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May 14, 2009

Via Hand Delivery and Email (delores@water.ca.gov)

Ms. Delores Brown
Division of Environmental Services
California Department of Water Resources
901 P. St., Bonderson Bldg., 4th Fl.
P. O. Box 942836
Sacramento, CA 95814

Re: Comments on NOP for Revised BDCP EIR/EIS

Dear Ms. Brown:

This firm represents Reclamation District 999 ("District"), which is within the Clarksburg District of the Delta with respect to the development of the Bay Delta Conservation Plan ("BDCP" or "Project"). This letter provides the District's comments on the Revised Notice of Preparation ("NOP") for the joint Environmental Impact Report/Environmental Impact Statement ("EIR/EIS") on the BDCP pursuant to the California Environmental Quality Act[1] ("CEQA") and the National Environmental Policy Act[2] ("NEPA").[3] The Project as described in the NOP is an extremely broad suite of potential actions within the Delta aimed at meeting the water supply goals of the Potential Regulated Entities ("PREs").

Provision of these comments should not be interpreted as an indication of acceptance of the premise that the suite of actions generally referenced in the NOP and in BDCP materials[4] are, on the whole, appropriate given the numerous considerations relevant to management of water and other resources of the Sacramento San Joaquin Delta. In particular, the District is concerned that the BDCP is being planned without

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[1] Pub. Resources Code, §§ 21000 *et seq.*

[2] 42 U.S.C. § 4321 *et seq.*

[3] The District's previous comments on the BDCP, dated April 30, 2008 and May 26, 2008, are attached as Exhibit A.

[4] In addition to the NOP itself, these comments are also informed by materials generated by the BDCP process. Even with these supplemental materials, there is still no clear description of the far-reaching actions being contemplated.

serious consideration of the impacts it will have on the environment and communities within the Delta.

I. Background Information Regarding the District

Formed in 1913, and chartered by the Legislature in 1919, Reclamation District 999 includes a complex network of channels that provide drainage in the winter and water for agriculture in the dry months,[5] and a perimeter of levees to prevent flooding from the Sacramento River, the Deep Water Ship channel, and the Delta. Within the District's 26,136 acre area, approximately 1,500 people are protected by the 32.4 miles of levees.[6] Communities within the District include the town of Clarksburg, and the south-eastern Yolo County and a small portion of Solano County, as well as residents of marinas and moorings on the Sacramento River.

The modern history of the Clarksburg area began with the settlement of Merritt Island by farmers in the 1850's, and has become a rich mosaic of small and large farmsteads. The agricultural community ranges from the famous Bogle vineyards and winery to the historic Sugar Mill. Of special economic and cultural value to the community is the Clarksburg wine appellation, spanning over 64,000 acres within Sacramento, Solano and Yolo counties.

Aquatic and terrestrial habitat within the rural District also hosts a wealth of native species. Wildlife is readily found throughout the community, from Swainson's hawks to river otters. The valley riparian forest is also relatively intact and forms a nearly continuous belt to the adjacent Delta waterways. In recognition of these valuable natural communities, the District is proactive in use of environmentally friendly levee control projects (e.g. use of Brush Boxes and establishment of vegetation along the waters edge). The District has also taken strides to protect smelt and salmon by installing a state-of-the-art fish screen on its Sacramento River diversion. Looking forward, the District intends to continue carefully stewarding the natural resources of this unique area, which are the bedrock of the community's quality of life and economic vitality.

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[5] All water used within the District, except water lost to evaporation, remains within the watershed.

[6] Unlike certain levees in the South and Central Delta, levees within the North Delta are not considered particularly vulnerable to damage from static conditions, seismic activity and predicted sea level rise. Lands within the District are also not associated with peat bodies and associated subsidence.

II. Overall Comments on BDCP Planning Process

The District recognizes the intense effort that is being dedicated to this Project by public and private entities alike with the goal of receiving 50-year incidental take permits ("ITP") for the covered species that authorize take related to operation of the State Water Project ("SWP") and Central Valley Project ("CVP") Delta facilities. ITP coverage would facilitate continued and increased exports of water over current levels for use out of the Delta watershed with "No Surprises" assurances under the Endangered Species Act.[7]

Despite the proposed dramatic and permanent changes to the Delta landscape and waterscape, and the proposed 50-year duration of "take" coverage, the BDCP process has not included significant outreach to and incorporation of feedback from local communities within the Delta. While Steering Committee representation of entities other than the Potentially Regulated Entities ("PRE") has grown, the Planning Agreement for the BDCP squarely provides ultimate decision-making authority regarding the Project to the PREs.[8] A prerequisite to Steering Committee membership is also an agreement with the Planning Goals formulated in 2006, which do not include any specific references to the protection, or even consideration, of core in-Delta interests (e.g. protection of in-Delta beneficial uses of water and land and minimization of disturbances to existing communities). As a result of these and other factors, Steering Committee membership is not considered a reasonable option by many representatives of interests within the Delta.

The District finds the repeated references to a "collaborative process" in BDCP materials misleading because such a description indicates participation by all affected parties in a consensus-driven process.[9] However, fundamental decisions regarding the components and direction of the BDCP were made well before the District (and likely *any* other entities within the Delta) began participating in the BDCP process.[10]

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[7] Under the No Surprises policy, the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed upon could not be required without the consent of the PREs. (See 50 C.F.R., §§ 17.22, subd. (b)(5), 17.32, subd. (b)(5), 222.307, subd. (g).)

[8] See Bay Delta Conservation Plan, Planning Agreement (October 6, 2006, rev'd March 19, 2009), § 7.4.1.1.

[9] See generally, Wondollek at al., *Making Collaboration Work: Lessons from Innovation in Natural Resource Management* (2000).

[10] For example, the selection of "the main new physical feature of [the] conveyance system includes the construction of a new point (or points) of diversion in the north Delta on the Sacramento River and an isolated conveyance facility around the Delta." (The Bay Delta Conservation Plan: Points of Agreement for Continuing into the Planning Process (November 16, 2007), at p. 3.) The casting of this massive structure with correspondingly massive impacts

Though some improvements have occurred since the BDCP process began (e.g., accessibility of meeting materials, although handouts are often withheld until the meeting and copies are not always provided to all audience members), a greater understanding of local concerns and actual responses to those directly impacted by the Project must occur to garner local support for this Project.

In addition to practical reasons to consult with the affected communities regarding development of such an enormous and far reaching project, close consultation with affected entities such as the District is legally required. Under CEQA, the District has management authority over several resources affected by the project and requests that its concerns be carefully considered.[11] Under NEPA, an EIS must be conducted "in cooperation with State and local governments" and other agencies with jurisdiction by law or other special expertise.[12] *Consultation under CEQA and NEPA is thus formally requested at this time.*

III. Comments on Scope of Environmental Review

A. Project Description

Significant work still needs to be undertaken to develop a proper Project description that would properly support an adequate environmental review process. A NOP must include "sufficient information describing the project and the potential environmental effects to enable the responsible agencies to make a meaningful response. At a minimum, the information shall include: (A) Description of the project, (B) Location of the project [], and (C) Probable environment effects of the project."[13] The lack of detail regarding the Project being proposed, including the interchangeability of major Project components that would dramatically change the scope and location of impacts severely constrains the District's ability to provide detailed NOP comments at this time.

Moreover, it is unclear from the NOP what level of review is contemplated for the various proposed actions. For instance, the NOP does not explain the level of review (i.e., project or program) that elements of the BDCP will be analyzed. A "program EIR should be explicit about what level of review is contemplated for project-level

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on habitats and species not previously affected by PRE diversions as a "conservation measure" occurred subsequently in the process.

[11] Tit. 14 Cal. Code Regs., div. 6, ch. 3 ("CEQA Guidelines"), § 15086, subd. (a)(3).

[12] 42 U.S.C., §§ 4331, subd. (a), 4332, subd. (C)(iv).

[13] CEQA Guidelines, § 15082, subd. (a)(1).

approvals."[14] The public must be apprised, in particular, of those aspects of the Project that will not receive additional environmental review.

Given the far-reaching effects of the Project under consideration as well as the underlying statutory mandates associated with development of Habitat Conservation Plans, one would expect that a sound scientific basis would support the currently proposed components of the BDCP. This scientific basis is, however, completely lacking in many respects. For example, biological goals and objectives for the BDCP still have not been established, and certainly had not been established prior to selection of the project components.[15] Without such objectives, the process of weighing the efficacy of proposed components to meet ESA requirements is not well grounded.

Additionally, it is not clear that the development of the BDCP project description (conservation measures/actions) comport with ESA guidance regarding the priority of avoiding, minimizing and mitigating impacts to covered species. "Mitigation actions under HCPs usually take one of the following forms: (1) avoiding the impact (to the extent practicable); (2) minimizing the impact; (3) rectifying the impact; (4) reducing or eliminating the impact over time; or (5) compensating for the impact."[16] The BDCP project description must be developed based on these underlying ESA principles, which provides more emphasis on avoidance of take in the first place, especially where compensation or mitigation for a given impact will lead to take of additional species and new environmental effects.[17]

With respect to the Project objectives/statement of purpose and need from a CEQA/NEPA perspective, project applicants are typically afforded a measure of flexibility to select project objectives and components.[18] In this instance, however, the participation of public entities with statutory responsibilities to the public, along with the

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[14] Remy et al., *Guide to the Environmental Quality Act*, 11th ed. (2007), at p. 654, discussing *Citizens for Responsible Equitable Environmental Development v. City of San Diego Redevelopment Agency* (2005) 134 Cal. App. 4th 598.

[15] According to the U.S. Fish and Wildlife Service's Five Point Policy, biological goals and objectives "create parameters and benchmarks for developing conservation measures, provide the rationale behind the HCP's terms and conditions, promote an effective monitoring program, and, where appropriate, help determine the focus of an adaptive management strategy." (Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35251-35251 (June 1, 2000).

[16] Habitat Conservation Planning and Incidental Take Permit Processing Handbook (1996) ("HCP Handbook"), at p. 3-19; see also 16 U.S.C., § 1539, subds. (a)(2)(A)(ii-iii), (a)(2)(B)(ii).

[17] See HCP Handbook, at p. 7-2 (describing circumstances under which take associated with mitigation activities may be authorized).)

[18] See, e.g., CEQA Guidelines, § 15124, subd. (b); 40 C.F.R., § 1502.13.

far-reaching scope and effects of the project dictates a more careful inspection of foundational assumptions underlying the selection of Project components. The ongoing and probable future public financing of development and implementation of the BDCP also creates a heightened responsibility for development of objectives that also serve a broader public interest beyond the interests of the PREs.

Given the long time horizons for the sought take coverage as well as the certainty that conditions will change over time, a rigorous adaptive management program is crucial to long term improvements in Delta ecosystems and viability of special status species. The adaptive management component of the BDCP must be carefully developed and articulated with enough specific details to understand what it means to the District. As with other foundational components of this Project, a complete description, of an effective adaptive management plan has yet to be developed. Technical comments on the draft Adaptive Management Plan made available thus far are attached for the consideration of the Project team members. (Exhibit B: Adaptive Management and Public Participation Comments.)

