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Subject:	comments on Draft EIR
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Attachments:	Comments on Delta Plan Draft EIR.pdf Pyke Remarks on Delta Plan EIR.pdf Pyke Comments on First Staff Draft.pdf Pyke Comments on Second Staff Draft.pdf Pyke Comments on Third Staff Draft.pdf

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I am attaching comments on the Draft EIR with an emphasis on Section 5. My comments on the NOP and the First, Second and Third Drafts of the Delta Plan are incorporated by reference and are also attached.

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Comments on the Delta Plan Draft EIR with an Emphasis on Section 5, Delta Flood Risk

By Robert Pyke, Ph.D., G.E.[1]

Introduction

Section 5 of the Draft EIR purports to evaluate the significance of potential environmental impacts of "the project", i.e. the 5th Staff Draft of the Delta Plan, with five alternatives – the "no project" alternative and four other alternatives, known as Alternatives 1A, 1B, 2 and 3, relative to Delta flood risk. While this section might also be presumed to apply to flooding of Delta islands and tracts due to earthquakes and possible sea-level rise combined with tidal flows in addition to flooding due to precipitation and run-off within the Delta's catchment area, neither the 5th Staff Draft nor the Draft EIR adequately address these issues. While the Draft EIR contains a whole section, Section 21, on Climate Change and Greenhouse Gas (GHG) Emissions, this focusses on reduction of GHG emissions using such measures as increasing tire pressures and fails to address the significant environmental consequences of widespread flooding in the Delta as a consequence of potentially more rapid sea level rise.

A description of the types of projects, facilities, or outcomes that may result from the Delta Plan's policies and recommendations in each of the following five issue areas are provided in Section 2A of the Draft EIR:

- Reliable Water Supply
- Delta Ecosystem Restoration
- Water Quality Improvement
- Flood Risk Reduction
- Protection and Enhancement of Delta as an Evolving Place

However, the project description in Section 2A fails the basic test of having a project description that meets both the requirements of CEQA and the requirements of the Delta Reform Act of 2009, which states that the Delta Plan should include measures to simultaneously improve water supply reliability and to restore the Delta ecosystem, while protecting and enhancing the Delta as a Place. Specifically, in Water Code Section

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85308 (b), the Act requires that the Plan "include quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan". While the 5th Staff Draft includes listings of possible "performance measures" in partial satisfaction of the requirements of Water Code Section 85211, it includes no "quantified or otherwise measurable targets" except for the surprising requirements that "total agricultural acreage and gross revenue in the Delta will be maintained or increased in the future" , "total annual gross revenue, adjusted for inflation or deflation, from Delta recreation activities will be maintained or increase", and "annual visitation and total annual gross revenue, adjusted for inflation or deflation, from ecotourism and agritourism will be maintained or increased". At least the first two, and possibly all three of these three requirements, in addition to other common-sense arguments such as the need to protect the very significant investment in infrastructure, including but not limited to the existing water conveyance system, that passes through the Delta, necessitate an aggressive program to maintain and improve Delta levees in the face of the hazards posed by floods, earthquakes and possible sea-level rise. Such a program would have a significant beneficial impact on Delta flood risk that would dwarf the impact on flood risk of all other possible actions that might be taken under the Delta Plan. However, the 5th Staff Draft includes no such program. And, the 5th Staff Draft contains no integrated program to address both water supply reliability and ecosystem restoration largely leaving that to the Bay Delta Conservation Plan. And, while the 5th Staff Draft places admirable emphasis on promoting statewide water conservation, water use efficiency, and sustainable water use and on reducing reliance on the Delta in meeting California's future water supply needs by investing in improved regional self-reliance and these other good things, it does not come to grips with the fact that reduced reliance on the Delta does not necessarily mean reduced water exported from, through, around or under the Delta. I have suggested elsewhere how, with exports intakes in the Western Delta and additional South of Delta storage, long-term water exports might be held steady at the higher levels of the last decade or even increased, while at the same time the stress on the Delta is reduced. While I have never expected that the Delta Plan would endorse my solution to this problem, or any other specific solution, I believe that as a minimum the Delta Plan can and should specify ranges of exports and through Delta flows that are acceptable in terms of meeting the co-equal goals in order to guide the

BDCP or any other combined conveyance and ecosystem restoration program. Any additional mitigations that might be required under CEQA should also be spelled out.

The Proposed Project with Respect to Delta Flood Risk

What the 5th Staff Draft does include are four "policies" related to flood risk as follows:

RR P1 Floodways shall not be encroached upon nor diminished without mitigating for future flood flows. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities unless they significantly decrease the existing level of flood protection.

RR P2 The following areas shall not be encroached upon because they are critical floodplains and may also provide ecosystem benefit. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities, or maintenance and repair of existing infrastructure, unless they significantly decrease the existing level of flood protection. Then three areas are spelled out: areas located in the Yolo ByPass; the Consumnes River – Mokelumne River Confluence; and the proposed Lower San Joaquin River Bypass.

RR P3 Covered actions in the Delta must be consistent with Table C-2. Table C-2 sets minimum standards for various classes of levees. These are not particularly forward-looking. Section 2A of the Draft EIR indicates that "The Proposed Project requires the use of more stringent levee design criteria (RR P3) for structures in non-urban areas (defined as communities of less than 10,000 per Government Code section 65865.5(a)(3)) located outside of the legacy communities of Freeport, Clarksburg, Courtland, Hood, Locke, Walnut Grove, Isleton, or Ryde, not including developments of less than five parcels. In order for major development in these areas to be consistent with the Proposed Project, the non-urban areas located outside of the legacy communities would be required to increase the level of flood protection from 100-year flood protection to 200-year flood protection. The Proposed Project encourages the development of specific flood protection plans for legacy communities (RR P3)", but the wording of Table C-2 indicates that the 200-year flood protection requirement is intended to discourage development and protect "lands that are or could be used for agriculture and/or ecosystem (sic)" rather than being part of a comprehensive approach to minimizing flood and earthquake risk.

RR P4 Prior to the completion of the Department of Water Resources' A Framework for Department of Water Resources Investments in Delta Integrated Flood Management, guidelines for the Delta Levee Special Flood Control Projects and Subventions programs shall be used to determine consistency of projects using state funds with the Delta Plan. This Framework shall be completed by the Department of Water Resources, in consultation with the Central Valley Flood Protection Board and Delta Stewardship Council, by January 1, 2013. Upon completion, the Framework shall be considered by the Delta Stewardship Council for adoption to direct State investments for levee operation, maintenance, and improvements in the Delta. If this Framework is not completed by January 1, 2013, the Delta Stewardship Council will define a strategy for State investments. However, the draft Framework basically abdicates the State's responsibility to maintain and improve levees to at least the Delta-specific PL 84-99 standard which has otherwise been the agreed policy of the State and federal governments for 30 years, and thus exposes the State to significantly increased "Paterno" liability [2]. Between RR P3 and RR P4 the 5th Staff Draft can only be said to be backwards-leaning rather than forwards-leaning.

Thus the four "policies" fail to address the need for an aggressive program to maintain and improve Delta levees in the face of the hazards posed by floods, earthquakes and possible sea-level rise as suggested in my comments dated February 21, 2011 on the 1st Staff Draft and subsequently spelled out in more detail in the Economic Sustainability Plan adopted by the Delta Protection Commission. And, in the absence of such a program the Delta Plan and the Draft EIR fail to provide mitigation for the negative consequences of doing little or nothing to address Delta Flood Risk.

The 5th Staff Draft also includes 12 recommendations to the legislature or other agencies regarding flood risk reduction. While the draft EIR acknowledges that "*it is uncertain whether the agencies will follow the recommendations*", the draft EIR "*assumes that the agencies will implement these programs*". But these programs currently include little if any detail - they are basically recommendations that certain studies be completed – so that any assessment of their environmental impacts is purely speculative. The only certain impact of these recommendations is continuing expenditure of tax-payer funds and, to the extent that people still print reports, the loss of a few more trees.

However, on the basis of these incomplete policies and uncertain recommendations, Section 2A of the Draft EIR also includes this description of the flood risk reduction elements of "the project": "*The Proposed Project encourages increased protection of floodways and floodplains and programs to reduce the risk to life and property from*

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[2] *Paterno v. State of California* (2003) 113 Cal.App.4th 998.

floods in the Delta. The Proposed Project includes various policies and recommendations that address flood management and ecosystem restoration simultaneously, as described in subsection 2.2.2. The Proposed Project does not direct the construction of specific projects, nor would projects be implemented under the direct authority of the Council. However, the Proposed Project seeks to improve the Delta flood management by encouraging various actions and projects which, if taken, could lead to construction and/or operation of:

- *Setback levees*
- *Floodplain expansion*
- *Levee maintenance*
- *Levee modification*
- *Dredging*
- *Stockpiling of materials*
- *Subsidence reversal*
- *Reservoir operation*

Setback levees and levee modification could involve levee modification and construction and maintenance of levees. <u>The number and location of all potential projects that will be implemented is not known at this time</u> (emphasis added)."

Three possible projects, however, are known to some degree and are named in the Proposed Project: Sacramento Deep Water Ship Channel Maintenance, Stockton Deep Water Ship Channel Maintenance, and *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management* (DWR 2011b). Again, the ship channel deepening projects are driven by shipping needs rather than flood and earthquake risk reduction and the DWR Framework is a backwards-looking document, so that none of these three items is part of a comprehensive approach to minimizing flood and earthquake risk. The descriptions of the proposed projects under the other four issues areas described in Section 2A are equally vague or inconsequential.

Assessment Methods

Chapter 5 then goes on to detail assessment methods. It notes that: "*The precise magnitude and extent of project-specific impacts on flood management resources would depend on the type of action or project being evaluated, its specific location, its total size, and a variety of project- and site-specific factors that are undefined at the time of preparation of this program-level EIR. Project-specific impacts would be addressed in project-specific environmental studies conducted by the lead agency at the time the projects are proposed for approval*" but is also asserts that "*This program-level document qualitatively assesses the potential impacts on flood management resulting from implementation of the Proposed Project and alternatives in terms of*

how project components could affect flood risk in the Delta and flood management facilities or programs as a result of project implementation. Potential flood management impacts were evaluated based on how the different aspects of the Proposed Project and alternatives could affect Delta flood management and the increased risk of flooding based upon increased probability of flood events and increased consequences to land uses, ecosystem, communities, transportation, utilities, and other resources. The potential increases in flood flows, elevations, and velocities that could be caused by the implementation of projects encouraged by the Proposed Project and the alternatives were assessed qualitatively by applying general principles of hydrology and hydraulics to a range of representative conditions in California during the period of analysis (emphasis added)." So, the projects are unknown but the potential increases in flood flows, elevations, and velocities that could be caused by the implementation of projects, albeit qualitatively rather than quantitatively, can still be assessed? This seems like a bit of a stretch!

Then the assessment is made on the following basis: "*Based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, an impact related to flood management resources is considered significant if the proposed project would do any of the following:*
♦ *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite*
♦ *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems*
♦ *Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM or other flood hazard delineation map*
♦ *Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam*
♦ *Place within a 100-year flood hazard area structures which would impede or redirect flood flows, or inundation by seiche, tsunami, or mudflow*
These "thresholds of significance" might be fine and dandy for projects such as construction of a freeway or a major subdivision or industrial park, but they have little relevance to the Delta where seiches, tsunamis and mudflows are not major concerns. Regardless, these threshold tests are then applied not only to the vaguely defined projects that might be constructed to reduce flood risk but also to the proposed projects under the other four issues areas described in Section 2A which, as already noted, are equally vague or inconsequential. This creates a 5 x 5 matrix of possible projects and thresholds – possible projects in five issue areas evaluated against five thresholds of significance – with the potential increases in flood flows, elevations, and velocities that

could be caused by the implementation of projects evaluated at least qualitatively in each case - or not ...

However, because no details of the proposed projects are available at this time this evaluation is done on the basis of projects already completed or in construction that might bear some resemblance to the proposed projects. This approach has been described in Council meetings as a "brilliant idea" that the consultants came up with but the entire process strains credulity. First the 5th Staff Draft contains no measurable or otherwise quantifiable targets, except as noted above, and proposes mechanisms for achieving the co-equal goals other than waiting for reports and recommendations by others. Second, the descriptions of possible projects in the Draft EIR are vague or inconsequential. Third, the thresholds of significance are of dubious significance in the Delta. Fourth, the potential increases in flood flows, elevations, and velocities that could be caused by the implementation of the ill-defined or uncertain projects are evaluated using projects which are completed or under construction. It is widely agreed that the Delta is in peril so that it seems unlikely that any earlier or current project has the sweep or the impact that will be required of projects implemented under a Delta Plan that might have a prayer of achieving the co-equal goals, however they are quantified.

Assessment of the Proposed Project

Regardless of the above, the Draft EIR proceeds with the assessment of "the project" for each of the cells in the 5 X 5 matrix using "analog" projects. A full list of possible projects and analog projects is provided in Section 2B of the Draft EIR but, as an example, the Los Vaqueros Reservoir Expansion project and the Calaveras Dam Replacement project are used as an analog for projects that might be constructed to achieve the reliable water supply component of the co-equal goals. But these projects are in no way comparable to the construction of twin tunnels under the Delta with five 3,000 cfs intakes in the North Delta which is the leading alternative being studied under the Bay Delta Conservation Plan, which in turn is the leading alternative for inclusion sooner or later in the Delta Plan as the centerpiece of current efforts to provide water supply reliability. And, any conclusions that can be drawn from these projects on potential increases in flood flows, elevations and velocities have no application to flood flows, elevations and velocities in the Delta. Los Vaqueros is an offstream reservoir and the Calaveras dam replacement is exactly that – the replacement of an existing dam for seismic safety reasons. Most of the other analog projects are similarly inappropriate.

Although the assessments of impacts on Delta Flood Risk fill each cell of the 5 x 5 matrix, it might be supposed that possible projects in the Flood Risk Reduction issue area would have the greatest impact so only these results are examined in detail.

For the first threshold of significance, substantial alteration of the existing drainage patterns etc., the conclusion is as follows: "*Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change. During the project-level analyses, these impacts will be identified by drainage or hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the construction site to people, structures, and transportation routes. These types of impacts are likely to be most evident in areas prone to flooding, such as those identified on FEMA FIRMs, where tall and long features, such as setback levees, are constructed across the floodplain flow path. However, because named projects and projects encouraged by the Delta Plan could result in changes to drainage patterns that could cause flooding, this potential impact is considered* ***significant****.*" This is basically nonsense. For instance, setback levees are generally considered to be beneficial from an environmental point of view. They are intended to create more natural conditions adjacent to waterways while still protecting existing and future investments in agriculture, tourism and recreation, infrastructure and the legacy communities. While setback levees are not in fact practical in much of the Delta, in any location where they might they might be constructed, the overall impact would be beneficial, not significant adverse. This is but one example of the standard CEQA thresholds of significance not being relevant to the Delta.

The second threshold of significance is the creation of run-off water which could exceed the capacity of existing or planned stormwater drainage systems. The Draft EIR concludes: "*Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change. During the project-level analyses, these impacts will be identified by drainage or hydrology and hydraulic studies, as they depend on various site-specific factors and on the proximity of the construction site to people, structures, and transportation routes. However, because named projects and projects encouraged by the Delta Plan could result in changes to runoff that could exceed the capacity of existing stormwater drainage systems, this potential impact is considered* ***significant****.*" Again this is nonsense. Conventional stormwater systems are not applicable in the Delta, much of which lies below sea level. Again this threshold of significance might apply to a freeway, a subdivision or a new industrial park outside the Delta but it does not even apply to industrial facilities such as packing sheds, wineries and crush-pads in the Delta. The issues in the Delta are agricultural drainage and maintenance of the water table at an appropriate level for crops, rather than

conventional stormwater collection and disposal. Impacts and mitigation should be discussed in terms of these considerations, not some irrelevant consideration.

