

Summary:

# Final State Water Project Delivery Reliability Report, 2009

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The *State Water Project Delivery Reliability Report 2009* updates DWR's estimate of the current (2009) and future (2029) water delivery reliability of the SWP. The report is produced every two years as part of a settlement agreement signed in 2003.

The report shows that future SWP deliveries will be impacted by two significant factors. The first is significant restrictions on SWP and Central Valley Project (CVP) Delta pumping required by the biological opinions issued by the U.S. Fish and Wildlife Service (December 2008) and National Marine Fisheries Service (June 2009). The second is climate change, which is altering the hydrologic conditions in the State.

This report represents the state of water affairs if no actions for improvement are taken. It shows continued erosion of SWP water delivery reliability under the current method of moving water through the Delta. The updated analysis shows that the primary component of the annual SWP deliveries (referred to as Table A deliveries) will be less under current and future conditions, when compared to the preceding report (*State Water Project Delivery Reliability Report 2007*).

The report discusses areas of significant uncertainty to SWP delivery reliability:

- restrictions on SWP and CVP operations due to State and federal biological opinions to protect endangered fish such as delta smelt and spring-run salmon;
- climate change and sea level rise; and
- the vulnerability of Delta levees to failure due to floods and earthquakes.

As in previous reports, estimates of SWP deliveries are based upon operation simulations with DWR's CalSim II model using an extended record of runoff patterns. These patterns have been adjusted to reflect the levels of development in the source areas and, for future conditions, possible impact due to climate change and accompanying sea level rise. Potential deliveries under current conditions are estimated at the 2009 level and assume current methods of conveying water across the Delta and the current operational rules contained in the federal biological opinions. Potential deliveries under future conditions are estimated at the 2029 level and are also based on the assumptions that no changes will be made in either the way water is conveyed across the Delta or in the operational rules. The analysis of future conditions incorporates a climate change scenario from DWR's 2009 report, *Using Future Climate Projections to Support Water Resources Decision Making in California*, which represents the median effects of the 12 scenarios contained in the report.

The 2009 report shows greater reductions in water deliveries on average when compared to the 2007 report. The 2007 report incorporates the interim operation rules established by Judge Wanger in the federal court in 2007. It shows very significant reductions in SWP deliveries when compared to the 2005 report, which assumes operation rules that were less restrictive. The 2007 report shows current SWP annual Table A deliveries averaging 63% (2595 taf) of the maximum contract amount of 4,133 thousand acre-feet (taf) per year. The 2009 report shows a corresponding value of 60% (2485 taf). The 2007 report projects an annual average of 66% to 69% (2725-2850 taf) for the future condition, whereas the updated report has 60%.

Although the averages of the updated estimates are less than were estimated in the 2007 report, the annual deliveries during drier conditions are projected to be somewhat higher than estimated in the 2007 report. This is due to the updated analysis incorporating the ability of SWP contractors to save water allocated in one year for delivery in the subsequent year and because water stored upstream cannot be delivered in some years due to export restrictions and is, therefore, available in drier times. This phenomenon is illustrated in the tables and curves below.

Under current conditions, annual SWP Table A deliveries from the Delta average 60% of the maximum annual amount of 4,133 taf per year. Over the 82-year simulation period, annual SWP Table A deliveries range from 7% to 81% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 34% to 36% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 67 to 71% of the maximum Table A amount. Under current conditions, annual SWP Article 21 deliveries, a secondary component of annual deliveries, average 85 taf and range from 2 taf to 850 taf over the 82-year simulation period.

Under future conditions, annual SWP Table A deliveries from the Delta also average 60% of the maximum Table A amount. Over the 82-year simulation period, annual SWP Table A deliveries range from 11% to 97% of the maximum amount. Over multiple-year dry periods, average annual Table A deliveries vary from 32% to 38% of the maximum Table A amount, while average annual deliveries over multiple-year wet periods range from 72 to 93% of the maximum Table A amount. Under future conditions, annual SWP Article 21 deliveries average 60 taf, ranging from 1 taf to 540 taf over the 82-year simulation period.

The *State Water Project Delivery Reliability Report, 2009* is available for public review at, <http://baydeltaoffice.water.ca.gov>. The report is an update to the *State Water Project Delivery Reliability Report, 2007* issued as final in 2008.

**Table 1. Highlighted SWP Table A delivery percent exceedance values under Current Conditions**

Exceedence	Annual SWP Table A Delivery (taf)		Change in delivery compared to 2007 report (taf)
	2007 SWP Delivery Reliability Report, Study 2007	Updated Studies (2009)	
25%	3218	2920	-298
50%	2976	2675	-301
75%	2168	2397	+229

Table 1 compares the probability estimates for current conditions from the 2007 report and the 2009 report. The comparison is also shown in Figure 1. The 2009 report estimates that for any given year in the future,

- There is a 25% chance that SWP deliveries will be at or above 2,920 taf.
- There is an equal chance (50%) that SWP deliveries will be above or below 2,675 taf. (Illustrated by the dotted lines.)
- There is 75% chance that SWP deliveries will be above 2,397 taf. Another way to state this is that there is a 25% chance that deliveries will be below this value.