B. Project Baseline

Under CEQA and NEPA, an EIR must include a description of the physical environmental conditions in the vicinity of the project from both a local and regional perspective.[19] An accurate description of the environmental setting of the Project is critical because it establishes the baseline physical conditions against which a lead agency can determine whether an impact is significant.[20] The EIR/EIS must thus include detailed description of Delta communities and the surrounding environment.

Equally important, the baseline for the EIR/EIS must account for current export levels (as modified by recent ESA and CESA litigation and related regulatory actions). It may not be assumed that SWP and CVP contract water amounts are already being fulfilled. Thus, *current export levels* are the appropriate environmental baseline against which to measure impacts of the Project.[21]

C. Project Impacts

Several probable components of the BDCP would have major environmental and other impacts within the District. It is unclear, however, whether and exactly how these components of the Project will ultimately be pursued. In light of this incomplete and

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[19] *Ibid*; 40 C.F.R., § 1502.15.
[20] CEQA Guidelines, § 15125, subd. (a).
[21] See *Save Our Peninsula v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 121 (impacts of project must be measured against real conditions on the ground).

shifting Project description, the District is only able to provide general comments at this time.

The District recommends consideration of the following impacts associated with the potential western alignment of an isolated conveyance facility:

- Impacts from conversion of farmland to canal and associated facilities. In agricultural areas such as the District, conversion of farmland leads to other indirect environmental and social effects that also must be disclosed, and to the extent required by law, mitigated.
- Impacts from destruction of habitat for riparian and terrestrial species.
- Impacts from incompatibilities of canal and associated facilities with existing local land use plans.
- Impacts associated with ancillary facilities for the canal, such as power supply and access roads.

The District also urges analysis of impacts of all Project components on the availability of water within the Delta for beneficial uses. Any isolated conveyance facility and northern intake point(s) would reduce the amount of freshwater within the Delta. Potential results of changes in water quality on the environment, special status species, and beneficial in-Delta uses of water must be carefully analyzed.[22]

A major component of the BDCP is restoration[23] of tidal and shallow water habitats, some of which may occur within the District,[24] in order to increase primary production[25] of food for species sought to be covered by the Habitat Conservation Plan. It has been postulated in the BDCP that additional nutrients provided by increased primary production would benefit the listed fish species, but the requirements for additional primary production to aid in listed fish species growth rate improvement is a complicated issue. The type (form/availability), size, location and timing of that food resource provided are critical in the actual value of that resource. Furthermore, it is

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[22] Water rights within the Delta are afforded priority over the SWP and CVP. (See, e.g., Wat. Code, § 12203; see also Wat. Code, § 11460 (area of origin protections).)

[23] The use of the term "restoration" here should not be considered an acceptance of the premise that these activities would actually restore areas to a previously historic condition.

[24] This comment is based upon materials provided in the BDCP process, not the NOP itself. These materials have typically included only low quality maps that depict constantly shifting proposals described by constantly changing nomenclature. As discussed in section III.A above, an intelligible and stable project description is necessary to an NOP that adequately informs the public.

[25] Primary production is the conversion of sunlight into food energy by plants or aquatic plant-like organisms (phytoplankton).

possible that increasing primary production may not yield the desired effect. (See Exhibit C, Terrestrial Species and Habitats Comments.)

For instance, there is no indication that the addition of more nutrients (eutrophication) or primary producers in the system would benefit fish. Eutrophication can have significant negative site-specific and regional impacts, which can vary both in space and time. The proposed management of the Delta does not have any mechanism for fine-tuning, managing, or otherwise controlling the degree and transformation of nutrients in this system. This well-intentioned, but undeveloped idea could by itself lead to extinction of rare aquatic species, the potential for which must be analyzed in the EIR/EIS.

The contemplated restoration activities, because of the potential to release and dislodge mercury within subsurface soils, would also create the potential for release of mercury that would otherwise continue to be sequestered underground. (See Exhibit D, Mercury Issues Comments.) The EIR/EIS must fully analyze the impacts of mercury releases that would occur as a result of soil disturbance from restoration activities on human and natural communities. This analysis should recognize the use of Delta waterways for subsistence fishing as well as the potential for contamination of drinking water supplies for use within and outside of the Delta.

The magnitude of the Project also makes essential a full analysis of cumulative impacts. In particular, the District is concerned about the impacts of the BDCP in combination with another proposed Project that would potentially bifurcate and disrupt lands within the District: the Transmission Agency of Northern California Transmission Project ("TTP"). One alternative route of the TTP includes massive transmission lines through the District. The TTP, in combination with components of the BDCP, would result in cumulative environmental impacts that must be carefully considered.[26] For instance, the combination of the TTP and a western conveyance facility would interfere with the ability of farmers within the District to continue agricultural activities. Together, these massive infrastructure projects would also disturb important habitat areas relied upon by myriad species. Moreover, we are aware that the TTP proponents have been in communication with the Department of Water Resources, given the need for power along any new conveyance route. To the extent that these projects are interrelated and interdependent, they must be reviewed in tandem.[27]

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[26] See CEQA Guidelines, § 15130; 40 C.F.R., § 1508.25, subd. (c)(3).
[27] See CEQA Guidelines, § 15378, subd. (a); 40 C.F.R. § 1508.25, subd. (a)(3).

D. Mitigation Measures to Address Significant Impacts Associated with Project

Once a detailed Project description is complete, an effective program to mitigate potentially significant effects to the extent feasible will be critical to the local communities where components of the Project are located. Mitigation will be necessary both during construction and operation of the Project. While the lack of a detailed Project description constrains the ability to make specific suggestions, the District recommends consideration of the following measures:

- Measures that would protect local soils and water from mercury contamination resulting from conversion of any upland areas within or upstream of the District to tidal or seasonal wetland habitat.
- Measures to compensate for direct and indirect loss of agricultural productivity in the area, such as programs to develop markets for agricultural products that are grown within the region.
- Measures to reduce water losses during transport.
- Measures to decrease the energy use and related carbon footprint associated with the Project.

E. Alternatives to Project

Given the major environmental and community impacts that could result from implementation of a Project of this magnitude, the District urges inclusion of a detailed discussion of a broad array of Project alternatives in the EIR/EIS. As noted above, the District does not agree with, and did not participate in, the initial selection of Project components. Had the District had an opportunity to participate in the development of the Project, the District would have urged that components be selected based both on established biological goals and objectives, with major consideration being given to minimization of disturbance to existing communities within the Delta. Though this did not occur during project development, the EIR/EIS must, as a minimum, consider alternatives that would address special status species requirements and avoid or minimize impacts on Delta ecosystems and communities.

As recognized by the state and federal courts that have considered the issue and the existence of the BDCP process itself, the Project's diversion of water from the Delta watershed results in take of special status species. Reductions in exported water would reduce take of special status species and other water quality impacts. Thus, alternatives that would reduce water exports should be given primary consideration as a means to conserve special status species. Specifically, serious consideration of the ability of water use efficiency and conservation, and development of alternative supplies to meet water

supply objectives of the PREs, must be provided in the EIR/EIS. Such alternatives include but are not limited to: desalinization, wastewater re-use, rainwater collection, groundwater banking, conjunctive use, and additional storage.

Because the bulk of water exported from the Delta is used for agricultural purposes, water use efficiency and related options must also focus on the San Joaquin agricultural sector. As District landowners are primarily farmers, the District appreciates the importance of maintaining a productive agricultural sector to the state and the nation. However, when agriculture relies on water exported from a watershed that is facing multiple challenges caused in large part by the exports themselves, special considerations arise.[28] Agriculture served by Delta water can and must move forward on measures that use water more efficiently, while continuing to provide essential foods and agricultural products.[29] These measures must be included in the EIR/EIS.

IV. CONCLUSION

The District hopes that the significant public and private investment dedicated thus far to addressing Delta issues through the BDCP leads to tangible improvements that ultimately benefit all those reliant upon Delta resources. Because the Delta contains irreplaceable natural resources and is also the water hub of California, informed decision making is essential. As the BDCP is refined, emphasis should be placed on options that avoid a situation where the "solution" creates significant (and perhaps unanticipated) consequences, such as the current SWP/CVP pumping configuration. The imperiled status of endangered and threatened species within the Delta is yet another indication that watersheds do have a carrying capacity for water exports. With a growing state population that is removed from our largest fresh water supplies, simply continuing to transfer more and more water from one part of the state to another is not a viable long term plan.

The District looks forward to participating in the BDCP process to ensure that the District's longstanding stewardship of Delta resources may continue. Please feel free to

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[28] In addition to removing water from the Delta ecosystem, San Joaquin Valley agricultural users also contribute contaminated return flows back into the Delta, exacerbating water quality and other impacts related to the initial diversion. Indeed, one of the primary benefits of a new northern diversion point is the ability of the SWP and CVP to divert water that does not contain "used" SWP and CVP water.

[29] See, e.g., The Pacific Institute, More with Less: Agricultural Water Conservation and Efficiency in California – A Special Focus on the Delta (September 2008). Though questions have arisen as to the feasibility of some of the measures discussed in this report, the report clearly indicates that agriculture can use water more efficiently.

contact me or Erik Ringelberg (Erik Ringelberg eringelberg@wallace-kuhl.com) with any questions about the information contained in this letter.

Very truly yours,

SOLURI MESERVE
A Law Corporation
By:
Osha R. Meserve

Enclosures

Exhibit A: Prior Scoping Comments on BDCP by Reclamation District 999
Exhibit B: BDCP Adaptive Management and Public Participation Comments: Areas of Concern to RD 999 (May 11, 2009 draft)
Exhibit C: BDCP Terrestrial Species and Habitats: Areas of Concern to RD 999 (September 27, 2008 draft)
Exhibit D: Mercury Issues Paper: Areas of Concern to RD 999 (January 30, 2009 draft)

cc: Senator Lois Wolk, 5th District
Senator Joseph Simitian, 11th District
Supervisor Mike McGowan, Yolo County District 1
Melinda Terry, North Delta Water Agency
Robin Kulakow, Executive Director, Yolo Basin Foundation
Robert Webber, Manager, Reclamation District 999
Erik Ringelberg, Director of Ecological Services, Wallace Kuhl and Associates

EXHIBIT A

1. Clarksburg , Ca, BDCP scoping meeting 4/30/2008.

2. Good Evening I am Bob Webber a long resident of Clarksburg and the Manager of Reclamation District 999. The District was formed on August 10, 1913 under the Reclamation Act of 1868. The District provides levee maintenance and operations for 33 miles of Federal project levees and Irrigation water to more than 25,000 acres ag lands. I have a history of Reclamation District 999 to be included in our public comments.

3. The District is very proactive in our use of environmentally friendly levee erosion control projects with the use of Brush Boxes, planting tulles grasses and willows along the waters edge. We installed a fish screen on our Sacramento river water diversion for protection of both delta smelt and salmon.