The third threshold of significance is the placement of housing within a 100-year flood hazard area as mapped by FEMA or others. The Draft EIR concludes: "*Flood risk reduction projects encouraged by the Delta Plan could include the construction of levees and operable barriers along the levees, levee maintenance, levee modification, expansion of floodplains, and sediment removal from channels. These actions would not include placement of new housing within a 100-year flood hazard area, so there would be* ***no impact****.*" This conclusion is fair enough but it again points out the limited value of using the standard CEQA thresholds of significance in the Delta. While not unimportant, the question of flood protection of housing is only one aspect of the need to develop and implement a comprehensive program for improving Delta levees to reduce the risk posed by floods, earthquakes and possible sea level rise to existing and future investments in agriculture, tourism and recreation, infrastructure and the legacy communities. Such a program needs to be integrated with solutions to the existing water conveyance and ecosystem degradation problems. A program such as that suggested in the Economic Sustainability Plan adopted by the Delta protection Commission would have wide ranging benefits and the failure to address such a program is a fatal flaw in both the 5th Staff Draft and the Draft EIR.

The fourth threshold of significance is the exposure of people or structures to a significant risk of life, injury or death involving flooding, including flooding as a result of failure of a levee or dam. At last there is a threshold of significance that has real application to the Delta, but the Draft EIR concludes: "*Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change. Because flood risk reduction projects are expected to decrease the current level of flood risk, the potential impacts of projects encouraged by the Delta Plan are considered* ***less than significant*** *and may be beneficial.*" However, neither the policies and recommendations of the 5th Staff Draft nor the three analog projects discussed in the Draft EIR do anything significant to reduce the risk of damage resulting from levee failures. Indeed the policies and recommendations of the 5th Staff Draft and the draft DWR Framework document are backwards-leaning rather than forwards-leaning and expose the State to greater rather than reduced "Paterno" liability. "The Project", that is, the 5th Staff Draft, is essentially the same as a "no project alternative" in this regard and must be said to have potentially very significant negative effects on the environment.

The fifth and final threshold of significance is the placement of structures that would impede or re-direct flood flows, or inundation by seiche [3], tsunami, or mudflow. The Draft EIR concludes: "*Project-level impacts would be addressed in future site-specific environmental analysis conducted at the time such projects are proposed by lead agencies, and these analyses will include more information on impacts resulting from climate change. However, because flood risk reduction projects are expected to decrease the current level of flood risk, the potential impacts of projects encouraged by the Delta Plan are considered* ***less than significant*** *and may be beneficial."* Again, this is nonsense. Even a comprehensive program of flood and earthquake risk reduction such as that suggested in the Economic Sustainability Plan adopted by the Delta Protection Commission does not attempt to directly address seiches, tsunamis, or mudflows as these are not pertinent mechanisms to the Delta where earthquake shaking, tidal flows, wind-generated waves, flood inflows from the river system and possible more rapid sea level rise are the drivers of the flood and earthquake hazard. The EIR is required to address actual risks ratger than imaginary ones.

Section 5 also discusses mitigation measures, as required by CEQA, as follows: "*Any covered action that would have one or more of the significant environmental impacts listed above shall incorporate the following features and/or requirements related to such impacts. With regard to covered actions implemented under the Delta Plan, these mitigation measures will reduce the impacts of the Proposed Project. Project-level analysis by the agency proposing the covered action will determine whether the measures are sufficient to reduce those impacts to a less-than-significant level. Generally speaking, many of these measures are commonly employed to minimize the severity of an impact and in many cases would reduce impacts to a less-than-significant level, as discussed below in more detail. With regard to actions taken by other agencies on the basis of Delta Plan recommendations (i.e., activities that are not covered actions), the implementation and enforcement of these measures would be within the responsibility and jurisdiction of public agencies other than the Council. Those agencies can and should adopt these measures as part of their approval of such actions, but the Council does not have the authority to require their adoption. Therefore, significant impacts of noncovered actions could remain* ***significant and unavoidable***. Huh? The ill-defined projects implemented under the Delta Plan will be mitigated to reduce their impacts to a less than significant level but the ill-defined projects implemented in accordance with the recommendations of the Delta Plan could remain significant and unavoidable. Since two of the three major goals of the Delta Plan are to restore the Delta ecosystem and to protect and enhance the Delta as a Place, this would seem to be a pretty big hole in the 5th Staff Draft. There is no guarantee that adverse environmental impacts will not occur?

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[3] A seiche is a standing wave in an enclosed or partially enclosed body of water. Seiches and seiche-related phenomena have been observed on lakes, reservoirs, swimming pools, bays, harbors and seas.

In summary, the detailed evaluation of the environmental impacts of "the Project" is largely nonsensical and/or irrelevant and does not provide an adequate basis either for certifying an EIR or for serving as a basis for comparisons with the environmental impacts of the considered alternatives.

Assessment of the Alternatives

With respect to the considered alternatives the Executive Summary of the Draft EIR states: "*This draft program EIR also describes five alternatives to the Proposed Project, which are analyzed at the same level of detail as the Proposed Project. Hence, this draft program EIR evaluates and describes the potential environmental impacts of the Proposed Project and the alternatives as required by CEQA"*, but this statement is incorrect – consideration of the project impacts and mitigation occupies 33 pages in the Draft EIR but consideration of the No Project Alternative and four other alternatives occupies only 10 pages or an average of 2 pages per alternative. This largely results from the selected alternatives being only modest variations of the Proposed Project and the differences in the impacts being discussed collectively in terms of the five thresholds of significance instead of for each cell in the 5 X 5 matrix that was used to evaluate the Proposed Project.

Section2A of the Draft EIR outlines the process by which the considered alternatives were selected and describes them as follows: "*The following five alternatives to the Proposed Project were selected to be evaluated in detail in this EIR. The characteristics of the five alternatives and the Proposed Project are summarized in Table 2-4. The five alternatives to the Proposed Project are described in subsections 2.3.2 through 2.3.6. The text of the policies and recommendations of the Proposed Project and Alternatives 1A, 1B, 2, and 3, but not the No Project Alternative, are set forth in full in Appendix C. Alternatives considered but rejected for further analysis are discussed in subsection 2.3.1.6.*

♦ ***No Project Alternative:*** *This alternative consists of the environment if no Delta Plan is adopted. In compliance with CEQA Guidelines section 15126.6(3)(A), the No Project Alternative assumes that existing relevant plans and policies would continue, which includes reasonably foreseeable modified or new plans or policies that are currently being analyzed for adoption or are required to be adopted. For example, it assumes that existing State statutory provisions requiring agencies that receive Delta water to engage in conservation and efficiency planning would remain in place in the future. The No Project Alternative also includes physical activities/projects that are permitted and funded at this time, such as expansion of Los Vaqueros Reservoir*

(Phase 1 only), new intakes/diversions for Freeport Regional Water Authority and Stockton, and initial construction of the Dutch Slough ecosystem restoration project. Under the No Project Alternative, conditions related to flood risk, ecosystem health, water quality, and water supply reliability (particularly in the Delta) would continue to degrade. Exports of Delta water would be greater under the No Project Alternative than under the Proposed Project(emphasis added).

♦ ***Alternative 1A - Export More Water Out of the Delta; Decreased Emphasis on Local and Regional Water Self-Reliance; Focus Levee Improvements on Protecting Water Supply Corridors:*** *Development of this alternative was informed by comments from water users in export areas south of the Delta. It involves exporting more water from the Delta and its watershed to areas that receive Delta water, and less water conservation and efficiency measures and fewer construction projects in those Delta-water-using areas aimed at improving local water supplies from new or expanded groundwater storage, ocean desalination plants, and water treatment plants. Alternative 1A accomplishes these changes from the Proposed Project primarily by changing a policy of the Proposed Project related to reliable water supply to a recommendation. As it relates to covered actions, the Delta Plan policy requires users of Delta water to increase water efficiency and conservation measures, and requires development of a variety of local water supplies so as to reduce reliance on Delta water. Changing this policy to a recommendation would nullify the Council's ability (at least by means of this Delta Plan) to compel other agencies' covered actions to be consistent with existing requirements of law as well as to require additional local water supply development/water efficiency planning. This, in turn, would decrease pressure on other agencies to increase efficiency, conservation, and local supplies, and to develop local and regional water supplies. This alternative delays and makes less certain the establishment of Delta water flow criteria (for more natural flows) and Delta flow and water quality objectives to protect Delta ecosystem resources. Alternative 1A would, instead, potentially reduce the availability of flows during some periods of the year. Alternative 1A would result in less ecosystem restoration (floodplains, riparian habitat, and tidal marsh) in the Delta. Alternative 1A would result in less overall levee maintenance and modifications because it would prioritize levees that protect water supply corridors under the theory that spending money on such levees results in more economic benefit per dollar spent than spending money on levees that protect other uses* (emphasis added). *This approach could result in less aggressive levels of flood risk reduction in other parts of the Delta. This alternative also would result in less reversal of subsidence and/or raising of subsiding lands.*

Alternative 1B - Export More Water Out of the Delta; Reduced Conservation and Water Efficiency Measures; Only Voluntary Actions by State and Local Agencies; Coordination, not Regulation; Large Number of

Additional Studies Before Action: *Development of this alternative was informed by a proposal from the Agriculture/Urban Coalition. It involves the same increased Delta water exports, reduction in local water supply projects, and reduction in water efficiency and conservation measures as described in the first paragraph above under Alternative 1A, and for the same reasons (conversion of the policy to a recommendation). Alternative 1B also involves the same delay and reduced certainty regarding more natural water flows in the Delta and reduced ecosystem restoration, as described in the second paragraph above under Alternative 1A. Alternative 1B, however, would involve more (as compared to the Proposed Project and Alternative 1A) invasive species management, such as removal of invasive vegetation and removal of nonnative predator Delta fish, adding of fish screens, and genetic management of hatchery fish. Regarding water quality, Alternative 1B would involve fewer water treatment plants, groundwater wells, and groundwater wellhead treatment. It would involve more wastewater and stormwater treatment and recycling facilities, more facilities to treat agricultural water runoff, and more stringent water quality objectives for municipal/industrial and agricultural dischargers. Regarding flood risk reduction, Alternative 1B is less aggressive with regard to constructing additional levees until collaborative studies are completed. This could result in fewer new levees that would facilitate floodplain expansion, but more maintenance and modification of existing levees. Alternative 1B would involve more dredging* (emphasis added). *Lastly, Alternative 1B changes all of the proposed Delta Plan policies to recommendations. With regard to physical actions that the policies target to meet the coequal goals, these actions would be delayed and/or less certain to occur under Alternative 1B. In general, Alternative 1B involves physical components similar to Alternative 1A, with some differences as discussed above. However, it involves a meaningfully different governance approach (changing all policies to recommendations) that weakens the Council's ability to move the State forward toward meeting the coequal goals. Moreover, Alternative 1B's versions of the recommendations generally call for studies rather than actions or projects, unlike the Proposed Project and Alternative 1A."*

♦ ***Alternative 2 - Decreased Export of Water from the Delta; Increased Emphasis on Ecosystem Restoration throughout California:*** *Development of this alternative was informed by proposals from environmental organizations led by the Environmental Water Caucus. It involves sharply decreased water exports from the Delta and its watershed to areas that receive Delta water (limited to a maximum of 3 million acre-feet/year). It involves fewer surface water storage projects, such as reservoirs (although it would include a large reservoir in the Tulare Lake basin, which currently is used for agriculture). It involves more water supply projects in the form of new or expanded groundwater storage, ocean desalination plants, and water*

treatment plants. It involves more water efficiency and conservation. It involves fewer discrete projects to restore floodplains, riparian habitat and tidal marsh, but more general floodplain expansion through levee removal. It involves more stringent criteria to bring water flows in the Delta closer to their natural state. It involves more facilities to treat and recycle wastewater and agricultural runoff. Regarding flood risk reduction, it involves fewer new levees, less levee maintenance and modification, and less dredging (emphasis added).

♦ ***Alternative 3 - Increased Emphasis on Protection and Enhancement of Delta Communities and Culture; Protection of Delta Agricultural Land and Less Ecosystem Restoration; Fewer Regulations for Delta Counties:*** *Development of this alternative was informed by letters and comments from interests in the Delta. It involves a reduction in exports as compared to existing exports (because of an emphasis on more natural water flows in the Delta, similar to the Proposed Project). It also involves a reduction in water efficiency and conservation measures—similar to Alternative 1A—but only for the Delta itself. This approach could lead to a reduction in alternative local water supply projects that serve users in the Delta and thereby not reduce their reliance (so less reduction in overall reliance) on Delta water; this could place greater pressure on other statewide water supply projects. Alternative 3 accomplishes these changes from the Proposed Project by changing a policy of the Proposed Project related to Reliable Water Supply to a recommendation (the same as Alternatives 1A and 1B, mentioned above), but only for water suppliers serving the Delta, while maintaining it as a policy for water suppliers that serve areas outside of the Delta. Alternative 3 also would deemphasize Delta ecosystem restoration on established agricultural lands, and focus expansion of the floodplain and ecosystem restoration on publicly owned lands instead. Alternative 3, however, would involve more invasive-species management, such as removal of invasive vegetation and removal of nonnative predator Delta fish, adding of fish screens, and genetic management of hatchery fish. Alternative 3 would involve fewer new levees and less floodplain expansion into agricultural lands. It would involve more levee maintenance, levee modification, and dredging to protect agricultural lands in the Delta* (emphasis added).

The changes from the Proposed Project to each of these alternatives relative to levees and flood risk have been highlighted above but these are constructs of the preparers of the EIR rather than necessities for each of these alternatives as might be proposed by others, particularly in the case of Alternatives 2 and 3. Organizations such as the Environmental Water Caucus and Restore the Delta are generally supportive of the Economic Sustainability Plan that has been adopted by the Delta Protection Commission and the suggestion that Alternative 2 would involve less levee maintenance and improvement is absurd. Alternative 3 does provide for more levee maintenance and

improvement but does not go as far as the Economic Sustainability Plan in addressing the long-term hazards posed by floods, earthquakes and potentially more rapid sea level rise.

In fact, the Draft EIR is wildly inconsistent in that it includes a description of key components of the Economic Sustainability Plan in Section 2A, as follow: "*The Proposed Project encourages the Delta Protection Commission to complete the Economic Sustainability Plan in accordance with the requirements of Public Resources Code section 29759 (DP R1) to inform the Council about policies for economic sustainability in the Delta. The Economic Sustainability Plan describes key elements of the Delta economy, considers strategies to enhance the economy and the impacts of several ongoing proposals for the Delta Plan on the region's economic sustainability, including extensive ecosystem restoration or construction of major water supply conveyance facilities (Delta Protection Commission 2011). The Economic Sustainability Plan also describes several proposals and strategies to promote both economic sustainability in the Delta and the coequal goals for the state, such as strengthening the Delta's levees and establishing emergency response systems. The Economic Sustainability Plan recommends the following actions that could directly affect the physical resources of the Delta:*
♦ *Improve core, non-project Delta levees to the Public Law 84-99 standard by 2015 using the existing Delta levee subventions and special project programs; and improve many Delta Levees beyond the Public Law 84-99 that addresses earthquake and sea-level rise risks, improve flood fighting and emergency response, and allow for vegetation on the water side of levees to improve habitat.*
♦ *Transfer responsibility for coordination of regional emergency management and response and recovery to a regional agency.*[4]
♦ *Maintain or enhance the value of Delta agriculture.*
♦ *Initiate a process to streamline local, State, and federal regulations and permitting.*
♦ *Create a Delta and/or Legacy Communities "brand" to enhance awareness; and designate the Delta as a National Heritage Area (described below).*
♦ *Create flood bypass and habitat improvements in the Yolo Bypass, McCormack-Williamson Tract, and the lower San Joaquin River near Paradise Cut.*
♦ *Improve water quality and freshwater outflow in the Delta" ,*
but the Draft EIR fails to include these recommendations in any alternative. While these recommendations were taken from an earlier draft of the Economic Sustainability Plan, they are essentially unchanged in the final version of the Plan that has been adopted by

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[4] This recommendation was subsequently modified to say "Transfer to a regional agency with fee assessment authority on levee beneficiaries of responsibility for allocating funds for the longer-term improvement of Delta levees and the coordination of Delta emergency preparedness, response, and recovery merits further consideration".

the Delta Protection Commission and peer-reviewed a panel assembled by the Delta Science Program. An alternative project based on the Economic Sustainability Plan or modifications of Alternatives 2 and 3 which include the recommendations regarding levees from the Economic Sustainability Plan would beat the Proposed Project by a country mile in terms of reducing flood risk and hence environmental damage from flooding as well as providing a significant beneficial impact by restoring appropriate vegetation to many miles of Delta levees.

