No. 8 Orig.

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In the Supreme Court of the United States

OCTOBER TERM, 1960

STATE OF ARIZONA, COMPLAINANT

v.

STATE OF CALIFORNIA, PALO VERDE IRRIGATION DISTRICT, IMPERIAL IRRIGATION DISTRICT, COACHELLA VALLEY COUNTY WATER DISTRICT, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, CITY OF LOS ANGELES, CALIFORNIA, CITY OF SAN DIEGO, CALIFORNIA, AND COUNTY OF SAN DIEGO, CALIFORNIA, DEFENDANTS

THE UNITED STATES OF AMERICA AND STATE OF NEVADA, INTERVENERS

STATE OF UTAH AND STATE OF NEW MEXICO, IMPLEADED DEFENDANTS

Simon H. Rifkind, *Special Master*

REPORT

December 5, 1960

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PART ONE

PART ONE

I. Introductory Statement of the Case

The record of this action is another chapter in the long history of controversy relating to the Colorado River. Suit was initiated by Arizona on August 13, 1952, by filing a motion for leave to file a bill of complaint against the State of California and seven public agencies of the State.[1] On January 19, 1953, the motion, unopposed, was granted.[2]

The complaint invoked the original jurisdiction of the Court under Article III, Section 2, Clause 2 of the Constitution. It alleged that pursuant to the Colorado River Compact[3] and the Boulder Canyon Project Act[4] Arizona was entitled annually to a certain quantity of water from the Colorado River System. It further alleged that various claims asserted by the defendants adversely affected the rights asserted by Arizona and that unless and until such rights were confirmed various existing projects in Arizona could not be operated at present levels and prospective projects could not be financed and constructed. Arizona requested, *inter alia,* that her title to the annual beneficial consumptive use of 3,800,000 acre-feet[5] of water of the Colorado River System be forever confirmed, that title of the State of California to the annual beneficial consumptive use of Colorado River System water be forever fixed at and

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[1]Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, the Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego and County of San Diego.

[2]344 U. S. 919 (1953).

[3]For the complete text of the Compact see Appendix 2.

[4]45 Stat. 1057 (1928). For the complete text of the Project Act see Appendix 3.

[5]An acre-foot of water is water sufficient to cover an acre of land to a depth of one foot. It is approximately 325,850 gallons. Ariz. Ex. 1000, p. 17 (Pre-Trial Order).

limited to 4,400,000 acre-feet, and that the defendants be forever enjoined from asserting claims inconsistent with Arizona's title so confirmed.

California answered, denying some of the allegations, and pleading several affirmative defenses. The United States, pursuant to leave granted, intervened.[5a] Nevada too obtained leave to intervene.[6]

After pleadings were exchanged among the parties, the Court, on June 1, 1954, appointed George I. Haight, Esq., of Chicago, Illinois, as Special Master. The Order directed him to find the facts specially and state separately his conclusions of law thereon, and to submit them to the Court together with a draft of a recommended decree.[7]

Thereafter, California moved to have Colorado, New Mexico, Utah and Wyoming joined as necessary parties. The Court, following receipt of a report from the Special Master pursuant to a reference,[8] denied the motion to join Colorado and Wyoming and granted the motion to join Utah and New Mexico only to the extent of their capacity as Lower Basin states.[9]

Thereupon, Utah filed a pleading called a "Complaint and Answer" and New Mexico filed an "Appearance and Statement." The last pleading herein was filed by Nevada on March 19, 1956. On August 13, 1958, Arizona offered amended pleadings. A detailed catalogue of all the pleadings and preliminary motions is set forth in Appendix 1.

On October 10, 1955, the undersigned was appointed Special Master *vice* George I. Haight, deceased, with instructions to proceed under the original order of reference.[10]

After pre-trial conferences a pre-trial order was entered by the Special Master, on the stipulation and consent of all

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[5a] 344 U. S. 919 (1953).
[6] 347 U. S. 985 (1954).
[7] 347 U. S. 986 (1954).
[8] 348 U. S. 947 (1955).
[9] 350 U. S. 114 (1955), *rehearing denied,* 350 U. S. 955 (1956).
[10] 350 U. S. 812 (1955).

the parties, which regulated the proceedings in several particulars. On June 14, 1956, in the United States Courthouse at San Francisco, California, the trial was begun.

In the course thereof, 106 witnesses were heard. The transcript of their testimony occupies about 22,500 pages. Thousands of exhibits were received in evidence. In addition, during a recess, depositions were taken at Silver City, New Mexico and at Reserve, New Mexico, at which 234 witnesses were heard. The deposition transcripts consist of 3,742 pages.

The trial was concluded on August 28, 1958. Thereafter, briefs, reply briefs and rebuttal briefs were exchanged among the parties, together with proposed findings of fact and conclusions of law.[11] On July 1, 1959, the matter was finally submitted for consideration.

As the action progressed it became clear that the pleadings were of little use in formulating the issues to be tried. Seeking to define the controversies among the parties more sharply, I requested them to file Statements of Position to clarify their respective contentions. While these were of some assistance, it is fair to say that many of the issues for decision did not emerge until final briefs were submitted.

On May 5, 1960, a Draft Report was circulated among the parties pursuant to the pre-trial order. All of the parties except Utah submitted comments on the Draft Report,[11a] and some replies to these comments were received. On motion by California, three days of oral argument were held in New York City on the Draft Report and the recommended decree. California also made several motions to

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[11]Proposed findings and conclusions and brief materials were received as follows: from Arizona 426 pages; California 2,179 pages; Nevada 394 pages; New Mexico 356 pages; United States 471 pages; Utah 36 pages—a total of 3,862 pages.

[11a]Comments on the Draft Report were received as follows: from Arizona 26 pages; California 144 pages; Nevada 26 pages; New Mexico 41 pages; United States 18 pages; Metropolitan Water District 17 pages—a total of 272 pages.

re-open the trial and take additional evidence; these motions have been denied. New Mexico moved to re-open the trial and take additional evidence on the present use of water from the Gila River System; this motion has since become moot.

As ultimately submitted, the action really presents a number of different but related controversies among the parties. First, there is the mainstream controversy, involving as parties Arizona, California and Nevada. Arizona claims the right to use 2.8 million acre-feet of water in the Colorado River plus half of "surplus." This claim is based on what Arizona conceives to be a mandatory division of water made by Congress in the second paragraph of Section 4(a) of the Boulder Canyon Project Act. Existing projects in Arizona consume somewhat less than half of this amount of water. Arizona expects to use most of the presently uncommitted water which she claims for a new project, called the Central Arizona Project, to provide water for irrigation in a large portion of central Arizona.

