

commentletters

From: Todd Shuman <tshublu@yahoo.com>
Sent: Friday, October 28, 2016 12:50 PM
To: commentletters; Landau, Katheryn@Waterboards
Subject: Comment Letter – 2016 Bay-Delta Plan Amendment & SED: From Todd Shuman, Analyst, Wasteful UnReasonable Use
Attachments: WURU Amended Complaint 09 29 2016.pdf
Follow Up Flag: Follow up
Flag Status: Flagged



To Jeanine Townsend, Clerk to the State Water Resources Control Board (SWRCB),

I wish to express my support for SWRCB proposals presented in the 2016 Bay-Delta Plan Amendment and SED that would have the effect of re-allocating future California surface water flows away from water uses that are substantially associated with dairy/livestock feed crop-related agricultural production in the San Joaquin Valley (as well as flood-irrigated agricultural rice production in the Sacramento Valley). I support a robust re-allocation of surface water flows that would promote native fisheries protection and restoration in the Bay Delta, the San Joaquin River (SJR), and the three tributaries to the SJR (Tuolumne, Merced, and Stanislaus rivers) that are identified within (and which are the foci of) this Bay-Delta Plan Amendment and SED. I also wish to express my support for even higher re-allocation targets proposed by the SWRCB that would promote heightened fisheries protection and restoration in the project area.

The rationale underlying my support for such a position is documented in the attached complaint that I previously submitted to the SWRCB and CalEPA on September 29, 2016. (In short, I argue that it is unethical to further jeopardize native fisheries in California in order to sustain allocation of surface water flows toward agricultural uses that are demonstrably wasteful and unreasonable.)

Please incorporate these comments and the attached complaint into the formal administrative for this proceeding. I wish to note for the record that all of the analysis upon which my September 29, 2016 complaint is based can be located for download at <http://wumu-wuru.my-free.website/>

I would be most appreciative if an acknowledgement of receipt by the SWRCB could be emailed to me. An earlier submitted comment concerning

Sincerely,

Todd Shuman, Senior Analyst, Wasteful Unreasonable Use,

P.O. Box 528, Camarillo, CA 93011, tshublu@yahoo.com, 805.236.1422

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, FAX: (916) 341-5400
Web: <http://www.waterboards.ca.gov/waterrights>
Rich.Satkowski@waterboards.ca.gov

Complaint

I, Todd M. Shuman, Senior Analyst, Wasteful UnReasonable Use (WURU), P.O. Box 528, Camarillo, CA, 93011 present the following complaint to the SWRCB concerning the use of water by David Valadao, James O'Banion, James L. Nickel, Stewart/Lynda Resnick, and Donald Bransford to produce livestock feed crops and rice.

Introduction

Based on previously-submitted comments, I allege that the past use of water by David Valadao, James O'Banion, James L. Nickel, and Stewart/Lynda Resnick to produce livestock feed (and to produce crops which resulted in livestock feed crop tonnage) was wasteful, unreasonable, and unconstitutional. I request that the State Water Resources Control Board (SWRCB) issue a finding that past use of water by Valadao, O'Banion, Nickel, and the Resnicks to produce livestock feed (and to produce crops that resulted in livestock feed crop tonnage) was wasteful, unreasonable, and unconstitutional. I request that the SWRCB issue a finding that current use of water, by Valadao, O'Banion, Nickel, and the Resnicks, to produce livestock feed (and to produce crops that results in livestock feed crop tonnage) is wasteful, unreasonable, and unconstitutional. I further request that the SWRCB issue a finding that further use of water by Valadao, O'Banion, Nickel, and Cameron to produce livestock feed (and to produce crops that will likely result in livestock feed crop tonnage) will be considered by the SWRCB to be wasteful, unreasonable, and unconstitutional.

I also allege that the use of water by Donald R. Bransford to produce rice has been, is currently, and will likely be wasteful, unreasonable, and unconstitutional. I request that the SWRCB issue findings concerning rice that are comparable to findings that should be issued concerning livestock feed crops.

References and Summary of References

I incorporate by reference and summarize below:

A. July 6, 2015 comment titled "June 8, 2015 Temporary Urgency Change Petition Concerning SWP/CVP and Water Deliveries, in relation to the April 6, 2015 TUCO", submitted by Ara Marderosian (Sequoia ForestKeeper), Guy Saperstein, Alexandra Paul, Jon Marvel, Connie Hanson, Mike Hudak, Lorelei Plotczyk, Lorin Lindner, Marcia Hanscom, Robert Roy van de Hoek, and Todd M. Shuman (Wasteful UnReasonable Use).

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian070615.pdf)

This referenced document explored "waste or unreasonable use" claims with regard to flood irrigation of alfalfa and irrigated pasture in terms of both "method of water use" and "use of water", independent of method of application. It also presented claims of "unreasonable use" in the context of water exports to the San Joaquin River Exchange Contractors Water Authority, in which that exported water has been substantially applied to livestock feed crop production more generally. The commenters argued that water applied to grow livestock feed crops in a time of drought was wasteful and unreasonable, and that such exports and application aggravated conflicts that were central to the TUCPs that had been requested by DWR and USBR and the TUCOs that were adopted by the SWRCB. The executive summary of this extensive 37 page comment is provided below:

- The use of irrigated water for livestock feed crop production is both wasteful and unreasonable during this time of drought in California; such use also conflicts with the “waste or unreasonable use” section of the California Constitution.
- The wasteful, unreasonable use of irrigation water for livestock feed production is manifest within four areas of California water use and policy: hay exports, continued flood irrigation of alfalfa and irrigated pasture, the April 6, 2015, Temporary Urgency Change Order (TUCO), and the extreme groundwater depletion within the San Joaquin Valley.
- The applied water value for four livestock feed crops alone (alfalfa, irrigated pasture, corn, and almond hulls) constituted just over 42% of all water applied in California agriculture in 2012.
- It is wasteful for California irrigation water to be used to grow feed resources for the very inefficient animal-based protein/fat/carbohydrate production system when a smaller fraction of that irrigated water could be used to grow equivalent amounts of plant-based protein and carbohydrates.
- It is unreasonable for California water to be used during this time of drought for activities (such as alfalfa-related livestock feed production) that are likely to generate even more water scarcity in California (by way of livestock-associated methane emissions into the atmosphere.)
- California continues to unreasonably export some of its water in virtual form through significant international exports of alfalfa and other hay.
- Flood irrigation devoted to alfalfa and irrigated pasture production (nearly two million acres combined in 2010) is a wasteful and unreasonable method of use of water, as well as a wasteful and unreasonable use of water.
- Based on the analysis provided in the comment, the April 6, 2015, TUCO is likely promoting the wasteful and unreasonable use of irrigation water to produce livestock feed crops in the area associated with the San Joaquin River Exchange Contractors Water Authority (SJRECWA). Methane emissions associated with dairy cows in the SJRECWA service area are converted in CO₂ equivalents using methane GWPs associated with both 20 year and 100 year intervals.
- The use of pumped groundwater from already-depleted groundwater aquifers in the southern Central Valley to produce livestock feed is a wasteful, unreasonable use of water. Scarce groundwater has been used for irrigation of crops in Tulare County that will be partially converted into significant amounts of methane and then emitted by livestock into the atmosphere. Such emissions will likely contribute to a long-term reduction in precipitation that will limit groundwater aquifer recharge in the future.
- The SWRCB is required to act on the matter of wasteful, unreasonable use of water being used to produce livestock feed. The mandatory legal authority to buttress SWRCB action has three components. First, the SWRCB and the courts can nullify “beneficial” use of water, if such use is wasteful and/or unreasonable. Second, the SWRCB can reduce and/or eliminate wasteful, unreasonable water use to re-balance an unbalanced situation. Third, the SWRCB is *required* to re-balance imbalanced situations.
- The SWRCB and the courts continue to use an anachronistic concept of “balancing” in relation to drought. New circumstances require a reconceptualization of “balancing” in order to reduce the strain that contemporary California society has been imposing on the natural world, including the native forests of California that are currently being adversely impacted by climate change.
- The April 6, 2015 TUCO does not accord with the Public Trust legal doctrine that the SWRCB is

required to enforce with regard to currently endangered native fish species, the environment, and the climate

B. August 16, 2015 comment titled “Unreasonable and Wasteful Water Use: Rice Cultivation, Livestock Feed Crop Production, the Sacramento River Settlement Contractors, and the July 3, 2015 TUCO”, submitted by Ara Marderosian (Sequoia ForestKeeper) Todd M. Shuman (Wasteful UnReasonable Use), Mike Hudak (Ph.D.), and Megan E. Gallagher, Esq.

