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CALIF. WATER  
CONSERVATION BOARD

# REPORT FOR PERIOD

July 1, 1966–December 31, 1967

2085

STATE OF CALIFORNIA  
RONALD REAGAN, *Governor*

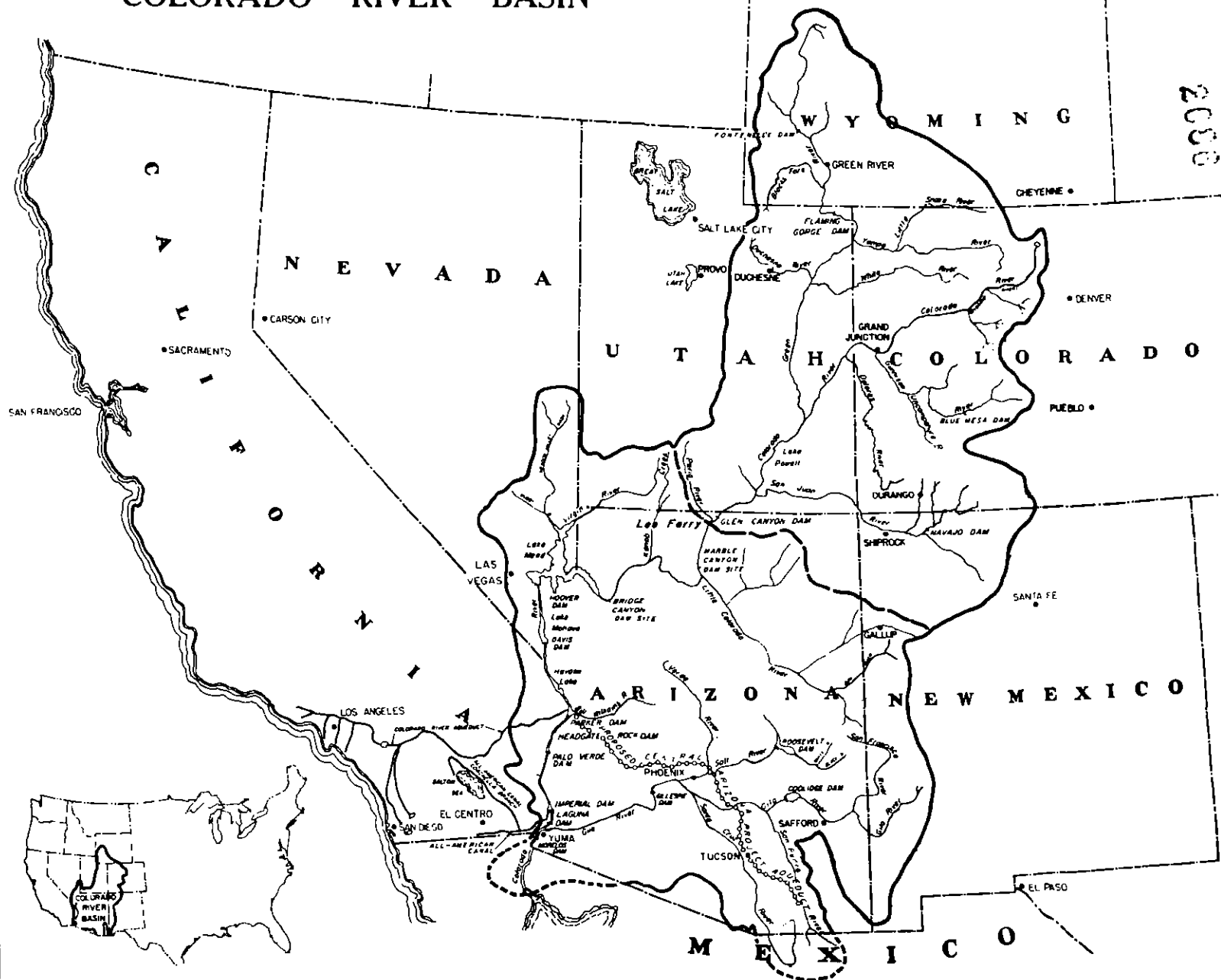
COLORADO RIVER BOARD OF CALIFORNIA



REPORT FOR PERIOD  
July 1, 1966—December 31, 1967

Dallas E. Cole, *Chief Engineer*  
Los Angeles, California

# COLORADO RIVER BASIN



LOCATION MAP

RAYMOND R. RUMMONDS  
CHAIRMAN AND COLORADO  
RIVER COMMISSIONER  
COACHELLA VALLEY COUNTY  
WATER DISTRICT

RAYMOND E. BADGER  
SAN DIEGO WATER AUTHORITY

JOSEPH JENSEN  
THE METROPOLITAN WATER DISTRICT  
OF SOUTHERN CALIFORNIA

HAROLD F. PELLEGRIN  
EXECUTIVE SECRETARY

2087



STATE OF CALIFORNIA  
**Colorado River Board of California**

909 SOUTH BROADWAY  
LOS ANGELES 90015

VIRGIL L. JONES  
PALO VERDE IRRIGATION DISTRICT

EDGAR L. KANOUSE  
DEPARTMENT OF WATER AND  
POWER, CITY OF LOS ANGELES

CARL C. BEVINS  
IMPERIAL IRRIGATION DISTRICT

MYRON B. HOLBURN  
CHIEF ENGINEER

April 8, 1968

DEAR GOVERNOR REAGAN:

I have the honor of submitting to you and the Legislature the report covering the activities of the Colorado River Board during the eighteen months, July 1, 1966, through December 31, 1967. Future reports will cover calendar years rather than fiscal years as in the past, because the calendar year coincides more closely with Congressional and Legislative sessions, with which much of our work is concerned. We will still present hydrologic data by water years, ending September 30.

The Eighty-Ninth Congress adjourned in October 1966 without passing the bill (H.R. 4671), which had been substantially agreed upon by all seven Colorado River Basin states, to authorize the Central Arizona Project and five Upper Basin projects, and to initiate a solution of the water problems of the Southwest on a regional basis. This failure to pass legislation so keenly desired resulted in a disruption of the Basin-wide unity behind H.R. 4671.

On August 7, 1967, during the first session of the Ninetieth Congress, the U.S. Senate passed a Central Arizona Project bill. But it did not contain an effective approach to regional problems and was unsatisfactory to the majority of the Basin states; therefore, the affected states continued to discuss new proposals aimed at bringing about a solution that would be satisfactory to the entire Basin. Toward this end California made concessions and so while our immediate objectives are not as ambitious as they were in 1965 and 1966, our long-range goals remain unchanged.

H.R. 3300, now before the House of Representatives, contains the three major elements essential for California's acceptance:

1. Adequate protection of the rights of existing Colorado River projects.
2. Initiation of steps which will lead to augmentation of the Colorado River.
3. Establishment of a means of financing such augmentation.

At this writing, we are hopeful of passage of the bill, approved by the House Committee on Interior and Insular Affairs on March 26, 1968, clearance by conference committee and approval by the Senate and the President.

Construction of the Central Arizona Project, which would be authorized by the Act, would of course place an added substantial demand upon an already overburdened river; a river which produced considerably less than its long-time average runoff for four of the past five years. So far in the 1967-68 water year, its production is also less than average. Consequently, the urgency to start a program for supplementing from outside sources the water supply of the Colorado River looms larger than ever.

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Although the Western States Water Council had provided a means of friendly communication of ideas and beliefs among the eleven western states, it has not yet served to overcome the resistance of the Columbia River Basin states to a unified west-wide study of water problems. But as a preliminary step in that direction, the Council did adopt a set of broad principles, standards and guidelines for interstate water planning, and we have high hopes that it will yet evolve into an effective organization oriented toward a coordinated, cooperative regional approach to the matter of geographic redistribution of the waters of the west for beneficial uses.

Meantime, the Northwest and the Southwest are studying their water problems separately. The Board staff has participated actively in the Federal-State Type I Comprehensive Framework studies for the Lower Colorado Region, and has coordinated its efforts with those of the Upper Colorado and California regions. Progress is being made, though less rapidly than desired because of the large number of participating agencies and federal budgetary restraints.

Claims of the parties in the Supreme Court suit, *Arizona v. California* et al, to "present perfected rights" (pre-1929 uses) in the Colorado River were submitted on or before March 9, 1967. Objections have been exchanged recently and are undergoing study. In the opinion of the Attorney General, further litigation may be necessary; however, passage of the satisfactory Colorado River legislation would be helpful in resolving the outstanding issues. The Board staff provides engineering support to the Attorney General's staff in this action.

Agreement was reached on January 13, 1967, among conferees of the Colorado River Basin states on guidelines for water quality standards on Colorado River, to be established in accordance with the Water Quality Act of 1965. Standards proposed individually by the states incorporated or referenced the guidelines. In accordance with the interstate agreement, none proposed numerical salinity standards for the stream. Although the Secretary of the Interior has acceded to such omission temporarily, he at the same time stated that programs are underway which are expected to lay the foundation for establishment of workable salinity standards. Much work remains to be done here.

Great challenges and opportunities lie ahead for all of us, since it is clear that augmentation of the Colorado River is needed not only to meet future demands but to improve water quality. We are confident that the job will be done, but it will require a sustained and cooperative effort on the part of us who are responsible to the people in this field of water resources.

Respectfully yours,



RAYMOND R. RUMMONDS  
Chairman and Colorado River  
Commissioner

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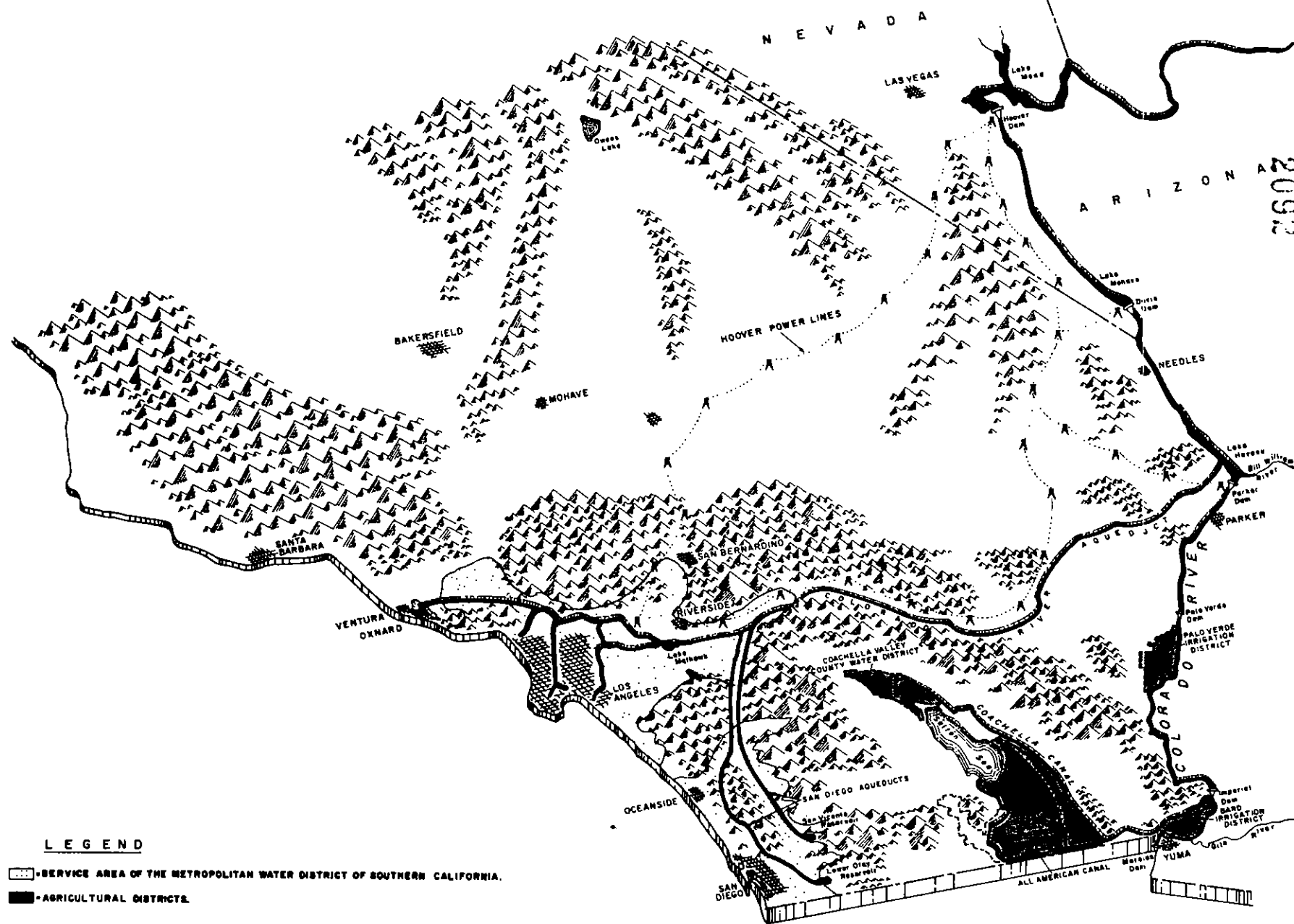
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# CALIFORNIA DEVELOPMENTS USING COLORADO RIVER WATER



Prepared by Colorado River Board

## REPORT OF COLORADO RIVER BOARD OF CALIFORNIA

Period July 1, 1966 through December 31, 1967<sup>1</sup>

## THE BOARD

**Statutory Responsibilities**

The Colorado River Board of California was created as a State agency by the Legislature under Chapter 838, Statutes of 1937 (Sections 12500 to 12533, State Water Code). It has the statutory responsibility of protecting the interests of California, its agencies and citizens in the water and power resources of the Colorado River System. The Board is composed of six members appointed by the Governor, each nominated by one of the public agencies of California having established rights to the use of water or power from the Colorado River. These agencies are: Imperial Irrigation District, The Metropolitan Water District of Southern California, City of Los Angeles—Department of Water and Power, San Diego County Water Authority, Coachella Valley County Water District, and Palo Verde Irrigation District. As the statutes provide, the Chairman of the Board, elected by the members, serves ex officio as Colorado River Commissioner of California.

Sections 12528 through 12532 of the State Water Code state the duties of the Commissioner and Board as follows:

12528. The commissioner shall consult and advise with the board in exercising the powers and performing the duties enumerated in this chapter and make such reports and recommendations as he deems proper or as the board requests, to the end that the rights and interests of the State, its agencies and citizens, in, to, and in respect of, the water of the Colorado River System and the use thereof may be properly safeguarded and protected.

<sup>1</sup> Previous annual reports of the Board have covered fiscal years. This report, covering an 18-month period from July 1, 1966, through December 31, 1967, is a transition; future annual reports will be published on a calendar year basis. Thus, the report will be more conclusive and integrated in content by conforming more readily to the water year of the Colorado River system and the annual sessions of the Congress of the United States and the Legislature of the State of California.

12529. The commissioner shall exercise on behalf of the State every right and power granted to the State or to any representative of it by Section 16 of the act of Congress designated the "Boulder Canyon Project Act."

12530. The commissioner shall investigate past, present, and potential uses of the water of the Colorado River System within and without the State.

12531. The commissioner shall investigate, coordinate, collect, and preserve information, facts, and data bearing upon the claims of all States and of all public or private agencies within and without the State to and in respect of the water and the use of water of the Colorado River System.

12532. The commissioner shall confer with representatives of other States in the Colorado River basin, representatives of the United States, and others concerning problems and measures relating to the development of the Colorado River basin, the use of the water of the Colorado River System, and the protection of the interests therein of the State and of the United States, and shall negotiate respecting such problems and measures and discuss the same and formulate and recommend to the Governor and the Legislature measures, agreements, and legislation deemed for the benefit of the State and the United States.

The water code requires that the Board headquarters be in Los Angeles. Regular meetings are held monthly and special meetings upon call.

The Attorney General is legal counsel to the Board.

**Personnel Changes**

Raymond R. Rummonds continued to serve as the Board Chairman, having been unanimously reelected at the special meeting of June 29, 1966. On May 16, 1967, the Governor's office sent letters to each of the six agencies represented on the Colorado River Board, requesting a list of at least three persons from which the Governor might select a representative for appointment to the Board.

Samuel B. Nelson resigned from the Board effective August 4, 1967 and Joseph D. Moore resigned effective August 8, 1967. On August 11, 1967 Governor Reagan reappointed Raymond R. Rummonds, Joseph Jensen and Virgil L. Jones, and appointed new members Raymond E. Badger as representative of the San Diego County Water Authority, Carl C. Bevins as representative of the Imperial Irrigation District and Edgar L. Kanouse as representative of the Department of Water and Power, City of Los Angeles. Mr. Rummonds was re-elected Chairman at a Special Meeting, September 5, 1967.

The Board unanimously authorized the preparation of resolutions in honor and appreciation of the services of Fred W. Simpson, Joseph D. Moore, and Samuel B. Nelson as former members of the Board, at the special meeting of September 5, 1967. The state legislature enacted resolutions of appreciation to Mr. Simpson for his 26 years of devoted service to the citizens as a member of the Board. Mr. Simpson was appointed by Governor Culbert L. Olson in 1941 and served continually until August 1967. He was Board Chairman and Colorado River Commissioner from 1952 to 1962.

### **Negotiations and Conferences**

In carrying out its statutory responsibilities, the members of the Board and staff participated in numerous negotiation meetings and conferences concerning a wide range of matters affecting California's interests in the Colorado River. These are described in more detail in the remainder of the report and include meetings with representatives of other states and the federal government concerning (1) Colorado River legislation, (2) setting of water quality standards on the river, (3) present perfected rights (pre-1929 uses of Colorado River water), (4) operation of the Mexican Water Treaty, (5) accurate compilation of data on water supply and use in the Colorado River System, (6) river management and water conservation, and (7) regional planning.

### **Liaison and Information Activities**

In addition to the meetings on specific subjects mentioned above, members of the Board and staff attended and participated in numerous meetings of organizations concerned with water

policy at local, state and national levels. Such organizations include the National Reclamation Association, Colorado River Water Users' Association, Southwest Water Council, Irrigation Districts Association of California, the Southern California Water Conference, committees of the Los Angeles and State Chambers of Commerce, Western States Water Council, Nevada Water Conference, the Pacific Southwest Interagency Committee and the California Water Resources Association. The Chief Engineer and Executive Secretary were members of the program committee of the Colorado River Water Users' Association in 1966 and 1967. The Chief Engineer was program chairman for the 24th annual meeting, in December 1967.

Board members, staff and counsel spoke to various organizations interested in Colorado River problems and regional water planning for the Pacific Southwest.

Dallas E. Cole, Chief Engineer, presented a paper before the Society of American Military Engineers in Portland, Oregon on May 10, 1967 and at a seminar at Oregon State University at Corvallis, Oregon on May 11, 1967, discussing the need for the development of new sources of water for the Southwest including interbasin transfers. Among his remarks:

"... Interbasin transfer of water from areas of surplus to areas of deficit is by no means new. For half a century the Colorado River Basin states have been conditioned to such transfers, and several large regional projects are built, being built or being planned in the Southwest to take water to where people want to live. The California State Water Project is a prime example. When finished in four or five years it will carry about 2½ million gallons of water a minute into the arid south half of the state from the north half. Even so, it will not reach the vital agricultural areas in the southeast corner, will not directly help the other states of the Colorado River Basin, and will not even take care of the metropolitan coastal plain after about 1990. Long before that, additional plans must be laid. . . .

