Attachment E

Analysis of BDCP Project Changes to Delta Exports

One of the alleged benefits of the Bay Delta Conservation Plan (BDCP) is that it will reduce the damaging effect of exports from the south Delta. There is general agreement that the location of the south Delta export locations (Clifton Court Forebay and the Jones Pumping Plant) cause reverse flows that direct fish toward the export pumps and adversely impact fish populations.

Another feature of the BDCP highlighted by its proponents is that it will operate according to a Big Gulp, Little Sip principle. This principle was defined in the original planning principles of the BDCP Steering Committee (BDCP March 2009 "An Overview and Update") as to "***Divert more water in the wetter periods and less in the drier periods***."

An inspection of the monthly Delta export data from the BDCP modeling studies suggest that neither of these alleged benefits of the BDCP is actually true. Currently, the maximum rate of exports from the Delta during drier periods is about 11,300 cubic feet per second (6,680 cfs at the SWP export facility plus 4,600 cfs at the CVP pumps.). The modeling data however, show that in many months, the combined SWP and CVP exports from the south Delta could be as high as 14,400 cfs. This is an increase in south Delta pumping of 3,100 cfs.

The same modeling simulations of the BDCP project alternatives suggest that the BDCP proposed project will increase rather than decrease total SWP and CVP exports during periods of low Delta outflow (drier months). During periods of high Delta outflow, there is no significant increase in export diversions, in large part because farmers' fields are already wet and south-of-Delta reservoirs quickly fill.

Increasing exports from the Delta in the dry months is also inconsistent with the 2009 Delta Reform Act (Water Code Section 85021), which states that the policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. The BDCP proposed project includes no actions to improve regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.

The following bolded bullet points outline specific concerns regarding the BDCP project on Delta Exports.

- **Changes in South Delta Exports with BDCP Proposed Project**

The diversion of water into Clifton Court Forebay is limited by a U.S. Army Corps of Engineers permit. The diversion rate is restricted to a three-day average inflow of 6,680 cfs and a daily average inflow of 6,993 cfs. From December 15 and March 15, the inflow can be increased by one-third of the San Joaquin River inflow to the Delta at Vernalis (for flows equal to or greater than 1,000 cfs.)

The SWP also has a permit to export an additional 500 cfs between July 1 and September 30 to replace pumping reductions earlier in the year to benefit Delta fish species. This increases the SWP limit during the summer to 7,180 cfs.

The CVP export capacity at Jones Pumping Plant near Tracy is about 4,600 cfs, so exports from the Delta are generally restricted to a total of 11,280 cfs, or 11,780 cfs from July-September.

It is not obvious when reading the DEIR/EIS that the BDCP proponents are proposing to eliminate the existing U.S. Army Corps of Engineers limits on inflow to Clifton Court Forebay (DEIR/EIS page 3-32. line 12). The BDCP proponents also assume in the DEIR/EIS that an additional limit on exports imposed by the 2009 NMFS Biological Opinion, the San Joaquin River inflow/exports ratio for April and May would no longer apply. This limit was assumed for the BDCP baseline condition cases (existing biological conditions), but was not included in the BDCP operations scenarios (Draft BDCP, page 5C.2-4, line 7).

Both of these relaxations of existing limitations will allow an increase in exports from the south Delta. As will be shown below by plotting monthly-averaged exports as a function of monthly-averaged Delta outflow, and despite the BDCP purpose of improving ecosystem conditions by reducing exports from the south Delta, the BDCP proponents are planning to significantly increase exports from the south Delta in many months. Contrary to the "Big Gulp, Little Sip" concept, most of the increases would occur during the driest months when Delta outflows are the lowest.

Figure E-1 shows the historical Delta exports as a function of Delta Outflow for the years since the Bay-Delta Accord and SWRCB Water Rights Decision 1641, and the earlier period (1979-1994) after adoption of SWRCB Water Rights Decision 1485. D-1485 introduced minimum Delta outflow requirements and these were made even more stringent in D-1641. The south Delta exports are limited to 11,280 cfs with an extra 500 cfs allowed July-September. The additional allowance based on San Joaquin inflow to the Delta (December 15 – March 15) typically does not apply until Delta outflows are much higher than 25,000 cfs.

Figure E-1 and subsequent figures were prepared using BDCP modeling data made available by DWR. The data are monthly exports and Delta outflows from CALSIM modeling studies for the BDCP DEIR/EIS for the early long term (ELT). South Delta and total Delta exports are presented in the DEIR/EIS as 82-year averages for each month of the year (e.g., Figure 5-21), or as average annual exports for different water year types (e.g., Figure 5-18 and 5-19). The data plots in this attachment are examples of more detailed types of data presentation that should have been provided in the DEIR/EIS to fully disclose the potential environmental impacts of the BDCP alternatives.