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian081615.pdf)

This referenced document explored “waste or unreasonable use” claims with regard to the use of irrigated water for rice cultivation, as well as substantial cultivation of livestock feed crops in the approximated Sacramento River Settlement Contractor-dominated areas north of Sacramento.

It provided a documented estimate that just over 800 TAF (thousand acre feet) was applied to arable land for rice cultivation in the approximated area of four of the largest SRSCs in 2014. It presented a documented estimate of the atmospheric carbon dioxide equivalency emission of the methane associated with such rice cultivation in this approximated SRSC area. The estimated value was 3.16 billion pounds of CO_{2e} over a 20 year period. The commenters also documented substantial cultivation of livestock feed crops in the approximated SRSC-dominated area (28,000-37,000 acres) that required an estimated water use value of roughly 100 TAF in 2014.

C. October 14, 2015 comment, “Five Counties, Five Numbers: Livestock Feed Crop Production in the S. San Joaquin Valley, 2014”, submitted by submitted by Ara Marderosian (Sequoia ForestKeeper) Todd M. Shuman (Wasteful UnReasonable Use), Mike Hudak (Ph.D.), and Megan E. Gallagher, Esq.

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian101415.pdf)

This referenced document explored “waste or unreasonable use” claims with regard to water, livestock feed crop production, and greenhouse gas emission in the southern San Joaquin Valley in 2014.

It documented that approximately 1.275 million acres were devoted to (or *resulted* in) livestock feed crop (LFC) production in these five counties in 2014. Approximately 4.55 million acre-feet (MAF) of water was used to cultivate acreage that *resulted* in LFC production in 2014. Approximately 14.257 million tons of livestock feed crop forage were produced from the application of this amount of water to the acreage cultivated in 2014. Assuming that such forage was fed to milking dairy cows, the commenters estimated that this amount of forage would have fed approximately 1.56 million lactating cows in 2014. They reiterated that livestock feed crops consumed by cows are partially converted by cows into significant atmospheric methane emissions. They provided science-based estimates that 1.56 million lactating cows would have collectively emitted (through the process of enteric fermentation) a quantity of methane that is equivalent to approximately 32.22 billion pounds of carbon dioxide trapping heat in the atmosphere over the next 20 years.

D. April 13, 2016 comment titled “Livestock Feed Crop Production in the San Joaquin Valley, 2014”, submitted by Ara Marderosian (Sequoia ForestKeeper) Todd M. Shuman (Wasteful UnReasonable Use), and Jan Dietrick, (MPH).(http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian041316.pdf)

This referenced document explored “waste or unreasonable use” claims with regard to water, livestock feed crop production, and methane gas emission in the total San Joaquin Valley (SJV) during 2014.

It documented that approximately 2.4 million acres were devoted to (or *resulted* in) livestock feed crop (LFC) production in these counties in 2014. Approximately 7.5 million acre-feet (MAF) of water was used to cultivate acreage that resulted in LFC production in 2014. Approximately 28 million tons of livestock feed crop forage were produced from the application of this amount of water to the acreage cultivated in 2014. The commenters

noted that this large amount of forage would have been primarily used to feed the cumulative California beef, dairy, heifer, bull, and steer populations in 2014. The cumulative 2014 California cattle population was 5.1 million, with the beef, dairy, heifer, bull, and steer populations cumulatively accounting for approximately 4.03 million, while calves accounted for the remaining 1.07 million.¹

The commenters reiterated that livestock feed crops consumed by cows are partially converted (through enteric fermentation) into significant direct atmospheric methane emissions. Cattle manure channeled into anaerobic manure lagoons and liquefied slurry storage constitutes a second major source of atmospheric methane emission.

Cumulative cattle-associated methane emission values for California during 2013 have been released by the California Air Resources Control Board. Approximately 1,911,000,000 pounds of cattle-associated methane were released into the atmosphere in 2013 -- 997,000,000 pounds by way of enteric emissions and 914,000,000 pounds by way of manure-related emissions. Using the IPCC AR5th 20-year interval methane GWP, the carbon dioxide equivalent (CO₂e) value associated with this mass of methane is comparable to an amount of carbon dioxide that would be annually released by 19.1 coal-fired electricity generation (CFEG) plants that would then trap heat in the atmosphere for 20 years before being sequestered. Using an IPCC AR5th 100-year interval methane GWP, the CO₂e value associated this mass of methane is comparable to an amount of carbon dioxide that would be annually released by 6.36 CFEG plants that would then trap heat in the atmosphere for 100 years before being sequestered.

SWRCB Comment Analyses Conservative Bias

I note for the record that these analyses of livestock GHG impact in California that have been submitted to the SWRCB have been very conservative. They have focused only on the methane emissions from livestock, with the primary focus on enteric emissions. They have often excluded the methane emissions associated with livestock manure that has been concentrated in anaerobic dairy manure lagoons. (Only the April 13, 2016 analysis incorporated discussion of manure-associated methane emissions.)

The analyses have excluded the nitrous oxide emissions associated with use of synthetic and manure-based fertilizers typically used for livestock feed crop production. Application of 100 lbs. of nitrogen fertilizer per acre typically results in the emission of approximately 2 lbs. of N₂O. (Source: Page 5, Greenhouse Gas Working Group. 2010. Agriculture's Role in Greenhouse Gas Emissions & Capture Greenhouse Gas Working Group Rep. ASA, CSSA, and SSSA, Madison WI [American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, August 2010].

1: Comprehensive 2015 data concerning SJV livestock feed crop production is not yet available. Merced, Stanislaus, and San Joaquin counties have not yet released 2015 crop reports, as of September 25, 2016. For a limited sample of 2014/2015 crop acreage and tonnage comparisons for some southern SJV counties, see Appendix A. Most noteworthy is that Tulare County experienced an extraordinary expansion in silage acreage and silage tonnage during 2015 during one of the hottest and driest years in recorded California history! Page 2 of the 2015 Tulare County Annual Crop and Livestock Report states: "In 2015, Tulare County saw an increase of over \$315,000,000 in field crop production value. This was primarily attributed to an increase of over 250% in small grain silage and a 46% increase in corn silage." Silage production also expanded in Kern County in 2015, and the tonnage value for Fresno County almond hulls increased in 2015, all relative to 2014.)

The analyses have also not included other GHG emissions associated with actual production of livestock feed crops. Globally, 45 percent of GHG emissions associated with the global livestock sector have been attributed to feed production and processing:

“Feed production and processing, and enteric fermentation from ruminants are the two main sources of emissions, representing 45 and 39 percent of sector emissions, respectively. Manure storage and processing represent 10 percent. The remainder is attributable to the processing and transportation of animal products. Included in feed production, the expansion of pasture and feed crops into forests accounts for about 9 percent of the sector’s emissions. Cutting across categories, the consumption of fossil fuel along the sector supply chains accounts for about 20 percent of sector emissions.”

Source: Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO), Rome, page xii.