California, on the other hand, claims that existing mainstream projects exhaust the safe annual yield (*i.e.*, the dependable supply) of water in the Colorado River and that, accordingly, there is no supply available for new projects in Arizona.

California argues for an allocation to Arizona of approximately 3 million acre-feet of water from all sources in the Lower Basin, both mainstream and tributaries. Under California's method of system-wide accounting, Arizona's share of the total Lower Basin apportionment would be in large part exhausted by her uses on the Gila River System, and California would be free to use most of the water available in the mainstream.

Perhaps the most crucial issue in the case arises from these conflicting views, an issue that is summarized by this

question: Is the application of the Project Act limited to the mainstream of the Colorado River or does it apply to the entire River System in the Lower Basin, that is to both mainstream and tributaries? Other important questions are at issue between the two states, such as the interpretation, operative effect and validity of several sections of the Colorado River Compact, the Boulder Canyon Project Act and the water delivery contract between the United States and Arizona. At issue also is the effectiveness of Arizona's purported ratification of the Compact and the applicability of principles such as priority of appropriation and equitable apportionment.

Nevada, the other state which utilizes water from the mainstream, takes still a third approach. She does not regard the Project Act or the water delivery contracts made by the Secretary of the Interior as controlling rights to water. Rather, she views this action as a traditional suit for an equitable apportionment, in which she claims the right to approximately 500,000 acre-feet of water, based on needs projected to the year 2000.

A second major controversy involves claims to tributary water by the states in which diversions from the tributaries occur. The important tributaries involved in this controversy are:

(1) The Gila River System, over which New Mexico and Arizona are in conflict;

(2) The Little Colorado River System, contested by the same two states; and

(3) The Virgin River System, the waters of which are claimed by Utah, Arizona and Nevada.

As to all three stream systems, the upstream states pray for "confirmation" of existing uses and an apportionment of water to be reserved for future uses.

Another major controversy involves a dispute between mainstream and tributary states over water in the tributaries. The genesis of the conflict lies, of course, in the fact that uses on the tributaries diminish the mainstream supply.

Superimposed on all of these interstate controversies are the claims of the United States as against all of the states. The United States claims power to regulate and control the uses of Colorado River water pursuant to the Project Act and by reason of its ownership and control of Hoover Dam and the mainstream works below. The United States also claims that it has reserved the use of water for the benefit of some 25 Indian Reservations and dozens of other federal establishments located throughout the 132,000 square miles of the Lower Basin.

This summary description of the various controversies involved in this case indicates that the action is far from being the traditional equitable apportionment suit in which the Court is called upon to apportion water in a single river among two or three states. Nor is it comparable to other interstate litigation in the original jurisdiction that presents for decision a single, relatively narrow issue, such as the proper location of a boundary.[12] On the contrary, this action is a complex of interstate lawsuits, the resolution of which depends upon the interpretation and application of the Federal Constitution, treaties, statutes, contracts and decisional law, as well as a variety of state law. Its determination will inevitably have a profound effect upon a great and rapidly developing territory, considerably larger in area and population than many nations, and containing political subdivisions therein as diverse and distant as Phoenix and Los Angeles or Las Vegas and the Imperial Valley.

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[12]In passing, it might be noticed that two of the minor issues in this case are raised by boundary disputes.

II. Prior Litigation

The present case is the fifth interstate suit affecting the Colorado River, although it is the first in which evidence has been taken. The four prior suits were as follows:

(1) On October 13, 1930, Arizona instituted an action against the Secretary of the Interior and the States of California, Colorado, Nevada, New Mexico, Utah and Wyoming to enjoin construction of Hoover Dam and the All-American Canal as well as to enjoin performance of contracts for the delivery of stored water. In addition, the bill of complaint sought to have the Boulder Canyon Project Act and the Colorado River Compact declared unconstitutional. The Court, per Mr. Justice Brandeis, held, *inter alia,* that the Compact and Project Act were constitutional, that the River is a navigable stream and that the Secretary could construct the dam authorized by Section 1 of the Project Act. The bill was dismissed without prejudice to a future action for relief in the event that the dam was so operated as to interfere with Arizona's rights.[13]

(2) On February 14, 1934, Arizona moved for leave to file a bill to perpetuate the testimony of the negotiators of the Colorado River Compact. The parties named were the other six states of the Colorado River Basin, the California public agencies which are defendants in the present action and the Secretary of the Interior. A unanimous Court, speaking through Mr. Justice Brandeis, denied the application.[14] One of the alternate grounds for decision was the incompetence of the evidence sought to be perpetuated. It was held that oral statements of negotiators of a treaty or compact not communicated to the ratifying body were not admissible to establish meaning.[15]

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[13]Arizona v. California, 283 U. S. 423 (1931).
[14]Arizona v. California, 292 U. S. 341 (1934).
[15]292 U. S., at 359-360.

(3) On January 14, 1935, the United States sued to enjoin Arizona's interference with construction of Parker Dam, Arizona having threatened to use military force to prevent work on the dam. The Court, per Mr. Justice Butler, dismissed the complaint on the ground that there was no showing that the Secretary of the Interior was authorized to construct the dam.[16] Subsequently, Congress, by Act of August 30, 1935, specifically authorized erection of Parker Dam for the purpose, *inter alia,* of improving navigation.[17]

(4) In November 1935, Arizona filed a petition for leave to file a bill of complaint against California, Colorado, Nevada, New Mexico, Utah and Wyoming praying for a judicial apportionment of the unappropriated water of the Colorado River. The Court, per Mr. Justice Stone, denied the petition on the ground that the United States was an indispensable party.[18] Specifically left undecided was the question whether an equitable division of the unappropriated water of the River could be decreed in a suit in which the United States was a party.[19]

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[16]United States v. Arizona, 295 U. S. 174 (1935).
[17]49 Stat. 1039.
[18]Arizona v. California, 298 U. S. 558 (1936).
[19]298 U. S., at 572.

III. Geography of the Colorado River Basin

The Colorado River is a stream of continental proportions. From its headwaters in the high peaks of north central Colorado to its mouth in the Gulf of California it runs a course of approximately 1,300 miles. During its journey to the sea it travels within or on the boundaries of five states and one foreign nation, as follows: through western Colorado, 245 miles; across Utah, 285 miles; through Arizona, 295 miles; on the Arizona-Nevada boundary, 145 miles; on the Arizona-California boundary, 235 miles; on the Arizona-Mexico boundary, 16-20 miles; and within Mexico, 75 miles.[20]

Within the United States the River System drains an area of 242,000 square miles or one-twelfth of the continental United States exclusive of Alaska. This drainage basin is approximately 900 miles long and varies in width from about 300 miles in the northerly section to about 500 miles in the southerly section. It is bounded on the north and east by the Continental Divide, on the west by the Wasatch Range and other divides, and by minor divides on the south and southwest. Within this drainage basin are portions of Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada and California.[21]

The following table shows the relationship of each of these states to the Basin.[22]

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[20]Ariz. Ex. 1000, p. 9.
[21]Ariz. Ex. 1000, p. 7.
[22]Ariz. Ex. 1000, p. 8.

