STATEMENT OF POSITION
ON HOUSE BILL H.R. 1246,
THE COLORADO RIVER FLOODWAY PROTECTION ACT,
BY THE
SEVEN COLORADO RIVER BASIN STATES

presented by Vernon E. Valantine, Chief Engineer,
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at a May 9, 1985 hearing of the Subcommittee
on Water and Power Resources of the
House Committee on Interior and Insular Affairs

The representatives* of the seven Colorado River Basin states have come to a unanimous position in support of House Bill H.R. 1246, the Colorado River Floodway Protection Act, introduced on February 25, 1985 by Congressman Richard Cheney (Wyoming) and Congressman George Miller (California). In developing this joint position, we have considered the experiences of high flows on the Colorado River in 1983 and 1984, the multiple purposes for which the major reservoirs in the Basin were built, and the various documents which make up what is commonly referred to as the "Law of the River".

Background

As the principal water resource in the arid southwest, the Colorado River is of major importance to each of the seven Basin states as well as to Mexico. The dams and reservoirs constructed on the river provide for flood control; river regulation; domestic, municipal, industrial, and agricultural water use; hydroelectric power production; recreational opportunities; and fish and wildlife enhancement.

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The Colorado River reaches peak flow rates in excess of 100,000 cubic feet per second (cfs) about once every 3 years, on the average, in the late spring due to snowmelt runoff. Prior to construction of Hoover Dam, these high flows caused correspondingly high levels of damage to the river banks and riparian lands along the lower Colorado River. Since the completion of Hoover Dam in 1935, the annual snowmelt floods have been controlled, first by Lake Mead and later by the upstream reservoirs as they were constructed.

The maximum flood control release objective of Hoover Dam since its closure has been 40,000 cfs. During the 48-year period from 1935 to 1982, releases from Hoover Dam exceeded 25,000 cfs in only 2 years, and never exceeded 36,000 cfs. This high degree of control was possible from 1935 to 1962 because the low level of downstream consumptive use requirements did not require a large amount of carry over storage to meet water requirements during an extended dry period. Under those conditions, it was possible to operate Hoover Dam to meet demands and keep the water in storage low enough that the annual snowmelt inflow could be captured without risking use of the maximum controlled release capability of Hoover Dam (73,000 cfs without use of the spillways). After 1963, with the completion of Glen Canyon Dam, and until 1980, all streamflow in excess of downstream consumptive use requirements was retained to fill Lake Powell's vacant storage capacity.

With the filling of Lake Powell in 1980, releases in excess of downstream delivery requirements were made from Hoover Dam but the peak rate reached only about 21,000 cfs until 1983. However, with the currently-filled condition of the reservoirs, and with the consumptive uses of the Basin states approaching the average annual flow (which increases the need to keep the reservoirs nearly full), there is a high probability over the next several years that flood control releases will have to be made in excess of downstream delivery requirements. This will be done in accordance with the Army Corps of Engineers' Hoover Dam Flood Control Regulations.

During the decades since Hoover Dam was built, commercial, residential, and recreational structures were built on the riparian lands along the river that had been previously subjected to flooding. Hoover Dam does provide protection from the peak flows that had formerly ravaged the riparian lands. However, when operating the dam to achieve the optimum balance between water conservation, flood control, and power generation under full reservoir conditions, as is now being done, Hoover Dam releases may occasionally have to be made at flow rates higher than those experienced from 1935-1982. This fact was brought forth in
1983 and 1984, when flood control releases had to be made which adversely affected many of the structures that had been improperly located in the floodway.

The Bureau of Reclamation provided information on its expected future Colorado River operations to the public in the mid to late 1970s, and explained how such operations would impact developments in the floodway. The term "floodway" refers to the channel of the river and any additional area necessary to convey the design flood. Brochures delineating the floodway were published, and a report was issued in 1976 and given wide public circulation. The report indicated that flows of 40,000 cfs could be anticipated within the next 10 years, with the expected filling of Lake Powell.

Flood Control Regulations

The Secretary of the Interior's operations for flood control are governed by the Army Corps of Engineers' Hoover Dam Flood Control Regulations. The regulations, established pursuant to the Flood Control Act of 1944 (33 U.S.C. sec. 709), have evolved with time. When there were no major Upper Basin storage facilities and when the average annual water supply far exceeded downstream demands, inflexible mandatory criterion reserved 9,500,000 acre-feet of vacant storage space on April 1 of each year. Now, a more flexible concept enhances all project purposes while providing a degree of flood protection equivalent to that provided under the earlier criteria. The flexible concept arose with the technical ability to forecast runoff and from periodic reviews of the regulations conducted by the Corps of Engineers, in cooperation with the Bureau of Reclamation and the Basin states. The most recent review and update of those regulations occurred between 1978 and 1982.

