



CENTER for BIOLOGICAL DIVERSITY

Because life is good.



March 19, 2009

Ms. Becky Victorine
United States Bureau of Reclamation
2800 Cottage Way, MP-410
Sacramento, CA 95825

Mr. Michael Hendrick
California Department of Water Resources
P.O. Box 942836
West Sacramento, CA 94236

Subject: Comments on Environmental Reviews for the 2009 Drought Water Bank.

Dear Ms. Victorine and Mr. Hendrick:

Butte Environmental Council, the California Sportfishing Protection Alliance, the Center for Biological Diversity, and the California Water Impact Network ("the Coalition") submit the following comments and questions for the Draft Environmental Assessment ("EA") and Findings of No Significant Impact ("FONSI"), for the *2009 Drought Water Bank* ("DWB" or "Project"). We also provide comments about the purpose and need for the 2009 Drought Water Bank, the Governor's recent drought emergency declaration, and the CEQA Notice of Exemption to cover this project's implementation with mitigation measures from the 2003 and 2007 Environmental Water Account environmental documents.

The Bureau of Reclamation's draft environmental review of the California Department of Water Resources ("DWR's") DWB does not comply with the requirements of National Environmental Policy Act ("NEPA"), 42 U.S.C. §4321 *et seq.* First, we believe that the Bureau needs to prepare an environmental impact statement ("EIS") on this proposal that could allow up to 600,000 acre-feet (AF) of surface water transfers, up to 340,000 AF of groundwater substitution, and significant crop idling. Bureau reliance on the EA itself violates NEPA requirements because, among other things, the EA fails to provide a reasoned analysis and explanation to support the Bureau's proposed finding of no significant impact. The EA contains a fundamentally flawed alternatives analysis, and treatment of the chain of cause and effect extending from project implementation leading to inadequate analyses of nearly every resource and cumulative impacts.

An EIS would afford the Bureau, DWR, the State Water Resources Control Board, and the California public far clearer insight into how, where, and why the DWB might or might not be needed. The draft EA/FONSI as released this month fails to provide adequate disclosure of these impacts.

Second, exemption of the 2009 DWB from the requirements of the California Environmental Quality Act (CEQA) does not reflect the actual environmental effects of the proposal—which are similar to the proposed 1994 Drought Water Banks and for which a final Program Environmental Impact Report was completed in November 1993. In 2000, the Governor’s Advisory Drought Planning Panel report, *Critical Water Shortage Contingency Plan* promised a program EIR on a drought-response water transfer program, but was never undertaken. Twice in recent history, the state readily acknowledged that CEQA review for a major drought water banking program was appropriate. So, DWR’s Notice of Exemption reflects an end-run around established water law through the use of water transfers, and is therefore vulnerable to legal challenge under the California Environmental Quality Act.

Finally, we also question the merits of and need for the DWB project itself. The existence of drought conditions at this point in time is highly questionable and reflects the state’s abandonment of a sensible water policy framework given our state and national economic recession and tattered public budgets. Our organizations believe the Governor’s drought emergency declaration goes too far to help a few junior water right holders, and that at bottom, the 2009 Drought Water Bank is not needed. The DWB will directly benefit the areas of California whose water supplies are the least reliable by operation of state water law. Though their unreliable supplies have long been public knowledge, local, state, and federal agencies in these areas have failed to stop blatantly wasteful uses and diversions of water and to pursue aggressive planning for regional water self-sufficiency.

The proposed DWB will have significant effects on the environment—both standing alone and when reviewed in conjunction with the multitude of other plans that incorporate and are dependent on Sacramento Valley water. Ironically, the Bureau appears to recognize in its cumulative impacts discussion that there is potential for significant adverse impacts associated with the DWB, but instead of conducting an EIS as required, attempts to assure the public that the 2009 DWB will be deferred to the “willing sellers” through individual “monitoring and mitigation programs” as well as through constraining actions taken by both DWR and Bureau professional staff whose criteria ought instead be incorporated into the Proposed Action Alternative. EA at p. 37, FONSI at p. 3, 4, 5, 6, 7. Of course, this is not a permissible approach under NEPA; significant adverse impacts should be mitigated—or avoided altogether as CEQA normally requires.¹ Moreover, in light of the wholly inadequate monitoring planned for the 2009

¹ Perhaps even more telling, the Bureau actually began its own Programmatic EIS to facilitate water transfers from the Sacramento Valley and the interconnected actions that are integrally related to it, but never completed that EIS and now has impermissibly broken out this current segment of the overall Program for piecemeal review in the present draft EA. See 68 Federal Register 46218 (Aug 5, 2003) (promising a Programmatic EIS on these related activities, “include[ing] groundwater substitution in lieu of surface water supplies, conjunctive use of groundwater

DWB's extensive water transfer program, the suggestion that the public should be required to depend on that insufficient monitoring to provide the necessary advance notice of "significant adverse impacts" is an unacceptable position.

We incorporate by reference the following documents:

- Butte Environmental Council's comments on the Supplemental Environmental Water Account EIR/EIR, 2006.
- Butte Environmental Council's letter to DWR regarding the Drought Water Bank Addendum from Lippe Gaffney Wagner LLP, 2009.
- Butte Environmental Council's letter to DWR regarding the Drought Water Bank Addendum.
- Multi-Signatories letter regarding the Drought Water Bank, 2008.
- Professor Kyran Mish's White Paper, 2008.
- Professor Kyran Mish's comments on the 2009 DWB EA/FONSI
- Professor Karin Hoover's Declaration, 2008.

I. The Bureau and DWR Must Prepare an Environmental Impact Statement/ Environmental Impact Report on the Proposed 2009 Drought Water Bank

We strongly urge the Bureau and DWR to withdraw these inadequate environmental documents and instead prepare a joint EIR/S on the 2009 DWB, before approval by the State Water Resources Control Board (SWRCB), in order to comply with both NEPA and CEQA requirements for full disclosure of human and natural environmental effects.

NEPA requires federal agencies to prepare a detailed environmental impact statement on all "major Federal actions significantly affecting the quality of the human environment . . ." 42 U.S.C. §4332(2)(C). This requirement is to ensure that detailed information concerning potential environmental impacts is made available to agency decision makers and the public before the agency makes a decision. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). CEQA has similar requirements and criteria.

Under NEPA's procedures, an agency may prepare an EA in order to decide whether the environmental impacts of a proposed agency action are significant enough to warrant preparation of an EIS. 40 C.F.R. §1508.9. An EA must "provide sufficient evidence and analysis for determining whether to prepare an [EIS]" (*id.*), and must demonstrate that it has taken a "hard look" at the potential environmental impact of a project." *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1212 (9th Cir. 1998) (internal quotation marks omitted). However, the U.S. Court of Appeals for the Ninth Circuit has cautioned that "[i]f an agency decides not to

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").

prepare an EIS, it must supply a convincing statement of reasons to explain why a project's impacts are insignificant." *Id.* (internal quotation marks omitted). The Bureau has not provided a convincing statement of reasons explaining why the DWB's impacts are not significant. So long as there are "substantial questions whether a project *may* have a significant effect on the environment," an EIS must be prepared. *Id.* (emphasis added and internal quotation marks omitted). Thus, "the threshold for requiring an EIS is quite low." *NRDC v. Duvall*, 777 F. Supp. 1533, 1538 (E.D. Cal. 1991). Put another way, as will be shown through our comments, the bar for sustaining an EA/FONSI under NEPA procedures is set quite high, and the Bureau fails to surmount it with its report on the 2009 DWB.

NEPA regulations promulgated by the Council on Environmental Quality identify factors that the Bureau must consider in assessing whether a project may have significant environmental effects, including:

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

Here, the Bureau has failed to take a hard look at the environmental impacts of the DWB. As detailed below, there are substantial questions about whether the 2009 DWB's proposed water transfers will have significant effects on the region's environmental and hydrological conditions especially the interactions between groundwater and surface streams of interest in the Sacramento Valley region. There are also substantial questions about whether the 2009 DWB will have significant adverse environmental impacts when considered in conjunction with the other related water projects underway and proposed in the region. The Bureau simply cannot rely on the EA/FONSI for the foreseeable environmental impacts of the proposed 2009 DWB and still comply with NEPA's requirements.

A. The Proposed Action Alternative is poorly specified making it difficult to identify chains of cause and effect necessary to analyze adequately the alternative's environmental effects.

The Proposed Action Alternative is poorly specified and needs additional clarity before decision makers and the public can understand the human and environmental consequences of the 2009 Drought Water Bank. The EA describes the Proposed Action Alternative as one reflecting the Bureau’s intention to approve transfers of Central Valley Project water from willing sellers who contract with the Bureau ordinarily to use surface water on their croplands. Up to 208,000 AF of CVP water are on offer from these sellers, according to Table 1 of the EA. “Priority criteria” are described in the EA indicating that sales will be prioritized for water-short public health, urban, and then agricultural uses, in that order. Table 2 of the EA indicates that as much as 839,117 AF has been requested.

The EA/FONSI’s statement of purpose and need states specifically that “the purpose of the proposed action is to help facilitate the transfer of water throughout the State from willing sellers of CVP water upstream of the Delta to buyers that are at risk of experiencing water shortage in 2009.” This paragraph omits coherent discussion of need. The purpose and need should also state that this transfer program would be subject to specific criteria for prioritizing transfers, as described on page 6: “It is anticipated that water made available to [potential buyers] from the DWB would be prioritized as flows: existing health and safety domestic needs, municipal supply subject to water shortage contingency plan measures, and agricultural irrigation for existing crops and livestock subject to water shortage contingency plan measures.”

The EA’s description of the proposed action alternative needs to make clear what would occur if the sale criteria are in fact applied. Are both project agencies applying them, or just one and not the other? What is the legal or policy basis authorizing use of these criteria? Will exceptions be provided, and if so, by what criteria would exceptions be made?

Taken together with DWR’s March 4th Addendum to the EWA EIS/R, there is considerable ambiguity over just how many potential sellers there are and how much water they would make available to the DWB. This is reflected in different numbers in the two environmental documents justifying the DWB. The following table shows the discrepancies across these uncoordinated environmental reviews:

Comparison of Environmental Review Parameters for the 2009 Drought Water Bank	DWR Addendum, March 4th	Bureau EA, March 4th
Narrative project description present in document?	No	Yes
DWB sale criteria discussed?	No	Yes
Total potential water for sale (AF)	533,435	389,328
Total potential water requests (AF)	818,905	839,117
Total potential water sales covered by environmental compliance with the EWA EIS/R (AF)	600,000	Not described.

Absence of agreement among these documents on basic facts of the 2009 DWB signals that neither the Bureau nor DWR have a clear idea what the DWB is. This problem contributes

greatly to and helps explain the poorly rendered treatment of causes and effects that permeate the Bureau's EA. The project agencies, decision-makers, and the public all face a moving target with the 2009 Drought Water Bank. Such discrepancies reflect hasty consideration and poor planning by project proponents. Nor can the agencies reasonably attribute their inadequate environmental reviews on lack of warning. The Governor has made fear of drought a centerpiece of his recent water statements since at least last June. Yet DWR and the Bureau apparently have not agreed on these basic facts making up the DWB.

From data available in the EA and the Addendum, it is not possible to determine with confidence just how much water is requested by potential urban and agricultural buyers. There is no attempt to describe how firmly tendered are offers of water to sell or requests to purchase. With between 400,000 and 500,000 AF of presumably urban buyer requests² (which have priority over agricultural purchases, according to the DWB priorities) and a cumulative total of less than 400 TAF from willing sellers (with just over half that coming from CVP water), it would appear that many agricultural buyers are not likely to have their needs addressed by the 2009 DWB? If so, the Bureau and DWR should state the likelihood that all urban requests and perhaps no agricultural requests will be fulfilled in order to achieve a full and correct environmental compliance treatment of the proposed action. Such an estimate is necessary for accurate explication of the chains of cause and effect associated with the 2009 DWB—and which must propagate throughout a NEPA document for it to be adequate as an analysis of potential natural and human environmental effects of the proposed project. We have additional specific questions:

- Within the request of the San Luis and Delta Mendota Water Authority (SLDMWA), its requesters include SCVWD in Table 2 of the EA/FONSI. Is this request for an agricultural use or an urban use of DWB water? At 30,000 acre-feet, it represents one-sixth of SLDMWA's 180,000 acre-feet request. If it is entirely for agricultural uses, how likely is it to be fulfilled under DWB priorities for water sales?
- What are the specific urban requests for water made by Avenal State Prison, and the cities of Avenal, Huron, and Coalinga, nested within the SLDMWA request?
- Sale criteria should be premised on full compliance with all applicable environmental and water rights laws.