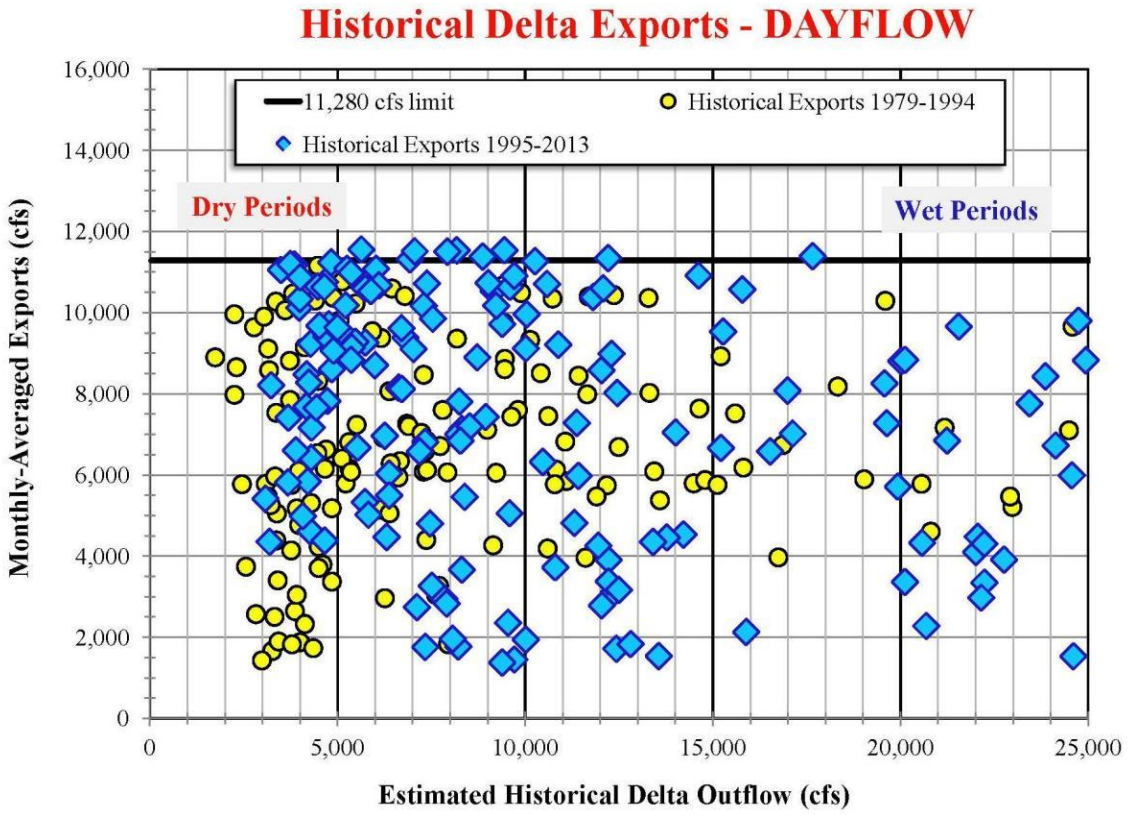

Figure E-1: Historical Delta exports as a function of Delta Outflow for the years since the Bay-Delta Accord and SWRCB Water Rights Decision 1641, and the earlier period (1979-1994) after adoption of SWRCB Water Rights Decision 1485. D-1485 introduced minimum Delta outflow requirements and these were made even more stringent in D-1641. Combined SWP and CVP exports from the south Delta are typically limited to 11,280 cfs, but an extra 500 cfs can be diverted

Figure E-2 shows the south Delta export data from an existing basecase simulation (with Fall X2) for the BDCP, also as a function of Delta outflow. This simulation was based on historical hydrology for water years 1922-2003. However, in this DWR planning study, the level of development and demands are the same for the whole 83-year period. Figure E-2 shows similar results as the historical data (Figure E-1).

