Comments on the BDCP Benefit-Cost Analysis

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The BDCP should stop referring to their new economic study as a benefit-cost analysis since the described analysis does not conform to established guidelines of agencies leading the BDCP.

The Department of Water Resources' Economic Analysis Guidebook (2008) begins its description of benefit-cost analysis as follows:

> "Benefit-cost analysis is the procedure where the different benefits and costs of proposed projects are identified and measured (usually in monetary terms) and then compared with each other to determine if the benefits of the project exceed its costs. Benefit-cost analysis is the primary method used to determine if a project is economically justified. A project is justified when:
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> - estimated total benefits exceed total estimated economic costs;
> - each separable purpose (for example, water supply, hydropower, flood damage reduction, ecosystem restoration, etc.) provides benefits at least equal to its costs;
> - the scale of development provides maximum net benefits (in other words, there are no smaller or larger projects which provide greater net benefits); and
> - there are no more-economical means of accomplishing the same purpose."

At best, the BDCP cost-benefit analysis will only look at the criteria in the first bullet point. In order to satisfy all four of these criteria, the benefit-cost analysis must a) separately analyze the benefits and costs of the conveyance and habitat elements, and b) consider a variety of other alternatives to address the project objectives.

The failure to consider alternatives and analyze the proposed tunnel conveyance separately from the habitat restoration elements will inevitably result in a severely biased analysis. It is no wonder that the scope of work fails to include an appropriate peer review for an economic study of the largest, most expensive, and most controversial water infrastructure project in California history.

In public meetings, the consultants themselves have appeared noticeably uncomfortable with these aspects of the analysis. Indeed, the consultants have repeatedly acknowledged the validity of comments that the analysis should look at more alternatives and have also commented that a Habitat Conservation Plan that satisfies the Endangered Species Act does not require the tunnels. However, they defer these questions to the client, represented by Jerry Meral, who has rejected requests to consider more alternatives and maintains strict control over the scope of work. Clearly, the BDCP is ignoring earlier reviews from the National Academy of

Sciences that criticized the BDCP as a "post-hoc rationalization" of the tunnels. This biased benefit-cost analysis is just another example.

While the biggest flaw in the study is the lack of an independent analysis of conveyance alternatives, the section on non-market environmental values is also very poor. Over the past year or two, Mr. Meral primary justification for refusing to conduct benefit-cost analysis is that he thought it was impossible to place an economic value on "priceless" endangered species. When he announced that they would, in fact, conduct a benefit-cost analysis and include non-market environmental values, I had assumed it meant that he had changed his mind.

Inexplicably to me, this scope of work continues to refuse to estimate an economic value on preserving endangered and threatened fish species, the primary environmental objective of the BDCP. If the environmental valuation section is going to completely ignore the primary environmental objective of BDCP, what is the point of conducting the environmental valuation analysis at all? The resources expended on this incomplete and uninformative environmental valuation analysis would be much better used on a clear, focused study of conveyance alternatives.

A much simpler analysis that focuses squarely on conveyance alternatives would be far more informative, simpler, potentially cheaper to conduct, consistent with benefit-cost analysis guidelines, and less controversial.

Below is an initial list of problems with the proposed benefit-cost analysis.

Conveyance is inappropriately bundled with habitat restoration. This is a clear source of bias. The conveyance is the most expensive and controversial piece, and must be independently justified. The tunnels are not required for compliance with the ESA.

Inadequate alternatives. It has been repeatedly stated that the chief concern of water supply reliability is the failure of the Delta levee system in an earthquake. Yet the analysis does not consider alternative and less extensive forms of addressing this risk, such as seismic levee upgrades. It is notable that the levee upgrades do not just help water supply reliability, but also provide environmental benefits by facilitating the improvement of riparian habitat and avoiding environmental damage that can result from levee breaches as described in the DRMS study. Most importantly, seismic levee upgrades would protect against loss of life and damage to other property and critical infrastructure in the Delta.