Application of DWB priority criteria will depend on intervening economic factors beyond the control of the DWB. Given this uncertainty, an EIS should be prepared to provide the agencies with advance information and insight into what the sensitivity of the program's sellers and buyers are to the influences of prices—prices for water as well as crops such as rice, orchard and vineyard commodities, and other field crops. It is plausible that crop idling will occur more in field crops, while groundwater substitution would be more likely for orchard and vineyard crops. However, high prices for rice—the Sacramento Valley's largest field crop—would undermine

² Neither DWR's Addendum nor the Bureau's EA specify numerical requests for the cities of Huron, Avenal, Coalinga, and the Avenal State Prison making it impossible to have a firmer number for the amount of urban request for water. Our estimate assumes SCVWD's 30,000 AF and MWD's 300,000 AF requests are for entirely urban uses of DWB-purchased water.

this logic, and could lead to substantial groundwater substitution. We have further extensive concerns about this, described below.

On page 96, the EA finally acknowledges this reality of crop prices:

“Hydrologic conditions change the supply of water available for transfers, which would shift the price of water. The difference in supply of water in a wet and dry year amounts to millions of acre-feet. The regional source of the water plays a role in pricing as well. Also, agricultural prices could also affect supply of water transfers. Small changes in agricultural prices can have a large effect on water transfer supply because net returns in farming are very responsive to agricultural prices. These factors are not controlled by participants in the market.”

This statement is actually not a matter of cumulative effects, but an integral part of the chains of cause and effect that affect how the DWB would unfold in the human and natural environments. It should be recognized as part of the 2009 DWB description and should directly apply to the Agriculture and Land Use, and Socioeconomic sections of the EA, because crop prices are key factors in choices potential water sellers would weigh in deciding whether to idle crops, substitute groundwater, or decline to participate in the DWB altogether. The EA and Addendum are inadequate because they fail to identify and analyze the market context for crops as well as water that would ultimately influence the size and scope of the DWB in 2009.

Rice prices are high because of conditions for the grain in the world market. Drought elsewhere is a factor in reduced yields, but growing populations in south and east Asia demand more rice and the rice industry has struggled to meet that demand.³

This is very important. The Bureau tacitly admits that the Bureau—and by logical extension, DWR—has no idea how many sales of what type (public health, urban, agricultural) can be expected to occur. Put another way, there is a range of potential outcomes for the 2009 DWB, and yet the Bureau has failed utterly to use the EA to examine a reasonable and representative range of alternatives as it concerns how the priority criteria would affect DWB transfers. And DWR did not bother to conduct an appropriate level of review under the California Environmental Quality Act.

Nor does the 2009 DWB prevent rice growers (or other farmers) from “double-dipping.” It appears to us they could opt to turn back their surface supplies from the CVP and the State Water Project and substitute groundwater to cultivate their rice crop—thereby receiving premiums on both their CVP contract surface water as well as their rice crop this fall when it goes to market. There appear to be no caps on water sale prices to prevent windfall profits to sellers of Sacramento Valley water in the event that groundwater is substituted in producing crops—

³ “Panic over rice prices hits California,” *AZCentral.com*, April 24, 2008; UN News Service, “Bumper rice harvests could bring down prices but poor may not benefit, warns UN,” 25 February 2009; “Era of cheap rice at an end in Taiwan: COA,” *The China Post*, March 5, 2009; Jim Downing, “Sacramento Valley growers see rice prices soar,” *Sacramento Bee*, 18 January 2009.

especially for crops where market prices are high, such as in rice. The DWB in the 1990s capped water prices at \$125/acre-foot, much to the disappointment of some water sellers at that time. Why are the state and federal projects encouraging such potential windfall profits at a time when many others suffer through this recession?

As stated, neither the Bureau nor DWR state how much of these transfers would go to public health, urban or agricultural buyers. The EA must also (but fails to) address the ability and willingness of potential buyers to pay for DWB water given the supplies that may be available. Historically, complaints from agricultural water districts were registered in the comments on the Draft EWA EIS/R and reported in the Final EIS/R in January 2004 indicating that they could not compete on price with urban areas buying water from the EWA. Given the DWB's priority criteria, will agricultural water buyers identified in Table 2 of the EA be able to buy water when competing with the likes of the Santa Clara Valley Water District and the Metropolitan Water District, representing two of the wealthiest regions of California? As a matter of statewide water, infrastructure, and economic policy, is it wise to foment urban versus agricultural sector competition for water based solely on price? Shouldn't other factors be considered in allocating water among our state's regions? This fails dramatically to encourage regions to develop their own water supplies more efficiently and cost-effectively without damage to resources of other regions.

Full disclosure of each offer of and each request for DWB water should be provided as part of the EA. This is necessary so the public can understand and have confidence in the efficacy of the DWB, benefit from full disclosure of who requests how much DWB water and for what uses, and so that the public may easily verify chains of cause and effect. Urban application of transferred surface water is not examined in the EA/FONSI, as though how urban buyers would use their purchased water had no environmental effects. Since the dry period could last beyond 2009, how will purchased water be used and conserved?

Nor is a hierarchy of priority uses among urban users stated in the criteria for purchasing DWB water. Could purchased water be used for any kind of landscaping, rather than clearly domestic purposes or strictly for drought-tolerant landscaping? We cannot tell from the EA/FONSI narrative. How can the citizens of California be assured that water purchased through the DWB will not be used wastefully, in violation of the California Constitution, Article X, Section 2?

Will urban users need their DWB purchased water only in July through September, or is that the delivery period preferred in the DWB because of ecological and fishery impact constraints on conveyance of purchased water?

Should agricultural water users be able to buy any DWB water, how will DWR and the Bureau assure that transferred water for irrigation is used efficiently? Many questions are embedded within these concerns that DWR and the Bureau should address, especially when they approach the State Water Resources Control Board to justify consolidating their places of use in their respective water rights permits:

- How much can be expected to be purchased by agricultural water users, given the priority criteria of the 2009 Drought Water Bank?
- How much can be expected to be consumptively used by agricultural water buyers?
- How much can be expected to result in tailwater and ag drainage?
- How much can be expected to add to the already high water table in the western San Joaquin Valley?
- What selenium and boron loads in Mud Slough and other tributaries to the San Joaquin River may be expected from application of this water to WSJ lands?
- What mitigation measures are needed to limit such impacts consistent with the public trust doctrine, Article X, Section 2 of the California Constitution, the Porter-Cologne Water Quality Control Act, and California Fish and Game Code Section 5937?

In other words, the most important chains of cause and effect—extending from the potential for groundwater resource impacts in the Sacramento Valley to potential for contaminated drainage water from farm lands in the western San Joaquin Valley where much of the agricultural buyers are located—are ignored in the Bureau’s EA and DWR’s Notice of Exemption based upon its EWA EIS/R Addendum.

Will more of surface water transfers go to urban users than to ag users given the 2009 DWB priority criteria? The EA’s silence on this is disturbing, and suggests that the DWB’s priority criteria may not be that important to the actual functioning of the DWB. What assurances will the Bureau and DWR provide that these criteria will be closely followed?

- The more that goes to urban water agencies the less environmental impacts there would be on drainage impaired lands of the San Joaquin Valley, a neutral to beneficial impact of the DWB’s operation on high groundwater and drainage to the SJR.
- However, the more DWB water goes to agricultural users than to urban users, the higher would be groundwater levels, and more contaminated the groundwater would be in the western San Joaquin Valley and the more the San Joaquin River would be negatively affected from contaminated seepage and tailwater by operation of the DWB.

The EA fails to provide a map indicating where the sources of the DWB are located, and where the service areas are to which water would be transferred under the DWB.

Two issues concerning water rights are raised by this EA/FONSI:

- **Consolidated Place of Use.** Full disclosure of what the consolidated places of use for DWR and USBR would be, since the permit request to SWRCB will need NEPA coverage. Why is this consolidated place of use sought by the project agencies? Does consolidation mean that each project agency has the other’s place of use, effectively a merger of the permits for DWB purposes? If so, the EA should state so. Will the consolidation be a permanent or temporary request be limited to the duration of the governor’s emergency declaration or of just the 2009 DWB? When is the 2009 DWB scheduled to sunset? How do the consolidated place of use permit amendments to the

SWP and CVP permits relate to their joint point of diversion? Why doesn't simply having the joint point of diversion in place under D-1641 suffice for the purpose of the DWB?

- **Description of the water rights of both sellers and buyers.** This would necessarily show that buyers clearly possess junior water rights as compared with those of willing sellers. Lack of full disclosure of these disparate rights is needed to help explain the actions and motivations of buyers and sellers in the DWB, otherwise the public and decision makers have insufficient information on which to support and make informed choices.
 - **Sacramento Valley water rights** – correlative groundwater rights, riparian rights and CVP settlement contract rights
 - **San Joaquin Valley water rights** – CVP contract rights only, junior-most contractors within the CVP priority system (especially Westlands Water District).
 - **Priority of allocations among water contractors within the CVP and SWP.**

To establish a proper legal context for these water rights, the Project Action Alternative section of the EA/FONSI should also describe the applicable California Water Code sections about the treatment of water rights involved in water transfers.

Thus, there are many avenues by which the 2009 DWB is a poorly specified program for NEPA and CEQA purposes, leaving assessment of its environmental effects at best murky, and at worst, risky to all involved, especially users of Sacramento Valley groundwater resources.

B. Correcting the EA's poorly specified chains of cause and effect forces consideration of an expanded range of alternatives.

The Proposed Action Alternative need not have sophisticated forecasts of prices for rice and other commodities. Instead, for an adequate treatment of alternatives, the EA should have examined several reasonable scenarios beyond simply the 2009 DWB and a "no action" alternative. Three reasonable permutations would have considered relative proportions of crop idling versus groundwater substitution (e.g., high/low, low/high, and equal proportions of crop idled water and groundwater substitution). Other reasonable drought response alternatives that can meet operational and physical concerns merit consideration and analysis by the Bureau include:

- Planned permanent retirement of upslope lands in the western San Joaquin Valley where CVP-delivered irrigation water is applied to lands contaminated with high concentrations of selenium, boron and mercury, and which contribute to high water table and drainage problems for lowland farmers, wetlands and tributaries of the San Joaquin River. Retirement of these lands would permanently free up an estimated 3 million acre-feet of state and federal water during non-critical water years. Ending irrigation of these lands would also result in substantial human environmental benefits for the San Joaquin River, the Bay-Delta Estuary, and the Suisun Marsh from removal of selenium, boron, and salt contamination. Having such reasonable and pragmatic practices in place would go a long way to eliminate the need for drought water banks in the foreseeable future.

- More aggressive investment in agricultural and urban water conservation and demand management among CVP and SWP contractors even on good agricultural lands, including metering of all water supply hook-ups by all municipal contractors, statewide investment in low-flush toilets and other household and other buildings' plumbing fixtures, and increased capture and reuse of recycled water. Jobs created from such savings and investments would represent an economic stimulus that would have lasting job and community stability benefits as well as lasting benefits for water supply reliability and environmental stabilization.

C. The 2009 DWB EA fails to specify adequate environmental baselines, or existing conditions, against which impacts would be assessed and mitigation measures designed to reduce or avoid impacts.

The 2009 DWB environmental reviews by DWR and the Bureau incorporate by reference for specific facets of their review the 2003 and 2007 Environmental Water Account EIS/R documents. In both cases, these environmental reviews were conducted on a program whose essential purpose is to “provide protection to at-risk native fish species of the Bay-Delta estuary through environmental beneficial changes in State Water Project/Central Valley Project operations at no uncompensated water cost to the Projects’ water users. This approach to fish protection involves changing Project operations to benefit fish and the acquisition of alternative sources of project water supply, called the ‘EWA assets,’ which the EWA agencies use to replace the regular Project water supply lost by pumping reductions.”

