flow where the capture of groundwater by a well can result in down gradient impacts that are outside of the immediate vicinity of the pumping well. The replacement or repair of subsidence-impacted infrastructures should probably be the responsibility of all large volume groundwater extractors within the subsiding region, rather than trying to assert that only one pumper is responsible.

In Step 5, GCID may elect to monitor land subsidence using a GPS network or local land surveys; this action is already part of Step 2. Step 5 seems to say that the GPS or local survey subsidence monitoring would cease when groundwater levels recover above historical lows, but no longer than 6 months. Step 5 doesn't address the issue of the need to continue subsidence monitoring if the next year's pumping would again draw groundwater levels down below the historical lows. It is presumed that the historical low isn't a moving target, although this isn't actually stated. It also isn't clear if Step 5 is allowing that after 6 months if groundwater elevations rise above historical lows, then extraction by GCID's project can resume, but because the project description seems to be for extractions that continue in perpetuity this would be logical. Step 5 only requires that if groundwater levels don't recover above historic lows within 6 months, pumping would not resume for the next year. WR-2 is somewhat unclear if GCID pumping could continue in second year following a failure to recover above historic lows in 6 months, or whether the low groundwater level would be considered a "regional condition" and extractions could resume.

For some reason not explained in Step 5, if groundwater levels don't recover above historical lows after 6 months following cessation of GCID's pumping, then the drawdown is assumed to be a *regional condition* and Step 5 subsidence monitoring will stop. I assume this to mean that GCID has technical analyses to show that groundwater levels from their extraction will always recover to a near pre-pumping condition within at least six months. However, the six-month period seems to conflict with the project's description. The project is designed to be a multiyear project with pumping based on climatic conditions, that is, during dry and critically dry years and with reductions in the availability of surface water deliveries. The duration of the pumping is said to be 8.5 months (Section 2.3.2), which only leaves 3.5 months of recovery before the next cycle of pumping begins. So the requirement that unless groundwater levels recover above the historical low, GCID pumping won't continue the next year, really means recovery must occur within 3.5 months or pumping would need to be delayed for at least 2.5 months. If, at that time, groundwater levels haven't recovered above the historical low, then no GCID pumping would occur for the year, or perhaps the pumping would be relocated as in Step 3. However, if GCID's pumping is relocated, then it seems that the area of relocation might be within the portion of the basin that is contributing to the

regional subsidence condition, which would exacerbate the regional condition. Again the need for additional supplemental CEQA analysis with the use of relocated wells seems to be clear.

WR-2 is silent on the fact that the 2008 DWR/USBR GPS survey found subsidence that averaged -0.38 feet between 2004 and 2008 at the station designated "WILD" in an area about 9 miles northeast of extensometer 21N02W33M001M and 2 miles east of GCID Well No. 3 (Exhibit 17B), which exceeds the -0.2 foot threshold of Step 3 that triggers one or more mitigation measures be undertaken. This historical information suggests that a portion of the land adjacent to the GCID project wells may already be subsiding. It seems that either past GCID groundwater extractions and/or other *non-project* pumping has already created a *regional subsidence condition*. Follow-up measurements of the amount of subsidence since 2008 in the area of station "WILD" apparently haven't been taken, but are critical to establishing the status of land subsidence in the basin.

I recommend the following:

1) **The Draft EIR should be revised to provide additional discussion on subsidence in and adjacent to the project's impact area.**
2) **Specific information should be provided on why DWR has categorized the Corning sub-basin as having a high potential for future subsidence.**
3) **Information should be provided on the conditions at each of the three existing extensometers lying within or adjacent to the project's impact area. Specifically, what are the conditions at extensometer 21N02W33M001M that causes the active subsidence?**
4) **Information should be provided on how WR-2 will address the existing land subsidence in the area of "WILD" station. Specifically, what monitoring has already been done and needs to be in the future to evaluate the current condition of ground subsidence in the area?**
5) **Information should be provided on what actions will be undertaken at the start of the GCID project's pumping to mitigate known land subsidence.**
6) **Additional analyses should be provided on the condition of the ground water in the area(s) of the wells that DWR indicates already having levels below the historical lows.**
7) **Analysis should be provided on the potential for the project's pumping to increase the number of wells whose groundwater levels might fall below the historical low.**
8) **Additional analysis should be provided on the potential impacts from land subsidence to any relocation site for GCID wells and for any *non*-GCID wells that may be utilize for the project.**
9) **Additional information should be provided on the sequencing of GCID extractions, subsidence monitoring and the interaction with any *regional subsidence condition*.**
10) **Information should be provided regarding why GCID believes that the failure of groundwater levels at GCID project wells to recover above historical lows within 6 months following cessation of pumping is due to a *regional condition*.**

References Cited

Bouwer, H., 1978, Groundwater Hydrology, McGraw-Hill Book Company, New York, 480 pp.

Bredehoft, J., 2011, Hydrologic Trade-Offs in Conjunctive Use Management, Ground Water, vol. 49, no. 4, pgs 468-475.