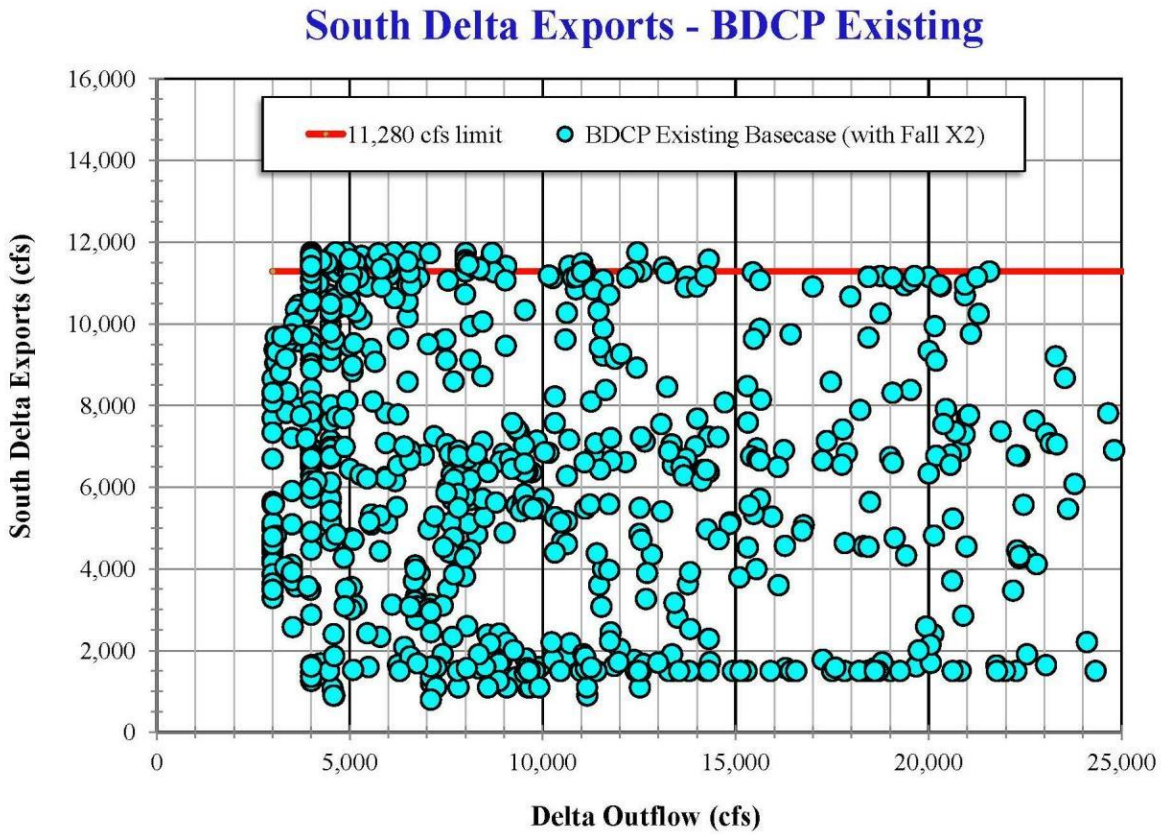

Figure E-2: South Delta exports as a function of Delta Outflow for a BDCP existing base case (with Fall X2) for outflows up to 25,000 cfs. The BDCP is being promoted as improving the Delta ecosystem by reducing exports from the south Delta. The BDCP proposed project, therefore, should be expected to reduce south Delta exports well below 11,280 cfs especially during drier months when fish species are stressed the most.

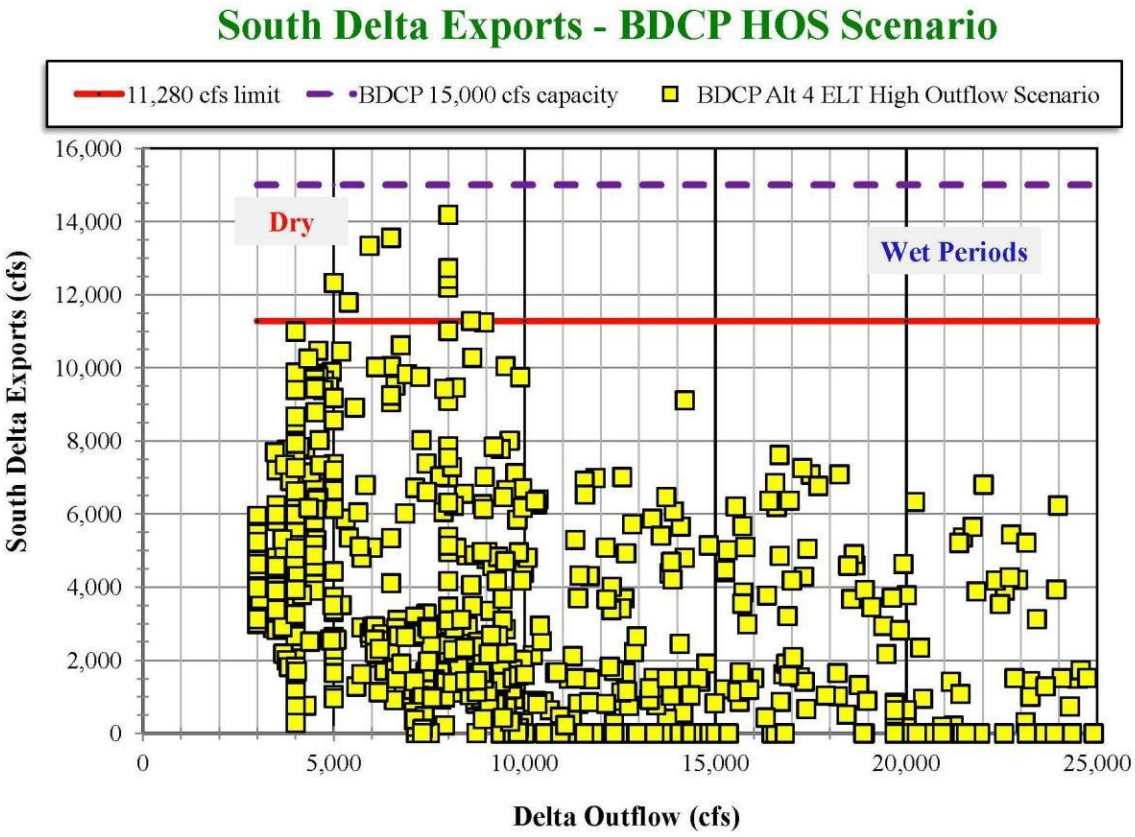

Figure E-3: South Delta exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 High Outflow Scenario for outflows up to 25,000 cfs. A goal of the BDCP is to improve ecosystem conditions in the south Delta by reducing exports from the south Delta. The BDCP proposed project may reduce south Delta exports in wetter months but significantly increases south Delta exports in a number of drier months when fish species are already stressed.