The two basic sets of actions of the EWA were to:

- Implement fish actions that protect species of concern (e.g., reduction of export pumping at the CVP and SWP pumps in the Delta); and
- Increase water supply reliability by acquiring and managing assets to compensate for the effects of the fish actions (such as by purchasing water from willing sellers for instream flows that compensates the sellers for foregone consumptive use of water).

Without going into further detail on the EWA program, there is no attempt by the EWA agencies to characterize its environmental review as reflective of water transfer programs generally; the EWA was a specific set of strategies whose purpose was protection of fish species of concern in the Delta, not drought aid for junior water right-holding areas of California. One consequence of this attempt to rely on the EWA EIS/R is that it makes the public’s ability to understand the environmental baseline of the 2009 Drought Water Bank impossible, because environmental baselines, differing purpose and need for the project, and many relevant mitigation measures are not readily available to the public. This mocks NEPA and CEQA missions to inform the public adequately about the environmental setting and potential impacts of the proposed project’s actions. Moreover, a Drought Water Bank is plainly not the same thing as an Environmental Water Account.

Another consequence is that the chains of cause and effect of an EWA versus a DWB are entirely different because of their different purposes. While the presence of water purchases, willing sellers, and requesting buyers is similar, the timing of EWA water flows are geared to enhancing and protecting fish populations; the water was to flow in Delta channels to San Francisco Bay and the Pacific Ocean. In stark contrast, the DWB's water flows focus water releases from the SWP and CVP reservoirs to be exported for deliveries in the July through September period, whereas EWA assets would be "spent" year-round depending on the specific need to protect fish. EWA was about purchasing water to provide instream flows in the Delta, while the DWB is to acquire water to serve consumptive uses outside of the Delta.

Furthermore, to tease out the various ways in which the EWA review—itsself a two-binder document consisting of well over 1,000 pages—could be used to provide appropriate environmental compliance for the DWB is not even attempted by DWR and the Bureau which at least has staff that could have been assigned to undertake it; yet they do not. It is therefore well beyond the reach of non-expert decision-makers and the public, and the use of the EWA EIS/R as the basic environmental review for the DWB therefore violates both NEPA and CEQA.

Nor is any attempt made in the EWA EIS/R to characterize the EWA as a "program level" environmental review off of which a DWB-like project could perhaps legitimately tier. In our view, this reliance on the EWA EIS/R obscures the environmental baselines of the DWB from public view, inappropriately conflates the purposes of two distinct environmental reviews, and flagrantly violates of NEPA and CEQA. This could only be redressed by preparation of an EIS/R on the 2009 DWB.

Finally, the most significant baseline condition omitted in the Bureau and DWR's inadequate reporting relates to Sacramento Valley groundwater resources, discussed in the next section.

D. Scientific uncertainties and controversy about Sacramento Valley groundwater resources merit consideration that only an EIS can provide.

There is substantial evidence that the 2009 DWB may have significant impacts on the aquifer system underlying the project and the adjacent region that overlies the Tuscan Formation. This alone warrants the preparation of an EIS.

Additionally, an EIS is necessary where "[a] project[']s ... effects are 'highly uncertain or involve unique or unknown risks.'" *Blue Mountains Biodiversity Project*, 161 F.3d at 1213 (quoting 40 C.F.R. §1508.27(b)(5)). Here, the draft EA/FONSI fails to adequately address gaps in existing scientific research on the hydrology of the aquifer system and the extent to which these gaps affect the Bureau's ability—and by logical extension, DWR's ability—to assess accurately the Project's environmental impacts.

- 1. Existing research on groundwater conditions indicates that the 2009 DWB may have significant impacts on the aquifer system.**

The EA fails to describe significant characteristics of the aquifers that the 2009 DWB proposes to exploit. These characteristics are relevant to an understanding of the potential environmental effects associated with the 2009 DWB's potential extraction of up to 340,000 acre feet ("af") of groundwater. Environmental Water Account 2003 EIS/EIR Record of Decision at p. 11; Draft Supplemental Environmental Water Account 2007 EIS/EIR at p. ES-6; 2009 Drought Water Bank addendum 12/17/08 at p. 2, 3, 9; 2009 Drought Water Bank addendum 3/4/09 at p. 2, 3, 9. First, the draft EA/FONSI fails to describe a significant saline portion of the aquifer stratigraphy of the 2009 DWB area. According to Toccoy Dudley, former Groundwater Geologist with the Department of Water Resources and former director of the Butte County Water and Resources Department, saline groundwater aquifer systems of marine origin underlie the various freshwater strata in the northern counties of Butte, Colusa, Glenn, and Tehama ("northern counties"). The approximate contact between fresh and saline groundwater occurs at a depth ranging from 1500 to 3000 feet. (Dudley 2005) (A list of all references cited in these comments can be found at the end of this letter.)

Second, the EA fails to discuss the pressurized condition of the down-gradient portion of the Tuscan formation, which underlies the northern counties Project area. Dudley finds that the lower Tuscan aquifer located in the Butte Basin is under pressure. "It is interesting to note that groundwater elevations up gradient of the Butte Basin, in the lower Tuscan aquifer system, are higher than the ground surface elevations in the south-central portion of Butte Basin. This creates an artesian flow condition when wells in the central Butte Basin are drilled into the lower Tuscan aquifer." (Dudley 2005). The artesian pressure indicates recharge is occurring in the up-gradient portions of the aquifer located along the eastern margin of the Sacramento Valley.

Third, the EA fails to describe the direction of movement of water through the Lower Tuscan Formation that underlies the northern counties. According to Dudley: "From Tehama County south to the city of Chico, the groundwater flow direction in the lower Tuscan is westerly toward the Sacramento River. South of Chico, the groundwater flow changes to a southwesterly direction along the eastern margin of the valley and to a southerly direction in the central portion of the Butte Basin." (Dudley 2005).

Fourth, the draft EA fails disclose that the majority of wells used in the Sacramento Valley are individual wells that pump from varying strata in the aquifers. The draft EA incorrectly asserts that, "Groundwater users in the basin pump primarily from deeper continental deposits." EA at p. 24. Contradicting this assertion, the EA later states that, "Fifty percent of the domestic wells are 150 feet deep or less," for the Natomas Central Mutual Water Company. (EA at p. 30) Why is the information not provided for other areas of the Sacramento Valley? The thousands of domestic wells in the northern counties are as susceptible as the wells in the Natomas Central MWC. The EA expands the discussion regarding Natomas Central MWC on page 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. As previously described, the well review data, mitigation and monitoring plans that will be required from sellers during the transfer approval process will reduce the potential for this effect.” As the latter statement makes clear, the Bureau hopes that the individual mitigation and monitoring plans will reduce the potential for impact, but there is no assurance in the EA to the thousands of well owners in the Sacramento Valley that it will reduce it to a level of insignificance. The Coalition questions the adequacy of individual mitigation and monitoring plans and suggests that an independent third party, such as USGS, oversee the mitigation and monitoring program. After the fiasco in Butte County during the 1994 Drought Water Bank and with the flimsy, imprecise proposal for mitigation and monitoring in the 2009 DWB, the agencies lack credibility as oversight agencies.

Fifth, the draft EA fails to provide recharge data for the aquifers. Professor Karin Hoover, Assistant Professor of hydrology, hydrogeology, and surficial processes from CSU Chico, finds that, “Although regional measured groundwater levels are purported to ‘recover’ during the winter months (Technical Memorandum 3), data from Spangler (2002) indicate that recovery levels are somewhat less than levels of drawdown, suggesting that, in general, water levels are declining.” According to Dudley, “Test results indicate that the ‘age’ of the groundwater samples ranges from less than 100 years to tens of thousands of years. In general, the more shallow wells in the Lower Tuscan Formation along the eastern margin of the valley have the ‘youngest’ water and the deeper wells in the western and southern portions of the valley have the ‘oldest’ water,” adding that “the youngest groundwater in the Lower Tuscan Formation is probably nearest to recharge areas.” (Dudley 2005). “This implies that there is currently no active recharge to the Lower Tuscan aquifer system (M.D. Sullivan, personal communication, 2004),” explains Dr. Hoover. “If this is the case, then water in the Lower Tuscan system may constitute fossil water with no known modern recharge mechanism, and, once it is extracted, it is gone as a resource,” (Hoover 2008).

All of these aquifer characteristics are important to a full understanding of the environmental impacts of the 2009 DWB because there are numerous indications that other aquifer strata associated with the Lower Tuscan Formation are being operated near the limit of overdraft and could be affected by the 2009 DWB. (Butte County 2007). The Bureau has not considered this important historic information in the draft EA. According to Dudley, the Chico area has a “*long term average decline in the static groundwater level of about 0.35 feet-per-year.*” (Dudley 2007) (Emphasis added.) Declining aquifer levels are not limited to the Chico Municipal area. This trend of declining aquifer levels in Chico, Durham and the Cherokee Strip is illustrated in a map submitted with this comment letter. (CH2M Hill 2006).

Declining groundwater elevations have been observed specifically in Butte County. A 2007 Butte Basin Groundwater Status Report describes the “historical trend” in the Esquon Ranch area as showing “seasonal fluctuation (spring to fall) in groundwater levels of about 10 to 15 feet during years of normal precipitation and less than 5 feet during years of drought.” The report further notes: “Long-term comparison of spring-to-spring groundwater levels shows a decline of approximately 15 feet associated with the 1976-77 and 1986-94 droughts. (Butte Basin Water

Users Association, 2007.) The 2008 report indicates that, “The spring 2008 groundwater level measurement was approximately three feet higher than the 2007 measurement, however it was still four feet lower than the average of the previous ten spring measurements. Fall groundwater levels are approximately nine feet lower than the averages of those measured during either of the previous drought periods on the hydrograph. At this time it appears that there may be a downward trend in groundwater levels in this well.” (Butte Basin Water Users Association, 2008.) Thus, “*it appears that there may be a downward trend in groundwater levels in this well.*” *Id.* (emphasis added).

Groundwater elevations in the Pentz sub-area in Butte County also reveal significant historical declines. The historical trend for this sub-area “...shows that the average seasonal fluctuation (spring to fall) in groundwater levels averages about 3 to 10 feet during years of normal precipitation and approximately 3 to 5 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows a decline in groundwater levels during the period of 1971-1981, perhaps associated with the 1976-77 drought. Since a groundwater elevation high of approximately 145 feet in 1985 the measured groundwater levels in this well have continued to decline. Recent groundwater level measurements indicate that the groundwater elevation in this well is approximately 15-25 feet lower than the historical high in 1985. *Id.* Water elevations at the Pentz sub-area well have been monitored since 1967. “Since 1985 spring groundwater levels in this well have been declining, and the spring 2008 measurement remained ten feet below historical high levels and continues the downward trend on the hydrograph.” *Id.* (Emphasis added.)

Both the Pentz and Esquon Ranch areas are located east of U.S. 99, in the eastern portion of the Tuscan aquifer.

In light of this downward trend in regional groundwater levels, the Bureau’s EA should closely analyze replenishment of the aquifers affected by the proposed 2009 DWB. The draft EA fails to provide any in-depth assessment of these issues. For example, the EA fails to discuss the best available estimates of where groundwater replenishment occurs. Lawrence Livermore National Laboratory analyzed the age of the groundwater in the northern counties to shed light on this process: “Utilizing the Tritium (H3) Helium-3 (He3) ratio, the age of each sample was estimated. Test results indicate that the “age” of the groundwater samples ranges from less than 100 years to tens of thousands of years, (Dudley et al. 2005). As mentioned above, Dudley opines that the youngest groundwater in the Lower Tuscan Formation is probably nearest to recharge areas. (2005).

Are isotopic groundwater data available for other regions in the Sacramento Valley? If so, they would be crucial for all concerned to understand the potential impacts from the proposed 2009 DWB. For example, the EA states, “The WFA area that could be affected by the proposed action includes only the ‘North Area’ bounded on the north and east by the Sacramento County line, by the Sacramento River on the west, and by the American River on the south.” EA at p. 34. If this is the area in Sacramento County that is identified as most vulnerable to groundwater impacts,

yet two major rivers surround it, shouldn't the Bureau understand the hydrologic relationship between the groundwater basin and the rivers? If that understanding exists, where is it presented in the EA? It is well known that the Sacramento River is already a losing river south of Princeton.