"For the Southwest as a whole, excluding northern California, the solution appears to lie in the importation of supplemental water from an outside source not only to augment the quantity of water in the Colorado but also to improve its quality. The growing water deficiency simply cannot be overcome by better conserva-

tion and use or by more studies and plans based solely on the presently available water resources. The search for additional water must begin immediately. Time is running out.

" . . . the need to get coordinated regional studies under way is urgent, because of decisions that have to be made soon, and because of the inevitable time-lag of 20 to 30 years between the beginning of reconnaissance and the completion of a regional project of the size needed, if one is found feasible."

The entire statement was inserted in The Congressional Record by Congressman John Tunney. The Chief Engineer also authored an article on "The Southwest's Water Needs" which appeared in the July/August, 1967 issue of Arts & Architecture magazine.

Mr. Cole also addressed the Board of Directors of the West Basin Water Association on May 25, 1967, on the subject "An Engineer's View

of Legal Accomplishments in the Colorado River Basin." He discussed the history of the use and development of the Colorado River and the significant legal milestones and legislation that guided this development.

Mr. Cole reported to the Water and Power Committee of the Los Angeles Chamber of Commerce on February 20, 1967 and Mr. Holburt, Principal Engineer, to the California Water Resources Association on May 12, 1967 on the status of the Colorado River Basin Project Bills pending before the 90th Congress.

The Board staff worked closely with the Colorado River Association on press releases, brochures and maps. Drawings and information were furnished for a telecast over the Columbia Broadcasting System on the water problems of the Colorado River Basin. Many persons made use of the Board's library as a reference source and sought the advice and help of the staff.

## FEDERAL LEGISLATION

### Colorado River Basin Project

During the period July 1, 1966, to December 31, 1967, legislative proposals concerning the utilization and augmentation of the water resources of the Colorado River basin were reviewed and analyzed by the Board's staff and counsel and brought before the Board for policy decision. The Board and its staff participated in extensive negotiations with representatives of other western states and the Federal Government, drafting of new bills and revisions of existing bills to reflect Board policy. Close cooperation was furnished by the Attorney General and by the Department of Water Resources. Studies were conducted of the probable effects of proposed legislative language upon the rights and interests of California water and power users.

During July and August, 1966 considerable attention was devoted by the Congress to the proposed Colorado River Basin Project bills, H.R. 4671 and S. 1019. The Board's annual report for 1965-66 discussed in detail the legislative problems concerning these similar bills, including hearings before the House Interior Subcommittee on Irrigation and Reclamation in May 1966. The Subcommittee on June 27, 1966, reported to the full committee the proposed Colorado River Basin Project bill, H.R. 4671 as amended.

During the National Governors Conference on July 5, 1966, a letter signed by each of the governors of the seven basin states was forwarded to the President urging active support of the Colorado River Basin Project by the Administration.

The House Interior and Insular Affairs Committee amended H.R. 4671 on July 21, 1966, by rewriting the provisions of Title II pertaining to augmentation of the river. In part, this amendment was objectionable to California and others because it weakened the augmentation study provisions by placing the investigation of the Colorado Basin water shortages and means of augmentation of the Colorado in the hands of a newly created National Water Commission,

taking this out of the hands of the Secretary; and the end product was to be a reconnaissance report, instead of a feasibility report, necessitating a second act of Congress to authorize a feasibility investigation and report. There followed negotiations among the representatives of the Colorado River Basin states which resulted in the substitution of a Title II amendment which was satisfactory to and could be supported by California and most of the basin states. The new amendment was approved and on July 28 the full House Interior Committee reported H.R. 4671, as amended, by a vote of 22 to 10. All the California members of the committee as well as all the Colorado River Basin congressmen voted in support of the bill.

On August 3, 1966, the Colorado River Board adopted the following resolution:

The Colorado River Board of California supports the Colorado River Project bill, HR 4671 as approved by the House Committee on Interior and Insular Affairs July 28, 1966.

This bill retains the features on which all seven states of the Colorado River Basin had agreed in interstate negotiations over the past year. These include:

1. Authorization for construction of the Central Arizona aqueduct, Bridge canyon (Hualapai) and Marble Canyon dams and power plants, and five projects in Colorado.
2. Protection of existing uses in Arizona and Nevada, and those in California up to the decreed quantity of 4.4 million acre-feet annually. The Central Arizona project is to bear the risk of shortages until importation works are constructed to bring at least 2.5 million acre-feet of water annually into the main stream of the Colorado River.
3. The portion of the cost of the importation works fairly allocable to the performance of the Mexican Water Treaty, a national obligation, is made nonreimbursable.
4. A development fund is created, fed by power revenues from Bridge, Marble, Hoover, Davis and Parker dams, to subsidize the Central Arizona aqueduct and help pay for importation works.
5. The compromise between the Upper and Lower Basins is retained. Its features include relief of both basins from the Mexican Treaty burden when works to import 2.5 million acre-feet annually are in operation, a plan for coordinating the operation of Lake Powell and Lake

Mead so that both reservoirs share the benefits of wet years and neither of them bears alone the burden of drawdowns during drouths, and provisions for reimbursing the Upper Basin's fund for payments that must be made out of that fund to keep the Hoover power contractors whole under their contracts if water is withheld from power generation at Hoover to build up Lake Powell.

6. The bill retains the careful protection for areas of origin.

7. A key feature of the seven-state bill is Title II, directing the Secretary to investigate shortages in the entire Colorado River Basin, and to formulate and report to Congress a regional plan for their alleviation through importations of water or otherwise. This is retained.

The Committee added a new feature, a seven-man national water commission under whose general direction the Secretary is to make his study and report. He is to first make a reconnaissance report and if this is favorable as to availability of a water surplus in the areas of origin, and as to the benefit-cost ratio of the importation works and the probability of repayment of their cost, he is authorized to proceed with a feasibility report on these importation works without further direction from Congress. Of course authorization of actual construction must await action from Congress on his feasibility report.

On August 19, 1966, Governor Hansen of Wyoming advised the President of withdrawal of Wyoming's support of H.R. 4671 on the grounds that the amendments by the House Interior and Insular Affairs Committee pertaining to augmentation had eroded the fundamental principles deemed to be essential by the State of Wyoming. Of growing concern to California and other basin states was the possibility that when the bill reached the floor of the House there would be a concentrated effort on the part of some eastern congressmen to introduce substitute amendments which would eliminate the regional aspects of the bill to essentially a Central Arizona Project authorization. By the end of August the House Rules Committee had not granted a rule on the bill. Accordingly, on August 31, 1966, the Board adopted a resolution reaffirming the essentials stated in its resolution of August 3 and adding this statement:

We are not prepared to endorse any modifications of that bill which do not result from full consultation among all of the states of the Colorado River Basin before the bill goes to the House floor. Two years of successful interstate negotiations, resulting in the present degree of unity in the Basin, should not be sacrificed.

Chairman Rummonds on September 1, 1966, sent a telegram to the California congressional members of the House Interior and Insular Affairs Committee and to California members of the House Rules Committee reiterating the Board's position on H.R. 4671 as reported by the full Interior Committee; he also telegraphed certain other members of the California congressional delegation, the Secretary of the Interior, and key officials of the seven Colorado River Basin states reaffirming the Board's endorsement of H.R. 4671 and urging that any renegotiation of the provisions of the bill be done in meetings of all seven Colorado River Basin states before rather than after the bill went to the House floor.

In response to the September 1 telegram, the Executive Director of the Arizona Interstate Stream Commission replied that Arizona's endorsement of H.R. 4671, without change, continued to be in effect; that Arizona wished to proceed with the bill in its present form; but that Arizona could not guarantee that the provisions as reported would survive floor debate.

By the close of September 1966 it was apparent that the Rules Committee would not grant a rule on H.R. 4671 and that the bill was dead. Charges were made that southern California interests had prevented progress of H.R. 4671 to the floor of the House. In reality, Congressman Wayne N. Aspinall, Chairman of the House Interior and Insular Affairs Committee, and others did not support the granting of a rule because passage could not be assured due to the following reasons:

1. Lack of support by the Administration for the bill as approved by the House Interior Committee.
2. Opposition of the "preservation" groups to the power dams proposed on the river.
3. Opposition of the Pacific Northwest to the regional study proposals.
4. Evidence of weakening of the seven-state unity.
5. Opposition of the economy bloc in the House in view of the high cost of the proposed projects.

In addition, one of the dangers of bringing the bill to the floor of the House was the possibility that a substitute bill by Mr. Saylor would have been adopted. This bill would have eliminated the major features desired by California and the

Upper Basin states. On October 1, 1966, in a speech before the Colorado State Grange, Chairman Aspinall discussed the above factors, the possible passage of the Saylor amendment and stated: "In these circumstances, it seemed to me that a lingering death in the Rules Committee was preferable to bringing the bill to the Floor where we would not only run the risk of defeat but face the possibility of having a bill passed which would be completely unacceptable to Colorado and the other upper basin states".

The Chief Engineer and Principal Engineer attended a special meeting of representatives of the seven Colorado River Basin states which was held in Albuquerque, New Mexico, on November 16, 1966, to consider whether legislation for a Colorado River Basin Project proposed to be introduced in the 90th Congress might have the support of all the states. Douglas J. Wall, Chairman of the Arizona Interstate Stream Commission, stated that all commitments and guarantees made by Arizona and included in H.R. 4671 were considered to be null and void as of the date of adjournment of the 89th Congress. He further stated that Arizona would make a full scale effort for a federal reclamation project in the 90th Congress and would accelerate its own program for a Central Arizona Project without federal help so as to utilize Arizona's share of Colorado River water at the earliest possible date. Congressman Udall of Arizona expressed the view that federal legislation was the best approach for a solution of Arizona's problems and that there was a continued need for seven-state cooperation.

On December 12, 1966, representatives of the seven Colorado River Basin states met again in the offices of the Colorado River Board. The State of Colorado presented three amendments to H.R. 4671 as the basis for compromise language which might be embodied in a new draft bill to be introduced in the 90th Congress. These amendments would provide for:

1. Elimination of proposed Marble Canyon Dam.
2. Lowering of proposed Hualapai (Bridge Canyon) Dam by 90 to 100 feet.
3. Downgrading the level of Colorado River augmentation study from feasibility to reconnaissance.

On January 4, 1967, the Colorado River Board adopted a resolution reaffirming its position statement of August 3, 1966, with respect

to proposed Colorado River Basin Project legislation; recommending introduction in the 90th Congress of a bill like H.R. 4671 as reported by the House Committee on August 11, 1966; recognizing the possibility of negotiated modifications of the text; and urging additional seven-state conferences.

This resolution was transmitted to the California senators, to the California and Arizona congressmen and to certain officials of the State of California.

A joint meeting of the Colorado River Board and the California Advisory Committee on Western States Water Planning was held in Sacramento on January 11, 1967, at which time the Board's resolution of January 4 was considered. Mr. William Gianelli, newly appointed Director, Department of Water Resources, presented a statement in which he concurred with the position of the Colorado River Board that California should begin where it left off in the last session of the Congress in negotiating Colorado River legislation. The Advisory Committee adopted a resolution in support of the Colorado River Board position and by letter of January 11, 1967, Committee Chairman Carley V. Porter so advised Governor Reagan.

Early in January 1967, following the opening of the 90th Congress, several bills were introduced with respect to a Colorado River Basin Project. These included: H.R. 30, a regional bill by Congressman Aspinall—subsequently re-introduced as H.R. 3300; an identical bill, H.R. 744, by Congressman Johnson of California; H.R. 9 by Congressman Udall—a Central Arizona Project bill; and H.R. 722 by Congressman Hosmer—identical to H.R. 4671 as reported by the House Interior Committee the previous year.

On January 31, 1967, Senator Kuchel advised that after consultation with Chairman Aspinall and Subcommittee Chairman Johnson of the House Interior Committee and with Northcutt Ely, Special Counsel of the Colorado River Board, and Special Assistant Attorney General and others, the Senator proposed to introduce legislation which would retain the basic principles of H.R. 4671 of the 89th Congress but would eliminate Marble Canyon Dam, reduce the size of the proposed Central Arizona Aqueduct and make certain other minor clarifying changes.

During its regular meeting of February 1, 1967, the Colorado River Board unanimously

endorsed Senator Kuchel's proposal and telegraphed him this message:

With regard to your telegram of January 31, 1967, the Colorado River Board endorses the introduction of legislation along the lines you propose, as such action would be consistent with our resolution of January 4, 1967, which reads in part as follows:

The Colorado River Board of California reaffirms its statement of position adopted on August 3, 1966, and recommends the introduction of proposed legislation in the 90th Session of the Congress in the form of H.R. 4671, the Colorado River Basin Project bill, reported favorably by the House Interior and Insular Affairs Committee on August 11, 1966. The Board recognizes that the text of the bill as introduced may be subject to modification as the result of further negotiation, provided, however, that it must retain language to protect existing uses in Arizona and Nevada and those in California up to the quantity of 4.4 million acre-feet annually.

Senator Kuchel's bill, co-sponsored by Senator Moss of Utah, was introduced as S. 861.

While the Board was in session on February 1, 1967, Senator Kuchel telephoned to inform the Board of an announcement by the Secretary of the Interior of a revised development program for the Lower Colorado River which in part would provide for a Central Arizona Project, expansion of the boundaries of Grand Canyon National Park to include Marble Canyon, deferment of any action on Hualapai Dam site, and substitution for hydro-electric power of power capacity to be purchased in thermal electric generating plants for pumping power needs of the Central Arizona Project. This proposal by the Administration represented a complete turnabout with respect to previous recommendations of the Secretary of the Interior for a regional concept of planning to meet the Colorado River Basin needs.

Two more bills were introduced in the Senate with respect to Colorado River legislation. On February 16, 1967, Senator Hayden, co-sponsors Senators Fannin and Jackson, introduced S. 1004 to authorize only the Central Arizona Project. The following day S. 1013, the Administration bill, was introduced by Senator Jackson.

Following announcement by the Chairman of the House Interior and Insular Affairs Committee that hearings would be scheduled beginning on March 13, 1967, before the Subcommittee on Irrigation and Reclamation to consider H.R. 3300 and related proposals for a Colorado River

Basin Project or a Central Arizona Project, the Board unanimously adopted this resolution on March 1, 1967:

# I

The Colorado River Board of California recommends enactment of S. 861, 90th Congress, introduced by Senator Kuchel of California and Senator Moss of Utah, and counterpart bills in the House, as introduced by Congressman Hosmer (HR 6271) and others. These bills agree in principle with those introduced by Chairman Aspinall of the House Committee on Interior and Insular Affairs and Chairman Johnson of that Committee's Subcommittee on Irrigation and Reclamation.

The foregoing bills all embody the following features, which the Colorado River Board has repeatedly endorsed, and which were contained in the bill reported out by the House Committee in the 89th Congress:

1. Recognition of the necessity for meaningful steps to augment the inadequate flows of the Colorado River.
2. Adequate protection for the states and areas of origin of water exported to the Colorado, including full protection of the priorities of those areas in perpetuity.
3. Recognition of the Mexican Treaty burden as a national obligation, and that an appropriate share of the cost of importing water should be allocated to the performance of that Treaty. Whenever importations are accomplished to the extent of 2.5 million acre feet annually, both basins should be relieved of the danger of curtailment of their own uses to perform the Nation's Treaty obligations to Mexico.
4. Balancing of the operation of Lake Mead and Lake Powell, so that the benefits of wet years and the burdens of drought shall be equitably distributed between Upper Basin and Lower Basin reservoirs. We recommend the language of the Kuchel-Moss-Hosmer bills in this respect.
5. Authorization for construction of the five projects in Colorado.
6. Reimbursement of the Upper Colorado River Basin fund for payments out of that fund to compensate reduction of the power operations at Hoover Dam occasioned by filling of Lake Powell.
7. Authorization for construction of Bridge Canyon (Hualapai) dam and Power Plant, and creation of a basin account to help finance the Central Arizona Project and importation works, fed by revenues from Hualapai Dam and by revenues from Hoover, Davis and Parker Dams after they have paid out.



8. Authorization for the construction of the Central Arizona Project, as part of the regional plan, but on the condition that if the water supply of the Colorado River is insufficient to satisfy the requirements of the projects already in existence or heretofore authorized by Congress for construction in Arizona, California and Nevada, then shortages shall be borne as provided in those bills. The effect is that California must bear the first burden of shortage, sacrificing nearly one million acre feet of constructed capacity whenever the supply shrinks to 7.5 million acre feet annually; but that the Central Arizona Project shall bear the next share of the shortage if the supply shrinks below 7.5 million acre feet before imported water arrives. To this end the priorities of existing and authorized projects will be protected as against the proposed Central Arizona Project, but only until works have been constructed to import at least 2.5 million acre feet annually. The protection to existing and authorized projects in Arizona and Nevada would be unrestricted in quantities, but the protection to California's existing projects would be restricted to 4.4 million acre feet annually, to give effect to a limitation to which California agreed at the time of enactment of the Boulder Canyon Project Act.

## II

The Colorado River Board of California recommends against enactment of the bill recommended by the Secretary of the Interior in his report on the Aspinall bill. The Secretary's proposal fails to protect the interests of any state other than Arizona. It abandons the regional solutions proposed by the Secretary in the last Congress, and which the seven states accepted in the bill (HR 4671) reported out of committee in the 89th Congress. California followed and supported the Secretary's leadership then, and regrets his abandonment of it now. California has not changed her position. We hope that unity among the seven states can be reestablished under the leadership of Chairman Aspinall within the framework of the principles the seven states agreed upon last year which this resolution restates.

Hearings were held in the House Subcommittee on March 13-17, 1967. Testimony was basically limited to such pertinent information as had not been covered the previous year during the hearings on H.R. 4671.

Statements were presented by Mr. Gianelli on behalf of Governor Reagan; by Chairman Rummonds on behalf of the Colorado River Board, including the resolution adopted by the Board on March 1, 1967, and by Northcutt Ely on be-

half of Attorney General Lynch, all in support of the general principles expressed in H.R. 3300. Mr. Floyd L. Goss, Chief Electrical Engineer and Assistant Manager of the Department of Water and Power, City of Los Angeles, accompanied by Mr. Gilmore Tillman, Chief Assistant City Attorney, City of Los Angeles and Mr. Holburt, presented important new testimony recommending the immediate authorization and construction of Hualapai Dam and power plant with an increase of generating capacity from the 1,500,000 kw originally proposed to 5 million kw as a combined hydro-pumped storage peaking plant.

The staffs of the Colorado River Board, Department of Water Resources and Attorney General collaborated on the statements presented to the committee and assisted committee members in cross-examination of witnesses.

Further action by the House Committee was delayed pending the outcome of Senate consideration.

On April 5, 1967, the Board unanimously adopted a resolution endorsing Mr. Goss' recommendations:

The Colorado River Board supports such amendment of the pending Colorado River bills now before the Congress of the United States as may be necessary to permit the full exploration and development of the hydro-pumped storage peaking plant for Hualapai Dam and Reservoir at Bridge Canyon, with an installed capacity of 5 million kilowatts. This project was proposed by the Department of Water and Power of the City of Los Angeles on March 17, 1967, in hearings before the Subcommittee on Irrigation and Reclamation of the House Interior and Insular Affairs Committee. The Board endorses the principles of the Department's proposal, which will help to optimize hydroelectric power development as well as to improve the recreational potential of the area and will expedite passage of the pending legislation.