4. We are concerned with the habit restoration that would convert agricultural lands into tidal wet lands. The district early history is an area of Swamp and Overflow lands. This is very different than tidal wet land for the benefit of endanger fish.

5. We request that your EIR process clearly show your compliance with Federal and State Reclamation Law.

6. The restoration of Tidal wetlands will require the diversion of water. We request that the EIR process evaluate the current water rights laws and their application to the Bay Delta conservation Plan.

Thank you,

Bob Webber
Reclamation District 999, Manager
916-775-2144
recdist999@sprintmail.com

06/29/06

MEMORANDUM RE DIFFERENCE BETWEEN SWAMP AND OVERFLOWED LANDS AND TIDE LANDS

This is a Memo to differentiate between Swamp and Overflowed Lands, herein called S & O Lands, and Tide Lands. The essential difference is that Tidelands are subject to being washed by the daily tides. S&O Lands are subjected to overflow only at flood stages, not at high tides.

This Memo is prompted by the impression, incorrectly held by some, that the Sacramento-San Joaquin Delta, at the time of the original settlers, was a marsh which was subject to daily tidal overflow until the settlers began to construct levees to reclaim it and presumably to "create" islands. As shown below, that was not the case. Each island had a natural bank, like that of the Sacramento River, which kept out the tides, but were subject to overflow at high water stages. The tides were always against these banks, but the banks were high enough to keep out the high tides, but not the flood waters. Since they were "overflowed" they were no doubt generally "marshy", but were, as shown, subject to being reclaimed and cultivated.

Pieces of the natural banks of several of the Delta islands can be seen today and are referred to as "Channel islands." These are isolated pieces of the original island bank which were cut off at the time of reclamation where the original island came to a point which was too narrow to justify reclamation. The dredge then simply cut off this point and left a channel resulting from the dredge cutting through it. These "Channel islands" (remnants of the original island banks) are not covered by high tides, but only by flood flows.

SWAMP AND OVERFLOWED LANDS

The source of the S&O Lands is in the Congressional Act of Sept. 28, 1860. This is called the "Arkansas Act" as it specifically involves land in the State of Arkansas. It was adopted to enable Arkansas to construct "the necessary levees and drains to reclaim the swamp and overflowed lands therein" which had been "made unfit thereby for cultivation." Section 4 of this Act, however, extends the provisions and benefits of the Act to "each of the other States of the Union", hence California.

The Secretary of the Interior is directed in the Arkansas Act to "make out an accurate list and plats of the lands" referred to as S&O lands, and transmit the list and plats to the governor and "cause a patent to be issued to the State therefor" to vest the land in the State of Arkansas subject to disposal by the legislature, provided that "the proceeds of said lands shall be applied, exclusively, as far as necessary, to the purpose of reclaiming said lands by means of the levees and drains."

The California Legislature quickly picked up on this opportunity to acquire ownership from the federal government of all S&O lands and to apply the proceeds from their sale to reclaiming these lands "by means of levees and drains." The first such act was adopted by the California Legislature on May 13, 1861. It provided for the "Reclamation and Segregation of Swamp and Overflowed, and Salt Marsh and Tide Lands, donated to the State of California by Act of Congress." The Arkansas Act does not refer to Marsh Lands or Tide Lands. Clearly, however, the reclaiming of the lands along the Sacramento River and in the Delta was made possible by this Congressional Act and the Legislative Acts which followed it.

Several Acts of the California Legislature followed, on May 14, 1861, April 25, 1863, April 27, 1863, March 24, 1864 and April 2, 1868. It is of interest that the Act of April 27, 1863 refers to the S&O Lands "granted to the State by Act of Congress of September 28, 1850" and to the "Tide Lands belonging to the State by virtue of her sovereignty." This provides the distinction between Tide Lands and S&O Lands. Where the "sovereign" title of the State to the Tide Lands is derived is not defined, but the distinction is clear.

These Acts of the Legislature provide for the sale of the S&O Lands and the formation of a Board of Swamp Land Commissioners to oversee the use of the funds for reclamation. In 1868 this was all succeeded by the Reclamation District Act which authorizes the Counties to approve the

formation of local districts to receive the funds from the sale of the S&O Lands, through the Office of the State Treasurer, and to apply them to the construction of the necessary levees and drains. That is how the reclamation of the Delta was accomplished through the elevation of the natural banks of the islands to attempt (not always successfully) to protect them from the periodic overflow from high water.

The surveying of the S&O Lands was done by the State Surveyor General, predecessor of the State Lands Commission, in conjunction with the US Surveyor - General for California. Such a survey of Delta lands was completed and dated February 14, 1872. A copy is available from the California State Lands Commission. The 1872 survey of "Notoriously Swampy and Overflowed" lands shows the Delta configuration of sloughs and islands essentially as it remains today.

Deeds to lands within the Delta invariably contain descriptions which show the parcel to be a portion of Swamp and Overflowed Survey No. ___. These would have been individual surveys, with individual numbers, prepared by State surveyors after the 1872 federal map was approved.

There should therefore be no question as to the condition of the Delta islands when California became a State. They existed essentially as they do now, but at that time with natural banks which held out the daily tides but were able to be overtopped by periodic seasonal high flows.

Unfortunately, the recent Report of the Corps of Engineers to Congress regarding Delta levees refers to the islands as having originally been "tidal marshlands." This could imply that they were "marshlands" subject to the daily tides. That clearly does not provide an accurate impression as to the condition of the Delta islands as of 1850 or now. The tides obviously rose and fell on the outside of the islands against the islands' natural banks. The islands' interiors, however, were no doubt marshy to a great extent, and probably filled with tules, but were not subject to daily tides as are "Tide Lands."

TIDE LANDS

Tide Lands, which are subject to daily tides, are not generally able to be conveyed into private ownership and even when this occurs are subject to an easement for navigation by the public. This occurred when Frank's Tract was flooded in 1938. The levees have never been repaired. The land within the island, covered by tidewater, is still owned privately, but is subject to a "navigation easement" for the public. See Bohn vs. Albertson, 107 Cal. App. 2d 738 (1951).

The first case analyzing the distinction between S&O Lands and Tide Lands is The People of California v. Morrill, 26 Cal 336 (1864). This case discusses the source of the State's title to the S&O Lands through the Arkansas Act. It points out that Arkansas had many such lands subject to periodic overflow, but due to its distance from the sea, no "tidelands." The court points out that California has a large quantity of swamp and overflowed lands "upon the Sacramento and San Joaquin Rivers." It also has a quantity of other lands which are overflowed in part by the ordinary high tides and therefore, as to that part "belong to the State by virtue of her sovereignty."

This "sovereignty" is derived, according to this 1864 case, from the English common law that the tidelands or "seashore" are "deemed to be public property for the free and common use of all" and "the king cannot divert it from this purpose." Why the "king" in this case is the State and not the federal government is not explained. It does, however, identify those lands which are subject to periodic overflow, and not daily tides, as having been acquired from the federal government under the Arkansas Act, separate and distinct from "tidelands." Those S&O lands, including the Delta islands, were subsequently conveyed by the State into private ownership for "reclamation" pursuant to the several legislative Acts referred to above.

George Basye

May 26, 2008

RECLAMATION DISTRICT 999
Organized 1913

Bay Delta Conservation Plan
Ms. Delores Brown
Chief, Office of Environmental Compliance
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236

Dear Committee Members:

I write to you as President of the Board of Trustees of Reclamation District No. 999 (District). This letter is intended to provide the Bay Delta Conservation Plan with an overview of the District's lands and operations, and its status as a "special place" within the greater Sacramento–San Joaquin River Delta. In preparing its final recommendations for the resource management of the Delta, the BDCP should give due weight to the needs and importance of our community and its people, and fashion a comprehensive program that provides for a healthily functioning ecosystem while ensuring the ongoing reasonable and beneficial use of water within the Delta.

The California Legislature created the District by special act in 1919 to safeguard approximately 26,000 acres of productive agricultural lands in Yolo and Solano Counties from flooding and overflow. (Reclamation District No. 999, Chapter 161, Statutes of 1919.) This area is bordered by the Deep Water Ship Channel and the Yolo Bypass to the west, Sutter Slough to the south, Elkhorn Slough and the Sacramento River to the east, and Reclamation District No. 307 to the north. The historical township of Clarksburg is in the northern part of the District, near the Sacramento River. Today, the District has the primary responsibility for virtually all facets of water management within its jurisdiction. Not only does the District operate and maintain the levees that protect the District's lands from floods and overflow, but also delivers water for irrigation and operates extensive drainage facilities.

The thriving agricultural community within the District's boundaries is a striking example of traditional family farming successfully adapting to changing market conditions. Since the 1850s, agriculture in this area focused primarily on vegetable row crops and grains. But during the 1960s, a growing demand for California wines prompted farmers to begin planting grape vines. Today, the District's lands form the backbone of the Clarksburg wine appellation, home to more than 25 varieties of grapes and a stable of fine wineries, including Bogle. Located in Sacramento's backyard, Clarksburg's Old Sugar Mill has become a popular weekend destination and wine-tasting venue. In short, six generations of family farmers in the District have developed a pastoral legacy that we anticipate will prosper for centuries, and that exemplifies the kind of special place that Delta agricultural interests recognize as critical to the area's future.

As a steward of our water resources, the District has also taken steps to ensure the coexistence of the beneficial use of water in our community with aquatic species in the Delta channels. In 2005, the District installed a positive fish screen barrier on one of its major water intake facilities, one of the first major screening efforts in the northern Delta. The District is currently

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YOLO COUNTY

working with State agencies to screen the rest of the District's diversions.

Yet it has come to our attention that one of the many recent proposals presented to the BDCP is a plan for the State to take most or all of the lands within the District and surrounding areas by negotiated sale or eminent domain, and to convert our lands from a community into a seasonal floodway and marsh. The BDCP should dismiss this approach outright. Such a plan would destroy our homes, our farms and our family legacies, hamstring the Clarksburg wine appellation, and eliminate a large, increasingly productive swath of the Yolo County tax base.

Instead, the BDCP should focus on other, more measured alternatives to improving passage of northern Delta floodwaters and enhancing habitat. One less invasive approach to controlling floods would be to improve the efficiency of the Yolo Bypass. If any additional seasonal floodways in the north Delta are deemed of critical importance, they should be located in narrow, targeted areas away from acreage that is planted in high-value permanent crops, such as grape vines.

The BDCP's Final Report must implicitly recognize that places like the District must be preserved. First, the report must recognize the importance of the Delta as a special place, and historic agricultural communities such as the District are a critical component of what makes the Delta so special. Second, the BDCP must recognize the goals of water supply and ecosystem protection, underscoring the California Constitution's requirement put water resources "to beneficial use to the fullest extent" possible. The beneficial use of water within the Delta, at the confluence of the State's two largest river systems, warrants a higher priority than the use of that water in distant locations, as recognized in the Water Code's protections for watersheds of origin.