Finally, the conservative bias in these earlier analyses is evidenced by exclusion of the extensive non-GHG nitrogen-based pollution that is also associated with livestock and livestock feed crop production (excluding alfalfa and clover production). Such pollution is substantial and worthy of recognition. Documentation concerning the magnitude of such nitrogen-based pollution in California was recently released in the California Nitrogen Assessment (2016). I provide for the record some relevant and illuminating excerpts from this report below:

“Synthetic fertilizer accounts for 32% (514,000 tons) new nitrogen entering CA each year, and animal feed accounts for another 12% (220,000 tons) ... on average, about half the nitrogen applied to crops is lost to the environment, though this varies greatly by soil type, crop, and farm management practices ... Annually, nearly 419,000 tons of nitrogen leach into groundwater. Nitrogen from cropland (including fertilizer and manure applications) is the largest contributor, accounting for 88% (367,000 tons) of nitrogen leaching to groundwater.” [pages 7-8]

“Livestock consume 614,000 tons of nitrogen each year in their feed. Only 25% of that becomes meat or milk for our consumption; the rest is excreted in manure. Much of that manure is reapplied to cropland, where its nitrogen has the potential to leach into groundwater. Some of the nitrogen in manure is released into the air or water or stored in soils.” [page 8]”

“Data show that California crops recover, on average, less than half of applied synthetic nitrogen, with some crops capturing as little as 30%. Similar or even lower nitrogen recovery rates are found when organic nitrogen sources are used...” [page 5]

“Only a little over a third of the net annual nitrogen inputs to groundwater are extracted from wells for irrigation and drinking water or removed by denitrification in the aquifer, leaving two thirds of the additions each year to accumulate in groundwater. However, it can take years to millennia for excess nitrogen in soil to reach groundwater.” [page 7]

(Source: California Nitrogen Assessment (2016), Dr. Tom Tomich, Principal Investigator, Agricultural Sustainability Institute, University of California, Davis.)

Finally, I note that the runoff of nitrogen fertilizers previously applied to livestock-feed-crop-associated agricultural lands is likely a contributing factor in the large number of toxic algae blooms that have occurred in California lakes, reservoirs, and other surface watercourses in 2016.

(See <http://www.eastbaytimes.com/2016/09/17/toxic-algae-troubles-many-california-lakes-and-waterways/> and <https://www.epa.gov/nutrientpollution/problem/>.)

Substantive Basis of Complaint

07/06/2015 SWRCB Comment: Wasteful Use

Water used by farmers during this time of drought for the irrigation of livestock feed crops is wasteful. Livestock are notoriously inefficient at converting water and other natural resources into protein available for human consumption, relative to plant-based sources of protein. With regard to water alone, the production of one pound of animal protein has been estimated to require nearly 100 times more water than the amount needed to produce one pound of plant-based grain protein, according to a study from researchers associated with Cornell University.

A more conservative, recent estimate has been provided by Mekonnen and Hoekstra (2010). They document that pulses (legumes), such as pinto beans, kidney beans, navy beans, dry peas, and lentils, have dramatically lower water footprints per unit protein than pig, sheep, goat, and bovine meat. Pulses use only one-sixth of the water that bovine meat requires to produce a comparable gram of protein (19 liters compared to 112 liters.) Pulses also require substantially less water to produce a gram of protein than milk (19 liters compared to 31 liters.)

Simply put, it is wasteful for California irrigation water to be used to grow feed resources for a very inefficient protein/fat/carbohydrate production system when a fraction of that irrigated water could be used to grow equivalent amounts of plant-based protein and carbohydrates. In our view, this judgment of “waste” resonates with great strength in this current time of severe drought and water-scarcity.

07/06/2015 SWRCB Comment: Unreasonable Use

Water used to irrigate livestock feed crops constitutes an unreasonable use of California water during this time of drought in California, especially in the context of climate change where California will only become even drier and warmer in the future. Livestock feed crops produced from California water are fed to livestock. Livestock then generate methane through enteric fermentation and emit methane into the atmosphere. Methane in the atmosphere is a highly potent greenhouse gas (GHG) that has contributed to the overall warming of the planet (see *05/26/2016 CA Enteric Emissions - Cumulative Effects of Enteric Methane Emissions from Livestock* below) and the rapid heating of the Arctic. Both global warming and rapid Arctic heating have now been strongly linked to the severe four-year drought in California that has adversely impacted the state’s water supplies.

Three recent studies² have documented linkage between heightened greenhouse gas emission levels, increased atmospheric heat, and the high pressure ridge that has formed and persisted in the Pacific Ocean, known colloquially as the “Ridiculously Resilient Ridge” (RRR). This RRR high pressure ridge has been responsible for re-routing Pacific storm activity well to the north of California over the last few years.

2: The first study demonstrating this linkage was published by Stanford University researchers on September 29, 2014 (co-authors Diffenbaugh, Swain, Rajaratnam, et alia) in a supplement to the Bulletin of American Meteorological Society. The study was summarized extensively in the Stanford Report issue of September 30, 2014. <http://news.stanford.edu/news/2014/september/drought-climate-change-092914.html>. The second study demonstrating this linkage was published in Environmental Research Letters, Jan 6, 2015, and coauthored by Rutgers Professor Jennifer Francis and Stephen Vavrus. The title of the study is “Evidence for a wavier jet stream in response to rapid Arctic warming.” (Source: <http://iopscience.iop.org/1748-9326/10/1/014005>). The third study was authored by Wang, S.-Y. (Simon Wang), Larry Hipps, Robert Gillies, and Jin-Ho Yoon, and is summarized in Fire and Ice—California Drought and "Polar Vortex" in a Changing Climate, Science and Technology Infusion Climate Bulletin NOAA’s National Weather Service, 39th NOAA Annual Climate Diagnostics and Prediction Workshop St. Louis, MO, 20–23 October 2014.]

(Of the three studies noted above, one has also linked these three phenomena with rapid Arctic heating and decline in Arctic sea ice.) The Wang study, which did not assert a link to rapid Arctic warming, noted that “there is a traceable anthropogenic warming footprint in the enormous intensity of the anomalous ridge during winter 2013–2014 and the associated drought.”) Finally, John P. Holdren, President Obama’s senior science director, has argued powerfully that climate change should be considered one of the drought’s major contributors. This can be accessed at:

https://www.whitehouse.gov/sites/default/files/microsites/ostp/critique_of_pielke_jr_statements_on_drought.pdf.

These findings were predicted in peer-reviewed scientific literature over ten years ago by Sewall and Sloan (2004). (For a full explanation and some thoughts on Sewall and Sloan’s theory from prominent climatologists, see this 2014 article.) Moreover, anthropogenic climate change has already increased the probability that more megadroughts will occur in California. Ault et al. (2014) conclude:

In the current generation of global climate models, the risk of a decade-scale drought occurring this century is at least 50% for most of the greater southwestern United States and may indeed be closer to 80% ... The probability of multidecadal megadrought is also high: the likelihood of a 35-yr event is between 10% and 50% depending on how much climate change is realized during the coming century. The probability of even longer events (50-yr, or “permanent,” megadrought) is non-negligible (5%–10%) for the most intense warming scenario (p. 7545).

Such megadroughts, if they occur, will undoubtedly exacerbate the water shortages and species extinction that are already afflicting California. (Cook, 2015; Diffenbaugh et al. 2015).

This assessment is also consistent with the argument presented in the recently-published study by Kevin Trenberth et al. (2015), which emphasizes how the impact of human-induced warming has affected the climate system’s thermodynamic state and consequently intensified major climatic events in recent years. Trenberth et al. also summarize the Diffenbaugh et al. (2015) study in a manner that highlights how anthropogenic warming has already increased the odds of increased drought risk and drought risk severity:

Another very recent example is the California drought beginning in 2012. Whereas one study found no significant trends in winter precipitation in recent decades, another [the Diffenbaugh et al. 2015 study] pointed out the critical role of the record high annual mean temperatures in combination with record low annual mean precipitation for 2013 which led to increased evapotranspiration and more intense drought. The combination of these had impacts on water shortages, vegetation and agriculture, and increased wildfire risk. The odds of this combination have increased with human-induced climate change and anthropogenic warming has increased drought risk (footnote numbers removed). [Kevin Trenberth et al. (2015)]

We also note for the record that the U.S. Geological Survey just released a study: “Temperature Impacts on the Water Year 2014 Drought in California” by Shradhanand Shukla et al. (<http://onlinelibrary.wiley.com/doi/10.1002/2015GL063666/abstract>), which finds that high heat has multiple damaging effects during drought, increasing the vulnerability of California’s water resources and agricultural industry. Not only does high heat intensify evaporative stress on soil, it has a powerful effect in reducing snowpack, a key to reliable water supply for the state. In addition to decreased snowpack, higher temperatures can cause the snowpack to melt earlier, dramatically decreasing the amount of water available for agriculture in summer when it is most needed. “If average temperatures keep rising, we will be looking at more serious droughts, even if the historical variability of precipitation stays the same,” Shukla said. “The importance of temperature in drought prediction is likely to become only more significant in the future.”