The Bureau should prepare an EIS that considers this and other existing research to evaluate the 2009 DWB's anticipated effect on regional hydrology.

2. The 2009 DWB proposes to rely on inadequate monitoring to avoid the acknowledged possibility of significant adverse environmental impacts.

The draft EA relies deflects responsibility of the Bureau and DWR for monitoring to individual "willing sellers." EA at p. 21. This fails to provide the most basic framework for governmental authority to enforce the state's role as trustee of the public's water in California, let alone a comprehensive and coordinated structure, for a very significant program that could transfer up to 389,328 af of water from the Sacramento Valley. (Recall that DWR suggests potential sale of water up to 533,000 AF, and believes it has environmental compliance coverage for up to 600,000 AF of water sales from the Sacramento Valley, including 340,000 AF in groundwater substitution alone.) The draft EA further defers responsibility to local groundwater management plans and ordinances to determine when the effects of the proposed extraction become "adverse." EA at p. 22. "As described in Section 3.2, well reviews and monitoring and mitigation plans will be implemented under the proposed action to minimize potential effects of groundwater substitution. Well reviews, monitoring and mitigation plans will be coordinated and implemented in conjunction with local ordinances, basin management objectives, and all other applicable regulations." EA at p. 10. The draft EA merely provides monitoring direction to "willing sellers" without identifying specific actions, responsible agencies, or funding that will be necessary for this oversight. This is unacceptable.

We propose instead that the Bureau and DWR require at a minimum that local governments select independent third-party monitors, who are funded by surcharges on DWB transfers paid by the buyers, to oversee the monitoring that is proposed in lieu of Bureaus and DWR staff. EA at p. 41-45.

Otherwise, the DWB's proposed monitoring is insufficient and cannot justify the significant risk of adverse environmental impacts. For example, the EA fails to identify standards that would be used to monitor the 2009 DWB's impacts. It fails to identify any specific monitoring protocols, locations (particularly in up-gradient recharge portions of the groundwater basins), and why chosen locations should be deemed effective for monitoring the effects of the proposed groundwater extraction. It also fails to describe how the objectives in the Drought Water Transfer White Paper will be met and by whom. EA at p.43. Moreover, it fails to provide a mitigation strategy for review and comment by the public, but defers this vital mitigation planning effort. EA at p.43. Another example of the inadequacy of the proposed monitoring is

that the draft EA fails to include any plan to monitor stream flow of creeks located in the presumed recharge area for the Lower Tuscan Formation located on the eastern edge of the Sacramento Valley.

Adequate monitoring is vital to limit the significant risks posed by the DWB to the health of the region's groundwater, streams, and fisheries, as discussed below. Moreover, to the extent this Project is conceived as a one-year drought program that will provide knowledge for future groundwater extraction, its failure to include adequate monitoring protocols is even more disturbing and creates the risk of significant long-term and even irreversible impacts from the DWB.

a. The Bureau's assertion that the DWB will be modified or halted in the event of significant adverse impacts to hydrologic resources is an empty promise in light of the wholly inadequate monitoring provided for in the DWB. Knowing that the Bureau and DWR knowingly violated the X2 standard in the Delta in February 2009 does little to instill confidence from the Coalition in non-specific program and mitigation criteria.

The EA repeatedly illustrates that there is potential for significant injury to other groundwater users, water quality, streams, flora and fauna, and the soil profile, EA at p. 36-41. Page 36 alone has numerous examples that illustrate the need for an EIS since there is insufficient, comprehensive planning for, let alone preparation to mitigate, adverse environmental impacts:

- *Crop idling and groundwater substitution transfers under the proposed action could affect groundwater resources. Changes in groundwater levels could cause secondary effects. Declining groundwater levels could result in: 1) increased groundwater pumping cost due to increased pumping depth, 2) decreased yield from groundwater wells due to reduction in the saturated thickness of the aquifer, 3) reduced groundwater in storage, and 4) decrease of the groundwater table to a level below the vegetative root zone, which could result in environmental effects.*
- *Groundwater pumping within the vicinity of a surface water body could change the existing interactions between surface and groundwater, potentially resulting in decreased stream flows and levels, with potential adverse effects to the riparian habitat and downstream users. The pumping of groundwater near wetland habitats could also result in adverse environmental effects.*
- *Excessive groundwater extraction from confined and unconfined aquifers could result in a lowering of groundwater levels and, in confined aquifers, a decline in water pressure. The reduction in water pressure results in a loss of support for clay and silt beds, which subsequently compress, causing a lowering of the ground surface (land subsidence). The compaction of fine-grained deposits, such as clay and silt, is permanent. The possible consequences of land subsidence are 1) infrastructure damage and 2) alteration of drainage pattern.*
- *Changes in groundwater levels or in the prevailing groundwater flow regime could cause a change in groundwater quality through a number of mechanisms. One mechanism is the potential mobilization of areas of poorer quality water, drawn down from shallow*

zones, or drawn up into previously unaffected areas. Changes in groundwater gradients and flow directions could also cause (or speed) the lateral migration of poorer quality water. Artificial or enhanced recharge of the aquifer with water of poorer quality, or even different geochemical constituents, could also have an adverse effect on existing conditions. Geochemical differences between the recharged water and groundwater could affect resultant groundwater quality through geochemical processes such as precipitation, bacterial activity, ion exchange, and adsorption.

The Bureau thus recognizes the potential for significant decline in groundwater levels as a result of the proposed activity. EA at p. 36, 37. This acknowledgement alone is sufficient to require a full EIS. Moreover, as detailed below, the monitoring proposed by the 2009 DWB is so inadequate that there can be no guarantee that adverse impacts will be discovered, or that they will be discovered in time to avoid significant environmental impacts.

Glenn County is noticeably omitted from the list of counties with some local regulatory authority. EA at p. 28-29. Glenn County does have a Groundwater Management Plan (adopted in August 2001), albeit inadequate. The Bureau's own 2008 EA for the GCID Seven Wells Project cautioned that "[s]ince the groundwater management plan is relatively new and not fully implemented, the enforcement and conflict resolution process has not been vigorously tested." Moreover, the Glenn County Groundwater Management Plan does not have any provisions to monitor or protect the environment. The 2009 DWB EA fails to explain why this management plan, as inadequate as it is, is not discussed nor is the absence of local protection mentioned.

b. Monitoring based on the Glenn County Groundwater Management Plan is inadequate. Since the Bureau omitted discussion of the Glenn County Groundwater Management Plan in the 2009 DWB, we refer to the language used in the 2008 Stony Creek Fan EA/FONSI that explained that the existing Glenn County groundwater management plan will ensure the testing project will have no significant adverse effects on groundwater levels: "This Finding of No Significant Impact (FONSI) is based upon the following: ... Implementation of the Glenn County Groundwater Management Plan during the aquifer performance testing plan will ensure that the proposed action will not result in any significant adverse effect to existing groundwater levels." Stony Creek Fan EA/FONSI at p. 2.

But the Butte County Department of Water and Resource Conservation explains that local plans are simply not up to the task of managing a regional resource:

Glenn County does not have an export ordinance because it relies on Basin Management Objectives (BMO) to manage the groundwater resource, and subsequently to protect third parties from transfer related impacts. Recently, Butte County also adopted a BMO type of groundwater management ordinance. Butte County, Tehama County and several irrigation districts in each of the four counties have adopted AB3030 groundwater management plans. All of these groundwater management activities were initiated prior to recognizing that a regional aquifer system exists that extends over more than one

county and that certain activities in one county could adversely impact another. Clearly the current ordinances, AB3030 plans, and local BMO activities, which were intended for localized groundwater management, are not well suited for management of a regional groundwater resource like that theorized of the Lower Tuscan aquifer system.

(Butte County DWRC 2007).⁴

c. The EA fails to propose real time monitoring for land subsidence. Third-party independent verification, perhaps by scientists from the U.S. Geological Survey, should be incorporated by DWR and the Bureau into the project description of the 2009 DWB. The draft EA/FONSI relies on very few existing extensometers in the Sacramento Valley that measure land subsidence, and a Global Positioning System land subsidence network established by one county. EA/FONSI at p. 26 and 32. The remaining responsibility is again deferred to the “willing sellers.” Unfortunately, voluntary monitoring by pumpers does not strike us as a responsible assurance given the substantial uncertainties involved in regional aquifer responses to extensive groundwater pumping in the Sacramento Valley.

Not only is there a failure to discuss real time monitoring for subsidence, there also is no discussion regarding delayed subsidence that should also be monitored according to the findings of Dr. Kyran Mish, Presidential Professor, School of Civil Engineering and Environmental Science at the University of Oklahoma. Dr. Mish notes: “It is important to understand that *all* pumping operations have the potential to produce such settlement, and when it occurs with a settlement magnitude sufficient enough for us to notice at the surface, we call it *subsidence*, and we recognize that it is a serious problem (since such settlements can wreak havoc on roads, rivers, canals, pipelines, and other critical infrastructure).” (Mish 2008). Dr. Mish further explains that “[b]ecause the clay soils that tend to contribute the most to ground settlement are highly impermeable, their subsidence behavior can continue well into the future, as the rate at which they settle is governed by their low permeability.” *Id.* “Thus simple real-time monitoring of ground settlement can be viewed as an *unconservative* measure of the potential for subsidence, as it will generally tend to underestimate the long-term settlement of the ground surface.” *Id.* (emphasis added).

d. The 2009 DWB EA fails to require stream flow monitoring, choosing to defer the monitoring and mitigation planning to “willing sellers.” We also urge incorporation of frequent and regular streamflow monitoring by either staff of the project agencies or a third, independent party such as the USGS, paid for by DWB transfer surcharges mentioned above. It is clear from existing scientific studies and the EA that the DWB may have significant impacts on the aquifers replenishment and recharging of the aquifers, and the 2009 DWB should therefore require extensive monitoring of regional streams. The radius for monitoring should be large, not the typical two to three miles as usually used by DWR and the Bureau. Though not presented for the

DWB, the *Stony Creek Fan Aquifer Performance Testing Plan*, which is a much smaller project, recognized that there may be a drawdown effect on the aquifer by considering results from a DWR Northern District spring 2007 production well test (EA/FONSI p. 28). However, it did not assess the anticipated scope of that effect—or even what level of effect would be considered acceptable. Moreover, the results from that test well indicate that the recharge source for the solitary production well “is most likely from the foothills and mountains, to the east and north”—which at a minimum is more than fifteen miles away. (DWR, Glenn-Colusa Irrigation District Aquifer Performance Testing Glenn County, California).

The Butte County Department of Water and Resource Conservation has identified streams that must be monitored to determine impacts to stream flows that would be associated with pumping the Lower Tuscan Aquifer. These “[s]treams of interest” are located on the eastern edge of the Sacramento Valley and include: Mill Creek, Deer Creek, Big Chico Creek, Butte Creek, and Little Dry Creek. (The Butte County DWRC 2007). The department described the need and methodology for stream flow gaging:

The objective of the stream flow gaging is to determine the volume of surface water entering into or exiting the Lower Tuscan Aquifer along perennial streams that transect the aquifer formation outcropping for characterization of stream-aquifer interactions and monitoring of riparian habitat. Measurement of water movement into or out of the aquifer will allow for testing of the accuracy of the Integrated Water Flow Model, an integrated surface water-groundwater finite differential model developed for the eastern extent of the Lower Tuscan aquifer.

Two stream gages will be installed on each of five perennial streams crossing the Lower Tuscan Formation to establish baseline stream flow and infiltration information. The differences between stream flow measurements taking upstream and downstream of the Lower Tuscan Formation are indications of the stream-aquifer behavior. Losses or gains in stream volume can indicate aquifer recharge or discharge to or from the surface waters.

Id.

As evident in the following conclusory assertions, the draft EA/FONSI narrowly defines the radius of influence associated with the aquifer testing and thus entirely fails to identify potential significant impacts to salmon:

“Interaction with Surface Water - Pumping close to the Sacramento River, and close to tributaries could reduce channel flows. This reduction in channel flows could adversely affect riparian and aquatic habitats, including wildlife refuge habitat, as well as downstream water users... Groundwater pumping for groundwater substitution transfers could reduce flows in nearby surface water bodies. (EA at p. 38)

Monitoring of flow on streams associated with the Lower Tuscan Formation is particularly important to the survival of Chinook salmon which use these “streams of interest” to spawn and where salmon fry rear. Intensive groundwater pumping would likely lower water table elevations near these streams of interest, decreasing surface flows, and therefore reducing salmon spawning and rearing habitat through dewatering of stream channels in these northern counties. This would be a significant adverse impact of the DWB and is ignored by the EA.