State	State's Total Square Miles	Square Miles Within Drainage Basin	Per cent of State's Total Area in Drainage Basin	Per cent of Drainage Basin in State	State's Square Miles in Lower Basin Drainage Area	Per cent of State's Total Area in Lower Basin Drainage Area	Per cent of Lower Basin Drainage Area in State
Arizona	113,909	107,242	94.1	44.3	100,306	88.5	75.8
California	158,693	3,599	2.3	1.5	3,599	2.3	2.7
Nevada	110,540	13,922	12.6	5.8	13,922	12.6	10.5
New Mexico	121,666	20,538	16.9	8.5	10,892	9.0	8.2
Utah	84,916	40,824	48.1	16.9	3,659	4.3	2.8
Colorado	104,247	38,501	36.9	15.9	none	none	none
Wyoming	97,914	17,210	17.6	7.1	none	none	none

Major tributary systems exist in every Basin state except California. The most important of these systems are: the Green in Utah, Colorado and Wyoming; the Gunnison in Colorado; the Dolores in Colorado and Utah; the San Juan in Utah, Colorado, New Mexico and Arizona; Johnson and Kanab Creeks in Utah and Arizona; the Little Colorado in Arizona and New Mexico; the Bill Williams in Arizona; the Gila in Arizona and New Mexico; and the Virgin in Nevada, Utah and Arizona. Of these, Johnson and Kanab Creeks, the Little Colorado, the Bill Williams, the Gila and the Virgin are within the Lower Basin of the Colorado River.[23] The Little Colorado River, which drains 26,930 square miles, Kanab Creek, which drains 2,200 square miles, and the Virgin River, which drains 11,000 square miles, all flow into the main Colorado River above Hoover Dam.[24] Both the Bill Williams, which drains 5,400 square miles, and the Gila, which drains 57,800 square miles, flow into the River below Hoover Dam.[25]

A canyon section, approximately 1,000 miles long in southern Utah and northern Arizona permits a convenient division of the Basin into two parts, an Upper Basin and a Lower Basin. The Colorado River Compact defines the Upper Basin as the parts of the Basin "within and from which waters naturally drain into the Colorado River System above Lee Ferry," and the Lower Basin as that part of the Basin "within and from which waters naturally drain into the Colorado River System below Lee Ferry." Lee Ferry is defined as a point on the mainstream of the Colorado River one mile below the mouth of the Paria River.[26]

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[23]Ariz. Ex. 1000, p. 9.
[24]Ariz. Ex. 1000, p. 11.
[25]Ariz. Ex. 1000, pp. 11-12.
[26]Colorado River Compact, Art. II.

The Upper Basin is comprised largely of the Great Colorado Plateau, a region of high elevations, high mountains and narrow valleys.[27] The Lower Basin is comprised primarily of basin and range province, a region of lower elevations, containing a series of northwest trending mountain ranges, intervening basins and desert.[28] The natural geographic dividing line between the plateau province and the basin and range province is the Mogollon Rim, a series of escarpments running from the head of Lake Mead in an easterly direction to the Continental Divide.[29] Lee Ferry is located in an area where the great cliffs of the upper plateau begin to spread out and where erosion from the Paria River has tended to level the topography.[30] From Lee Ferry to Hoover Dam, the Lower Basin is characterized by canyons, cliffs and deep gorges cut by the River. From Hoover Dam south, elevations decline, and the River runs into desert areas. On the west side of the River, the terrain remains rough and a chain of rocky desert mountains extends from the Dam to the international border.[31] Intermittent flat areas occur, suitable for habitation and agriculture.[32] One of these is the Palo Verde Valley,[33] which is 30 miles long and 5 to 8 miles wide, and in which is located the defendant Palo Verde Irrigation District.[34] On the east side of the River lies the basin and range province, the basins or valleys of which are suitable for habitation and agriculture if water is available.

West of the River and north of the international boundary, in the State of California, lies the Salton Basin. The

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[27]Ariz. Ex. 45—The Fall-Davis Report, p. 2.
[28]Tr. 1218 (Turner).
[29]Tr. 1209-1210 (Turner).
[30]Tr. 563-564 (Akin).
[31]Tr. 626 (Akin).
[32]Tr. 634 (Akin).
[33]*Ibid.*
[34]Tr. 6483-6484 (Dowd)

drainage area of this great basin is 7,500 square miles, 1,000 of which are in Mexico.[35] While not part of the natural drainage area of the Colorado River, this basin is proximate thereto and parts of it are irrigated therefrom. The Salton Basin is a great saucer-like depression with elevations near sea level at its outer rim and dropping below sea level towards the center.[36] The low point of the Basin is 273½ feet below sea level,[37] and the lowest portion of the Basin, now filled with water, is called the Salton Sea.[38] In 1956 the water level in the Sea was approximately 234 feet below sea level.[39] The Salton Basin is separated on the east from the Colorado River and Basin by a chain of desert mountains and sand hills running to the international border. The southernmost range is called the Chocolate Mountains. Within the Salton Basin, the natural drainage is into the Salton Sea.[40]

In both the Lower and Upper Basins, because of the prevailing arid and semi-arid conditions, most kinds of agriculture can be successfully practiced only by means of irrigation.[41] However, there are significant geographical and climatic contrasts between the two Basins. Above the canyon section the Colorado River Basin lies at relatively high elevations in contrast to the comparatively low elevations below the canyon section. Thus, in the Upper Basin the growing season is relatively short, 90-120 days; in the Lower Basin the growing season is much longer, lasting in many places throughout the year.[42] The extreme aridity of climate and the long growing season in the Lower Basin

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[35]Tr. 6461, 6468, 7411 (Dowd).
[36]Tr. 627-628 (Akin).
[37]Tr. 6444, 6469, 7410 (Dowd).
[38]Tr. 628 (Akin).
[39]Calif. Ex. 246.
[40]Tr. 626-629 (Akin).
[41]Ariz. Ex. 1000, p. 15.
[42]*Ibid.*, Tr. 570 (Akin).

make the annual water consumption per irrigated acre relatively high. Throughout the Basin, considerable quantities of water are lost by evaporation and transpiration but these losses are greater in the Lower Basin than in the Upper.[43]

The geology of portions of the Lower Basin may be briefly described. Within the range and basin province are found groundwater basins, which are merely valleys between the ranges of mountains. Over a period of time these valleys, which are rock-walled and rock-bottomed, were filled with alluvial fill washed in from surrounding mountains and carried in by streams. The alluvium formed strata capable of holding water. Most of the basins were subject to downfaulting so that one end of the basin is lower than the other. Underground water therefore flows from the upper end to the lower end, and out of the basin, except in the case of closed basins in which the lower end is sealed off. Some water remains in the strata in the upper end of basins, held there between sand grains by capillary attraction, and water is added by recharge. The quality of the ground water in various basins differs materially.[44]

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[43]Ariz. Ex. 1000, p. 15.
[44]Tr. 1216-1222 (Turner).