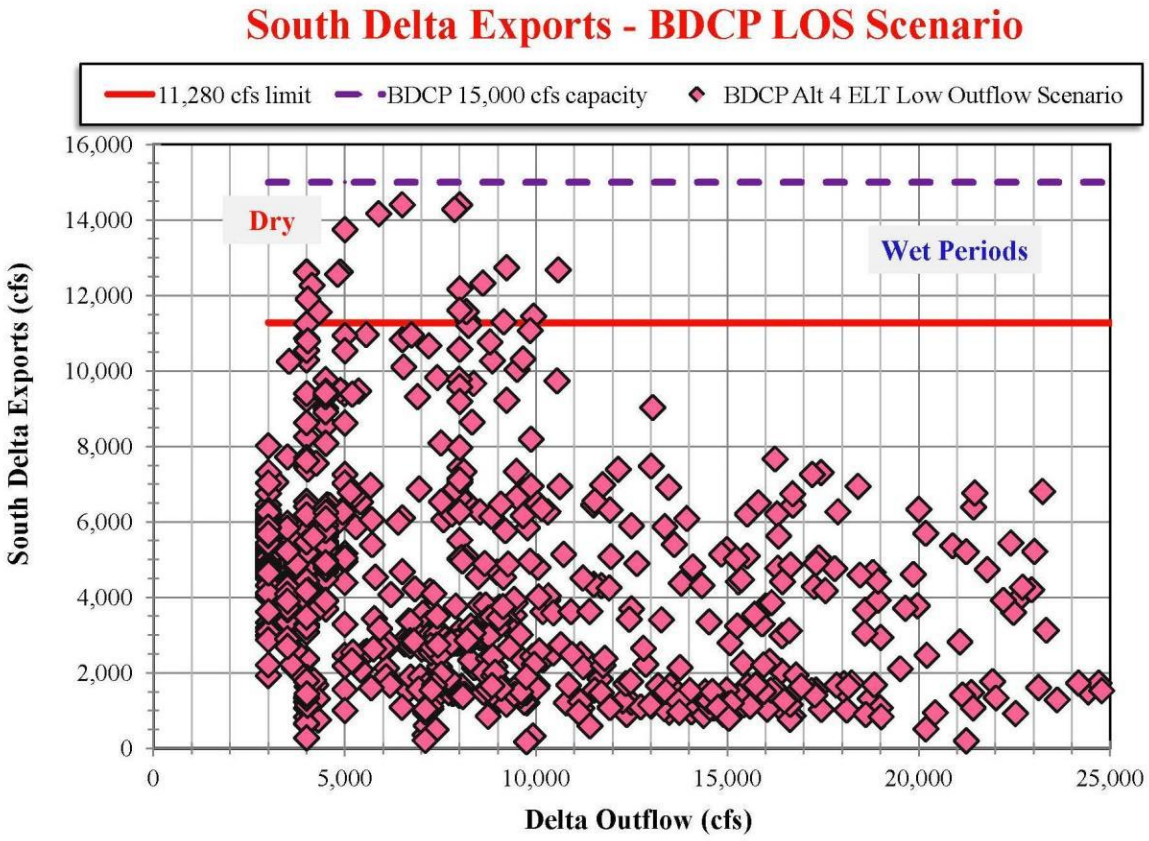

Figure E-4: South Delta exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 Low Outflow Scenario for outflows up to 25,000 cfs. A goal of the BDCP is to improve ecosystem conditions in the south Delta by reducing exports from the south Delta. The BDCP proposed project needs additional limits on exports because it significantly increases, rather than decreases south Delta exports in a number of months, and all those increases occur during the driest months when fish species are already stressed.

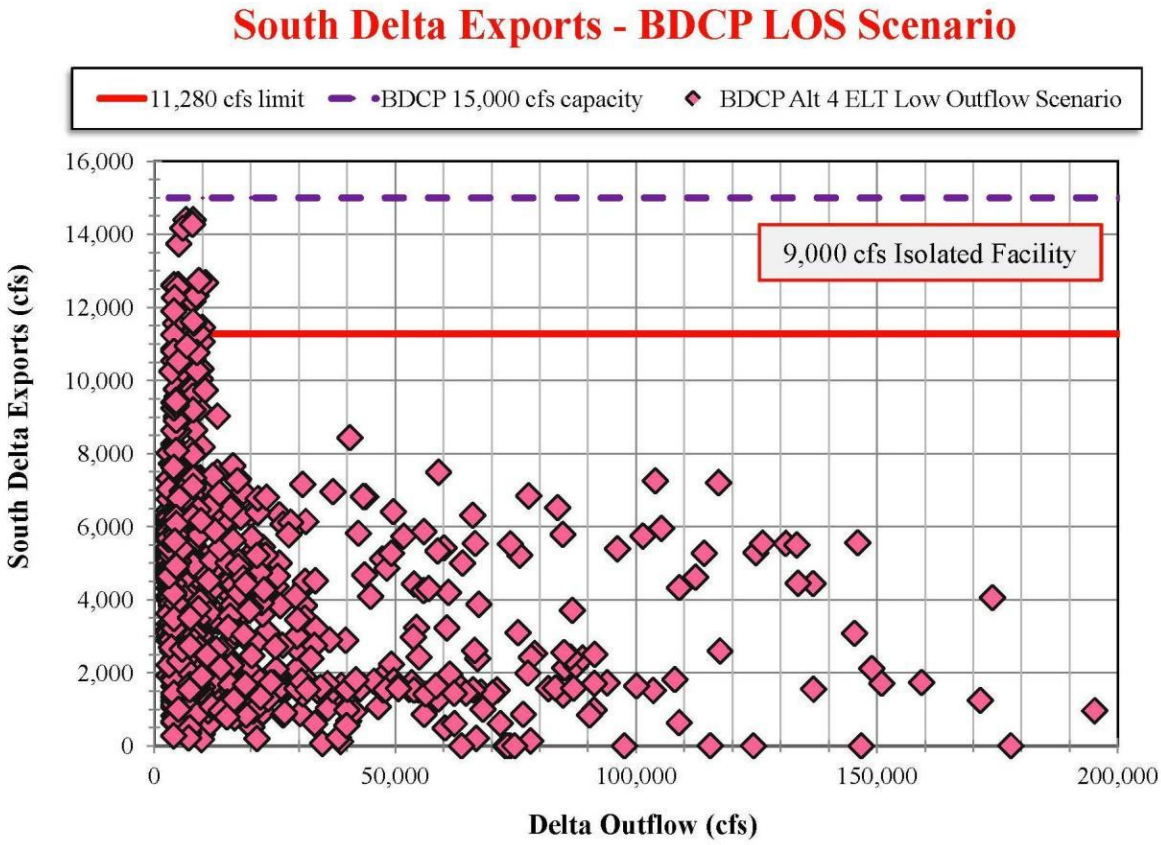

Figure E-5: South Delta exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 Low Outflow Scenario. This graph is the same as Figure E-4 but shows are larger range of Delta outflows (i.e., up to 200,000 cfs). A goal of the BDCP is to improve ecosystem conditions in the south Delta by reducing exports from the south Delta. The BDCP proposed project is inadequate and fails to meet the original BDCP goals because it significantly increases, rather than decreases, south Delta exports, and all those increase occur during the driest months when fish species are already stressed.