As already noted the evaluation of the alternatives impact on Delta Food Risk is much shorter than the evaluation of the Proposed project because the selected alternatives are only modest variations of the Proposed Project and the differences in the impacts are discussed collectively in terms of the five thresholds of significance instead of for each cell in the 5 X 5 matrix that was used to evaluate the Proposed Project. As with the Proposed Project, the impact relative to placing housing in mapped 100-year flood hazard areas is said to be zero for each of the alternatives. The impacts in terms of the other four thresholds of significance are said to be significant, which is the same as the average impact over all five issue areas for the proposed Project. Thus, on the basis of the qualitative assessments made in the Draft EIR, there is essentially no difference between the Proposed Project and the alternatives in terms of Delta Flood Risk. It is true that for two thresholds of significance, flood risk itself and placement of structures which could impede or redirect flood flows, or inundation by seiche, tsunami or mudflow, the Draft EIR asserts that the Proposed Project would have impacts that are considered less than significant and may be beneficial, but as explained elsewhere these particular assessments are erroneous and/or nonsensical. The analysis is incomplete with respect to the real risks and mitigation of present and future Delta flood risks is not adequately addressed.

Draft EIR Summary Conclusions

Section 25, Comparison of Alternatives concludes with the following overall summary. All five issue areas are considered in this summary but it concludes with an emphasis on Flood Risk in the final paragraph:

An EIR is required to identify the environmentally superior alternative from among the range of reasonable alternatives that are evaluated. State CEQA Guidelines section 15126(d)(2) states that if the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative from among the other alternatives.

Identification of an environmentally superior alternative involves weighing and balancing the various impacts of the alternatives compared to each other and to the Proposed Project. Inherent in this process is an evaluation of which impacts are relatively most important in differentiating the Proposed Project and alternatives.

The biggest differentiators among the Proposed Project and alternatives, given their varying focus and the subject matter requirements of the Delta Reform Act, relate to long-term impacts to biological resources, flood risk reduction, water supply and water quality, and agricultural land. Impacts in other areas are relatively less important. For example, the Proposed Project and all the alternatives could result in significant environmental impacts related to geology and soils (e.g., risks of locating new projects on expansive soils, in earthquake fault zones, or in areas subject to landslides), but these impacts generally can be reduced to less-than-significant levels through standard mitigation such as careful siting and standard engineering techniques.

From a short-term construction-impacts perspective, the No Project Alternative is environmentally superior. It involves the least amount of construction of all the alternatives, including the Proposed Project. From an operations perspective, however, it would be environmentally inferior to the Proposed Project in many ways in that it would not stem the increasing environmental impacts to the Delta ecosystem, water quality, flood risk and water supply.

Among the remaining alternatives, the Proposed Project is the environmentally superior alternative, taking into account both construction and operations impacts.

Alternatives 1A and 1B are inferior mostly because they would fail to arrest the increasing environmental deterioration of the Delta ecosystem. They fail to do so because they would result in fewer ecosystem restoration projects in the Delta and would be less aggressive in moving toward minimum standards for water flow in the Delta necessary for a healthy fishery and ecosystem. Alternatives 1A and 1B generally would result in delayed action to stem the decline of the Delta ecosystem and declining water quality by awaiting the outcome of additional data collection and additional studies to take action, and by changing many (Alternative 1A) or all (Alternative 1B) of the Delta Plan's regulatory policies to non-binding recommendations thereby decreasing the chance of preventing further environmental decline.

Alternative 2 is slightly environmentally inferior to the Proposed Project because it would result in the greatest amount of water supply uncertainty and agricultural land losses. Alternative 2 would result in the greatest reduction in agricultural land use in the San Joaquin Valley through the loss of approximately 320,000 acres of Farmland

of Statewide Importance (if Alternative 2's Tulare Lake Basin reservoir is constructed), 380,000 acres to be fallowed within the San Luis Drainage Area, and possibly additional acreage to be periodically fallowed due to restrictions on total amount of water to be exported from the Delta. Extensive land fallowing also has adverse air quality impacts from resulting dust. Alternative 2 is superior to the Proposed Project in terms of stemming the decline of the Delta ecosystem and declining water quality because it would encourage new water flow objectives for the Delta and tributaries that emphasize meeting environmental needs ahead of all other beneficial uses of Delta waters; it would also eliminate the water quality impacts associated with agricultural runoff water from Tulare Lake Basin agriculture. These two items, however, would not be enough to outweigh the extensive loss of agricultural land. Under CEQA, both agricultural land and fish/wildlife/habitat are environmental resources (CEQA Guidelines Appendix G). Lastly, Alternative 2 would be inferior to the Proposed Project regarding potential water supply impacts because it would result in fewer redundancies in the water supply system, thereby increasing the chance that water users could be without sufficient water during droughts affecting their water source more than another source that might be a back-up source under the Proposed Project.

Alternative 3 would be slightly environmentally inferior to the Proposed Project because it would do less to stem the declining ecosystem in the Delta and in ecologically important areas along the lower San Joaquin River. Lastly, while Alternative 3 would preserve more agricultural land in the Delta than the Proposed Project, it would do so at the cost of lower reduction of long-term worsening impacts to the Delta ecosystem (e.g., because of less habitat and tidal marsh restoration) in the Delta and the cost of the environmental impacts due to runoff water from that Delta agricultural land preserved.

Regarding flood risk reduction, all of the alternatives are inferior to the Proposed Project because they would do less to reduce flood risk by focusing levee investments on only part of the Delta (all alternatives) or focusing prevention of encroachment into floodplains in only limited parts of the Delta (Alternatives 1A and 1B) (emphasis added).

But these conclusions are driven by the assumptions that the preparers have made regarding the alternatives. These assumptions are unsupported and it is impossible to escape the conclusion that these assumptions have been made in such a way to favor the Proposed Project over the alternatives.

If the alternatives were tweaked by the parties whose views they are supposed to represent, the results might be quite different. For example Alternatives 1A and 1B are dinged because they are said to be "result in fewer ecosystem restorations projects in the

Delta " and "less aggressive in moving towards minimum standards for water flow in the Delta". But the Proposed Project includes no definitive projects or action in these areas, instead relying, in the first instance, on completion of the Bay Delta Conservation Plan and the State Water Resources Control Board flow criteria for the Delta. Who knows at this point what they might provide for? In the absence of the Delta Plan specifying measurable or otherwise quantifiable targets, as required by law, no-one can say with any certainty what the results of the proposed project might be. The interests whose views Alternatives 1A and 1B are supposed to represent could just as easily claim that their preferred alternatives would be superior, not only for water supply reliability but for environmental issues as well. It is particularly ludicrous that Alternative 2 should be judged to have a more significant negative impact than the Proposed Project when it purports to represent the interests of environmental organizations. The environmentally-friendly alternative is less friendly to the environment than the Proposed Project? It is no doubt correct that "*under CEQA, both agricultural land and fish/wildlife/habitat are environmental resources (CEQA Guidelines Appendix G)"* but they do not necessarily have equal value, particularly if the agricultural land in question is high in boron and selenium and there is no long-term plan to capture the salts that contained in agricultural waste water. That is not to say that these salts could not be captured and disposed of safely but Alternative 2 as framed by the Draft EIR does not do that. The argument that Alternative 3 is slightly inferior to the Proposed Project is so pallid that it gives the impression that the authors do not believe what they are saying but are determined that the Proposed project should be superior come what may. And, if Alternative 3 were modified to include the recommendations of the Economic Sustainability Plan, it would clearly be the environmentally superior alternative and one can only suppose that that is the reason it was not so modified.

Further, in the case of Alternative 3 the final paragraph is not consistent with the description of this alternative in the Draft EIR and modification of either Alternative 2 or 3 to include the recommendations of the Economic Sustainability Plan would make them clearly superior to the Proposed Project. The intended purpose of this final paragraph is not clear but it is bafflegab of the worst kind.

Summary

The project description in Section 2A of the Draft EIR fails the basic test of having a project description that meets both the requirements of CEQA and the requirements of the Delta Reform Act of 2009, which states that the Delta Plan should include concrete measures to simultaneously improve water supply reliability and to restore the Delta ecosystem, while protecting and enhancing the Delta as a Place.

A Delta Plan that relies on other agencies to do the heavy lifting with respect to both planning and implementation is not much of a plan. The 5th Staff Draft, i.e. "the project", largely relies on the Bay Delta Conservation Plan (BDCP) to address water conveyance issues through the Delta; it relies on BDCP and/or the Delta Conservancy for a strategic plan to address ecosystem restoration; it relies on the State and or Regional Water Boards to come up with flow criteria and water quality criteria; it relies on the Department of Water Resources to complete a totally inadequate draft document on levee standards and policies; and it relies on the Delta Protection Commission to come up with an Economic Sustainability Plan that will provide a basis for protecting and enhancing the Delta as a Place. Oh, wait a moment – that has actually been done but its recommendations were not included in the 5th Staff Draft and are not included in the alternatives that were studied for the Draft EIR! But with respect to the first four issue areas, the Delta Plan needs to come up with ranges of acceptable outcomes that would meet the co-equal goals of the Delta Reform Act. And, it needs to consider integrated solutions that have a positive impact on all five issue areas.
This is a fatal flaw both in the 5th Staff Draft and in the Draft EIR, which evaluates impacts in five issue areas but fails to address integrated solutions and to give sufficient weight to possible projects that might have beneficial impacts in several issue areas. The key policy issues in the Delta are simply not addressed.

With respect to Delta Flood Risk, the four "policies" enunciated in the 5th Staff Draft fail to address the need for an aggressive program to maintain and improve Delta levees in the face of the hazards posed by floods, earthquakes and possible sea-level rise. Such a program would have positive benefits with respect to water conveyance, ecosystem restoration and the Delta as a Place and is an example of an integrated solution that has benefits in multiple issue areas.

The entire process used to develop the Draft EIR strains credulity. First the 5th Staff Draft contains no measurable or otherwise quantifiable targets, except as noted above, and proposes no mechanisms for achieving the co-equal goals other than waiting for reports and recommendations by others. Second, the descriptions of possible projects in the Draft EIR are vague or inconsequential. Third, the thresholds of significance that are used generally do not apply in the Delta. Fourth, the potential increases in flood flows, elevations, and velocities that could be caused by the implementation of the ill-defined or uncertain projects are evaluated using projects which are completed or under construction. It is widely agreed that the Delta is in peril and that no existing project has addressed the basic problems of the Delta. Thus no existing project has had the sweep or the impact that will be required of projects implemented under a Delta Plan that might have a prayer of achieving the co-equal goals, however they are quantified.

With respect to Delta Flood Risk, on the basis of the qualitative assessments made in the Draft EIR, there is essentially no difference between the Proposed Project and the alternatives in terms of Delta Flood Risk. It is true that for two thresholds of significance, flood risk itself and placement of structures which could impede or redirect flood flows, or inundation by seiche, tsunami or mudflow, the Draft EIR asserts that the Proposed Project would have impacts that are considered less than significant and may be beneficial, but as explained above these particular assessments are erroneous and/or nonsensical. Further, in the case of Alternative 3 the final paragraph of Section 25 is not consistent with the description of this alternative in the Draft EIR and modification of either Alternative 2 or 3 to include the recommendations of the Economic Sustainability Plan would make them clearly superior to the Proposed Project. The intended purpose of this final paragraph is not clear but it is bafflegab of the worst kind.

Indeed, the entire Draft EIR is bafflegab. Members of the Delta Stewardship Council have publically commended the consultants and staff of the Office of the Attorney General who prepared the Draft EIR for their long hours and hard work but to what effect? Producing an excessively long document that is nonsensical and/or erroneous? Such efforts are wasted without proper leadership and technical direction. Without a meaningful Delta Plan, there can be no meaningful Environmental Impact Report. It is far from clear to this writer that even a meaningful plan requires an Environmental Impact Report, but I assume that when the Office of the Attorney General advised the Council that an EIR was required, they assumed that there would be meaningful content in it. Since that is not presently the case the Council has no alternative but to abort the current efforts to produce an EIR and instead focus on developing a plan that is responsive to the legislation and the People of California.

Attachments:

Comments on Notice of Preparation dated January 25, 2011
Comments on 1st Staff Draft dated February 21, 2011
Comments on 2nd Staff Draft dated March 21, 2011
Comments on 3rd Staff Draft dated April 25, 2011

Remarks of Robert Pyke, Ph.D., G.E., prepared for the Delta Plan EIR Scoping Meeting, Stockton CA, January 25, 2011

My name is Robert Pyke. I have two comments about the Notice of Preparation and the scope of the EIR, plus a comment about the necessity to prepare an EIR in the first place.

I am a civil engineer specializing in geotechnical, earthquake and water resources engineering, but as part of my Ph.D. studies in civil engineering at the University of California I also completed a minor in environmental planning under the guidance of Professor Robert Twiss.

I have worked for almost 30 years on various problems in the Delta starting with a forensic investigation of the 1982 flooding of McDonald Island, and I am currently a member of the Board of Senior Consultants for the ongoing Reclamation District 17 levee improvements. I might also note that I was an expert witness for the plaintiffs in the now famous Paterno case, which confirmed the State's liability resulting from levee failures in cases where the State has been uneven in its performance.

My first comment has to do with the Improved Water Conveyance and Storage Element of the proposed Delta Plan and the EIR.

On November 15 I e-mailed the following comment on the then draft NOP to the Council:

"In view of the controversy surrounding BDCP, the likelihood that it will not come together in time for inclusion in the Delta Plan, and the near certainty that it will not meet the statutory requirements for inclusion in the Delta Plan, should not the first bullet (bottom of p.18) [which at that time read *prompt implementation of the BDCP program if the program complies with Water Code section 85320*] be rewritten as:

Prompt implementation of the BDCP if it complies with Water Code Section 85320 and/or alternatives designed to accomplish improvements in water conveyance and storage consistent with the co-equal goals of the Delta Reform Act.

This would allow for inclusion of the BDCP in the Delta Plan should lightning strike, but would also allow for alternate plans for improved conveyance." Although my comment was posted on the Council web site, apparently it was the collective wisdom of the Council, its staff and consultants, not to change the wording in the NOP.

As it turns out my comment was somewhat prophetic as it has come to pass that the BDCP will not be completed, even in draft form, before the end of this year, if then. In many ways this is fortunate, because now, instead of the cart being before the horse, the horse is properly ahead of the cart, or at least the horse has an opportunity to get ahead of the cart. As suggested by Richard Roos-Collins at the California Water Law Symposium on Saturday, the Delta Council now has the opportunity to set forth in the Delta Plan its own guidelines or rules for improved water conveyance and storage and the BDCP, or its successor, will then be obliged to be consistent with those guidelines or rules.

However, the NOP has no bullet to describe this task and the Water Resources White Paper, as far as I can see, did not even address water conveyance through the Delta. Although there will be other important aspects to the Delta Plan, there is no aspect that is more important than this because getting conveyance right is also the key to making a meaningful start on ecosystem restoration.

In that respect I would draw your attention to my recent Op-Ed in the Stockton Record. In that piece I point out that there are two keys to meeting the co-equal goals of the Council: The first is the need to recognize that man-made alteration of the Delta, in combination with larger export flows, has turned the Delta from an estuarine environment into a weedy lake which favors invasive species over native species; and the second is to recognize that precipitation in California is extremely variable and that past and future variability must be addressed in any sustainable water management plan.

Thus, there are at least two principles that should be embodied in your guidelines or rules: One, that natural flows through the Delta should be restored to the maximum practical extent; and Two, that much more water should be extracted at periods of high flow and much less, or zero, water should be extracted at periods of low flows. In my Op-Ed I expanded on how these principles might be implemented. For now I just note that additional South of Delta storage would be required, either in groundwater banks or in surface storage facilities.

However, the NOP does not address such storage facilities but instead talks about completion of the CALFED Surface Storage Program which includes such dogs as the Temperance Flat Reservoir which, by DWR's own calculations, would generate an annual yield of only 140,000 acre-feet for a capital cost of $3.36 billion – making it more costly than desalination of sea water. That program has provided employment for the staff of DWR and the Bureau and their consultants for many years but it has no place in the Delta Plan. Instead, the Delta Plan should be talking about possible decommissioning of reservoirs on the rivers upstream of the Delta and replacing them with South of Delta storage.

