Comparing Estimates of the Benefits and Costs of the Delta Tunnels

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On August 27, the State Water Contractors’ issued a news release with a misleading comparison between benefit-cost estimates for the proposed Delta tunnels that I released in July 2012 to estimates released in May 2013 for Bay Delta Conservation Plan (BDCP) by the Brattle Group under the leadership of Dr. David Sunding. The table below shows the actual difference in the benefit and cost estimates from the two reports and should help clear up confusion generated by the SWC release that did not include any information on the two reports’ benefit and cost estimates.

Benefits and Costs of Delta Tunnels through 2074. Results are expressed as present values in 2012 dollars calculated with 3% discount rates. The Michael report also includes a 6% discount rate scenario with a lower benefit-cost ratio, but only the 3% results are shown in this comparison.

<table>
<thead>
<tr>
<th></th>
<th>Michael (7/2012)</th>
<th>BDCP (5/2013)</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Water Supply</td>
<td>3,916</td>
<td>15,722 to 16,642</td>
<td>11,806 to 12,726</td>
</tr>
<tr>
<td>Export Water Quality</td>
<td>2,328</td>
<td>1,819 to 1,789</td>
<td>-509 to -539</td>
</tr>
<tr>
<td>Earthquake Risk Reduction</td>
<td>866</td>
<td>470 to 364</td>
<td>-396 to -502</td>
</tr>
<tr>
<td>Environmental Benefits/Costs</td>
<td>0</td>
<td>Not Estimated*</td>
<td>NA (0)</td>
</tr>
<tr>
<td>Tunnel Costs (Capital, O&amp;M)</td>
<td>-12,310</td>
<td>-13,328 to -13,343</td>
<td>1,018 to 1,033</td>
</tr>
<tr>
<td>In-Delta and Upstream Impacts</td>
<td>-1,173</td>
<td>Not Estimated*</td>
<td>NA (-1,173)</td>
</tr>
<tr>
<td>Net Benefits ($ millions)</td>
<td>-6,374</td>
<td>4,684 to 5,452</td>
<td>11,058 to 11,826</td>
</tr>
<tr>
<td>Benefit-Cost Ratio</td>
<td>0.53</td>
<td>1.35 to 1.41</td>
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*Both of the values not estimated in BDCP chapter 9 analysis would be very negative, because of the assumption used to create large water supply benefits for the tunnels.

The table illustrates that virtually all of the $11 to $12 billion difference in estimated net benefits is due to export water supply benefits. This difference is due to both studies using a different no-tunnel water supply scenario for comparison to the tunnels. The large water supplies in the BDCP economic analysis result from the introduction of a new no-tunnel scenario that is inconsistent with the no-tunnel scenario used by BDCP in its environmental impact report (EIR), and current state and federal policies. Even if the assumed change to water supplies could be justified, the BDCP economic analysis does not account for the off-setting environmental impacts from a larger change in water exports.

In contrast, my estimates compare the tunnels to the no-tunnel alternative in the BDCP EIR. Using the EIR baseline has two significant advantages. First, it is consistent with BDCP environmental documents and current policy. Second, it allows me to account for the environmental benefits/costs of the tunnels relative to the no-tunnel alternative since this has been formally assessed in the EIR. Since the BDCP EIR finds that the tunnels themselves do not provide benefits to endangered and threatened fish, I have
valued the environmental benefits/costs of the tunnels at zero. While it is true that habitat restoration proposals in the BDCP could benefit endangered fish, the habitat enhancements can be implemented with or without the tunnels. Thus, it would be incorrect to attribute habitat restoration benefits to the tunnels.

**Detailed Discussion of Benefit and Cost Categories In the Table:**

Export Water Supply: I compared no-tunnel average water exports of 4.7 million acre feet (maf) to an average of 5.3 maf with the tunnels. Both the no-tunnel and tunnel water supplies are consistent with the BDCP EIR, and in fact represents one of the best water supply scenarios for the water contractors modeled in the EIR. In contrast, the BDCP analysis assumes that water exports without the tunnels will decrease about 25% from current levels, to 3.4 maf to 3.9 maf, about 1 maf less than a continuation of the current biological opinions governing water exports and the no-tunnel alternative used in the BDCP EIR. The BDCP analysis assumes water supplies with the tunnels will average 4.7 maf to 5.6 maf. Changing the no-tunnel water supply assumption from the one used in the EIR allows the BDCP economic analysis to attribute more than 1 maf in new water supplies to the tunnel, and it results in over $10 billion in additional water supply benefits to the water contractors.

Export Water Quality and Earthquake Risk Reduction: Notably, the new BDCP analysis has even lower valuations for these water contractor benefits than my 2012 paper, although the differences are minor in the overall picture of benefits and costs. In the 2012 paper, I discussed why the benefits estimates of these benefits are probably too high, but I used them to avoid the appearance of bias against the tunnels.

