

# Water Supply Measures for Stage 1 Summary

## Key Points

- Water supply measures for Stage 1 have been identified.
- All require additional evaluation.
- If any are going to be part of Stage 1, action must be taken now to ensure timely permitting and implementation.
- Agency coordination will be required to implement.
- Mitigation measures must be part of a package to ensure no re-directed impacts, especially water quality and fisheries.
- Operational criteria are key to defining water supply, water quality and environmental benefits or impacts.
- Core elements including demand management (conservation, reclamation) have not been included in the analysis.

Over 40 potential measures for improving water supply and operational flexibility have been identified and evaluated for possible implementation in Stage 1. The measures range from surface and ground water storage to exchanges and transfers. They have been examined for implementability, water supply potential, conflicts with the CALFED Program and other criteria.

In all cases, additional evaluation is required as they become more fully defined and placed in the context of an overall package. Some are further along in the permitting process than others. However, all will require immediate action, including development or completion of environmental documentation, if they are to be implemented in a timely fashion in Stage 1. All require agency coordination to ensure that they can be implemented in a timely fashion.

Individually, each measure can produce unwanted consequences or redirected impacts. As a consequence, none are, by themselves, fully endorsed by all stakeholders. However, as part of a package that can enable impacts to be avoided, offset or mitigated, the elements are implementable. Consequently, it is imperative that they be considered in the context of a package that resolves issues related to water levels, water quality and fishery impacts.

The degree to which water supply benefits accrue with any of the measures depends entirely upon the operational rules under which the projects will be governed. These rules must be defined. With an adequate definition of these rules, it becomes possible to examine more potential supply measures, such as transfers or exchanges, which can enhance the efficiency of the system or reduce water supply impacts of rules that protect fisheries or water quality.

## Measures for supply

- Joint use of Federal and State pumping capacity in the South Delta
- Maximize the use of State's Pumping Plant (now restricted)
- Intertie between Federal and State aqueducts
- Groundwater banking (Madera, Kern, Semitropic, & Southern California)
- Small Shasta enlargement
- In-Delta storage
- Alteration of operational limits
- Exchanges, transfers and rescheduling of water (these measures largely increase the flexibility of the system)

Joint use of State and Federal pumping facilities allows sharing of capacity. It especially provides the CVP access to capacity from time to time when the capacity of its own facilities, which are more limited than those of the State, are fully used. It also allows the projects to shift pumping back and forth to reduce entrainment of fish. Increasing the permitted capacity of the State facilities allows the State to use its full pumping capacity more frequently. This is currently limited by a Corps of Engineers permit to protect channels and water levels in the south Delta from the effects of high pumping rates. A 400 cfs intertie between the aqueducts allows the CVP to use its full pumping capacity (4,600 cfs) with a bypass around a section of the canal that is limited to 4,200 cfs.

A number of groundwater banking opportunities have been examined. In Stage 1, it is likely that as much as 800,000 acre-feet of storage could be available, and possibly more. An enlarged Shasta Reservoir would provide an additional 300,000 acre-feet. In-Delta storage amounting to 240,000 acre-feet was also examined.

All the above measures could impact water quality and fisheries, and will require other measures, such as operational rules to avoid impacts or provide mitigation. In-Delta storage can severely impact urban water quality unless the stored water is isolated from urban supplies. Increased pumping can cause salinity intrusion affecting agricultural and urban supplies. Increased pumping can affect water levels, impairing the ability of other users in the South Delta to divert water.

Conversely, the measures offer the opportunity for flexibility to reduce impacts to fisheries and improve water quality when they are coupled with operating rules and other measures.

## Results of analysis

Increasing SWP capacity and joint use of facilities:  
100 TAF dry, 230 TAF average

Storage (300 TAF):  
50 TAF dry, 70 TAF average

Shasta enlargement, Madera Ranch, Kern Water Bank, In-Delta storage plus increasing SWP capacity and sharing:  
320 TAF dry, 380 TAF average  
(220 TAF/150 TAF increase)

### **Effects of Operational Criteria**

Restrictive operations:

Reduces exports by 450 TAF

Increasing SWP capacity and allowing joint use:

15 TAF dry, 180 TAF average (compared to 100/230)

Relaxing operations and increasing SWP capacity with sharing:

200 TAF dry, 400 TAF average

Rule of thumb: dry year water supply from storage is about 1/6 of the storage available (the standard extended dry period used in the studies lasted 6 years). In the case with all primary measures included, 1.3 MAF of storage is added. Some storage is operated to maximize dry year storage, which reduces somewhat the average year storage. For example, 300 TAF of groundwater storage can yield about 10 TAF on average, but 70 TAF per year in an extended drought; operating to maximize average year storage reduces the dry year yield but increases the average year yield to about 50 TAF.

The studies were conducted assuming the current Water Quality Control Plan was in place (Delta Accord) as well as the operating rules relating to the current CVPIA AFRP upstream and in-Delta actions. If the rules are changed, the results change. For example, removing the export-inflow limit approximately doubles the yield of joint use. Increasing the operational restrictions can reduce the benefits of any water supply action and further reduce the total project yield.

Once water supply benefits or impacts are identified, it is important to examine the impacts on fisheries, water quality and water levels. Impacts will require operational changes (which in turn modify the supply impacts or benefits) to avoid, offset, mitigate or provide net improvements to fisheries, water quality and water levels.

There are a number of limitations to the analysis. Trinity flows are not yet defined. A number of levels were examined, within the range of those being considered. Shasta water levels are, in some dry years, drawn to such low levels that some action would likely be required to protect winter run salmon. San Joaquin River flows are not adequate to always fully meet levels in the WQCP.

## **General Conclusions**

- Flexible pumping operations can shift more exports outside of sensitive fish periods.
- As storage is added, more water becomes available for dry years.
- Storage benefits depend on operations (dry year vs. average year).
- As Delta restrictions increase, benefits from measures decrease.
- Exchanges and transfers add to potential supplies. Increasing permitted pumping capacity adds to the potential. However, willing participants must be identified and other limitations must be recognized.

## **Summary**

- To implement any measures in Stage 1, agency coordination and permitting need to start immediately.
- Operational rules need definition to quantify benefits (water supply for export areas, non-export areas, water quality or fisheries).
- Package must be complete and self-mitigating.