IV. History of the Colorado River

In large portions of the Lower Basin true desert conditions prevail and, without the resources of the Colorado River System, human life could not be maintained in these areas. Certainly settled habitation would become impossible. There is archaeological evidence that some 2,000 years ago irrigation canals were built and maintained by the ancient Hohokam tribe in the Salt River Valley in the vicinity of present-day Phoenix, Arizona. Indians practiced irrigation in this vicinity before and during the period of exploration of this region of the southwest by white men.[45]

The region of California in which large scale use of the Colorado River for irrigation purposes was first made was the Imperial Valley, located in the Salton Basin, just west of the Colorado River at the international boundary, and outside the natural drainage basin of the River. In 1876 the Bergland Survey was made to ascertain the feasibility of irrigating the Valley by diversions from the Colorado River.[46] Water was first brought into the valley by the California Development Company [hereinafter C. D. C.], a New Jersey corporation formed in 1896 by C. R. Rockwood and his associates.[47] Because it was found that a canal would have to traverse Mexican territory in order to irrigate the Valley with River water, *La Sociedad de Irrigacion y Terrenos de la Baja California, S. A.* [hereinafter *La Sociedad*], a Mexican corporation, was formed to hold title to the land, canal and works in Mexico. The stock of *La Sociedad* was held by the directors of C. D. C.[48] 1901 saw

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[45]Tr. 448-449, 2845-2846 (Ewing) (Turner).

[46]Tr. 6516, 6529 (Dowd).

[47]Title Ins. and Trust Co. v. California Development Co., 171 Cal. 173, 179-180, 152 Pac. 542, 545 (1915).

[48]171 Cal., at 180-181, 152 Pac., at 546.

the first Colorado River water brought to the Imperial Valley.[49]

Today it is perfectly clear that the viability of numerous communities in the Lower Basin is conditioned on and limited by the availability of Colorado River System waters.

It is thus manifest that in the Lower Basin the water of the Colorado River System is "more than an amenity"; it is more than a "treasure."[50] It is indispensable to life; no substitute for it has yet been invented or envisaged. Even under ordinary circumstances it is natural that grave conflicts should develop over the rationing of such a precious supply. But the circumstances of the past quarter century have not been ordinary. They were such as to intensify the competition for water by every class of demand. The southwest has witnessed an explosive growth of population and industry, accompanied by a sharp rise in every index of prosperity as the accompanying tables indicate.

POPULATION GROWTH[51]

State	1945	1955	Growth	Per Cent Gain
Arizona	594,000	980,000	386,000	65.0%
California	9,344,000	13,032,000	3,688,000	39.5%
Nevada	149,000	225,000	76,000	51.0%

GROWTH OF MANUFACTURING EMPLOYMENT[52]

State	1945	1955	Growth	Per Cent Gain
Arizona	11,200	32,700	22,500	192.0%
California	636,000	1,113,700	477,700	75.1%
Nevada	2,700	5,900	3,200	118.5%

GROWTH OF NON-FERROUS METALS OUTPUT[53]

State	1945	1955	Growth	Per Cent Gain
Arizona	$ 95,963,006	$ 351,631,254	$ 255,668,248	266.4%
California	11,152,081	13,882,100	2,730,019	24.5%
Nevada	24,186,294	62,436,160	38,249,866	158.1%

[49]Tr. 7381 (Dowd).
[50]See New Jersey v. New York, 283 U. S. 336, 342 (1931).
[51]Source: Ariz. Ex. 134; Calif. Ex. 528.
[52]Source: Ariz. Ex. 134; Calif. Ex. 528.
[53]Source: Ariz. Ex. 134; Calif. Ex. 528.

GROWTH OF PERSONAL INCOME[54]

State	1945	1955	Growth	Per Cent Gain
Arizona	$ 654,000,000	$ 1,468,000,000	$ 814,000,000	124.5%
California	15,194,000,000	27,026,000,000	11,832,000,000	77.8%
Nevada	233,000,000	507,000,000	274,000,000	117.6%

GROWTH OF BANK DEPOSITS[55]

State	1945	1955	Growth	Per Cent Gain
Arizona	$ 372,721,000	$ 762,799,000	$ 390,078,000	104.7%
California	13,255,770,000	19,532,281,000	6,276,511,000	47.3%
Nevada	156,368,000	290,622,000	134,254,000	85.9%

It is universally recognized that this rapid development is pressing hard against the ceilings imposed by the availability of water from the Colorado River System.

This circumstance united with another to accentuate the intensity of the competition for this life-giving water. Since 1930 the Colorado River has been in drought. Whether this drought cycle has come to an end has been a subject of some debate. It is noteworthy that since 1922 estimates of the Colorado River's capacity have steadily been revised downward.[56]

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[54]Source: Ariz. Ex. 134; Calif. Ex. 528.

[55]Source: Ariz. Ex. 134; Calif. Ex. 528.

[56]*Compare* Herbert Hoover's estimate that it would take 75 years before the Compact apportionment of 16,000,000 acre-feet would be fully appropriated (Special Master's Ex. No. 4, The Hoover Dam Documents, appendix 205, p. A32) *with* the following: (1) the Compact negotiators assumed a System supply of approximately 21 million acre-feet (*Id.*, at p. A36); (2) in Arizona v. California, 283 U. S. 423 (1931), the Arizona complaint indicated a total River supply of 18 million acre-feet; (3) in Arizona v. California, 298 U. S. 558 (1936), Arizona's complaint alleged an average annual undepleted flow at Imperial Dam of 16,840,000 acre-feet and further alleged that at that time 9,720,000 acre-feet were still unappropriated; and (4) in the present litigation, both Arizona and California have agreed that the average annual undepleted or virgin flow of the Colorado River at Lee Ferry is approximately 15,200,000 acre-feet. (Ariz. Ex. 366; Calif. Proposed Finding 5C:102)

A shrinking supply accompanied by an increasing demand have thus conspired to generate a very bitter law suit indeed.