Environmental Benefits/Costs: As discussed above, my analysis uses the EIR no-tunnel baseline and relies on the EIR assessment that found little or no benefit for fish from the tunnels, and thus entered a 0 value for environmental benefits from the tunnels. The BDCP economic analysis does not assess this value, but it should be noted that the assumption they used to push up water supply benefits would generate a large negative number on this line since his no-tunnel alternative would be significantly more protective for endangered fish than the current Biops and the no-tunnel scenario in the EIR. This new no-tunnel scenario was introduced for the first time in the BDCP economic study.

Tunnel Costs: Dr. Sunding used the most recent cost estimate which is about $1 billion higher than 2012. If I were to update my paper with the latest cost estimates, the benefit-cost ratio would be even lower.

In-Delta and Upstream Impacts: Admittedly, neither report completely estimates these costs. Michael’s estimate is based on the potential impact to Delta agriculture from changing water quality and a lack of commitments in the BDCP to protect water quality. However, new BDCP analysis suggests Delta water quality would be little changed by the tunnels, and the implication of this finding is discussed in a separate BDCP economic impact report. While this is an area where additional research is highly desirable and there is active debate, it is important to note that it is not a source of significant difference in the overall assessment of benefits and costs, and has no impact on the differing conclusions.
Key questions and answers about the reports that are not included in the State Water Contractors’ Cost-Benefit Comparison “Fact Sheet”

Q: Is Dr. Sunding’s report really a cost-benefit analysis?

A. No. In a recent legislative hearing, Dr. Sunding clearly stated that his study is “fundamentally different from a cost-benefit analysis.” (http://mavensnotebook.com/2013/08/15/mavens-minutes-joint-informational-hearing-on-the-governance-and-financing-of-the-bay-delta-conservation-plan-an-overview-of-the-issues/#more-7271) One of his reports was conducted to satisfy a narrow regulatory requirement for a habitat conservation plan under the Endangered Species Act, and the other analysis is clearly states in the title that it is an “economic impact” report not a cost-benefit analysis as it is portrayed by the State Water Contractors.

Q. Which study has the most realistic and defensible water supply assumption?

A. Dr. Michael’s water supply assumption is based on an extension of current policy and is taken from the BDCP’s Environmental Impact Report. The BDCP economic analysis water supply assumption is not based on any current policy proposal, is not consistent with other BDCP documents, and has not been subject to any environmental assessment.

Q: If Dr. Sunding’s report used the baseline that is in the EIR, would the tunnels be cost effective?

A. No, according to Dr. Sunding’s response to this question at a Metropolitan Water District board meeting. (http://mavensnotebook.com/2013/07/29/dr-sunding-makes-his-case-for-the-bdcp-to-metropolitans-special-committee-on-the-bay-delta/)

Q. What about earthquakes? Isn’t that why the water contractors say we need the tunnels?

A. Both studies find that the benefits to export water supply from earthquake risk reduction are very small compared to the cost of the tunnels. One of the strengths of the BDCP analysis is that it correctly finds that the tunnels do not fully protect water exports from the Delta earthquake scenario. Only a seismically resistant levee system in the Delta can fully protect export water supplies from this risk. These levee investments would cost more than $10 billion less than the tunnels and would provide many more benefits, including public safety benefits, environmental benefits, and protection of billions of dollars in energy, transportation and water infrastructure. The Delta Protection Commission’s Economic Sustainability Plan discusses the advantages of this approach in detail.

Q. What do the studies assume about future growth in California?

A. Both studies assume rapid growth in southern California using pre-recession projections of population growth that far exceed current estimates. The California Department of Finance currently projects Southern California population will be about 5 million people lower in 2050 than the projections used in these studies. Thus, both studies exaggerate the projected future need for Delta water supplies and are biased in favor of building the tunnels.
Q. Do the studies account for the risk of escalating costs for the tunnels?

A. No, both studies use the cost estimates in BDCP documents, and do not consider cost escalation scenarios that are common for large infrastructure projects. This biases both reports in favor of the tunnels.

Q. What do the studies assume about the time it takes to build the tunnels?

A. Both studies assume the tunnels will take 10 years to construct and be operating by 2025, even though tunnel proponents often state that it will take 15 years or more to build. This optimistic construction time assumption biases both reports in favor of the tunnels.

Q. What do the studies assume about future technology?

A. Both studies are based on current technology, and do not account for highly likely new developments in alternative water supplies or water conservation technology. Thus, both studies’ conservative view of technological change biases their analysis in favor of the tunnels.

Q. What do the studies assume about cost and availability of alternative water supplies?

A. Both studies ignore up to 1 maf of alternative water supplies that are in southern California water agencies plans but are not yet under construction according to a compilation made by the San Diego County Water Authority. In addition, both studies utilize Dr. Sunding’s model which substitutes the cost of water scarcity for the cost of alternative water supplies. In his most recent report, Dr. Sunding has put this cost in excess of $1,400 per acre foot, significantly higher than the California Department of Water Resources’ estimate of many alternative water supplies. These assumptions bias both analyses in favor of the tunnels.

