

AQUALLIANCE

DEFENDING NORTHERN CALIFORNIA WATERS

Hearing in the Matter of California Department of Water Resources and United States Bureau of Reclamation Request for a Change in Point of Diversion for California WaterFix

Testimony of Barbara Vlamis on behalf of AquAlliance

I, Barbara Vlamis, do hereby declare:

I. Introduction

I am the Executive Director of AquAlliance and have 25 years of experience in environmental advocacy and education. AquAlliance is a not-for-profit California corporation that was formed in 2009. Its mission is to defend northern California waters and the ecosystems these waters support and to challenge threats to the hydrologic health of the northern Sacramento River Watershed, including escalating attempts to divert and withdraw more water from the northern Sacramento River hydrologic region. AquAlliance's members include farmers, scientists, businesses, educators, and residents who have significant financial, recreational, scientific, aesthetic, educational, and conservation interests in the aquatic and terrestrial environments that rely on waters of the Sacramento River Watershed. This hydrologic system provides water for orchards, homes, gardens, businesses, wetlands, streams, rivers, terrestrial habitat, and myriad species, which in turn allows AquAlliance members to reside, farm, fish, hunt, cycle, photograph, camp, swim, and invest in the economy of the region.

AquAlliance was formed because it was clear that “we,” the public and the environment of the Sacramento Valley, were on our own when it came to repercussions from large water transfers to buyers south of the Delta. We reached this conclusion after a committed handful of people tried over 15 years to prevent the repetition of the 1994 Drought Water Bank (“DWB”). The 1994 DWB led water districts in Butte and Yuba counties to sell Feather River water and pump groundwater. The two Butte County Districts, Western Canal Water District and Richvale Irrigation District, sold 100,000 acre-feet (“af”)¹ of the 115,000 af total.² This led to an increase in groundwater withdrawals used for irrigating rice. This early experiment in the conjunctive use of the groundwater resources precipitated a significant and immediate adverse impact to upslope wells.³ It caused the water levels to fall suddenly in shallow domestic wells,⁴ water quality to deteriorate in the wells serving the town of Durham,⁵ irrigation wells to fail on several orchards, and one farm to enter bankruptcy because it did not recover from the loss of its crop.

¹ Thomas, Gregory A. 2001. *Designing Successful Groundwater Banking Programs in the Central Valley: Lessons from Experience*. p. 30.

² Msangi, Siwa, 2006. *Third Party Effects and Asymmetric Externalities in Groundwater Extraction: The Case of Cherokee Strip in Butte County, California*. p. 9.

³ *Id.* p. 3.

⁴ Barris, Lynn, 1995. Personal communication.

⁵ Scalmanini, Joseph, 1995. Memo to Don Gilbert and Sandra Dunn, *VWPA SUBSTANTIATION OF DAMAGES*. p. 4

The apparent impacts reported from 1994 Drought Water Bank were challenged by state government and the water districts. Affected farms and homeowners were told they must prove that they and/or their farms had been impacted – something for which there was no preparation. Local government allied itself with the water sellers in the region. Legal remedies were extremely limited and very costly. People who were harmed discovered how vulnerable their farming and rural communities were to water mining. After this experience, local groundwater dependent farmers and activists tried engaging with the CalFed program, attempted to ignite protective policies at the county level, and took the 1994 story on the road for over a decade. Despite valiant efforts, the interests south of the Delta and the agencies that provide them with water were able to obscure the impacts from 1994 and continued with business as usual. Exhausted, most of the farmers and activists dropped out of the water justice struggle a decade later. AquAlliance was founded to continue and build upon their work to stop the decimation of the stunningly beautiful and prosperous northern Great Valley and its bountiful watershed.

II. WaterFix Project

~~The Bay Delta Conservation Program (“BDCP”) Draft Environmental Impact Statement/Environmental Impact Report (“DEIS/EIR”) and the WaterFix Supplemental Draft Environmental Impact Statement and Partially Recirculated Draft Environmental Impact Report (“SDEIS/RDEIR”) were completely inadequate. AquAlliance submitted comments for each phase of the BDCP and the WaterFix (“Project”) and found significant failures to disclose, analyze, and therefore propose mitigation for the Project.~~

My testimony in part summarizes the information that was provided in my comments on past water transfers and BDCP. These previous letters contain detailed material on potentially significant impacts to the Sacramento Valley groundwater and surface water systems from water transfers and should be considered in the Petition record.

- AquAlliance comments on the *2010-2011 Water Transfer Program*. (AquAlliance Exhibit 37)
- AquAlliance comments on the *2013 Water Transfer Program*. (AquAlliance Exhibit 38)
- AquAlliance comments on the *2014 Water Transfer Program*. (AquAlliance Exhibit 39)
- AquAlliance comments on the *2015 Long-Term Water Transfers* (aka 10-Year Water Transfer Program) (AquAlliance Exhibit 40)
- AquAlliance’s comments on the Bay Delta Conservation Plan’s DEIS/EIR. (AquAlliance Exhibit 41)

In addition, we submit the following comments previously submitted for water transfer projects and programs, attached hereto, as fully bearing upon the WaterFix Petition to Change the Point of Diversion:

- AquAlliance comments. Bureau of Reclamation’s Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft Environmental Impact Statement. (AquAlliance Exhibit 42)
- Mish, Kyran D., Comments BDCP DEIS/EIR. (AquAlliance Exhibit 43)
- Mish, Kyran D., 2014. Comments for AquAlliance on Long-Term Water Transfers Draft EIR/EIS. (AquAlliance Exhibit 44)

A. Hydrology

1. Capacity of the Project

What does it mean for the Sacramento River if the Twin Tunnels are constructed as planned with the capacity to take from 9,000 to 15,000 cubic feet per second (“cfs”)? That kind of capacity could drain between 38% - 63% of the Sacramento River’s average annual flow of 23,490 cfs at Freeport⁶ (north of the planned Twin Tunnels). As proposed, the Twin Tunnels will also increase water transfers when the infrastructure for the Project has capacity:

Alternative 4 provides a separate cross-Delta facility with additional capacity to move transfer water from areas upstream of the Delta to export service areas and provides a longer transfer window than allowed under current regulatory constraints. In addition, the facility provides conveyance that would not be restricted by Delta reverse flow concerns or south Delta water level concerns. As a result of avoiding those restrictions, transfer water could be moved at any time of the year that capacity exists in the combined cross-Delta channels, the new cross-Delta facility, and the export pumps, depending on operational and regulatory constraints, including BDCP permit terms as discussed in Alternative 1A.⁷ [This paragraph failed to remove “BDCP” from the SDEIS/RDER.]