Figure 11-4-1 in Chapter 11 of the Draft EIR/EIS is a clear indication that the BDCP proposed project will make the situation much worse, rather than better, for the Delta smelt. This figure shows the average annual estimated proportion of larval and juvenile Delta Smelt population lost to entrainment at the south Delta export pumps for Alternative 4 for the High Outflow Scenario (H4) and Low Outflow Scenario (H1). The modeling results for each water year type suggest that the Low Outflow Scenario will significantly **increase** entrainment losses at the south Delta export pumps. Even the High Outflow Scenario will increase entrainment losses in dry and critical years.

- **Changes in Total Delta Exports with BDCP Proposed Project**

According to the "*Divert more water in the wetter periods and less in the drier periods*" principle, BDCP should be expected to export less during periods of low outflow, i.e., export less under existing infrastructure and operation rules.

The total export graph for existing conditions is the same as the plot of south Delta exports (Figure E-2) because there are currently no north Delta intakes or isolated facilities. Figures E-6 and E-7 show the total SWP and CVP exports as a function of Delta outflow for the proposed project for the High Outflow Scenario and Low Outflow Scenario, respectively. The proposed project would significantly increase exports in the driest months when Delta outflows are lowest.

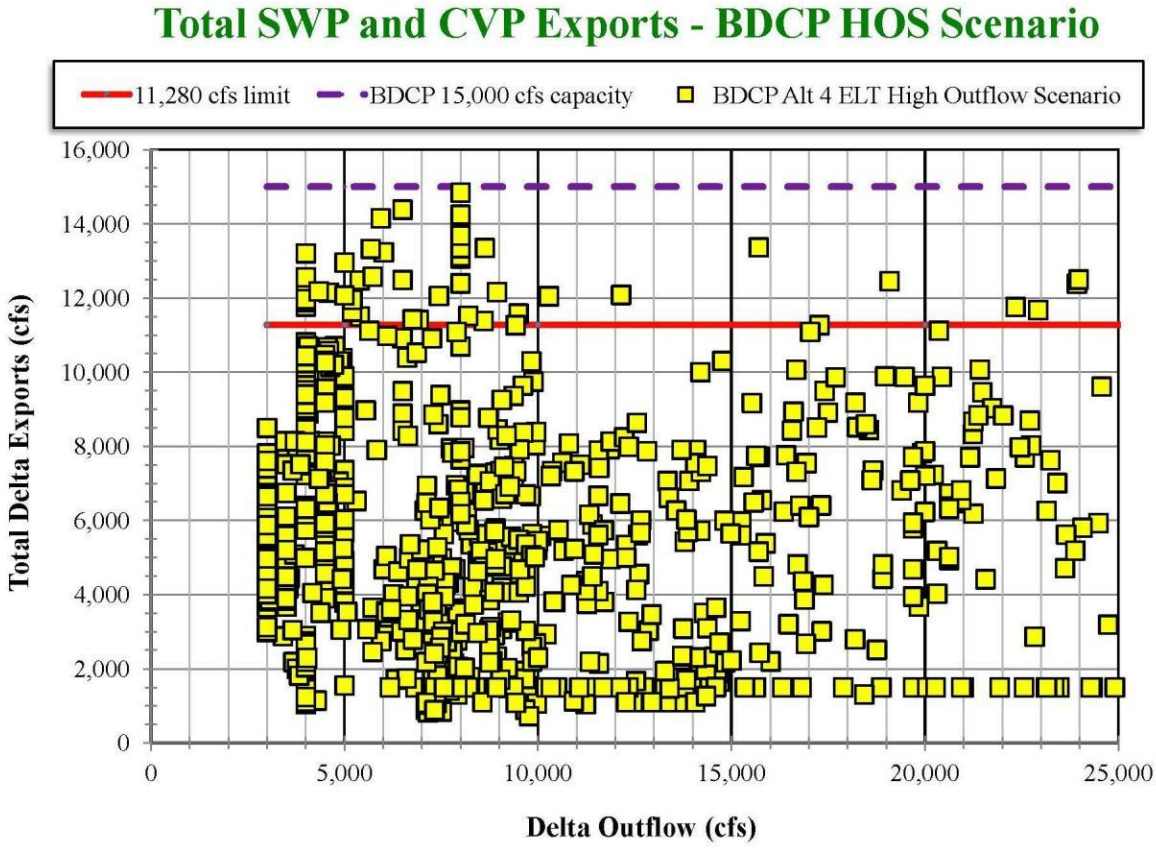

Figure E-6: Total exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 High Outflow Scenario. Contrary to the BDCP "Big Gulp, Little Sip" planning principle, the BDCP proposed project would increase exports from the Delta during drier months (low Delta outflow).During wetter months (e.g., outflows greater than 10,000 cfs), there are only a few months when exports are greater than existing limit. Without additional south-of-

Delta and near Delta storage, the BDCP alternatives only have limited capacity to capture surplus water ("Big Gulp").