Not only were such levee upgrades recommended in the peer-reviewed Economic Sustainability Plan conducted by the Delta Protection Commission, seismic levee upgrades were identified as the lowest cost of three promising alternatives (including isolated conveyance) in a 2008 report to the California legislature by the Department of Water Resources required by AB 1200(Laird). DWR did not release the draft DRMS Phase 2 report that was described in the 2008 report to the legislature until I requested it four years later while completing the DPC economic sustainability plan.[1] That report showed that a strategy with only 100 miles, 8 islands, of seismic levee upgrades had the highest risk

[1] http://forecast.pacific.edu/DESP/report/Appendix%20N.pdf

reduction benefits and lowest cost of any of the alternatives, including a peripheral canal assumed to cost only $5 billion. In the report to the legislature, state agency staff subjectively changed the DRMS analysis rankings so that the seismic levee upgrade option was moved from first to last in risk reduction so as not to conflict with the BDCP analysis. When the final DRMS phase 2 report was released by DWR in June 2011, the seismic levee upgrade strategy had been removed from the alternatives despite having the highest rating in the unreleased, first draft. This shows that DWR already has an established history of eliminating alternatives in a benefit-cost analysis in order to bias the final analysis in favor of isolated conveyance over levee upgrades.

In addition to failing to consider levee upgrade alternatives, the analysis fails to appropriately consider smaller size alternatives, such as the 3,000 cfs option that has been recently endorsed for stand-alone analysis by the Natural Resources Defense Council, San Diego Water Authority and others.

One excuse given for the limited alternatives has been cost and time of the analysis. That is not an adequate answer for a project of this scale and controversy. Furthermore, I disagree that this would increase the complexity of the benefit-cost analysis. From comments, it is clear that the consultant is working on a speculative and complex No Action Alternative. I would argue that the No Action Alternative could be dropped altogether, and replaced with no-tunnel and small tunnel BDCP alternatives that include levee upgrades to protect water supply reliability and habitat restoration to satisfy the requirements of an HCP. Since all of these BDCP alternatives would provide similar levels of environmental benefits, the expense and controversy of valuing environmental benefits could be largely eliminated from the analysis. The analysis would then be focused squarely on the critical issue of the relative benefits and costs of seismic levee upgrades and various sizes and configurations of conveyance facilities. This analysis would be simpler, cheaper, and more informative to policy makers.

Earthquake Analysis Is Deeply Flawed. The presentations by the consultants give the appearance that they intend to exaggerate the probability and the duration of water export outages from an earthquake. It has been reported to me that presentations at BDCP steering committee meetings suggest maximum outages of a few months, not a few years, and the probability of an earthquake induced collapse is low. Some experts have placed the probability of this at less than 0.1% per year, and the much criticized DRMS analysis that did not utilize current data on levee conditions placed the probability at 1-3% per year. Furthermore, the analysis incorrectly compares a loss of exports from an earthquake outage to normal operations. It does not consider that a Delta levee failure due to earthquakes could result in a significant loss in water exports after an earthquake even with the tunnels. This is because there will still be significant environmental constraints on the intake operations. The economic analysis seems to speculate that these restrictions would be lifted in the case of an earthquake, allowing greater harm to endangered species, without taking into account the environmental cost of such an action.

However, the biggest error is in failing to include alternatives to the tunnels in addressing seismic risk, such as the seismic levee upgrades. According to the DRMS studies, an isolated conveyance facility would only protect against 20% of the economic cost and 0% of the loss of life from a massive earthquake that could create a massive Delta flood from simultaneous failure of multiple islands without warning. In contrast, seismic levee upgrades protect all the economic cost and human lives from the impact of such an event which is why the initial draft of the DRMS Phase 2 analysis agreed with Delta Protection Commission's Economic Sustainability Plan and found that seismic levee upgrades provide the highest risk reduction benefits for the lowest cost in the Delta. The continued refusal of BDCP to consider a lower-cost alternative that performed well in two previous state studies is a clear source of bias. When alternativea are fully considered, it is clear that the currently preferred BDCP proposal will result in lower seismic risk reduction benefits than lower-cost alternatives and unnecessarily place thousands of Californian's lives at risk in a Katrina-like flood.

