Committee on Resources
Subcommittee on Water & Power

Testimony

Testimony
of
Joseph D. Countryman PE
Murray, Burns & Kienlen
(Engineer Consultant to SAFCA)
Hearing on Folsom Dam Modifications
May 27, 1998
U.S. House of Representatives
Committee on Resources
Subcommittee on Water & Power
Room 4202, State Capitol
Sacramento, California

INTRODUCTION

I am Joseph D. Countryman, a resident in the American River flood plain. The issues before us today are more than just a technical curiosity to me since I will join 400,000 other people in the Sacramento area as a flood victim should the American River breach its levees. I have worked as a civil engineer in California for over 30 years planning, designing and operating flood control facilities. The first 21 years of my career were with the U.S. Army Corps of Engineers. During that period I was chief of Reservoir Operations, and I ended my career with the Corps as Chief of Civil Design. The last 11 years I have been in private practice with the firm of Murray, Burns and Kienlen (MBK), a civil engineering company. I am a principal at MBK. Our company works exclusively on flood control and water resources issues.

I have reviewed the statement provided to your committee by SAFCA, and I concur with both the technical presentation therein and the logic presented supporting the construction of the Folsom Dam modifications and the improvements in downstream levees. I will not reiterate the descriptions provided in that testimony. I will provide specific technical data in my testimony pertinent to the issues on which you have requested additional information. As I understand the purpose of this hearing, it is to explore questions on construction impacts at Folsom Dam relative to traffic, water supply and recreation. In addition, the impact raising American River levees and the consequent higher objective flood releases in the lower American River would have on the overall flood control system reliability will be reviewed.

FOLSOM MODIFICATION IMPACTS

Traffic.
The modification of Folsom Dam to improve its outlet capacity under the original plan proposed by the Corps would have a substantial impact on traffic that uses the top of the dam as a highway. My report, prepared for SAFCA in March 1998, indicated that the lowering of the spillways at Folsom Dam would cause the road to be closed for a substantial period over nine years. Construction of new river outlets or the enlarging of the existing outlets will have minimal impacts on traffic and no impacts during peak travel periods. In our report we recommended that the lowering of the spillway bays be replaced with the addition of five new river outlets because it would be less costly, it would essentially eliminate traffic impacts, and could be constructed in two years. I believe once the Folsom Dam modifications are authorized by Congress, the Corps will confirm my findings in their Preconstruction Engineering and Design (PED)

studies.