Thus, the best available science demonstrates that continued GHG emissions in the present and near future are likely to further accelerate the warming of the planet generally and heating of the Arctic in particular. Such heating will likely increase the probability that more high pressure ridges will form in the Pacific. These high

pressure ridges will then likely continue steering Pacific storm activity around (but not through) California in the future, thus aggravating the California drought. This best available science also indicates that GHG-associated global warming is likely to intensify the duration and severity of such future droughts and the adverse impacts associated with such projected future droughts.

In short, it is profoundly unreasonable—indeed, intensely irrational—for the SWRCB to continue to allow California water to be used during this time of drought for activities (such as alfalfa-related livestock production) that are likely to generate even more water scarcity in California, both for the short and long term future.

08/16/2015 SWRCB Comment: Rice Cultivation, Methane Emission, and Unreasonable Use

Calculation incorporating application of a Methane GWP of 86 (IPCC, AR5th, 2013) to denote a CO_{2e} that traps heat in the atmosphere for a period of 20 years:

(190.926 lbs. CH₄ per rice-acre-cultivated) X (192,503.5 acres) X (86) = 3,160,837,399 lbs. (CO_{2e}) released in 2014, or 3.16 billion pounds of CO₂ equivalency (20 year interval), or 3/8 of the amount of CO_{2e} (20-year heat-trapping period) that a year 2010 coal plant would have emitted into the atmosphere in 2014 (EPA).

The 190 lbs. CH₄/acre figure concerning rice cultivation comes from the conversion of the 2013 CA ARB figure of 214,000 g/ha as the annual amount of methane released per land unit area due to rice cultivation in California. (See http://www.arb.ca.gov/cc/inventory/doc/docs3/3c7_ricecultivation_ricecroparea_ch4_2013.htm)

We assert that it was unreasonable (and hence, unconstitutional) for these large SRSCs to use water for rice cultivation when such rice cultivation likely generated an additional, large, and significant emission level of CO₂ equivalency (20-year interval) on an already warming planet. This use was especially unreasonable when such water use occurred at the expense of imperiled native aquatic species in the Delta and along the Sacramento River during the 2014 drought year.

10/14/2015 SWRCB Comment: Unreasonable Use: Atmospheric Carbon Emissions

Livestock-associated carbon emissions should not be considered insignificant. (32 billion lbs. of heat-trapping CO_{2e}^{20yr} is just under the amount of CO₂ that would be emitted by four yr2010 coal-fired electricity-generation plants [33.6 billion lbs.]). Moreover, it is likely that these emissions have already contributed (and are currently contributing) to the further warming of our planet and the associated severe drought that has afflicted California. We note for the record that this claim is consistent with yet another recently published scientific study concerning this matter: Williams et al. (2015) concluded that “anthropogenic warming is estimated to have accounted for 8–27% of the observed drought anomaly [in California] in 2012–2014 and 5–18% in 2014. . . . anthropogenic warming has substantially increased the overall likelihood of extreme California droughts.” [Williams, A. P., R. Seager, J. T. Abatzoglou, B. I. Cook, J. E. Smerdon, and E. R. Cook (2015), Contribution of anthropogenic warming to California drought during 2012–2014, *Geophys. Res. Lett.*, 42, 6819–6828, doi:10.1002/2015GL064924.] <http://onlinelibrary.wiley.com/doi/10.1002/2015GL064924/full>

The prominent Stanford University scientist and professor Noah Diffenbaugh has also noted recently that "We have a very high statistical confidence that the warming of California would not happen without human influence, and the amount of years that are warm and dry would not have happened without humans. . . . Continued human emissions are likely to lead to the continued warming of California, increased co-occurrence of dry years and warm conditions and the increased occurrence of extremely low precipitation seasons." [http://www.appeal-democrat.com/news/scientists-blame-human-activity-for-climate-change/article_c26d333e-4b8b-11e5-ab6d-ab7bd68872bc.html]

Diffenbaugh was quoted in another article stating that “High temperatures plus low precipitation are more likely to produce a drought, and this will increase with climate change. . . .Global warming has at least tripled the probability of the atmospheric condition that brought the resilient high-pressure ridge” – the phenomenon that has been the primary cause of the California drought. [<http://www.dailybreeze.com/environment-and-nature/20150825/california-climate-researchers-sound-the-alarm-at-symposium-theres-no-way-out>]

Thus, the best available science continues to assert that continued greenhouse gas emissions in the present and near future are likely to further accelerate the warming of the planet generally and increase the probability that California will be adversely impacted by more frequent high-temperature droughts in the future.

We must, therefore, re-assert our previous claim: it is profoundly unreasonable—indeed, intensely irrational—for the SWRCB to continue to allow California water to be used during this time of drought for activities that are likely to generate even more water scarcity in California.

04/13/2016 SWRCB Comment: LFC Production, Methane Emission, and Extreme Weather

It is likely that livestock-associated methane emissions generated in California in 2014 have already contributed to the further warming of our planet. It is also likely that such livestock-associated methane-related atmospheric heat trapping has increased the probability that certain types of extreme weather-related events will become even more likely to occur in California and the U.S. in the future. It is also likely that these types of extreme weather-related events (triggered in part by livestock-related methane emission) will generate significant adverse impacts on human health, essential infrastructure, and vulnerable coastal populations. A number of recently published studies over the last eight months provide evidentiary support for the latter two claims:

1: A recent peer-reviewed study has directly linked human-caused global warming to the catastrophic flooding in Texas and Oklahoma in spring of 2015. (In May, more than 35 trillion gallons of water fell on Texas—enough to cover the entire state in eight inches of water. More than two dozen people were killed, and it was the wettest single month on record in both Texas and Oklahoma.) The new peer-reviewed study from Utah State and Taiwanese researchers concluded, “There was a detectable effect of anthropogenic [manmade] global warming in the physical processes that caused the persistent precipitation in May of 2015 over the southern Great Plains.”² (See Simon Wang, S.-Y., W.-R. Huang, H.-H. Hsu, and R. R. Gillies (2015), Role of the strengthened El Niño teleconnection in the May 2015 floods over the southern Great Plains, *Geophys. Res. Lett.*, 42, 8140–8146, doi:10.1002/2015GL065211.

[We note that a recently released National Academies of Science study also notes the high confidence level of extreme event attribution modelling studies that are clearly related to heat and temperature, such as the Wang et al. study summarized above: “**Confidence in attribution findings of anthropogenic influence is greatest for those extreme events that are related to an aspect of temperature, such as the observed long-term warming of the regional or global climate, where there is little doubt that human activities have caused an observed change.** For example, a warmer atmosphere is associated with higher evapotranspiration rates and heavier precipitation events through changes in the air’s capacity to absorb moisture . . . **Confidence in attribution analyses of specific extreme events is highest for extreme heat and cold events, followed by hydrological drought and heavy precipitation.**” (National Academies of Sciences, Engineering, and Medicine. 2016. *Attribution of Extreme Weather Events in the Context of Climate Change*. Washington, DC: The National Academies Press. doi: 10.17226/21852. Page 106.)]

2: A recently-published study by Swain, Horton, Singh, and Diffenbaugh (2016) has documented that the number of very dry atmospheric patterns in California has increased in recent decades, while the number of “average” moisture atmospheric patterns has declined. Swain noted: “We’re seeing an increase in certain atmospheric patterns that have historically resulted in extremely dry conditions. . . .What seems to be happening is that we’re having fewer ‘average’ years, and instead we’re seeing more extremes on both sides. This means

that California is indeed experiencing more warm and dry periods, punctuated by wet conditions." <https://www.sciencedaily.com/releases/2016/04/160401144457.htm>

While the authors of this study have deployed careful and highly technical language in their study, they have, nonetheless, written a crucially important statement concerning an apparent positive statistical relationship between global greenhouse gas forcing and the specific extreme atmospheric configurations that have been manifest in the northeastern Pacific over the last 65 years:

“The results presented in the current study therefore confirm that the observed pattern of the long-term GPH [geopotential height field] trend in the NPD [Northern Pacific domain] is spatially nonuniform, strongly positive in the mean, driven by the specific pattern of lower tropospheric warming, and characterized by an amplification of the West Coast mean ridge highly reminiscent of that which occurred during historical dry and warm years in California. These empirical findings demonstrate a complex evolution over the northeastern Pacific between 1949 and 2015, with 500-mb GPH and SLP [sea level pressure] trends of generally the same sign occurring “in-phase” with the mean West Coast cool-season ridge (Fig. 1, A to C, and fig. S1) and the largest trends occurring just east of the terminus of the East Pacific storm track (33). This is especially interesting in light of recent investigations into the physical structure of anthropogenically forced trends in regional atmospheric circulation, which have suggested that changes in mean flow (via momentum/energy fluxes driven by embedded transient cyclones) may reinforce planetary-scale stationary waves in the upper atmosphere under certain conditions(37, 45, 54, 56).”