Ignores the Economic Value of Protecting Endangered Species, The Primary Environmental Goal of a Habitat Conservation Plan. The objective of the Habitat Conservation Plan is to protect endangered species, however the scope of work says on page 5 "No attempt to value the benefits of increases in the covered species will be made, but defensible methods will be identified to estimate the value of habitat services due to the significant increase in habitat and habitat biological values that the BDCP may provide." This omission is bizarre given the objective of the BDCP is to protect species and comply with the ESA. This only provides additional support for my suggestion that the analysis specify a number of conveyance alternatives that are considered to be equally protective of fish, and thus focus the benefit-cost analysis on the conveyance options.

A reasonable explanation for the glaring omission of the value of protecting endangered species is that applying economic values to covered species recovery could obviously be used to demonstrate that reducing water exports from the Delta would have economic benefits to the state that offset the economic loss from reduced water supplies. In addition, the effects analysis has shown that the tunnel intakes and their construction could harm covered species.

Use of Outdated Population Projections Inflates Future Water Demand and Overestimates Benefits of the Tunnels. As a state study, the analysis should be based on the state's most recent official population projections. The California Department of Finance recently released new population projections to 2060 that show less than 1% annual population growth over the entire period. The state's official growth projections for key counties that export from the Delta, including Los Angeles, Riverside, Orange and San Diego, are sharply lower than has been typically assumed in studies of water demand. The contractor is using outdated Metropolitan Water District demand forecasts that utilize outdated assumptions that grossly overstate demand growth in Southern California. As a state sponsored study, the contractor should utilize the state's official population estimates and recalibrate residential and commercial water demand accordingly.

Use of Low Discount Rate Biases the Analysis in Favor of the Tunnels. The contractor is using an unusually low discount rate of 2.275% justified by recent credit market conditions. Appropriate discount rates are a source of intense debate in economics, and the contractor should include a sensitivity analysis to a range of discount rates to show whether the conclusions are sensitive to this assumption. I think it is significant that the state recently utilized a 7% discount rate in benefit-cost analysis of the high-speed rail project, another mega-infrastructure project that is competing with BDCP for scarce California bond funding. Similarly, the DWR economic analysis guidelines endorsed a 6% discount rate in January 2008 when market rates for 30 year Treasury bonds were only 1.25 percentage points higher than their current levels. If current low market interest rates are the main justification for the change, then the discount rate should only be lowered to 4.75%. As can be seen, consistency with prior state reports suggests discount rates of 4.75% or 7% are more appropriate than 2.275%. By incorporating sensitivity to discount rates as high as 7%, the study can avoid the appearance of bias and give policy makers a consistent and appropriate basis for comparison to other state funding priorities.

Labor Markets Impact Analysis Is Not Statewide and Is Inappropriate For Benefit-Cost Analysis: This analysis serves no purpose except to generate pro-BDCP talking points, and is inappropriate for benefit-cost analysis. The job creation touted in this analysis is a result of government spending, but makes no account of the economic impact of how the money is raised and the impact on government, consumer and business spending in other areas. It is most likely financed by a) higher water rates that reduce household disposable income and raise business costs, b) the use of state funds for BDCP instead of other purposes such as education, health care, or other infrastructure, or c) higher taxes. These three negative impacts will reduce jobs across the state, and the lost jobs could be more than the BDCP creates jobs in the Delta. In addition, the burden of the first two financing mechanisms, higher water rates and diversion of state funds from other priorities, would disproportionately harm low-income families in California. These opportunity costs are also an important argument for why the 2.275% discount rate is inappropriately low. The bottom line is that this entire section should be eliminated from the analysis since it is irrelevant to benefit-cost analysis. The resources would be much better used analyzing a full range of conveyance alternatives.

No Action Alternative May Be Inappropriately Altered. The consultants and the scope of work suggest the No Action Alternative may be altered in ways to bias the analysis in favor of the tunnels. Dr. Sunding has repeatedly suggested that he is constructing a No Action Alternative that will include highly-speculative, severely restrictive water operations, potentially as low as 3 maf of future exports.