A few brief remarks should now be made about the behavior of the River itself. It has not been well behaved. Its flows have been uneven and unpredictable, varying in historic times from a recorded flow measured at Lee Ferry of 4,396,400 acre-feet in 1934 to 22,003,000 acre-feet in 1907.[57] Before it was harnessed the River was given to violent floods causing great damage. It did not always stay on course.[58] Approximately 500 years ago most of the Salton Basin was filled with water from the Colorado River in one of its many breaks to the west. The body of water so formed was known as Lake Cahuilla. The River then broke east and emptied into the Gulf of California. Thus deprived of its source of replenishment Lake Cahuilla dried up, leaving great areas of silt deposit. At its largest the lake was 30 to 35 miles wide, 110 miles long, 300 feet deep and covered 1,400,000 acres.[59]

In 1905, following floods on the Colorado and Gila Rivers, the River again abandoned its bed and course to the Gulf of California and made its way swiftly over a steeper grade to the Salton Sink in Southern California threatening the whole Imperial Valley with destruction.[60] This disaster followed certain changes made in the diversion points of the C. D. C.[61] The break was closed temporarily in November, 1906, but in December the River broke loose again, causing additional flooding of the Valley.[62] Serious

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[57]Ariz. Exs. 77B, table A; 197, p. 56; Calif. Ex. 5582A. See also p. 117, *infra*.

[58]Tr. 8685-8689 (Seeley); Ariz. Ex. 45, pp. 8-9.

[59]Tr. 6449-6501 (Dowd).

[60]Ariz. Ex. 45, p. 72.

[61]*Ibid.;* Title Ins. and Trust Co. v. California Development Co., 171 Cal. 173, 181-82, 152 Pac. 542, 546 (1915).

[62]Tr. 7396-7397 (Dowd); Ariz. Ex. 45, p. 73.

damage to the Mexican canal and works was sustained. The western portion of the Imperial Valley was threatened with destruction. Through funds, equipment, labor and materials supplied by the Southern Pacific Railroad Company, whose tracks were in danger, the break was closed and the flow of the River re-diverted to the Gulf of California.[63] Remaining behind, in the Salton Basin, was the Salton Sea.

The C. D. C., in addition to becoming heavily indebted to the Southern Pacific as a result of the 1906 floods, was also obligated to the Title Insurance and Trust Company for money loaned in 1900 to finance construction of irrigation works and secured by a deed of trust on all C. D. C. property.[64] Moreover, the New Liverpool Salt Company, which in the late 1890's had established a salt works on the north end of the Salton Sink,[65] recovered a substantial judgment for the negligent destruction of its works.[66] Subsequently, the Mexican property of C. D. C. was sold at an execution sale pursuant to a judgment obtained by the Southern Pacific. The purchaser at the execution sale was *La Compania de Terrenos y Aquas de la Baja California, S. A.*, a Mexican corporation formed by the Railroad specifically for this purpose.[67] Thereafter, when the Title Insurance and Trust Company sought to foreclose its lien, the assets of C. D. C. were sold by the receiver, W. H. Holabird,[68] to the Southern Pacific and the claims of prior creditors were paid off.[69]

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[63]Tr. 7396-7404 (Dowd).

[64]Title Ins. and Trust Co. v. California Development Co., 171 Cal. 173, 181, 152 Pac. 542, 546 (1915).

[65]Tr. 6506 (Dowd).

[66]Title Ins. and Trust Co. v. California Development Co., 171 Cal. 173, 182, 152 Pac. 542, 546 (1915).

[67]171 Cal. at 183, 152 Pac. at 546.

[68]Tr. 7418.

[69]Calif. Ex. 149.

In 1911 the Imperial Irrigation District was formed to acquire the assets formerly held by C. D. C. and in 1916 all such assets were purchased from the Southern Pacific, except Mexican agricultural lands.[70]

The River broke westward again in 1909. Over a period of years thereafter, a system of levees was erected within Mexico which was paid for by landowners in the Imperial Valley through the Imperial Irrigation District, and by the United States. Approximately six million dollars were spent.[71] A highly qualified witness expressed the opinion that if these efforts to control the River had not been made it would have broken permanently into the Salton Basin.[72]

In another respect was the River ill behaved. It carried vast quantities of silt, estimated as being proportionately 17 times that of the Mississippi River.[73] The silt was brought down from the highlands and deposited on the irrigated lands below, clogging canals and works.

Considering the vast drainage area, the supply of water brought down into the Lower Basin is less than might be expected. The loss of water is explained by the very high rate of evaporation and by heavy channel losses on both the mainstream and tributaries as these waters traverse the hot desert lands of the Lower Basin.[74]

The erratic flows of the River, its propensity to violent and destructive floods, its high silt content, the desire for a gravity canal located wholly on American soil to serve the Imperial Valley, and other factors brought about a realization that a reservoir with large storage capacity on the mainstream of the Colorado River would have sub-

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[70]Tr. 6998, 7422 (Dowd).
[71]Tr. 7003-7007 (Dowd).
[72]Tr. 7009, 7017 (Dowd).
[73]Tr. 6495 (Dowd).
[74]See Ariz. Ex. 1000, p. 15.

stantial beneficial effects.[75] Congress thereupon passed the Kinkaid Act of May 18, 1920,[76] which directed the Secretary of the Interior to make a study of certain of the River's problems. The Fall-Davis Report,[77] submitted to Congress in February 1922, is a result of that legislation. Some of its relevant portions are recited in the footnote.[78]

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[75]See Department of the Interior, Report of The All-American Canal Board 22-29 (July 22, 1919), Calif. Ex. 185.

[76]41 Stat. 600.

[77]Sen. Doc. 142, 67th Cong., 2d Sess. (1922), Ariz. Ex. 45.

[78]The Report opens with the following statement:

> "The control of the floods and development of the resources of the Colorado River are peculiarly national problems for several good reasons:
>
> 1. The Colorado River is international.
> 2. The stream and many of its tributaries are interstate.
> 3. It is a navigable river.
> 4. Its waters may be made to serve large areas of public lands naturally desert in character.
> 5. Its problems are of such magnitude as to be beyond the reach of other than national solution." Ariz. Ex. 45 p. 1.