“Additionally, because the location and amplitude of atmospheric stationary waves are dictated by the relative placement and orography of global landmasses, the observed alignment of the nonuniform spatial pattern of thermal dilation with the North American continent (Fig. 1B) supports the notion that *at least some of the observed trend in GPH—and thus specific extreme atmospheric configurations—may be due to increasing land-sea thermal contrasts. Enhanced warming over the continents is a predicted (and observed) response to global greenhouse forcing and has the potential to influence broader circulation regimes (57, 58).*” [emphasis added, see Daniel L. Swain, Daniel E. Horton, Deepti Singh, and Noah S. Diffenbaugh. Trends in atmospheric patterns conducive to seasonal precipitation and temperature extremes in California. *Science Advances*, March 2016, page 9 DOI: 10.1126/sciadv.1501344]

3: A comprehensive meta-study recently released by the Federal Government (U.S. Global Change Research Program, April 2016) has documented numerous significant adverse impacts associated with “Extreme Events” driven by anthropogenic forcing (greenhouse gas emissions). The key findings of this study, summarized on page 100, are provided below:

“Increased Exposure to Extreme Events-Key Finding 1: Health impacts associated with climate-related changes in exposure to extreme events include death, injury, or illness; exacerbation of underlying medical conditions; and adverse effects on mental health [High Confidence]. Climate change will increase exposure risk in some regions of the United States due to projected increases in the frequency and/or intensity of drought, wildfires, and flooding related to extreme precipitation and hurricanes [Medium Confidence]. . . Key Finding 2: Many types of extreme events related to climate change cause disruption of infrastructure, including power, water, transportation, and communication systems, that are essential to maintaining access to health care and emergency response services and safeguarding human health [High Confidence]. . . Key Finding 3: Coastal populations with greater vulnerability to health impacts from coastal flooding include persons with disabilities or other access and functional needs, certain populations of color, older adults, pregnant women and children, low-income populations, and some occupational groups [High Confidence]. Climate change will increase exposure risk to coastal flooding due to increases in extreme precipitation and in hurricane intensity and rainfall rates, as well as sea level rise and the resulting increases in storm surge [High Confidence].” (See Bell, J.E., S.C. Herring, L. Jantarasami, C. Adrianopoli, K. Benedict, K. Conlon, V. Escobar, J. Hess, J. Luvall, C.P. Garcia-Pando, D. Quattrochi, J. Runkle, and C.J. Schreck, III, 2016: Ch. 4: Impacts of Extreme Events on Human Health. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment.*

04/13/2016 SWRCB Comment: *Unreasonable Water Use and Extreme Weather*

On the basis of all of the studies that we have summarized and cited in all of our SWRCB comments since June 19, 2015, we re-assert our previous claim: it is profoundly unreasonable—indeed, intensely irrational—for the SWRCB to continue to allow California water to be used for activities that are likely to promote an increased frequency of drought events in California’s future, and hence, further water scarcity in California. We add to our assertion that it is unreasonable for the SWRCB to continue to allow California water to be used for activities that are likely to promote extreme weather conditions throughout California, the United States, and the rest of the planet. Given the severe adverse impacts that have been, and will likely be, partially generated by anthropogenically-forced extreme weather events, we assert that it is unreasonable (and hence unconstitutional) for California water to be used for agricultural production when such production is likely to result in livestock feed crops -- even when drought conditions in California are absent.

05/26/2016 CARB SLCP Reduction Strategy Draft EA Comment: *CA Enteric Emissions - Cumulative Effects of Enteric Methane Emissions from Livestock*

(https://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=slcp2016&comment_num=73&virt_num=66 or <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=slcp2016>, then select Attachment for Comment #66, Todd Shuman, WUMU)

1: Enteric emissions from livestock (which is mostly from dairy and non-dairy cattle in California) constitute about 30 percent of methane emissions in California in a normal year. This methane emission source constitutes just under a billion pounds of methane emission per year in California, as of 2013, (or 0.452022 Megatonnes [Mt] or million metric tonnes [MMT]). (Total *cumulative* California-associated methane emissions due to dairy and livestock production – both enteric and manure-related - are typically just under one Mt per year – 0.867 Mt.)

A billion pounds of methane emitted per year from this specific methane emission source have been, and are, contributing to a large and growing global accumulation of enteric-related atmospheric methane that has been contributing to significantly-increased global surface and ocean temperatures over the last 55 years. A recently published analysis has provided information that now enables us to estimate much more precisely the degree to which past global enteric methane emissions have been, and will be, changing the environment of our planet. Based upon Figure 2d in "New use of global warming potentials to compare cumulative and short-lived climate pollutants," (Myles R. Allen, Jan S. Fuglestedt, Keith P. Shine, Andy Reisinger, Raymond T. Pierrehumbert and Piers M. Forster, *Nature Climate Change*, May 2, 2016, <http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate2998.html>), past and future global temperature change (GTC) values (in degrees Celsius) associated with the cumulative year 2011 global anthropogenic livestock and cattle-related methane emission (expressed as a pulse) are presented below:

Year	2015	2021/2022	2031/2032	2050
Livestock enteric:	0.0044	0.0061	0.0044+	0.0015
Cattle enteric:	0.0033	0.0045	0.0033+	0.0011

In short, cumulative year 2011 anthropogenic livestock-related and cattle-related methane emissions likely increased the 2015 average global temperature by 0.0044 and 0.0033 degrees C (respectively), beyond what the

2015 global average temperature would otherwise have been. The year 2011 anthropogenic livestock-related and cattle-related methane emissions can be expected to increase the 2021/2022 average global temperature by 0.0061 and 0.0045 degrees C (respectively) beyond what the 2021/2022 global average temperature would otherwise likely be. (Note: the global anthropogenic methane emission value used for Figure 2d was 330 Mt; the total enteric livestock methane emission value for year 2011 was projected at 98 Mt; the total cattle methane emission value for year 2011 was projected at 72 Mt. The latter two values come from FAOSTAT. The first value was provided by Myles R. Allen, email communication, May 15, 2016.)

Based on the information provided in Allen et al. (2016) above, a one Mt methane emission in 2011 can be expected to generate the following annual global temperature effects 20 and 40 years in the future: a 0.00004545+ degrees Celsius global temperature rise for the year 2031-2032 and a 0.00001535 degrees Celsius global temperature rise for the year 2051-2052. Alternative (and substantially higher) global temperature change values concerning a one Mt methane emission pulse (again originating with a 2010-2011 methane emission pulse and spanning over a 20 year-40-year time frame) has been provided in **What Science Tells us: why methane is important**, Global Methane Forum, Washington DC 29th March, 2016, Drew Shindell, Professor of Climate Sciences, Duke University, CCAC Science Advisory Panel Chair Johan C.I. Kuylenstierna, Policy Director, Stockholm Environment Institute, CCAC Science Advisory Panel member. On Slide/Page 45, Shindell and Kuylenstierna write: “How much benefit do we get from reductions? Each Mt methane emission prevented avoids: ~300-400 premature deaths due to ozone; ~186,000 tons of crop yield loss due to ozone; ~0.002C [sic] warming over 2-4 decades; 3000-6000 \$US societal benefits.”