In this last review, nine alternatives were evaluated, each one of which was set up to favor, in turn, a different one of the authorized Hoover Dam project purposes of flood control and river regulation, water conservation, and power generation, which are listed here in descending order of priority as established by Congress. Frequently, the optimum operating procedure for one purpose is directly opposed to the optimum operating procedure for another purpose. Flood control benefits are maximized by keeping reservoir storage levels low to maximize the amount of empty space available to regulate flood flows. Water supply benefits are maximized by keeping the reservoir storage levels high so as to provide for deliveries during multi-year periods with low runoff. Hydroelectric benefits are maximized by storage somewhat lower than the optimum for water conservation so as to minimize releases in excess of power plant capacity. Also, such
a lower storage level avoids the necessity to release water to produce energy on a continuous basis rather than storing it for release at a later date to meet peak demands.

Hydrologic analyses of the Colorado River system using these alternatives were made jointly by the Corps of Engineers and the Bureau of Reclamation, and the benefits of each, as measured by reduced flood damages, increased availability of water and generation of hyroelectric energy, were compared. In addition, the impacts of these alternatives on fish and wildlife, water quality, and other parameters were analyzed.

The Corps of Engineers' analyses concluded that the alternative that most closely paralleled the then-existing regulations produced the optimum combination of beneficial objectives. After public review and comments on the Corps of Engineers' study, this alternative was adopted as the Hoover Dam Flood Control Regulations.

The regulations provide for (1) a minimum of 5,350,000 acre-feet of empty reservoir space to be available as of January 1 of each year, (2) forecasts to be made monthly, from January through July, of the maximum inflow to Lake Mead during the period January through July of each year, and (3) flood releases to be made based upon the current amount of empty reservoir space and the forecasted Lake Mead inflow. The required flood control releases are made in stepped amounts, with the next-to-last step being the target maximum rate of 40,000 cfs. This target maximum rate of release has a 50-year history, having been determined for the initial operating plans for Hoover Dam and later by the Corps in its earlier operating studies to be the maximum release rate from Hoover Dam that "...would have caused only minimal damage downstream".

The Lake Mead inflow forecasts are made by the Colorado River Forecasting Service located at the National Weather Service River Forecast Center in Salt Lake City, Utah. A minimum August 1 empty storage space of 1,500,000 acre-feet is required at Lake Mead each year to control rain floods and to initiate the reservoir storage space building to achieve the January 1 space requirement. The forecasts on which the system operations are based are the maximum forecasts that have the probability of not being exceeded 95 percent of the time.

The Bureau of Reclamation must meet the minimum flood control requirements, but beyond that it has some flexibility in the manner in which it operates the river. Specifically, for good cause it can release flows in excess of the minimum required by the regulations, develop flood control storage
space greater than required by the regulations, and provide for the required flood control storage space by using available space in the different reservoirs, within constraints set by the regulations, the Operating Criteria promulgated in compliance with Section 602 of P.L. 90-537 and the remainder of the "Law of the River".

1983 Reservoir Releases and Flood Damages

On January 1, 1983, there was 6,600,000 acre-feet of vacant reservoir storage space in the Colorado River system, about 25 percent more than the minimum required by the Flood Control Regulations. A very unusual combination of weather events in 1983 caused a rapid succession of increasing runoff forecasts from 117 percent of normal on May 1 to 210 percent of normal in late June. The unusual weather conditions resulted in a near record runoff of 14.6 million acre-feet for the April-July period and a peak inflow into Lake Powell of approximately 116,000 cfs on June 28, 1983. This occurred when the Lake was already full. Lake Powell began spilling on June 8, with a peak release of 91,000 cfs occurring on June 29.

The storage in downstream Lake Mead reached the top of the Hoover Dam spillway gates on July 3, and the first spill occurred since 1941, when releases were made to test the dam's spillways. The nearly doubling of the forecasted runoff between the May 1 and late June forecasts, with the reservoirs full, could have required Hoover Dam flood control releases of up to 65,000 cfs pursuant to the regulations. However, the Bureau of Reclamation was able to manage the reservoir system so as to avoid these very damaging releases. The maximum average monthly release from Hoover Dam was limited to 42,000 cfs. With regard to the frequency of occurrence of such flows, a 1982 Corps of Engineers report shows a Hoover Dam release of 40,000 cfs for a one-month duration as a 1-in-200 to a 1-in-333 year event.