2. Groundwater Existing Conditions

a) **Groundwater Elevation**

As you are aware, ~~the NEPA/CEQA documents for the~~ proponents’ testimony for the WaterFix ignored the watersheds that will provide the water for the Twin Tunnels. What you also know is that many California counties and communities have serious, historic groundwater declines, more recent significant groundwater declines, or both including in the source areas. Sacramento Valley groundwater is experiencing the most serious and persistent declines since the CVP and SWP projects were built. Despite this fact, DWR hasn’t provided a comprehensive assessment of groundwater overdraft in California for 35 years!⁸ Undaunted by such a dearth of information, DWR produced an *estimate* in 2003 that “[o]verdraft is estimated at between 1 to 2 million acre-feet annually” in California.⁹ The Bureau acknowledged these errors of omission in the 2015 *Coordinated Long-Term Operation of the Central Valley Project and State Water Project* Draft Environmental Impact Statement.

DWR’s knowledge of groundwater conditions exists even if it is not disclosed ~~in CEQA documents~~. For example, the 2009 Water Plan contains Table SR-3, a summary of the Sacramento River Hydrologic Region’s water balance for the years 1998-2005. The “Change in Groundwater Storage” row indicates declines in every year from 1999 to 2005, even in robust precipitation years. Six of those years have deficits over 1.2 million af with 1999 containing the largest deficit at 1.7 maf with 101% of normal precipitation (p. SR-18). What this reveals about the WaterFix is that both DWR and the Bureau cherry pick data regarding groundwater while they pursue transfers and the Water Fix.

AquAlliance believes that it is important that the SWRCB have some actual understanding of the conditions of our region in the Sacramento Valley. To highlight our concerns, we created Table 1 to

⁶ USGS 2009. <http://wdr.water.usgs.gov/wy2009/pdfs/11447650.2009.pdf>

⁷ USBR and DWR, 2015. SDEIS/RDEIR Appendix A, pp. 5-15, 5-16.

⁸ USBR, 2015. *Coordinated Long-Term Operation of the Central Valley Project and State Water Project* Draft Environmental Impact Statement. p. 7-12.

⁹ (*Id.*)

provide a summary of fall, county-level groundwater monitoring results from our region in the northern Sacramento Valley.¹⁰ Kit Custis will present the spring numbers, so you have the bookends of stress on the aquifers. Table 1 shows the tremendous declines and the Custis material illustrates the recovery or lack thereof.

Table 1.

County Fall '04 - '15	Deep Wells (Max decrease gwe)	Deep Wells (Avg. decrease gwe)**
Butte	-20.6 (-12.7)*	-12.8 (-10.5)*
Colusa	-87.3 (-59.5)*	-35.0 (-59.5)* (only 1 well was monitored in 2014)
Glenn	-89.9 (-79.7)*	-40.1 (-44.3)*
Tehama	-44.0 (-34.6)*	-11.6 (-10.9)*

County Fall '04 - '15	Intermediate Wells (Max decrease gwe)	Intermediate Wells (Avg. decrease gwe)**
Butte	-26.0 (-23.0)*	-12.9 (-9.4)*
Colusa	-125.4 (-40.6)*	-32.4 (-22.6)*
Glenn	-58.0 (-57.2)*	-26.7 (-25.0)*
Tehama	-35.9 (-30.2)*	-13.6 (-12.4)*

County Fall '04 - '15	Shallow Wells (Max decrease gwe)	Shallow Wells (Avg. decrease gwe)**
Butte	-19.2 (-17.6)*	-8.0 (-5.9)*
Colusa	-51.4 (-36.7)*	-10.5 (-7.6)*
Glenn	-58.0 (-53.5)*	-15.8 (-15.1)*
Tehama (Sac Valley basin)	-34.1 (-30.2)*	-11.1 (-9.5)*

- * 2004-2014 monitoring results are in parentheses for comparison with 2015 results.
- ** Some average well depth numbers are not accurately comparable between 2004-2014 and 2004-2015 due to a change in the number of wells monitored.
- Highlighted in yellow are negative changes of over 10 feet from 2014 to 2015.

Significant concerns about fall 2015 groundwater levels were summarized in the Northern Sacramento Valley Integrated Regional Water Management Board meeting: “Bill Ehorn (Chief of Groundwater Section in Northern Region Office, DWR) gave an update on groundwater levels within the NSV region. Change maps for October groundwater levels show that in much of the northern valley the groundwater levels are lower than 2011 – going from bad to worse. Historic groundwater level hydrograph maps show that groundwater levels are the lowest ever on record. A wet winter will help the water tables rebound but deeper aquifers will take longer to rebound.”¹¹ (emphasis added)

~~The absence of current scientific research in the Project’s DEIS/EIR regarding groundwater conditions in the source watershed and the failure to correct it in the SDEIS/RDEIR leaves the documents exceedingly deficient under NEPA and CEQA.~~