Q. Can farmers afford water from the tunnels? Will urban ratepayers subsidize farmers?

A. Dr. Sunding’s report ignores this critical financing issue. Dr. Michael’s report discusses how farmers’ share of tunnel costs greatly exceeds their benefits, even under the most optimistic water supply assumptions. Since agriculture receives the majority of water exported from the Delta, financing of the tunnels will require a substantial subsidy of farmers from urban ratepayers or taxpayers.

Q. Do the studies use an appropriate discount rate?

A. Both studies utilize a low 3% discount rate which biases the analysis in favor of the tunnels. Dr. Michael’s report also includes a 6% discount rate scenario which is less favorable to the tunnels. The California Department of Water Resources’ economic analysis guidelines call for a 6% discount rate, federal guidelines call for a 7% discount rate, and the state’s economic analysis of the high-speed train also used a 7% discount rate. Most economic and financial analysis of long-term investments utilize higher discount rates, and the high-degree of uncertainty and risk surrounding the tunnels project suggest a higher discount rate than 3% is appropriate.
Direct Response to the Questions Asked In State Water Contractors’ Fact Sheet

Most of the water contractors’ fact sheet comparison is focused on superficial issues and questions that are unrelated to benefit-cost analysis. Below is a brief response to each of the SWC’s comparison criteria on their “fact sheet”.

How many pages of analysis?

This is the first complaint I have heard about the length of the report. Most readers, including other economists, have appreciated the clear, concise presentation with references to primary studies and source data. More pages do not equate with clarity or quality.

Was it original research?

The water contractors’ are implying that my paper is of low quality because it utilizes the results of Dr. Sunding’s previous research and BDCP’s own estimates to estimate the value of most benefits and costs. It is odd for them to criticize me for using their numbers and models. I used Dr. Sunding’s valuations of benefits to make it easier to compare the results, and to illustrate differences that result from policy choices and assumptions – not arcane economic methods. The objective of my paper is to show what a BDCP benefit-cost analysis would find if they followed the state’s own benefit-cost guidelines, and thus it uses values of benefits and costs provided by the BDCP when available.

The more relevant question is whether it is independent research. Dr. Sunding’s paper was produced as a consultant for BDCP, and the research questions and the study assumptions were controlled by BDCP managers. My study was written independently as part of our academic center’s mission to inform the public about economic and policy issues impacting the state and region.

Is their value in creating regulatory stability...?

It is true that my report states that the water contractors’ regulatory assurance transfers risk to the public, and thus it is unclear whether there is any net value to the state from regulatory assurance itself. Dr. Sunding himself has made that point about HCPs. In HCPs, the government provides the regulatory assurance to the applicants in return for a conservation investment that benefits endangered species. But in the BDCP, the water contractors are only paying for the tunnels, and the government is paying for the habitat conservation, so it isn’t clear why the water contractors should receive a regulatory benefit for the public’s conservation investment. That’s a bad deal for taxpayers and the environment, and it is one reason many environmental groups say that the BDCP is not a valid habitat conservation plan.

Did the study analyze job creation and preservation?

Benefit-cost analysis is not job analysis. However, the job creation of BDCP is not impressive compared to the enormous level of public spending, less than 10 jobs per million dollars of spending according to the BDCP economic report. Most public and private spending generates more jobs than that per million dollars, so it is not clear that BDCP will result in net job creation.
Did the study utilize scientific methods to estimate changes in Delta water quality?

My report may not use a computer simulation of water quality, but it does use a valid method to estimate changes in water quality. The estimate of a 25-50% increase in salinity is based on current proposals to degrade Delta water quality standards in advance of building the tunnels, and the lack of strong water quality commitments within the BDCP.

In contrast, the BDCP report utilizes results from a computer simulation that estimates little to no change in Delta salinity from the BDCP. While these modeling results are encouraging, the water contractors’ policy actions suggest that they either do not believe these modeling results or do not intend to operate the tunnels as described in the BDCP. When the state and water contractors commit to maintaining water quality standards that are consistent with the results of their computer model, I will accept and incorporate their model results. But if they do not show faith in their computer model results through their policy actions, why should anyone else?

Besides the assumption about water exports, this is the only substantive disagreement in the papers’ estimates of benefits and costs. However, it only accounts for a $1 billion difference in total cost estimates which has an insignificant impact on the conclusion of either study.

Did the study examine statewide economic impacts?

Benefit-cost analysis is not economic impact analysis. The Department of Water Resources’ economic analysis guidelines and fundamental principles of economic and policy analysis are clear that benefit-cost analysis, not economic impact analysis, is the correct way to evaluate investment decisions.

Did the study conform to federal guidelines for the economic analysis of a habitat conservation plan?

Many projects that are poor public investments and fail benefit-cost analysis could satisfy the guidelines for economic analysis of a habitat conservation plan. The fact that benefit-cost analysis is not a regulatory requirement of the ESA is not a valid excuse for the state to avoid benefit-cost analysis when they are proposing the investment of $25 billion or more of taxpayer and ratepayer funds in the tunnel plan. This question simply underscores the point that the BDCP economic analysis is not a benefit-cost analysis, but is narrowly designed to satisfy specific regulatory requirements of an HCP.