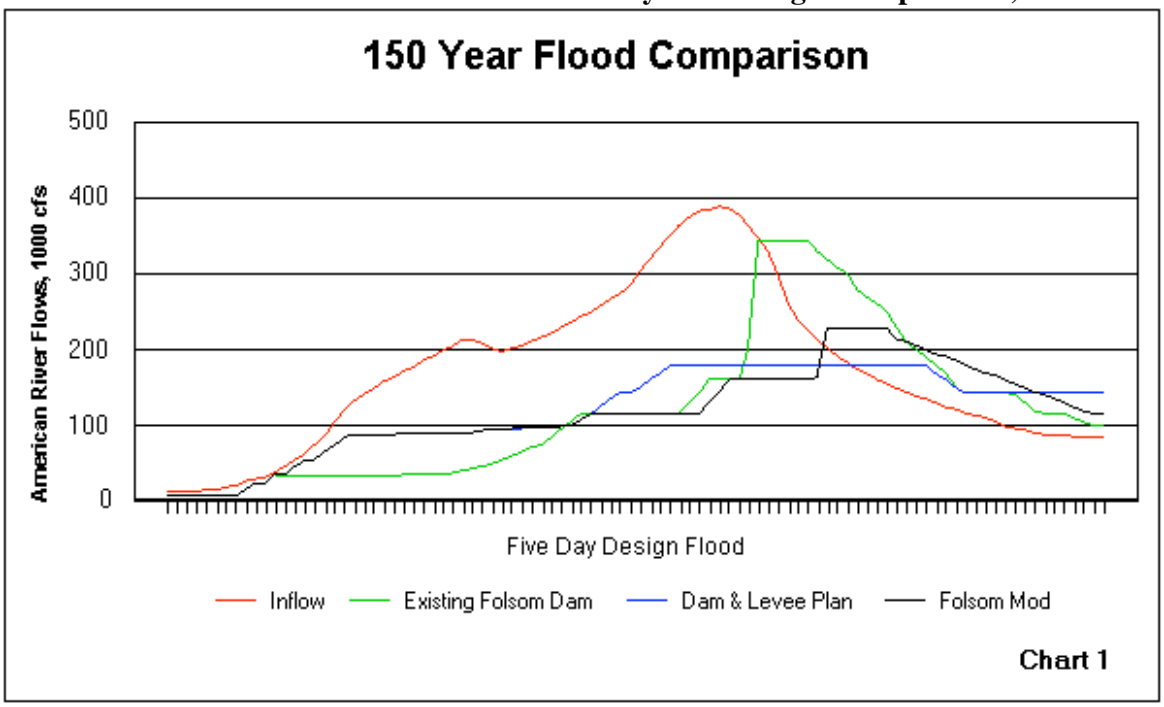
Separate from the issue of modifications to Folsom Dam, the use of the top-of-dam road by the public should be addressed. The public highway interferes with the operation and maintenance of the dam. If possible, a bridge should be constructed downstream of the dam to move the traffic off of the dam to improve safety for the personnel at the dam and to facilitate Reclamation's ability to operate and maintain the structure. If future emergency operations are required, then this critical transportation link across the American River would not be lost during the emergency.

Water Supply Impacts.
The proposed modifications to Folsom Dam and the time extension of the reoperation for flood control would not have any impact on local water supply. Construction of improved pumping capacity at Folsom Dam is currently underway and will be finished this year. This new water supply pumping capability will assure Roseville, Folsom, San Juan Water District and Placer County Water Agency that they will be able to obtain their water from Folsom Lake.

The addition of the new outlets will allow a reduction in the existing reoperation flood space due to the increased efficiency of the flood control operation. The reoperation flood space could be reduced from 270,000 acre-feet to 200,000 acre-feet, a 25% reduction once the Folsom Dam outlets are modified. Therefore the adoption of this plan would substantially reduce the chance that the CVP water supply or other uses of Folsom Dam would be impacted by the revised flood operations plan. In addition, I am now working with the Corps, Reclamation, National Weather Service and the State Flood Center to determine if the utilization of currently available flood forecasting technology can be implemented that would improve flood operations and water supply performance at the dam. If we are successful in developing a new operation schedule based on the use of this technology, flood control, recreation and water supply will all benefit. I would be happy to keep you informed of progress we make in this area.