The recommendations of the Report were as follows:

> "1. It is recommended that through suitable legislation the United States undertake the construction with Government funds of a high-line canal from Laguna dam to the Imperial Valley, to be reimbursed by the lands benefited.
>
> 2. It is recommended that the public lands that can be reclaimed by such works be reserved for settlement by ex-service men under conditions securing actual settlement and cultivation.
>
> 3. It is recommended that through suitable legislation the United States undertake the construction with Government funds of a reservoir at or near Boulder Canyon on the lower Colorado River to be reimbursed by the revenues from leasing the power privileges incident thereto.
>
> 4. It is recommended that any State interested in this development shall have the right at its election to contribute an equitable part of the cost of the construction of the reservoir and receive for its contribution a proportionate share of power at cost to be determined by the Secretary of the Interior.
>
> 5. It is recommended that the Secretary of the Interior be empowered after full hearing of all concerned to allot the vari-

Despite general recognition of the need for a storage reservoir to regulate and control the River there was a political obstacle in the path of such a project. The Upper Basin states, Colorado, New Mexico, Utah and Wyoming, were apprehensive that construction of storage facilities on the mainstream would permit a rapid expansion of irrigation and other uses in the Lower Basin and form the basis for claims of appropriative rights in the water, which would preclude its availability for the more slowly developing needs of the Upper Basin.[79] The doctrine of prior appropriation governed water rights at the time, as it does now, in all Basin states except California, and there it was, and is, significant.[80]

To relieve the apprehension of the Upper Basin, the affected states requested and the Congress passed the Act

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ous applicants their due proportion of the power privileges and to allocate the cost and benefits of a high-line canal.

6. It is recommended that every development hereafter authorized to be undertaken on the Colorado River by Federal Government or otherwise be required in both construction and operation to give priority of right and use:

First. To river regulation and flood control.

Second. To use of storage water for irrigation.

Third. To development of power."

Ariz. Ex. 45, p. 21.

[79]Special Master's Ex. No. 4, The Hoover Dam Documents, pp. A65, A80, A123.

[80]See Clough v. Wing, 2 Ariz. 371, 17 Pac. 453 (1888); Coffin v. Left Hand Ditch Co., 6 Colo. 443 (1882); Jones v. Adams, 19 Nev. 78, 6 Pac. 442 (1885); Albuquerque Land and Irrigation Co. v. Gutierrez, 10 N.M. 177, 61 Pac. 357 (1900), *aff'd sub nom.* Guiterrez v. Albuquerque Land and Irrigation Co., 188 U. S. 545 (1903); Stowell v. Johnson, 7 Utah 215, 26 Pac. 290 (1891); Moyer v. Preston, 6 Wyo. 308, 44 Pac. 845 (1896). See also United States v. Gerlach Livestock Co., 339 U. S. 725, 746 (1950); California Oregon P. Co. v. Beaver Portland Cement Co., 295 U. S. 142, 154-157 (1935); Wyoming v. Colorado, 259 U. S. 419, 459 (1922). *Compare* Irwin v. Phillips, 5 Cal. 140, 63 Am. Dec. 113 (1855) *with* Lux v. Haggin, 69 Cal. 255, 4 Pac. 919 (1884). See also Calif. Const. art. XIV, § 3.

of August 19, 1921, whereby consent was given to the Basin states to negotiate and enter into a compact.[81] The text of that act appears in the footnote.[82] Its purpose was:

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[81]42 Stat. 171.

[82]"[Sec. 1. Preamble—Apportionment of waters—Federal representative to be appointed—Expenses—Approval.]—Whereas the Colorado River and its several tributaries rise within and flow through or form the boundaries between the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming; and

"Whereas the territory included within the drainage area of the said stream and its tributaries is largely arid and in small part irrigated, and the present and future development necessities and general welfare of each of said States and of the United States require the further use of the waters of said streams for irrigation and other beneficial purposes, and that future litigation and conflict respecting the use and distribution of said waters should be avoided and settled by compact between said States; and

"Whereas the said States, by appropriate legislation, have authorized the governors thereof to appoint commissioners to represent said States for the purpose of entering into a compact or agreement between said States respecting the future utilization and disposition of the waters of the Colorado River and of the streams tributary thereto; and

"Whereas the governors of said several States have named and appointed their respective commissioners for the purposes aforesaid, and have presented their resolution to the President of the United States requesting the appointment of a representative on behalf of the United States to participate in said negotiations and to represent the interests of the United States: Now, therefore,

"*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That consent of Congress is hereby given to the States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming to negotiate and enter into a compact or agreement not later than January 1, 1923, providing for an equitable division and apportionment among said States of the water supply of the Colorado River and of the streams tributary thereto, upon condition that a suitable person, who shall be appointed by the President of the United States, shall participate in said negotiations, as the representative of and for the protection of the interests of the United States, and shall make report to Congress of the proceedings and of any compact or agreement entered into, and the sum of $10,000, or so much thereof as may be necessary, is hereby authorized to be appropriated to pay the salary and expenses of the representative of the United States appointed hereunder: *Provided,* That any such compact or agreement shall not be binding or obliga-

> "to permit the States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming to enter into an agreement for the equitable division and apportionment of the water supply of the Colorado River. The necessity for this grows out of the possibility of conflict in the diversion and use of the waters of the Colorado River in the various States through which the river and its tributaries flow. Without an agreement between the States interested respecting the division and apportionment of the waters for irrigation purposes, conflicts as to the amount of water which may be diverted on the various portions of the river and its tributaries, without interference with diversion and use elsewhere, are certain to occur and to lead to expensive litigation, in the meanwhile holding up and preventing development. Most irrigation projects on the Colorado River and its tributaries involve large expenditures, and complete or even considerably further development cannot be had or secured without an agreement under which development can be carried on without conflict and litigation."[83]

Commissioners were duly appointed and on November 24, 1922, after extensive meetings, agreement was reached in Santa Fe, New Mexico, among the Compact commissioners representing the seven states of the Colorado River Basin. The representative of the United States, Mr. Herbert Hoover, signed the agreement to indicate his approval. The agreement so reached is the Colorado River Compact. It was promptly ratified by the legislatures of all the signatory states except Arizona.[84] In 1925 these six states

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tory upon any of the parties thereto unless and until the same shall have been approved by the legislature of each of said States and by the Congress of the United States." (42 Stat. 171)

[83]H. R. Rep. No. 191, 67th Cong., 1st Sess. (1921).