During the period May 2-5, 1967, hearings were held by the Senate Interior Subcommittee on Water and Power Resources on proposed Colorado River Basin legislation (S. 1013, S. 1004 and S. 861). Testimony was again presented by Messrs. Gianelli, Rummonds and Ely, and by Mr. Goss with respect to the Department's proposal for Hualapai Dam. A statement by the Chief Engineer on "California's Stake in the Colorado River" was also inserted in the record. During the hearings the differences among the several bills and the issue of parochial

versus regional approach became more apparent as well as the need for continued negotiations by all interests. On June 26, 1967, Congressman Tunney commented before the House on the importance to California of an augmentation program and inserted in the Congressional Record the statement by Dallas E. Cole before the Senate Interior Subcommittee, as well as a presentation by Mr. Cole before Northwest water experts at Oregon State University, Corvallis, Oregon, on May 11, 1967. In considering California's future course of action in view of these legislative difficulties, the Board adopted a resolution in reaffirmation of its position:

The Colorado River Board of California endorses the statement of Governor Ronald Reagan to the Senate Committee on Interior and Insular Affairs, presented by William Gianelli, Director of Water Resources, and that of Attorney General Thomas C. Lynch, presented by Special Assistant Attorney General Northcutt Ely, in support of Senator Kuchel's Colorado River bill, S. 861.

The Board expresses to Senator Kuchel its appreciation, and that of California's water users, for his leadership in the fight to protect California's rights in the Colorado River.

The Board reaffirms the policies outlined in its resolution of March 1, 1967. It now appears appropriate to restate California's position with respect to the three major issues which developed during the Senate hearings.

#### 1. *With Respect to the Protection of Existing Uses of Water*

The construction of the Central Arizona Project will in time result in water shortages for existing projects on the Colorado River. If that project is to be authorized in advance of congressional authorization of works to augment the Lower Basin water supply, the Central Arizona Project must bear a portion of the shortages it will create, and existing projects in California, Arizona and Nevada must have priority protection. We recognize that the protection to California's existing projects must be limited to 4.4 million acre-feet annually to conform to the Supreme Court decree. This means that California, not Arizona, actually bears the first burden of the shortage, losing 662,000 acre-feet of the Metropolitan Water District supply when California's is reduced to 4.4 million. The protection to California's remaining supply must not end until the river is augmented to firm up the 7.5 million acre-feet annually which the Supreme Court apportioned among Arizona, California and Nevada. This was our agreement with Arizona in the 89th Congress. We will not agree to terminate this protection of California's 4.4 million acre-feet at the end of any specific number of years,

or to reduce it to a lesser quantity at some future date, as Arizona now proposes.

#### 2. *With Respect to Importations*

California cannot support a bill to authorize the Central Arizona Project unless that bill also authorizes an immediate and meaningful study of ways to augment the water supply in the main Colorado River, including studies of importation possibilities, by at least the quantity necessary to firm up the 7.5 million acre-feet apportioned by the Supreme Court decree. We are willing that this investigation include sources in northwestern California, but only on a parity of intensity and of timing with studies of all other possible sources. The bill must contain adequate protection for areas and states of origin. We have no objection to the creation of a National Water Commission to exercise jurisdiction over these investigations, provided that this is not used as a device for delay. The investigation should get underway at once.

#### 3. *With Respect to Hualapai Dam*

It is essential that Hualapai Dam and power plant be included in the Central Arizona Project bill, as they always have been. Hualapai Dam is an essential source of low-cost power for the economy of the Southwest, as well as an essential source of funds to finance works to add water to the Colorado River. We endorse the proposal of the Los Angeles Department of Water and Power that the Hualapai power plant be built as a 5 million kilowatt pumped storage peaking plant. We will not agree to the creation of a basin account or development fund which mortgages the future power revenues of Hoover, Davis and Parker Dams unless revenues from Hualapai (which will have more capacity than all three of these dams combined) are also included in the fund.

The Kuchel bill, S. 861, and its counterparts in the House, include all three of these essentials, as did the bills in the 89th Congress on which Arizona, California and the other Basin states agreed. California has not changed her position, will keep the agreement she then made; we therefore support the Kuchel bill. But California must oppose the Hayden bill, S. 1004, and the Administration bill, S. 1013, which leave out all three of these essentials to which previously Arizona agreed, and by which she secured California's support for her Central Arizona Project.

As a consequence of the Senate Interior Subcommittee hearings, there followed a series of conferences with Upper Basin representatives in an attempt to reconcile various positions and reach compromise agreements before the Senate and House committees' markup of the respective bills.

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On June 29, 1967, the Senate Interior and Insular Affairs Committee approved S. 1004, primarily a Central Arizona Project authorization bill, with certain modifications. Members of the Board's staff in collaboration with Mr. Ely, and others, assisted Senator Kuchel in the preparation of minority views to accompany the report of the Interior Committee: Senate Report 408, together with minority and individual views.

During a meeting of the Colorado River Board on July 5, 1967, the Chief Engineer analyzed the key provisions of S. 1004 and pointed out that the water problems of the Southwest would not be solved but rather compounded if such legislation were to be enacted. The Board opposed the bill by unanimous resolution:

The Colorado River Board of California opposes the enactment of the Central Arizona Project bill approved by the Senate Committee on Interior and Insular Affairs on June 29, 1967.

The proposed bill does not contain the essential elements of a fair and equitable settlement of the many problems of the Colorado River water supply. It diverts revenues from Hoover, Parker and Davis projects after 1987 to the support of the Central Arizona Project instead of to the augmentation of the water supply of the Colorado River, which is so urgently required to meet Upper Basin as well as Lower Basin water needs.

We again urge that the Senate adopt Senator Thomas Kuchel's Colorado River Project bill S. 861, as outlined in the resolution of this Board adopted May 17, 1967.

Following floor debate which culminated on August 7, the Senate by voice vote approved S. 1004. This bill is unacceptable to California for several reasons:

1. Provides protection of the 4.4 million acre feet per year for only 27 years.
2. Contains no provision for commencement of water augmentation studies.
3. Does not provide for construction of Hualapai Dam.
4. Earmarks Hoover-Parker-Davis power revenues to help contribute to payoff of the Central Arizona Project with higher rates for Southern California and Nevada power users.

Chairman Aspinall criticized the Senate action and stated that no action on Colorado River Basin legislation would be taken by his committee in the first session of the 90th Congress. On August 17 the committee voted to hold no more regular meetings after the week of August 28.

Mr. Win Adams, Assistant Administrator, Resources Agency, and Mr. Gianelli, met with the Colorado River Board on September 5, 1967. Mr. Gianelli discussed various problems faced by California in relation to possible courses of action which might be followed to achieve California's goals in pending Colorado River Basin legislation. He emphasized the continuing need for augmentation of the Colorado River, based upon meaningful studies, as the real basis for solution to the Colorado River problem.

On September 28, 1967, Senator Hayden announced a move to amend the House Public Works Appropriations measure by adding to it the text of the Central Arizona Project bill, S. 1004, as passed by the Senate. Such a move would in effect circumvent the House Interior Committee and bring the measure on the floor of the House for vote. The California House delegation met on call of Congressman Holifield and voted to oppose the Hayden amendment. Representatives of other Colorado River Basin states similarly opposed such action by Senator Hayden. On October 10 it was reported that Senator Hayden had withdrawn his motion, on the strength of a promise that the House Interior Committee would consider the Colorado River Basin Project legislation early in the second session of the Congress.

Because of the major differences between the Senate legislation, S. 1004, and H.R. 3300, pending in the House, there ensued a period during which many suggestions were made by California representatives, the Upper Basin states, the federal government and others as to possible shifts in policy and lines of cooperative action which would perhaps achieve the desired results without sacrifice of basic regional principles. Members of the Board and its staff took active roles in meetings involving California interests and representatives of other basin states.

On November 28, 1967, Governor Reagan wrote to Chairman Rummonds concerning the status of Colorado River legislation and expressing his conviction that it was essential that all possible effort be made to further the augmentation of the inadequate water supplies of the Colorado River and yet provide for optimum protection for existing economies in California until the river is actually augmented, and stating his view that California's position could be improved through negotiations with Arizona. The

Governor designated the Director of Water Resources to assume responsibility for the direction of such negotiations on behalf of the Governor and urged that all possible assistance be provided. At a special meeting held on November 29, the Colorado River Board unanimously "agreed to support Governor Reagan's leadership of negotiations with Arizona and the other states of the Colorado River Basin as set forth in his letter to the Chairman on November 28, 1967," and pledged continuing cooperation "as in the past in achieving a satisfactory solution to Colorado River legislation."

Looking toward early consideration of Colorado River Basin Project legislation by the House Interior Committee in the second session of the 90th Congress, a draft of revision to H.R. 3300 was prepared by the State of Colorado for consideration during a meeting of the seven Colorado River Basin states to be held in Las Vegas, Nevada, on December 7, 1967. On December 4, 1967, the Colorado River Board staff and advisors, representatives of the Department of Water Resources and the Attorney General met to consider the draft proposal. A prime objective of the seven-state meeting on December 7 was to bring together the suggestions for revision and develop areas of agreement on proposed legislative amendments to H.R. 3300 which could be supported by the basin states. As a result of the seven-state meeting, a new revision to the Colorado draft of H.R. 3300 was developed.

Certain aspects of the legislation prepared by the State of Colorado were not acceptable to California so a draft of revision was also prepared by the California interests: representatives of the Colorado River Board, Department of Water Resources, Attorney General and the California Advisory Committee on Western States Water Planning. Although the new draft of a California bill deferred authorization of Hualapai Dam, it did contain the three major elements essential to California's acceptance of a bill.

1. *Protection of existing uses.* We must insist upon the principle stated in H.R. 3300 for the allocation of water shortages, irrespective of how it may be expressed. This is the universal principle of western water law, that existing uses shall not be impaired to make water available for new ones. The Boulder Canyon Project Act in 1929 limited this protection for California to 4.4 million acre-feet annually. The result is that California's presently existing projects, which were constructed

to use 5.4 million acre-feet at a cost exceeding \$600,000,000 and are now furnishing 5.1 million acre-feet of water annually to more than half of California's population, must bear the full impact of shortages which reduce the Lower Basin's total mainstream supply to 7.5 million. California is then reduced to 4.4 million, while leaving 2.8 million for Arizona, 300,000 for Nevada, to make possible large expansion of uses in those states. California's legislature agreed to this in 1929 because Congress required it of us if construction of Hoover Dam were to proceed notwithstanding Arizona's rejection of the Colorado River Compact. We will live up to that burdensome limitation, but we did not agree then, and will not agree now, to any deeper cut, below 4.4 million. If the supply is less than 7.5 million, the next loss must be borne by Arizona, and diversions for the Central Arizona project must be reduced, as H.R. 3300 requires, in the amount necessary to supply the requirements of existing projects in Arizona and Nevada, and 4.4 million acre-feet of the requirements of existing projects in California.

2. *Augmentation.* Inasmuch as the assurance of 7.5 million acre-feet of mainstream consumptive uses will require the introduction of about 2.5 million acre-feet of new water annually into the river below Lee Ferry, the bill should authorize investigations of means to accomplish at least this minimum objective. The protection of existing uses must continue until that objective is accomplished. To facilitate passage of the bill, we would reduce the target figure for planning the first stage of augmentation to a flat 2.5 million acre-feet (it is now stated in H.R. 3300 as a "range" of 2.5 to 8.5 million). By "augmentation" we mean the introduction of new supplies into the river for use below Lee Ferry, not salvage or exchange or other devices. We must insist on adequate priority protection for areas and states of origin in the event that any of this water is taken from California rivers.

3. *Financing.* To facilitate passage of the bill, we would reluctantly agree to delete authorization of Hualapai dam, deferring that issue to later consideration. But if Hualapai is eliminated, we must insist that the remaining sources of revenues for the "development fund", primarily Hoover, Davis and Parker Dam power revenues be earmarked to finance augmentation works, and not be made available to subsidize the Central Arizona project. This accords with the Boulder Canyon Project Act, which specifically prohibits use of any Hoover power revenues to assist the All-American Canal, and denies use of such revenues to aid Metropolitan's aqueduct. The cost of augmentation works attributable to the Mexican Treaty burden and associated losses (about 1.8 million acre-feet altogether) must be nonreimbursable, carrying out the agreement which Senator Kuchel obtained from the Budget Bureau on this point.

**National Water Commission Act (S. 20)**

On January 11, 1967, Senator Henry Jackson of the State of Washington with 33 other senators as cosponsors introduced S. 20, the proposed National Water Commission Act (90th Congress). This bill would provide for a seven-man commission appointed by the President by and with the advice and consent of the Senate; such appointees would be from among areas outside the Federal Government. The Commission would review water resource problems and programs on a nationwide basis. On February 6, 1967, the Senate passed the bill without amendment.

Following hearings by the House Interior Subcommittee on Irrigation and Reclamation, the full committee approved S. 20, as amended, on June 8, 1967, and subsequently the House passed the measure. Of significance was one House-approved amendment which deleted language providing for Senate confirmation of the appointment of commission members by the President. Other amendments were of minor importance. As of the close of the 1st session of the 90th Congress, S. 20 was still awaiting action by a conference committee.

## REGIONAL WATER DEVELOPMENT

The Board continued its campaign for regional water planning studies designed to determine the best way to augment the water supply of Colorado River. In addition to supporting progressive legislation as described in the previous section, members of the Colorado River Board and staff participated in the activities of the Western States Water Council.

### Western States Water Council

The Council was created by the Western Governors Conference to provide for effective cooperation among the western states in planning for development of their water resources. It consists of thirty-three delegates, three from each of the eleven states: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming. The governors are members ex officio.

California delegates in 1966 were William E. Warne, Director of Water Resources, Chairman; James A. Cobey, State Senator; and Raymond R. Rummonds, Chairman of the Colorado River Board. Mr. Warne and Senator Cobey resigned, and early in 1967 Governor Reagan appointed in their places William Gianelli, Director of Water Resources, Chairman; and Gordon Collogne, State Senator, 36th District; and reappointed Mr. Rummonds. Wesley E. Steiner and W. Don Maughan of the Department of Water Resources and the Chief Engineer of the Colorado River Board serve as technical advisors.

The Council meets quarterly. At the meeting of July 15-16, 1966, Freeman Holmer of Oregon was reelected Chairman and Raphael J. Moses of Colorado was reelected Vice Chairman, for the year ending June 30, 1967. Mr. Moses became the Chairman when Mr. Holmer resigned in October 1966. Mr. William Holden of Idaho was elected Vice Chairman.

Two working committees were formed as a result of a resolution introduced by California: a Water Policy and Legislative Committee and a Water Resources Committee. Mr. Rummonds is the California member of the Water Resources Committee; Mr. Cole acted as his alternate, and

he and W. Don Maughan gave technical advice and assistance. The committees were charged with the drafting of principles, guidelines and standards for consideration by the Council, to be adhered to in western water resources studies and developments.

The committees met frequently in work sessions, and their chairmen reported progress to the Council at its quarterly meetings. After much labor by the committees, repeated consideration and lengthy debate by the Council, a statement of Principles, Standards and Guidelines was adopted, in part on March 31, 1967, and in part on September 29, 1967.

At the June 23, 1967 meeting, Chairman Moses and Vice Chairman Holden were unanimously reelected for the 1967-68 year, and Donel Lane of Oregon was reappointed Secretary-Treasurer.

### California Advisory Committee on Western States Water Planning

The California Advisory Committee consists of one member of the Assembly appointed by the Speaker of the Assembly; one member of the Senate appointed by the Rules Committee of the Senate; one member of the California Water Commission designated by the Commission; and four members of the public appointed by the Governor.

The Committee was created to advise and consult with California delegates to any interstate commission or council organized to plan for the regional development of water and related resources, e.g., the Western States Water Council.

At the end of 1967, the Chairman of the Advisory Committee was Assemblyman Carley V. Porter and the Vice Chairman, Jerome B. Gilbert. Other members are William H. Jennings, Joseph Jensen, Theodore George, James Sorensen and Senator Lawrence Walsh. Mr. Steiner, Department of Water Resources and the Chief Engineer, Colorado River Board serve as technical advisors.

Each member of the Advisory Committee attended at least one meeting of the Western States

Water Council during the year and reported to the Advisory Committee on the Council activity.

The Committee focused much of its attention on the proposed Colorado River Basin and Central Arizona Project legislation. Oral and written reports by the Chief Engineer and Special Counsel of the Board and by officials of the Department of Water Resources kept the Committee informed about the progress and status of the legislation and the problems involved. The Committee took a position consistent with that of the Colorado River Board.

At the meeting of the Advisory Committee on January 11, 1967, the following motion was adopted unanimously:

RESOLVED, That the California Advisory Committee on Western States Water Planning recommend to the Governor and the California members of the Western States Water Council support of the Resolution by the Colorado River Board of California, dated January 4, 1967, on Colorado River legislation, as presented to the Committee by Mr. Northcutt Ely on this date.

At its meeting on March 21, 1967, the Advisory Committee unanimously adopted the following "Statement of Principles" which it recommended as a guide to California representatives in the forthcoming negotiations on the pending Colorado River Basin legislation:

"1. The important essence of the program is recognition of shortage of supplies to meet commitments of the Colorado River and, therefore, the necessity to include at least the preliminaries of an augmentation project in any project legislation.

"2. Whether this is to be accomplished through a National Commission or otherwise, or through a provision in the Colorado River Bill, or by a separate Water Commission Bill, the end result must be the same, i.e., a study of availability of water to augment the river flow and formulation of plans for the ways and means to accomplish such augmentation.

"3. With recognition of the inherent shortages and implementation of the augmentation project it logically follows that there must be protection of existing projects in the interim until the shortage no longer exists."

In line with the concentration of effort in late 1967 to reunite the Colorado River Basin states in the matter of water resource development, the Advisory Committee joined with the Colorado

River Board, the Attorney General, the Department of Water Resources and others in restating the principles essential to the interests of California in any comprehensive Colorado River Basin legislation. It urged the maintenance of a unified state position, commended the Governor for his leadership, and recommended that every effort be made to reach equitable resolution of interstate differences on the Colorado.

### **Type I Comprehensive Framework Studies**

The Water Resources Council, created by the Water Resources Planning Act of 1965, PL 89-80, to carry out the policy of water conservation, development and utilization embodied in the Act, launched in fiscal 1967 a nation-wide study program which will lead to the development of Comprehensive River Basin Reports referred to as Type I Framework Studies. The continental United States has been divided into 18 major hydrologic regions and a report will be prepared for each region.

The studies will provide long-range projections of economic development, translation of such projections into demands for water and related land resource uses, hydrologic projections of water availability both as to quantity and quality, and the general approaches that appear appropriate for solution of water and land use problems. In addition to indicating which regions, or subbasins within them, have water problems calling for prompt detailed planning as well as those where no such problems are current or looming, the studies are expected to provide substantial contributions of fact and analysis for subsequent detailed plan formulation.