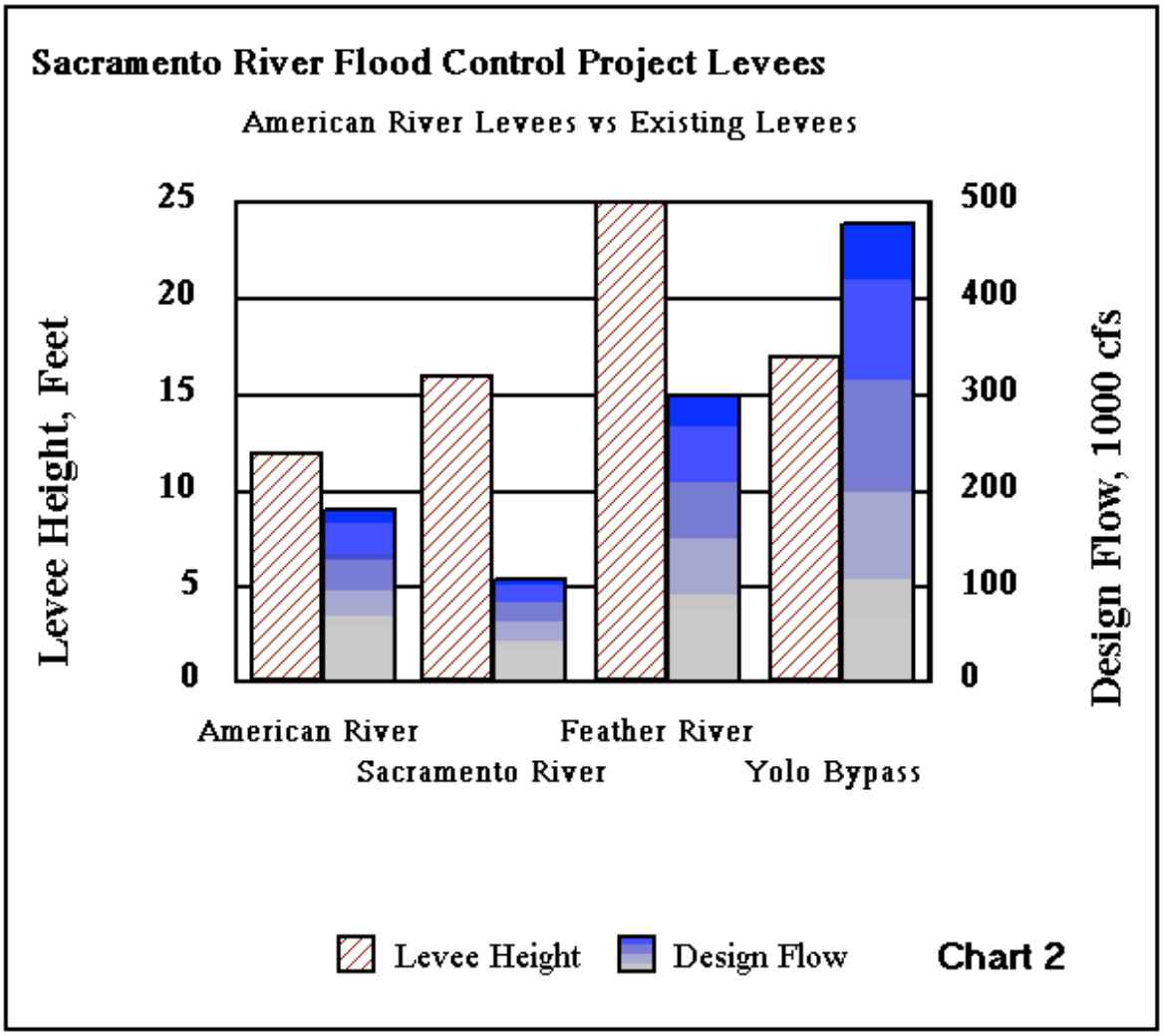
AMERICAN RIVER LEVEE RELIABILITY

Would the American River levees be more or less reliable if they were designed to pass 180,000 cfs?

