Let's Modernize Our Reservoir Operation Rules

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Background: The major multiple purpose reservoirs were constructed between 1940 and the 1980. These reservoirs (Shasta, Friant, Folsom, Oroville, New Bullards Bar, New Melones, New don Pedro, New Exchequer, etc) are governed by release schedules that individually govern water supply, hydropower, recreation and flood management. The rules governing the flood management of the reservoirs have a profound affect on all of the other reservoir purposes. The idea governing the flood operations was developed by the Corps of Engineers (Corps) in mid 1950's. The idea is that we do not have a rain flood concern with our reservoirs in the summer months and the months of December, January, and February (sometimes March) present the greatest exposure to rain flood risk. The sierra snow pack has been available to fill the reservoirs from April through June. The operations using this simple yet effective methodology has been very successful. It has been tested with extreme floods and extreme droughts and has performed relatively effectively. This conceptual framework has governed the development of the flood management of the reservoirs for nearly 50 years. The operation of the reservoirs is becoming more challenging as time goes on. Climate change is real in California! Many studies have been conducted that show the average temperature is increasing steadily since the 1950's. This has had the effect of increasing the proportion of the annual flows that occur in the winter months (rain flood) to the proportion that occur in the spring (snowmelt). The net impact on the reservoirs is that less water is available to fill the reservoirs (on average) than we have had historically. This is occurring at a time of greatly expanded human population and the consequent increased demand for water. The population growth has also expanded the need for greater flood protection. The increasing population has increased both the demand for stored water and the need to keep the reservoir space empty for flood management. The ability to meet the increasing water demands and the increased need for flood regulation space by reliance on historic snow pack levels is declining. The historic response to these conditions has been to attempt to construct more reservoir storage. With limited reservoir sites available for on stream storage and operational difficulties for off stream storage and environmental impact issues for both, it is unlikely that new storage will be the answer for the next 25 years or longer.

The major problem with the flood control criteria is that it does not distinguish between large floods, small floods and no floods. It only focuses on the current storage in the reservoir and not on the threat of flooding. This frustrates the optimization of the operation for water supply and other uses without improving flood protection. Conversely when storage is not in the allocated flood space, no flood releases are called for even when a major storm approaches California from the Pacific Ocean.

Recommended Actions: The flood control operation diagrams for all major California reservoirs for which the Corps has prescribed flood control regulations, should be modernized. The modernization would account for the current technology advances and the hydrologic changes that have occurred and changes that are likely to occur because of climate change. As a minimum, the operations criteria should be based on forecasts and not be based on existing reservoir storage. This modernization effort would require $2 million annual funding for ten years for the Corps to complete the work. The work that could be accomplished with this funding would include both the update of the operations criteria and manuals and the environmental documentation (EIS) that may be required to accomplish the changes in operation. Following the initial 10 year modernization period, an annual Corps funding level of about $500,000 would assure the operations of these reservoirs stays up to date. Normally these activities are funded out of the Corps O&M budget. This has been a problem in the past because any new stipulated work to be done has had the effect of limiting funds for normal maintenance. The modernization work should be stipulated as a separate line item that would not affect the normal maintenance of the projects in order to assure the funds will meet the intended purpose.