[84]Special Master's Ex. No. 4, The Hoover Dam Documents, appendices 215-220, Ariz. Exs. 16, 18, 20, 22, 24.

waived the Compact requirement for seven-state approval and ratified the same to become effective upon approval by at least six of the states and consent of the United States.[85] Utah's 1925 act of ratification was repealed in 1927.[86]

By Section 13 of the Act of December 21, 1928,[87] commonly known as the Boulder Canyon Project Act, Congress gave its consent to the Colorado River Compact, waiving the Compact's requirement of seven-state approval, and provided that "this approval shall become effective when the State of California and at least five of the other states mentioned, shall have approved or may hereafter approve said Compact as aforesaid and shall consent to such waiver, as herein provided." Section 4(a) of the Act provides that the Act should not take effect and no authority should be exercised thereunder unless and until (1) all of the States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming had ratified the Compact, or (2) if all of said states failed to ratify the Compact within six months from the passage of the Act, until the same should be ratified by six of such states, including California, and California should agree to certain limitations upon the aggregate annual consumptive use (diversions less returns to the River) of water of and from the Colorado River for use in the State of California.

Ratification by Arizona did not occur within the six-month period specified in Section 4(a) of the Project Act. By an act of March 4, 1929,[88] the State of California again waived the Compact's requirement of seven-state approval and provided that the Compact should become binding and

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[85]Special Master's Ex. No. 4, The Hoover Dam Documents, appendices 221-226, Ariz. Exs. 17, 19, 21 and 25.

[86]Act of January 19, 1927 (Utah Laws 1927, p. 1).

[87]45 Stat. 1057.

[88]Special Master's Ex. No. 4, The Hoover Dam Documents, appendix 227, Ariz. Ex. 13.

obligatory upon the State of California when at least six of the signatory states should likewise have waived the requirement of seven-state approval and ratified the same without such approval and the United States should have consented thereto. By a separate act of the same date California agreed to the limitation upon aggregate annual consumptive use of Colorado River water for use in California required by Section 4(a) of the Project Act.[89]

By act of March 6, 1929, the State of Utah again waived the Compact's requirement of seven-state approval and agreed that the Compact should become binding upon Utah upon approval by at least six of the states and consent by the United States.[90]

Six states, including California, having ratified the Compact and having waived seven-state ratification, the President of the United States on June 25, 1929, issued Public Proclamation No. 1882,[91] the text of which is as follows:

> "Pursuant to the provisions of section 4(a) of the Boulder Canyon project act approved December 21, 1928 (45 Stat. 1057), it is hereby declared by public proclamation:
>
> "(a) That the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming have not ratified the Colorado River Compact mentioned in section 13(a) of said act of December 21, 1928, within six months from the date of the passage and approval of said act.
>
> "(b) That the States of California, Colorado, Nevada, New Mexico, Utah and Wyoming have ratified said compact and have consented to waive

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[89]Ariz. Ex. 14. The complete text of the California Limitation Act appears in Appendix 4.

[90]Ariz. Ex. 23.

[91]46 Stat. 3000, Ariz. Ex. 3.

the provisions of the first paragraph of Article XI of said compact, which makes the same binding and obligatory only when approved by each of the seven States signatory thereto, and that each of the States last named has approved said compact without condition, except that of six-State approval as prescribed in Section 13(a) of said act of December 21, 1928.

"(c) That the State of California has in all things met the requirements set out in the first paragraph of section 4(a) of said act of December 21, 1928, necessary to render said act effective on six-State approval of said compact.

"(d) All prescribed conditions having been fulfilled, the said Boulder Canyon project act approved December 21, 1928, is hereby declared to be effective this date."

Almost 15 years later the State of Arizona enacted a statute which purported unconditionally to approve, ratify, and confirm the Colorado River Compact.[92]

Between 1922 and 1927 three attempts were made to secure legislation authorizing the construction of a dam in the canyon section of the Colorado River and a canal (the All-American Canal) running wholly within the United States from the River to the Imperial Valley. These attempts were reflected in three Swing-Johnson bills.[93] The fourth attempt was successful[94] and became the Boulder Canyon Project Act of December 21, 1928.[95] Construction of the dam authorized by the Project Act was commenced in 1930 and completed in 1935. Originally named Boulder Dam, it is now known as Hoover Dam.

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[92]Special Master's Ex. No. 4, The Hoover Dam Documents, appendix 230, Ariz. Ex. 10.

[93]H. R. 11449, 67th Cong., 2d Sess. (1922); H. R. 2903 and S. 727, 68th Cong., 1st Sess. (1923); H. R. 6251, 69th Cong., 1st Sess. (1925); H. R. 9826 and S. 3331, 69th Cong., 1st Sess. (1926).

[94]H. R. 5773 and S. 728, 70th Cong., 1st Sess. (1927).

[95]45 Stat. 1057.

Between 1930 and 1934 the Secretary of the Interior, on behalf of the United States, contracted with the defendants Palo Verde Irrigation District,[96] Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California and the City of San Diego for the delivery of the water to be stored in Lake Mead, subject to the availability thereof for use in California under the Compact and Project Act.[97]

In response to a request from the Secretary of the Interior,[98] these California agencies entered into an agreement dated August 18, 1931, commonly known as the Seven-party Agreement which fixes the relative priorities, as among the signatories, to California's share of water from the mainstream of the Colorado River.[99] The terms of this agreement were recommended by the Division of Water Resources of the State of California, and the Secretary of the Interior incorporated the intrastate priorities stated therein in general regulations promulgated on September 28, 1931, relating to contracts for the storage and delivery of mainstream water impounded by Hoover Dam.[1] There is no contract between the United States and the State of California itself.

By contracts with Nevada dated March 30, 1942, and January 3, 1944, the United States agreed to deliver certain quantities of water to Nevada from storage in Lake Mead, subject to the availability thereof for use in Nevada under the Compact and Project Act.[2]

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[96]The text of this contract, which is representative of the California contracts, appears in Appendix 8.

[97]Ariz. Exs. 33, 34, 36-40.

[98]Calif. Ex. 1810.

[99]Ariz. Ex. 27. The Seven-party Agreement is reprinted as part of the Palo Verde Water Delivery Contract, Appendix 8.

[1]Calif. Ex. 1811.

[2]Special Master's Ex. No. 4, The Hoover Dam Documents, appendices 1018-1019, Ariz. Exs. 43, 44. The text of these contracts appears in Appendices 6 and 7.

By contract dated February 9, 1944, and effective February 24, 1944, the United States agreed to deliver certain quantities of water from storage in Lake Mead for use in Arizona, subject to the availability thereof for use in Arizona under the Compact and Project Act.[3]

Utah and New Mexico have no contracts with the United States for the delivery of Lake Mead water and, indeed, such water cannot be feasibly utilized in either of those states.