While stronger regulation is certainly possible, it seems equally if not more likely that No Action would result in higher exports than the current Biological Opinions. After all, the Department of Water Resources has joined with the contractors in litigation to weaken the Biops and allow greater exports. In the recent Presidential campaign, the losing candidate made rolling back environmental regulations a central plank of his campaign platform, and we have seen much weaker enforcement of the ESA under previous administrations in the

recent past. In addition, there have been numerous attempts in Congress to weaken the ESA.

Obviously, reducing this uncertainty is one of the key objectives of achieving a Habitat Conservation Plan through the BDCP. Thus, I understand the consultant's interest in modeling this. However, this will also result in the injection of enormous speculation and controversy into the analysis, especially if the consultant is not balanced in the discussion of risks. Similar to the controversy surrounding the environmental values, this could largely be avoided if the benefit-cost analysis included a full set of BDCP alternatives that are HCPs under the ESA, including no-tunnel with seismic levee upgrades and smaller tunnel options, all BDCP options could have operations specified by a "decision tree" so that uncertainty and environmental values are handled consistently. This is a much better option than playing games with the No Action alternative in an analysis that only considers one BDCP alternative.

Flood Control: The analysis wants to quantify the flood control benefits of wetlands while ignoring the potential flood control impacts of conveyance alternatives such as levee upgrades. While some habitat measures, such as Yolo Bypass expansion, would provide flood control benefits, some habitat measures in the BDCP could increase flood risk. Some stakeholders have expressed concerns about levee seepage and enhanced flood risk from wetlands.

Recreation Benefits: The scope of work references a Brattle Group analysis of economic value of changes in Delta recreation. To my knowledge, that study has not been released or reviewed, and it should be posted for review. Many of the strongest opponents of BDCP are people working in the Delta recreation industry and they obviously do not think much of the BDCP's recreational benefits. Like flood control, this is another area of benefits where a seismic levee upgrade plan would be far superior to the BDCP. Such upgrades would enhance riparian habitat and increase flood control to facilitate greater investment in much needed support services for Delta recreation.

Many Negative Construction Impacts Are Ignored. The analysis considers the potential negative impact of building the conveyance facility on air quality, but nothing else. This is a stunningly callous oversight of enormous in-Delta impacts. The construction will severely impact transportation in the region and generate noise and traffic that will harm a variety of economic activities in the region including recreation, agriculture, emergency services and day to day life in the Delta. Some people in the Delta recreation business think that the disruption from BDCP construction could put them out of business in a few years since they are barely making ends meet under current conditions.

Failure to Consider Public Safety Values and Life Loss: As discussed above, the analysis only considers the impact of earthquake and floods on water supplies. The tunnels would do nothing to prevent life loss in the event of the flood, and alternatives to the tunnels would. In addition, stakeholders have raised serious concerns about how the construction of the tunnels would alter transportation in the Delta in ways that could significantly harm

emergency medical response to Delta residents and visitors. These concerns should be examined.

Aesthetic, Noise and Other Impacts of Conveyance Facility Are Ignored: The enormous intake facilities will be along a state scenic highway and a lovely stretch of the Sacramento River. This will industrialize a region that local governments and communities have worked for decades to protect its rural character. These non-market values will be lost.

Overall Greenhouse Gas Impacts Are Ignored. The analysis looks at potential greenhouse gas benefits of habitat restoration, but does not consider greenhouse gas impacts of water project operations which are known to be the largest electricity consumer in the state. Why does the analysis not consider the greenhouse gas impacts of increasing or decreasing water exports?

Benefit Transfer Analysis Is Especially Problematic Due to the Unique Characteristics of the Delta. The benefits transfer methodology is controversial, although common. One of the biggest identified problems with benefits transfers is the use of studies from inappropriate sites. Given the unique nature of the Delta, it will be challenging to identify appropriate study sites and valid benefit transfer studies. Ironically, it might be easier to find appropriate benefit transfer studies to the non-market value of increasing populations of the covered species than the habitat restoration measures. However, as noted above, the benefit-cost study is inexplicably ignoring non-market value for achieving species recovery goals (the objective of an HCP) while focusing on a subset of non-market environmental values that are more loosely connected to the environmental objectives of the BDCP.