2: For the 1962–2012 period: +0.90/+0.67 degree Celsius rise for land/land-ocean combined
1958-1965 (1962) 1988-1995 (1992) 2008-2015 (2012) relative to 1880-1920 (1900)
0.36/0.27 0.80/0.62 1.26/0.94 relative to 1900 land/land-ocean value of 0 degrees C
1962-1992 increase: +0.44/+0.35; 1992-2012 increase: +0.46/+0.32;
1962-2012 increase +0.90/+0.67

Source: <http://data.giss.nasa.gov/gistemp/maps/>. [Note: Todd Shuman consulted with Dr. Ron Miller, Deputy Chief of Lab, NASA Goddard Institute of Space Studies concerning proper parameters for input. Dr. Miller recommended “smoothing” anomalies over 7-year time frames; use Anomalies, not Trend; define Mean Period as Annual (Jan-Dec); defined base period 1880-1920 was considered reasonable. Use 1200 KM Smoothing Radius, and Robinson Map Projection. For Land: use GISS analysis; For Ocean: use ERSST v.4.]

3: “NASA recently released data showing that the planet has just seen seven straight months of not just record-breaking, but record-shattering heat. It is clear, through the space agency's data, that this year we are already well on track to see what will likely be the largest increase in global temperature a single year has ever seen. The NASA data also show that April was the hottest April ever recorded, as well as the fact that it crushed the previous April record by the largest margin of increase ever recorded. That makes it three months in a row that the monthly record has been broken, and easily at that, by the largest margin ever.” Dahr Jamail, May 23, 2016, <http://www.truth-out.org/news/item/36133-atmospheric-carbon-dioxide-concentration-has-passed-the-point-of-no-return>

[September 26, 2016 update: “Not only did Earth witness its hottest August on record, according to NOAA, but it also extended its streak of record-warm months to 16. Such a lengthy period of record-setting warmth is unprecedented in 137 years of temperature observation, NOAA said ... August’s average temperature was 1.66 degrees above the 20th century average, 0.09 degrees above the previous warmest August — set just one year ago. (Source: <https://www.washingtonpost.com/news/capital-weather-gang/wp/2016/09/20/earth-posts-hottest-august-on-record-and-16th-straight-month-of-unsurpassed-heat/>)

On September 25, 2016, Dr. Juan Cole, the Richard P. Mitchell Collegiate Professor of History at the University of Michigan, quoted eminent climate scientist Michael Mann asserting that there is “tentative but compelling evidence” that it was hotter this past summer on Earth than it has been at any point in the past 100,000

years. (Source:http://www.truthdig.com/report/item/the_last_time_summer_was_this_hot_human_beings_hadnt_left_africa_20160925.)

From *USA Today*, September 21, 2016: “Before 1880, scientists rely on paleoclimatic records such as ice cores, tree rings and lake sediments that provide an ever further look back in time: ‘It is plausible that this summer was the warmest in thousands of years, perhaps even longer,’ said meteorologist Michael Mann of Penn State University. ‘There is now very robust paleoclimate evidence that the past decade was likely Earth’s warmest in more than a thousand years, and there is somewhat more tentative but nonetheless compelling evidence that we have moved into territory unseen in more than a hundred thousand years,’ he added. Another climate scientist, Gavin Schmidt of NASA, agrees that while individual seasons may be hard to quantify in terms of record warmth, the unusual warmth over the past few decades ‘seems exceptional in many hundreds and perhaps thousands of years. ‘Glacier retreat is indicative of this, since they are unearthing soil, debris, and trees that were buried 1,000, to 4,000, years ago,’ he said.” (Source: <http://www.usatoday.com/story/weather/2016/09/20/earth-hottest-summer-record/90731548/>)]

[September 29, 2016 update, from The World Meteorological Organization: “28 September 2016 (WMO) - Dramatic and unprecedented warming in the Arctic is driving sea level rise, affecting weather patterns around the world and may trigger even more changes in the climate system . . . ‘The Arctic is a principal, global driver of the climate system and is undergoing an unprecedented rate of change with consequences far beyond its boundaries,’ said WMO President David Grimes . . . Global temperatures are rising as a result of climate change, with 2014, 2015 and the first eight months of 2016 breaking records. The Arctic is warming at least twice as fast as the world average, in places even faster. For instance, Inuvik in the Northwest Territories in Canada has warmed by almost 4° Celsius since 1948 . . . ‘The melting of snow and ice cover is having far reaching environmental consequences and may potentially contribute to changes in circulation patterns in the ocean and atmosphere. The Arctic changes have also been a factor in unusual winter weather patterns in North America and Europe, The thawing of the frozen permafrost in Arctic regions has the potential to release vast quantities of greenhouse gases into the atmosphere. These are part of the vicious circles of climate change which are the subject of intense scientific research,’ said WMO Secretary-General Petteri Taalas.” Source: http://public.wmo.int/en?utm_source=Climate+News+Network&utm_campaign=196b8196a7-Arctic_changes_fast9_29_2016&utm_medium=email&utm_term=0_1198ea8936-196b8196a7-38788029]

Past, present, and reasonably-foreseeable enteric-associated global temperature change is an effect which has been partially generated by the many individually minor, but collectively significant livestock-related methane emissions taking place in California yearly and over an extended period of time. Such emissions have been fueled by the water that has been used to grow livestock feed in California. (Methane emissions associated with rice cultivation are also implicated in global temperature change.)

07/06/2015 SWRCB Comment: Imbalance and Unreasonable Water Use

The conservation of the waters of the state is of paramount importance. We believe that we have presented sufficient evidence in this comment to establish that water used to grow livestock feed crops is, on its face, wasteful and unreasonable, and the consequences of such use adversely impact California society and natural ecosystems across a number of different yet inter-related economic, political, social, and ecological spheres. The cumulative impact of all these effects has now created in California a phenomenon of “transcendent importance” (*Joslin v. Marin Mun. Water Dist.*, 67 Cal.2d 132, [1967]). What is this phenomenon? California is out of balance, and the use of water to produce livestock feed crops promotes further imbalance between the human species and California’s native ecosystems. The path to balance requires actions that reduce and/or eliminate these wasteful and unreasonable uses that have been contributing to the imbalance between the human species and California’s native ecosystems.

We believe that the SWRCB is required to act on the matter of wasteful, unreasonable use of water being used to produce livestock feed. The mandatory legal authority to buttress SWRCB action has three components. First, the SWRCB and the courts can nullify “beneficial” use of water, if such use is wasteful and/or unreasonable (*Joslin, 1967, Forni, 1976, Light v. SWRCB, 2014*). Second, the SWRCB can reduce and/or eliminate wasteful, unreasonable water use to rebalance an unbalanced situation (*U.S. v. SWRCB, 1986*). Third, the SWRCB is *required* to re-balance imbalanced situations (*Audubon, 1983, Cal Trout II.*).

Concerning our first point, we rely primarily on *Joslin (1967)*, but also *Forni (1976)*. In *Joslin*, the CA Supreme Court commented about the plaintiffs’ claim:

[5] In essence their position is that such use is a [67 Cal.2d 143] beneficial one encompassed within their riparian rights and that all beneficial uses are reasonable uses. Such a position ignores rather than observes the constitutional mandate. Article XIV, section 3, does not equate “beneficial use” with “reasonable use.”... the mere fact that a use may be beneficial to a riparian’s lands is not sufficient if the use is not also reasonable within the meaning of section 3 of article XIV and, as indicated ... use must be deemed unreasonable. (*Joslin v. Marin Mun. Water Dist., (1967)*)

Concerning *Forni (1976)*, Littleworth and Garner (2007) note, “Forni followed Joslin in holding that a beneficial use could nonetheless be unreasonable (p. 111).” Finally, *Light v. SWRCB* (which the CA Supreme Court declined to review on Oct 1, 2014) appears to also reinforce the previous holdings of the court in both *Joslin* and *Forni*.

Concerning our second point, we rely primarily on *U.S. v. SWRCB (1986)*. In this case, the court upheld a decision in which the SWRCB made an “implicit finding” of unreasonable use to justify a curtailment of CVP and SWP project activities that resulted in a reduction of water storage and a reduction in water exports. The SWRCB made this decision on the basis of new information documenting “adverse impacts of the projects upon the Delta.” We assert that it is reasonable to interpret the SWRCB’s decision as an act of “balancing”: the SWRCB discerned an imbalance in the relationship between human activities and the Delta ecosystem and curtailed the unreasonable use of water that was generating the imbalance. By reducing an unreasonable use of water, the SWRCB promoted balance in the relationship between humans and the natural world.