A similar effect has been observed in the Cosumnes River, where “[d]eclining fall flows are limiting the ability of the Cosumnes River to support large fall runs of Chinook salmon.” This is a river that historically supported a large fall run of Chinook Salmon. *Id.* Indeed, “[a]n early study by the California Department of Fish and Game . . . estimated that the river could support up to 17,000 returning salmon under suitable flow conditions.” *Id.*, citing CDFG 1957 & USFWS 1995. But “[o]ver the past 40 years fall runs ranged from 0 to 5,000 fish according to fish counts by the CDFG (USFWS 1995),” and “[i]n recent years, estimated fall runs have consistently been below 600 fish, according to Keith Whitener.” (Fleckenstein, *et al.* 2004). Indeed, “[f]all flows in the Cosumnes have been so low in recent years that the entire lower river has frequently been completely dry throughout most of the salmon migration period (October to December).” *Id.*

Research indicates that “groundwater overdraft in the basin has converted the [Cosumnes River] to a predominantly losing stream, practically eliminating base flows....” (Fleckenstein, *et al.* 2004). And “investigations of stream-aquifer interactions along the lower Cosumnes River suggest that loss of base flow support as a result of groundwater overdraft is at least partly responsible for the decline in fall flows.” *Id.* Increased groundwater withdrawals in the Sacramento basin since the 1950s have substantially lowered groundwater levels throughout the county.” *Id.*

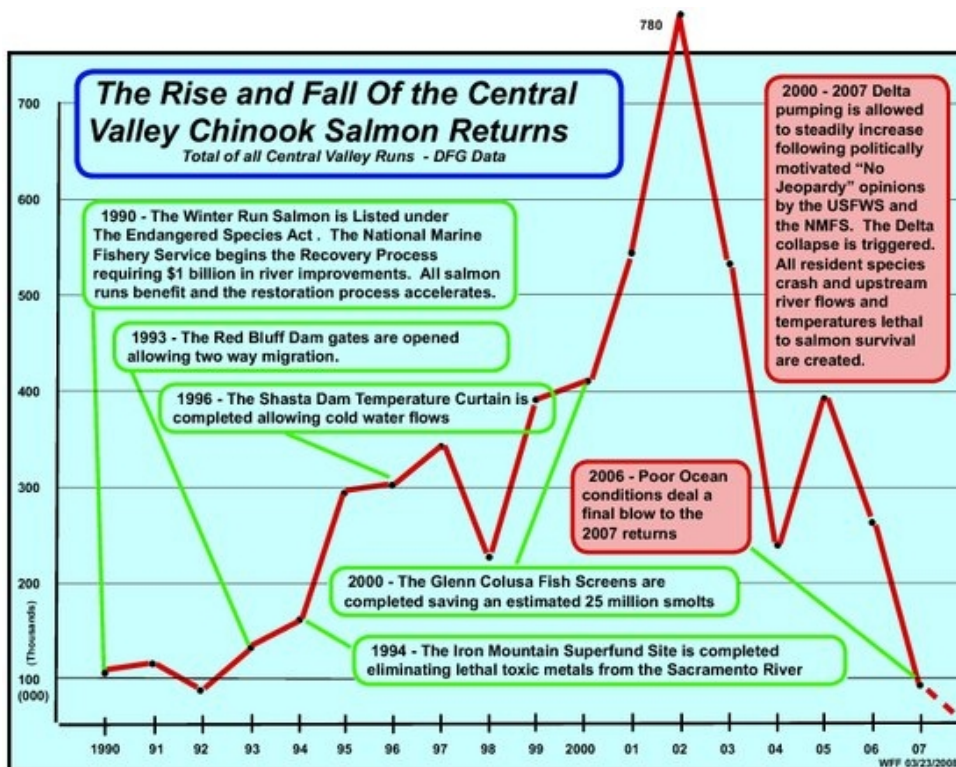
The draft EA acknowledges the potential for impacts to special status fish species from altered river flows and commits to maintaining flow and temperature requirements already in place. (EA at p. 70) The coalition would like to have greater assurance of this commitment after the Bureau and DWR’s failure in February 2009 to meet the X2 standard. The Bureau and DWR should make X2 compliance and streams of interest monitoring in real time part of their permit amendment applications to the SWRCB this spring. If stream levels are affected by groundwater pumping, then pumping would cease.

Unfortunately, the draft EA fails to anticipate possible stream flow declines in important salmon rearing habitat in the 2009 DWB area. Mud Creek is located within the 2009 DWB and flows through probable Tuscan recharge zones. While a charged aquifer is likely to add to base flow of this stream, a de-watered aquifer would pull water from the stream. According to research conducted by Dr. Paul Maslin, Mud Creek provides advantageous rearing habitat for out-migrating Chinook salmon. (Maslin 1996). Salmon fry feeding in Mud Creek grew at over twice the rate by length as did fry feeding in the main stem of the Sacramento River. *Id.*

Another tributary to the Sacramento River, Butte Creek, hosts spring-run Chinook salmon, a threatened species under the Endangered Species Act. 64 Fed. Reg. 50,394 (Sept. 16, 1999). Butte Creek contains the largest remaining population of the spring-run Chinook and is designated as critical habitat for the species. *Id.* at 50,399; 70 Fed. Reg. 52,488, 52,590-91 (Sept. 2, 2005). Additionally, Butte Creek provides habitat for the threatened Central Valley steelhead. *See* 63 Fed. Reg. 13,347 (Mar. 19, 1998); 70 Fed. Reg. at 52,518. The Bureau should not overlook the importance of rearing streams, and should not proceed with this Project unless and until adequate monitoring and mitigation protocols are established.

Existing mismanagement of water in California’s rivers, creeks, and groundwater has already caused a precipitous decline in salmon abundance. There is no mention of the fall-run salmon numbers in the main stem Sacramento River or its essential tributaries despite the fact that their numbers dropped precipitously in 2007 (see graphic) and 2008. For the second year in a row, the commercial salmon fishery is closed for fear of pushing these fish to extinction. As noted above, the EA casually asserts that maintaining flow and temperature requirements in the main stem will be sufficient to protect aquatic species, but it fails to consider the impacts of up to 600,000 af of water transfers, fallowing, and groundwater substitution on the tributaries. How much additional pumping does the DWB represent, given CVP and SWP contractual commitments, available reservoir supplies, and other environmental restrictions south of the Delta? The EA and DWR’s Addendum are silent on this.

Where are the data to support assertions that impacts to aquatic species will be below a level of significance? Habitat values are also essential to many other special status species that utilize the aquatic and/or riparian landscape including, but not limited to, giant garter snake, bank swallow, greater sandhill crane, American shad, etc. Where is the documentation of the potential impacts to these species?



Graphic is courtesy of Dick Pool.

In addition to the direct decline in the salmon populations is the food chain affect that will influence species such as killer whales.

3. The EA fails to address the significant unknown risks raised by the 2009 DWB's proposed groundwater extraction.

The EA fails to identify and address the significant unknown risks associated with this Project. There are substantial gaps in scientists' understanding of how the aquifer system recharges.

While the EA asserts that the Lower Tuscan is an isolated layer in the aquifer, expert opinion and experience suggest otherwise. Professor Karin Hoover from CSU Chico asserts that: "[T]o date there exists no detailed hydrostratigraphic analysis capable of distinguishing the permeable (water-bearing) units from the less permeable units within the subsurface of the Northern Sacramento Valley. In essence, the thickness and extent of the water-bearing units has not been adequately characterized." (p. 1)

Though the Projects fails to disclose the limitations in knowledge of the geology and hydrology of the northern counties, it was disclosed in 2008 in the EA for the *Stony Creek Fan Aquifer Performance Testing Plan* (Testing Plan EA). It revealed that there is also limited understanding of the interaction between the affected aquifers, and how that interaction will affect the ability of the aquifers to recharge. The Testing Plan EA provides:

The Pliocene Tuscan Formation lies beneath the Tehama Formation in places in the eastern portion of the SCF Program Study Area, although its extent is not well defined. Based on best available information, it is believed to occur at depths ranging between approximately 300 and 1,000 feet below ground surface. It is thought to extend and slope upward toward the east and north, and to outcrop in the Sierra Nevada foothills. The Tuscan Formation is comprised of four distinct units: A, B C and D (although Unit D is not present within the general project area). Unit A, or Upper Tuscan Formation, is composed of mudflow deposits with very low permeability and therefore is not important as a water source. Units B and C together are referred to as the Lower Tuscan Formation. Very few wells penetrate the Lower Tuscan Formation within the SCF Program study area.

The Testing Plan EA/FONSI at p. 23 (emphasis added). The Tehama Formation, however, generally behaves as a semi-confined aquifer system and the EA contains no discussion of its relationship with the adjoining formations. Nor is there any discussion of the role of the Pliocene Tehama Formation as "the primary source of groundwater produced in the area." (DWR 2003).

The EA fails to offer any in-depth analysis of which strata in the aquifers will be most likely affected by the 2009 DWB's proposed extraction of groundwater. The EA incorrectly states that, "Groundwater users in the basin pump primarily from deeper continental deposits." EA at p. 24. The majority of wells are in the upper layers of the aquifers since they are for domestic use, which is not even considered in the EA. In addition, the EA provides no assessment of the interrelationship of varying strata in the aquifers in the Sacramento Valley or between the aquifers themselves.

The EA fails to provide basic background information regarding the recharge of groundwater. The documents states, "Groundwater is recharged by deep percolation of applied water and rainfall infiltration from streambeds and lateral inflow along the basin boundaries." EA at p. 24. How was the conclusion reached that applied water leads to recharge of the aquifer? Where are the supporting data? This claim is unsubstantiated by any of the work that has been performed to date. For example, the RootZone water balance model used by a consultant with Glenn Colusa Irrigation District, Davids Engineering, was designed to simulate root zone soil moisture. It balances incoming precipitation and irrigation against crop water usage and evaporation, and whatever is left over is assigned to "deep percolation." Deep percolation in this case means below the root zone, which is anywhere from a few inches to several feet below the surface, depending on the crop. There is absolutely no analysis that has been performed to insure that applied water does, indeed, recharge the aquifer. For example, if the surface soils were to dry out, water that had previously migrated below the root zone might be pulled back up to the surface by capillary forces. In any case, the most likely target of the "deep percolation" water in the Sacramento Valley is the unconfined aquifer and possibly the Sacramento River. The EA has not demonstrated otherwise.

E. Other resource impacts flowing from corrected chains of cause and effect are unrecognized in the EA and should be considered in an EIS instead.

Regarding surface water reservoir operations in support of the 2009 DWB, we have several questions and concerns:

- We do not understand from the EA/FONSI which BiOps will govern the DWB's environmental compliance with the Endangered Species Act. The Bureau's EA is confusing at best on this point. Compare pages 8, 9, 22, and 70. We note that reliance on the 2004 OCAP biological opinions on Delta smelt and anadromous fisheries were declared unlawful by a federal judge in 2008 and should not be relied on.
- CVPIA water transfer rules should be stated as part of the "affected environment." Do they permit transfers to non-CVP urban water districts?

Regarding fisheries, we note that the Bureau intends to comply with the State Water Resources Control Board's Water Rights Orders 90-05 and 91-01 in order to provide temperature control at or below 56 degrees Fahrenheit for anadromous fish, their redds, and hatching wild salmonid fry, and to provide minimum instream flows of 3,250 cubic feet per second (cfs) between September

1 and February 28, and 2,300 cfs between March 1 and August 31. How will the Bureau and DWR comply with Fish and Game Code Section 5937—to keep fish populations below and above their dams in good condition, as they approves transfers of CVP water from willing CVP contractors to willing buyers? We urge this compliance effort be integrated with the streams of interest and groundwater monitoring programs we recommended above.

We also find confusing the EA's treatment of instream flows for fisheries. On one hand, minimum flows and temperature criteria established in the above-mentioned water rights orders is to be adhered to by the Bureau for the Sacramento River. The necessity for April and May storage is not well explained as well as the reasons that surface water releases from Shasta would occur in the July through September period. Why?