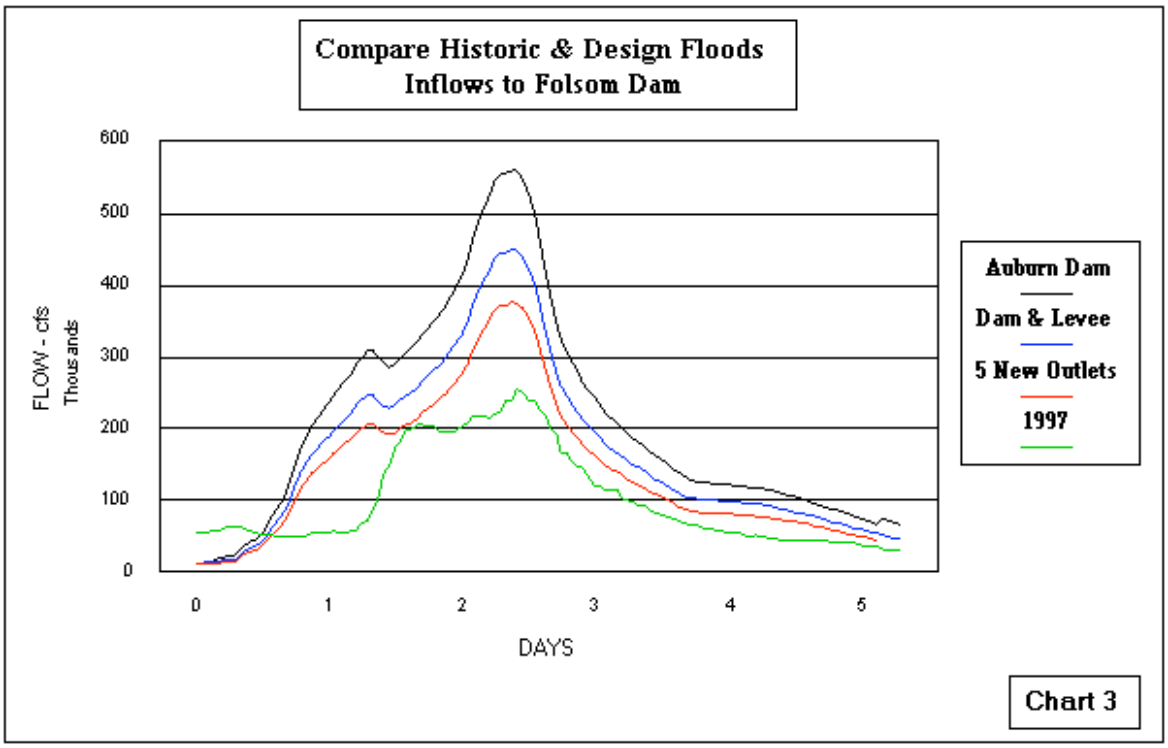


The existing federal levees along the American River were designed to pass 152,000 cfs with 3' of freeboard under emergency conditions or 115,000 cfs under "normal" flood operations. During the 1986 flood, a 134,000 cfs was safely passed down the American River. The "Stepped Release Plan" envisions a "normal" flood operations flow of 145,000 cfs and an extreme event release of 180,000 cfs. From a flood control

perspective, the design of a flood system can be made more reliable with lower flows than for higher flows. This is because the higher a levee is the greater the forces are working against that levee. The height of the water and the erosive force of the water against the levee are factors. When a reservoir is involved in the flood control design, higher controlled flood releases actually reduce the maximum flows that the downstream levees must carry. I have attached Chart 1 to this presentation which illustrates this point with the 150-year flood under three operating conditions; (1) existing Folsom Dam facilities and operation plan, (2) modify Folsom Dam (new outlets + enlarge existing outlets) with 115,000 cfs objective flood release, and (3) modify Folsom Dam with "stepped" 145,000 cfs - 180,000 cfs objective flood release. The chart shows that the flow will be nearly 350,000 cfs in the American River with the existing Folsom Dam facilities and operation plan. I can assure you that the American River levees will not pass flows of this magnitude without breaching, and I have no doubt that Sacramento River levees and Yolo Bypass levees will also be severely impacted. Modifying Folsom Dam while keeping the objective flood release of 115,000 cfs would reduce the American River flows to about 230,000 cfs. Again, the American River levees will be overwhelmed by a flow of this magnitude. Finally, by adopting the "stepped" objective flood release schedule, flows in the American River can be controlled to 180,000 cfs. Hydraulic modeling studies by the Corps indicate flows of this magnitude can be safely accommodated within the American River levees. Therefore, the system will be much safer with the increased objective flows than if the current objective flow of 115,000 cfs is maintained.



I reviewed the existing Sacramento River Flood Control System levees to determine if either the flow magnitudes or levee heights required along the American River by the "Stepped Release Plan" were consistent with the rest of the system; Chart 2 summarizes my research. The American River levees, after modification to pass the emergency release of 180,000 cfs, compare favorably with the Feather River, Sacramento River and Yolo Bypass levees. Another factor to consider is the extensive bank protection currently underway along the American River that is significantly improving the protection of the levees from lateral erosion.