As for our last point, we rely upon *Audubon (1983)* and *Cal Trout II (1990)*. In both of these cases, the SWRCB had refused, over extended periods, to take actions that would compel a re-balancing of the severely imbalanced relationships between the City of Los Angeles, the Mono Lake ecosystem, and the fisheries of Mono Lake’s feeder streams. While neither of these cases focused on Article X, Section 2 of the California Constitution, the courts in both of these cases clearly ruled that the SWRCB had a legal duty to re-balance relationships between human institutions and natural ecosystems that had been clearly unbalanced for significant periods of time. In both of these cases, the court stepped in to “re-balance” when the SWRCB failed to meet its legal duty to “re-balance” an unbalanced situation.

Almond Hulls and Wasteful, Unreasonable Water Usage

In this complaint, I consider a significant proportion of water applied to almond orchards as wasteful and unreasonable – that proportion that can be reasonably associated with the almond hulls that are typically sold to dairies and then fed to dairy livestock. I acknowledge that such an assumption is controversial. Most people tend to assess the value of water in relation to the money that is generated by the sale of products grown due to the application of that water. For most, that is the only value criteria that can be conceived, and that can be the only acceptable criteria to apply with regard to a wasteful and/or unreasonable water usage analysis.

According to such narrowly-defined economic criteria, almond kernel production must constitute a social good with virtually no downside. It is indisputable that almond growers make large amounts (and nearly all of their) money by selling the almond kernels, not by selling almond hulls (or almond shells for that matter). It is also not in dispute that water is applied to almond orchards by almond farmers with the sole intention of producing almond meats for sale.

However, I assert that other “value” criteria exist – including criteria that consider or integrate the broader social and environmental costs associated with water use that results in the production of such almond kernels. Water applied to almond orchards results in three commodities that are sold each year. Roughly half of the cumulative mass of all those almond-related commodities that get sold and which result from that application of water are almond hulls, a crop almost exclusively sold to the dairy and livestock industries as a nutritional feed input. *In short, half of the water applied to almond orchards results in a livestock feed crop commodity mass that is ultimately sold to dairies and fed to dairy cows and then partially converted into methane that is then emitted into the atmosphere.* That is a fact that must be factored into an analysis of the ultimate social and environmental utility of almond kernel production – and the applied water that gives rise to the almond-orchard-related commodities ultimately sold.

I note for the record that the county almond hull values per unit are typically three or more times as great as silage, which is the primary feed for dairy production in California in terms of sheer tonnage.

David Valadao, James O’Banion, James L. Nickel, Stewart/Lynda Resnick, and Donald Bransford Biographies

David G. Valadao

<http://valadao.house.gov/biography/>

“The Valadao family immigrated from the Azores Islands of Portugal to the United States in 1969. After settling in the Central Valley, Valadao’s father started a small dairy farm in the Central Valley in 1973. Valadao was born on April 14, 1977. The business now consists of two dairies, as well as over 1,000 acres of farmland in Kings and western Tulare County, on which Valadao and his family grow alfalfa, corn, and wheat as dairy feed stock.”

<http://www.latimes.com/politics/la-pol-ca-poorest-in-congress-david-valadao-story.html>

He listed a minimum of \$1.3 million in assets that he and his wife, Terra, hold for the family farms, Valadao and Triple V Dairies. Valadao Dairy - 17293 9 1/2 Avenue, Hanford; Triple V Dairy 18183 I Dr. Tulare, California 93274 (559) 584-9108

congressmanvaladao@mail.house.gov

James O’Banion

<http://www.ccidwater.org/board.html>

James O’Banion, Chairman, San Joaquin River Exchange Contractors Water Authority; President of CCID Board of Directors; O’Banion Ranches. Occupation: Farmer and Dairyman; 2492 acres; Crops: Alfalfa, Cotton, Corn, Wheat, Wheat Grass, Permanent Pasture; 475 head dairy herd; Director, San Luis & Delta-Mendota Water Authority, President, Poso Canal Company

15775 Indiana Rd, Dos Palos, CA 93620 Phone: (209) 387-4651

contactus@sjrecwa.net

James L Nickel

James L Nickel, Nickel Family LLC, Treasurer and member of the Board of Directors, San Joaquin River Exchange Contractors Water Authority

“Rio Bravo Ranch . . . Eventually, the 30,000 acre ranch was divided in two, and George W. Nickel bought the lower 16,000 acres. Today, the Nickel family farms citrus, almonds, and walnuts, and cattle feed on the land’s dry

pastures.” <http://www.riobravoranch.com/the-ranch/>

“Nickel Family LLC is a multi-generational, family-owned grower of citrus, nuts, tomatoes, grapes and alfalfa. They own and farm on more than 9,000 acres throughout California.” <http://theproducenews.com/more-people-articles/people/17548-nickel-family-llc-hires-darren-filkins-as-ceo>

15701 Highway 178 Bakersfield, CA 93306 661.872.5050;

<http://www.riobravoranch.com/the-ranch/>; jl nickel@nfl lc.net; asembach@nfl lc.net,

Stewart and Lynda Resnick

<http://www.forbes.com/sites/chloesorvino/2015/11/04/americas-nuttiest-billionaire-couple-amid-drought-stewart-and-lynda-resnick-are-richer-than-ever/#63df4ca543d6>

“Here there are rows upon rows of green—some 70,000 lush acres of water-hungry pistachio and almond trees. Come at the right time of year and you’ll see the almond trees blossoming, covering the valley in a blanket of light pink petals. This land belongs to the billionaire Resnicks, Stewart, 77, and Lynda, 72. . . .”

The Wonderful Company, Wonderful Citrus, Wonderful Pistachios & Almonds, Teleflora, FIJI, Wonderful Sales, 11444 Olympic Blvd., Los Angeles, CA 90064, (310) 966-5700

<https://www.wonderful.com/>; comments@wonderful.com

Donald Bransford

https://www.cd fa.ca.gov/state_board/BrdBios/bioDonaldBransford.html

Donald Bransford, President of the Board of Directors for the Glenn-Colusa Irrigation District, is the owner of Bransford Farms, a 1,200 acre ranch that include almonds, prunes and rice.

Don Bransford formed Bransford Farms with his wife and partner Diane in 1980

Donald R. Bransford, President, PO Box 809 Colusa, CA 95932 Phone: 530-304-7768 Fax: 530-458-4715

<http://www.bransfordfarms.com/>; donald.bransford@gmail.com

Under what conditions may this complaint be disregarded and dismissed?

The SWRCB issues a finding that past use of water by Valadao, O’Banion, Nickel, the Resnicks, and Bransford to produce livestock feed, crops which resulted in livestock feed crop tonnage, and/or rice was wasteful, unreasonable, and unconstitutional.

The SWRCB issues a finding that current use of water by Valadao, O’Banion, Nickel, the Resnicks, and Bransford to produce livestock feed, crops which resulted in livestock feed crop tonnage, and/or rice is considered by the SWRCB to be wasteful, unreasonable, and unconstitutional.

The SWRCB issues a finding that further use of water by Valadao, O’Banion, Nickel, and the Resnicks to produce livestock feed, crops which resulted in livestock feed crop tonnage, and/or rice will be considered by the SWRCB to be wasteful, unreasonable, and unconstitutional unless the following remedies are widely implemented.