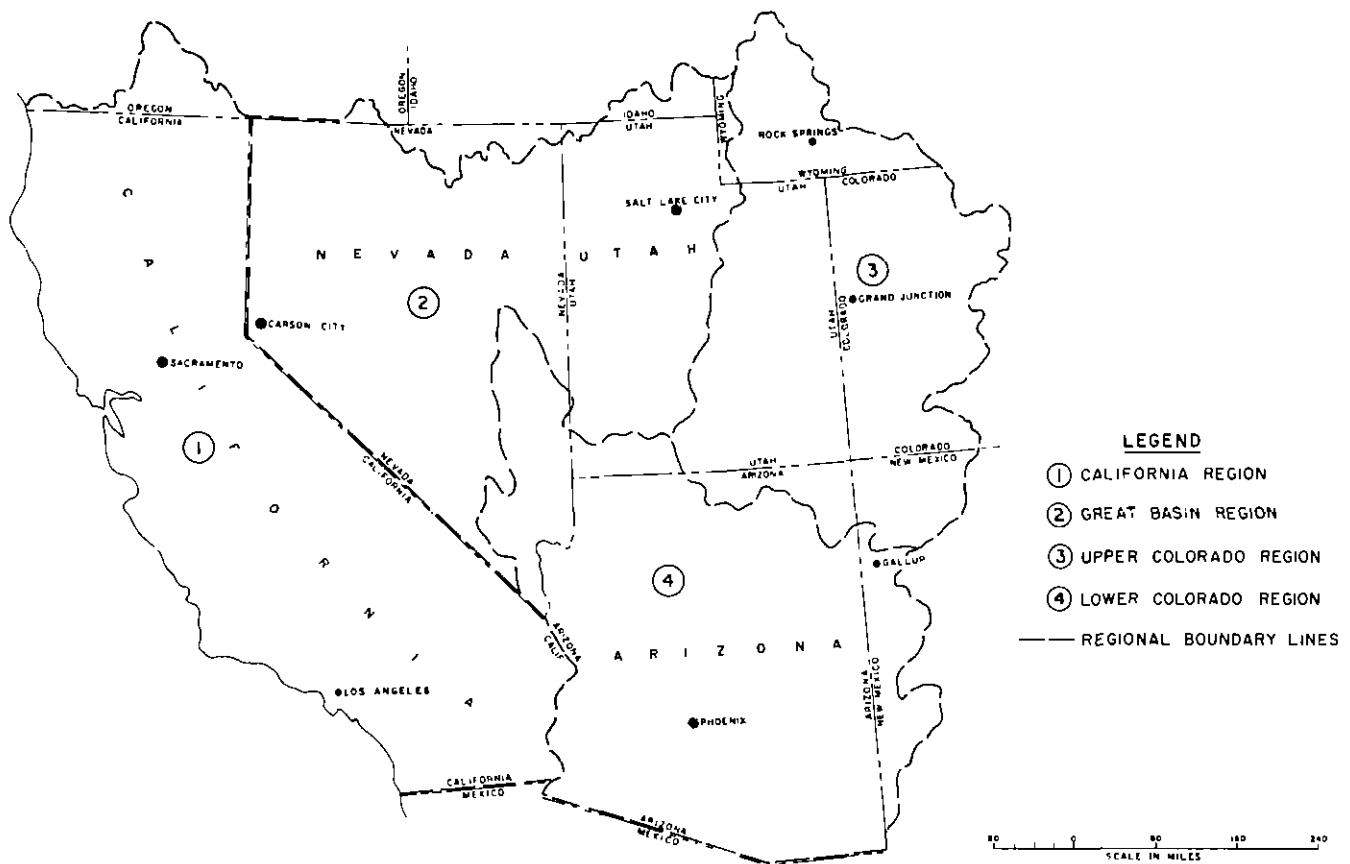
In enacting the Water Resources Planning Act of 1965, Congress recognized that the States have major responsibilities in the water field and in controlling the use of their water within their boundaries. Thus the Act lays great stress upon the idea that state and federal activity in areas of mutual interest in water resources should be undertaken in a cooperative and coordinated manner—a state-federal participation.

The Water Resources Council has delegated to the Pacific Southwest Inter-Agency Committee (PSIAC) the leadership and coordination of the comprehensive framework studies in the four regions constituting the Pacific Southwest—California, the Great Basin, and the Upper and Lower Colorado River Regions. PSIAC com-

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FRAMEWORK STUDY REGIONS IN P.S.I.A.C. AREA

PLATE 3



prises representatives of state as well as federal agencies. Plate 3 shows the four regions coordinated by PSIAC.

A Coordinated Planning Subcommittee was created within PSIAC, and given the responsibility for overall planning, coordination and supervision of the studies for the four regions. Membership of the subcommittee is drawn from the various federal agencies and from the various states within the four regions. Representatives from the Department of Water Resources and Mr. Holburt attend the subcommittee meetings. Active participation is essential so as to provide continuity of purpose and goals within the framework studies as related to the California and Colorado river regions.

A lower Colorado River State-Federal Interagency Group was formed to provide overall direction for the various studies to go into the Lower Colorado River Region comprehensive

report. Mr. Holburt is California's representative on the Group, and is also a member of the staff which was formed to coordinate the activities of subsidiary work groups, implement policy, consolidate and coordinate budgets and work plans, review appendices, schedule work, etc.

### The 1967 National Assessment

The Water Resources Council is required by PL 89-80 to prepare biannually, assessments of the adequacy of water supplies to meet requirements in each water resource region of the United States. The initial assessment for the Pacific-Southwest was begun in early 1967.

Successive drafts of the Pacific Southwest chapters were prepared by the corresponding state-federal interagency groups and were distributed to all agencies concerned, beginning in May 1967. The Board staff reviewed the drafts and submitted comments as deemed necessary to



achieve accuracy and completeness and to improve consistency and coordination among the four regions.

Drafts submitted by the field agencies were revised and coordinated by the Water Resources Council, and again distributed for review and comment. The chapters for the Lower Colorado, Upper Colorado, California and Great Basin regions reached that stage in late 1967. At a meeting of the Lower Colorado River Region staff in November the Council's version of the Lower Colorado chapter was discussed, and as a result the Board and other agencies in the region urged further revision, to provide a truer assessment of the water problems of the region.

### **River Basins Commissions**

In June 1966, governors of the Columbia River Basin states sent letters to the Water Resources Council requesting that a Pacific Northwest River Basins Commission be established for planning water and related land resources development in the Pacific Northwest area, consisting of the states of Washington and Oregon (excluding the Klamath River Drainage Basin) and those portions of the states of Idaho, Wyoming and Montana within the Columbia River drainage system.

The Colorado River Board at its meeting on August 3, 1966, directed that the following telegram be sent to Governor Brown:

Columbia River Basin states by letters to the Water Resources Council, Washington, D.C., in June requested establishment of a Pacific Northwest River Basins Commission in accordance with the Water Resources Planning Act of 1965. Although the proposed area of study includes certain stream basins common to Oregon and California the proposed membership does not include California.

It is evident that the water problems of the west can only be resolved through a west-wide approach.

The Colorado River Board, voting unanimously today, strongly recommends that you request the Water Resources Council to include California as a member state of the proposed Pacific Northwest River Basins Commission, and that furthermore,

you urge the Commission be broadened to include west-wide representation.

RAYMOND R. RUMMONDS, *Chairman*  
Colorado River Board of California

In response to such recommendation by the Board, the Department of Water Resources, and the California Advisory Committee on Western States Water Planning, Governor Brown on August 4, 1966, sent a telegram to Secretary of the Interior Stewart L. Udall, Chairman of the Water Resources Council, applying for California membership in the Pacific Northwest River Basins Commission and urging enlargement of the Commission to include all eleven western states, in order to seek a truly regional and integrated rather than fragmented solution to the West's water problems.

The Chief Engineer and Principal Engineer of the Board attended a meeting of the Southwest Water Council on November 28, 1966, convened to learn the reactions of the Colorado River Basin States to the proposed Pacific Northwest River Basins Commission and to discuss the advisability of creating a Pacific Southwest River Basins Commission. Staff members of the Water Resources Council explained the Water Resources Planning Act of 1965, and announced that on August 5, 1966, the Council had agreed in principle to establishment of the Pacific Northwest Commission substantially as requested by the Columbia Basin governors.

Consensus of the Southwest Water Council members was that a west-wide eleven-state commission would be preferable, but that in view of the action of the Water Resources Council on the request of the Northwest, and in view of the existence and study program of the Pacific Southwest Interagency Committee, that a Pacific Southwest River Basins Commission should not be formed at this time. It was decided to defer further consideration pending future developments.

The Pacific Northwest River Basins Commission was established by Executive Order on March 6, 1967, and has members representing the states of Idaho, Montana, Oregon, Washington and Wyoming and various federal departments.

## LITIGATION

**Arizona v. California**

Article VI of the decree in *Arizona v. California* required the parties prior to March 9, 1967, to exchange among themselves and submit to the Court their lists of present perfected rights to Colorado River waters. As defined in article I(G) and (H) of the decree, "present perfected rights" are rights to main stream waters acquired under state law and measured by the extent of consumptive use prior to June 25, 1929. They also include all main stream water reserved for federal establishments (primarily Indian reservations) prior to that date, regardless of use, if any.

Present perfected rights are significant because of the provisions in article II(B) (3) of the decree. That article provides that in any year in which there is less than 7.5 million acre-feet of main stream water for consumptive use among Arizona, California, and Nevada, the Secretary of the Interior shall first provide for satisfaction of present perfected rights in the order of their priority dates, and then apportion the amount remaining in a manner consistent with the Boulder Canyon Project Act as interpreted by the Court, and consistent with other federal statutes.

The Board staff assisted California attorneys in preparing California's list of present perfected rights. The list, which was filed with the United States Supreme Court on March 9, 1967, claimed present perfected rights for California agencies and other persons in a total quantity of approximately 3,000,000 acre-feet per annum of consumptive use. By March 9, 1967, lists of present perfected rights were also filed by the United States, Arizona and Nevada. Table 1 summarizes, in general, the 1967 present perfected rights claims. The claims of the United States and Arizona were reviewed and compared with the California claims. The analysis showed that either California's claims should be raised or other claims lowered so that all claims would be on the same basis. At the end of the year California was in the process of preparing revised claims.

At the request of the Office of the Attorney General, the Board staff has continued extensive

assistance to California's attorneys on this aspect of the suit. Although the parties are prepared to litigate these claims, it is hoped that the quantities for each claimant can be settled by stipulation.

The staff was also active in a review of the data submitted by the United States to all parties as required by article V of the decree. That article requires the Secretary of the Interior to prepare and maintain records of uses from the mainstream for each water user in the states of Arizona, California and Nevada and of other hydrologic data relating to river operation.

The staff determined that the 1967 submission by the United States was not in compliance with the terms of article V (the same determination that it had reached regarding the government's submissions in prior years), and a letter so stating was sent to the United States and all parties by the Attorney General.

**United States v. Imperial Irrigation District, et al.**

In 1933, Secretary of the Interior Ray Lyman Wilbur issued a letter opinion that the acreage limitation provisions (sometimes called the "160-acre limitation") of the federal reclamation law would not apply to privately owned lands within Imperial Irrigation District (IID). Secretary Wilbur concluded that these lands had a vested water right and "are entitled to have such vested right recognized without regard to the acreage limitation. . . ." IID's water delivery contract was confirmed, as required by federal law, in a California Superior Court decree that declared that the acreage limitation was not applicable to IID. Accordingly, there is no acreage limitation provision in the IID contract.

For more than 30 years, Secretaries of the Interior continued to adhere to this position; and land was bought and sold within IID on the basis of that construction of the law.

In 1964, however, the Solicitor of the Department of the Interior issued an opinion that the Wilbur opinion was wrong and that privately

Table 1  
PRESENT PERFECTED RIGHTS CLAIMS  
SUBMITTED TO THE UNITED STATES SUPREME COURT IN MARCH 1967  
(Acre-feet per annum)

<i>Claims Submitted by States</i>	<i>Arizona</i>	<i>California</i>	<i>Nevada</i>	<i>Total</i>
(In terms of consumptive use)				
Imperial Irrig. Dist. ....	--	2,806,000	--	2,806,000
Palo Verde Irrig. Dist. ....	--	208,100	--	208,100
Res. Div. (Bard), Yuma Proj.* ..	--	21,162	--	21,162
City of Needles .....	--	2,000	--	2,000
Miscellaneous Claims .....	45,084.52	2,145.7	--	47,229.22
Valley Div., Yuma Proj.* .....	279,378	--	--	279,378
Yuma Auxiliary Proj.—Unit B* ..	7,350	--	--	7,350
North Gila Valley Irrig. Dist.* ..	31,840	--	--	31,840
Cibola Valley .....	27,706	--	--	27,706
Supplemental Claim .....	8,000	--	--	8,000
<b>Total .....</b>	<b>399,358.52</b>	<b>3,039,407.7</b>	<b>0</b>	<b>3,438,766.22</b>
<i>Claims Submitted by United States</i>				
(In terms of diversions and acreage)†				
<i>Federal Establishments:</i>				
Indian Reservations				
Yuma (7,743 ac) .....	--	51,616	--	51,616
Ft. Mohave (18,974 ac) .....	96,416	13,698	12,534	122,648
Chemehuevi (1,900 ac) .....	--	11,340	--	11,340
Cocopah (431 ac) .....	2,744	--	--	2,744
Colorado Riv. (107,588 ac) .....	662,402	54,746	--	717,148
Lake Mead Nat'l Rec. Area .....	--	--	500	500
<b>Total .....</b>	<b>761,562</b>	<b>131,400</b>	<b>13,034</b>	<b>905,996</b>
<i>Federal Reclamation Projects:</i>				
Res. Div. (Bard), Yuma Proj. (6,215 ac) ..	--	39,561	--	39,561
Valley Div., Yuma Proj. (46,563 ac) .....	299,852	--	--	299,852
Yuma Auxiliary Project—Unit B (1,225 ac) ..	6,801	--	--	6,801
North Gila Valley Irrig. Dist. (5,000 ac) ..	31,994	--	--	31,994
<b>Total .....</b>	<b>338,647</b>	<b>39,561</b>	<b>0</b>	<b>378,208</b>

\* United States also submitted claims for these users. See Federal Reclamation Projects in this table.

† United States stated that claims would not exceed the diversions and would be the diversions or the amount necessary to supply the consumptive use for respective acreage, whichever is less.

owned lands within IID are subject to the acreage limitation provisions of the federal reclamation laws.

In January 1967, the United States filed suit against IID in the federal district court in San Diego and sought a declaratory judgment that the acreage limitation does apply to privately owned lands within the district. By stipulation, nine private landowners were permitted, as representatives of the alleged excess land owners, to intervene as defendants. The state of California, on motion made by Attorney General Lynch, was permitted to intervene as a defendant over the opposition of the United States. The State's motion was granted because its Colorado River water rights—namely, those of IID, including its present perfected rights—are involved in the defenses asserted in the action. Of course, the state and the other defendants are opposing the

application of the acreage limitation provisions to privately owned lands within IID.

Procedurally, the case is still in pre-trial and discovery stages. The parties have agreed to a bifurcated trial: In phase one, the issue would be whether the acreage limitation applies to privately owned lands within IID. If not, the trial would conclude. If so, in phase two, the issue would be the extent to which water rights would preclude or restrict the application of the limitation. However, trial is not expected to begin until the summer of 1968, at the earliest.

At the request of the Attorney General's office, the Principal Engineer has attended the court proceedings and participated in conferences among defendants. As the litigation proceeds, the staff will continue to assist the Attorney General's office in the defense of the suit.

## WATER SUPPLY AND REQUIREMENTS

### Streamflow and Storage

The staff continued its collection of basic data on water supply and use, estimates of unmeasured items and projections of all items affecting the water budget of Colorado River. Data in this section are reported for the water year from October 1, 1966, through September 30, 1967.

The flow of Colorado River at Lee Ferry during the water year was 7,782,000 acre-feet. Adjusted for changes in surface storage in the Colorado River Storage Project reservoirs, the quantity becomes 8,327,000 acre-feet. The Bureau of Reclamation estimates that if there had been no upstream man-made depletions the virgin flow at Lee Ferry would have been approximately 11,700,000 acre-feet. For comparison the estimated annual average undepleted or virgin flow was 13.7 million acre-feet during the 1922-67 period of record and 14.8 million acre-feet during the 1896-1967 period. Plate 4 shows estimated annual virgin flows at Lee Ferry since 1896.

Climatological data early in the 1966-67 water year gave indications of high runoff of the Colorado River. However, the prospect of having two successive years with below average flows was assured by an extremely dry spring in the major contributing areas of the basin. The January 1967 forecast of the Bureau of Reclamation predicted an April-July inflow to Lake Powell of 10,000,000 acre-feet, but succeeding forecasts were drastically reduced, and the actual runoff during April-July 1967 was only 6,045,000 acre-feet.

Table 2 summarizes the Bureau of Reclamation forecasts of the 1967 April-July inflow to Lake Powell.

Measured flows at the three upstream stations which account for approximately 95 percent of the inflow to Lake Powell were all less than average. Regulated releases below Hoover Dam were limited to the amounts necessary to meet consumptive use requirements in the United States and the obligations to Mexico.

Flows at key points in the basin for water year 1966-67 are shown in Table 3.

Table 2  
U.S. BUREAU OF RECLAMATION FORECASTS OF  
APRIL-JULY RUNOFF INTO LAKE POWELL

1967 Forecasts as of	Mean Forecast* (Acre-feet)	Mean Forecast % of Average† 1906-1966	% of Actual Runoff
January 1.....	10,000,000	119	165
February 1.....	9,900,000	118	163
March 1.....	8,800,000	105	145
April 1.....	6,300,000	75	104
May 1.....	5,100,000	61	84
June 1.....	5,700,000	68	94

\* Assuming no regulation by major reservoirs upstream.

† U.S.B.R. estimate of average April-July historic inflows to Lake Powell for the 1906-1966 period is 8,500,000 acre-feet.