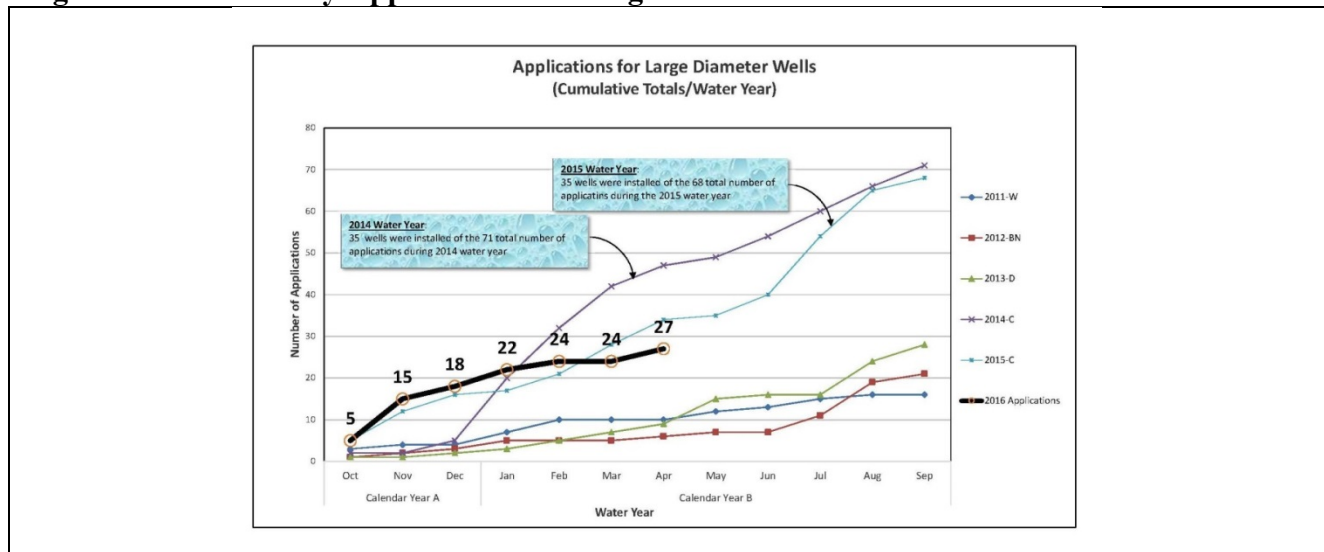
¹⁰http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm#Well%20Depth%20Summary%20Maps

¹¹ December 7, 2015. Minutes from Northern Sacramento Valley Integrated Regional Water Management Board Meeting, p. 4 of 23.

b) Groundwater Demand

Sadly, many local jurisdictions continue to ignore these serious threats to aquifers while others are taking preliminary steps to grapple with the increased extraction of groundwater. The responses to groundwater conditions have varied greatly by the four counties in Table 1. Colusa County initiated a well moratorium in 2015, but chose to end it in January 2016. They believe that the significantly depleted groundwater is mostly due to lack of precipitation since 2007. Due to dire conditions, Glenn County extended its 2015 well moratorium that ended August 3, 2016. Butte and Tehama counties are looking toward the Sustainable Groundwater Management Act (“SGMA”) process to make decisions regarding groundwater sustainability, despite the fact that well levels have continued to decline and, at least in Butte County, permits for new deep wells continue to escalate (see Figure 2).

Figure 1. Butte County Applications for Large Diameter Wells.¹²



c) Groundwater Age and Implications for Recharge

Nowhere in BDCP or WaterFix environmental documents did I encounter material discussing the age of groundwater or recharge in the Sacramento River Watershed despite the fact that the DEIS/EIR discusses the potential to transfer up to 1 million acre feet (“MAF”) per year with 400,000 af coming from groundwater substitution transfers.¹³ Notwithstanding the absence of disclosure in WaterFix documents regarding the age of groundwater or recharge in the Sacramento River Watershed, research by the academic community exists. For example, according to Professor Jean Moran regarding the mid Sacramento Valley, “Wells with top perforations below 300 ft bgs do not contain tritium. The large volume of old groundwater produced at drinking water wells has implications for groundwater management since recharge to these wells takes place over periods greater than 50 years. Relatively rapid groundwater flow is limited to the shallow regime in localized areas near the major streams and

¹² Butte County Environmental Health Department. May 2016.

¹³ DWR and USBR, 2013. Bay Delta Conservation Plan Draft Environmental Impact Statement/Environmental Impact Report.

“If all of these sources could be contracted with willing sellers in the same year, about 1,000,000 acre feet of cross-Delta transfer water might be generated. This estimate is approximately the same as that referenced in Reclamation’s Biological Assessment of the OCAP at Page 12-39: Water transfers would increase Delta exports from about 0 to 500,000 acre feet (af) in the wettest 80 percent of years and potentially more in the driest 20 percent years, and up to 1,000,000 af in the most adverse Critical year water supply conditions.” p. 5C-23

in fan sediments.”¹⁴ Dr. Moran’s Groundwater Ambient Monitoring Assessment report also demonstrated that except for fairly rapid recharge near streams in Chico, “Drinking water wells that back up to the foothills to the east, and wells to the north of Lindo Channel produce almost exclusively pre-modern groundwater.”¹⁵ This was also the case for “[d]eep monitoring wells, especially to the west of the Sacramento River, [that] produce paleowater that recharged more than ten thousand years ago.”¹⁶ “This implies that there is currently no active recharge to the Lower Tuscan aquifer system (M.D. Sullivan, personal communication, 2004),” explained Dr. Karin Hoover. She continued by stating, “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.”¹⁷

d) Groundwater Quality

A number of pollutants in Sacramento Valley groundwater have considerable potential to affect public health. The WaterFix ~~environmental review documents~~ testimony failed to consider that increased groundwater extractions for water transfers might:

- Mobilize PCE, TCE, and nitrate plumes under the City of Chico.¹⁸
- Mobilize arsenic and iron in domestic and public wells in part of Tehama County where "Fourteen percent of the wells had concentrations of both arsenic and iron above their associated CDPH MCLs or secondary MCLs."¹⁹

In addition, the ~~WaterFix environmental review~~ failed to describe a significant saline portion of the aquifer stratigraphy of the project area exists. 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.²⁰

Research that is more recent 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

¹⁴ Moran, Jean et al., 2005. *California GAMA Program: Groundwater Ambient Monitoring and Assessment Results for the Sacramento Valley and Volcanic Provinces of Northern California*, p. 46.