Concerning the social and economic effects of the proposed 2009 DWB, we note that UC Davis researcher Richard Howitt and his colleagues predict loss of 60,000 to 80,000 farm-related jobs in the Central Valley due to crop idling from drought effects and curtailed project deliveries for irrigation (though not specifically attributable to EA/FONSI activities). The EA neither identifies nor comments on this seemingly credible finding. Howitt, et al, do reasonably conclude that the bulk of these potential impacts are in the western San Joaquin and Tulare and Kern County areas where water rights for imported supplies are the most unreliable.

(Given the facts that DWB buyer requests exceed water supplies offered by potential sellers, and that the DWB priority criteria favor public health and municipal buyers over agricultural buyers, it does seem to us that the state and federal government should identify and commit to permanent mitigations for these acute economic dislocations resulting from drought. However, we would dispute, as discussed below, that this year's hydrologic conditions constitute a drought.)

On its own terms, the Bureau's EA makes no attempt to establish baseline agricultural crop acreages for each agricultural county offering or seeking DWB water in order to calculate and apply its 20 percent threshold for limiting economic impacts to agriculture in selling counties. Moreover, this 20 percent threshold needs to be incorporated into the description of the Proposed Action Alternative, since it appears to be an integral part of DWB actions.

In general, the 2009 DWB EA/FONSI—and by logical implication, DWR's Addendum—consistently avoids full disclosure of existing conditions and baseline data, rendering their justifications for the 2009 DWB at best incoherent, and at worst, dangerous to groundwater users and resources, and to vulnerable fisheries in tributary streams of the Sacramento River.

F. The 2009 DWB is likely to have a cumulatively significant impact on the environment.

The draft EA/FONSI does not reveal that the current Project is part of a much larger set of plans to develop groundwater in the region, to develop a “conjunctive” system for the region, and to integrate northern California's groundwater into the state's water supply. These are plans that the

Bureau, together with DWR and others, have pursued and developed for many years. Indeed, one of the plans—the short-term phase of the Sacramento Valley Water Management Program—is the subject of an ongoing scoping process for a Programmatic EIS that has not yet been completed.

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

An environmental impact statement should also consider “[c]onnected actions.” *Id.* §1508.25(a)(1). Actions are connected where they “[a]re interdependent parts of a larger action and depend on the larger action for their justification.” *Id.* §1508.25(a)(1)(iii). Further, an environmental impact statement should consider “[s]imilar actions, which when viewed together with other *reasonably foreseeable or proposed agency actions*, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.” *Id.* §1508.25(a)(3) (emphasis added).

As detailed below, instead of assessing the cumulative impacts of the proposed action as part of the larger program that even the Bureau has recognized should be subject to a programmatic EIS (but for which no programmatic EIS has been completed), the Bureau has attempted to separate this program and approve it through an inadequate EA. Further, the Bureau has failed to take into account the cumulative effects of other groundwater and surface water projects in the region, the development of “conjunctive” water systems, and the anticipated further integration of Sacramento Valley surface and ground water into the state water system.

G. The Environmental Assessment Fails to Meet the Requirements of NEPA.

Even if an EIS were not clearly required here, the draft EA/FONSI prepared by the Bureau violates NEPA on its own. As discussed above, the draft EA does not provide the analysis necessary to meet NEPA’s requirements and to support its proposed finding of no significant impact. Further, as outlined above, the draft document fails to provide a full and accurate description of the proposed Project, its relationship to myriad other water transfer and groundwater extraction projects, its potentially significant adverse effects on salmon critical habitat in streams of interest tributary to the Sacramento River, and an assessment of the cumulative environmental impacts of the 2009 DWB when considered together with other existing and proposed water programs.

Additionally, the draft EA/FONSI fails to provide sufficient evidence to support its assertions that the 2009 DWB would have no significant impacts on the human or natural environments, neither decision makers nor the public are fully able to evaluate the significance of the 2009 DWB's impacts. These informational failures complicate the Coalition's efforts to provide meaningful comments on the full extent of the potential environmental impacts of the DWB and appropriate mitigation measures. Accordingly, many of the Coalition's comments include requests for additional information.

1. The EA Fails to Consider a Reasonable Range of Alternatives.

NEPA's implementing regulations call analysis of alternatives "the heart of the environmental impact statement," 40 C.F.R. §1502.14, and they require an analysis of alternatives within an EA. *Id.* §1408.9. The statute itself specifically requires federal agencies to:

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

42 U.S.C. §4332(2)(E). Here, because the Bureau's EA considers only the proposed Project and a "No Action" alternative, the EA violates NEPA.

The case law makes clear that an adequate analysis of alternatives is an essential element of an EA, and is designed to allow the decision maker and the public to compare the environmental consequences of the proposed action with the environmental effects of other options for accomplishing the agency's purpose. The Ninth Circuit has explained that "[i]nformed and meaningful consideration of alternatives ... is ... an integral part of the statutory scheme." *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir. 1988) (holding that EA was flawed where it failed adequately to consider alternatives). An EA must consider a reasonable range of alternatives, and courts have not hesitated to overturn EAs that omit consideration of a reasonable and feasible alternative. *See People ex rel. Van de Kamp v. Marsh*, 687 F.Supp. 495, 499 (N.D. Cal. 1988); *Sierra Club v. Watkins*, 808 F.Supp. 852, 870-75 (D.D.C. 1991).

Here, there are only two alternatives presented: the No Action and the Proposed Action. The lack of *any* alternative action proposal is unreasonable and is by itself a violation of NEPA's requirement to consider a reasonable range of alternatives.

Even more significantly, there are numerous other alternative ways to ensure water is allocated reliably when California experiences dry hydrologic years. We described several elements of reasonable alternatives above. These are the alternatives that should have been presented for the Bureau's draft EA/FONSI on the 2009 DWB to comply with NEPA. 42 U.S.C. § 4332(2)(E).

2. The EA Fails to Disclose and Analyze Adequately the Environmental Impacts of the Proposed Action

The discussion and analysis of environmental impacts contained in the EA is cursory and falls short of NEPA's requirements and stems from having an unclear and poorly described narrative for the proposed 2009 DWB. It obscures realistic chains of cause and effect, which in turn prevent accurate and comprehensive accounting of environmental baselines and measurement of the DWB's potential impacts. NEPA's implementing regulations require that an EA "provide sufficient evidence and analysis for determining whether to prepare an [EIS]." 40 C.F.R. §1508.9(a). For the reasons discussed above, the EA fails to discuss and analyze the environmental effects of the water transfers, crop idling, and groundwater substitution proposed by the 2009 DWB. The Bureau must consider and address the myriad of environmental consequences that are likely to flow from this proposed agency action.

Along with our significant concerns about the adequacy of the proposed monitoring, the draft EA/FONSI also fails to explain what standards will be used to evaluate the monitoring data, and on what basis a decision to modify or terminate the pumping would be made. In light of the document's silence on these crucial issues, the draft EA/FONSI's conclusion that there will not be significant adverse impacts withers quickly under scrutiny.

3. The EA Fails to Analyze Cumulative Impacts Adequately.

The Ninth Circuit Court makes clear that NEPA mandates "a useful analysis of the cumulative impacts of past, present and future projects." *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 810 (9th Cir. 1999). Indeed, "[d]etail is required in describing the cumulative effects of a proposed action with other proposed actions." *Id.* The very cursory cumulative effects discussion contained in the EA plainly fails to meet this standard.

As discussed in Part I.C. above, the proposed DWB does not exist in a vacuum, and is in addition to a broader program to develop regional groundwater resources and a conjunctive use system. The 2009 DWB is also only one of several proposed and existing projects that affect the regional aquifers. The existence of these numerous related projects make an adequate analysis of cumulative impacts especially important.

4. The Bureau Has Failed to Consider the Cumulative Impact of Other Groundwater Development and Surface Water Diversions Affecting the Region

In addition to the improper segmentation evident in the draft EA/FONSI, the assessment of environmental impacts is further deficient because the Bureau has failed to consider the cumulative impacts of the proposed groundwater extraction when taken in conjunction with other projects proposed for the development of groundwater and surface water.

The Bureau and its contractors are party to numerous current and reasonably foreseeable water programs that are related to the water transfers contemplated in the DWB including the following:

- Sacramento Valley Integrated Regional Water Management Plan (2006)
- Sacramento Valley Regional Water Management Plan (January 2006)
- Stony Creek Fan Conjunctive Water Management Program
- Sacramento Valley Water Management Agreement (Phase 8, October 2001)
- Draft Initial Study for 2008-2009 Glenn-Colusa Irrigation District Landowner Groundwater Well Program
- Regional Integration of the Lower Tuscan Groundwater Formation into the Sacramento Valley Surface Water System Through Conjunctive Water Management (June 2005)
- Stony Creek Fan Aquifer Performance Testing Plan for 2008-09
- Lower Tuscan Integrated Planning Program, a program funded by the Bureau that will “integrate the Lower Tuscan formation aquifer system into the management of regional water supplies.”
- Annual forbearance agreements (2008 had an estimated 160,00 acre feet proposed).

We briefly describe some of their key elements here.

Stony Creek Fan Conjunctive Water Management Program. The SCF Aquifer Plan is part of and in furtherance of the Stony Creek Fan Conjunctive Water Management Program (“SCF Program”). This program is being carried out by GCID, Orland-Artois and Orland Unit Water Association.

The long-term objective of the SCF Program is the development of a “regional conjunctive water management program consisting of a direct and in-lieu recharge component, a groundwater production component, and supporting elements....” (SVWMA: Project 8A Stony Creek Fan Conjunctive Water Management Program

(“SVWMA Project 8A”), at 8A-1). The potential supply from such a program was estimated at 50,000 af per year to 100,000 af per year. *Id.*

The SCF Program has 3 Phases: (1) a feasibility study; (2) a demonstration project; and (3) project implementation. Phase I of the SCF Program has already been completed. The SCF Aquifer Plan described in a draft EA/FONSI is part of Phase II of the larger SCF Program. Phase III of the SCF Program will implement the program’s goal of integrating test and operational production wells into the water supply systems for GCID, Orland-Artois, and Orland Unit Water Association for long-term groundwater production in conjunction with surface water diversions.

The Bureau is well aware of the SCF Program, but declined to analyze the environmental effects of the program as a whole, and not simply considered the effects of an isolated component of the larger program. Indeed, the Bureau recently awarded a grant to GCID to fund the SCF Program. The Bureau’s grant agreement states that the SCF Program “target[s] the Lower Tuscan

Formation and possibly other deep aquifers in the west-central portion of the Sacramento Valley ... as the source for all or a portion of the additional groundwater production needed to meet [the SCF Partners'] respective integrated water management objectives." BOR Assistance Agreement No. 06FG202103 at p. 2. The agreement further provides that provides that "[a]dditional test wells and production wells will be installed within the Project Area." *Id.*

Moreover, the Bureau's own description of the reasons for not choosing the "No Action" alternative indicate the Bureau's recognition that the primary goal of the SCF Aquifer Plan is to realize the objectives of the SCF Program – "increas[ing] reliable water supplies through conjunctive management of groundwater and surface water" at a fast pace. *See* EA/FONSI at p. 5. The Bureau was obligated to assess the potentially significant environmental impacts associated with such conjunctive management of groundwater and surface water, and wholly failed to do so.

There are serious concerns raised by the proposal to engage in conjunctive management of groundwater and surface water that are not addressed in the EA. For example, in 1994, following seven years of low annual precipitation, Western Canal Water District and other irrigation districts in Butte, Glenn and Colusa counties exported 105,000 af of water extracted from the Tuscan aquifers to buyers outside of the area. This early experiment in the *conjunctive use* of the groundwater resources – conducted without the benefit of environmental review – caused a significant and immediate adverse impact on the environment. (Msangi 2006). Until the time of the water transfers, groundwater levels had dropped but the aquifers had sustained the normal demands of domestic and agricultural users. The water districts' extractions, however, lowered groundwater levels throughout the Durham and Cherokee areas of eastern Butte County. (Msangi 2006). The water level fell and the water quality deteriorated in the wells serving the City of Durham. (Scalmanini 1995). Irrigation wells failed on several orchards in the Durham area. One farm never recovered from the loss of its crop and later entered into bankruptcy. Residential wells dried up in the upper-gradient areas of the aquifers as far north as Durham (.