Table 3  
MEASURED FLOW IN COLORADO RIVER  
BASIN FOR WATER YEAR 1966-67  
(Thousands of Acre-feet)

Station	Measured Flow	Measured Flow Adjusted for Change in Surface Storage	% of Average†
<i>Upper Basin</i>			
Green R. @ Green River (Utah)	3,059	3,298	63
Colorado R. @ Cisco (Utah)...	3,963	4,215	100
San Juan R. @ Bluff (Utah)...	934	1,051	59
Subtotal.....	7,956	8,564	--
Colorado R. at Lee Ferry.....	7,809	8,354*	71
<i>Lower Basin-Colorado R.</i>			
Near Grand Canyon.....	8,257	8,802*	74
Below Hoover Dam.....	7,832	--	81
Below Davis Dam.....	7,941	--	83
Below Parker Dam.....	6,407	--	74
Flow into Mexico.....	1,566	--	45

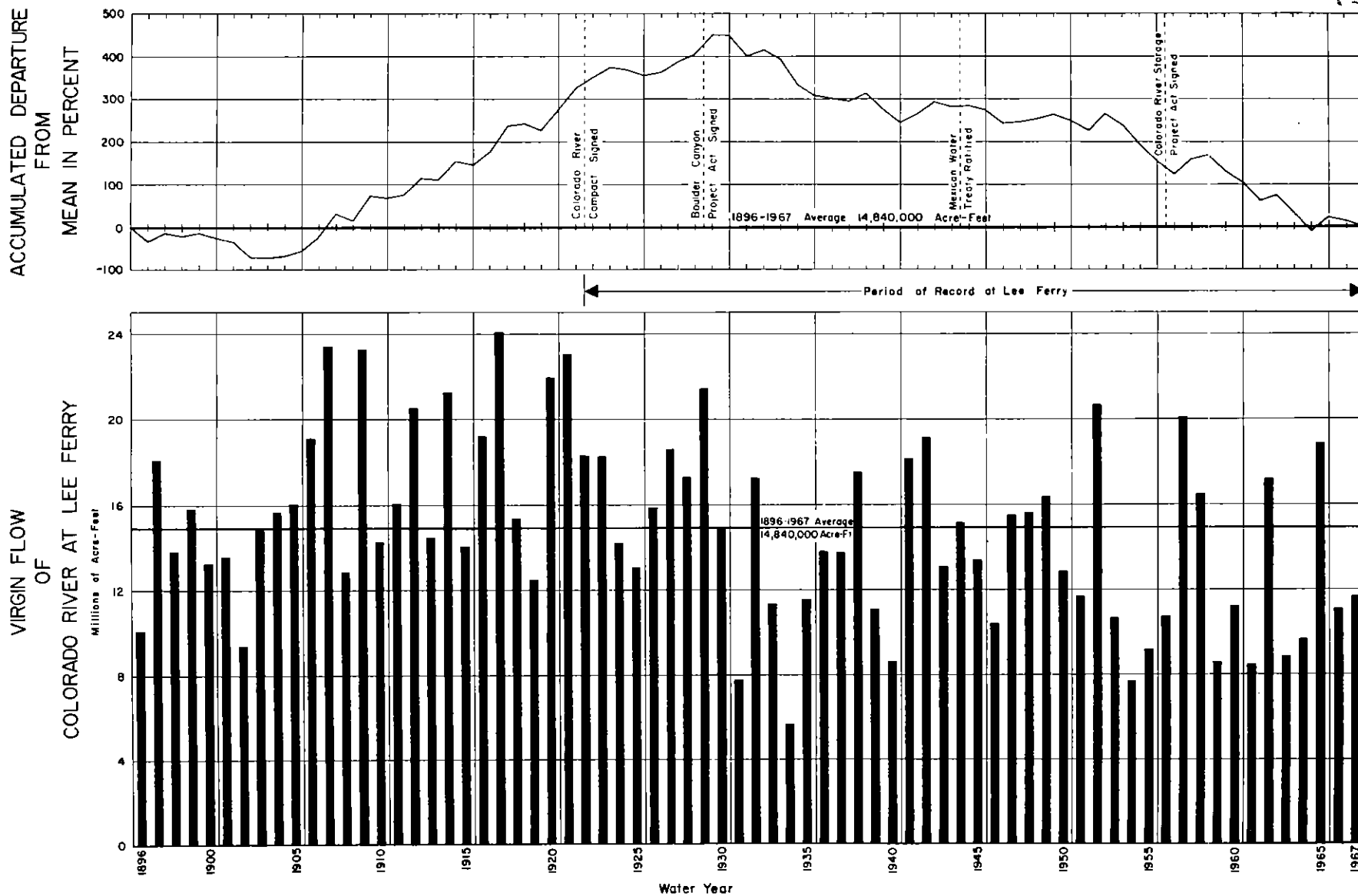
\* It is estimated that about 332,740 acre-feet was absorbed in Lake Powell bank storage during the water year 1966-67.

† The averages for the stations upstream from Hoover Dam represent the 1922-67 period which is the length of record at Lee Ferry. The averages for Hoover Dam and downstream stations represent the 1950-65 period which is the length of record at Davis Dam.

Article III (d) of the Colorado River Compact provides that the States of the Upper Division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years. In the past five years the accumulation of storage in the Colorado River Storage Project

# CHARACTERISTICS OF THE VIRGIN FLOW COLORADO RIVER AT LEE FERRY

2113



reservoirs coupled with the generally low runoff has resulted in a total flow at Lee Ferry of only 31,464,000 acre-feet as shown below:

Water Year	Flow at Lee Ferry (Acre-Feet)
1962-63 .....	2,520,000
1963-64 .....	2,427,000
1964-65 .....	10,835,000
1965-66 .....	7,873,000
1966-67 .....	7,809,000
Total .....	31,464,000
5-Year Average .....	6,293,000

In the next five years it will be necessary to release 43,536,000 acre-feet at Lee Ferry or an average of 8,707,000 acre-feet a year in order that delivery will total 75,000,000 acre-feet for the 10-year period 1963-1972.

The required 5-year average is 154,000 acre-feet greater than the required 6-year average computed in the Board's annual report for 1965-66, indicating additional "slippage" in 1967.

In the Spring of 1967 the Board expressed concern relative to future operation of Lake Powell in view of the continued subnormal runoff in the Colorado River Basin and requested the Bureau of Reclamation's plan of operation for satisfaction of the III(d) requirement of the Compact in the six remaining years of the 1963-72 period.

The Bureau in a letter dated June 9, 1967, informed the Board that the planned power releases at Glen Canyon Dam during the years 1967 through 1972 will provide a total flow at Lee Ferry for the years 1963 through 1972 equal to or greater than 75,000,000 acre-feet, with quantities at Lee Ferry in the remaining six years approximately as follows:

1967 .....	7.9 million acre-feet
1968 .....	8.3 million acre-feet
1969 .....	8.8 million acre-feet
1970 .....	8.8 million acre-feet
1971 .....	8.8 million acre-feet
1972 .....	8.8 million acre-feet

51.4 million acre-feet

Water releases and losses during water year 1966-67 were somewhat less than inflow with the result that the surface storage in the Colorado River Basin increased moderately during the 1966-67 year as shown in Table 4.

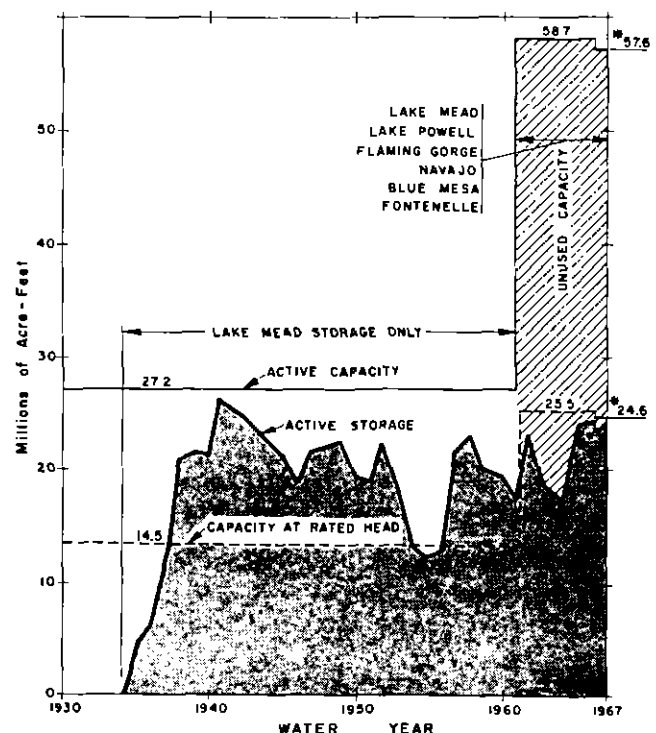
Table 4  
CAPACITY AND SURFACE STORAGE OF MAJOR  
COLORADO RIVER BASIN RESERVOIRS  
(Thousands of Acre-feet)

	Gross Capacity	Usable Capacity	Active Storage End of Sept. 1967	Change During Year
<i>Upper Basin</i>				
Lake Powell .....	27,000	25,002	6,360	-63
Flaming Gorge .....	3,789	3,749	2,713	+259
Navajo .....	1,709	1,534	451	+117
Blue Mesa .....	941	830	430	+238
Fontenelle .....	345	345	17	-7
Subtotal .....	33,784	31,460	9,971	+544
<i>Lower Basin</i>				
Lake Mead .....	*28,537	*26,159	14,375	+265
Lake Mohave .....	1,818	1,810	1,402	+15
Lake Havasu .....	648	619	560	-5
Subtotal .....	31,003	28,588	16,337	+275
Total Both Basins .....	64,787	60,048	26,308	+819

\* Based upon 1964 sedimentation survey.

PLATE 5

#### COLORADO RIVER BASIN RESERVOIRS STORAGE AND CAPACITY

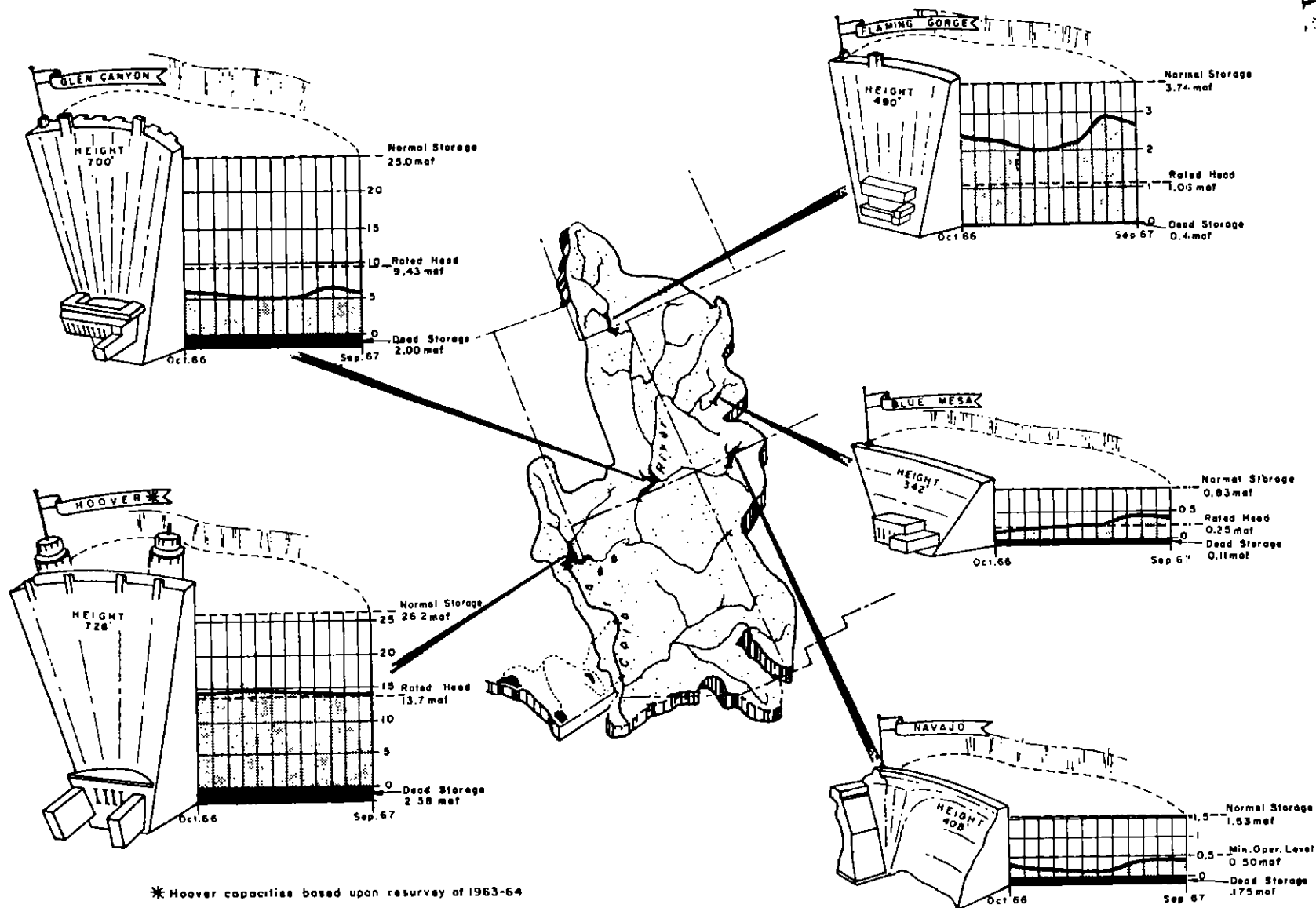


\* Change in capacity due to reservoir of Lake Mead

Plate 5 shows the combined active surface storage of Lake Mead and the Colorado River Storage Project reservoirs for the period 1935-1967. Lake Mohave and Lake Havasu are not in-

# COLORADO RIVER BASIN RESERVOIRS

OCTOBER 1, 1966—SEPTEMBER 30, 1967



cluded because <sup>2145</sup>they are operated at relatively constant levels. In addition to surface storage, water is absorbed in the areas adjacent to the reservoirs. At Lake Powell, this absorption or bank storage was estimated to be about 3,500,000 acre-feet as of the end of water year 1967, or 42 percent of the gross surface storage.

As can be seen in Plate 5 the low runoff for 1967 has delayed initial filling of major basin reservoirs to the combined rated head capacity. Plate 6 shows the changes in contents of the major mainstream reservoirs during the 1967 water year.

### Lake Mead Sedimentation

All plates and tables in this report showing storage at Lake Mead are based upon area-capacity tables prepared from a hydrographic survey conducted by the Bureau of Reclamation during 1963 and 1964. The last previous sedimentation survey was made in 1948-49.

When Hoover Dam was completed in 1935, the reservoir had an active storage capacity of 28,030,000 acre-feet at top of spillway gates, elevation 1221.4 feet above sea level. Sediment encroachment reduced the active capacity at gate top to 27,209,000 acre-feet in 1949 and to 26,159,000 acre-feet in 1964. Findings from the 1948-49 and 1963-64 surveys are compared in Table 5.

Table 5  
LAKE MEAD SEDIMENTATION

	1935	1935-1949	1949-1964
Sediment Accumulation, ac. ft.			
Total.....	--	1,424,000	1,292,000
Annual average.....	--	104,000	80,750
	1935	1949	1964
Water storage space avail- able, ac. ft.			
Active.....	28,030,000	27,209,000	26,159,000
Dead.....	3,223,000	2,620,000	2,378,000

The average annual rate of sediment accumulation in Lake Mead was 22 percent less during the 16 years 1949 through 1964 than during the 14 years from 1935 through 1948. The decrease during the later period is attributed by the Bureau principally to the lower average runoff and to small extent to the closing of the gates in Glen Canyon Dam in 1963. Future surveys should make it possible to segregate more readily

the effects of Glen Canyon Dam and other upstream structures in reducing sediment inflow to Lake Mead.

### Uses and Losses

Depletions in the Upper Basin are not all measured. The Bureau of Reclamation computes irrigation depletions by applying a unit rate to an estimated acreage. The unit rate is derived for each year by applying to the estimated long-time average a factor varying with the annual runoff, indicating uses greater than average in years of high runoff and less than average in years of low runoff. This type of adjustment is questionable for application to present development because of the increasing amount of storage regulation available to supplement low runoff. Including transmountain diversions which are measured, and evaporation from reservoirs, total depletion in 1966-67 is estimated to be 2,480,000 acre-feet, an increase of 450,000 acre-feet from the estimated 1965-66 depletion.

Diversions minus measured returns to the river by Lower Basin mainstream users in water year 1966-67 were 5,873,000 acre-feet, an increase of 127,000 acre-feet from 1965-66.

Quantities for the past five years are shown in Table 6.

Table 6  
DIVERSIONS MINUS MEASURED RETURNS  
LOWER COLORADO RIVER  
(Thousands of Acre-feet)

Water Year	1963	1964	1965	1966	1967
<i>California</i>					
Palo Verde Irrig. Dist.	362	403	373	384	365
Metropolitan Water Dist.	1,065	1,092	1,180	1,121	1,182
Yuma Project Reserv. Div.	45	48	46	48	51
Imperial Irrig. Dist.	3,053	2,859	2,756	2,778	2,860
Coachella Valley Co. Water Dist.	537	505	526	484	453
Total.....	5,062	4,907	4,881	4,815	4,911
<i>Arizona</i>					
Colorado R. Indian Reservation.....	182	189	178	186	200
Gila Project.....	591	642	616	555	566
Yuma Proj. Valley Div.	171	176	182	162	171
Total.....	944	1,007	976	903	937
<i>Nevada</i>					
Pumping from Lake Mead.....	26	27	23	25	27
Grand Total....	6,032	5,941	5,880	5,743	5,875



# LOWER COLORADO RIVER AREA

## TIME REQUIRED FOR PARKER DAM RELEASES TO REACH;

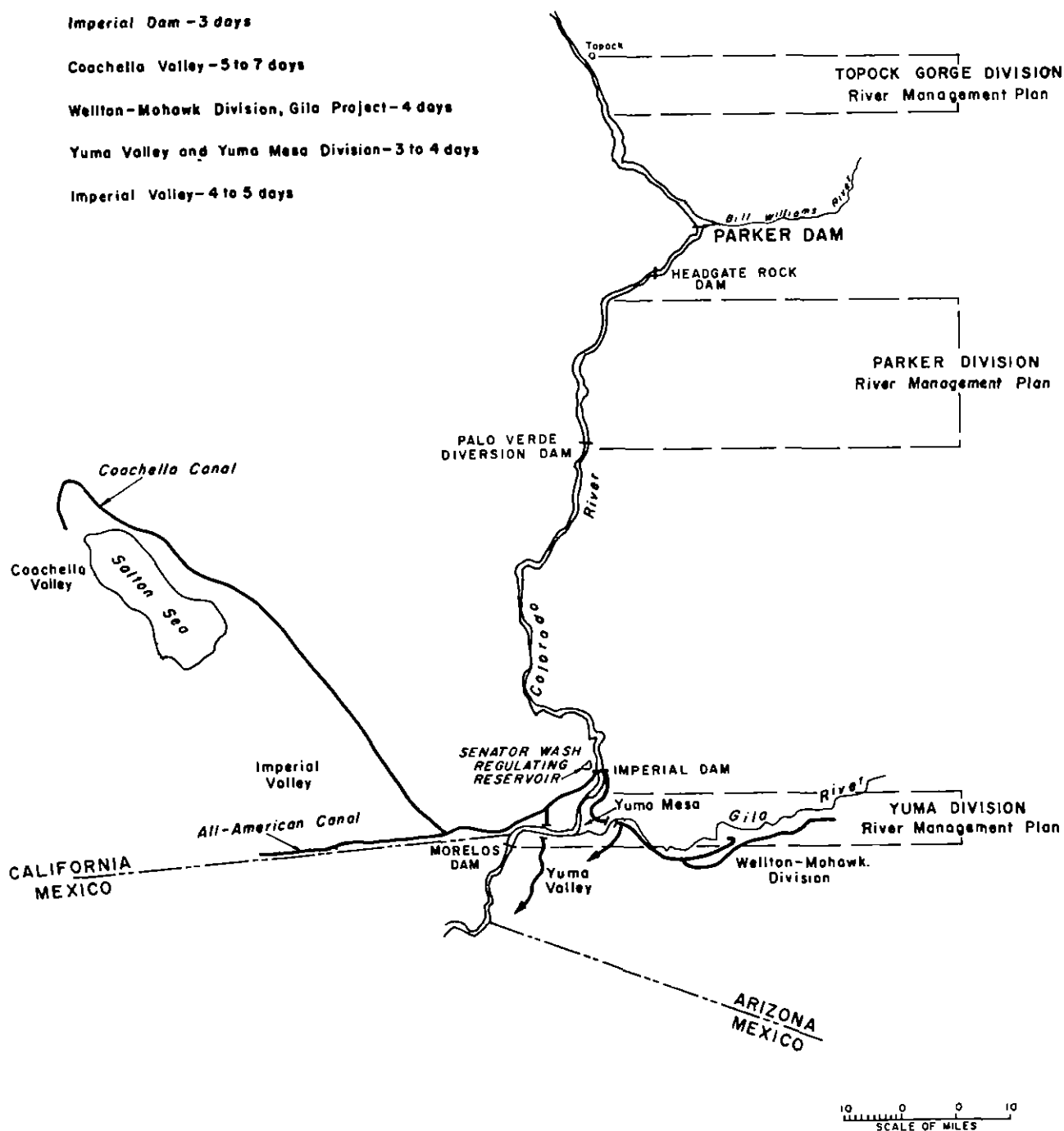
Imperial Dam - 3 days

Coachella Valley - 5 to 7 days

Wellton-Mohawk Division, Gila Project - 4 days

Yuma Valley and Yuma Mesa Division - 3 to 4 days

Imperial Valley - 4 to 5 days



In addition to the users listed on Table 6, miscellaneous users divert from Colorado River or pump from wells adjacent to the mainstream. Gross diversions of these miscellaneous users in California, Arizona and Nevada have amounted to more than 100,000 acre-feet a year for the past several years.