¹⁵ *Id.* p. 34.

¹⁶ *Id.* p. 46.

¹⁷ 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.

¹⁸ Moran, Jean et al. 2005. *California GAMA Program: Groundwater Ambient Monitoring and Assessment Results for the Sacramento Valley and Volcanic Provinces of Northern California*, p. 4.

¹⁹ 2010. *GAMA Domestic Well Project, Groundwater Quality Data Report, Tehama County Focus Area*. p. 5.

http://www.waterboards.ca.gov/gama/docs/tehama/tehama_summary_report.pdf

²⁰ *Id.*

brackish and saline water upconing beneath areas of prolonged groundwater pumping in the Sacramento Valley.”²¹

3. Water Transfers

AquAlliance and its members are deeply concerned about water transfers supplying significant water for the WaterFix. The source of water that is integral to the Project was mentioned, but not analyzed, in the environmental review documents. Appendix 5C revealed that there is the potential to transfer up to 1 million acre-feet per year with 400,000 af coming from groundwater substitution transfers.²²

Additionally, internal BCDP communication indicated that the purchase of approximately 1.3 million acre-feet (“MAF”) of water is being planned as a means to make up for flows that would be removed from the Sacramento River by the BDCP tunnels.²³ As provided above, it is possible that the Twin Tunnels may extract almost two-thirds of the average annual flow from the Sacramento River, which is what creates the drive for the 1.3 MAF. Notwithstanding the tremendous demand that will be placed on the Sacramento River Watershed, the Applicants (lead agencies) improperly concluded that, “~~The analysis of any potential upstream impacts from transfers is not a part of this EIR/EIS and must be covered pursuant to separate laws and regulations once the specific transfer has been proposed.~~” (DEIS/EIR p. 5-77)

During these hearings, I heard the Applicants’ representatives unable to answer questions regarding whether or not transfers will increase. Nevertheless, the SDEIS/RDEIR acknowledged that the Project would deliver less water south of the Delta (SDEIS/RDEIR 4.3.1-9) and preferred Alternative 4A “would increase water transfer demand compared to existing conditions.” (*Id.*) The Project document also demonstrated that past transfers have taken place in all water year types and when SWP and CVP south-of-Delta contractors receive allocations of all kinds (DEIS/EIR p. 5-51), notwithstanding that the Applicants downplay this by stating that, “Little demand exists in wetter years due to greater SWP and CVP deliveries and availability of alternative local supplies,” and then clarifies that, “Some water agencies in the export service area have suffered from chronic water supply reductions, especially the San Luis and Delta-Mendota Water Authority, representing numerous CVP contractors in the export service area,” (DEIS/EIR p. 5-50). I emphasize again that there is no analysis-disclosure of the significant impacts to wells, communities, farms, recreation, and human health that will accompany increased transfers due to the Project ~~in clear violation of NEPA and CEQA.~~

I would like to add that ~~the Project’s DEIS/EIR~~ WaterFix testimony makes ~~made~~ it quite difficult to believe there will be any limitations on transfers if the Project is built. The DEIS/EIR also stated that north-to-south water transfers will occur during dry years when State Water Project (“SWP”) contractor allocations drop to 50 percent of Table A amounts or below or when Central Valley Project (“CVP”) agricultural allocations are 40 percent or below, or when both projects’ allocations are at or below these levels (p. 5-52). However, the DEIS/EIR itself demonstrated that this has not been the

²¹ Springhorn, Steven T., et 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>

²² DWR and USBR, 2013. Bay Delta Conservation Plan Draft Environmental Impact Statement/Environmental Impact Report.

"If all of these sources could be contracted with willing sellers in the same year, about 1,000,000 acre-feet of cross-Delta transfer water might be generated. This estimate is approximately the same as that referenced in Reclamation’s Biological Assessment of the OCAP at Page 12-39: Water transfers would increase Delta exports from about 0 to 500,000 acre-feet (af) in the wettest 80 percent of years and potentially more in the driest 20 percent years, and up to 1,000,000 af in the most adverse Critical year water supply conditions.” p. 5C-23

²³ Belin, Lety, 2013. Department of Interior e-mail regarding Summary of Assurances.

historic pattern. In Table 5-2, it is clear that past water transfers have regularly occurred when SWP and CVP San Joaquin Ag allocation percentages have been much higher such as:

- 2002 when SWP and CVP San Joaquin Ag allocations were 70 percent each.
- 2003 when allocations were 90 (SWP) and 75 (CVP SJ Ag) percent.
- 2004 allocations were 65 (SWP) and 70 (CVP SJ Ag) percent.
- 2007 allocations 60 (SWP) and 50 (CVP SJ Ag) percent.

(DEIS/EIR p. 5-51). ~~You should know that the SDEIS/RDEIR did not correct this narrative or disclose what sector received the lion's share of the transfer water.~~

The WaterFix is a clear danger to the people of the Sacramento Valley and surrounding foothills. ~~There is an~~ increased likelihood of groundwater substitution transfers under the WaterFix ~~that~~ will deplete water tables, increase costs to groundwater dependent homes, farms, and businesses, cause more losses to rivers and streams upstream of pumping, mobilize polluted plumes, and impact terrestrial habitat downstream that is essential for wildlife, including special status species, refuges, ~~recreation~~, tourism, and local economies that benefit from tourism. Simply because the Applicants have not adequately studied, presented, or analyzed impacts from current and planned transfers, and only played lip service to modeling, does not mean there are no highly probable impacts to AquAlliance's members, the general public, visitors to the Sacramento Valley, and the environment on which all life depends. The 1994 Drought Water Bank discussed above was the grand experiment, as I call it, and it failed. The WaterFix is 1994 on steroids. I am here to tell you that the people, farms, and businesses of the NorthState will not go quietly into the night as water players from Washington to Sacramento to Fresno try to replicate the egregious mistakes from the Owens and San Joaquin valleys.