My second, much briefer, comment on the NOP has to do with the Flood Management and Levees Element, which is actually entitled "Reduce Risks to People, Property and State Interests". This element is generally more complete and it includes both prioritization of investments and creation of a Delta-wide flood management and financing entity. However, it says nothing about the drafting of Delta-specific levee standards, which are sorely needed. I have prepared an outline of what I think might be appropriate standards for Delta levees and will submit them to the Council, or publish them in the Stockton Record, in due course. I would just note that one essential component of the Council's policy on levees should be a requirement to restore native vegetation on the water side of every mile of the Delta levees. I believe that there are ways that this can be done without compromising the integrity of the levees, and that the Council should join with Congressman John Garamendi and others to push back on the Corps of Engineers who want to enforce an inappropriate and ill-advised blanket policy on levee vegetation in every state of the nation.

My third and final comment has to do with the need for an EIR. While I am not a lawyer, let alone a specialist in environmental law, I find the arguments made by the State and Federal Contractors Water Agency, which is led by lawyers, and others, to be persuasive on this matter - they argue that even a programmatic EIR is not required for you to adopt and enforce the Delta Plan . I understand that, as a State agency, you are likely obliged to follow the advice of the Attorney General's Department on this matter, but I note that the Attorney General's Department is not always right – witness the Paterno case! The reason that I raise this question is simply that you, your staff and consultants have limited time and resources to develop the Delta Plan, and it would appear that sooner or later you are going to have to devote more effort to studying alternatives for conveyance, ecosystem restoration, flood management and land use, and to developing a meaningful plan that integrates all of these elements, possibly at the expense of completing an EIR. And, if that is true, you had best address this issue sooner rather than later. An EIR for a plan that has no real content, is like a suit of armor with no-one inside it.

Thank you for your forbearance.

Referenced Op-Ed from Stockton Record is attached.

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New Delta thinking needed

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By ***Robert Pyke***
January 08, 2011 12:01 AM

Recent comments by Ken Salazar, David Hayes and Diane Feinstein on the Bay Delta Conservation Plan are unnecessarily anchored to the past. The BDCP is not the last, best hope for the Delta or the only game in town. The BDCP not only has been bungled in execution, but its basic concept has always had a fatal flaw. No amount of tweaking the existing plan will overcome the fact that it will never satisfy the dual goals of the BDCP or the co-equal goals of the new Delta Stewardship Council.

The dual goals of the BDCP are enough recovery of the Delta ecosystem to allow the granting of incidental take permits in accordance with the state and federal endangered species acts, and the guarantee of reliable delivery of water for export at something approaching the full contract amounts that are part of the Central Valley project and the State Water Project agreements. However, the goal of even this minimal level of ecosystem recovery is in conflict with the goal of sustainable exports at a relatively high level, because it is widely agreed that of all the multiple stressors impacting the Delta, changes in the flow pattern are the most important. It is principally changes in the flow pattern that have transformed the Delta from an estuary into a weedy lake.

The basic problem with the BDCP is that the idea of moving the export intakes from the south Delta to the north Delta is a legacy idea that has been around since the 1920s and is simply the cheapest way to get Sacramento River water safely to the south.

The idea was conceived when the ecology of the Delta was not a big issue, and it was also planned that there would be diversions from the northern rivers that would in fact provide much of the export flows.

When Jerry Brown made a deal with the Sierra Club around 1980 to bar the planned diversions from the northern rivers in return for their support for a peripheral canal, he inadvertently caused the present stalemate. Without additional flow in the Sacramento River, moving the intakes from the south Delta to the north Delta simply changes the flow pattern in the Delta from cross flow to no flow.

And no flow is not better than cross flow. If the basic BDCP concept remains the same, there is no possibility of anything like a win-win solution. However, it may be that there is a win-win-win.

Any well-thought-out plan for getting out of this stalemate has to start by recognizing both the need for more natural flows through the Delta and that precipitation in California is extremely variable.

Thus, natural flows through the Delta should be restored to the maximum practical extent; and much more water should be extracted at periods of high flow and much less at periods of low flow.

Adherence to these principles, with appropriate pumping and temporary storage facilities, will allow simultaneous recovery of the Delta ecosystem and sustainable exports at close to contract levels.

A plan based on these principles would include four physical elements:

1. Restoration of floodplains on the Sacramento and San Joaquin rivers and their tributaries, which provides three significant benefits: stretching out floods to allow export pumping over a longer time; reducing peak flows as floods pass by the major urban areas and through the Delta; and restoring complexity and nutrients to the ecosystem.

2. New pumping facilities somewhere in the west Delta to allow flows to pass through the Delta in a natural way before surplus flows are extracted; these facilities might include some temporary storage.

3. One or more tunnels that can move the extracted water to a large temporary storage facility until the existing pumps can move it south; this storage facility would likely be adjacent to and might incorporate the existing Clifton Court Forebay.

4. Additional south-of-Delta storage, much of it likely as groundwater but also including new west-side surface storage.

So the third win is integration of enlightened flood management that has benefits to Northern California residents, with a plan to restore the Delta and restore reliable water supply to Central Valley farmers and Southern California urban areas.

In addition to getting the engineering right, a necessary ingredient for success is genuine outreach to and involvement of all stakeholders.

Because it has correct fundamentals, this is a plan that can succeed.

Robert Pyke is a consultant based in Lafayette with 40 years of experience in geotechnical, earthquake and water resources engineering in Australia and California.

Robert Pyke, Consulting Engineer

April 25, 2011

Mr. Phil Isenberg
Chair, Delta Stewardship Council
980 Ninth St. Suite 1500
Sacramento, California 95814

Re: Comments on the Third Staff Draft of the Delta Plan

Dear Chair Isenberg and Council Members,

In spite of some hints of forward movement at the conclusion of the Council meeting held at the Holiday Inn, I am disappointed that there is still no coherent plan that addresses all five elements of conveyance and storage, ecosystem restoration, water quality, flood management, and protecting and enhancing the Delta as a Place. In particular, there is not even a hint of a suggested policy on conveyance and storage, which is the key to the Delta Plan as a whole. Without a solution to the conveyance problem that by itself makes a significant contribution to eco-system restoration, there can be no Delta Plan as was envisioned by the Delta Vision Task Force and the 2009 legislation.

Your efforts to date appear to have largely focused on developing an additional regulatory framework, rather than on developing a Delta Plan – with an emphasis on words rather than maps and drawings – an emphasis on legal considerations rather than science and engineering considerations. To be sure, ultimately you are setting public policy, but that public policy has to be based on sound science and engineering and have some real content and a vision for the future.

As a results-oriented engineer I would have approached this whole exercise differently. As I noted in my comments on the second staff draft, the legislative requirement that the plan include "*quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan*" is still not addressed. Many possible measures are now listed but specific targets are not. Such targets, whether quantified or conceptual, are not something that can be added at a later date. If you do not have a clear idea of the current situation and the future goals, how can you construct a plan to move from one to the other?

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I know that the staff and consultants prepared a series of white papers to describe the current situation but they were largely cut and paste of previous reports and the many errors that appear in previous reports were simply repeated. What was needed, and is still needed, is a more succinct and focused quantified summary of the current situation. Then, you need a vision of what the Delta might be in the future and a plan on how to get there. And finally, since you have essentially no power to initiate any positive actions at this time, you need recommendations on the additional legislation and financing to get from the current situation to the future - a much improved situation in which the Delta is the leading worldwide example how to balance sustainable water management and a flourishing estuarine ecosystem with sustainable fishing and farming, so that students and tourists come here from the Netherlands to see how these things should be done!

The third of these three steps is perhaps optional. The 2009 legislation does not require you to do anything more than to develop a plan and determine whether the BDCP satisfies the legislated criteria for inclusion in that plan. You could develop the plan and then sit back and simply smack down any project that is not consistent with the plan and hope that other parties come up with projects that are consistent with the plan. But I think the legislature implied that you should have a more activist role, even if they did not provide you with any tools for that purpose.

In this context then, I am offering some further suggestions in three areas: (1) studies that would be helpful in quantifying the current situation and setting future goals; (2) the actual content of the Plan; and (3) possible recommendations for additional legislation.

1. Missing studies

There are at least four studies that are either missing or incomplete that would be helpful in quantifying the current situation and setting future goals. Two of these could be completed by the end of the year but the other two likely cannot, so that you will have to punt on related issues.

(1) A simple study to address the question previously posed by both Tom Zuckerman and by Chair Isenberg: How much water is surplus to the legitimate needs of upstream and Delta users that is available for export on a sustainable basis? A good start was made on addressing this question by Chris Enright at the request of Cliff Dahm. The necessary data for this is readily available and such a study could be completed within several months.

(2) An updated study of expected water surface elevations in the Delta for a range of flood events. Such a study should be part of the development of the Central Valley Flood Protection Plan which is due by 2012, but it will not be. This is frustrating but not critical because reasonable estimates of maximum water surface elevations can still be made.

(3) An updated study of the status of the Delta levees and the estimated cost of bringing them all up to the PL 84-99 standard or some higher standard - the numbers given in DRMS and other previous studies are questionable. Such a study is in fact being conducted in cooperation with DWR and the local reclamation districts by the University of the Pacific team that is working on the Delta Economic Sustainability Plan and results should be available within several months.

(4) A 3-D hydrodynamic and sediment transport study of the Delta to guide the Council on multiple issues including: developing an improved understanding of flood water surface elevations; studying the effects of various alternate export intake locations on maximum water surface elevations, water quality and biological impacts; aiding in the development of a policy on dredging; and studying the effects of additional ecosystem restoration measures. Such a study requires a longer-term effort but should be initiated as soon as possible.

2. The Missing Plan

I believe that the basic elements of a coherent Delta Plan can be found in my comments on the first staff draft dated February 21, 2011, and Tom Zuckerman's ten "Big Affordable Ideas" dated March 30, 2011. If you combine the ideas in these two documents, you will have a more complete and coherent Delta Plan than can be found in the third staff draft. The ideas in these two documents are general in nature, rather than specific with regard to location and other details, but that is really all that can be done pending the completion of detailed studies of the kind listed above. At this time they also generally lack the quantified or otherwise measurable targets that are required by the legislation, although I have suggested tentative minimums for environmental flows and sustainable water exports. I have also suggested that an updated DRMS-type study be used to monitor progress in reducing flood and earthquake risks to the Delta. That risk is both a function of capital improvements to make the levees more robust and use of improved methods to both monitor levees to warn of impending failures and to respond to impending failures. These measures should include Mr Zuckerman's idea of overbuilding critical levees in the Western Delta and elsewhere.

My own ideas are weakest on water quality. While my idealistic suggestion that anyone

who uses the water of the state should return them in no worse condition, is not entirely practical and is far outside the reach of the Council, I do believe that, independent of the State Water Resources Control Board, the Council could set its own targets for water quality at selected location throughout the Delta. Then, any project with significant water quality impacts within the Delta or the watershed that moves water quality towards meeting those goals would be applauded, and any project that moves water quality away from meeting those objectives would be deemed inconsistent with the Delta Plan. This also provides an example of one of the limited instances in which I believe the Council's authority extends outside the legal Delta and where, for better or worse, it is justified that there be one more layer of regulation on top of all the existing regulations.

Because of this, I believe that it is appropriate to include the watershed as a secondary planning area for the Delta Plan although I agree with SFWCA and others that W.C. 85304 means what it says, which is that "the Delta Plan shall promote statewide water conservation, water use efficiency, and sustainable use of water", rather than regulate those things, and that the areas outside the watershed that use water from the Delta should not be included as a secondary planning area. A Delta Plan that includes rules for a conveyance and storage solution that effectively guarantee minimum annual developed water out of the conveyance and storage solution, that is paid for by the beneficiaries, and that has greater capital and operating costs as the guaranteed minimum increases, will automatically promote all three of these good, green things. While I believe the Chairman has been less than correct in repeatedly suggesting that there is no win-win solution to the current problems, I am pleased to see that he has now modified that to no win-win solution at no cost to anyone. That is correct, and it is the cost of proving more reliable water supply that will drive water conservation, water use efficiency, and sustainable use of water in at least the areas of the state supplied through the Delta.

3. Some Possible Recommendations

In my remarks to you on February 24, I noted that mention of the need for a policy on dredging had been omitted from my written comments on the first staff draft and I suggested that while a chapter on governance is not needed in the Delta Plan, somewhere, perhaps not in the Plan itself but in a separate document, the Council does need to call for State and Federal legislation to broaden the powers of the Council so that you become the one-stop permitting agency for things like dredging. I was therefore pleased to see the comments from the Bay Conservation and Development Commission staff dated April 15, 2011, which say in part "the Bay Plan's dredging policies encourage the reuse of dredged material in wetland restoration projects, as appropriate, and

support efforts to fund the additional costs associated with transporting dredged material to project sites. We suggest that the Delta Plan encourage the coordination of use of dredged material in the Bay and the Delta as part of a regional sediment management strategy". That does not necessarily mean that there should be yet another agency created, but it does mean that the Council or any further Delta-specific entity that is created to facilitate dredging, levee construction and restoration of flooded islands in the Delta should closely coordinate with the BCDC on dredging policy and related issues.

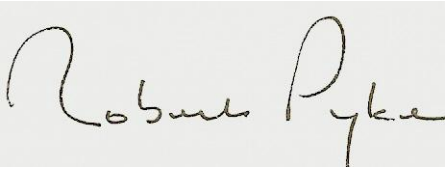
In my comments on the second staff draft I went on to say that I was not sure how practical it was to more generally broaden the powers of the Council over actions that take place strictly in the Delta such as dredging so that you become the one-stop permitting agency for things like dredging, levee construction, restoration of the flooded islands and other eco-system restoration activities, but I am further warming up to that idea. Regardless, I strongly support Mr Zuckerman's suggestion that responsibility for emergency-response planning and levee improvements be turned over to a Delta-region authority with an appropriate funding base. This would include taking over responsibility for the existing subventions and special projects funding that are administered by DWR. This idea is not inconsistent with the recommendation in the third staff draft for a Delta Flood Management Assessment District, although the reporting required under bullet two should be to the Council, not to DWR, and the suggestion that propositions 1E and 84 funding be used to develop and implement a levee improvement plan is questionable, if not downright illegal. Those funds were intended to be applied to actual levee improvements, not to endless paper studies, and diversion of these funds to other uses is improper.

Creation of this new district would of course require additional legislation but since the activities of this district and the existing reclamation districts, which it would fund, while no longer hamstrung by the bureaucracy of DWR, would still be hamstrung by having to deal with something like 19 regulatory agencies, I think that there is a persuasive argument to go the extra miles and seek state and federal legislation that gives the Council one-stop permitting authority for all dredging, levee construction, and eco-system restoration activities in the Delta. The ecosystem restoration activities would include but not be limited to restoration of flooded islands, other strategic dredging, construction of water-side eco-berms on existing levees and enhancement of mid-channel berms in the dredger cuts, possible conversion of some islands and tracts to managed wetlands or tidal marshes, possible consolidation of some islands or tracts into larger polders, and possible modest changes in channel geometry in order to add more complexity in flows and retention times. I understand that the legislature considered giving the Council these powers in the 2009 legislation but stopped short of doing that, but without such legislation little if anything will ever get done. In this

model, the actual improvements would be made by the new Delta Flood Management District and the existing reclamation districts, the Delta Conservancy and others, and whatever entity is charged with constructing new conveyance facilities, but the Council, in conjunction with the Delta Protection Commission, would serve as big brother ensuring that the co-equal goals, including the second sentence, were respected. Intelligent application of the Council's powers would of course involved extensive cooperation not only with the BCDC but also with the Department of Fish and Game, the State Water Resources Control Board, the federal fish and wildlife agencies, and the state and federal environmental administrations, but the buck would stop with the Council. It would be the responsibility of the Council not only to ensure that no harm is done relative to the co-equal goals, but to make sure that things actually get done to advance the co-equal goals. This model could serve as an example to the rest of the nation and the world of how to escape from suffocating bureaucracy and maintain a balance between sustainable environmental and economic aspirations.