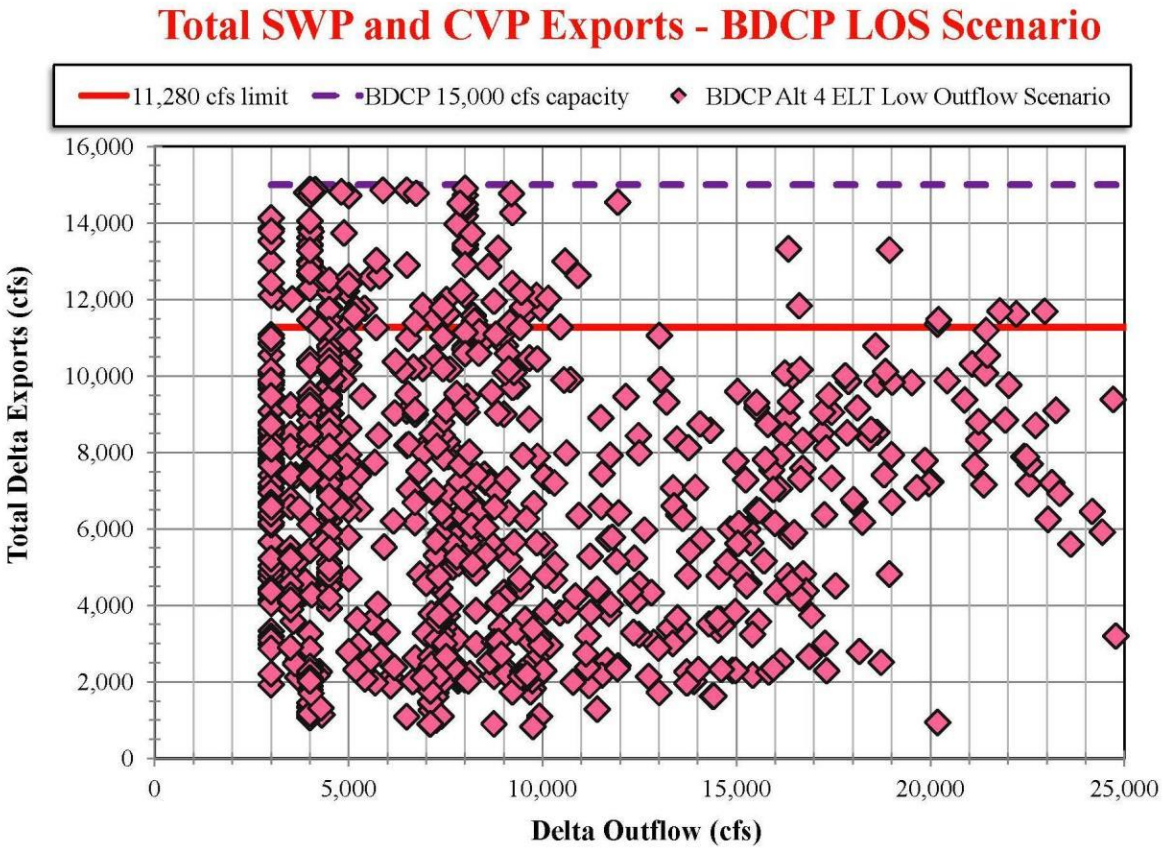

Figure E-7: Total exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 Low Outflow Scenario. Contrary to the BDCP "Big Gulp, Little Sip" planning principle, the BDCP proposed project would increase exports from the Delta during drier months (low Delta outflow). The increase in exports in drier months is even worse than for the High Outflow Scenario. During wetter months (e.g., outflows greater than 10,000 cfs), there are only a few months when exports are greater than existing limit. Without additional south-of-Delta and near Delta storage, the BDCP alternatives only have limited capacity to capture surplus water ("Big Gulp").

Figure E-8 again shows the total exports for the Low Outflow Scenario, but extends the range of Delta outflows to 200,000 cfs. There are a some very wet months (high Delta outflow) when total exports approach the 15,000 cfs maximum, but also many months when total exports are less than existing levels. Without additional south-of-Delta and near Delta storage, the BDCP alternatives only have limited capacity to capture surplus water during periods of high Delta outflow.