The Bureau of Reclamation releases water at Hoover Dam to satisfy requirements for the Mexican Water Treaty and sixteen separate agencies in the United States; thirteen of the agencies are served by diversions at Imperial Dam. Parker Dam, 148 miles upstream and three days' flow time from Imperial Dam, is the nearest major regulating structure. Many factors are involved in scheduling releases to meet anticipated downstream requirements. The rate of flow at Imperial Dam is seldom the precise rate actually required owing to changes in the weather and other factors, during the travel time from Parker Dam. Minor shortages can sometimes be compensated for by increased deliveries on subsequent days. Plate 7 shows the periods of time required for Parker Dam releases to reach various agricultural areas.

### Deliveries to Mexico

In January 1966 the Bureau of Reclamation completed construction of Senator Wash Dam and Regulating Reservoir, on a tributary wash in California upstream from Imperial Dam. However, operation was on a limited basis during the remainder of 1966. Excessive wear was experienced in much of the pumping machinery and extensive repairs were made by the manufacturer prior to placing the project in full use early in 1967.

Senator Wash Dam and Regulating Reservoir was formally dedicated on the afternoon of April 20, 1967, by Secretary of the Interior Stewart L. Udall.

The dam is an earthfill embankment 94 feet high and 2,340 feet long. The dam and three dikes create a reservoir with a capacity of 13,800 acre-feet. The reversible dual-purpose plant has a pumping capability of 990 cfs and generating capacity of 7,200 kilowatts. The plant is operated by remote control from Imperial Dam where the Bureau of Reclamation has an operator on duty around the clock.

Senator Wash Pumping Plant commences pumping water from Imperial Reservoir to Sena-

tor Wash Reservoir whenever surplus water reaches Imperial Reservoir. Concurrently, if Senator Wash Reservoir contains more than 5,000 acre-feet of water, releases from Parker Dam are reduced. As a precautionary measure, because of the three days required for Parker releases to reach Imperial Dam, releases from Parker Dam are not reduced if Senator Wash Reservoir contains less than 5,000 acre-feet. If the available river flow to Imperial Dam is less than water requirements, the flow is augmented by releases from Senator Wash Reservoir.

The Bureau of Reclamation maintains a "control schedule" which includes the scheduled deliveries to Mexico plus releases from storage for sluicing, river regulation and other purposes. The scheduled deliveries, control schedules and excess deliveries to Mexico for recent years are shown in Table 7.

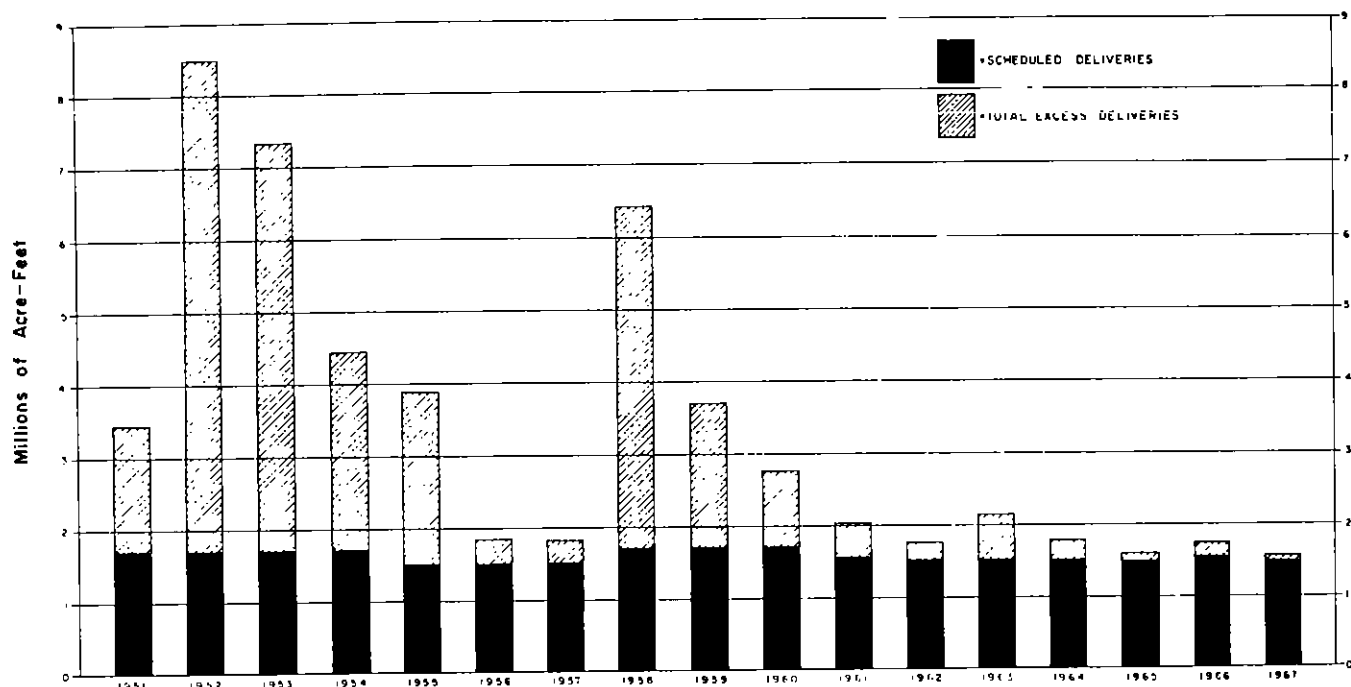
Table 7  
DELIVERIES TO MEXICO-COLORADO RIVER SYSTEM  
(Thousands of Acre-feet)

Water Year	Scheduled Deliveries to Mexico	Control Schedule	Flow to Mexico	Total Excess Deliveries to Mexico	Excess Over Control Schedule
1962-----	1,500	1,540	1,763	263	223
1963-----	1,500	1,873	2,113	613	240
1964-----	1,500	1,549	1,776	276	227
1965-----	1,474	1,502	1,594	120	92
1966-----	1,541	1,632	1,720	179	88
1967-----	1,459	1,517	1,566	107	49

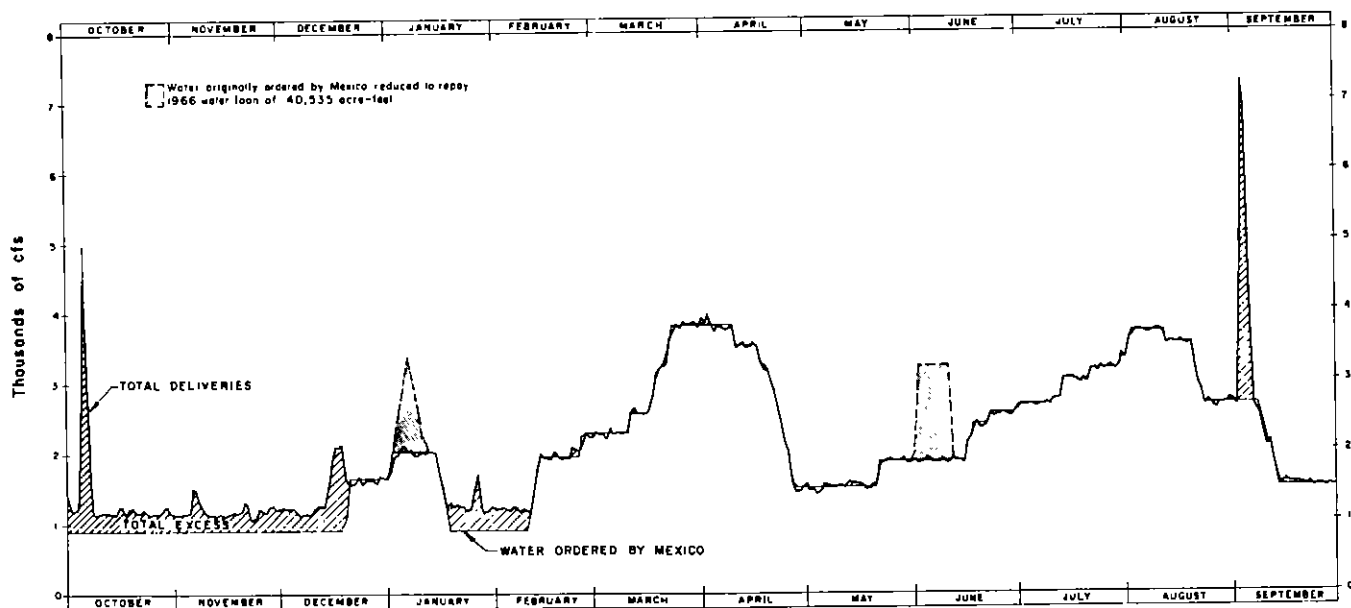
Plate 8 shows deliveries to Mexico by years from 1951 through 1967, and Plate 9 shows the same information by days for the water year 1966-67. The improvement in control afforded by the Senator Wash Project can be judged by comparison of the total excess deliveries to Mexico in 1967 with the excess for 1965 and 1966, as shown in Table 7.

During most months of calendar year 1967 the unavoidable excess arrivals of water at the boundary, i.e., excess arrivals not caused by Minute 218 of the International Boundary and Water Commission, were remarkably low. By deducting a roughly estimated but substantial amount for uncontrolled storm runoff below Imperial Dam in September, the total of such unavoidable excess arrivals may be approximated at about 10,000 acre-feet, or less than 0.7 percent of the scheduled flow for the year. The minimum monthly

# WATER DELIVERIES TO MEXICO SINCE COMPLETION OF DAVIS DAM



## WATER DELIVERIES TO MEXICO October 1, 1966 to September 30, 1967



excess was 134 acre-feet in August, or about 0.06 percent of the August schedule. The record augurs well for the effectiveness of the regulation afforded by the Senator Wash project.

In 1967, about 66 percent of the total water reaching Mexico was from the river above Imperial Dam, primarily from storage, and 34 percent was from return flows to the river below Imperial Dam, and hence below the Senator Wash control point.

### **Loan of Water to Mexico**

During the latter part of August 1966 the Departments of State and Interior announced that in response to a request from the Republic of Mexico, the United States had offered to loan Mexico 40,535 acre-feet of Colorado River water to assist farmers in the Mexicali Valley during an emergency in which according to Mexican authorities many acres of crops would be lost unless an emergency supply of water were forthcoming. The loan of the water was made contingent upon the following three conditions:

1. If the May 1, 1967, forecasted spring runoff of the Colorado River dropped below the long-term average of 8.5 million acre-feet, the loan would be repaid out of Mexico's treaty allotment of 1,500,000 acre-feet during 1967.

2. If the forecasted runoff for 1967 exceeded the long-term average, the 40,535 acre-feet of water would be repaid over a three-year period.

3. Mexico would reimburse in dollars the United States for any decrease in power generation at either Hoover or Glen Canyon Dam powerplants caused by the loss of power head resulting from the release of the 40,535 acre-feet from storage.

In reporting to the Board on August 31, 1966, the Chief Engineer pointed out that the State of California was not advised, nor had the matter been referred to the Committee of Fourteen representing the seven Colorado River Basin States, in advance of the loan.

The Board agreed, after discussion, to request the Committee of Fourteen to seek an explanation of the facts by the U.S. Commissioner of the International Boundary and Water Commission concerning the loan of water to Mexico before the Board considered what course of action should be taken.

At a meeting of the Committee of Fourteen in Las Vegas, Nevada, on November 28, 1966,

it was reported by both State and Interior Department representatives that the situation was not likely to be repeated in the future, but that the Secretary of the Interior had acted within his authority under the Reclamation Project Act of 1939, and that such release was not in violation of the Mexican Water Treaty of 1944.

At the twenty-third annual meeting of the Colorado River Water Users Association at Las Vegas, Nevada, December 1-2, 1966, Mr. Cole introduced the following resolution which was endorsed and adopted by the Association:

#### *Resolution Re: Mexican Water Treaty*

WHEREAS, on August 23, 1966 it was announced by the Departments of State and Interior that the United States has offered to loan Mexico 40,535 acre-feet of Colorado River water in addition to the quantity required to be delivered at the International Boundary under the terms of the Mexican Water Treaty; and

WHEREAS, the offer was made by federal officials without prior consultation with officials of the Colorado River Basin States; and

WHEREAS, it is in the interest of international comity to render assistance to the Republic of Mexico in an emergency, it is at the same time only fitting that responsible officials of the Colorado River Basin States be consulted in advance of an action which affects or may affect the rights of the citizens of those states;

NOW, THEREFORE, BE IT RESOLVED, that the Colorado River Water Users Association urge the federal Departments and officials to advise and consult with the proper and responsible officials of the Colorado River Basin States before entering into agreement or taking action with regard to delivery of Colorado River water to Mexico if such agreement or action is not expressly provided for by the terms of the Mexican Water Treaty.

BE IT FURTHER RESOLVED, that copies of this resolution be forwarded to the Secretaries of State and Interior; to the Governors of the seven Colorado River Basin States; and to the Congressional Representatives of the seven Colorado River Basin States.

In the early months of calendar year 1967 the 1966 loan to Mexico of waters amounting to 40,535 acre-feet was repaid by Mexico, by reduction of that amount in the scheduled deliveries in 1967, to a total of 1,459,465 acre-feet. Incident to the loan there was a loss of head and power revenue at Glen Canyon Dam amounting to \$6,623.37, and this amount has been paid by Mexico to the United States Department of the Interior.

### Data Collection Programs

The Colorado River Board has encouraged the U.S. Geological Survey, Public Health Service, Bureau of Reclamation, International Boundary and Water Commission and others to expand their water data collection programs and to make the data collected more readily available.

The Chief Engineer conferred on several occasions with high officials of the U.S. Geological Survey on the need for more accurate and complete information on water supply and use of the Colorado River System, and in a letter dated May 24, 1967, to O. M. Hackett, Chief of the Office of Water Data Coordination of the Survey, expressed the following views:

1. We need more complete and precise data on the consumptive use of water in the Upper Colorado River Basin. Such data are vital to the estimation of the virgin flow or total production of the river at Lee Ferry. Primary needs are for an accurate running census of the irrigated acreage and for more reliable information on the net consumption of water for all purposes. . . .

2. We need a more comprehensive inventory of the available groundwater storage reservoirs and their capacities throughout the Colorado River Basin, and a study of whether the dependable yield of the river system could be increased by proper management of groundwater storage in conjunction with surface facilities.

3. We need an analysis of the concurrence or lack of concurrence of wet and dry periods among major river systems of the West. Such a study obviously would be helpful in exploring the possibilities of augmenting the Colorado River by importation from another source, a thing we in the Southwest believe must happen some day.

4. More accurate and complete information is needed on the inflow and outflow, including net evaporation, at major storage reservoirs and potential sites on the Colorado River, primarily so that bank storage can be more accurately evaluated. . . .

5. I would like to see more exhaustive research and study made regarding the effects of upstream consumptive uses and storage manipulation including groundwater storage on the quality of water in the Lower Colorado River, especially salinity. . . .

As a member of the Geological Survey's Advisory Committee on Water Data for Public Use the Chief Engineer participated in a work session in Washington, D.C., on November 30 and December 1, 1967, for critical review and suggestions concerning the computerized storage and retrieval system of water data being set up and the catalogs and indexes being published by the Office of Water Data Coordination for the entire country.

## WATER QUALITY

### Water Quality Act of 1965

The period covered by this annual report was one of intensive effort to establish water quality standards for the Colorado, New and Alamo Rivers, that would comply with the requirements of the Water Quality Act of 1965 (PL 89-234). The Principal Engineer and other members of the staff and advisors took active parts, in collaboration with the California state and Regional Water Quality Control Boards, the Department of Water Resources, the Attorney General and others, as well as with similar agencies of the federal government. Many conferences and technical work sessions were held, intrastate, interstate and state-federal, participated in by one or more of the Board staff and by technical advisors from the agencies represented on the Board. The Technical Committee of the Board was kept informed of problems and progress by correspondence and conferences.

Assistance was given to the Executive Officers of the State Water Quality Control Board and the Colorado River Basin Regional Water Quality Control Board in preparing drafts and final editions of the State's water quality standards. Hearings and meetings of the regional board were attended, as well as conferences pertaining specifically to the level and salinity of Salton Sea.

At a meeting in Denver, Colorado, on August 11, 1966, representatives of all seven basin states began the difficult task of establishing water quality standards for the entire basin upon which all of the states could agree. Many proposals were discussed which defined the scope of the task and served to bring into focus the major difficulties and obstacles to establishing mutually acceptable standards.

The states were desirous of establishing standards among themselves, rather than deferring to the Secretary of the Interior to do so, which he would if the states failed to develop acceptable standards in accordance with the purpose of the Act.

Specifically, the objective of the interstate conferences was to achieve cooperatively a com-

mon framework of guidelines so that the water quality standards to be set separately by the seven states of the Colorado River Basin for the interstate waters of Colorado River would be mutually compatible. The Executive Officer of the State Water Quality Control Board stated that no definite proposal would be accepted or approved by California until the Colorado River Board and the State Water Quality Control Board had both given their official approval.

It became apparent early that the most troublesome problem would be that of setting upper limits for total dissolved solids, chlorides and sulphates, or salinity. Fair agreement seemed achievable on other parameters, but conflicts of interests were inherent in the matter of dissolved solids. The salinity of the lower Colorado, already high, will go higher as consumptive uses increase upstream. Lower Basin interests are apprehensive of the detriment to their operations that will result, while Upper Basin interests are concerned that a restrictive criterion for salinity downstream may hamper Upper Basin developments.

It was clear that no consensus could be reached among the states on a salinity criterion, and after several exhausting sessions it was agreed that the proposed water quality standards should state the criteria for salinity in qualitative terms only, pending the acquisition of more data and knowledge, and that augmentation of Colorado River with water of superior quality should be urged as the only real solution to the problem. A statement to this effect prepared by the Colorado River Board staff was later incorporated with minor modification into the final interstate document.