In summary, I would suggest that the next draft of the Delta Plan needs less minutiae and more bold ideas. My comments on the first staff draft ran 29 pages, but a lot of that was commentary. I don't see why the plan itself should be more than about 20 pages.

Respectfully,



Robert Pyke, Ph.D., G.E.

Robert Pyke, Consulting Engineer

March 21, 2011

Mr. Phil Isenberg
Chair, Delta Stewardship Council
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Sacramento, California 95814

Re: Comments on the Second Staff Draft of the Delta Plan

Dear Chair Isenberg and Council Members,

I regret that it is not possible to make constructive comments on the content of this second staff draft. In the space of a month the staff has gone from a plan with findings but no policies, to a plan with tentative policies but no basis for those policies. The legislative requirement that the plan include "quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan" is still not addressed. Such targets are not something that can be added at a later date. If you do not have a clear idea of the current situation and the future goals, how can you construct a plan to move from one to the other? However, I would like to make the following four points in the hope that they will be of value to you as you try to right this foundering ship and bring it safely into harbor.

1. Handling of public comments.

I have read most of the public comments submitted subsequent to the issuance of the First Staff Draft. As with the scoping comments on the EIR, there are in my judgment both many excellent comments and common threads amongst the comments from disparate stakeholders. However, not only do I not see these reflected in the Second Staff Draft, but I have to say that your "workshop" on March 10 and 11, while also producing many excellent comments, was not structured with a view to bringing people together. You continue to provide a platform for posturing and polarization that is little different from what happens on cable television news programs. What is needed is facilitated communication.

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2. A policy on dredging (with wider implications).

In my remarks to you on February 24, I noted that mention of the need for a policy on dredging had been omitted from my written comments on the First Staff Draft. Dredging in the Delta continues to be necessary to maintain, and perhaps to deepen, the deep-water ship channels, and for other reasons associated with the Council's mandate to protect and enhance the values of the Delta as an evolving place. Although the historic use of dredging to maintain and improve levees is being supplanted by use of compacted dry fill, extensive dredging may be required to restore the sunken islands and to make other small but important changes in the geometry of the Delta islands and channels. But dredging in the Delta currently requires the pulling of nineteen separate permits. Thus, while I have previously opined that the new governance structure for the Delta is already in place and that a chapter on governance is not needed in the Delta Plan, somewhere, perhaps not in the Plan itself but in a separate document, the Council does need to call for State and Federal legislation to broaden the powers of the Council so that you become the one-stop permitting agency for things like dredging. Imagine – simplify the process and give the authority to someone who is already charged with balancing competing interest in the Delta. I know many people will say that this cannot happen because it makes too much sense, but nothing ventured, nothing gained? The more difficult question is to what other issues could these broadened powers be extended? Ideally, some of the powers of the State Water Resources Control Board and the Department of Fish and Game might be transferred to the Council for actions that take place strictly in the Delta, but it is not easy to uncouple actions that are strictly within the Delta from things that happen in the watershed, so that may not be entirely practical. But, streamlining of regulations and the enforcement of regulations that directly impact conveyance of water through and eco-system restoration in the Delta and placing these issues more squarely under your control, would constitute a giant step towards achieving the co-equal goals.

3. Yet another comment on adaptive management.

In my comments on the first staff draft I wrote "*there is no need for a Chapter 4, especially if it just talks about science and logic-chains – that could be an appendix. Comments on adaptive management should be included in the actual elements of the plan, Chapters 5-9, as appropriate and should be tied to the content of those elements*". I don't know whether it was this comment that prompted the following from the Independent Science Board in their draft comments "*We were pleased to receive at our meeting, the draft of Chapter 4, which deals with adaptive management, and will comment on it at the next ISB meeting. However, we understand that there is a*

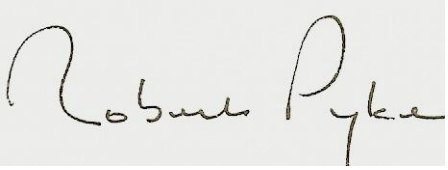
proposal to eliminate the chapter dedicated to adaptive management and disperse discussion of adaptive management throughout the Plan. We feel that would be a bad approach. A discussion of how adaptive management should be employed for each major aspect of the plan (water supply, ecosystem, water quality, risk, Delta as place) should be included in each chapter, but adaptive management is so important to the overall success in achieving the coequal goals that the framework should also be fully described in a dedicated chapter".

I don't think that any of this is a big deal. The draft of Chapter 4, when it emerged, was exceptionally well-written and it does no harm, regardless of whether it is a stand-alone chapter or merged into Chapter 2 as it is in the new draft. But I stand by my previous comment - it could be an appendix. It is fine in theory, but as Emery Roe of UC Berkeley said at this week's Delta Science Program brown-bag, the promise of adaptive management is separated from the reality of adaptive management by multiple social science issues. What matters much more is whether there is a meaningful plan to adapt in the first place. At this time there is not. Adaptive management is not a substitute or a panacea for a plan that lacks quantified or otherwise measureable targets.

4. A comment on the role of the Independent Science Board

Although I agree with many of the draft comments of the Independent Science Board on the "findings" in the first staff draft and commended them for speaking their minds, I am not at all sure that this is proper use of the ISB. As I have noted previously, the Delta Plan involves more than just science. Nor is it the role of the ISB to do the Council's dirty work for you. Their role is to advise you on the Delta Science Program and the scientific content of the Delta Plan and the BDCP. It mostly certainly is not to counsel the staff and consultants as a professor would counsel a graduate student. But you have placed them in an awkward position and you should now rescue them from it.

Respectfully,



Robert Pyke, Ph.D., G.E.

Robert Pyke, Consulting Engineer

February 21, 2011

Mr. Phil Isenberg
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Re: Comments on the First Staff Draft of the Delta Plan

"It doesn't appear anyone has yet identified a sweet spot combining economics, environment and political feasibility," Jonas Minton, quoted by the Associated Press.

Dear Chair Isenberg and Council Members,

Because the first staff draft of the Delta Plan is long on hand-wringing and short on policies and solutions, I wish to emphasize two things in the following comments. One is that there have been many excellent ideas submitted to you as part of the EIR scoping process, and otherwise, that do not appear to be reflected in this first draft. I will attempt to use some of these as examples, but will by no means be complete. The second thing that I would emphasize is that there appears to me to be more common ground in these written comments than is apparent from many of the oral presentations at Council meetings. I would suggest that you need to find ways both to be more responsive to comments from both the general public and organized stakeholders, and to bring all these various people together so that there is some reasonable consensus on the final Delta Plan. I really believe that this is possible. Unlike the Murray-Darling Basin in Australia, where there is not enough water to go around on a long-term basis, it is my judgment that in California there is enough water to go around, if its use is optimized, and if you can pry people away from the positions to which they have been anchored, in some cases for thirty years or more. In the end you, the Council, may still need to make some tough decisions, but, based on my conversations with a number of people from various stakeholder groups, I believe that you may be able to tease out more of a consensus than you expect at this point. So, rather than waiting for a more substantive draft from the staff, I am going ahead and offering some of my own suggestions on the basis that these are ideas that you should discuss with other interested citizens and stakeholder groups in an appropriate forum.

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General comments

1. **Scope**

With regard to the scope of the Delta Plan and the accompanying EIR, should you choose to complete one, I commend to you the comments of the State and Federal Contractors Water Agency dated January 28. When they say that "overbroad objectives for the content of the Delta Plan will undermine the process as well as the product", they are correct. I also agree with their assertion that "section 85021 of the (Delta Reform) Act is inappropriately included in the NOP as providing definition to the Delta Plan's objectives". But I would also suggest that the preceding section, 85020, is also misinterpreted in both the NOP and the First Staff Draft. These two sections are very clearly stated to be the policy of the State and to be "inherent in the co-equal goals", but they were not intended to be the primary basis for the Delta Plan. The specific directives regarding the content of the Delta Plan come later in Sections 85300-85309. In support of this interpretation I note that 85020(h) talks about establishing a new governance structure. You do not have to do that even though it is part of State policy. The legislature did that, and you are a key part of that new governance structure.

If you choose to complete an EIR, then no doubt the secondary planning area has to include both the Delta watershed and the areas outside the watershed serviced by the State Water Project, but regardless of the Act and of the requirements of CEQA, as a practical matter there is not much that you can do to directly mess with areas outside the Delta. Although both urban and agricultural waste water that is discharged into the rivers that flow through the Delta must have an impact on both the water quality in, and the ecology of, the Delta, there is simply not much that you can do about it. That is the job of the Water Boards, and all that you can do is jawbone about it. Likewise, statewide water conservation and water use efficiency has some impact on the demand for exports from the Delta, but while you can and should jawbone about that, there is not much that you can do about it directly. However, there are some aspects of ecological restoration of the Delta and flood management as it impacts the Delta, that might require going some distance into the watershed and additional south of Delta storage might be required as part of a long-term conveyance solution. Thus, I am not in complete agreement with ACWA, who state in their letter also dated January 28, that "the legislation limits the scope of the Council and hence the Delta Plan to actions within the legally defined Delta", but that is what you should focus on: conveyance through, ecosystem restoration within, water quality within, flood management within, and land use within the Delta. Come up with rational policies for these five issues, and find ways to finance them, and do not get into other fights that you cannot win.

Longer term, it is likely that issues such as regulation of groundwater, water rights and rational pricing of water will need to be addressed by the State, but to get sidetracked on these issues initially is, well, to get sidetracked. Therefore my comments are directed to what can be accomplished within the existing framework of dams, canals, complex water rights and screwed-up pricing. And what can be accomplished is significant. Fortunately it is not necessary to wait for solutions to these longer term problems, to solve the basic problems of the Delta. Unlike the Murray Darling Basin in Australia, there is still enough water, on average, to satisfy most if not all of the demands in California, provided that the *variability* of supply is accommodated. I will develop this thought further below in discussion of Chapter 5.

2. **Use of best available science**

The Act specifically calls for the Delta Plan to "be based on the best available scientific information and the independent science advice provided by the Delta Independent Science Board". This is right and proper and I commend the staff for coming up with a reasonable definition for "the best available science". The ecosystem restoration element of the Plan should not be based on anything other than the best available science. However, as illustrated by the recent report of the ISB on ranking of stressors, the best available science may not go very far in lighting the way to solutions. More generally, I would caution you not to think that every problem has a solution with a strictly scientific basis, or a calculated solution with little uncertainty, even within the ecosystem restoration element. Many of the solutions will necessarily be based more on consensus good management practices than on pure science. And other elements, such as conveyance and flood management, are almost purely engineering problems, not scientific problems. Use of "the best-available science" or "good science" is necessary, but not sufficient, to address complex environmental and engineering problems such as those being faced in the Delta.

Science after all is the systematic gathering and assessment of observable phenomena. It is directed to unraveling the mysteries of the universe rather than to solving problems. Scientists are people who like to unravel and study problems. Engineering, on the other hand, is about using one's ingenuity to solve problems. The term "engineer" comes from a French word that means ingenuity. Engineers are people who like to solve problems, or at least they used to be before bureaucracy took over.

"Good engineering" requires consistency with "good science". That has always been true, from Babylonian through Egyptian and Roman times down to present day, but for most of this time political and military objectives have dominated over the objectives of

compatibility with the environment and sustainability. In the mid-twentieth century, when the Central Valley Project and the State Water Project were constructed, political and short-term economic objectives dominated over the objectives of compatibility with the environment and sustainability. Today, however, population growth and the damage to natural ecosystems that have resulted from an "extraction economy" require that engineers pay much closer attention to the environment, "good science" and sustainability.

Thus new thinking is required to solve the problems facing the Delta. Thinking that accounts for both the wide variation in precipitation in the catchment area that feeds the Delta and the need for as much as possible of the natural flows to pass through the Delta before any water that is surplus to the needs of the Bay-Delta ecosystem is extracted. That may require some ingenuity. That requires "good engineering".

But good engineering and good science are still insufficient to solve complex problems. Good management is also required. In this connection it is worth taking note of a quote in a recent New York Times article about development in China " Clark Manus, who is the president of the American Institute of Architects, has a theory about the streamlined Chinese process. 'The U.S. political establishment is mostly attorneys and other people who are involved with political science', he says. 'In China, the highest-ranking officials tend to be engineers. They see a problem, they allocate money and effort toward a solution'." This is not to say that that this approach can only be executed by engineers, but the crafting of the Delta Plan must recognize the need for all three of "good science", "good engineering" and "good management", and be driven by a problem-solving mentality.

3. **Whom to believe?**

One of the challenges facing the Council is that on at least some subjects, and possibly many subjects, you will have apparently well-qualified experts offering differing opinions on technical topics. So how do you choose between those opinions? In order to trigger intelligent discussion of this subject, I offer my own version of "A Layperson's Guide to Weighting Expert Opinion".

In the first place use common-sense – spot check some facts where possible – ask around and get multiple recommendations. Then, in approximate order of importance, give more weight to the opinions of those experts:

1. Who have formal qualifications and are licensed to practice in the field in question; for example, my brother is professor of law in Brisbane Australia – he is

a pretty smart guy and a quick study so he might quickly be able to make some sage comments on California water law, but you would hardly want to rely on his opinion alone, and he could not represent you in court in California.

2. Who have practical experience not only in the field in question but also in the relevant geographic area. This is particularly important in a field like engineering which is still as much an art as a science. Experience and common-sense still outweigh the ability to do sophisticated calculations. All other things being equal, preference should be given to the opinions of people who have actually signed design drawings and stood behind their work. For example, engineers who have actually participated in the design and maintenance of levees should be given more weight than those who have performed only academic studies.

3. Who have superior academic qualifications. On the other hand, all other things being equal, higher degrees count. I would be the first to admit that a Ph.D. does not necessarily mean a heck of a lot, and in fact in some cases it is an indication of lack of common-sense, but it is an indication that you have the ability to study something in detail, and if the person in question has kept up in his/her field, that provides an understanding of what it takes to stay up to date in other fields.

4. Who are *not* trying to dredge up additional research funding by grandstanding and making problems appear to be worse than they really are.

4. **Adaptive management**

The Act specifically calls for the inclusion of "a science-based, transparent, and formal adaptive management strategy for ongoing ecosystem restoration and water management decisions". Again that is right and proper as far as it goes, but a successful adaptive management strategy requires good engineering and good management as much as good science. As an example, much of the discussion regarding the inclusion of adaptive management in the Bay Delta Conservation Plan (BDCP) has been misplaced. Adaptive management is not a substitute for a well-thought-out plan in the first place. A robust adaptive management plan requires a well-thought-out plan of action or roadmap with quantified or otherwise measurable goals, for which the consequences and effects have been modeled using robust tools. These tools can then be used to back-analyze the observed effects and can be used to test why the observed effects may have varied from the predicted effects. Then there is a basis for changes in the plan of action rather than those changes being just another guess. Moreover, there has to be a management structure that enforces discipline and can respond appropriately and logically to deviations from the predicted behavior. The subject is not called adaptive

management for nothing.

To the extent that one develops a robust plan that encompasses best management practices, the need for adaptive management should be reduced. However, there are some issues such as possible systematic climate change that can only be addressed using adaptive engineering and management. For instance, it makes no sense to design and build even critical facilities for the more extreme predictions of sea-level rise that have very low probabilities of occurrence – so low in fact that no-one can really say what they are. However, it does make sense to design facilities on a "no regrets" basis, so that they can be modified by future generations if the more extreme predictions of sea-level rise start to be confirmed by observations. That means, for instance, providing sufficient right of way for levees so that they can be safely raised, and protecting the westernmost Delta islands as a bulwark against salt water intrusion. To the extent that sea level actually rises a meter or two, further engineering measures would be required to limit salt water intrusion and damp out tidal energy in tidal marshes as it approaches the Delta, so while the initial Delta Plan should not include such measures, neither should it do anything that might make their subsequent construction more difficult. An excellent example of the intelligent application of adaptive engineering and adaptive management to the design of improvements to low-lying land is provided by the proposed development of Treasure Island in San Francisco Bay.