Remedies concerning the “unreasonable” criteria:

Ranchers and dairy owners capture at least 80 percent of the enteric methane emissions of livestock and at least 80 percent of the methane emissions from anaerobic manure lagoons and then pay a carbon-dioxide-related tax/fee concerning the combustion of that captured methane biogas. Alternatively, they are required to purchase pollution credits (allowances) or offsets concerning such resulting carbon dioxide emissions; or they are required to compensate for livestock-related methane emissions through mandatory one-off carbon sequestration measures; or they are required to pay methane emission taxes concerning emissions of uncaptured methane; or they are required to purchase CA ARB auction pollution permit/allowances or offsets concerning uncaptured methane. [With these remedies implemented, water use for livestock feed production is no longer unreasonable but it is still wasteful]

Remedies concerning both “wasteful” and “unreasonable” criteria:

Almond growers find alternative uses for almond hulls and no longer sell hulls to dairies as livestock feed. (Compost could be generated and then applied to soil to promote carbon sequestration; hulls could be used as human health supplements, given that USDA Agricultural Research Service chemist Gary R. Takeoka and colleagues in Albany, Calif., have shown that hulls are a rich source of natural compounds.) [With these remedies, water use that results in almond hull tonnage is no longer wasteful or unreasonable]

Rice growers use different (non-flood) irrigation techniques for rice farming that eliminate methane emission during the rice production farming cycle. Alternatives include direct seeding of rice into fields rather than transplanting rice into flooded paddies; drip irrigation, use of center pivot sprinkler systems, pressurized water application methods, upland cultivars of rice, and alternation between wetting and drying the fields. (In this latter process, the field is supplied with water, then allowed to completely dry before the next watering. Not only does this cut down on water usage, but it also minimizes the methane gas that is produced due to anaerobic decomposition of organic matter in flooded fields.) [Water use for rice production is no longer wasteful or unreasonable]

[Concerning the “rice fields drying” alternative discussed above, we note that alternative, lower-methane-emitting compensatory habitat for migrating bird species should be created as compensation for the prospective loss of flood-irrigated rice cultivation acreage that concurrently functions as water fowl habitat. Other areas, cumulatively equal in size (and preferably where historic valley lakes existed), should be established so that water fowl have alternative, non-toxic resting and feeding locations. Additionally, non-methane-emitting methods for groundwater aquifer recharge in the rice cultivation fields of the Sacramento Valley (and further north) should also be deployed.]

Sincerely,

A handwritten signature in black ink that reads "Todd M Shuman". The signature is written in a cursive, slightly slanted style.

Todd Shuman, Senior Analyst, Wasteful UnReasonable Use (WURU),
P.O. Box 528, Camarillo, CA 93011, 805.236.1422, tshublu@yahoo.com
September 29, 2016

References

- Myles R. Allen, Jan S. Fuglestedt, Keith P. Shine, Andy Reisinger, Raymond T. Pierrehumbert and Piers M. Forster, "New use of global warming potentials to compare cumulative and short-lived climate pollutants," Nature Climate Change, May 2, 2016,
- Ault, Toby, Julia E. Cole, David M. Meko, Jonathan T. Overpeck, and Gregory T. Pederson, "Assessing the Risk of Persistent Drought Using Climate Model Simulations and Paleoclimate Data," Journal of Climate 27, 15 October 2014.
- Cook, B. I., et al. Unprecedented 21st-Century Drought Risk in the American Southwest and Central Plains. 2015. Available at: <http://advances.sciencemag.org/content/1/1/e1400082>
- Diffenbaugh, N.S., Daniel L. Swain, and Danielle Touma, "Anthropogenic Warming Has Increased Drought Risk in California," Proceedings of the National Academy of the United States of America, 2015. Available at: <http://www.pnas.org/content/early/2015/02/23/1422385112.full.pdf+html>.
- Francis, Jennifer A. and Stephen J. Vavrus, "Evidence for a Wavier Jet Stream in Response to Rapid Arctic Warming," Environmental Research Letters, 10 014005 doi:10.1088/1748-9326/10/1/014005 6 January 2015.
- Mekonnen, M. M. and A. Y. Hoekstra, "The Green, Blue and Grey Water Footprint of Farm Animals and Animal Products," Value of Water Research Report Series 48 (2010) UNESCO-IHE, Delft, the Netherlands, Table 6, p. 29. Available at: <http://waterfootprint.org/en/resources/publications/value-water-research-report-series-unesco-ihe/>
- Pimentel, D and M. Pimentel, "Sustainability of Meat-Based and Plant-based Diets and the Environment," American Journal of Clinical Nutrition 78(3) (September 2003): 660S–663S.
- Sewall, J. O. and L. C. Sloan (2004), "Disappearing Arctic sea ice reduces available water in the American west," Geophysical Research Letters 31, L06209, doi:10.1029/2003GL019133. <http://onlinelibrary.wiley.com/doi/10.1029/2003GL019133/full>
- Trenberth, K., Fasullo, J., and Shepherd, T., "Attribution of climate extreme events" Nature Climate Change PERSPECTIVE PUBLISHED ONLINE: 22 JUNE 2015 | DOI: 10.1038/NCLIMATE2657 © 2015 Macmillan Publishers Limited. All rights reserved. (See http://www.nature.com/articles/nclimate2657.epdf?referrer_access_token=7sXj2Pn_pEL6yQJ3CH6GJtRgN0jAjWel9jnR3ZoTv0PwsZ1SqlEmC5WQ9lpPX99LWpebViNbgRz1NXp7powvabDILdArtCz7JJmdQaDDh-hRq)
- Wang, S.-Y. (Simon Wang), Larry Hipps, Robert Gillies, and Jin-Ho Yoon, "Fire and Ice—California Drought and 'Polar Vortex' in a Changing Climate," Science and Technology Infusion Climate Bulletin, NOAA's National Weather Service, 39th NOAA Annual Climate Diagnostics and Prediction Workshop, St. Louis, MO, 20–23 October 2014.

Appendix A: Select 2014/2015 SJV County Crop Production Values (Acres and Tonnage)

<i>Kern County</i>		<i>Acres</i>	<i>Production/Unit</i>
Silage and Forage	2015	93,000	1,769,000 Ton
	2014	85,000	1,632,000 Ton
Hay, Alfalfa	2015	101,000	723,000 Ton
	2014	109,000	922,000 Ton
Almonds Meats	2015	210,000	197,000 Ton
	2014	199,000	201,000 Ton
Almond By-Products	2015	--- ---	300,000 Ton
	2014	--- ---	329,000 Ton
<i>Tulare County</i>		<i>Acres</i>	<i>Production/Unit</i>
Corn-Silage	2015	158,000	4,866,000 Ton
	2014	117,000	2,948,400 Ton
Silage-Small Grain	2015	287,000	5,769,000 Ton
	2014	75,100	1,232,000 Ton
Alfalfa-Hay	2015	60,500	592,000 Ton
	2014	60,000	612,000 Ton
Alfalfa-Silage	2015	--- ---	1,077,000 Ton
	2014	--- ---	492,000 Ton
Almond Meats	2015	45,300	43,000 Ton
	2014	46,400	48,700 Ton
Almond Hulls	2015	--- ---	86,100 Ton
	2014	--- ---	97,500 Ton
<i>Fresno County</i>		<i>Acres</i>	<i>Production/Unit</i>
Corn-Silage	2015	26,450	626,000 Ton
	2014	28,100	649,000 Ton
Alfalfa Hay	2015	43,500	294,000 Ton
	2014	52,200	338,000 Ton
Almond Meats	2015	186,229	186,000 Ton
	2014	170,711	184,000 Ton
Almond Hulls	2015	--- ---	348,000 Ton
	2014	--- ---	326,000 Ton

Sources: 2015 Kern County Agricultural Crop Report; 2015 Tulare County Annual Crop and Livestock Report; 2015 Fresno County Agricultural Crop and Livestock Report

Appendix B: WURU Comments to SWRCB and CA ARB: Documentation, and Download Links

SWRCB Comments:

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian041316.pdf

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian101415.pdf

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian081615.pdf

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sfk_marderosian070615.pdf

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/sequoiaforestkeeper_marderosian.pdf

http://www.waterboards.ca.gov/waterrights/water_issues/programs/drought/comments_tucp2015/docs/public_testhuman061915.pdf

CA ARB Comments:

May 26, 2016 SLCP RS (CA ARB) Comments and Attachments are accessible at:

https://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=slcp2016&comment_num=73&virt_num=66

<https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=slcp2016>, then select Attachment for Comment #66, Todd Shuman, WUMU)

October 30, 2016 SLCP RS (CA ARB) comments are accessible at

https://www.arb.ca.gov/lispub/comm2/bccomdisp.php?listname=slcpdraftstrategy-2016&comment_num=72&virt_num=66