It should be remembered that the imbalances in the Delta ecosystem are primarily the consequence of the construction and operation of the Central Valley Project and the State Water Project. Along with the Delta ecosystem itself, the water users in the Delta are the most negatively affected by the operation of the Projects. The State committed itself to protecting in-Delta waters users from the effects of the Projects, not sacrificing them in order to sustain high export rates, when it executed the North Delta Water Agency contract in 1981.

On a final note, we urge the BDCP to make a more concerted effort to reach out to local landowners and solicit their feedback on the final recommendations. More than any other group of stakeholders, the residents of the Delta will most strongly feel the impact of these decisions.

We appreciate the efforts of the BDCP, and the District's Board of Trustees looks forward to working with you in laying the groundwork for a sustainable future for our Delta.

Very truly yours,

Stephen Heringer,

President, Board of Trustees, Reclamation District No. 999

EXHIBIT B

Wallace Kuhl
& ASSOCIATES INC

Bay Delta Conservation Plan
Adaptive Management and Public Participation
Comments
Areas of Concern to Reclamation District 999

Draft Comments 5/11/09

Reclamation District 999
38563 Netherlands Road
Clarksburg, California 95612

Wallace Kuhl
& ASSOCIATES INC

Bay Delta Conservation Plan
Adaptive Management Comments
Areas of Concern to Reclamation District 999
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INTRODUCTION

Reclamation District RD 999 (district or RD 999) has been a Delta land steward for almost a century, and supports adaptive management as a tool to manage the Bay-Delta system for ecological sustainability and water supply, and to guide specific habitat restoration actions. However, it is not a substitute for detailed understanding of ecosystem functions and processes, and it does not relieve managers for responsibility for inherently risky actions.

RD 999 and the Clarksburg community are likely to be impacted through the proposed altered hydrology of the Sacramento river system or/and the Yolo Bypass; the proposed flooding of the islands south of the district; infrastructure modifications along (or of) its levees, and the associated changes in the types of nearby habitats; and, the proposed new governance entity for the Delta, regardless of the final scope of the Bay Delta Conservation Plan (BDCP). *However, properly developed adaptive management can help reduce the impacts from BDCP to our community, if the community is allowed to participate in a meaningful way.*

RD 999 puts forth these comments on the BDCP premise that flooding of the District and the Clarksburg community is an adaptive management action, and that flooding will provide the specific benefits that have been stated by the BDCP. Prior to planning, prioritizing, and funding actions in the district, the BDCP needs to demonstrate that the scientific basis for its premises for action, the desired cause and effect is demonstrable, and that adaptive management (according to the framework described later) can be accomplished.

Just as ecological restoration means many different things to many people, and for each species of concern, adaptive management means different things in different contexts and viewpoints. The BDCP proposes to use what it calls adaptive management to overcome uncertainty in the nature of and extent of project impacts, *and* uncertainty regarding the effectiveness of its proposed mitigation measures.

This *dual-use* of adaptive management, and the ambiguity of what adaptive management under the BDCP really means on this landscape and in this context, has resulted in significant

confusion among the people who live in the proposed impact zone. This analysis and commentary is intended to provide a primer, and address specific concerns regarding its use in the BDCP.

ADAPTIVE MANAGEMENT

All natural resource management of species, habitats, and ecosystems requires an adaptive approach[1]. Natural variation at each scale can be substantial and difficult to understand and manage for, even before changing anthropogenic system drivers at the same time. Most natural resource scientists understand this dynamic environment all too well, and resource managers have started to accept this philosophy. However, it is critical to distinguish that attempting to manage natural resources, managing resources to particular metric, and managing diverse metrics under changing conditions, are three very different things.

By any definition, adaptive management is not intended to replace careful planning and a foundation of science. It is intended to supplement the best available information, in a framework that tests (testable) competing hypotheses to inform future management decisions, in a continuous feedback loop. The management framework (testable hypotheses, metrics, statistical tests) must be developed a priori, and not to support essentially pre-determined outcomes.

> "It is not a "trial and error" process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits." (NAS, 2004)
>
> "There are multiple views and definitions regarding adaptive management, but elements that have been identified in theory and in practice are: management objectives that are regularly revisited and accordingly revised, a model(s) of the system being managed, a range of management options, monitoring and evaluating outcomes of management

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[1] Although in some cases it may be more expensive: Drechsler, M., K. Johst, F. Wätzold, M.I. Westphal (2006) Integrating Economic Costs Into The Analysis Of Flexible Conservation Management Strategies. Ecological Applications: Vol. 16, No. 5, pp. 1959-1966.

actions, mechanisms for incorporating learning into future decisions, and a collaborative structure for stakeholder participation and learning." (NAS, 2004)

Adaptive management is not a trivial process when done effectively. It requires at the minimum:

I. A management structure-

Who is assessing the effectiveness of the management structure and system?
What are the qualifications of the people in the management structure?
Who is included and who is excluded?
Is there effective stakeholder participation, as identified in the Department of the Interior's (DOI) adaptive management process (Williams *et al.*, 2007)?

II. A management process-

Where is the feedback loop in the decision making?
How does the management team identify the appropriateness of tools, effectiveness of decisions, applicability of methods, outcome metrics?
How is funding associated with management metrics or success criteria?
How is funding (and projects) adjusted to meet evolving conditions?
What types of questions/uncertainties require new science?

III. Within the structure and process, the appropriate management tools-

What is the spatial resolution (granularity) of the monitoring tools vs. the scale of effect for the management tools?
What is the temporal scale for monitoring vs. management vs. outcome?
What statistics are they using to define states or outcomes?
What statistical significance is appropriate for decision-making?

These structural and functional issues, and associated questions, are by no means all-inclusive or in a particular order of importance, but are provided to illustrate the challenges of establishing adaptive management at an ecosystem scale.

Adaptive management has progressed in the many years of its theoretical development and application. The BDCP process has focused almost exclusively on the most simplistic of these, the California Natural Community Conservation Planning (NCCP) version, a weak model at best, which has been directly critiqued (CBI, 2006)

> *"Adaptive management* has been touted as the answer to alleviating threats, as well as inadequate preserve design (e.g., fragmentation), but with insufficient understanding of what it entails or if it is financially feasible."

> "The Little Hoover Commission, California Department of Finance, and KPMG, LLP each published reports in 2005 that reviewed different aspects of CALFED implementation. The audit reports found problems in implementation of the Science Program over the first 5 years due to a lack of focus, inadequate staffing and organization, inadequate funding, philosophical conflicts between compliance monitoring and trends monitoring, disagreements between basic research and habitat management as funding priorities, inadequate coordination between funding decisions and milestone requirements, ineffective coordination of work contracted out to consultants, an overtone of politics instead of science, and bureaucratic delays and confusion on direction and priorities."

This extensive critique followed both the Little Hoover Commission and the 2001 Pollack Report. There is no need to reproduce the entire text here, simply to note that virtually the same errors and resulting problems from the overall NCCP Adaptive Management process and in particular CALFED's are being perpetuated in the BDCP process. This is not to take away from the significant and positive efforts that the BDCP's Implementation Structure and Governance committee has done; far from it as it is clear that they have demonstrated a willingness to carefully consider and respond to these issues. The intent here is to define more effective and mature processes to learn from, and then illustrate some of the biological context that the adaptive management has to take place in.

While there are entire journals devoted to land and wildlife management, there is a local application of one of the more advanced versions of adaptive management, the Point Reyes Bird Observatory (PRBO) Conservation Science program, Adaptive Conservation Planning (2008).

PRBO's application uses birds as the biological integrator of habitat structure and complexity, certainly useful for the BDCP's riparian, seasonal wetland, and channel (riparian to emergent aquatic) habitats. More importantly, they have taken the approach that adaptive management is not the only tool in an adaptive management strategy, but is instead the initial step in a coherent multi-project, multi-habitat learning process:

> An adaptive conservation strategy has two components:
> 1. **Adaptive management** is a decades-old method of natural resource management that integrates design, management, and monitoring to systematically test assumptions in order to adapt and learn.
> 2. **Adaptive Conservation Planning** is the process of synthesizing monitoring and

> assessment data from many projects to develop science-based conservation recommendations that can be shared across projects. (PRBO, 2008, emphasis in original)

It would do the BDCP process well to adopt the DOI's adaptive management process in its entirety to supplement the proposed NCCP/Habitat Conservation Plan (HCP), and add the PRBO adaptive conservation planning element. This would bring the BDCP adaptive management process and structure up to the current state of the field, a critical foundation for a process with a 50-year permit. A final note on this discussion of the mechanics of adaptive management, external scientific peer review should not be discretionary. *External scientific peer review is a critical element in ensuring that the process is scientifically valid and that the iterative process is actually followed.*

The proceeding sections identified some of the key areas where the BDCP's general approach to adaptive management might be strengthened. The following sections identify the specific failure of the BDCP to integrate a specific, crucial, adaptive management element of effective public participation, and continues with a "drill down" of how the BDCP's process does not address some of the critical scientific issues inherent in its proposed management.

Public Participation and Stakeholders

One of the key elements in successful adaptive management and natural resource management in general is participation. The desire by Federal Agencies to keep their decision-making process secret was one of the reasons that lead to the National Environmental Policy Act (NEPA 1970, [42 U.S.C. 4321 et seq.]). This is why there is manditory opportunity for public participation and for comment as the central core of the NEPA process.

In terms of public participation, NEPA itself is considered flawed because the public is typically not involved in the *actual* decision making process, which can artificially narrow the decision space and engender conflict (Cheek and Ringelberg, 1999). This has lead to a movement by academics and Federal Agencies to use a pre-NEPA, collaborative process (Shindler and Cheek,1999; Wondolleck and Yaffee, 2000; Ringelberg, 2002).

> "Despite challenges that attend meaningful stakeholder collaboration, it is an important part of adaptive management. Stakeholder and agency involvement should begin in the initial stages of adaptive management efforts and should include participation in periodic review of monitoring results and management models." (NAS, 2004)

> "Stakeholder collaboration should be an integral component in the adaptive management of Corps projects and systems. ...Furthermore, as illustrated in reviews of adaptive

> management science programs in the Comprehensive Everglades Restoration Plan, independent expert review can point out inadequacies in modeling, monitoring, and assessment." (NAS, 2004)

There is significant disagreement about the form and effectiveness of the BDCP's outreach efforts. It is fair to say that individuals within the BDCP process have attempted to engage local stakeholders. The difference between those positive engagements and the larger process have created difficulties in the pre-NEPA stage, ranging from denial to engage active local stakeholders in the process[2], refusal to provide meeting documents from the various teams[3], refusing to provide email updates[4], and refusing to provide countervailing scientific references to advisory groups[5], the BDCP must significantly change its outreach and process to follow the DOI's guidance (Williams *et al.* 2007) and NAS recommendations for meaningful stakeholder involvement, an explicit component of adaptive management. Adaptive management is not just a check box to be completed some time in the future; it is a process that has to begin with the formulation of the management needs.