Finally, there is no need for a Chapter 4, especially if it just talks about science and logic-chains – that could be an appendix. Comments on adaptive *management* should be included in the actual elements of the plan, Chapters 5-9, as appropriate and should be tied to the content of those elements. Fortunately, in this case, the basic management structure is already in place in that the Council is required to update the Plan every 5 years. But that updating and adapting might require more than just jawboning to bring other agencies and their policies in line with the Delta Plan - it likely will require new legislation as well. That would be adaptive management!

5. **The need for an EIR**

At the EIR scoping meeting in Stockton I stuck my neck out a bit and questioned the need for an EIR: "While I am not a lawyer, let alone a specialist in environmental law, I find the arguments made by the State and Federal Contractors Water Agency, which is led by lawyers, and others, to be persuasive on this matter - they argue that even a programmatic EIR is not required for you to adopt and enforce the Delta Plan . I understand that, as a State agency, you are likely obliged to follow the advice of the Attorney General's Department on this matter, but I note that the Attorney General's Department is not always right – witness the Paterno case! The reason that I raise this

question is simply that you, your staff and consultants have limited time and resources to develop the Delta Plan. It would appear that sooner or later you are going to have to devote more effort to studying alternatives for conveyance, ecosystem restoration, flood management and land use, and to crafting a meaningful plan that integrates all of these elements, possibly at the expense of completing an EIR. And, if that is true, you had best address this issue sooner rather than later. An EIR for a plan that has no real content, is like a suit of armor with no-one inside it."

Further, organizations with generally opposing views, such as SFWCA and the Board of Supervisors of San Joaquin County, have made persuasive arguments that the Notice of Preparation is inadequate and needs to be revised if you are intent on proceeding with an EIR. I particularly like SFWCA's quoting of "the purpose of CEQA is not to generate paper, but to compel the government at all levels to make decisions with environmental consequences in mind". Clearly the legislature has already done that and if you complete a Delta Plan in accordance with the legislature's directives, you will be doing that also.

As I understand it, the intent of a programmatic EIR is to provide a basis for subsequent environmental documents that actually implement projects. A programmatic EIR can establish mitigation ratios or offset/describe cumulative effects or even describe large-scale effects. It is also common for a programmatic EIR to have project-specific elements that can be implemented immediately following the certification of the EIR. Generally, however, programmatic EIRs are a waste of time because they are overly broad and don't provide any value for the subsequent documents. However, the Delta Plan is required by law to include "quantified or otherwise measurable targets associated with achieving the objectives of the Delta Plan". If such targets are actually developed, they might form the basis for a useful programmatic EIR.

Organization of My Comments

My remaining comments are aligned with the chapters of the first staff draft starting at Chapter 5. Although I believe that the titles of some of these chapters could be more to the point, I commend the staff for sorting the issues into the five basic elements. Also, as recognized by the staff in the title of Chapter 12, these elements are not separate and distinct but must be integrated and include features that benefits multiple goals. I have been surprised by the degree to which that is possible. But it is possible if the Plan is based on two foundation stones. One is that the plan for conveyance must not be at odds with ecosystem restoration but should by itself, even without any add-on conservation measures, constitute a major step forward in repairing the damaged Delta ecosystem. The second is that it must be recognized that the Act does not allow for the

PPIC death wish for the Delta – acceptance that over time agriculture is unsustainable, levees will fail, and at least parts of the Delta will be converted to an inland sea. That is not even be the lowest cost solution, as the cost of re-routing the existing infrastructure that passes through the Delta likely exceeds the cost of making the existing levee system robust in the face of floods, earthquakes and possible sea-level rise. Certainly land-use in the Delta may evolve, and there may be some changes in the landscape, but the charge in the Act to the Council and to the Delta Protection Commission, is to "protect, enhance, and sustain the unique cultural, historical recreational, agricultural and economic values of the Delta as an evolving place .." This charge does not allow the Council to stand by and do nothing to maintain and improve the existing system of levees that, for better or worse, create the existing landscape of the Delta. But, just as conveyance should be handled in a way that promotes repair of the ecosystem, improvement of the levees should be handled in such a way that it serves multiple ends – not only flood protection and limiting salt water intrusion even in the face of sea-level rise, but also ecosystem repair through the restoration or addition of various forms of native vegetation on the water side of every mile of the Delta levees, providing interconnected habitat for at least some species, and adding to the recreational and tourism value of the Delta.

Chapter 5 – Manage Water Resources – i.e. Conveyance

As noted previously, this chapter or element should focus on conveyance and not get caught up on issues such as statewide water conservation, treatment and re-use of storm water and waste water, and trading of paper water, no matter how important those issues may be. It should focus on conveyance, and it should grapple with the questions of defining what a "reliable water supply" means and establishing "quantified or otherwise measurable targets" for the delivery of water to the Central Valley Project and the State Water Project. I don't mean to neglect the legitimate needs of the Contra Costa Water District, the Solano County Water Agency, the City of Antioch and other in-Delta users, but the CVP and the SWP are the elephants in the room.

There are two keys to addressing the conveyance issue: (1) Recognition that manmade alteration of the Delta in combination with larger export flows has turned the Delta from an estuary into a weedy lake which favors invasive species over native species; and (2) Recognition that precipitation in California is extremely variable and that past and future variability, which many climate scientists predict might be greater, must be addressed in any sustainable water management plan.

Therefore, two principles must be followed: (1) That natural flows through the Delta should be restored to the maximum practical extent; and (2) That much more water

should be extracted at periods of high flow and much less, or zero, water should be extracted at periods of low flows.

Adherence to these principles, with appropriate pumping and temporary storage facilities, will allow simultaneous recovery of the Delta ecosystem and sustainable exports at levels which might approach, equal, or even exceed the maximum past figure of something like 6 million acre-feet per year.

Implementation of a plan that adheres to these principles might involve four physical elements:

1. Restoration of floodplains on the Sacramento and San Joaquin Rivers and their tributaries in order to stretch out the flood hydrograph and allow export pumping at high levels for as long as possible;

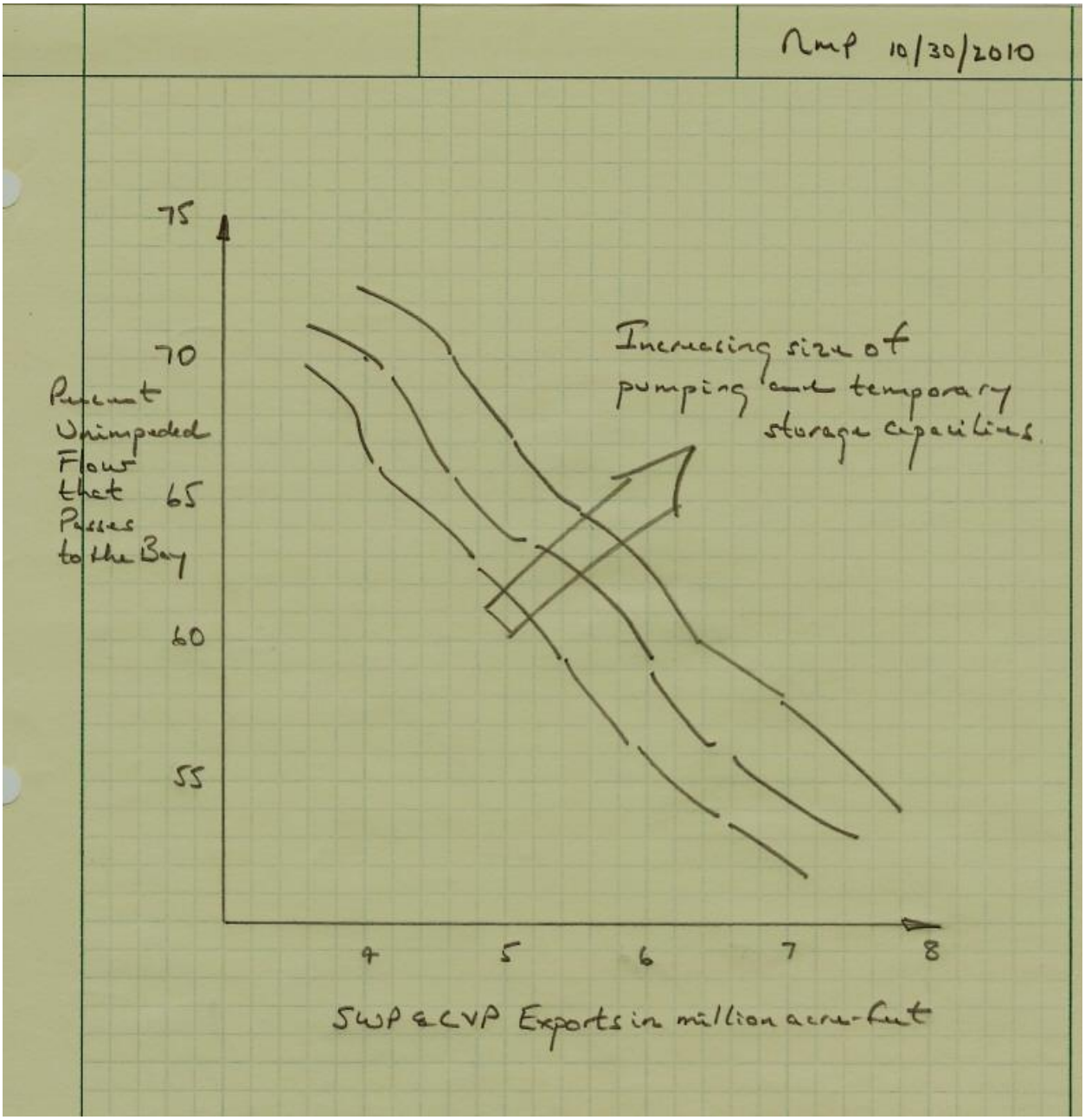
2. New pumping facilities somewhere in the Western Delta to allow flows to pass through the Delta in a natural way before surplus flows are extracted; these facilities might include some temporary storage;

3. One or more tunnels that can move the extracted water to a large temporary storage facility until the existing pumps can move it south; this storage facility would likely be located adjacent to and might incorporate the existing Clifton Court Forebay;

4. Additional south-of-Delta storage, much of it likely as groundwater but also including new Westside surface storage.

All these facilities should be designed in such a way that they can be progressively enlarged if that is justified by the initial performance. Note that the first element also provides significant flood management and ecosystem enhancement benefits.

They key to the optimum sizing of these facilities, as well as to establishing what reliable water supply means, and answering the question that has been repeatedly posed by Tom Zuckerman and others: “how much surplus water is there?” is illustrated by the graph on the following page.



Graph illustrating the trade-off between flows out of the Delta and the level of sustained exports. The size of the pie can be increased by increasing the size of the pumps and temporary storage facilities provided that they are properly located. The sizes of these pieces of the pie are also a function of the pieces of the pie not shown, which include net upstream diversions and in-Delta uses. To the extent that these uses are modified, the remainder of the pie is increased or decreased.

The numbers shown on the axes of the graph are for illustrative purposes only. The wavy lines in the figure are intended to indicate uncertainty. But there is some reason to believe that the numbers shown might be in the ballpark. The preliminary calculations made by Chris Enright at the request of Cliff Dahm that were presented at the last Council meeting, even though they were in terms of actual flow at Freeport rather than unimpeded flow, provide some support for the notion that with sufficiently large pumping and temporary storage capacity, exports at the levels desired by the Contractors might be possible at the same time that "environmental flows" approach the 75 percent of unimpeded flows that the Water Board has set as a desirable target. There is clearly a trade-off here - higher environmental flows mean lower exports, and vice versa. The Contactors can also get reliable supply at higher levels with a larger investment in new pumping and temporary storage facilities in the Delta and additional south-of-Delta storage facilities, but the Contactors would have to bear most of that cost and that has to be balanced against the willingness of both urban and agricultural water users to pay these costs, which in turn is a function of worldwide agricultural economics and the cost of alternate water supplied for urban users. Notwithstanding these complications, I believe that it is essential that you, the Council, commission a small study to develop a more formal version of this graph as part of the development of the Delta Plan. That is an essential first step in addressing questions that have been waiting for answers for far too long and providing a basis for you responding to the requirements of the Act. While it is possible that some reasonable consensus might emerge once everyone is looking at the same set of numbers, and while you should be informed by input from the Water Board and the Department of Fish and Game on the need for environmental flows, the Water Board is not going to make a determination about balancing the need for environmental flows and exports in time for inclusion in the Plan, and possibly in our lifetimes, so that it is more than likely that you will ultimately have to make a Solomon-like decision about where the sweet spot lies on the graph. But it can be done.

How much of this should end up being in the Plan? As a minimum, the two principles enunciated above must form the core of the conveyance element of the plan. The plan must also require that a study that producing results of the kind illustrated in the graph on page 10 be developed as part of any conveyance alternative. No conveyance alternative should be acceptable unless it provides satisfactory data on the long-term implications for environmental flows and sustainable water exports. I don't know how far you might want to go in specifying acceptable minimums, but any alternative that provides less than say 60-65 percent unimpeded flows for the environment and less than 5-6 million acre=feet per year in sustainable exports does not solve the present technical and political problem.
Should the Plan spell out the four physical elements enunciated above? Not necessarily, but unless someone else comes up with a conveyance alternative that satisfies the two basic principles, this is the only game in town. Note that in addition to being inherently consistent with the co-equal goals, a conveyance alternative based on these four physical

elements also does the following: in Element One, it provides additional ecosystem restoration and flood management benefits; in Element Four it encourages conjunction use of surface water and groundwater; and in Element Two, by providing a huge suck in the Western Delta at times of high flow, it reduces maximum water surface elevations in the Delta and hence the height to which levees need to be raised. One of the findings of the development of the Central Valley Flood Protection Plan that you should be aware of is that improvement of riverine levees actually increases peak flows in the Delta! That should not be allowed to happen and it is another item on which you should be jawboning, but whether that happens or not, very large pumps in the Western Delta will help move water through the Delta with lower maximum water surface elevations at times of high flow. They could also do the reverse – they could move saline water closer to, or into the Delta, at times of low flow and/or king tides. However, this conveyance alternative is self-regulating because unless the Contactors want to pay the additional cost for brackish water desalination, excessive pumping in periods of low flow will just suck salt water into the pumps!

As indicated, conveyance necessarily includes additional storage, likely in both groundwater and surface storage facilities, but I believe that the Council's emphasis should be on South of Delta storage. In fact, although this topic is a political hot potato, I would suggest that the Plan might jawbone about the fact that additional upstream storage, notwithstanding potential water supply and flood management benefits, is not desirable because it can only further disrupt the natural flows that ultimately pass through the Delta. Those water supply and flood management benefits at this point can be better provided by re-activating floodplain storage and by taking out surplus water once it has passed through the Delta.

As to who should manage and operate new Delta conveyance facilities and new South of Delta storage facilities, the answer is clear in the case of the latter – they should be planned, managed and operated by the San Joaquin Valley water users. I believe that the best solution for planning, management and operation of new Delta conveyance and temporary storage facilities would be a new JPA including the Delta Counties and Water Agencies. I can already hear the shrieks from the Contactors who seem to have the mindset of resisting things that are in their best interests, but since the kind of conveyance and storage that I have suggested represents the best chance that they have to maximize sustained exports, maybe you can bring them around. Planning, management and operation of re-activated floodplain storage is perhaps the hairiest of these management issues. Although such measures have apparently been talked about in the Central Valley Flood Protection Plan development, and have been promoted by various environmental interests, as I understand it no-one has yet reached out to the farming interests that would be impacted to start exploring solutions that might be of mutual benefit. This is something that the Council might start exploring at an early point.

In many ways the problem of constructing short-term operating rules for the CVP and SWP exports is more difficult than solving the long-term problem. While BDCP has many other problems, this is one of the major issues that has caused BDCP to founder. The Act states that "the department (DWR), in consultation with the United States Army Corps of Engineers and the Central Valley Flood Protection Board, shall prepare a proposal to coordinate flood *and water supply operations of the State Water Project and the federal Central Valley Project*, and submit the proposal to the council for consideration for incorporation into the Delta Plan". I have no idea where that proposal stands, but I would not hold out much hope that these three agencies plus the Bureau of Reclamation will offer you a proposal than you can include directly in the plan and it may be that in the short-term you can do no more than go down to Fresno and have lunch with Judge Wanger to sort out who is going to set these rules.