a) Cumulative Transfers Not Disclosed

Potential cumulative impacts from the Project and the numerous existing plans and programs that extract NorthState water for sales within and without the Sacramento Valley have either not been provided to the public by the Applicants or, if already disclosed, were considered in only a cursory manner. I provide you with a list of what I am aware of that most certainly needs to be thoroughly ~~considered and~~ reviewed ~~in another WaterFix NEPA/CEQA document.~~

(i) *Water Transfer Plans, Projects, and Programs*

The Bureau, DWR, the SWRCB, and individual water districts have claimed much of the transfer water market was "one-year," "short-term," or an "emergency." The serial and escalating nature of water transfers from the Sacramento Valley to south-of-Delta fit none of those descriptions. Examples of the type of material that should have been provided and analyzed cumulatively in WaterFix environmental review and has a direct bearing on the hydrologic foundation that NorthState residents, businesses, farms, and tourists depend includes:

- Environmental Assessment and Findings of No Significant Impact ("FONSI") for the *2008 Option and Forbearance Agreement Between Glenn-Colusa Irrigation District, San Luis & Delta-Mendota Water Authority and the United States Bureau of Reclamation, and Related Forbearance Program*. The proposed project planned to transfer Sacramento River water, up to 85,000 acre-feet (AF), in accordance with a forbearance program undertaken by Glenn Colusa Irrigation Project ("GCID") through voluntary crop idling or crop shifting (82,500AF), and to provide up to 2,500 acre-feet with groundwater substitution produced from two GCID-owned groundwater wells located near the western edge of Butte County.
- Environmental Assessment and FONSI, *2009 Drought Water Bank*. The Bureau and 20 of its contractors planned to sell 199,885 af through a combination of crop idling, crop

substitution, groundwater substitution, and reservoir reoperation.²⁴ “The cumulative total amount potentially transferred under the DWB from all sources would be up to 370,935 af.” (*Id.* p. 10) However, DWR and the Bureau allowed up to a maximum 600,000 af.²⁵

- Environmental Assessment and FONSI for the *2010-2011 Water Transfer Program*. 395,910 AF of CVP and non-CVP water. That AquAlliance sued over the inadequate Environmental Assessment should be noted.
- For 2012 and 2013, the Bureau disclosed the amount of water that was actually transferred in their 2015 Operations DEIS, but failed to reveal that significantly more water was planned for south-of-Delta transfers.²⁶ This is a crucial point when considering a growing dependence on transfers as demand escalates and in analyzing cumulative impacts.
 - Initiating Section 7 Consultation letter 2012. “For 2012 water transfers, Reclamation anticipates a maximum of approximately 76,000 acre-feet of water could be transferred. The 76,000 acre-feet of transfer water would be made available through groundwater substitution.” (p. 2) The Operations DEIS revealed that 47,420 af were actually transferred, but the uppermost potential for the 76,000 af transfer all from groundwater substitution combined with all other transfers was not disclosed.
 - The DEIS disclosed that in 2013 63,790 af were transferred. The amount of water planned for transfer from all sources was not provided.
- The Bureau and the San Luis Delta Mendota Water Authority’s (“SLDMWA”) 2014 Environmental Assessment/Initial Study. “The Proposed Action is for sellers to potentially make available up to 175,226 AF of water based on a 75 percent CVP water supply forecast for Settlement Contractors. Sellers could make water available for transfer through groundwater substitution, cropland idling, or crop shifting. Other transfers not involving the SLDMWA and its participating members could occur during the same time period. The Tehama Colusa Canal Authority (TCCA) released a separate EA/IS to analyze transfers from a very similar list of sellers to the TCCA Member Units.” AquAlliance sued the Bureau over the inadequate EA/IS.
- The Bureau and SLDMWA’s *Environmental Impact Statement and Environmental Impact Report* for the *2015-2024 Long Term North-to-South Water Transfer Program*. The DSEIS/REIR mentioned the 10-year water transfer program and disclosed the uppermost amount of water that may be transferred: 600,000 af each year. This amount of water over the 10-Year period is equivalent to water needs by a city the size of Chico with 100,000 people. A lawsuit on federal and state claims was filed in May 2015.
- Bureau and Tehama Colusa Canal Authority, multiple years (e.g. 2014, 2015, 2016): Draft Environmental Assessment, Initial Study, and Mitigated Negative Declaration for the *Tehama Colusa Canal Authority In Basin Water Transfers*.

²⁴ Bureau, 2009. Final FONSI. pp. 2-3.

²⁵ Bureau & DWR 2009. *Addendum to the Environmental Water Account Environmental Impact Statement/Environmental Impact Report* p. ES-5.. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=107

²⁶ USBR, 2015. *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft Environmental Impact Statement*. p. 5-59. “Water transfers involving CVP and SWP water: -2012: 47,420 acre-feet of water transfers... - 2013: 63,790 acre-feet of water transfers...”

- Bureau 2016 Environmental Assessment for the *Accelerated Water Transfer and Exchange Program for Sacramento Valley Central Valley Project Contractors – Contract Years 2016-2020*.
- The Bureau should disclose how it and DWR began programmatic environmental review for the SVWMA to facilitate water transfers from the Sacramento Valley, but never completed it. The interconnected actions that were integrally related to it were impermissibly separated from the annual transfers for piecemeal review as AquAlliance presents above.²⁷

(ii) *Other Projects*

Additional projects with cumulative impacts upon groundwater and surface water resources that were not part of Project environmental review include:

- Court settlement discussions between the Bureau and Westlands Water District over provisions of drainage service. Case # CV-F-88-634-LJO/DLB will further strain the already over allocated Central Valley Project with the following conditions:
 - A permanent CVP contract for 890,000 acre-feet of water a year exempt from acreage limitations.
 - Minimal land retirement consisting of 100,000 acres; the amount of land Westlands claims it has already retired (115,000 acres) will be credited to this final figure. Worse, the Obama administration has stated it will be satisfied with 100,000 acres of “permanent” land retirement.
 - Forgiveness of nearly \$400 million owed by Westlands to the federal government for capital repayment of Central Valley Project debt.
- Five-Year Warren Act Contracts for Conveyance of Groundwater in the Tehama-Colusa and Corning Canals – Contract Years 2013 through 2017 (March 1, 2013, through February 28, 2018).
- The DWR Dry Year Purchase Agreement for Yuba County Water Agency water transfers from 2015-2025 to SLDMWA.²⁸
- GCID’s *Stony Creek Fan Aquifer Performance Testing Plan* to install seven production wells in 2009 to extract 26,530 AF of groundwater as an experiment. It was subject to litigation due to GCID’s use of CEQA’s exemption for research.
- Installation of numerous production wells by the water districts and their members. Many wells were installed with the use of public funds such as Butte Water District,²⁹ GCID, Anderson Cottonwood Irrigation District,³⁰ and Yuba County Water Authority³¹ among others.