> ***"Adaptive management requires the participation of stakeholders.*** Stakeholders include people and organizations that use, influence, and have an interest, or "stake," in a given resource (25). Stakeholders should be involved early in the adaptive management cycle, to help assess the problem and design activities to solve it. Stakeholders also can help to implement and monitor those activities, and participate in the evaluation of results. Involvement of stakeholders from the beginning increases management effectiveness and the likelihood of achieving agreed-upon outcomes (25)." (Williams *et al.,* 2007, emphasis in original)

For the BDCP to substantively engage the directly affected communities, it must make substantive changes in its polices and outreach, required to implement adaptive management.

ADAPTIVE MANAGEMENT IMPLICATIONS

It is important to illustrate the implications of adaptive management on the smallest scale, with just one species, in terms of a couple of variables. For example, adult Delta smelt (*Hypomesus transpacificus*) require plankton to feed on. The species of zooplankton that makes up most of

[2] 2008. BDCP Steering Committee membership denied for North Delta Cares, 2008.
[3] 2008. Mark Wilson correspondence, The Resource Agency Public Records Act requests.
[4] 2008. Holly Wilson, SAIC; 6/30/08 Email: Regarding your request to be added to the distribution list for BDCPWorking Groups and Technical Teams, per BDCP Steering Committee policy, we only provide emailed notices and materials for technical teams and working groups to representatives of Steering Committee member agencies, so we cannot put you on the mailing list.
[5] 2008. RD 999 Comments to BDCP Terrestrial Experts.

the smelt's diet have changed over time as new plankton and bivalve species invade its habitat; and, the overall plankton numbers has been observed to decline over time (Orsi and Mecum, 1996). The overbite clam (*Corbula amurensis*) has been associated with the decline of plankton (Kimmerer, 2002), as has the Asian clam (*Corbicula fluminea)*, to a lesser degree (Phelps, 1994). Freshwater clams are also apparently food limited in the Delta (Foe and Knight, 1986). This precipitous plankton decline parallels other bi-valve invasions in the US (Pace *et al.*, 2002).

Therefore, simply looking at smelt population dynamics, Delta trophic level interactions, Delta nutrient cycling, or water management operations alone is not going to provide a basis for effective management for this species. An adaptive management team for smelt-associated actions then needs to have experts in conservation biology, aquatic ecology, fish biology, fish ecology, aquatic toxicology, Delta water management, local stakeholders, Regional water supply and delivery agencies, and State and Federal Agency managers with the authority to authorize immediate implementation of control strategies, and control over water management facilities.

This team has only a limited set of controls over the smelt and its ecosystem based on current conditions and BDCP-proposed future projects (assuming a Delta-wide real-time water quality monitoring system and SCADA control system, and the decision making system described above):

Short-Term
Water management (mainly reservoir control) and the existing cross-channel, and diversion intake control.

Long-Term
Proposed in-Delta flow control structures, diversion intake control (proposed upstream and in-Delta), and proposed hatchery system.

Indirect Benefits
Improved structural habitat condition, arguably improved water quality, reduced rate of predation, and reduced rate of invasives.

Clearly, the key structures and potential control over the ecological functions are related to the control of the quantity and quality of the water. *It does not appear that there are sufficient control mechanisms in either the short- or long-term to achieve the necessary adaptive management of this species.* Adaptive management is a useful process to manage these direct control systems and guide the specific needs for the long-term control systems. Adaptive management is still useful for the indirect benefits, but as the management metrics are secondary

and tertiary effects, spread over long time scales for both implementation and for effects measures, the management process becomes more traditional and takes the form of best guess.

It is this area of purported indirect benefits, specifically the BDCP FLOO2.1 Clarksburg Bypass, flooding portions of RD 999 and the community of Clarksburg that requires much greater scientific analysis than has happened to this point in the BDCP process. The following section describes how and why the purported ecological reasons for flooding Clarksburg are largely speculative and not well grounded in science.

Eutrophication and Diet

The 2007, Independent Science Advisors Report (BDCP) specifically identified that, under current ecological conditions, aquatic invasive species which dominate the Delta may respond more favorably than the covered species, and potentially that other species' interactions may be changed in unpredictable ways: "Rather, considering how these species [non-native striped bass and threadfin shad] may respond to actions that are designed to benefit the Covered Species may provide information on the potential effects of plan implementation on a more diverse set of components of the Delta Ecosystem." This is an accurate analysis for essentially any ecosystem, which has apparently gone unnoticed by the BDCP.

The BDCP technical documents (Habitat Restoration Program documents August 8, 2008, define one of the key benefits of seasonal flooding and shallow water restoration activities is the increased export of materials out of the terrestrial system into the aquatic system and eventually to the Delta. These nutrients are couched in the language of "increased primary and secondary activity," and DOC (dissolved organic carbon), so there is no need to go into the actual chemistry and biochemical cycling here, but to simply identify that deliberately introducing nutrients into a system and increasing productivity is a form of eutrophication.

The deliberate eutrophication of the Delta as a proposed seasonally flooding regime, "conservation measure" is at best an indirect means of increasing plankton, which may increase smelt numbers or body condition. A *much likelier* condition, given the ecological history of the Delta, is that increased eutrophication will result in more and healthier clams, and not translate to detectible smelt improvements. This supposition needs to be tested through adaptive management.

Given that the adult smelt feeds almost exclusively on zooplankton, and that plankton is declining, we can hypothesize that some portion of the smelt decline is correlated to the decline in food. In order to manage the food resources to maximize smelt, we might want to attempt to

improve not just "nutrients" or a coarse metric such as TOC, but the specific suite of plankton that are the actual prey for the smelt.

Keep in mind that there are many illustrations of "management" that attempted to maximize food productivity through eutrophication or new "better" diets. Mysis shrimp introduction in Flathead Lake Montana, (Chess and Stanford, 1998; Spencer *et al.* 1999), is a classic example of apparently well-intentioned management actions that lacked a scientific understanding and resulted in the collapse of the native fishery.

Indeed, locally, the related non-native wakasagi, *H. nipponensis*, was first introduced into California in 1959 as a forage fish for salmonids in warm-water reservoirs (Wales, 1962). The ecological implications of this fish for Delta smelt food competition and genetics are not well understood, but given the overlap in range in the Sacramento River system, certainly can be considered a threat. Trenham *et al.*, (1995) found an F1 hybrid (wakasagi x Delta smelt), and delta and longfin smelt hybrids have also been found (May, 1996).

There is also a historic parallel in Europe that demonstrates that the theoretical benefits of limited eutrophication, increased productivity, can be easily overwhelmed leading to ecological collapse (de Nie, 1987). The now historic analysis demonstrates the relationship between suitable prey size, dietary shifts, eutrophication, loss of native species fish diversity and eventual collapse. Ironically, the striped bass cohort disappeared with the simplification of the ecosystem from eutrophication, the wrong lesson to be learned from this study.

Also it is critical that any attempt to increase the available food resources for the smelt succeed in providing not just more plankton (or worse still maximizing a secondary metric associated indirectly with plankton), but more of the specific plankton size and food quality that the smelt requires. Plankton of the right size, but lower quality can lead to worsening fish body condition and make them more susceptible to other stressors (Allen *et al.* 2006; Mitra and Flynn, 2006). Plankton of the right quality, but smaller size can lead to the same problem because of the greater effort required to consume the same relative diet (loss of feeding efficiency). Rolke, 2000, gives an indication of how adaptive management might achieve the proposed combination of nutrients and ideal prey size.

RESTORATION IMPLICATIONS

The proceeding discussions have examined the potential risks, benefits, and challenges of applying adaptive management for a single species. Taken more broadly, the implications of

attempting adaptive management on a basin scale, without adequate science for the basic premise that underlies the *need* for a specific type of restoration (such as seasonal floodplain and shallow tidal habitat), and without management tools to reverse the effects, is a recipe for disaster.

Management action as simple as creating preferential flows for Delta smelt spawning, can potentially induce hybridization with longfin smelt. A management action that intends to improves habitat can readily have an opposite from intended effect for a target species: "However, if restored habitats are dominated by exotic fishes such as inland silversides, improvements in spawning could be offset by increased predation on delta smelt larvae(.)" (Bennett, 2005).

Other researchers have provided the same warning for competition issues: "With respect to these factors, the native delta smelt may be at a physiological disadvantage, particularly in habitats with suboptimal environmental conditions, and may be excluded from shallow-water habitat restoration sites, which are characterized by poor circulation, low flows, and more environmentally extreme conditions." (Swanson *et al.*, 2000)

Swanson, *et al.*, (2000) also provide the following warning: "Further habitat modifications, particularly those that exacerbate extreme environmental conditions, such as seasonal high temperatures in poorly circulated shallow waters, could inadvertently favor non-native species like the wakasagi and trigger an ecological time bomb that results in abiotic and/or biotic conditions that exceed the capacity of the delta smelt to persist within this system. (Swanson, *et al.*, 2000). When cautious scientists identify ecological "time bombs" and extinction in regards to a proposed action, politicians and resource managers should do everything in their power to ensure that the proposal is scientifically based, and approached as diligently as possible.

Even the fundamental ecological concepts used by the BDCP as the basis for restoration, and the proposed flooding of RD 999 and the Clarksburg community, go beyond the significant risk and uncertainty identified by the previously cited researchers, and enter the realm of speculation:

> "There are few quantitative data to suggest that restoration of tidal wetlands will substantially increase populations of native fishes. On a qualitative basis, there is some support for the idea that tidal wetland restoration will increase populations of some native fishes; however, the species deriving the most benefit from restoration might not be of great management concern at present." (Brown, 2003)

Brown, (2003[b]), further identifies in his seminal series of analyses:

> "Ecologically, DOC and POC that are derived from decomposing plant material appear to be of fairly low importance in supporting higher trophic levels. In contrast, DOC is very important for drinking water quality. Conceptually, minimizing DOC export from restored tidal wetlands would be beneficial; however, it is unclear how such reductions could be accomplished for large areas of tidal wetlands."

Brown is not alone in his analysis that seasonal flooding and shallow wetlands do not have a strong foundation of science to support its use for improving food availability for Delta fish, indeed the scientific data shows that Upper Delta nutrients are of low importance (Jassby *et al.*, 2002):

> "Second, although nutrient concentrations have increased over the past decades, they were already far above levels saturating phytoplankton growth in 1975.
>
> Why is Delta annual production low compared with other systems, given that nutrients are plentiful and the water column light utilization efficiency is high? Low biomass therefore probably plays a role in low production.
>
> Relatively high TSS is an additional reason underlying relatively low annual production."
>
> Nutrients in the Delta are usually far in excess of needs and unlikely to be a driving force."