Chapter 6 – Restore Delta Ecosystem

Although not specifically required by the Act, it is desirable that this element of the Delta Plan be informed by input from the Delta Conservancy. I understand that that development of the Conservancy's strategic plan has been delayed as a result of funding issues, but that you have been working to help the Conservancy in that regard and I commend you for that.

As indicated above, ecosystem restoration – more properly ecosystem repair, since we are not talking about restoring the Delta to any specific previous condition – starts with a solution to the existing conveyance problems that, rather than aggravating the present situation, makes a significant improvement. But many additional "conservation measures" will need to be taken to fully achieve the co-equal goals. The broad principles that should be followed are relatively clear and should include restoring connectivity, complexity and variability to the Delta ecosystem on a landscape scale, that is throughout the Delta, rather than on a piece-meal basis. It must also be recognized that the Delta ecosystem is not a closed system and that the ocean-bay-Delta-rivers system must be addressed as a whole. But a systematic ranking or prioritization of possible conservation measures has never been done. I have suggested to the Delta Conservancy that a starting point for such an effort might be the working paper by Sandstrom et al., which draws heavily on the companion paper by Moyle et al. (both produced by the Center for Watershed Sciences at UC Davis).

Such a prioritization necessarily starts with some assessment of the drivers or stressors that impact the ecology of the Delta. The Independent Science Board having whiffed on that, I offer my own sorting of stressors. This is not a strict ranking of stressors, since I

don't know how to do that either, but it sorts the stressors into groups and makes a start at a connection with remedies. My sorting draws heavily on both the working paper by Moyle et al. and the POD report of the Inter-Agency Ecological program. In defense of the ISB, I note that, as explained in the landmark paper on altered flow regimes by Bunn and Arthington, the necessary detailed observations were not made during the decline of most rivers and estuaries to allow the development of robust detailed correlations of causes and effects on a scientific basis. Bunn and Arthington express the hope that that will be done as these ecological systems are repaired, and that that will guide adaptive management, but in the meantime there is a need to go forward in accordance with broader principles and best management practices.

Tentative ranking of stressors

1. The first order factors:

a. Climate variability, including both the magnitude of winter and spring freshwater pulses and oceanic conditions (which are very significant for anadromous fish but not so significant for other species) - *out of our hands*.

b. Flow regime – *we have significant but not complete control (reservoir operations, upstream diversions and conveyance/pumping operations)*

2. Landscape - *have all been altered by man, we have limited but nonetheless some significant opportunities to reverse course*:

a. Connectivity
b. Complexity
c. Variability

3. The second order factors - *which are mostly a function of 1 and 2, and are not really independent unless you want to physically stir up turbidity or construct salinity control barriers:*

a. Salinity
b. Temperature
c. Turbidity
d. Natural nutrients

4. Introduced stuff - *should all be eliminated – you use the waters of the state, you return them to the river in the same condition*:

a. Unnatural nutrients

b. Contaminants
c. Disease

5. Harvest- *the first of these should be eliminated or at least reduced to insignificant levels*:

a. Entrainment
b. Predation
c. Fishing

Tentative list of conservation measures

On the basis of this sorting of stressors, the following can be suggested as the more obvious things to do (in addition to regulating flow which is addressed in Chapter 5 and regulating water quality which is addressed in Chapter 7 – also note that some of these actions are necessarily integrated with actions discussed in Chapters 8 and 9):

1. Restore sunken islands including Franks Tract, Mildred Island and Western Sherman Island as tidal marsh and/or tule marsh.

2. Work with the Bay Conservation and Development Commission (BCDC) and the existing landowners, who are primarily duck clubs, to convert the Suisun Marsh into tidal and sub-tidal wetlands

3. Encourage the growth of native vegetation on the water side of all Delta levees which will not only provide significant ecological benefits but also recreational and tourism benefits. At selected locations this vegetation may be extended into the existing waterways on berms, or up widened levees to create riparian habitat.

4. Preserve the tradition of agriculture in the Delta as much as possible while developing mechanisms to encourage agricultural interests to adopt habitat friendly agricultural practices such as those employed by The Nature Conservancy on Staten Island, providing benefits to wildlife, recreation and tourism.

5. Restore some measures of complexity to the Delta waterways by, in addition to creating more natural channel margins as discussed in (3) above, making use of both set-back levees and berms to create more natural slough geometries, and using rock barriers to create more dead-end waterways.

6. Convert additional lands to tidal marsh and sub-tidal habitat.

I defer to others on the subject of establishing quantified or otherwise measurable targets for the combined effects of all the ecological repair related actions discussed under chapters 5-9, but note that the Act refers to doubling salmon population – I have no idea what the base is for that, but getting the combined salmon runs back to the order of a million or more might be a better target. In my judgment the goal should be not just to avoid jeopardy for listed species but to obtain a flourishing ecosystem, which might not be as rich as that which existed before European development, when native Americans lived in harmony with their brothers and sisters in the plant and animal worlds, but is still the envy of the developed world.

Chapter 7 – Improve Water Quality

There are three big water quality issues in the Delta: (1) flow and circulation; (2) salt water intrusion; and (3) introduction of nutrients and contaminants from the watershed and from within the Delta itself.

The first of these is under your direct control and will be addressed largely, but not entirely, by adopting a rational solution for conveyance. The principle element that will still be missing is the need for further increased flows in the San Joaquin River but that is a tough nut to crack and it is one of the fights that you would be wise not to get into in the initial Delta Plan.

The second of these big water quality issues is also under your control, or rather under the joint control of the Council and of BCDC. It is obviously strongly impacted by the solution for conveyance and the Solomon-like decision that you are going to make on flow criteria. But longer-term, depending on the observed rate or sea-level rise, other actions may need to be taken in concert with BCDC. In dealing with tidal influence on top of sea-level rise, there is the option of restoring additional tidal wetlands around the Bay, as opposed to diking off the lands around the Bay, thus absorbing more tidal energy within the Bay, or doing the same thing around Suisun Bay and in the Suisun Marsh. Likely both would be needed and the Council and BCDC will need to act together to promote the restoration of further wetlands, even if it means rolling back existing development in some cases. Fortunately, this is not an immediate concern and in my judgment this is not an issue that needs to be addressed in the initial 5-year Delta Plan, but during that initial 5-year period, longer-term solutions, which might include restricting flows in and out of the Delta by narrowing channels or by the construction of engineered barriers, will need to be studied.

The third big water quality issue, that of the introduction of nutrients and contaminants from the watershed and from within the Delta itself, without additional legislation, is clearly more the responsibility of the Water Boards than of the Council. But the Council can and should jawbone on this issue. My phrase "*you use the waters of the state, you return them to the river in the same condition*" has attracted some attention in earlier drafts of this document! But, it seems to me that that should be the long-term goal. And, some intelligence needs to be applied to the issue. Individual farmers, particularly in the Delta, but also elsewhere, cannot be expected to fully treat all return flows, but there is no excuse not to have tertiary treatment of all return flows from urban areas and aggregations of farmland. In the short-term, one of the most significant things that you might do is to apply pressure to the Bureau of Reclamation to solve the San Luis Drain problem in a satisfactory manner. It is my understanding that that remains their legal responsibility and you might use that fact as a bargaining tool in any discussions regarding both short and long-term flow criteria. I also commend to you the comments of the Contra Costa Water District regarding water quality.

Chapter 8 – Reduce Risks to People, Property, and State Interests in the Delta – i.e. Flood Management

Flood management in the Delta is mostly, but not entirely, about levees. The Delta Plan is supposed to be informed by the Central Valley Flood Protection Plan, especially with respect to flood flows and maximum water surface elevations, but it does not appear that that can be done using real numbers until the second edition of the Delta Plan. In the meantime a rational policy on Delta levees needs to be enunciated which can cope with whatever maximum water service elevations are determined subsequently. In some respects this is not a major problem because, although I believe that the target must be to have significant levee improvements in place within the next ten years, final design of these improvements cannot commence until financing is in place, and that might take several years.

As noted previously, the Act also states, with different emphasis this time, that "the department (DWR), in consultation with the United States Army Corps of Engineers and the Central Valley Flood Protection Board, shall prepare a *proposal to coordinate flood* and water supply *operations of the State Water Project and the federal Central Valley Project*, and submit the proposal to the council for consideration for incorporation into the Delta Plan". I assume that the flood control part of that proposal will be included in the Central Valley Flood Protection Plan in due course.

As you are aware, the Delta levees have become something of a technical and political football and I will therefore spend some time addressing some of the background issues before suggesting a rational Delta levee policy.

For starters, it does not seem to me that letting Delta levees fail is an option. This is the result in part of the language in the Act: " the council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and non-project levees"; "the Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments". Abandoning the Delta levees is also at odds with the core requirement to "protect, enhance, and sustain the unique cultural, historical recreational, agricultural and economic values of the Delta as an evolving place .."

And, the arguments to the contrary, such as that made by Jeff Mount in his letter to you dated January 7 commenting on the Flood Risk White Paper
"to date, all planning efforts have failed to consider that it is more economically efficient to allow some islands to remain flooded following levee failure. New policies need to be established that address this" are flawed. It is not at all clear that it is more economically efficient to allow the Delta islands to remain flooded, should there be a levee failure. This conclusion is, I assume, based on the economic analyses in the PPIC reports which failed to account properly for non-agricultural uses and values. It is true that one of the desirable characteristics of a good investment in the Delta that was suggested by Moyle et al. in the working paper previously cited is "create/allow large expanses of low salinity (1-4 ppt) open water habitat in the Delta"; but this is at odds with more general water quality goals and it must be noted that the historic Delta in fact never contained large expanses of open water. Flooded islands also have other undesirable features such as increasing the loads on adjacent levees and potentially eliminating habitat for listed terrestrial species. Thus, a more rational strategy is not only to work to limit or prevent future levee failures, but also to restore in some form the presently flooded islands.

Before beating to death some of the technical issues involved in the debate over Delta levees I should emphasize that there is really not that much difference between the "doomsday school", represented by Jeff Mount and Ray Seed, and the "they are not so bad, but they could be better" school, represent by Gil Cosio and myself. These differences get amplified in public discussion for various reasons, but can be bridged in private discussions. It is certainly true that the "doomsday school" can sometimes be correct. I am one of many engineers who knew that the New Orleans flood protection

system was a disaster waiting to happen and, like Bob Bea, I regret not having spoken out more publically on that issue. But more often than not, the "doomsday school", both in engineering and in environmental science, blows up a legitimate smaller concern into a larger concern for in part the same reasons that minor differences between experts get amplified in public debate or lawsuits. The best local example that I can give of the "doomsday school" run amok is the story of the BART Transbay Tube Uplift. As part of an overall system vulnerability study, a large A-E firm in consort with a professor of structural engineering, raised the specter of the Transbay Tube floating to the surface of the Bay in an earthquake and this became the center-piece of BART's effort to pass a bond measure to finance the overall system improvements. Some test sections costing millions of dollars were constructed to evaluate possible mitigation techniques and the cost of mitigating the alleged problem the full length of the tube was estimated to be in the order of $300 million. However, this issue had been considered by the original designers of the tube, who had advisers that included that late Professor Harry Seed, and there was in fact no mechanism that would allow uplift. This was finally confirmed by an updated engineering study that included both advanced analyses and centrifuge tests at UC Davis and the $300 million has been reallocated – although you have never read that in the press!

Next, it is necessary to make some comments about the Delta Risk Management Strategy (DRMS) and the recent presentation to the Council on earthquake hazards and the risk to levees by three geologists from the US Geological Survey (USGS), because the actual DRMS documents and the USGS presentation and the subsequent debate over them, unnecessarily colors rational consideration of the Delta levees.

As you are aware, DRMS was a study of overall risks to the Delta, but with prime emphasis on levees, commissioned by DWR in response to AB 1200. It was extensively reviewed, including a review by an independent review panel assembled by the Cal-Fed Science Program. That review concluded that "the revised DRMS Phase 1 report is now appropriate for use in DRMS Phase 2 and serves as a useful tool to inform policymakers and others concerning possible resource allocations and strategies for addressing risks in the Delta". But the IRP then went on to say: "This conclusion, however, is subject to some important caveats. First, the IRP cautions users of this revised DRMS Phase 1 Report that future estimates of consequences must be viewed as projections that can provide relative indicators of directions of effects, not predictions to be interpreted literally."

Notwithstanding the overly scientific bias of the IRP, I believe they were correct in concluding that DRMS developed a good framework for assessing risks to the Delta levees but that one should be wary of taking the results literally. That is no reflection on the co-PI's, Marty McCann and Said Salah-Mars, in part because the DRMS effort was

schedule driven and had data gaps that were drawn to DWR's attention but never filled. It is well known that lack of data and knowledge in this kind of study tends to drive the estimates of fragilities down, and the risks up. Further, significant improvements have been made to some Delta levees under the subventions program since DRMS was completed, so that DRMS may already be out-of-date. Also, in addition to the on-going studies performed for various reclamation districts, it is my understanding that additional data has been acquired on the northern Delta levees as part of DWR's Non-Urban Levee Evaluation program and that further data may be acquired in the Central and South Delta under that program. The Corps of Engineers, in collaboration with DWR, has also embarked on their own "Delta Islands and Levees Feasibility Study", and that may develop additional data. Thus, rather than relying on results from DRMS, I would suggest that you should take the lead in drawing on the results of these additional studies and use the DRMS framework to make updated and better estimates of current and future risks to the Delta levees.

But much more egregious than misuse of the DRMS results by a variety of people was both the invitation to the USGS to speak, and the content of the USGS presentation at the last Council meeting. I am sure that Eric Nichols was well-intentioned, but anyone with even modest knowledge of this field knows that the USGS personnel tend to grandstand and at best they should be included in a panel discussion that includes people with other views. I note that the co-PI's have written to both you and to the USGS and that in response USGS management has issued a qualified retraction, but the initial presentation was widely reported, including in your own newsletter, without qualification, and the damage that was done, as with the misleading statements in Joe Grindstaff's cover memo to the first staff draft, is difficult to contain.

Briefly, what was wrong with the presentation is that most of it was showboating and the USGS geologists were wrong on at least two key issues. The showboating included showing examples of levees failures which are largely irrelevant to the Delta. I happen to be very familiar with Christchurch, New Zealand, for instance (it is the only place in the world where I have ever been an expert witness on the losing side of a lawsuit). The levees that deformed or "failed" there sat directly on top of very recent and loose sand deposits. The natural sand deposits that some people worry about liquefying in the Delta are <u>under</u> the peat and thus much older – but perhaps I am getting too technical. Joe's Fletcher citing of amplifications of ground motion by a factor of 40 in the Mexico City earthquake was purely scare tactics. We know why such amplifications occurred in Mexico City and why they will not happen in the Delta.

Marty and Said have elaborated on the major criticism made by USGS of DRMS, which was that only firm soil attenuation relationships were used. It is true that the section of the DRMS report that deals with seismic risk to the levee system runs some 270 pages

and so not many people have actually read it, but if you do read it, it is clear that as a first, logical step, DRMS used firm soil attenuation relationships, but then in a second step they conducted both equivalent linear and nonlinear analyses of the response of the local soil conditions and levees. It may well be true that the activity of the Greenville fault may now be thought to be greater than it was even a few years back, but that still does not make a dramatic difference to the seismic hazard in the Delta, and it was outrageous for Dave Schwartz to say that prior studies, meaning DRMS, made "very, very unrealistic" assumptions.