Several drafts of a proposed interstate agreement regarding water quality standards were prepared, discussed and revised in successive meetings. On January 13, 1967, the conferees developed and agreed upon, subject to approval by proper authority in each state, a document entitled "Guidelines for Formulating Water Quality Standards for the Interstate Waters of the Colorado River System." (See page 39 for

2122  
text.) The document bears a footnote, however, that California and Nevada do not agree to the following sentences which were insisted upon by Upper Basin interests, namely:

Such standards will not be used to restrict reasonable use and development of each State's apportionment of water in the Colorado River System. Nothing herein is intended to construe the Colorado River Compacts.

It was the intent of the conferees that the interstate document be incorporated in and provide a general framework for the water quality standards on the Colorado River System to be submitted by each state to the Secretary of the Interior.

At the regular meeting of the Colorado River Board on February 1, 1967, the following action was taken:

*Resolution of the Colorado River Board of California to Approve in Principle "Guidelines for Formulating Water Quality Standards for Interstate Waters of the Colorado River System"*

WHEREAS, "Guidelines for Formulating Water Quality Standards for Interstate Waters of the Colorado River System," as stated in a draft dated January 26, 1967, were formulated as a result of several interstate meetings which were participated in by representatives of the Colorado River Board, the agencies represented thereon, the State Water Quality Control Board, the Colorado River Basin Regional Water Quality Control Board, the Attorney General, and the Department of Water Resources; and

WHEREAS, the objective of the interstate meetings was to achieve, by interstate cooperation, a common framework so that the water quality standards to be set by each of the seven states of the Colorado River Basin for the interstate waters of the Colorado River System in compliance with the federal Water Quality Act of 1965 would be compatible:

NOW, THEREFORE, BE IT RESOLVED, that the Colorado River Board of California, with the exception indicated in footnote number two of the Guidelines, approves in principle "Guidelines for Formulating Water Quality Standards for Interstate Waters of the Colorado River System" as stated in a draft dated January 26, 1967; and

BE IT FURTHER RESOLVED, that the Colorado River Board of California recommends to the Colorado River Basin Regional Water Quality Control Board the incorporation of the Guidelines, in substantially the same language as that stated in the draft of January 26, 1967, in its "Water Quality Control Policy, Colorado River in California; and

BE IT FURTHER RESOLVED, that the Colorado River Board of California recommends to the State

Water Quality Control Board the adoption of the Guidelines, in substantially the same language as that stated in the draft of January 26, 1967, as part of the water quality standards for the Colorado River in California to be submitted to the Secretary of the Interior in compliance with the federal Water Quality Act of 1965.

At its regular meeting at Los Angeles, California, on February 15, 1967, the State Water Quality Control Board adopted a resolution approving in principle the "Guidelines for Formulating Water Quality Standards for Interstate Waters of the Colorado River System."

The Colorado River Basin Regional Water Quality Control Board held a hearing at El Centro, California, on January 26, 1967, regarding the proposed plans and policies for water pollution control and water quality control for Colorado River. The Principal Hydraulic Engineer of the Colorado River Board presented a statement concerning the 1965 Act and the interstate Guidelines. He emphasized key points that had been agreed upon by the basin states' conferees as follows:

1. Water augmentation of Colorado River is essential in order to maintain existing water quality and, hopefully, to provide for enhancement of quality.
2. Criteria for total dissolved solids, chlorides, sulfates and sodium should be stated in qualitative terms until better information is obtained for these items.
3. Future utilization of the Basin's water resources, absent water augmentation, will cause increases in concentration of dissolved solids downstream.
4. Maximum effort is to be directed to maintaining the highest possible water quality for beneficial water use in the Basin.

The Colorado River Basin Regional Water Quality Control Board on March 9, 1967, adopted water quality control policies for New River, Alamo River and Colorado River, culminating months of intensive effort on the part of many individuals. They incorporated the interstate Guidelines. The State Water Quality Control Board adopted the policies and standards on May 18, 1967, and submitted them to the Secretary of the Interior prior to the June 30, 1967, deadline established by the Act of 1965.

Standards were also adopted by all the other Colorado River Basin states prior to the June 30,

1967, deadline. Mostly they incorporated, bodily or by interlineation, the Guidelines formulated by the interstate conferees.

In August 1967 the Regional Director, Southwest Region, Federal Water Pollution Control Administration announced that specific numerical criteria for total dissolved solids would be required for the Colorado River System, based upon an upper limit of 1,000 milligrams per liter at Imperial Dam. The announcement raised storms of protest throughout the basin. More meetings were held, intrastate, interstate and state-federal.

The consensus of the California interests was that the State should support the previous position of the seven basin states and oppose the setting of numerical limits on salinity at this time.

On November 15, 1967, the conferees of the seven Colorado River Basin states at a meeting in Denver, Colorado, took formal action in which it was:

RESOLVED, that the Conferees do not believe it is appropriate that a standard of 1,000 mg/l or any other definite number for TDS at Imperial Dam be set by the basin states or the Secretary of the Interior at this time; and be it further

RESOLVED, that the Conferees urge the completion of water quality reports of the federal agencies at the earliest practicable date, and that thereafter the basin states and federal agencies again consider the setting of salinity standards for the Colorado River System; and be it further

RESOLVED, that the Conferees hereby urge the FWPCA to consider the approval of the water quality standards of the seven Colorado River Basin states conditioned upon ultimate establishment of acceptable numerical salinity standards after completion and consideration of FWPCA and Bureau of Reclamation reports presently underway.

Similar action was taken by other bodies, including the Colorado River Water Users Association in adopting at its annual convention in December a resolution submitted by the Chief Engineer of the Colorado River Board.

Near the end of the year there were indications that the federal administration would defer the requirement for numerical salinity standards, pending the availability of more and better data, and providing the states continue to cooperate with federal agencies in seeking answers. The states are fully aware of their responsibility, although at the moment they see no clear answer

other than the addition of better water to the river.

This matter of salinity criteria, plus a number of other significant but less troublesome issues in the water quality standards will continue to demand much time and work by all concerned.

#### GUIDELINES FOR FORMULATING WATER QUALITY STANDARDS FOR THE INTERSTATE WATERS OF THE COLORADO RIVER SYSTEM \*

January 13, 1967

##### General Considerations

Past and future economic growth of the States served by the Colorado River System\*\* has been and will continue to be dependent upon the development and utilization of its water resources. Appropriate water quality standards will enhance this development by protecting the quality and productivity of the System's waters. Such standards will not be used to restrict reasonable use and development of each State's apportionment of water in the Colorado River System\*\*\*. Nothing herein is intended to construe the Colorado River Compacts\*\*\*.

The System's interstate waters are used for municipal and industrial supplies, irrigation, fish and wildlife, and recreation. Maximum effort must be directed toward maintaining the highest possible water quality for these uses consistent with reasonable beneficial future development and utilization of all resources within States served by the System.

In order to develop practicable and reasonable quality standards for interstate waters of the Colorado River System, full consideration must be given to the numerous factors and variables connected with the control, development, utilization, conservation, and protection of the System's water resources. It is evident that future development and utilization of the System's water resources for expansion of irrigated agriculture, increases in population, and industrial growth will be accompanied by progressive increases in consumptive losses of water and attendant increases in concentrations of dissolved solids.

In view of the anticipated increase in consumptive use of water, augmentation of the Colorado River is essential just to maintain the existing water quality. Enhancement, as contemplated by the Guidelines of the Federal Water Pollution Control Administration, of the present water quality of the Lower Colorado River is most practicable by a major water augmentation program. One objective of a major water augmentation program would be to approach the limits for total dissolved solids, chlorides, and sulfates recommended by the U. S. Public Health Service Drinking Water Standards of 1962.

##### Basic Principles

1. The States served by the Colorado River System recognize that answers to important questions regarding total dissolved solids, chlorides, sulfates and sodium are lacking or are based on factors that are not yet well-defined. In respect of this recognition the States agree that pending the development of acceptable answers to enable the setting of criteria for total dissolved solids, chlorides, sulfates and sodium for the interstate waters of the Colorado River System, such criteria should be stated in qualitative terms. At the same time it is agreed that all identifiable sources of water pollution will

\* Developed by the State Conferees in the Matter of Pollution of the Interstate Waters of the Colorado River and its Tributaries at a series of meetings during 1966 and 1967, in the interest of compatible State water quality standards. Several water resource interests of each State were involved in most meetings, particularly the last two, held in Scottsdale, Arizona on December 7, 1966 and January 13, 1967.

\*\* The Colorado River and all those streams contributing water thereto.  
\*\*\* California and Nevada do not agree with these two sentences, but propose that there be further negotiations and discussions to resolve this issue.



be managed and controlled to the maximum degree practicable with available technology in order to provide water quality suitable for present and potential future uses of the System's interstate waters.

2. Reviews of all available technical knowledge\* pertaining to the water quality problem and evaluation of new pollution potentials will be made at intervals of not greater than 3 years by representatives of the seven System States with the view and intent of improving, strengthening, or otherwise modifying the quality standards.
3. Monitoring of the quality of interstate waters will be carried out at designated points near State lines and other key locations for all constituents covered by the standards. In addition, measurements will be made at these locations for total dissolved solids, sulfates, chlorides, and sodium.
4. Any State may convene a meeting of all seven States to discuss remedies in those instances where the quality of water available to that State has been adversely affected or threatened by pollutants discharged into the Colorado River System.

#### Minimum Quality Criteria Applicable to Interstate Waters at Agreed State Line Sampling Points

1. Free from substances attributable to domestic or industrial waste or other controllable sources that will settle to form sludge or bottom deposits in amounts sufficient to be unsightly, putrescent or odorous, or in amounts sufficient to interfere with any beneficial use of the water.
2. Free from floating debris, oil, grease, scum, and other floating materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to be unsightly or in amounts sufficient to interfere with any beneficial use of the water.
3. Free from materials attributable to domestic or industrial waste or other controllable sources in amounts sufficient to produce taste or odor in the water or detectable off-flavor in the flesh of fish, or in amounts sufficient to change the existing color, turbidity or other conditions in the receiving stream to such degree as to create a public nuisance, or in amounts sufficient to interfere with any beneficial use of the water.
4. Free from high temperature, biocides, organisms pathogenic to human beings, toxic, corrosive, or other deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life or in amounts sufficient to interfere with any beneficial use of the water.
5. Radioactive materials attributable to municipal, industrial or other controllable sources shall be minimum concentrations which are physically and economically feasible to achieve. In no case shall such materials exceed the limits established in the 1962 Public Health Service Drinking Water Standards or 1/10 of the 168-hr values for other radioactive substances specified in National Bureau of Standards Handbook 69.
6. No wastes from municipal or industrial or other controllable sources containing arsenic, barium, boron, cadmium, chromium, cyanide, fluoride, lead, selenium, silver, copper and zinc that are reasonably amenable to treatment or control will be discharged untreated or uncontrolled into the Colorado River System. At agreed points of sampling above Imperial Dam in the Colorado River System the limits for concentrations of these chemical constituents will be set at values that recognize their cumulative effects and which will provide River Water quality consistent with the mandatory requirements of the 1962 Public Health Service Drinking Water Standards.

\* During the periodic reviews of technical knowledge full consideration will be given to all new technological or other developments and research which may be utilized to upgrade the standards to provide for the protection and enhancement of water quality. This will include possibilities such as: (1) importation of water of better quality from outside the System; (2) control or management of natural sources of salinity; (3) reduction of total dissolved solids in irrigation return flows through reasonable and practicable means; and (4) other suitable measures.

7. The dissolved oxygen content and pH value of the waters of the Colorado River System shall be maintained at levels necessary to support the natural and developed fisheries.

#### Salinity at Northern Mexican Boundary

The second year of operation, under the five-year agreement between the United States and Mexico embodied in Minute No. 218 of the International Boundary and Water Commission, was completed on November 15, 1967. The objectives of the United States are to reduce the salinity of the waters delivered to Mexico and at the same time to avoid adverse effects upon United States interests.

Minute 218 provides that at Mexico's request the highly saline pump-drainage discharge from the Wellton-Mohawk project in Arizona will be diverted around the Mexican diversion dam through the bypass channel constructed by the Bureau of Reclamation in 1965. It also provides that if the bypass occurs during times when Mexican delivery orders are at the Treaty minimum of 900 cubic feet per second the flow of the river at Morelos diversion dam will nevertheless be not less than 900 cubic feet per second. Thus, the interim agreement of Minute 218 could cost the United States some extra water from storage.

Meetings of the Committee of 14 were held on November 29, 1966, and December 8, 1967, at which the U.S. Commissioner, International Boundary and Water Commission, and Bureau of Reclamation officials reported the results of the first and second years of operation of the bypass channel, ending November 15, 1966, and November 15, 1967, respectively. The Chief Engineer of the Board attended as a member of the Committee. Written reports were received. The following table summarizes some statistics from those reports.

#### MINUTE 218 OPERATION

	1st Year 11-16-65 to 11-15-66	2nd Year 11-16-66 to 11-15-67
Wellton-Mohawk drainage discharge, ac. ft. ....	216,900	210,530
Salt load, tons .....	1,388,000	1,318,000
Diverted around Morelos Dam, ac. ft. ....	105,830	99,100
Bypass during minimum Treaty order, ac. ft. ....	58,660	53,390
Makeup from storage release, ac. ft. (approx.) .....	15,000	35,000
Avg. salinity of river at northerly boundary, ppm .....	1,230	1,210

The annual average salinity of Colorado River treaty deliveries to Mexico at the northerly boundary was less in the second year of operation, November 16, 1966 to November 15, 1967, than that recorded in the first year of operation, and each was less than the averages in preceding years. The average decreased from 1310 ppm in the year prior to the agreement to 1230 ppm in the first year of Minute 218 operation and to 1210 ppm in the second year.

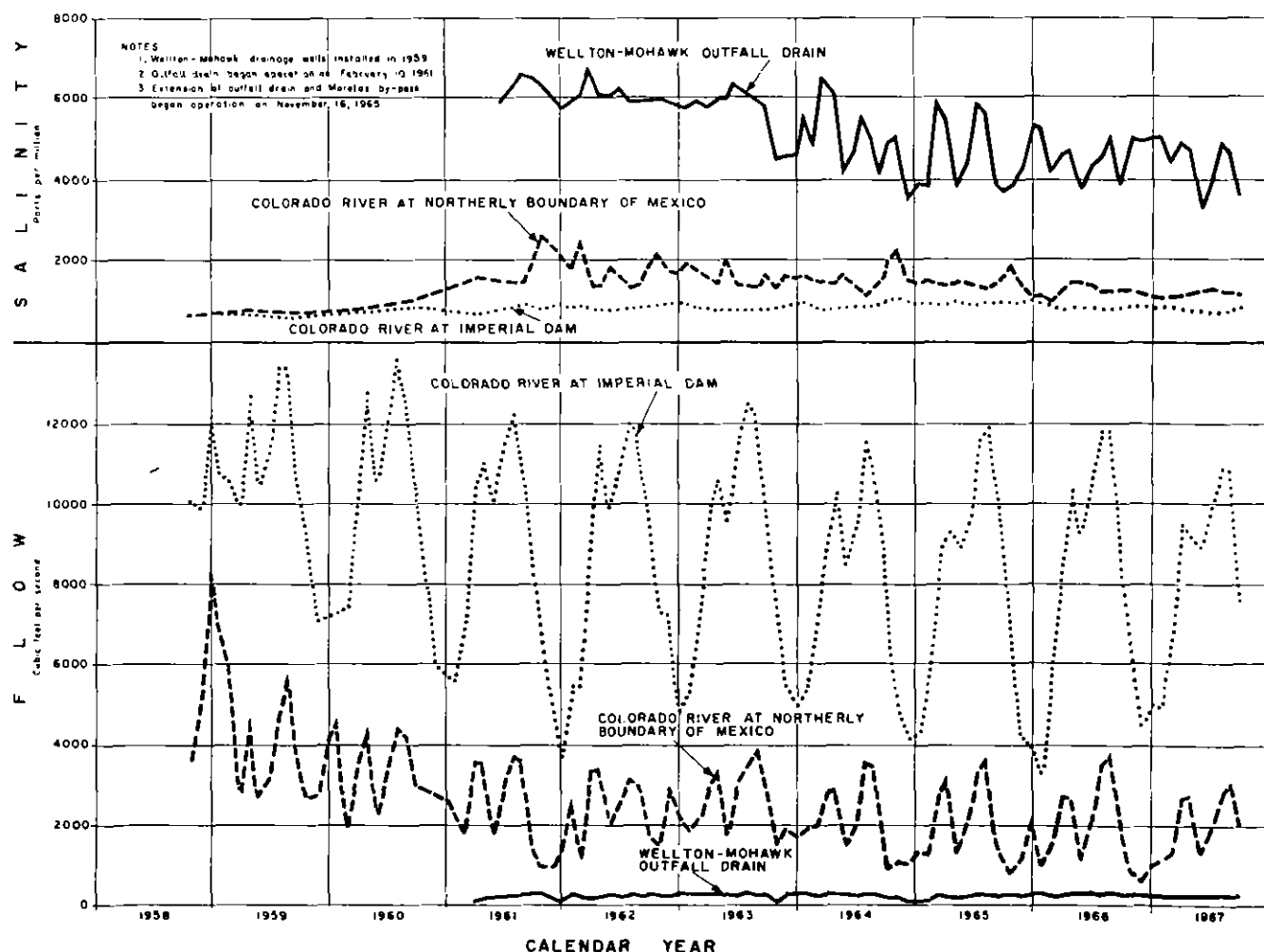
The daily average salinity of the Colorado River treaty deliveries to Mexico at the northerly boundary varied from 850 to 1400 ppm during the 1967 water year. The average salinity of the Wellton-Mohawk drainage waters in 1967 is estimated at 4600 ppm, which is about 100 ppm less than that of 1966. Plate 10 shows the salinity and flow of the Wellton-Mohawk drain, and of the Colorado River at Imperial Dam and at the northerly boundary of Mexico.

During the latter part of 1966, Mexico expressed concern about the increased pumping from the South Gila Valley and the program for new drainage wells in the Yuma area to discharge to the river. The groundwater regime in the Yuma area and the effects of pumping are being studied by means of an analog model by the U.S. Geological Survey at its laboratory in Phoenix, Arizona. The study, though not complete, tentatively indicates that the pumping in the United States will not materially affect groundwaters in Mexico.

It is reported that Mexico has made application for a loan from the World Bank for the purpose of rehabilitating the Mexicali Valley irrigation project. This application is being processed, and detailed planning is taking place. It is anticipated that construction will start in 1968.

PLATE 10

### SALINITY AND FLOWS NEAR INTERNATIONAL BOUNDARY



## RIVER MANAGEMENT

The Lower Colorado River management program of the United States Department of the Interior unavoidably arouses conflicts of interest between agencies with rights to Colorado River water for agricultural and urban use and agencies concerned with recreational, fish and wildlife uses of the river. Stated objectives of the river management program are to salvage water, stabilize banks and channel, control sedimentation, and to enhance recreation development and fish and wildlife resources.

In a water-short river these purposes are not wholly compatible, but the Bureau of Reclamation, in cooperation with the Bureau of Sports Fisheries and Wildlife, is attempting to achieve reasonable and realistic balance. In recognition of this attempt, the Colorado River Board has endorsed the Reclamation Bureau's river management program; so has the Department of Water Resources.