The SCF Program is a Component of the Sacramento Valley Water Management Program. The Sacramento Valley Water Management Program (Phase 8) ("SVWMP") also includes the SCF Program as one of its elements. (SVWMA Project 8A at pp. 8A-1 to 8A-13).

The SVWMP recognizes that the SCF Program "has the potential to improve operational flexibility on a regional basis resulting in measurable benefits locally in the form of predictable, sustainable supplies, *and improved reliability for water users' elsewhere in the state.*" *Id.* at p. 8A-2 (emphasis added). By piecemealing this program improperly and analyzing only the small component of the SCF Program, the Bureau has failed to assess the environmental impacts associated not just with the anticipated conjunctive use of the groundwater, but also the effect of the anticipated export of water to other regions of the state.

Additionally, approximately five years ago, on August 5, 2003, the Bureau published a notice in the Federal Register announcing its intention to prepare a programmatic EIS to analyze the short-

term phase of the SVWMP. 68 Fed. Reg. 46218, 46219 (Aug. 5, 2003). Like the SVWMP, this “Short-term Program” for which the Bureau stated its intent to conduct a programmatic EIS included implementation of the SCF Program. *Id.* at 46219, 46220.

The SCF Program is Also a Component of the Sacramento Valley Integrated Regional Water Management Program. The Bureau has been working with GCID and others to realize the Sacramento Valley Integrated Regional Water Management Program (“SVIRWMP”). SVIRWMP is comprised of a number of sub-regional projects, including the SCF Program. *See* SVIRWMP, Appendix A at A-5; BOR Assistance Agreement No. 06FG202103. Here again, even though the SCF Aquifer Plan is clearly a necessary component of the SCF Program – which is in turn a component of the SVIRWMP – the draft EA/FONSI failed to even acknowledge, let alone assess, the cumulative impacts of these related projects.

Most obviously, the draft EA wholly fails to assess the impact of the Bureau’s *Sacramento Valley Regional Water Management Plan (2006)* (SVRWMP) and the forbearance water transfer program that the Bureau and DWR facilitate jointly. As noted above, the Programmatic EIS for the 2002 Sacramento Valley Water Management Agreement or Phase 8 Settlement was initiated, but never completed, so the SVRWMP was the next federal product moving the Phase 8 Settlement forward. The stated purpose of the Phase 8 Settlement and the SVRWMP are to improve water quality standards in the Bay-Delta and local, regional, and statewide water supply reliability. In the 2008 forbearance program, 160,000 af was proposed for transfer to points south of the Delta. To illustrate the ongoing significance of the demand on Sacramento Valley water, we understand that GCID alone entered into “forbearance agreements” to provide 65,000 af of water to the San Luis and Delta Mendota Water Association in 2008, 80,000 af to State Water Project contractors in 2005, and 60,000 af to the Metropolitan Water District of Southern California in 2003.

Less obvious, but certainly available to the Bureau, are the numerous implementation projects that Phase 8 signatories are pursuing, such as Glenn Colusa Irrigation District’s (GCID) proposed to divert groundwater pumped from private wells to agricultural interests in the District. *See* Attach. (GCID Proposed Negative Declaration, GCID Landowner Groundwater Well Program for 2008-09). Additionally, the draft EA does not consider the cumulative effect of the Lower Tuscan Integrated Planning Program, a program funded by the Bureau that will “integrate the Lower Tuscan formation aquifer system into the management of regional water supplies.” Grant Agreement at 4. This program, as described by the Bureau, will culminate in the presentation of a proposed water management program for the Lower Tuscan Formation for approval and implementation by the appropriate authorities. Clearly, the cumulative impact of this program and the 2009 DWB’s proposed groundwater extraction should have been assessed.

Finally, with the myriad projects and programs that are ignored in the EA and have never been analyzed cumulatively, the EA finally discloses that there could be a devastating impact to

groundwater: “The recent reduction in recharge (due to the decrease in precipitation and runoff) in addition to the increase in groundwater transfers would lower groundwater levels. Multi-year groundwater acquisition for other programs in areas that have repeatedly transferred groundwater may also be more susceptible to adverse effects. In these areas groundwater levels may not fully recover following a transfer and may experience a substantial net decline in groundwater levels over several years.” (EA at p. 94) While the honesty is refreshing, the lack of comprehensive monitoring, mitigation, and project cessation mechanisms is startling. This alone warrants the preparation of an EIS.

Here again, the document does not discuss or analyze these potential impacts, their potential scope or severity, or potential mitigation efforts. Instead, it relies on the existence of local ordinances, plans, and oversight with the monitoring and mitigation efforts of individual “willing sellers” to cope with any adverse environmental effects. However, as we have shown above, for example, the Glenn County management plan is untested and does not provide adequate protection and monitoring of the region’s important groundwater resources. To further clarify the inadequacy of relying on local plans and ordinances, Butte County’s Basin Management Objectives have no enforcement mechanism and Chapter 33 requires CEQA review for transfers that include groundwater in Butte County. As one can see, there is very limited local protection for groundwater and no authority to influence pumping that is occurring in a different county.

5. The 2009 DWB is likely to serve as precedent for future actions with significant environmental effects.

As set forth above, this Project is part of a broader effort by the Bureau and DWR to develop groundwater resources and to integrate GCID’s water into the state system. For these reasons, the 2009 DWB is likely to “establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration” (40 C.F.R. § 1508.27(b)(6)), and should be analyzed in an EIS.

6. The 2009 DWB has potential adverse impacts for a threatened species.

As the Bureau of Reclamation is well aware, the purpose of the ESA is to conserve the ecosystems on which endangered and threatened species depend and to conserve and recover those species so that they no longer require the protections of the Act. 16 U.S.C. § 1531(b), ESA § 2(b); 16 U.S.C. § 1532(3), ESA §3(3) (defining “conservation” as “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary”). “[T]he ESA was enacted not merely to forestall the extinction of species (i.e., promote species survival), but to allow a species to recover to the point where it may be delisted.” *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Service*, 378 F3d 1059, 1069 (9th Cir. 2004). To ensure that the statutory purpose will be carried out, the ESA imposes both substantive and procedural requirements on all federal agencies to carry out programs for the conservation of listed species and to insure that their actions are not likely to jeopardize the continued existence of any listed

species or result in the destruction or adverse modification of critical habitat. 16 U.S.C. § 1536. See *NRDC v. Houston*, 146 F.3d 1118, 1127 (9th Cir. 1998) (action agencies have an “affirmative duty” to ensure that their actions do not jeopardize listed species and “independent obligations” to ensure that proposed actions are not likely to adversely affect listed species). To accomplish this goal, agencies must consult with the Fish and Wildlife Service whenever their actions “may affect” a listed species. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.14(a). Section 7 consultation is required for “any action [that] may affect listed species or critical habitat.” 50 C.F.R. § 402.14. Agency “action” is defined in the ESA’s implementing regulations to “mean all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States.” 50 C.F.R. § 402.02.

The giant garter snake (“GGS”) is an endemic species to Central Valley California wetlands. (Draft Recovery Plan for the Giant Garter Snake (“DRP”) 1). The giant garter snake, as its name suggests, is the largest of all garter snake species, not to mention one of North America’s largest native snakes, reaching a length of up to 64 inches. Female GGS tend to be larger than males. GGS vary in color, especially depending on the region, from brown to olive, with white, yellow, or orange stripes. The GGS can be distinguished from the common garter snake by its lack of red markings and its larger size. GGS feed primarily on aquatic fish and specialize in ambushing small fish underwater, making aquatic habitat essential to their survival. Females give birth to live young from late July to early September, and brood size can vary from 10 to up to 46 young. Some studies have suggested that the GGS is sensitive to habitat change in that it prefers areas that are familiar and will not typically travel far distances. The EA discloses that one GGS study in Colusa County revealed the “longest average movement distances of 0.62 miles, with the longest being 1.7 miles, for sixteen snakes in 2006, and an average of 0.32 miles, with the longest being 0.6 miles for eight snakes in 2007. However, in response to droughts and other changes in water availability, the GGS has been known to travel up to 5 miles in only a few days, but the impacts on GGS survival and reproduction from such extreme conditions are unknown due to the deficiency in data and analysis.

Flooded rice fields, irrigation canals, and wetlands in the Sacramento Valley can be used by the giant garter snake for foraging, cover and dispersal purposes. The draft EA fails to comprehensively analyze the movements and habitat requirements for the federal and state-threatened giant garter snake and yet again defers responsibility to a future time. The Biological Assessment acknowledges the failure of Bureau and DWR to complete the Conservation Strategy that was a requirement of the 2004 Biological Opinion. (BA at p. 19-20) [The BA appears to have no page numbers] What possible excuse delayed this essential planning effort?

The 2009 DWB also proposes to delete or modify other mitigation measures previously adopted as a result of the EWA EIR process to substantially reduce significant impacts, but without showing they are infeasible. For example, the Bureau and DWR propose to delete the 160 acre maximum for “idled block sizes” for rice fields left fallow rather than flooded and to substitute for it a 320 acre maximum. (See 2003 Draft EWA EIS/EIR, p. 10-55; 2004 Final EWA EIS/EIR, Appendix B, p. 18, Conservation Measure # 4.) There is no evidence to support this change. In

light of the agencies failure to complete the required Conservation Strategy mentioned above and the data gathered in the Colusa County study, how can the EA suggest that doubling the fallowing acreage is in any way biologically defensible? The agencies additionally propose to delete the mitigation measure excluding Yolo County east of Highway 113 from the areas where rice fields may be left fallow rather than flooded, except in three specific areas. (See 2004 Final EWA EIS/EIR, Appendix B, p. 18, Conservation Measure # 2.) What is the explanation for this change? What are the impacts from this change?

Deleting these mitigation measures required by the EWA approval would violate NEPA and CEQA's requirements that govern whether, when, and how agencies may eliminate mitigation measures previously adopted under NEPA and CEQA. (See *Napa Citizens for Honest Government v. Napa County Board*.)

The 2009 DWB fails to include sufficient safeguards to protect the giant garter snake and its habitat. In order to avoid potentially significant adverse impacts for the snake, additional surveys should be conducted prior to any alteration in water regime or landscape. (Addendum March 4, 2009 at p. 8)

It is conspicuously noticeable that there isn't a claim of a less-than-significant impact for the Giant Garter Snake (*Thamnophis gigas*), in the EA and the BA. There is really no conclusion reached due to the fundamental absence of science for the species. The Bureau should also prepare an EIS because the 2009 DWB will likely have significant environmental effects on the Giant Garter Snake, a listed threatened species under the federal Endangered Species Act and California Endangered Species Act. 40 C.F.R. §1508.27(b)(9).

II. Purpose and Need Issues of the 2009 Drought Water Bank

A. The Purpose and Need Section of the EA/FONSI fails to specify the policy framework upon which the 2009 Drought Water Bank is based.

Exemption of the 2009 DWB from the requirements of the California Environmental Quality Act (CEQA) does not reflect the actual environmental effects of the proposal—which are similar to the proposed 1994 Drought Water Banks and for which a final Program Environmental Impact Report was completed in November 1993. In 2000, the Governor's Advisory Drought Planning Panel report, *Critical Water Shortage Contingency Plan* promised a program EIR on a drought-response water transfer program, but was never undertaken. Twice in recent history, the state readily acknowledged that CEQA review for a major drought water banking program was appropriate. So, this Notice of Exemption reflects an end-run around established water law through the use of water transfers, and is therefore vulnerable to legal challenge under the California Environmental Quality Act.

We question the merits of and need for the 2009 DWB itself. The existence of drought conditions at this point in time is highly questionable and reflects the state's abandonment of a

sensible water policy framework given our state and national economic recession and tattered public budgets. Our organizations believe the Governor's drought emergency declaration goes too far to help a few junior water right holders, and that at bottom the 2009 Drought Water Bank is not needed. The DWB is to directly benefit the areas of California whose water supplies are the least reliable by operation of state water law. Though their unreliable supplies have long been public knowledge, local, state, and federal agencies in these areas have failed to stop blatantly wasteful uses and diversions of water and to pursue aggressive planning for regional water self-sufficiency.