A second major error in the USGS presentation was Dave's statement that "We are less sophisticated at retrofitting levees for earthquake risks as we are at retrofitting buildings". I have two problems with that. One problem is that, although Dave is an unusually well qualified and able tectonic geologist, our relative ability to retrofit buildings and levees is an engineering question, not a geologic question. The second problem is that the assertion is just not correct. Nor was Joe Grindstaff's comment, reported by Matt Weiser in the Sacramento Bee, that "We have no earthquake standard for levees in the state, it's not something we design a levee around yet." It is true that DWR has been slow to develop procedures for analyzing the earthquake hazard to levees and in drawing up standards, but the DWR Urban Levee Evaluation includes consideration of earthquake shaking and so does the recently released 4th draft of the DWR Interim Levee Design Criteria. While specifically for urban levees, these criteria address what are called "non-intermittent" levees, i.e. Delta levees and constitute a useful step towards developing appropriate standards for Delta levees. Otherwise, in addition to working on both Delta and riverine levees, including serving as an expert witness in the Paterno Case, I have worked on evaluating the earthquake hazard to levees around San Francisco and San Pablo bays since at least 1977. These levees protect both homes and landfills that contain varying amounts of toxic waste. Neither BCDC, nor the multiple agencies that regulate landfills, will accept even low probabilities of failure of these levees. As to whether it is easier to retrofit a levee or a building structure, as someone who has also worked on the BART seismic retrofit program and the design of the new East Bay Bridge, as well as a number of school and hospital buildings, I will assert that making a levee robust to withstand earthquake shaking is a lot simpler than retrofitting or even designing a new building or bridge structure to be robust. Basically it just takes a wider cross-section and more dirt

Now to some relatively brief comments on the Flood Risk White Paper. I refer you to the comments submitted by the Central Valley Flood Control Associates and by MBK Engineers for additional comments.

Section 11a, page 5-9 and ff. **Earthquakes**. This section generally demonstrates a less than deep understanding of the issues. For instance, it is pointless to cite a DWR 1992

report (that is not listed in the references) and to include a chart from it as Figure 5-5. On the other hand, the seismic risk portion of DRMS was relatively well done and the results shown in Figure 5-14 can serve as a useful starting point for an intelligent discussion of earthquake-induced failure of levees. Figure 5-14 indicates that the 100 year return period peak ground acceleration (pga) in the Delta ranges from 0.1 to 0.2g in firm soils. The phenomenon of liquefaction is generally cited as the greatest contributor to the hazard faced by the delta levees and this level of acceleration is lower than that which has been observed to trigger liquefaction in hydraulically-placed dams and sand fills. Further, the examples of liquefaction-induced failures that are shown in Figures 5-8 to 5-13 are of questionable relevance. The subsurface conditions in the Delta are unique and unlike those of the case histories shown in these figures. In the Delta there are two different kinds of soils that may be susceptible to liquefaction. One is the topmost sand layer that underlies the peat. This, relatively thin, layer typically shows low penetration resistances and may be considered by some experts to be susceptible to liquefaction, however, these natural deposits are quite old, predating the formation of the peats, and others experts would argue that this reduces the probability of liquefaction considerably. The other kind of soil that is susceptible to liquefaction is hydraulically placed clean sand that has been dredged from the main river channels and placed in adjacent levees without compaction. The actual extent of these materials is unclear and it may be that these materials are sufficiently well drained that most of the excess pore pressures that are generated by earthquake shaking would quickly dissipate so that any deformations would be limited. Thus, a fair summary would be that the risk of failure of Delta levees due to earthquake shaking cannot be dismissed but that further detailed studies are required to determine whether it rises to significant levels.

Section 11b, pages 5-20 **Sunny Day Failures**. The White Paper cites numbers from DRMS in spite of the fact that the IRP cautioned against taking DRMS numbers at face value. And the number cited of a levee breach due to causes other than flood or earthquake of once every 10 years is inconsistent with the recent actual performance. In fact there have been three major "sunny day" failures in the last 30 years, the 1980 failure of Lower Jones Tract, the 1982 failure of McDonald Island and the 2004 failure of Upper Jones Tract, consistent with one failure every ten years, however the first two of these resulted from operation of the PG&E gas storage facility under McDonald Island (knowledge developed when I served as an expert witness in the litigation that followed the McDonald Island failure). Thus, the true rate of sunny day failures due to unknown causes is less than once every 30 years. Further, improvements in systems for monitoring the internal condition of levees (as was asked about by Council Member Hank Nordoff at an early Council meeting) should allow more prompt discovery of dangerous conditions in the future and further reduce the probability of sunny day failures.

If anyone is still reading at this point, I apologize for the long-winded introduction, but it is necessary to combat the misinformation that runs rampant on the subject of Delta levees and earthquakes. Finally, before getting to my suggested Delta levee policy, I want to repeat and comment on several other points contained in Jeff Mount's letter on the Flood Risk White paper:

- Levee fragility, including the different potential causes and consequences of levee failure, is highly variable in the Delta. Therefore, one-size-fits-all levee policies are unlikely to be successful.

- Current levee policy is driven by state and federal levee standards that are uniformly applied, regardless of risk. This leads to inefficiencies at mitigating risk and is unlikely to perform well under changing future conditions.

- Risk-based approaches, which seek to make strategic investments that yield the highest risk reduction, are likely to be most successful, as well as transparent and objective.

There is some validity to each of these points. However, the variability of subsurface and levee materials is routinely taken into account in the design of Delta levee improvements. And, in part it is because of variable soil conditions and properties that we always use factors of safety in geotechnical engineering. We know that we can't always control the properties of the materials that we have to work with. To be sure, existing state and federal levee standards are not directly applicable in the Delta. That is why you, the Council, should take the lead in developing a Delta-specific levee policy. As noted in Point 9 of my suggested Delta levee policy, it is impractical to design Delta levees, or in fact any levee system, to precisely have a uniform risk, although we should work in that direction. However, a more useful role for risk analysis would be to use the DRMS methodology with improved and updated data as a tool for evaluating progress on making the levees more robust. A first update should be completed in the near future to serve as the base case.

A rational policy for Delta levees

The historic Delta has been modified by the creation of islands surrounded by levees. The following points assume that this configuration will be largely preserved, partly to protect the existing infrastructure, including water conveyance, and partly to maintain the Delta as a Place. While some evolution in uses is likely, significant change in the geometry of the Delta islands is unlikely. The failure of Delta levees and the creation of

open water within the Delta will not restore the historic condition and is undesirable for a number of reasons. Restoration of some measure of complexity to the Delta waterways is desirable but this can best be accomplished by recovering the sunken islands, not as farmed islands but as tidal wetlands, by encouraging the growth of native vegetation on the water side of all the levees and perhaps adding water side benches, and possibly by restricting the flows in selected channels.

1. Opinions vary as to the current condition of the delta levees but these differences are exaggerated in public discussion as a result of posturing by one side or another.

2. Dave Mraz of DWR gave a very good summary at an early meeting of the Delta Stewardship Council of the current status of the Delta levees: (i) the levees hold back water every day so that their static stability and seepage control measures are pretty good; (ii) "sunny day failures" are still a problem but the likelihood of these failures can be minimized by better monitoring; (iii) earthquake-induced failures are a legitimate concern but opinions vary on how great the hazard really is and more precise evaluations are hampered by a lack of data (paraphrased).

3. The DRMS study is not a good basis for drawing any numerical conclusions because it was schedule-driven and hampered by big data gaps.

4. With continuing improvements funded by the State's subventions program and the $200m that is being made available by the Federal government through the Corps of Engineers, the Delta levees are, or will be, in not such bad shape for flood and earthquake loadings with a 100 year return period.

5. However, given the importance of the levees for maintaining the Delta as a place and protecting the vital infrastructure that runs through it, designing for a 100 year return period is inadequate. Critical structures in this state like schools and hospitals are designed for something like a 1000 year return period. The new East Bay Bridge, which is a critical structure, but no more critical than many of the Delta levees, was designed for 1500 year return period ground motions. On balance, design for flood and earthquake loadings with return periods in the order of 500 years would appear to be appropriate. This corresponds to higher probabilities of failure than are used for instance in the Netherlands, but the economics and politics are different in the Netherlands and they really don't meet their stated criteria anyway!

6. It is feasible to design for 500-year return period loadings by widening the existing levees on the land side as shown by the "super levees" designed for Delta

Wetlands. Such levees can be constructed at a cost which might be in the order of $5m per mile. These levees can also easily be raised as necessary to accommodate sea level rise.

7. A critical component of the ecosystem restoration element of the Delta Plan should be the restoration of native vegetation on the water side of every Delta levee. This might require the installation of an engineered rodent and root barrier but can otherwise be easily accommodated by using a more substantial levee section.

8. Other levee standards are not applicable to the Delta and the Delta Plan should include a Delta-specific levee standard. This standard should require advanced monitoring for defects on a regular basis and real-time alerts of deformation or failure. An attractive approach for the former has been developed by Professor Ken Stokoe of the University of Texas, and for the latter by Professor Jason de Jong of UC Davis.

9. Both Jeff Mount and Bob Bea are calling for wider use of risk- based approaches for dealing with the Delta levees. That is fine in theory, and an updated risk assessment might be a good way to prioritize spending on Delta levees, but it should be recognized that there are significant uncertainties in such analyses and that they cannot be used directly for design purposes. However, a suitable quantified and measurable target for evaluating Delta levees might be that, with the exception of designated non-critical islands, 90 percent of the remaining levees should offer 500-year protection against both flood and earthquake using a 50-year window, that is, they should have no more than a 10 percent chance of failing in the next 50 years, and the remaining 10 percent of the levees should have not less than 200-year protection. The goal should be to meet this target within 10 years.

10. The cost of the required improvements is manageable relative to the value of the infrastructure that passes through the Delta (including water conveyance) and the cost of relocating this infrastructure. A mechanism for financing these improvements is discussed under Chapter 11.

Emergency planning

The Act states in part that "the council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5", however, progress in developing that strategy is slow and it might not be available for inclusion

directly in the Plan. In the meantime I would commend to you the comments submitted by Ron Baldwin of San Joaquin County dated February 17 and in particular "The Bold Vision for Future Delta Flood Fight Response".

I also note that DWR has actively been working on both emergency response and assessment of the time that export supplies might be interrupted by massive levee failures. My understanding is that current assessment is that supplies will not be disrupted for more than six months in the worst case and likely only for shorter periods. It is important that this finding be confirmed and publicized as it undercuts one of the main arguments that has been made for the need for a BDCP-like isolated conveyance.

Chapter 9 – Protect and Enhance the Unique Cultural, Recreational and Agricultural Values of the Delta as an Evolving Place

The Act requires the Delta Protection Commission to "develop, for consideration and incorporation into the Delta Plan a proposal to protect, enhance, and sustain the unique cultural, historical recreational, agricultural and economic values of the Delta as an evolving place, in a manner consistent with the co-equal goals", and to "include in the proposal a regional economic plan to support increased investment in agriculture, recreation, tourism, and other resilient land uses in the Delta". It is my understanding that the development of the economic plan and thus the proposal has been delayed by bureaucratic hurdles but that it still might be forthcoming in time to inform the Delta Plan. In the meantime here are my own thoughts on the subject.

A policy for protecting and enhancing the Delta as a Place

The historic Delta has been modified by the creation of islands surrounded by levees. The following points assume that this configuration will be largely preserved, partly to protect the existing infrastructure, including water conveyance, and partly to maintain the Delta as a Place. While some evolution in uses is likely, significant changes in the geometry of the Delta islands are unlikely. The failure of Delta levees and the creation of open water within the Delta will not restore the historic condition and is undesirable for a number of reasons. Restoration of some measure of complexity to the Delta waterways is desirable but this can best be accomplished by recovering the sunken islands, not as farmed islands but as tidal wetlands, by encouraging the growth of native vegetation on the water side of all the levees and perhaps adding water side benches, and possibly by restricting the flows in selected channels.

1. Preserving and evolving the Delta as a Place requires a rational policy for maintaining and improving Delta levees and a mechanism for funding these improvements. This is detailed elsewhere, but I note that the cost of improving the existing levees is manageable relative to the value of the infrastructure that they protect and/or the cost of relocating it.

2. The Delta levee and water conveyance policies should allow for adaptive management in order to adjust to sea level rise as necessary.

3. Encouragement of the growth of native vegetation on the water side of all Delta levees will not only provide ecological benefits but significant recreational and tourism benefits.

4. The tradition of agriculture in the Delta should be preserved to the maximum extent possible. However, mechanisms should be developed to encourage agricultural interests to adopt habitat friendly agricultural practices such as those employed by The Nature Conservancy on Staten Island, providing benefits to wildlife, recreation and tourism.

5. The Delta Stewardship Council, in conjunction with the Delta Protection Commission and the Delta Conservancy should establish a Delta Recreation and Tourism Board that will actively promote Delta recreation and tourism, with an emphasis on eco-tourism.

6. Subdivision-type development in the Delta should be discouraged but policies should be adopted to preserve and enhance the existing towns with an emphasis on supporting both agriculture and recreation and tourism.

7. Land-use planning policies should encourage the development of recreational and tourism facilities on broadened levees that provide positive flood protection as well as access to the water.

8. New intrusive infrastructure should be prohibited, except for improved highways, and existing intrusive infrastructure such as overhead power lines should re-replace or re-routed at the end of its useful life.

Chapter 10 – Governance Plan

As previously noted, there is really no need for a governance plan. The governance plan, for better or worse, has already been specified by the Act. To be sure, additional legislation will likely be needed to provide financing of implementation of the Delta Plan

and perhaps to clarify and extend the powers of the Council, but the governance structure consisting of the Council, the Delta Protection Commission and the Delta Conservancy, is already in place.

Chapter 11 – Finance Plan

"I should be clear up front. A realistic and ambitious Delta financing plan is possible. And beneficiaries should not pay for the entire cost of this plan. The investment of some public funds can be justified. After all, the Delta Plan should generate real public benefits. But the benefits to some stakeholders will be great and the limits on public funds are real. Relying primarily on public funding would be neither fair nor realistic". Barry Nelson, NRDC Switchboard.

I offer some initial suggestions on how various elements of the Delta Plan might be funded in general accordance with Barry's thinking.

Conveyance. Improved conveyance should be paid for by the Contractors but they should not be asked to pay under this element for any environmental restoration activities other than direct mitigation required as a result of construction activities, because any approved conveyance will by itself make enormous strides towards repairing the Delta ecosystem.

Ecosystem Restoration. Other ecosystem restoration efforts should be funded by state and Federal grants, because the Bay-Delta is an estuary of state and national significance, and by private monies that may be donated to the Delta Conservancy. However, a base level of funding should be generated by a fee imposed on all users of water from the Delta and the Delta watershed, that is, upstream diverters, in Delta users, and export Contractors. All these users have contributed to the damage to the Delta ecosystem and they should contribute to its repair.

Levees. Levee improvements should be financed in part by the Federal government because of its historic support for protecting navigable waterways and because of the national economic security implications of massive failures of the Delta levees. Otherwise the bulk of the monies required should be raised by imposing fees on an infrastructure that passes through the Delta. Until such time as new conveyance facilities are completed, the export Contractors should contribute to this fund but once those facilities are completed the Contractors should be excused since they will no longer be so dependent on the levees. Delta landowners should contribute at something like the level of their historic contributions but it should be recognized that Delta landowners also contribute sweat equity by service on reclamation boards and by providing inspection, maintenance and flood-fighting services.

Chapter 12 – Integration of Policies, Performance Measures and Targets, and Adaptive Management

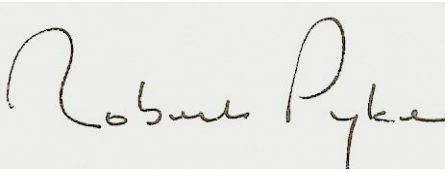
These subjects should be covered within each element and keyed to the specific policies and actions that are described in those elements, and a separate chapter is not required.

Closing Remarks

You, the Council, have been extraordinarily patient listening to presentations and public comments, but I think part of the problem is that at meetings you provide a forum for everyone to push their own point of view and this contributes to posturing and polarization. What is needed is more of what I might call "facilitated communication". There are various ways to do this and I urge you to explore them.

The choice of wording in this document is entirely my own but much of my thinking is based on the white paper by Tom Zuckerman and others that was prepared for Delta Vision. I would also like to acknowledge the help of a dozen or more people with whom I have had very useful discussions, and a subset of that group who have help edited drafts of this document. I would particularly like to acknowledge interaction with Rod Mayer, Mike Inamine, Dorian Fougeres and all the participants in the DWR Interim Levee Design Criteria process, who have demonstrated that facilitated discussion of complex issues can lead to positive results.

Respectfully,



Robert Pyke, Ph.D., G.E.

Addendum, February 23, 2011

A suggested policy on dredging and dredged material disposal is not included in these comments, but these issues are common to all five physical elements of the Delta Plan.