The Reclamation Bureau has adopted suggestions and made modifications in response to criticism of the fish and game departments of California and Arizona, but those agencies apparently feel obliged to urge additional changes, deferment or even cancellation of parts of the program.

In June, 1966 the Secretary of the Interior announced the establishment of a Colorado River Management Program Advisory Group, composed of representatives of the Department of the Interior, the states of Arizona and California, and water user organizations in each state. The purpose of the group as stated by Secretary Udall was "proposing some basic principles, guidelines, objectives and possible procedures for broadening the present concepts and objectives of the water salvage and channelization programs on the Lower Colorado River." California state representatives were the Chief Engineer of the Colorado River Board, the Administrator of the Resources Agency, and the Director of the Department of Fish and Game.

The Advisory Group met in Boulder City, Nevada on July 13-14, 1966. In general the water contractors in Arizona and California sup-

ported the proposed Interior Department program, and urged its implementation including the water salvage features.

The California Colorado River water contractors presented the following summary statement:

1. Were it not for the needs of the people of Southern California for water there would be no Colorado River as we have it today. Because of the great investments and debts assumed by these various California agencies it is obvious that the total conservation of the water of the Colorado River is of prime importance. It is highly important that this water be conserved because of its importance to the economy of the entire southwest. Full conservation of water, be the quantities great or small, is imperative in the Lower Basin of the Colorado River, and such practice has the complete support of the California Colorado River water contractors.

2. The following comments are made on each of the following named reports:

- (a) *In General*: Great care should be exercised in expanding, if any is deemed necessary, the recreational features recommended in the three reports. If such expansion is deemed necessary, the California Colorado River water contractors request the opportunity to review and comment upon such expansion. Each of the following named reports is endorsed, except as hereinafter indicated.

- (b) *Yuma Division Report*: The existing lakes referred to in this report should be reduced in size in harmony with the recommendations of the Arizona Game and Fish Department.

- (c) *Topock Gorge Division Report*: The major purpose of the work proposed in this report is to correct the sediment problems by establishing a workable grade of the Colorado River. This is most essential.

- (d) *Parker Division Report*: The program is too generous in its proposed use of water solely for recreational purposes. The program should be carefully reviewed to accomplish the purpose of River control.

Official comments on the draft reports of the Bureau of Reclamation on the river management programs for Topock Gorge, Parker and Yuma Divisions were transmitted by the Administrator of the California Resources Agency, Mr. Hugo Fisher, to the Regional Director of Region 3, Bureau of Reclamation on August 26, 1966. Mr. Fisher recommended that the plan presented in

the Topock Gorge report should not be implemented, and that the reports on the Yuma and Parker Divisions be re-submitted to the State after being revised to reflect the comments of the Department of Fish and Game and the Department of Parks and Recreation. Mr. Hugo Fisher made no mention of the fact that both the Colorado River Board and the Department of Water Resources had approved the proposed plans and favored construction as soon as possible.

At a Special Meeting on August 31, 1966 the Colorado River Board directed that protests be made to the Administrator of Resources and the Governor. The letter to the Administrator stated:

... "Your conclusions and recommendations in the letter of transmittal to the Regional Director and in the summary attached thereto are obviously incompatible with and ignore the position and views which have been expressed by the Board and the Department of Water Resources and the views of the California water contractors on the Colorado River, which were expressed at Boulder City, Nevada. These water contractors hold legal rights which cover substantially all the water supply that will be available to California from the river on a permanent basis. These agencies, the Board and the Department endorse the objectives and the program of the federal agencies and urge implementation of the program including the salvage of water incidental thereto. At the same time, they recognize the desirability of a fair balance among the various water needs along the river as nearly as balance can be achieved within the available water supply, including the needs of fish, wildlife and recreation. They credit the Bureau of Reclamation and the Bureau of Sport Fisheries and Wildlife with considerable achievement and perspective in this regard.

"No such recognition or credit is given in the official conclusions and recommendations of the state. They give the impression, contrary to reality, that the use of water for fish, wildlife and recreation is superior legally and morally to its use for irrigation, municipal and industrial purposes, and that the preservation and enhancement of fish and wildlife resources takes precedence over the need for efficient control and management of the river and its sediment load. Surely this position does not truly reflect the philosophy of the state as a whole, and certainly it is contrary to the position of the Colorado River Board, the Department of Water Resources, and the water contractors. . . ."

Each of the agencies represented on the Colorado River Board lodged a vigorous protest with the Administrator of Resources regarding the position he had taken on the river management

issue, and wrote a letter to the Secretary of the Interior supporting the program outlined in his three draft reports.

Such differences of opinion were left in the laps of the new state administration which took office in January, 1967, and have not been fully resolved. Meantime, however, the Bureau of Reclamation has continued construction of numerous phases of the program. Accomplishments include stabilization of 20 miles of river channel below Parker, Arizona, and of 19 miles in the Palo Verde Division. Substantial progress has been made in realigning and stabilizing the channel about 15 miles downstream from Blythe in the Cibola Division, where a large river oxbow has been cut off from the main channel but preserved for recreation. The final report of the Bureau on the Topock Gorge Division, dated August, 1967, proposes to carry out essentially the original plan, with some modification of the work program on an interim trial basis, to minimize spoil and disposal areas.

The Bureau is incorporating many wildlife and recreational features in all its plans, including reduction of sediment, improvement and freshening of several backwater areas, reduction of shoals hazardous to boating, maximum practical preservation of brush cover and care in the placing of spoil, to preserve and enhance scenic value. In June 1966 facilities were completed for optimum control of the water level in Topock Marsh, a prize fish and wildlife habitat.

Plate 11 shows the location of fish and wildlife features that have been completed, are under construction, or are planned by the Bureau of Reclamation.

The Board staff reviewed a report by the Lower Colorado River Land Use Office, dated July 9, 1966 and entitled "Recreational Aspects of Parker Division Channelization Plan, Lower Colorado River, Arizona-California."

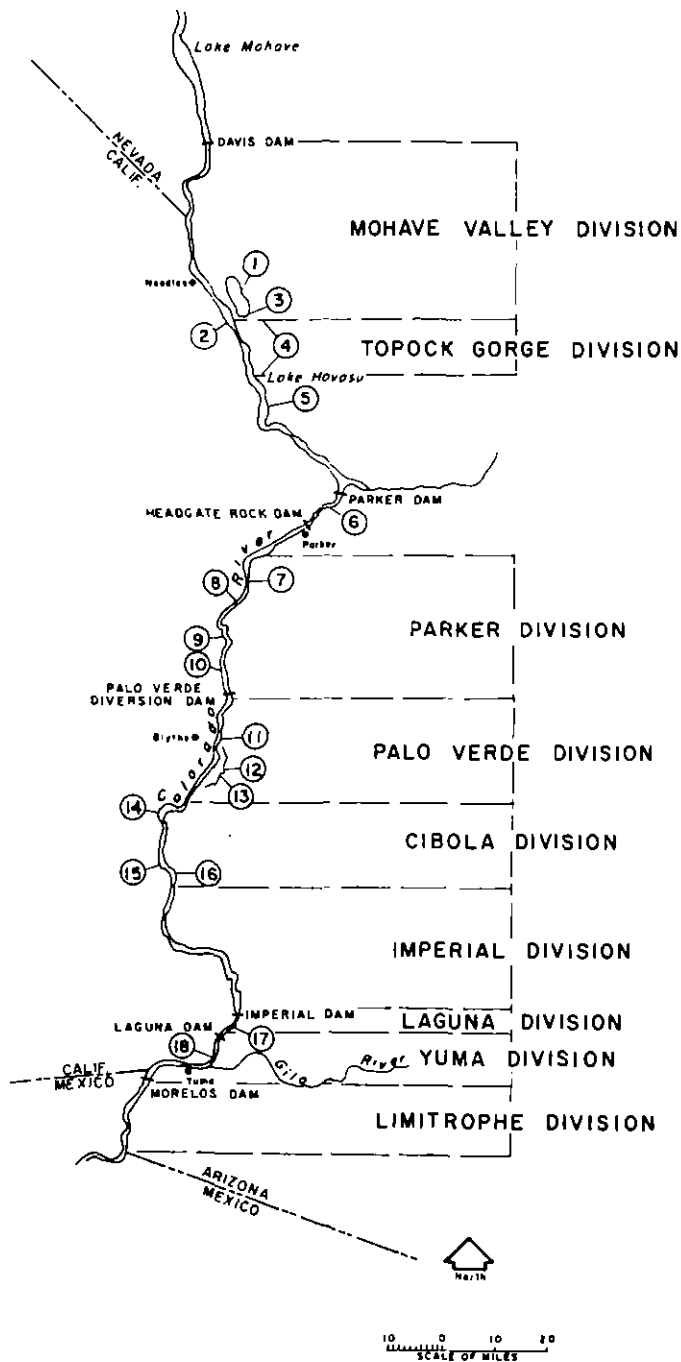
The report proposes measures to enhance the recreational, fish and wildlife uses along the California side of the 14-mile Quien Sabe area, which is a section of the 44-mile Parker Division. In its river management report on the entire Parker Division the Bureau of Reclamation proposes a reduction of about 1800 acres in water surface area, and improvement of 600 acres of backwater areas, of which only one body, 100 acres in extent, would be in the Quien Sabe reach. The Land Use Office on the other hand proposes retention and improvement of seven

# COLORADO RIVER MANAGEMENT PROJECTS

## FISH AND WILDLIFE AND RECREATION FEATURES OF LOWER COLORADO RIVER MANAGEMENT PROGRAM

Item numbers refer to the facilities enumerated on the map.

1. Dike, canal and control structures to stabilize and provide control of water surface in Topock Marsh (part of Havasu Lake National Wildlife Area). Status: Completed.
2. Navigation channels cleared and deepened in Park Moabi Marina Park. Inlet structure provides circulation of water. Status: Completed.
3. Day use facility for boater access to Topock Gorge. Status: Planning nearing completion.
4. Backwater areas in Topock Gorge to be deepened to preserve and assure their continued fishery value. Status: Planning nearing completion.
5. Removal of submerged trees which constitute a boating hazard on Lake Havasu. Status: Clearing requested by local residents and developers is complete. Reclamation also has a continuing program of removal of tree snags from other sections of the river where they constitute boating hazards.
6. Beach improvement and bank stabilization in Arizona's Red Rock Unit of the Colorado River State Park. Status: Complete.
7. Deer Island area. Bypassed channel to be dredged by USBR and developed by BSW as high quality lake for fishing and recreational use. Status: Channel cutoff complete. Improvement of lake being planned.
8. Small backwater areas to be preserved as fishery and recreation areas. Status: Construction complete. Maintenance to be provided as needed.
9. Four major cutoff channels to be dredged by Bureau of Reclamation and developed by BSW for fishing and recreation use. Status: Planning nearly complete.
10. Road and river access and recreation facilities to be constructed in the Quien Sabe area. Status: Planning nearing completion.
11. Blythe Marina Park. Reclamation participated in construction by improvement of boat basin and stabilization of adjacent river channel. Status: Reclamation work and first stage of county development complete.
12. Structures provided to circulate fresh water through backwater areas which resulted from channel stabilization. Status: Complete.
13. Backwater areas to be deepened to provide improved hunting and fishing. Status: Joint planning by state and Federal agencies is under way.
14. Oxbow Lake preserved. Water circulations and control structures, parking areas, and boat ramps. Status: All but one boat ramp complete.
15. Three Fingers Lake to be provided with waters circulating and control structures. Status: To be accomplished concurrently with channel stabilization in about two years.
16. Cibola Lake to be provided with water circulation and control structures. Status: To be accomplished concurrently with channel stabilization in two or three years.
17. Mitty Lake to be deepened and developed as fishing and recreation area. Status: Planning nearly complete.
18. Fish and wildlife management areas to be developed near Yuma in California. Status: Planning nearly complete.



backwater bodies totaling about 265 acres on only the west side of the Quien Sabe reach, a 165 percent increase over the Bureau's 100 acres.

The Board staff, in comments approved by the Board and transmitted through official channels, on December 13, 1966, pointed out that such a differential applied to both sides of the entire

Parker Division would substantially offset the proposed 1800-acre reduction in water surface and hence much of the estimated water salvage. The comments put the Board on record as opposed to any program that would retain greater backwater area in the Parker Division than the 600 acres proposed by the Reclamation Bureau.

## POWER

### Hoover Plant Operations

The principal objectives in the operation of Lake Mead are the conservation and regulation of water for consumptive uses, and flood control. Because of the effort to fill the Colorado River Storage Project Reservoirs, storage at Lake Mead has been relatively low in recent years, and releases at the Hoover Powerplant have been made only in the amounts required to meet downstream water requirements; the generation schedule at Hoover Powerplant for the power operating year ending May 31, 1967, was based upon this premise. At the Power Integration meeting of Hoover power allottees held on June 15, 1966, to program operation of Hoover Powerplant for 1966-67, total release for 1966-67 was estimated at 8,376,000 acre-feet, and Hoover energy deliveries to the allottees at 3.082 billion kilowatt-hours, which together with the estimated replacement energy for Hoover firm deficiency caused by initial filling of Upper Basin reservoirs would result in a total delivery of approximately 3.710 billion kilowatt-hours or about 91 percent of defined contract firm energy for the year ending May 31, 1967. The actual Hoover release during the year was 8,152,000 acre-feet and the total energy delivered to the Hoover power allottees was 3.670 billion kilowatt-hours. Of this total, Hoover generation plus Parker-Davis Interchange amounted to 2.963 billion kilowatt-hours and replacement energy amounted to 0.707 billion kilowatt-hours.

Releases from Hoover Dam and delivery of energy to Hoover power allottees for the past six years are shown on Table 8.

At the Power Integration meeting on June 29, 1967, attended by the Board's Principal Engineer, the Bureau of Reclamation estimated 1967-1968 Hoover release at 8,278,000 acre-feet. Delivery of energy to Hoover allottees was estimated at 3,661 million kilowatt-hours or 90.0 percent of defined firm energy.

### Lake Mead and Colorado River Storage Project Reservoirs

Power was generated at all Colorado River Storage Project plants throughout the 18-month

period covered by this report. Lake Mead remained above rated power head level and the Colorado River Storage Project reservoirs, except at Fontenelle on Green River, remained above minimum power operating levels throughout the 1965-66 and 1966-67 water years. Operating levels in Lake Mead and the Colorado River Storage Project reservoirs at the ends of the two water years are shown in Table 9.

The Glen Canyon Filling Criteria provide that the United States will recompense either in power or money any deficiency in firm energy generation at Hoover power plant caused by initial filling of Colorado River Storage Project reservoirs. The filling period is defined as the time interval from initial storage in Lake Powell (March 13, 1963) to the date when Lake Powell

Table 8  
RELEASES FROM HOOVER DAM AND ENERGY  
DELIVERED TO HOOVER POWER ALLOTTEES

Operating Year June 1-May 31	Releases from Hoover Dam (Acre-Feet)	Actual Power Generation at Hoover Dam (Millions of KWH)	Energy Delivered to Allottees* (Millions of KWH)
1961-62.....	8,200,000	3,157	3,151
1962-63.....	8,752,000	3,638	3,654
1963-64.....	8,548,000	3,167	3,649
1964-65.....	7,782,000	2,584	3,721
1965-66.....	7,658,000	2,708	3,661
1966-67.....	8,152,000	2,963	3,670

\* Includes Hoover generation, Parker-Davis Interchange of energy with Hoover and replacement energy for deficiency due to filling of CRSP reservoirs.

Table 9  
WATER SURFACE ELEVATIONS OF MAJOR  
COLORADO RIVER BASIN RESERVOIRS

	Elevation 9/30/66	Elevation 9/30/67 (Feet Above Sea Level)	Net Change During Year	Designated Minimum Power Operating Level	Storage Above Minimum Operating Level 9/30/67 (1000 A.F.)
Lake Mead	1127.6	1130.2	+2.6	1083	4351
Lake Powell	3529.5	3528.5	-1.0	3490	2234
Flaming Gorge...	6004.2	6012.3	+8.1	5871	2480
Blue Mesa	7425.3	7469.3	+44.0	7393	349
Fontenelle	6439.0	6435.0	-4.0	6485	-178

2131  
first attains elevation 3,700 feet (27.0 million acre-feet total storage) and Lake Mead is simultaneously at or above elevation 1,146 feet (17.0 million acre-feet available storage) or May 31, 1987, whichever occurs first.

Plate 12 shows the computed power generation at Hoover power plant and actual storage in Lake Mead as well as the computed power generation and storage absent the filling of the Colorado River Storage Project reservoirs. The 1966-67 energy deficiencies at Hoover power plant and the accumulated deficiency since Glen Canyon closure, are shown in Table 10.

Table 10  
FIRM ENERGY DEFICIENCY AT HOOVER POWER PLANT  
CAUSED BY FILLING OF CRSP RESERVOIRS  
(Millions of KW-Hrs)

	Computed Power Generation <sup>1</sup> Absent Filling of CRSP Reservoirs	Computed Power Generation <sup>1</sup> with Filling of CRSP Reservoirs	Total Computed Deficiency During Month <sup>2</sup>	Accumulated Deficiency
1966-67				
Accumulated Deficiency as of 9/30/66	--	--	--	2777
October—1966	292	193	99	2876
November....	286	196	90	2966
December....	297	186	111	3077
January—1967	294	208	86	3163
February....	271	239	32	3195
March.....	356	350	6	3201
April.....	364	318	46	3247
May.....	396	366	30	3277
June.....	361	322	39	3316
July.....	377	342	35	3351
August.....	351	311	40	3391
September...	329	205	124	3515

<sup>1</sup> Computed at 83 percent efficiency in accordance with filling criteria for Lake Powell adopted April 4, 1962.

<sup>2</sup> Delivery of deficiency energy to Hoover Allottees may follow a different schedule.

<sup>3</sup> Includes 200 million kilowatt hours of "impairment" energy.

## Marble Canyon Project

The Congressional moratorium on the granting of licenses by the Federal Power Commission for construction of power projects on Colorado River expired on December 31, 1966. On December 27, 1966, the Arizona Power Authority filed a motion requesting the Federal Power Commission to consider and determine the issues regarding the Marble Canyon Project and to immediately issue a license authorizing Arizona to construct and operate the project. The Sierra Club filed a petition for leave to intervene and become a party to the proceedings.

The California intervenors, including the State acting through the Colorado River Board, responded in opposition to the motion by Arizona, by filing on January 9, 1967, an "Answer of the California Intervenors to the Arizona Power Authority Motion for Commission License and Order Issuing License," and a "Motion of the California Intervenors That the Commission Suspend Action on the Application of the Arizona Power Authority for a License on the Marble Canyon Project, No. 2248, Until the Close of the 90th Congress."

The California intervenors also filed a motion in support of the Sierra Club's motion to intervene in the proceedings and to present evidence and testimony as required.

Several bills were introduced in the Congress to extend the moratorium on the issuance of licenses by the Federal Power Commission on the Lower Colorado River for power developments. No action has been taken on them. Bills pending to authorize the Colorado River Basin Project and initiate a regional program to augment the river contain a proviso which in effect would extend the moratorium until the Congress removes it.



# EFFECT ON LAKE MEAD CONTENT AND HOOVER ENERGY GENERATION DUE TO INITIAL FILLING OF "CRSP" RESERVOIRS