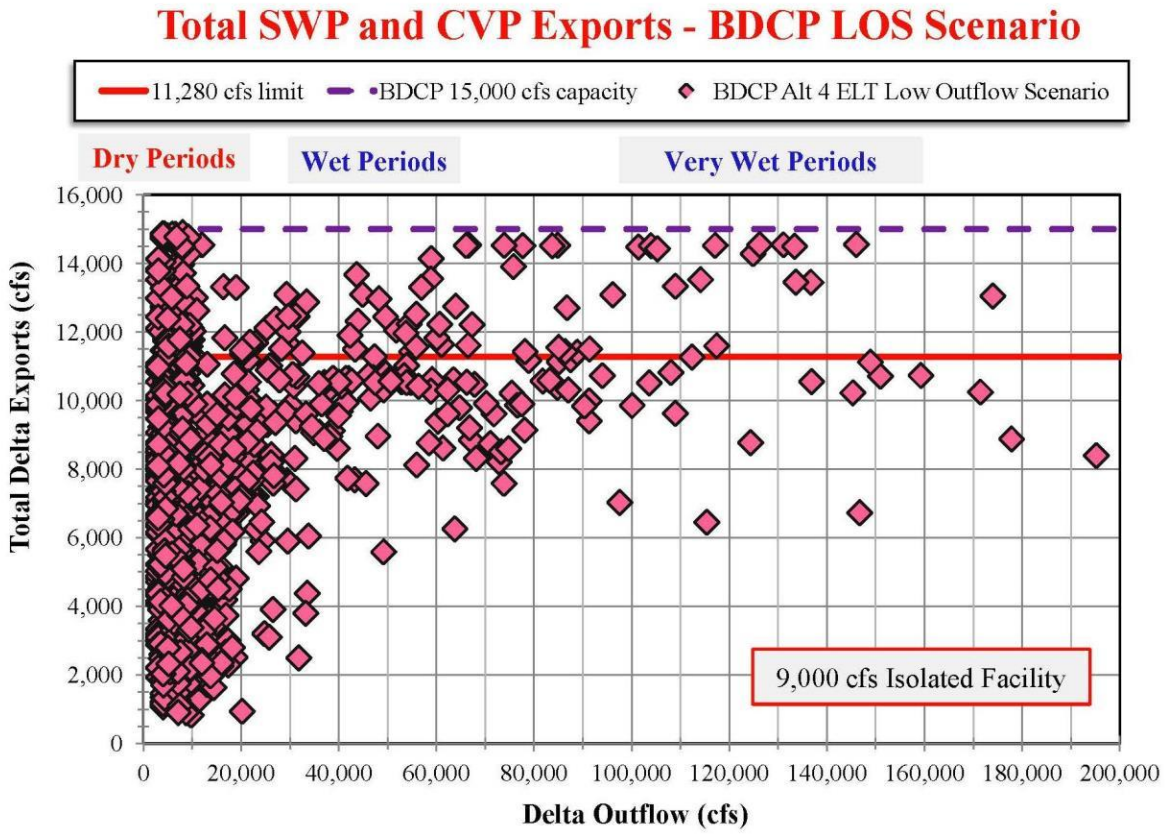

Figure E-8: Total exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 Low Outflow Scenario. This graph is the same as Figure E-7, but extends the range of Delta outflows to 200,000 cfs. During very wet periods (e.g., outflows greater than 60,000 cfs), there are a some of months when total exports approach the 15,000 cfs maximum, but also many months when total exports are less than existing levels.

Figure E-9 shows the total exports as a function of Delta Outflow for BDCP Alternative 3 at Early Long Term. Alternative 3 only has 6,000 cfs of north Delta intake tunnel capacity. There are more months with exports in excess of 11,300 cfs during wetter periods (high outflow) than for Alternative 4 (9,000 cfs isolated facility). The reasons for this should be discussed and disclosed in the EIR/EIS.

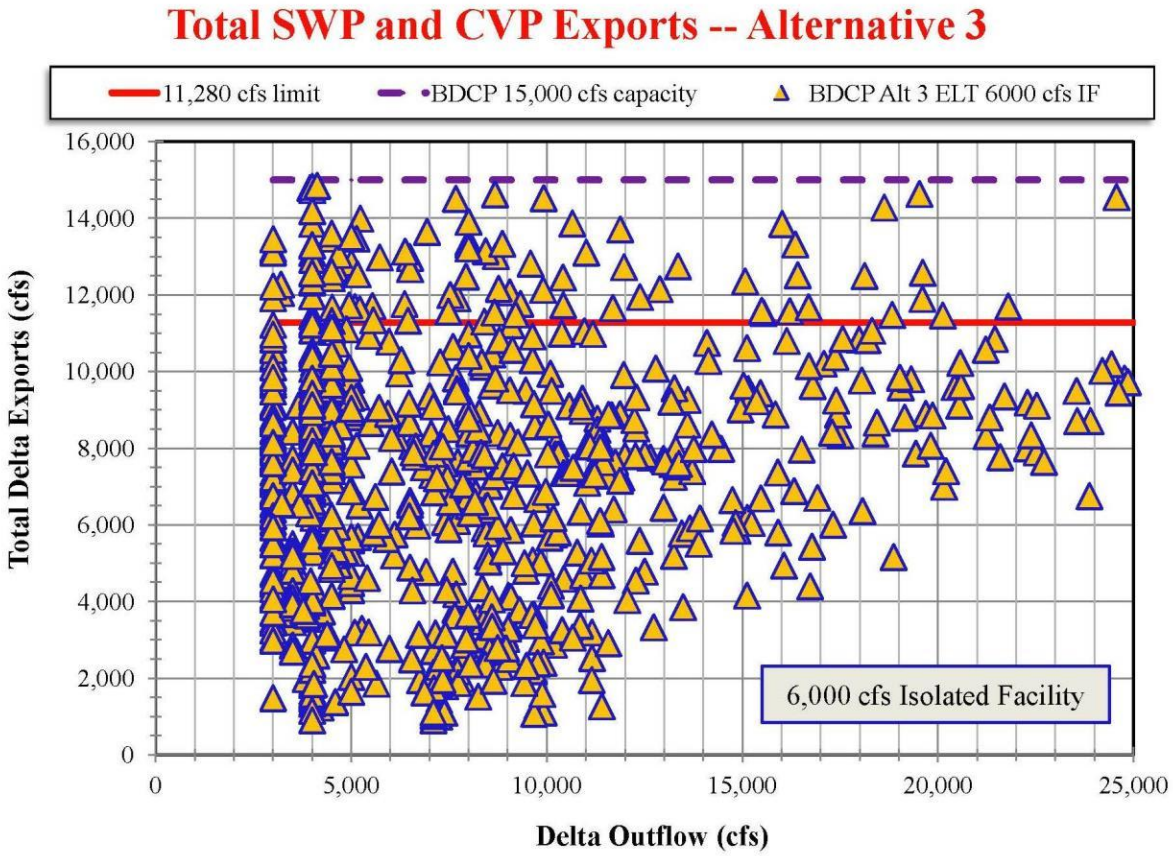

Figure E-9: Total exports as a function of Delta Outflow for BDCP Early Long Term Alternative 3 which has only 6,000 cfs of north Delta intake tunnel capacity. There are more months with exports in excess of 11,300 cfs during wetter periods (high outflow) than for Alternative 4 (9,000 cfs isolated facility). The reasons for this should be discussed and disclosed in the EIR/EIS.