Nutrients already saturate the system, and TSS, total suspended sediments are already very high and in fact play a part in suppressing internal Delta productivity. Why then would the BDCP promote even more nutrients in the Upper Delta? (Jassby *et al.*, 2002 continued)

> "It appears that the dissolved and detrital particulate organic carbon delivered to the Delta does not enter the planktonic food web to a significant degree even though it may support net microbial ecosystem metabolism.
>
> The combination of metabolic losses, recalcitrance of detrital POC, and short residence time combine to minimize the importance of riverine sources of particulate and dissolved organic carbon to Delta consumers…(.)
>
> These results suggest that incidental export of phytoplankton associated with water export from the Delta may be more important than originally thought. In the Delta,

> significant amounts of primary production are exported at the state and federal pumping facilities."

Given these data, simply providing in-river export, instead of taking the water from lower in the Delta could by itself significantly improve high-quality zooplankton resources for the smelt. Although, it could move X2 up gradient, and increase the influence of San Joaquin toxins. (Jassby *et al.*, 2002 continued)

> "The resulting primary producer biomass is consumed by higher trophic levels within tidal wetlands, exported to open water systems for consumption, or decomposes, possibly to the detriment of drinking water quality."

This citation is intended to provide a caution that an action may indeed benefit the main Delta's productivity, but lead to unintended water quality impacts to communities that draw their water from the Delta.

Finally the BDCP's own Independent Science Advisors Report (2007) identifies:

> "While habitat enhancement or restoration can theoretically benefit populations, these effects are difficult to quantify compared to direct mortality. Consequently, the measurable impact of habitat improvement on fish populations may be small, and the scale of restoration needed to achieve conservation goals through mitigation is likely very large. Moreover, the potential for success of large-scale restoration efforts is often uncertain."

When your own scientists warn that your "conservation measure" may be a small improvement, hard to measure, on a vast scale, with uncertain effect, why would you flood a vibrant community with productive farms and valuable intact terrestrial and riparian habitat?

Summary

The existing science either provides cautionary notes or does not support the BDCP premises that flooding will benefit the Covered species' food needs. This uncertainty requires adaptive management and a solid scientific foundation to ensure the success of the actions or mitigate impacts to the residents and other water users of the Delta. The science does provide evidence that the BDCP's various proposals to flood RD 999 and Clarksburg can make ecological conditions worse, at high-risk, and low certainty.

CONCLUSIONS

RD 999 has significant concerns that the BDCP process has failed to adequately: assess the current ecological conditions, base its proposal on the available science, develop realistic alternatives, assess likely project impacts, and avoid before it mitigates for foreseeable impacts, or identify cumulative impacts.

A thorough scientific analysis is required to understand site specific, watershed and cumulative impacts of the BDCP and its various alternatives before those actions take place, not after.

It is our hope that the BDCP rely more on its technical advisors and its consultants, and specifically that the BDCP legitimize its efforts by following a developed framework, such as the DOI's Adaptive Management (2007), including the public participation component; and, learn from existing, mature processes including PRBO's Adaptive Conservation Planning.

REFERENCES

Allen, L. G., D.J. Pondella, M.H. Horn. 2006. The Ecology of Marine Fishes: California and Adjacent Waters. University of California Press.

Anderson, J. L., R. W. Hilborn, R. T. Lackey, and D. Ludwig. 2003. Watershed restoration: Adaptive decision making in the face of uncertainty. In: Wissmar, R. C., and P. A. Bisson (eds.) Strategies for Restoring River Ecosystems: Sources of Variability and Uncertainty in Natural and Managed Systems. Bethesda, MD: American Fisheries Society.

Bennett, B. 2005. Conceptual Model - Delta Smelt -A Contribution for the CBDA Ecosystem Restoration Program. Available online at: http://www.delta.dfg.ca.gov/GIS/erip/Con_ds1_default.asp

Bennett, W.A. and P.B. Moyle. 1996. Where have all the fishes gone? Interactive factors producing fish declines in the Sacramento-San Joaquin estuary. J. T. Hollibaugh (ed.) San Francisco Bay: The Ecosystem, Further Investigations into the Natural History of San Francisco Bay and Delta With Reference to the Influence of Man. Pacific Division, American Association for the Advancement of Science, Pacific Division. 519-542.

Brown, L.R. 2003. Will Tidal Wetland Restoration Enhance Populations of Native Fishes? In: L. R. Brown, (ed.) Issues in San Francisco Estuary Tidal Wetlands Restoration. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1 (October 2003), Article 2. Available online at http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art2

Brown, L.R. 2003[b]. Potential Effects of Organic Carbon Production on Ecosystems and Drinking Water Quality. In: L. R. Brown, ed. Issues in San Francisco Estuary Tidal Wetlands Restoration. San Francisco Estuary and Watershed Science. Vol. 1, Issue 1 (October 2003), Article 3. Available online at http://repositories.cdlib.org/jmie/sfews/vol1/iss1/art2

Conservation Biology Institute (CBI Authors unknown), 2006 Comparative Review of Governance Structures for Ecosystem Management. 25 pg. Available online at: http://www.dfg.ca.gov/habcon/nccp/publications.html

Cheek, K., and E. Ringelberg. 1999. Rural Community Collaborations in Natural Resource Management, a Case Study in Western Montana. The University of Montana. (Manuscript)

Chess, D.W. and J.A.Stanford. 1998. Comparative energetics and life cycle of the opossum shrimp (*Mysis relicta*) in native and non-native environments Freshwater Biology, Blackwell Publishing. Volume 40, Number 4, December 1998, pp. 783-794

Crowfoot, J. E., J. M. Wondolleck (and eds.) 1990 Environmental Disputes: Community Involvement in Conflict Resolution. Island Press. 295 pp

de Nie, H. W. 1987. The decrease in aquatic vegetation in Europe and its consequences for fish populations (1987) EIFAC Occasional Papers EIFAC/OP19 1987 52 pp

Elliott, G., M. Chase, G. Geupel, and E. Cohen. 2008. Developing and Implementing an Adaptive Conservation Strategy: A guide for improving adaptive management and sharing the learning among conservation practitioners. PRBO Conservation Science.72 pp. Available online at http://www.prbo.org/cms/docs/consplans/ACSGUIDEweb.pdf

Foe C and A. Knight. 1985. The effect of phytoplankton and suspended sediment on the growth of *Corbicula fluminea* (Bivalvia). Hydrobiologia 127: 105-115.

Gunderson, L. 1999. Resilience, flexibility and adaptive management—Antidotes for spurious certitude? Conservation Ecology 3(1):7. Available online at *http://www.consecol.org/vol3/iss1/art7*,

Jassby, A.D., J.E. Cloern, and B.E. Cole. 2002. Annual primary production: Patterns and mechanisms of change in a nutrient-rich tidal ecosystem by the American Society of Limnology and Oceanography, Inc. Limnol. Oceanogr., 47(3), 698–712.

Johnson, B.L. 1999. The Role of Adaptive Management as an Operational Approach for Resource Management Agencies. Conservation Ecology 3(2):8. Available online at *http://www.consecol.org/vol3/iss2/art8*,

Kimmerer, W. J. 2002. Effects of freshwater flow on abundance of estuarine organisms: physical effects or trophic linkages. Marine Ecology Progress Series 243:39-55.

Lee, K.N. 1999. Appraising Adaptive Management. Conservation Ecology 3(2):3. Available online at *http://www.consecol.org/vol3/iss2/art3*,

May, B. 1996. Identification of Smelt Species and Their Interspecific Hybrids in the Sacramento-San Joaquin Estuary by Allozyme Analysis. Interagency Ecological Program. Available online at http://iep.water.ca.gov/report/newsletter/1996summer/96sum06.html

McLain, R.J. and R.G. Lee. 1996. Adaptive management: Promises and pitfalls. Environmental Management 20: 437-438.

Mitra A. and K.J. Flynn Accounting for variation in prey selectivity by zooplankton. Ecological Modelling. Volume 199, Issue 1, 1, Pages 82-92.

National Research Council (NRC). 2004. Adaptive Management for Water Resources Project Planning. Panel on Adaptive Management for Resource Stewardship, Committee to Assess the U.S. Army Corps of Engineers Methods of Analysis and Peer Review for Water Resources Project Planning, National Research Council. National Academies Press. 138pp.

Orsi, J.J. and W.L. Mecum. 1996. Food limitation as the probable cause of a long-term decline in the abundance of *Neomysis mercedis* the opossum shrimp in the Sacramento-San Joaquin Estuary. In: JT. Hollibaugh (ed.) *San Francisco Bay: The Ecosystem.* San Francisco: Pacific Division, AAAS, California Academy of Sciences. Pg 375–401.

Pace, M.L., S.E.G. Findlay, and D. Fischer. 2002. Effects of an invasive bivalve on the zooplankton community of the Hudson River Freshwater Biology Volume 39 Issue 1, Blackwell Publishing Ltd. Pg 103 – 116.

Phelps H. 1994. The Asiatic Clam (*Corbicula fluminea*) invasion and system-level ecological change in the Potomac River estuary Washington, DC. Estuaries 17: 614-621.

Pollak, D. 2001. The future of habitat conservation? The NCCP experience in Southern California. Part 2 of a Series. http://www.library.ca.gov/crb/01/09/01-009.pdf

Regan, H.M., M. Colyvan, and M.A. Burgman. 2002. A taxonomy and treatment of uncertainty for ecology and conservation biology. Ecological Applications 12: 618-628.

Ringelberg, E. 2002. Stakeholder Involvement in Department of Energy Decision Making: A Stakeholder's Perspective, Spectrum, International Conference on Nuclear and Hazardous Waste Management. American Nuclear Society.

Rolke, D.L. 2000. Copepod food-quality threshold as a mechanism influencing phytoplankton succession and accumulation of biomass, and secondary productivity: a modeling study with management implications. Ecological Modelling. Volume 134, Issue 2, 3, Pg 245-274.

Shindler, B. and K.A. Cheek. 1999. Integrating Citizens in Adaptive Management: A Propositional Analysis. Conservation Ecology 3(1): 9. Available online at http://www.consecol.org/vol3/iss1/art9,

Spencer, C.D. Potter, R. Bukantis, and J. Stanford. 1999. Impact of predation by *Mysis relicta* on zooplankton in Flathead Lake, Montana, USA. Oxford University Press Journal of Plankton Research, Vol 21, 51-64.

Swanson, C., T. Reid, P.S. Young, and J.J. Cech Jr. 2000. Comparative environmental tolerances of threatened delta smelt (*Hypomesus transpacificus*) and introduced wakasagi (*H. nipponensis*) in an altered California estuary. Oecologia, Springer Berlin / Heidelberg. 123:384-390.

United States General Accounting Office (GAO). 2003. South Florida Ecosystem Restoration: Task Force Needs to Improve Science Coordination to Increase the Likelihood for Success. GAO-03-345. Washington, DC: Government Printing Office.

Wales, J.H. 1962. Introduction of pond smelt from Japan into California. California Fish and Game. 48(2):141-142.

Walters, C.J. 1997. Challenges in Adaptive Management of Riparian and Coastal Ecosystems. Conservation Ecology 1(2):1. Available online at *http://www.consecol.org/vol1/iss2/art1*,

Williams, B.K., R.C. Szaro, and C.D. Shapiro. 2007. Adaptive Management, The US Department of the Interior Technical Guide. Adaptive Management Working Group (AMWG). U.S. Department of the Interior, Washington, DC.