²⁷ See 68 Federal Register 46218 (Aug 5, 2003) (promising a Programmatic EIS on these related activities, “include[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).

²⁸ SLDMWA Resolution # 2014 386

http://www.sldmwa.org/OHTDocs/pdf_documents/Meetings/Board/Prepacket/2014_1106_Board_PrePacket.pdf

²⁹ DWR. *Proposition 13 Groundwater Grants and Loans: Program Summary. 2000-2004*. “Develop two production wells and a monitoring program to track changes in groundwater levels due to groundwater extraction & natural recharge. \$1,397,149. p. 7.

³⁰ Bureau, 2011. *Anderson-Cottonwood Irrigation District Integrated Regional Water Management Program – Groundwater Production Element Project EA/IS/FONSI*. “The ACID Groundwater Production Element Project includes

- GCID's 10 Wells Project proposed 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-March 15 and April 1-November 15. The annual, maximum, cumulative total pumping is 28,500 af and is more water than the annual use of the Chico district of California Water Service Company that serves over 100,000 people.³² GCID abandoned this project after intense public and legal pressure.

4. Streamflow Depletion

With all the projects, plans, and programs seeking to extract massive amounts of water from the Sacramento River Watershed, you would think there would have been some intense scientific scrutiny over decades of numerous topics, but particularly hydrology. The depletion of streamflow and the interaction between streams, rivers, and groundwater all seemed ripe for study since our laws require disclosure, documentation, analysis, and avoidance of impacts. I finally had it pounded into my head that this was *not* going to happen almost a decade ago. It is an important factual story.

I called the Bureau to find out what was the status of the Sacramento Valley Water Management Agreement ("SVWMA") draft EIS/EIR that the Applicants initiated, theoretically, after the 2003 federal register notice.³³ I was referred to a Bureau employee who I had never spoken with before. He was terse from the start and told me that the Bureau and DWR had both spent a million dollars each on the project, but when I pressed him for the third time for an answer to my question – why isn't the draft environmental review finished – he yelled over the phone, "Because the science isn't there!" Finally a clear answer from the Bureau. Moreover, since the science *still isn't there*, AquAlliance hired Mr. Kit Custis to help us not only understand the facts, but present them in usable form – something the Applicants have refused to do despite the fact that Mr. Custis uses their data.

As mentioned many times already, the Applicants denied the public disclosure, analysis, and mitigation measures to the watershed of origin for the source water to fill the Twin Tunnels. This deficiency strikes at the core of our critique, which views the CVP and the SWP as once intending to operate within the law, albeit with more water on paper than could ever be available, until the limits of hydrology caused the Agencies and some of their contractors to look for tools to game the law, and the hydrology, of California.

The CVP and SWP have extended water far from the areas of origin for agricultural, urban, and industrial uses. In so doing, particularly with paper water, the state and federal governments have facilitated a destructively unrealistic demand for water. Ever willing to destroy natural systems to meet demand for profit, the San Joaquin River dried up and subsidence caused by groundwater depletion in the San Joaquin Valley is even cracking water conveyance facilities.³⁴ The continual, long-term

the installation of two groundwater wells to supplement existing district surface water and groundwater supplies." p. 1-1. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=8081

³¹ DWR. *Proposition 13 Groundwater Grants and Loans: Program Summary. 2000-2004*. "Install eight wells in the Yuba-South Basin to improve water supply reliability for in-basin needs and provide greater flexibility in the operation of the surface water management facilities. \$1,500,000. p. 10.

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

³³ Federal Register /Vol. 68, No. 150 /Tuesday, August 5, 2003 /Notices.

³⁴ Sneed, et al., 2012. Abstract: *Renewed Rapid Subsidence in the San Joaquin Valley, California*.

"The location and magnitude of land subsidence during 2006–10 in parts of the SJV were determined by using an integration of Interferometric Synthetic Aperture Radar (InSAR), Global Positioning System (GPS), and borehole extensometer techniques. Results of the InSAR measurements indicate that a 3,200-km² area was affected by at least 20 mm of subsidence during 2008–10, with a localized maximum subsidence of at least 540 mm. Furthermore, InSAR results indicate subsidence rates doubled during 2008. Results of a comparison of GPS, extensometer, and groundwater-level data

groundwater overdraft in the San Joaquin Valley, the expansion of new permanent crops in both the San Joaquin and Sacramento valleys, and groundwater substitution transfers by CVP and SWP contractors *all* cause streamflow depletion. Enter conjunctive use in the Sacramento Valley starting during the 1991-1994 Drought Water Bank and again with the SVWMA with the Applicants facilitating and their contractors implementing river water sales and groundwater substitution to continue crop production. Over 25 years the Applicants have failed to present to the public how the CVP and SWP caused and currently cause streamflow depletion. This is equally true for the WaterFix and is a major omission that leaves the SWRCB without a CEQA document on which to rely.

The 2014 work of Mr. Custis made it clear what the historic and current trends are in AquAlliance Exhibit 62. In addition, DWR's own consultant demonstrated that the impacts are significant. Peter Lawson of CH2MHILL wrote in a 2010 memo to DWR, "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."³⁵ The results of the model run was the best prediction available to Applicants and suggested caution above all else, even though they are preliminary and the model subject to modification.³⁶ Instead of implementing this conservative result from 2010 that used a model the Applicants rely on for other analysis, the Applicants continue to use a 12 or 13 percent deduction for streamflow and may be causing considerable legal injury to other users and the environment.