CH2MHill, 2010, Groundwater Substitution Transfer Impact Analysis, Sacramento Valley, Technical Memorandum from Peter Lawson (CH2MHill) to Abdul Khan (DWR) and Bob Niblack (DWR), 10 pp., 10 Figures.

CH2MHill and MBK Engineers, 2015, SACFEM2013, Sacramento Valley Finite Element Groundwater Flow Model, User's Manual, February 2015, *in* Appendix M in the USBR/SLDMWA's March 2015 Long-Term Water Transfer EIS/EIR.

Department of Water Resources, CASGEM web site, (http://www.water.ca.gov/groundwater/casgem/online_system.cfm), accessed July 2015.

Department of Water Resources, Groundwater Information Center's GIS web site (https://gis.water.ca.gov/app/groundwater/, accessed July 2015.

Department of Water Resources, 2003, California's Groundwater, DWR Bulletin 118 - Update 2003, October 2003, 265 pp.

Department of Water Resources and United State Bureau of Reclamation, 2008, Project Report, 2008 DWR/USBR Sacramento Valley GPS Subsidence Report, September 30, 2008, 7 pp., Appendices A to F.

Department of Water Resources, 2013, California Water Plan Update 2013, Sacramento River Hydrologic Region, Volume 2, Regional Reports, 182 pp., http://www.waterplan.water.ca.gov/docs/cwpu2013/Final/Vol2_SacramentoRiverRR.pdf.

Department of Water Resources, 2014a, Summary of Recent, Historical, and Estimated Potential for Future Land Subsidence in California, 13 pp., 1 Appendix.

Department of Water Resources, 2014b, Northern Sacramento Valley Change in Groundwater Elevation Maps, (http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm)

Department of Water Resources, 2014c, Maps of Domestic and Production Well Depth Summary with Depth to Groundwater for Glenn County, DWR Northern Regional Office, January 2014 (http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm#Well%20Depth%20Summary%20Maps)

Ehorn, B., 2015, Letter to Glenn County Board of Supervisors, and Glenn County Water Advisory Committee, on results of 2004 to 2008 land subsidence GPS surveys performed in

Glenn County, dated February 3, 2015, presented at February 10, 2015 Water Advisory Committee meeting, Willows, CA, 3 pp., 1 Figure.

Faunt, C.C., ed., 2009, Groundwater Availability of the Central Valley Aquifer, California: U.S. Geological Survey Professional Paper 1766, pp. 225 (http://pubs.usgs.gov/pp/1766/).

Glenn-Colusa Irrigation District, 2013, Proposal, Monitoring and Reporting Plan, Groundwater Pumping Proposal, 20 pp.

Glenn County's Groundwater Management Plan, 2001, Basin Management Objective (BMO) for Groundwater Surface Elevations, in Glenn County, Glenn County – Ordinance 1115, August 21, 2001 (http://www.glenncountywater.org/management_plan.aspx)

Glenn County's Groundwater Management Plan Cover Report, Methods for Determining BMOs, 3 pp. (http://www.glenncountywater.org/documents/BMO_CoverReport_000.pdf)

Greene, T.J., and Hoover, K., 2014, Hydrostratigraphy and Pump-test Analysis of the Lower Tuscan/Tehama Aquifer, Northern Sacramento Valley, CA, California State University Chico, Department of Geologic and Environmental Sciences, dated November 2014, 105 pp.

JAMS, Arbitration, Mediation, and ADR Services, Sacramento, CA (http://www.jamsadr.com/)

Jenkins, C.T., 1968, Computation of rate and volume of stream depletion by wells: U.S. Geological Survey Techniques of Water-Resources Investigations, book 4, chap. D1, pp. 17 (http://pubs.usgs.gov/twri/twri4d1/)

Miller, C.D., Durnford, D., Halstead, M.R., Altenhofen, J., and Flory, V., 2007, Stream depletion in alluvial valleys using the *SDF* semianalytical model, Ground Water, v. 45, no. 4, p. 506–514

Northern California Water Association, 2002, Sacramento Valley Water Districts map, http://www.norcalwater.org/wp-content/uploads/district_map.pdf

United States Bureau of Reclamation, and San Luis & Delta-Mendota Water Authority, March 2015, Final Long-Term Water Transfer EIS/EIR (http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=18361)

Wallace, R.B., Yakup, D., and Annable, M.D., 1990, Stream depletion by cyclic pumping of wells, Water Resources Research, v. 26, no. 6, pgs. 1263–1270 (http://www.hydra.iwr.msu.edu/iwr/cv/proposals/publications/documents/1990/Stream%20Depletion%20by%20Cyclic%20Pumping%20of%20Wells%20Vol%2026%20No%206%20June%201990.pdf)

West Yost Associates, 2014, 2013 Final Water Transfer Report, prepared for Glenn-Colusa Irrigation District, dated May 2014, 16 pp., 5 Appendices.

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