Another issue relating to flood protection reliability is the size of the flood that can be controlled by the dam and levees. I have prepared an illustration, Chart 3, showing the relative performance of the proposed flood system alternatives. This chart compares the size of the flood that can be controlled by Auburn Dam, Folsom Dam and Levee Modifications, and Folsom Dam Modifications to the 1997 Flood (the largest flood recorded on the American River since 1860). The Dam and Levee Plan will safely control a flood nearly 70% larger than the record 1997 flood. My Conclusion is that the American River levee system will be much more reliable with the proposed dam and levee modifications than the existing condition levee and dam system.

DOWNSTREAM AND UPSTREAM AFFECTS OF THE PROPOSED PROJECT

The hydraulic impacts of the Dam and Levee Plan have been documented by the Corps. The Dam & Levee Plan includes widening the Sacramento Weir to accommodate the increased objective releases from the American River. Because of this weir widening, the river stages in the Sacramento River will be reduced since additional water will be transferred to the Yolo Bypass. The Corps hydraulic modeling indicates that the limit of the upstream hydraulic impacts of the project is near Verona on the Sacramento River and downstream of the Fremont Weir in the Yolo Bypass. I have attached a map that shows the Corps' proposed hydraulic mitigation work in the Yolo Bypass to offset the increased flows in the Yolo Bypass. Although the Corps studies did not identify any impacts downstream of the Yolo Bypass due to increased flows in the bypass, this conclusion was partially based on engineering judgment. I understand detailed design studies will be completed by the Corps following federal authorization of the project to quantify their findings. They will expand their hydraulic modeling effort to assure that downstream concerns about impacts of the project are evaluated in detail. Additional impacts are not expected to be identified but if new impacts are identified, the project will mitigate the impacts. The existing Corps studies show that the maximum water level difference in the Yolo Bypass will be about 6" for the 200-year flood, and the levee system will maintain about 3' of freeboard for this rare flood.

It is important to note that any improvements to the Sacramento River Flood Control Project levees upstream of the Yolo Bypass that increase the carrying capacity of the levees could increase flows in the Yolo Bypass. Certainly, the Feather River levee failure in 1997 reduced downstream flows in the Yolo Bypass. I know of no flood control project in California, other than the American River project, that recognizes this potential and is recommending hydraulic mitigation. I strongly recommend that the Corps' current Sacramento River Watershed Investigation recognize the critical importance of the downstream

levee systems and make recommendations to assure that downstream levees can carry increased flows that result from upstream levee improvements.

CONCLUSIONS

Sacramento is facing an extreme flood risk. No area in this country has either the number of people or value of improved property at risk as does Sacramento. The federal, state and local flood agencies have made significant progress since 1986 to improve the flood control system. I believe that without these heroic efforts, Sacramento would have flooded in January 1997.

I have supported Auburn Dam as the ultimate solution for American River flood protection. I have twice traveled to Washington to testify in support of the construction of the Auburn Dam, and twice the Congress has refused to support the construction of the dam. I have become convinced that the federal government will not support construction of the dam in the near term. This is because there is determined opposition to the dam from national environmental organizations and because of the cost of the project (nearly $1 billion). The dam will eventually be built because California will need the water supply (regardless of cost) and the added flood protection will accrue.

We need flood protection NOW.
The Dam and Levee Modification Plan provides the most flood protection that we can obtain without constructing an upstream dam or severely impacting Folsom Dam's multiple purpose functionality. The improvements under the Dam & Levee Improvement Plan will provide even greater reliability to the flood system as a whole when the upstream dam is finally constructed. I strongly endorse moving forward with the Folsom Dam and Levee System Improvements to provide Sacramento and the surrounding area with a very significant improvement in flood protection. If we move expeditiously, within three flood seasons we can have new Folsom Dam outlets in place and the remainder of dam and levee improvements well underway. The high probability of flooding that Sacramento now faces will finally see a substantial reduction.

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