Dan Wendell of The Nature Conservancy presented a similar picture as a panelist at a workshop held by the California Natural Resources Agency, the California Department of Food and Agriculture, and California EPA on March 24, 2014. Moreover, he also raised the alarm about how long it takes for streamflow losses to appear:

The Sacramento Valley still has water levels that are fairly shallow," he said. "There are numerous perennial streams and healthy ecosystems, and the basin is largely within a reasonable definition of sustainable groundwater yield. However, since the 1940s, groundwater discharge to streams in this area has decreased by about 600,000 acre-feet per year due to groundwater pumping and it's going to decrease an additional 600,000 acre-feet in coming years under 2009 status quo conditions due to the time it takes effects of groundwater pumping to reach streams. It takes years to decades, our work is showing.

B. Subsidence

As with other potential impacts in the Sacramento River Watershed that were not addressed in the BDCP and WaterFix environmental review, subsidence is also lacking. The Applicants are well aware of subsidence issues in the Sacramento Valley and their WaterFix project proposes up to 400,000 af of groundwater substitution transfers as mentioned above in the very the region experiencing the

suggest that most of the compaction occurred in the deep aquifer system, that the critical head in some parts of the deep system was exceeded in 2008, and that the subsidence measured during 2008–10 was largely permanent." Conference presentation at *Water for Seven Generations: Will California Prepare For It?*, Chico, CA.

³⁵ Lawson 2010. *Groundwater Substitution Transfer Impact Analysis, Sacramento Valley*.

³⁶ WRIME 2011. *Peer review of Sacramento valley Finite Element Groundwater Model (SacFEM)*

subsidence. Relevant information regarding subsidence from other documents produced by the Applicants includes:

- “Land subsidence has not been monitored in the Redding Area Groundwater Basin. However, there would be potential for subsidence in some areas of the basin if groundwater levels decline below historic low levels. 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 Area Groundwater Basin could be conducive to land subsidence.”³⁷ (emphasis added)
- “Out of the 11 [DWR] extensometers five show potential subsidence over time:
 - “09N03E08C004M, in Yolo County within Conaway Ranch: DWR observed inelastic land subsidence estimated at approximately 0.2 foot from 2012 to 2013 and an additional 0.6 foot from 2013 to 2014 (DWR 2014b). In comparison, slightly less than 0.1 feet foot of subsidence occurred over the previous 22 years (1991-2012);
 - “11N01E24Q008M, in Yolo County near the Yolo-Zamora area: 0.5 to 0.6 foot decline from 1992 to present;
 - “11N04E04N005M, in Sutter County: approximately 0.01 foot decline from 1994 to present;
 - “21N02W33M001M, in Glenn County: 0.05 foot decline from 2005 to present; this extensometer is located in areas in which the Tehama Formation is mapped in the subsurface and indicates the potential for inelastic subsidence (West Yost Associates 2012); and
 - “16N02W05B001M, in Colusa County: 0.04 foot decline from 2006 to present.

“Historically, land subsidence occurred in the eastern portion of Yolo County and the southern portion of Colusa County, due to extensive groundwater extraction and that region’s geology. The earliest studies on land subsidence in the Sacramento Valley occurred in the early 1970s when the U.S. Geological Survey (USGS), in cooperation with DWR, measured elevation changes along survey lines containing first and second order benchmarks. As much as four feet of land subsidence due to groundwater withdrawal occurred east of Zamora over the last several decades. The area between Zamora, Knights Landing, and Woodland has been most affected (Yolo County 2009). Subsidence in this region is generally related to groundwater pumping and subsequent consolidation of compressible clay sediments.”³⁸

- 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 and DWR and the Bureau conducted a second survey jointly in 2008.³⁹ The Bureau’s SWP partner, DWR, presented the results of the 2004 and 2008 GPS subsidence monitoring to the Glenn County Water Advisory Committee in February 2015, which identified an area of subsidence east of the GCID wells at an average of -0.38 feet.⁴⁰

Added to this is personal experience by a farmer in Glenn County:

³⁷ USBR and SLDMWA, 2015. Final EIS/EIR *Long-Term Water Transfers*. p. 3.3-23.

³⁸ *Id.* p. 3.3-69 to 3.3-70.

³⁹ 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.

⁴⁰ 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.

My Grandmother's historic brick and beam Ranch Style house started cracking 3 years ago, after 60 years of none. In the confluence of the GCID pumps, subsidence has dropped one of my well pads. A 30 year old PVC pipeline buried 5 feet deep decided to shift and break for no reason, this spring.

I am facing the immediate replacement of at least 3 wells. The local farmers in the area of your [GCID's] influence have all been paying more money for the same water. Water quality changes in 2 of my other wells have cost me a fortune this year to keep the systems clean. I believe because of your drawing down the aquifers.⁴¹

III. NorthState Population

As mentioned generally above, AquAlliance represents many residents, businesses, and farms that depend on the health of the Sacramento River foothill and valley watershed. The Central Valley Project and the State Water Project impacted counties presented below are where water selling water districts are prominent. As you will see, the majority of the population depends on groundwater for its personal and economic uses. The impacts from the Project to the many thousands of people in the Sacramento Valley are not disclosed or analyzed because the Applicants have separated the Project from the source of the water for the Project. ~~The Applicants decision to avoid disclosure and analysis of the water source areas violates CEQA's prohibition against segmenting a project.~~

A. Butte County

Estimated Population - 224,601⁴²

There are over 12,699 domestic wells alone in Butte County and approximately 2,579 irrigation wells.⁴³ The Chico Urban Area is the largest urban center north of Sacramento with a population of approximately 102,000.⁴⁴ It is nestled against the foothills of the Cascade and Sierra mountain ranges and is entirely dependent on groundwater. Seven streams traverse Chico and carry significant water from the eastern watershed to the Sacramento River.