The EA/FONSI's statement of purpose and need states specifically that "the purpose of the proposed action is to help facilitate the transfer of water throughout the State from willing sellers of CVP water upstream of the Delta to buyers that are at risk of experiencing water shortage in 2009." This paragraph omits coherent discussion of need. The purpose and need should also state that this transfer program would be subject to specific criteria for prioritizing transfers, as described on page 6: "It is anticipated that water made available to [potential buyers] from the DWB would be prioritized as flows: existing health and safety domestic needs, municipal supply subject to water shortage contingency plan measures, and agricultural irrigation for existing crops and livestock subject to water shortage contingency plan measures."

The EA/FONSI makes no attempt to place the 2009 Drought Water Bank into the context of the 2005 California Water Plan that the state recently completed. It appears to us that this plan is largely on the shelf now, perhaps because of the state's dire fiscal problems. It does contain many good recommendations concerning increasing regional water self-sufficiency. However, our review of the 2005 California Water Plan reveals no mention of the 2000 Critical Water Shortage Reduction Marketing Program or any overarching drought response plan that the state could have planned for in 2005, but did not. We sadly conclude that the state of California has no meaningful adopted drought response policy, save for gubernatorial emergency declarations to suspend protective environmental regulations. This is not a sustainable water policy for California.

The purpose and need section of the EA/FONSI *and the Governor's own drought emergency declaration* cry out for placing the 2009 Drought Water Bank into a policy framework. What is the state doing otherwise to facilitate regional water self-sufficiency for these areas with the least reliable water rights? How does the 2009 DWB fit into the state and federal government's water and drought policy framework? Instead, the state and federal response to this third consecutive dry year falls back on simply the Drought Water Bank model that ran into environmental and water users' opposition in 1991 and 1992. Is anybody home at our water agencies?

B. The 2009 Drought Water Bank is not needed because the state's current allocation system—in which the federal Bureau of Reclamation participates—wastes water profligately.

The incentive from the state's lax system of regulation of California's State Water Project and Central Valley projects is to deliver the water now, and worry about tomorrow later. Indeed, the State Water Resources Control Board (SWRCB) has been AWOL for decades. In response to inquiries from the Governor's Delta Vision Task Force last fall, the SWRCB acknowledged that while average runoff in the Delta watershed between 1921 and 2003 was 29 million acre-feet annually, the 6,300 active water right permits issued by the SWRCB is approximately 245 million acre-feet. In other words, **water rights on paper are 8.4 times greater than the real water in California streams diverted to supply those rights on an average annual basis.** *And the SWRCB acknowledges that this "water bubble" does not even take account of the higher priority rights to divert held by pre-1914 appropriators and riparian water right holders, of which there are another 10,110 disclosed right holders. Many more remain undisclosed.*

Like federal financial regulators failing to regulate the shadow financial sector, subprime mortgages, Ponzi schemes, and toxic assets of our recent economic history, the state of California has been derelict in its management of scarce water resources here. This in no way justifies suspension of environmental and water quality regulations, for which the Governor's drought emergency declaration calls. We supplement our comments on this matter of wasteful use and diversion of water by incorporating by reference the joint complaint to the State Water Resources Control Board of the California Water Impact Network and the California Sportfishing Protection Alliance on public trust, waste and unreasonable use and method of diversion as additional evidence of a systematic failure of governance by the State Water Resources Control Board, the Department of Water Resources and the U.S. Bureau of Reclamation, filed with the Board on March 18, 2008 (attached).

We question the Governor's contention of continued dry conditions, since the storms of early March have greatly increased reservoir levels throughout California. The Climate Prediction Center of the National Oceanographic and Atmospheric Administration believes the drought will ease by May 2009. Non-state and non-federal reservoirs indicate conditions fast approaching normal for their facilities: Bullard's Bar in Yuba County is at 107 percent of the 15-year average for this time of year, EBMUD's Pardee Lake is at 98 percent of normal, San Francisco's Hetch Hetchy Reservoir on the Tuolumne River is at 169 percent of normal, while Don Pedro Reservoir on the same river is at 90 percent. The CVP's Millerton (101 percent of normal) and Folsom reservoirs (112 percent) exceed the normal storage for this time of year. These two reservoirs must provide water to the agricultural San Joaquin River Exchange Contractors, and who have among the most senior rights on that river. Rice growers in the Sacramento Valley are generally expecting close to full deliveries from the CVP and Yuba River water supplies. The CVP's own New Melones Reservoir on the Stanislaus River, which contributes to Delta water quality as well as to meeting eastern San Joaquin Valley irrigation demands, is at 87 percent of normal for this time of year.

Moreover, the SWP's terminal reservoirs at Pyramid (102 percent of average) and Castaic (99 percent of average) Lakes are right at about normal storage levels for this time of year,

presumably because DWR has been releasing water from Oroville for delivery to these reservoirs.

The fact that reservoirs of the CVP with more senior responsibilities in the water rights hierarchy do well with storage for this time of year suggests that at worst this will be a year of below normal runoff in 2009—hardly a drought scenario. Low storage levels at Oroville, Shasta and San Luis may easily be attributed to redirected releases to terminal reservoirs or groundwater banks in the San Joaquin Valley and Tulare Lake Basin—these latter storage venues and their current performance are not disclosed on DWR’s Daily Reservoir Storage levels web site. Still, given what is known, from what these reservoir levels indicate many major cities and most Central Valley farmers are very likely will have enough water for this year.

The ones expecting to receive little water this year do so because of the normal functioning of their water rights—their imported surface supplies are therefore less reliable in dry times. It is the normal and appropriate functioning of California’s system of water rights law that makes it so. Among those with more junior water rights, the Metropolitan Water District and the Santa Clara Valley Water District are the wealthiest regions and the agencies most capable of undertaking aggressive regional water self-sufficiency actions. They should be further encouraged and assisted to do so through coherently formulated state and federal water policies and programs.

On the agricultural side, the drought emergency declaration appears to benefit mainly the few western San Joaquin Valley farmers whose contractual surface water rights have always been less reliable than most—and whose lands are the most problematic for irrigation. In excess of 1 million acres of irrigated land in the San Joaquin Valley and the Tulare Lake Basin are contaminated with salts and trace metals like selenium, boron, arsenic, and mercury. These lands should be retired from irrigation to stop wasteful use of precious fresh water resources. This water drains back—after leaching from these soils the salts and trace metals—into sloughs and wetlands and the San Joaquin River carrying along these pollutants. Retirement of these lands from irrigation usage would help stem further bioaccumulation of these toxins that have settled in the sediments of these water bodies.

The 2009 DWB would exacerbate pumping of fresh water from the Delta, which has already suffered from excessive pumping in earlier years of this decade. Pumped exports cause reverse flows to occur in Old and Middle Rivers and can result in entrainment of fish and other organisms in the pumps. Our organizations share the widely held view that operation of the Delta export pumps is the major factor causing the Pelagic Organism Decline (POD) and in the deteriorating populations of fall-run Chinook salmon. 2009 will be the second consecutive year where no commercial fishing of fall-run Chinook fish will be allowed because of this species’ population decline. Operation of the DWB at a time when others refrain from taking these fish and other organisms strikes us as a consummate unwillingness on the part of the State of California and the U.S. Bureau of Reclamation to share in the sacrifices needed to help aquatic ecosystems and anadromous fisheries of the Bay-Delta Estuary recover.

New capital facilities should be avoided to save on costly, unreliable, and destructive water supplies that new dams and canals represent. Moreover, these facilities would need new water rights; yet the most reliable rights in California are always the ones that already exist—and of those, they are the ones that predate the California State Water Project and the federal Central Valley Project. We should be applying our current rights far more efficiently—and realistically—than we do now. California should instead pursue a “no-regrets” policy incorporating aggressive water conservation strategies, careful accounting of water use, research and technological innovation, and pro-active investments.⁵

III. Conclusion

The Bureau’s EA/FONSI states on page 9:

California laws contain numerous protections that apply to water transfers. However, there are three fundamental principles that apply: no injury to other legal users of water, no unreasonable effects to fish, wildlife, or other instream beneficial uses of water, and no unreasonable effects on the overall economy or the environment in the counties from which the water is transferred.

We unreservedly state to you that the draft EA/FONSI on the proposed 2009 Drought Water Bank appears to describe a project that would fail all three of these tests as currently described. The 2009 Drought Water Bank clearly has the potential to affect the human and natural environments, both within the Sacramento Valley as well as in the areas of conveyance and delivery. It is entirely likely that injuries to other legal users of water, including those entirely dependent on groundwater in the Sacramento Valley, will occur if this project is approved. Groundwater, fishery and wildlife resources are likely also to suffer harm as instream users of water in the Sacramento Valley. And the economic effects of the proposed DWB are at best poorly understood through the EA/FONSI. To its credit, at least the Bureau studied the proposed project, while DWR, with the Governor’s assistance, went the route of exempting it from CEQA, thereby enabling the agency to ignore these potential effects.

Taken together, the Bureau and DWR treat these serious issues carelessly in the EA/FONSI, and in DWR’s specious reliance for environmental compliance on an emergency exemption and the Environmental Water Account EIS/R of 2003 and 2007. In so doing, they deprive decision makers and the public of their ability to evaluate the potential environmental effects of this Project, and violate the full-disclosure purposes and methods of both the National Environmental Policy Act and the California Environmental Quality Act.

⁵ See especially, Pacific Institute, *More with Less: Agricultural Water Conservation and Efficiency in California, A Special Focus on the Delta*, September 2008; Los Angeles Economic Development Corporation, *Where Will We Get the Water? Assessing Southern California’s Future Water Strategies*, August 2008, and Lisa Kresge and Katy Mamen, *California Water Stewards: Innovative On-farm Water Management Practices*, California Institute for Rural Studies, January 2009.

Becky Victorine, US Bureau of Reclamation
Mike Hendri, California Department of Water Resources
Comments on 2009 Drought Water Bank Environmental Review
March 19, 2009
Page 39 of 43

Our organizations request advance notification of any meetings that address this proposed Project or any other BOR projects in Butte, Colusa, Glenn, or Tehama counties that require consideration of NEPA/CEQA as well as water rights applications that will be needed as the 2009 DWB moves forward. Please add C-WIN, CSPA, BEC, and the Center for Biological Diversity to your basic public notice list on this Project, and send us each any additional documents that pertain to this particular Project.

Sincerely,



Barbara Vlamis
Executive Director
Butte Environmental Council
116 W. Second Street, #3
Chico, CA 95
(530) 891-6424
barbarav@becnet.org



Carolee Krieger
Executive Director
California Water Impact Network
808 Romero Canyon Road
Santa Barbara, CA 93108
(805) 969-0824
caroleekrieger@cox.net



Bill Jennings
Chairman
California Sportfishing Protection Alliance
3536 Rainier Avenue

Becky Victorine, US Bureau of Reclamation
Mike Hendri, California Department of Water Resources
Comments on 2009 Drought Water Bank Environmental Review
March 19, 2009
Page 40 of 43

Stockton, CA 95204
(209) 464-5067
deltakeep@aol.com

Lisa Belenky
Senior Attorney
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA
(415) 436-9682
lbelenky@biologicaldiversity.org

References Cited

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

Bureau of Reclamation 2008. Draft Environmental Assessment and Finding of No Significant Impact. Stony Creek Fan Aquifer Performance Testing Plan. Glenn-Colusa Irrigation District.

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

Butte Basin Water Users Association 2008. *2008 Butte Basin Groundwater Status Report* p. 26-27 and 32-33.

Butte County 2007. Summary of Spring 07 Levels.

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

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

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

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

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

DWR 2006. *California's Groundwater* – Bulletin 118.

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

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

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

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

Becky Victorine, US Bureau of Reclamation
Mike Hendri, California Department of Water Resources
Comments on 2009 Drought Water Bank Environmental Review
March 19, 2009
Page 42 of 43

Municiple Consulting.

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

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

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

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.

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

McManus, Dan; Senior Engineering Geologist, DWR Northern District on August 27, 2007, Personal communication with Jim Brobeck.

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

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

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

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

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

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

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

Becky Victorine, US Bureau of Reclamation
Mike Hendri, California Department of Water Resources
Comments on 2009 Drought Water Bank Environmental Review
March 19, 2009
Page 43 of 43

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

USFWS. 2008 Biological Opinion for Conway Ranch.