**Figure 1 SWP Table A delivery probability under Current Conditions**

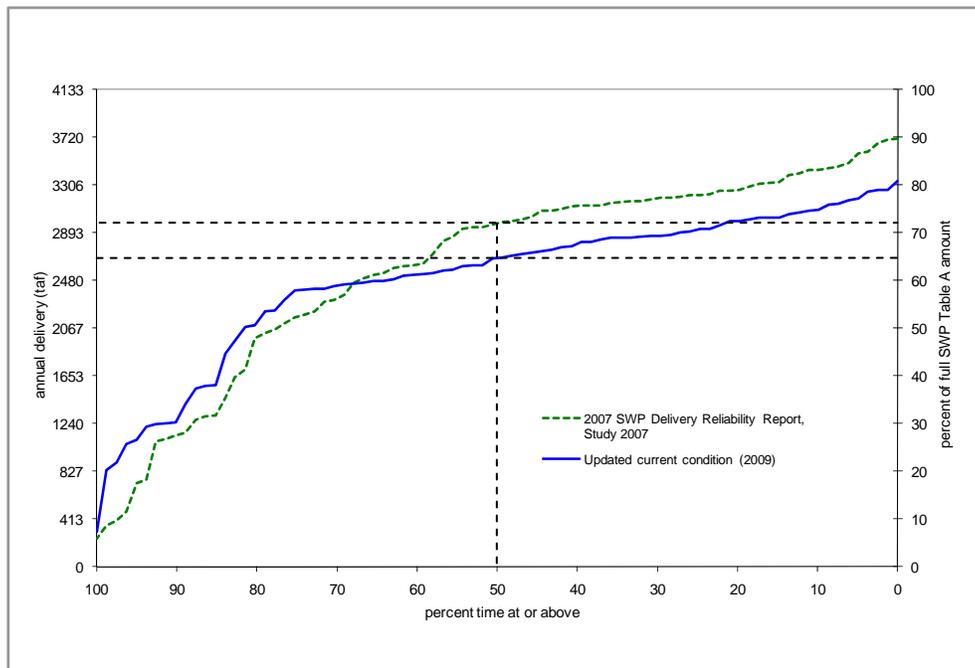


Figure 1 is a plot of all the annual estimates of SWP deliveries in ascending order, with the smallest value on the left and largest on the right.

**Table 2 Highlighted SWP Table A delivery percent exceedance values under Future Conditions**

Exceedence	Annual SWP Table A Delivery (taf)		Change in delivery in updated studies compared to 2007 report (taf)
	2007 SWP Delivery Reliability Report, Study 2027 <sup>1</sup>	Updated Studies (2029)	
25%	3687 – 3815	2915	-772 to -900
50%	2967 – 3205	2596	-371 to -609
75%	1860 – 2077	2137	+60 to +277

1/ Range in value reflects four modified scenarios of climate change.

Table 2 compares the probability estimates for future conditions from the 2007 report and the 2009 report. The 2009 report estimates that for any given year in the future,

- There is 1 chance in 4 (25% chance) that SWP deliveries will be at or above 2,915 taf.
- There is an equal chance (50% chance) that SWP deliveries will be above or below 2,596 taf. (Illustrated by the dotted lines in Figure 2.)
- There is 75% chance that SWP deliveries will be above 2,137 taf. Another way to state this is that there is a 25% chance that deliveries will be below this range.

**Figure 2 SWP Delta Table A delivery probability under Future Conditions**

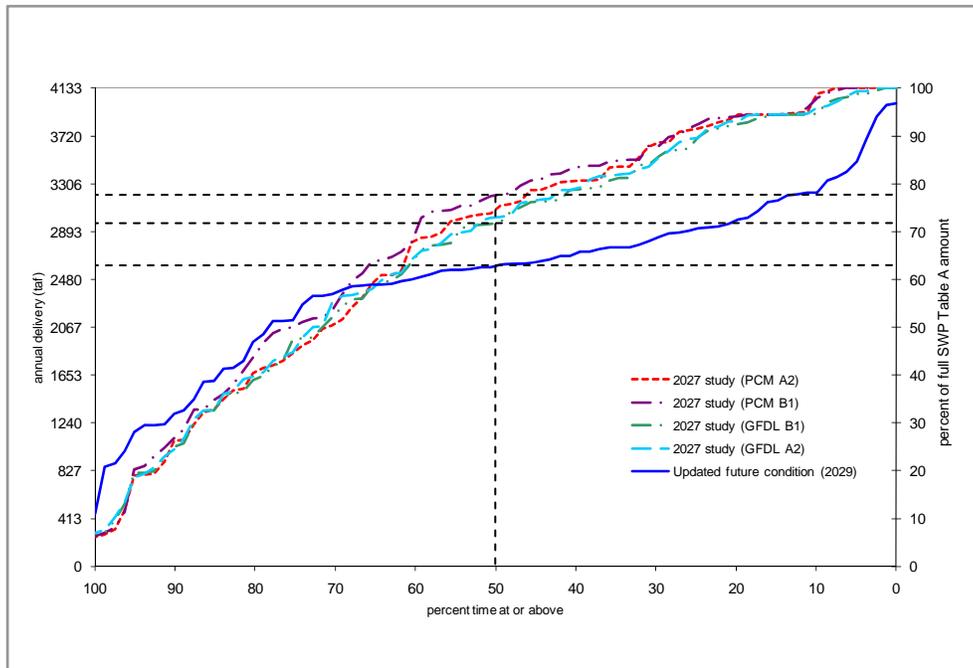


Figure 2 is the corresponding plot of all the annual delivery estimates for the future condition.