Wondolleck, J.M. and S.L. Yaffee, 2000. Making Collaboration Work: Lessons from Innovation in Natural Resource Management. University of Chicago Press 280 pp.

EXHIBIT C

Wallace Kuhl
& ASSOCIATES INC

Bay Delta Conservation Plan
Terrestrial Species and Habitats
Areas of Concern to Reclamation District 999

Draft Comments 9//27/08

Reclamation District 999
38563 Netherlands Road
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Wallace Kuhl
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Bay Delta Conservation Plan
Terrestrial Species and Habitats
Areas of Concern to Reclamation District 999
Draft Comments 9//27/08

Reclamation District RD 999 (RD 999) has been a Delta land steward for almost a century and supports ecological restoration. Many people in the region remember our installation of innovative fish screens[1] on the Sacramento River, and our strong support of vegetated levees for fish and wildlife habitat. RD 999 also has obligations as a water provider for thousands of acres of farmland in the Clarksburg area.

However, ecological restoration means many different things to many people, and for each species of concern. RD 999 is proud of the many miles of contiguous riparian forest in its district and its high density of raptors, including Swainson's hawks. The landscape of the district is a series of farms, with wooded streams and sloughs. Understandably, this is a highly productive agricultural environment, but it is also a mix of terrestrial, riparian, and emergent wetland habitats that a relatively intact given the adjacent cities.

RD999 has the following questions and concerns associated with the proposed restoration efforts and requests that the terrestrial team provide analysis and responses to them. These are not our only concerns regarding the project, but we feel that these are those that bear scrutiny by this panel of experts at this time.

The Clarksburg community and its district feel that they have protected their environment, and do not want that replaced with seasonal wetlands or permanent marshes.

Specifically:

1. Clarksburg does not want to exchange its existing terrestrial habitat for a proposed future aquatic landscape.
    a. Where is the analysis that demonstrates that there will be equally functional terrestrial habitats to replace those lost in the proposed flooding? What patch sizes, in what geometry, at what time scales?

[1] http://fwafishforum.com/current_999.htm

b. How is it reasonable or legal to trade off one threatened ecosystem, lowland riparian forest, for seasonally flooded weeds, as is found in the upper Yolo Bypass?
c. How is it reasonable to fragment riparian forest for the hope that a new wetland will help the Delta smelt? Given the very mixed history of restorations of similar sites in the San Joaquin watershed, or Prospect Island for that matter, there is far more evidence that this hope will never be met.
d. Where is the supporting science that a fully functional aquatic ecosystem can be/will be created in these locations? What sizes of restoration projects of both riparian forest which will be lost and seasonal floodplain have been demonstrated to function in this region, and by which metrics?

2. There has been no systematic effort to identify rare terrestrial plant species which may occur in the proposed restoration areas. Indeed Westlands and its consultant identified that they had specific plans to convert areas that are currently uplands to tidal marsh without having first completed rare plant surveys.
    a. What systematic, watershed level analysis of listed plant and animal species has been completed for the proposed "restorations"?

3. Projects like this have impacts at both the site scale, where a given restoration is proposed, and at a watershed scale.

    Site Scale Issues

    a. What were the historic uses for the site, which chemicals were used at the site, how were they tested for, and what concentrations to they have currently? This is important for both fills brought to raise restoration elevations, and for material taken off the site and used to create uplands at another location. Specifically, what are the arsenic, lead, and mercury levels of fill materials?
    b. Seasonally flooded soils in the area have been identified as significant sources of elevated mercury and have been associated with ***creating*** significantly elevated levels of methyl mercury. The projects have the very real potential to create new methyl mercury sources that jeopardize reproductive success and neurological development of both aquatic and terrestrial species. Nobody wants the Delta to become the Kesterson for mercury. How will methyl mercury formation be assessed (Which species, when, how?), and how will it be managed?

Watershed Scale Interactions

a. What are the fragmentation effects for piecemeal habitat type conversions of the proposed locations?
b. What are the cumulative effects of the loss of the existing habitats, given their landscape position and patch size?
c. What are the cumulative effects of the fragmentation of the existing terrestrial habitat through the proposed actions?

These questions are not rhetorical. The district has significant concerns that the BDCP process has failed to explore the nature and extent of potential impacts to existing terrestrial systems. A thorough scientific analysis is required to understand, site specific, watershed and cumulative impacts of the BDCP and its various alternatives.

EXHIBIT D

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Bay Delta Conservation Plan
Mercury Issues

Draft January 30, 2009

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BDCP MERCURY ISSUES- DRAFT

Summary
The proposed Bay Delta Conservation Plan (BDCP) "conservation measures" may include flooding significant portions of Reclamation District RD 999 (or District). The District believes that the BDCP's own documentation, as well as that from independent scientific experts, identifies that the proposed seasonal flooding would lead to a significant *new* threat, mercury methylation, to terrestrial and aquatic wildlife, and exacerbates a well-documented human health threat.

From the District's perspective, it is critical that Conservation Measure FLOO2.1 (aka WOCM3: Deep water Ship Channel Bypass; and, "flooding any ROA") is intended to provide additional seasonal wetland habitat and primary production-associated nutrients, (and occasionally and ironically flood benefits) is removed, and that any proposed new flooding be re-assessed for its value as a Conservation Measure. The following is a description of the key elements of the BDCP proposal regarding these issues.

Methylmercury and Wetland Creation
The BDCP has identified mercury, particularly methylmercury (MeHg) as an important "other stressor" under Conservation Measure TOCO3 Reduce the Load of Methylmercury Entering Delta Waterways by __ Percent from 200_ Levels[1]. The need for effective mercury control is of singular priority in this watershed due to excessive levels resulting from historic mercury mining (cinnabar) on the Coastal Range and gold mining on the Sierra range. The severity of this threat from MeHg to this watershed is so significant that there are specific mercury management plans, including the Central Valley Regional Water Quality Control Board's Draft Sacramento-San Joaquin Delta Methylmercury TMDL[2]

Beyond the current State and Federal water quality standards based on human health concerns, the mercury levels are high enough in the watershed that many water bodies have fish consumption advisories, and there is significant evidence that organisms higher in the food chain are facing both acute and chronic effects from mercury[3]. Because of the risk from methylmercury to people and wildlife, University of California Davis and the Moss Landing Marine Laboratories, among others have focused thousands of hours on research in this watershed[4].

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[1] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #4
[2] Sacramento-San Joaquin Delta Methylmercury TMDL
[3] Tideline [v. 27, no. 2]; http://soundwaves.usgs.gov/2007/10/research.html
[4] Mercury Strategy for the Bay-Delta Ecosystem: A Unifying Framework

The District lauds the BDCP for taking on this issue and supports in concept the proposed Conservation Measure actions:

> "Four primary actions could be supported: (1) Modify the Cache Creek settling basin to improve mercury and sediment trapping efficiency, (2) remediate inorganic mercury sources upstream of the Delta, including mercury contaminated sediment "hot spots" in stream channels and mercury and gold mines, (3) avoid or minimize transport of loads of methylmercury entering the Delta from floodplain and intertidal marsh restoration actions by the BDCP, and (4) work with the Central Valley Regional Water Quality Control Board to identify best management practices for other sources of methylmercury."

However, the District is concerned on two levels. The first concern is that the BDCP has failed to engage the groups already working on and directly associated with the science and management of both mercury and the proposed primary actions. The second concern, which will be the emphasis of the latter part of this comment, is that the BDCP fails entirely to identify that its proposed Conservation Measure FLOO2.1, flooding the Clarksburg Bypass and lower reaches of the District, would directly contribute to violating the proposed Water Board guidance for MeHg, and would likely reverse the benefits of this positive Conservation Measure (TOCO3).

BDCP Engagement of Outside Experts

The Delta Tributaries Mercury Council has scientific representation from state and federal agencies, local watershed groups, and consulting scientists. This group has identified that seasonal flooding of the existing bypass and BDCP proposed flooding of new bypass(es) and restoration areas, may exacerbate MeHg production and pose new threats for Delta wildlife exposure[5]. Members of the Council have also discussed how the Cache Creek settling basin may in fact not be an effective sediment trap for mercury-impacted sediment size classes[6]. To date the BDCP has not asked for counsel from or engaged this group.

The Cache Creek Technical Assistance Committee (committee) advises Yolo County on issues pertaining to the Cache Creek Resource Management Area. The committee, comprised of experts in hydrology, geomorphology and ecology, sponsors research on mercury impacts to the watershed. The committee is active in the planning of restoration and managing the ecological

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for Science, Adaptive Management, and Ecological Restoration (Wiener, Gilmour, and Krabbenhoft, 2003) http://www.science.calwater.ca.gov/pdf/MercuryStrategyFinalReport.pdf

[5] December 2, 2008 DTMC Meeting

[6] December 2, 2008 DTMC Meeting (Disagreement between RWQCB staff and Scientists see also Pg 37. CALFED Final Report, Task 2, Methylmercury.

consequences of mercury impacts from one of the primary sources of mercury loading in the watershed. To date, the BDCP has not asked for counsel from or engaged this group.

MERCURY RISK GENERATED BY FLOODING CLARKSBURG AREA

BDCP's Perspective

Flooding the Clarksburg bypass (aka WOCM3: Deep water Ship Channel Bypass; "flooding any ROA"; aka FLOO2.1) is intended to provide additional seasonal wetland habitat and primary production-associated nutrients, (and occasionally and ironically flood benefits)[7]. The unintended *but certain* effect of flooding this area is increased MeHg production and increased MeHg loads to the Delta. The degree of increase is of course uncertain, as mercury chemistry is relatively complex, but the relative comparison to the adjacent Yolo Bypass provides a good indication of what can be expected:

> "The largest sources of methylmercury to the Delta are flux from wetland and open water sediments within the Delta and Yolo Bypass (~35% of total load) and upstream tributaries (~58% of total load)[8]."
>
> "(P)otential for increasing mercury methylation and resuspension and downstream transport of other contaminants;[9]"
> **"Uncertainties/risks:** Methylation of mercury may occur in seasonally inundated floodplains and intertidal zones, making methylmercury bioavailable to plants, fish, and wildlife in and downstream of the floodplain (Alpers et al. 2006). Mercury loading from Cache and Putah Creeks and exposure to agricultural pesticides and herbicides may adversely affect habitat productivity.[10]"

And again,

> "(P)otential for increasing mercury methylation and resuspension and downstream transport of other contaminants; and potential for short-term mobilization of toxic compounds from newly inundated agricultural lands.[11]"
>
> **"Uncertainties/risks:** Methylation of mercury may occur in seasonally inundated floodplains and intertidal zones, making methylmercury bioavailable to plants,

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[7] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #3 pg. 9, 11
[8] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #4 pg. 30
[9] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #3 pg. 8
[10] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #3 pg. 9
[11] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #3 pg. 14

fish, and wildlife in and downstream of the floodplain (Alpers et al. 2006). Exposure to agricultural pesticides and herbicides may impact habitat productivity in the first few periods that the restored floodplain is inundated."[12]

Other researchers have rearticulated these vague uncertainties and defined these links between flooding and mercury methylation for the Yolo Bypass and the Delta:

"Wetland restoration and inundation of floodplains: Potential changes in the extent of methylmercury-producing habitat and in food-web structure. Wetland habitats are known to support high rates of microbial methylation (St. Louis et al. 1994, Gilmour et al. 1998, King et al. 1999), and initial data show that some Delta marshes produce and export methylmercury (Gill et al. 2002, Slotton et al. 2002a). However, wetland and floodplain habitat varies greatly across the salinity gradient in the estuary, and little is known about the relative rates of methylmercury production and export across these habitat types. Shallow sediments and flooded soils are also potentially important sites of methylmercury production (Hall et al. in press). Habitat changes resulting from wetland restoration and seasonal floodplain inundation could also influence food-web structure, affecting exposure to and bioaccumulation of methylmercury in organisms atop aquatic food webs (Wiener et al. 2003).