The majority of wells used in Butte County and throughout the Sacramento Valley are individual wells that pump from varying strata in the aquifers. The thousands of domestic wells in the Project's source area are vulnerable to groundwater manipulation and lack historic monitoring. The Bureau's 2009 Drought Water Bank Environmental Assessment elaborated on this point regarding Natomas Central MWC (p. 39) stating that, "Shallow domestic wells would be most susceptible to adverse effects. Fifty percent of the domestic wells are 150 feet deep or less. Increased groundwater pumping could cause localized declines of groundwater levels, or cones of depression, near pumping wells, possibly causing effects to wells within the cone of depression." In addition, a number of groundwater dependent farmers in Butte County who have deeper wells have told me that the escalating costs to maintain, rehabilitate, and at times drill new wells will eventually put them out of business.

⁴¹ Billiou, Michael, 2015. Written comments on the draft EIR for the Glenn Colusa Irrigation District 10-Wells Project.

⁴² Department of Finance, 2016. E-1: City/County Population Estimates with Annual Percent Change.

<http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/>

⁴³ DWR, 2016. Spreadsheet.

⁴⁴ Department of Finance, 2016. E-1: City/County Population Estimates with Annual Percent Change.

<http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/> and personal communication with Chico Planning Department.

B. Colusa County

Estimated Population – 21,948⁴⁵

- The largest City in Colusa County is Colusa with a population of 6,315.
- There are 1,337 domestic wells, 57 public supply wells, and 1,131 irrigation wells in Colusa County to date.⁴⁶

C. Glenn County

Estimated Population – 28,668⁴⁷

- The City of Orland has a population of 7,676 people⁴⁸ and is located on the west side of the Sacramento River.
- The City of Willows has a population of 6,154 people⁴⁹ and is located on the west side of the Sacramento River.
- There are 2,923 domestic wells, 34 public supply wells, and 1,849 irrigation wells in Glenn County to date⁵⁰

D. Shasta County

Estimated Population – 178,952⁵¹

- Shasta County's largest city is Redding with a population of 90, 230. Redding is in the northern Sacramento Valley and is bifurcated by the Sacramento River.
- There are 11,253 domestic wells, 219 public supply wells, and 363 irrigation wells in Shasta County to date⁵²

E. Tehama County

Estimated Population - 63,934⁵³

- Tehama County's largest city is Red Bluff with a population of 14,048.⁵⁴ Red Bluff is bifurcated by the Sacramento River. "Groundwater use for irrigated agriculture increased to two-thirds of the irrigated agriculture supply in the 1990s and continues at a similar rate to the present day (FCWCD 1996). "Other factors have also contributed to an increasing reliance of groundwater, including local and statewide population growth, changing land use patterns, increased environmental water use, and water supply reliability. Increased municipal and industrial uses within the County rely almost entirely on groundwater as a water source."⁵⁵

⁴⁵ *Id.*

⁴⁶ DWR, 2016. Spreadsheet.

⁴⁷ Department of Finance, 2016. E-1: City/County Population Estimates with Annual Percent Change. <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/>

⁴⁸ City of Orland Department of Finance. 2016. http://cityoforland.com/business/city_demographics.asp

⁴⁹ City of Willows 2015. Housing Element. http://www.cityofwillows.org/vertical/sites/%7B7D6DB31A-99CB-469D-88CF-327433878F6D%7D/uploads/Housing_Element_Adopted_2015.pdf

⁵⁰ DWR, 2016. Spreadsheet.

⁵¹ Department of Finance, 2016. E-1: City/County Population Estimates with Annual Percent Change. <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-1/>

⁵² DWR, 2016. Spreadsheet.

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ Tehama County Flood Control and Water Conservation District, 2003. *Water Inventory and Analysis. Water Inventory*

- There are 10,589 domestic wells, 111 public supply wells, and 1,591 irrigation wells in Tehama County to date⁵⁶

IV. Conclusion

As demonstrated in our testimony, there is a great deal omitted from the WaterFix NEPA and CEQA documents on which you must rely for this Petition. ~~The Applicants ignored the requirements of NEPA and CEQA that demand entire project disclosure and analysis with impacts avoided or mitigated.~~ It is as if where the water comes from has no meaning. As if the Sacramento Valley and foothill people, farms, and businesses that all depend on the water that supports the human and natural landscapes are not there. Until the Applicants are challenged – here and in court – they will ignore the water, the land, and the people that will be sacrificed for the dreams of three governors, numerous speculators, and less than 2% of the NorthState population that stands to make money mining water.

But don't we all know where the water is coming from? Where is the infrastructure to move water, a crop that is easily fallowed, large groundwater basins, and a pattern of water sales? (see Figure 2)

~~The Applicants decision to avoid disclosure and analysis of the water source areas violates CEQA's prohibition against segmenting a project to evade proper environmental review.~~⁵⁷ AquAlliance and our colleagues have done all we can in responding to Project documents, attending meetings, and participating in the SWRCB WaterFix hearing. ~~We~~ So far we have not been heard. It is as if we are not part of California. As if our watershed, California's largest, has an endless supply of water. As if you can trick not only people, but hydrology. And because the Sacramento River Watershed would wither and die like the watersheds of the San Joaquin and Owens rivers - in someone else's lifetime - should we not care? Should you not care? For as goes the Sacramento River and its watershed, so goes the State of California. If you do not hold the Applicants accountable for their errors and omissions, the public will be forced to fill your shoes in a court of law.

Executed on the 16th ~~31st~~ day of ~~August~~ October, 2016 in Chico, California



Barbara Vlamis
Executive Director
AquAlliance
P.O. Box 4024
Chico, CA 95927

and Analysis. p. ES-1.

⁵⁶ DWR, 2016. Spreadsheet.

⁵⁷ *Laurel Heights Improvement Association v. Regents of the University of California*, 1988, 47 Cal.3d 376

Figure 2. Selling Water Districts in the Sacramento Valley.