To ensure that the BDCP operations actually reduce exports during periods of low Delta outflow, it will be necessary for the SWRCB and fishery agencies to set limits on exports based on Delta outflow. The minimum Delta outflows in D-1641 could be increased to 4,000 cfs to provide more protection for fish species. If the current lowest value of 3,000 cfs were retained, then the total exports could be limited to 3,000 cfs. Similarly, if the Delta outflow were 7,100 cfs, the combined SWP and CVP exports could not exceed, say, 10,000 cfs. No more than 13,000 cfs could be exported unless the Delta outflow remained at least 11,400 cfs.

These limits on total exports are hypothetical, but are consistent with the principle of reducing exports in drier months, and reducing reliance on the Delta for water supply.

These hypothetical "Little Sip" limits on total exports are shown in Figure E-10. The "Little Sip" export limits are compared with the same Low Outflow Scenario data plotted in Figure E-7. The

limit on total exports increases with increasing Delta outflow, and would allow for export increases in wetter periods to capture water when it is surplus.

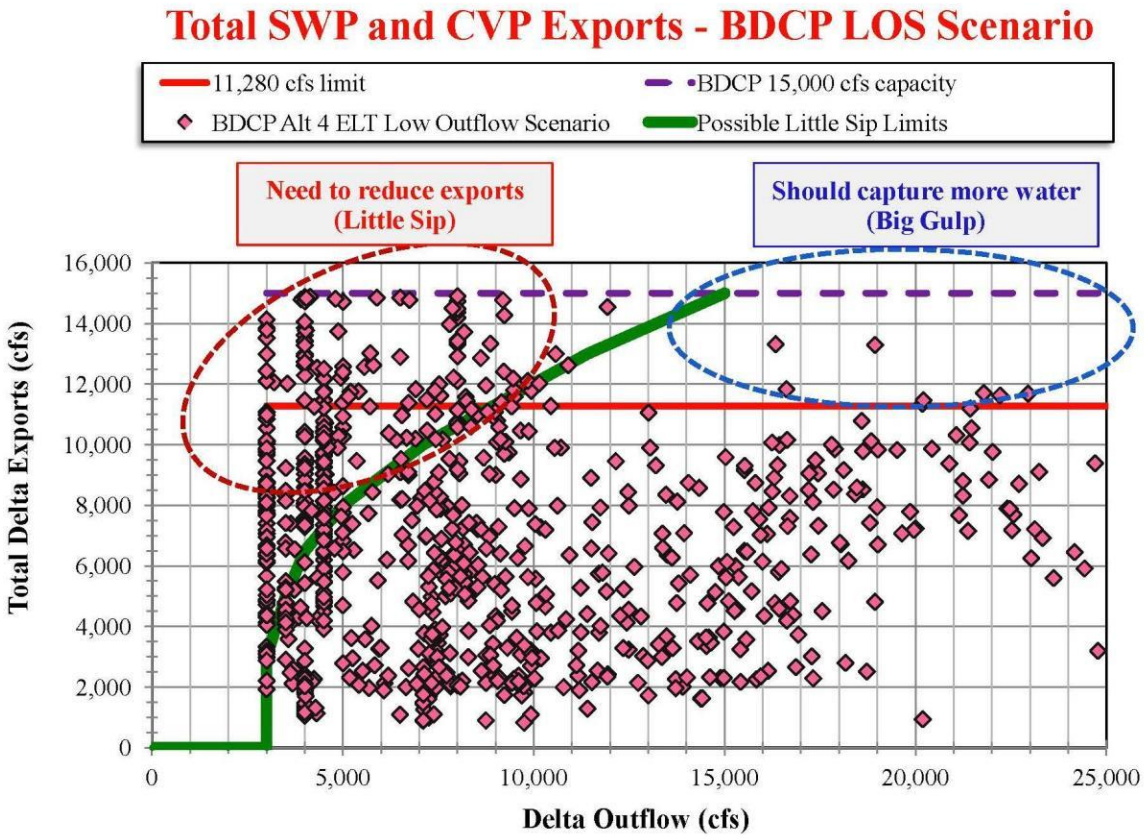

Figure E-10: Total exports as a function of Delta Outflow for BDCP Early Long Term Alternative 4 Low Outflow Scenario. Exports would increase rather than decrease during drier periods (low Delta outflow) and fail to increase to capture more water during wet periods (high Delta outflow). Limiting exports to no more than shown by the green line would ensure that only "little sips" are taken in drier periods to protect fish, and would allow for export increases in wetter periods to capture water when it is surplus.

The BDCP proposed project is deficient because it fails to reduce exports during drier months. This is in part due to the assumption that key operation limits on export operations will be eliminated (e.g., the Army Corps limits on Clifton Court inflow and NMFS Biological Opinion limits on the San Joaquin inflow to south Delta exports limit).

The BDCP DEIR/EIS is also inadequate because it fails to analyze any alternatives that can increase exports above existing levels in wetter months. This is not possible without **new storage** south of and in or immediately adjacent to the Delta.

The BDCP proposed project is also inconsistent with the 2009 Delta Reform Act because it relies on increased exports from the Delta, especially in the driest months. The DEIR/EIS must be revised to include alternatives that do not increase south Delta exports, that reduce total exports in drier months, and capture water to storage in wetter months when flow is available that is surplus to the needs of the Delta ecosystem, Delta water quality, in-Delta water users and the Delta as a place.