Environmental Justice. The Ecosystem Restoration Program includes environmental justice concerns as a program priority. Ecological restoration in a mercury-contaminated ecosystem could affect methylmercury production, increasing methylmercury contamination of food webs and exposure of biota, including humans. Thus, the issue of methylmercury-contaminated fish also raises concerns about environmental justice, given that certain ethnic and socioeconomic groups of humans can be disproportionately exposed to contaminants in fish via their high rates of fish consumption (National Environmental Justice Advisory Council 2002), a situation considered probable in the Delta and its tributaries." [13].

The California Regional Water Quality Control Board's (CRWQCB) Perspective:

"Using data published before the April 2008 hearing, staff estimated that about 5% of overall tributary mercury loading to the Delta results from modern point sources (e.g., NPDES urban and facility discharges) and about 65% results from

[12] Bay Delta Conservation Plan Steering Committee Meeting October 31, 2008 Handout #3 pg. 14
[13] Wiener, Gilmour, and Krabbenhoft, 2003

naturally mercury-enriched soils, atmospheric deposition, and geothermal springs. The remaining 30% likely comes from historic mining activities[14]."

"Of the approximately 400 kilograms (kg) total mercury that enters the Delta each year, about 2.2 kg is methylmercury[15]."

The CRWQCB comments specifically to the point of the BDCP's proposed flooding regime for the Yolo Bypass:

"Background mercury loading is high enough that even if legacy mercury in the tributary watersheds were reduced to zero, methylmercury concentrations in Delta waters and fish would be expected to be elevated in some areas of the Delta, such as the Yolo Bypass[16]."

"The Yolo Bypass is an area with high methylmercury production. Routing more flood flows down the Yolo Bypass or keeping the Yolo Bypass flooded for longer periods may increase methylmercury production and discharge. Additionally, new reservoirs created in mercury-enriched areas have been shown to increase methylmercury levels in fish in the reservoirs.

For these three reasons (salinity control, additional bypass flooding, and new reservoir creation), staff recommends that the agencies responsible for water management activities be required to evaluate methylmercury production if changes are made to current water management operations."

"Changes are defined in the proposed Basin Plan amendment as new or modified weirs in the Yolo Bypass, changes to the current Central Valley Project – Operation Criteria and Plan (OCAP, June 2004), new or expanded reservoirs, and changes to water storage and release schedules.

And to the flooding proposed for the Delta:

"Given how much wetland restoration is planned in the Delta and Yolo Bypass, it may be difficult, if not impossible, to achieve safe fish mercury levels for wildlife

[14]http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/cvwb_hearing_apr08/25nov08_hearing_rtc.pdf
[15]http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/cvwb_hearing_apr08/25nov08_hearing_rtc.pdf
[16]http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/central_valley_projects/delta_hg/cvwb_hearing_apr08/25nov08_hearing_rtc.pdf

> in all areas of the Yolo Bypass and Delta if the control program does not address methylmercury production by wetlands."
>
> "Much of the restoration is expected to take place in the Yolo Bypass, which is directly downstream of Cache Creek, a major source of inorganic mercury to the Bypass. When flooded, the Bypass has some of the highest mercury concentrations measured in fish in the Central Valley. If the Delta program does not include controls for methylmercury production in wetlands (at the same time it addresses legacy mercury from upstream), fish within or downstream of the wetlands may become more contaminated. The 2000 CalFed Record of Decision found that extensive restoration efforts in the Delta have the potential to increase exposure of people and wildlife to methylmercury and that methylmercury mitigation should be developed for wetlands prior to their construction."

The CRWQCB comments do not *preclude* flooding or specific flooding regimes, and they specifically support wetlands, but they indicate that the assumptions about potential benefits be examined carefully (A position the District also supports.):

> "The proposed methylmercury control program purposely does not prevent wetland projects from moving forward.
>
> "Phase 1 studies may show that methylmercury production in some wetlands cannot be controlled without impacting habitat function. At the end of Phase 1, then, the Board may find that the benefits of particular wetlands or wetland types outweigh the detrimental effects of methylmercury management and determine that those wetlands are exempt from implementing methylmercury control projects. Alternatively, the Board may find that reductions in methylmercury from wetlands are feasible and should be required."

The CRWQCB also identifies the obvious, but heretofore ignored by the BDCP, issue of environmental justice that was also raised by the independent researchers cited earlier[17]:

> "Finally, there is an environment justice concern that allowing some discharges to increase while focusing remediation efforts in other watersheds will disproportionately affect disadvantaged communities that fish near a discharge point. Environmental justice stakeholders have said that dischargers must first

[17] Wiener, Gilmour, and Krabbenhoft, 2003

> show that they have done everything possible to meet permit requirements in their effluent before being allowed to comply using an offset. Environmental justice stakeholders oppose offset programs that would allow pollution reduction efforts to focus elsewhere, while allowing the discharger to continue or increase its pollutant load. Staff recommends that all methylmercury dischargers, public and private, have the opportunity to pursue offset projects once they have evaluated the feasibility of on-site methylmercury controls."

Methylmercury Threat Assessment

The BDCP proposes seasonally flooding between 2,000 and 5,000 new acres in the Clarksburg area under this Conservation Measure, equivalent to between 4% and 10% of the approximately 50,000 acres[18] (CALFED 59,000[19]) of the Yolo Basin.

The area proposed for flooding by the BDCP is predominately rural. This area was at one time directly connected to the Yolo Bypass before the construction of the Deep Water Ship Channel levees in 1963). Presumably, there was a direct run-on to this area from bypass floods. On the Sacramento River side of the District, the levee system was not fully closed until 1918, making it accessible to the high levels of mercury from the upper watershed and the Sierras as well. The assumptions made for the calculations will be based on the average for the Yolo Bypass as the best surrogate for the similarity of soil types and proposed flooding frequencies.

> "Daily average Hgp [at X2] estimated thus varied from 1.8 ng/l to 99.9 ng/l. The flow weighted mean concentration for that period was estimated to be 13.2 ng/l. Daily loads ranged from <1 kg to 65 kg. Annual loads varied from 162±36 kg to 701±154 kg and averaged 435±96 kg for the 6-year period (Table 1)."[20]

> "Water exiting the Bypass at Prospect Slough has the second highest average unfiltered methyl mercury concentration of any channel in the Delta (0.26-ng/l, Table 2). All but four monthly measurements were made with no water spilling over the Fremont Weir. Average monthly methyl mercury concentrations increase statistically when the Bypass is used for flood conveyance (0.25 to 0.70-ng/l, $P<0.01$). More importantly, the Yolo Bypass can become the single largest source of methyl mercury to the Delta (Table 4)."[21]

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[18] http://www.yolobasin.org/text/chapter_4.pdf
[19] http://mercury.mlml.calstate.edu/wp-content/uploads/2008/10/04_task2mmhg_final.pdf
[20] http://mercury.mlml.calstate.edu/wp-content/uploads/2008/10/05_task2thg_final.pdf
[21] CALFED Final Report, Task 2, Methylmercury , http://mercury.mlml.calstate.edu/wp-content/uploads/2008/10/04_task2mmhg_final.pdf

This independent assessment clearly identifies that when the Yolo Bypass is used for flood conveyance, the MeHg concentration increases 180% over the non-flood condition flow. The Yolo Bypass data is a good starting point, although the statistical issues associated with the sampling, and the possibility of non-linear interactions at moderately low flows (0-35,000 cubic feet per second [cfs]) require more analysis.

Using "first-cut" estimations, given the historic exposure of the District from both Yolo Bypass and Sacramento River flows, the area proposed for flooding by the BDCP is in the 4-10% range for the Yolo Bypass, or 0.08- 2.8g day MeHg for the 2,000 acre proposed bypass and 2-7g/day MeHg for the proposed 10,000 acre bypass, which also coincides closely to the approximately 8 g/day MeHg extrapolated from Figure 32 for the Yolo Bypass at 10,000 cfs.

While the degree and extent of existing mercury within the proposed Clarksburg bypass is unknown, its confluence between two mercury rich systems, the Yolo Bypass and the Sacramento River is well-described. Seasonal wetlands created from similar or identical soils in the Yolo Bypass have demonstrated exceptional methylation potential and efficiency, and there is limited research and no practical model available to show how this methylation, and consequent increase in MeHg load on the Delta could be mitigated for. There is also no recognition by the BDCP of the incremental and cumulative effects on the basin's TMDL, which is already excessive and a major challenge; already impacted wildlife, such as the California least tern and bank swallow, as well as other higher trophic order species such as the California clapper rail, giant garter snake, and Swainson's hawk.

Mercury as Other Stressor

The Conservation Measure focus has apparently changed to the potential risks associated with the exposure of MeHg to fish as a stressor (OSCM3[22]). As many fish are robust to observable effects from MeHg at the typical watershed concentrations, it is likely that MeHg is not a significant "other Stressor" but is likely, as described above, a contaminant exacerbated by direct and indirect effects of the BDCP, as well as other "Conservation Measures." Given the challenges of field concentration measurements and effects measurements, the potential for a false negative on effects is quite high. A thorough power analysis and sampling and analysis plan would be required to even attempt this question. Further, the "Conservation Measure" inappropriately places the burden for the implementation and monitoring on the CVRWQCB, they regulatory agency.

[22] Fifth Draft Other Stressors Conservation Measures (May 1, 2009)

CONCLUSION

The BDCP's proposed efforts to reduce mercury are a valuable first step in the right direction, and certainly prioritization of efforts to reduce Delta mercury loads and methylation in general would be beneficial. But these efforts must be done in concert with local and regional experts and existing programs. More importantly, it is critical for the health of the Delta that the BDCP's well-intentioned restoration efforts do not themselves create a scenario similar to the Kesterson Reservoir on a vast scale for a variety of listed and non-listed species, and the people who rely on the Delta for subsistence.