Substantially higher than normal releases from Hoover Dam continued through the remainder of calendar year 1983 and into 1984 in order to evacuate flood control storage space. Releases remained above 27,500 cfs during this period. By comparison, releases from Hoover during the year would normally range from about 5,000 cfs during low water demand periods to about 17,000 cfs during high irrigation months.

The 1983 high release rates from Hoover Dam resulted in flooding of low-lying areas, bank erosion, and the raising of adjacent ground water levels. Areas downstream of Davis Dam experienced the greatest incidences of flood damage and economic loss, most of which occurred to structures and businesses within the floodway. Damage to recreational
facilities was widespread, affecting beaches, camp sites, boat docks, launch sites, and businesses servicing these activities. Substantial revenue losses were incurred by businesses and many business owners experienced severe personal hardships due to reduced recreation along the river during the period of peak releases.

Flood-related damages below Davis Dam sustained by the Bureau of Reclamation facilities have been estimated to be about $40 million. Damages to the private sector downstream of Davis Dam have been estimated to be in the order of $30 million. Another $10 million of estimated losses were sustained by state, county, and local governments in the lower Colorado River area, bringing the total estimated damages below Davis Dam to roughly $80 million. The revenue losses to businesses along the river due to the high flows are not included in this estimate.

Technical Changes to River Operations and Runoff Forecasting Procedures

Data on the weather events and subsequent runoff that occurred in 1983 have been incorporated into the Colorado River Forecast Center data base, resulting in an increase in the uncertainty values added to the mean monthly forecast to obtain the maximum forecast. This will provide additional empty reservoir space and will increase flood control protection. Also, additional data collection stations have been added by the National Weather Service, the Soil Conservation Service and the Bureau of Reclamation at locations throughout the Colorado River's mountainous watershed to provide real-time operating data. The additional real-time data should significantly contribute to improved and more timely forecasting of streamflow and reservoir operations.

Basin States and Federal Review of River Operations

In July 1983, the Commissioner of the Bureau of Reclamation requested that the Governors of the Basin states each appoint a representative to join with various federal agencies in a review of 1983 river operations to determine possible modifications to improve river operations. These representatives have joined in making this statement.

We reviewed the 1983 runoff experience and the Bureau of Reclamation's studies of the 1983 runoff; participated in oversight hearings conducted by the House Committees on Interior and Insular Affairs and on Science and Technology regarding the Bureau of Reclamation's management of the 1983 runoff; considered various proposals to increase the amount of vacant flood control space in the reservoirs and to reduce...
the Hoover Dam maximum release objective to 35,000 cfs; and reviewed the Bureau of Reclamation's plans for future years' operations. After consideration of all factors, we, the representatives of the seven Colorado River Basin states, prepared two statements of position, dated December 7, 1983 and August 24, 1984, on Colorado River management issues, which were presented to the Commissioner of Reclamation.

Several issues regarding river management and operations were covered in those statements. With respect to flood control operations, the state representatives considered that the technical changes made in data collection and in procedures for making the maximum forecasts of runoff and inflows to Lakes Powell and Mead (which increased the margin for error) offered sufficient levels of flood protection considering the fact that the 1983 high flows were a rare event. We concluded that it would not be desirable to reduce the floodway capacity and that there was no need to increase the vacant flood control storage space. We also concluded that the 1982 Hoover Dam Flood Control Regulations are based on the most acceptable mix of the purposes of flood control, water conservation, and power generation, and should continue to govern future operations. We further recommended that a floodway capable of containing a flood control release of 40,000 cfs from Hoover Dam should be reestablished.

Proposed Colorado River Floodway Protection Act

On March 7, 1984, Congressmen Richard Cheney and Morris Udall introduced House Bill H.R. 5055, which would establish a Colorado River Floodway below Hoover Dam, and would severely limit federal expenditures within the floodway. The Colorado River Board of California, representing one of the three states that would be directly affected by terms of the proposed legislation, carefully reviewed the bill. Based on comments by the California cities, communities, and counties along the Colorado River and California's Colorado River water and power users, California's representative developed modifications to the proposed legislation that would meet the concerns of those entities, while maintaining the purpose of the bill.

The Colorado River Basin state representatives considered the amendments proposed by California and reached agreement on a further draft of the legislation during a meeting on January 9, 1985, in San Diego, California. All of the representatives were concerned that the pressures for continuing development along the lower Colorado River could result in further encroachments into the Colorado River floodway. They concluded that the proposed bill would provide a tool to help the states and local governmental
agencies guide future developments along the river so that they would not encroach upon the floodway.

