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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.

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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.

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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.