Accordingly, the Colorado River Basin state representatives declared their support for the enactment of the proposed legislation. The representatives from the seven states unanimously passed and signed a "Resolution Supporting Enactment of the Colorado River Floodway Protection Act", as redrafted during the January 9 meeting. The redraft of the legislation developed by the Colorado River Basin states forms the basis for House Bill H.R. 1246 as introduced by Congressmen Richard Cheney and George Miller.

Technical Comments on Selected Sections of House Bill H.R. 1246

Sec. 2(b). PURPOSE. In this section, the bill sets forth its purpose: to establish the Colorado River Floodway so as to provide benefits to river users and to minimize losses of human life, protect health and safety, and minimize damages to property and natural resources by restricting future federal expenditures which have the effect of encouraging development within the floodway. This purpose is similar to that adopted by Congress in establishing the Coastal Barrier Resources Act of 1982, Public Law 97-348. The riparian lands along the Colorado River experienced damages to structures located thereon from the controlled releases of flood waters in 1983. The federal government should not encourage development on lands subject to inundation by such controlled releases through federal expenditures related to those developments, and this goal is stated in Section 2(b).

Sec. 4(b). This section describes the duties of the Colorado River Floodway Task Force established in Section 4(a), which is to prepare recommendations concerning the management of lands within the Colorado River Floodway. The Task Force, by including representatives of the communities, districts, counties, and Indian Reservations along the river, as well as federal and state agencies, brings together those organizations that would be most affected by the recommendations on how the lands within the floodway could be best managed. If the Task Force recommends that federal expenditures be made for some elements in the floodway, then any such recommendations would have to be submitted to Congress for implementation.

Sec. 5(b)(1). Since the flows carried by the Colorado River below Davis Dam include both the releases from Davis Dam and any inflow from the ephemeral tributaries entering the mainstream below the Dam, a floodway, to be effective, must have the capacity to carry both the controlled releases
and such tributary inflows. In this section, the Secretary is directed to complete, in consultation with the seven Basin states and other interested parties, a study of these tributary inflows and to determine the boundaries of the Colorado River Floodway to accommodate both controlled releases and tributary inflows.

The standard level of protection that has been adopted in the administration of the National Flood Insurance Act is the one-in-one-hundred-year frequency flood. As mentioned earlier in this statement, the Corps of Engineers had determined that 40,000 cfs is the maximum release rate that historically would have inflicted a minimum level of downstream damages. Consequently, the boundaries of the Colorado River Floodway should be capable of accommodating a one-in-one-hundred-year river flow or a 40,000 cfs flow, whichever is greater, from Davis Dam to the Southerly International Boundary between the United States and the Republic of Mexico.

It is the position of the Basin states that the Secretary's analysis of the one-in-one-hundred-year river flow should represent a realistic one-in-one-hundred-year probability of such flow occurring in any reach of the river at a given time, and should not arbitrarily assume that flood inflows from all tributaries occur simultaneously. It is the nature of weather events along the lower Colorado River, a desert region, that most rain storms are intense, localized thunder showers that would produce floods from only a few tributaries at a time, and the Secretary's study should reflect this. To ensure that this technical matter is made clear, we recommend that Section 5(b)(1)(ii) be amended to read as follows:

"(ii) define the specific boundaries of the Colorado River Floodway so that the Floodway can accommodate either a one-in-one-hundred-year river flow consisting of controlled releases and tributary inflow, or a flow of forty thousand cubic feet per second (cfs), whichever is greater, from below Davis Dam to the Southerly International Boundary between the United States of America and the Republic of Mexico."

Sec. 6. This section provides the restriction on future federal expenditures within the floodway necessary to accomplish the purpose of the bill as set forth in Sec. 2(b). Any individual who wishes to risk his personal funds by constructing a development within the floodway would not be prohibited from doing so by this bill. However, the bill prohibits any such potential developer from participating in federal programs that may aid his development and puts him on
notice that public funds will not be available to compensate him for his losses in the event of inundation of his land.

Sec. 7. There are several functions and uses of the floodway that serve the public interest, and this section recognizes those functions and uses by providing limited exceptions to the prohibition of federal expenditures. These exceptions are enumerated as river control structures and related works, public roads, military activities, fish and wildlife enhancement projects, navigation aids, emergency action assistance, public health assistance, public recreational developments, and farming activities.

Sec. 8. There is a typographical error in the first sentence of this section. The date "1984" should be "1985".

Conclusion

We, the representatives of the Governors of the seven Colorado River Basin states, have carefully considered this legislation and believe that it will assist in the future operation of the Colorado River dams and reservoirs so as to maximize their benefits in fulfilling the purposes established by Congress. We recommend the passage of this bill, with the technical amendments to Sections 5 and 8 recommended herein.