The prospect of a treaty between the United States and Mexico with respect to Colorado River water, which was envisioned in the Colorado River Compact, became a reality on February 3, 1944, when such a treaty was executed.[4] By its terms, the treaty became effective on November 8, 1945, after the Senate ratified it with eleven reservations. It guarantees delivery to Mexico "from any and all sources" of one and one-half million acre-feet of water per annum in the limitrophe section of the Colorado River at the United States-Mexican boundary. Under certain circumstances, these deliveries may be increased or diminished.[5]

In 1948 the Upper Colorado River Basin Compact among Arizona, Colorado, New Mexico, Utah and Wyoming was signed by representatives of those states, and after ratification by the respective legislatures, was approved by Congress in 1949.[6] This compact provided for the division of the waters of the Colorado River System in the Upper Basin among the Upper Basin States. No such compact has ever been made apportioning water of the Lower Basin.

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[3]Special Master's Ex. No. 4, The Hoover Dam Documents, appendix 1016, Ariz. Ex. 32. The text of this contract appears in Appendix 5.

[4]59 Stat. 1219 (1945), Ariz. Ex. 4.

[5]Ariz. Ex. 4, art. 10.

[6]Special Master's Ex. No. 4, The Hoover Dam Documents, appendix 231, Ariz. Ex. 2.

Following the execution of the contract between the United States and the State of Arizona, and Arizona's "ratification" of the Colorado River Compact,[7] the Bureau of Reclamation in cooperation with Arizona began investigation of a project, identified as the Central Arizona Project, designed to bring supplemental water from the mainstream of the Colorado River to a portion of the central Arizona area. The Commissioner of Reclamation submitted his report to the Secretary of the Interior on March 20, 1948, and on September 16, 1948, the Secretary of the Interior transmitted the report to Congress for its information and action.[8] The following is a quotation from the Secretary's letter of transmittal.

> "The project has engineering feasibility and the proposed reimbursable costs probably can be repaid in 78 years under the plan outlined. . . .
>
> "The showing in the report of the availability of a substantial quantity of Colorado River water for diversion to Central Arizona for irrigation and other purposes is based upon the assumption that the claims of the State of Arizona to this water are valid. It should be noted, however, as the regional director and the Commissioner of Reclamation pointed out, that the State of California has challenged the validity of Arizona's claims. If the contentions of the State of Arizona are correct, there is an ample water supply for this project. If the contentions of California are correct, there will be no dependable water supply available from the Colorado River for this diversion. While the necessary water supply is physically available at the present time in the Colorado River, the importance of the questions raised by the divergent views and claims of the States is apparent. The Bureau of Reclamation and the De-

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[7]Ariz. Ex. 10.

[8]H. R. Doc. No. 136, 81st Cong., 1st Sess. (1949), Ariz. Exs. 65, 65A, 70.

> partment of the Interior cannot authoritatively resolve this conflict. It can be resolved only by agreement among the States, by court action, or by an agency having jurisdiction.[9]

During the 79th, 80th, 81st and 82nd Congresses, Arizona sought congressional authorization for the construction of the Central Arizona Project by the Bureau of Reclamation. While some of her proposals passed the Senate, none passed the House.[10] On April 18, 1951, the Committee on Interior and Insular Affairs of the House of Representatives adopted a resolution that consideration of bills relating to the Central Arizona Project "be postponed until such time as use of the water in the lower Colorado River Basin is either adjudicated or binding or mutual agreement as to the use of the water is reached by the States of the lower Colorado River Basin."[11] About a year later, this action was instituted by Arizona.

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[9]Ariz. Ex. 70, at pp. 140, 141.

[10]The following are bills which failed of enactment by the Congress. H. R. 4534, 79th Cong., 1st Sess. (1945); S. 1175, 80th Cong., 1st Sess. (1947); S. 75, 81st Cong., 2nd Sess. (1950); S. 75, 82nd Cong., 1st Sess. (1951); H. R. 1500, H. R. 1501, 82nd Cong., 1st Sess. (1951).

[11]*Hearings on H. R. 1500 and H. R. 1501 Before the Committee on Interior and Insular Affairs, House of Representatives,* 82nd Cong., 1st Sess., pt. 2, pp. 739, 740-756 (1951).

V. Major Works in the Lower Basin

Helpful to an understanding of the problems raised by this controversy is an awareness of the existence and function of the various works affecting the flow of water in the Lower Basin of the Colorado River System.

A. Mainstream Works

1. *Hoover Dam.* This is the principal structure in the Lower Basin, impounding the waters of the Colorado River to form Lake Mead. The reservoir has an active or usable storage capacity of about 27,200,000 acre-feet, a maximum length of 115 miles, a maximum width of 8 miles, and, at elevation 1229, a maximum surface area of 162,700 acres. Hoover Dam is situated in Black Canyon on the main channel of the Colorado River, 330 miles above the Mexican border. The middle of the channel at the site of the dam is the common boundary between the States of Arizona and Nevada.

It is the world's highest dam: a concrete arch, gravity type structure having a height of 726.4 feet and a hydraulic height of 575.8 feet. Two side-channel spillways, with a capacity of 400,000 cubic feet per second [hereinafter "c.f.s"],[12] have been constructed in connection with the dam. The outlet works have a capacity of 91,000 c.f.s. and the power plant discharge (17 turbines) is 30,560 c.f.s. The rating of the generators presently installed, including two small station-service units, is 1,249,800 kw.; ultimately the generator rating installation will be 1,354,-300 kw.

Construction of Hoover Dam was initiated on September 17, 1930, and water was first impounded on February 1,

[12]One cubic foot of water is approximately 7.48 gallons. One c.f.s. flow is approximately 1.983 acre-feet per day or 646,317 gallons per day. Ariz. Ex. 1000, p. 17.

1935. Power was first generated on September 11, 1936. Title to the dam is in the United States and it is operated and maintained by the Department of the Interior.[13]

2. *Davis Dam.* This dam implements regulation of releases at Hoover Dam into the seasonal pattern required by downstream irrigation and domestic users. It is located 67 miles below Hoover Dam on the main channel of the Colorado River, directly west of Kingman, Arizona. The middle of the channel at the dam site constitutes the common boundary between Arizona and Nevada. Its reservoir, Lake Mohave, is 67 miles in length, has a total usable capacity of 1,820,000 acre-feet, and at elevation 647 has a surface area of 28,500 acres.

Davis Dam, with a height of 200 feet and a hydraulic height of 138 feet, is an earth and rock fill structure and has a bypass channel on the Arizona side for the spillway, outlets and power plant. The spillway capacity, at elevation 647, is 192,000 c.f.s. and the outlet capacity is 60,000 c.f.s. The five unit generating facilities have a total installed capacity of 225,000 kw.

Construction of the dam was initiated on July 29, 1942, water was first impounded on January 17, 1950, and power was first generated on January 12, 1951. Title to Davis Dam is held by the United States and it is operated and maintained by the Department of the Interior.[14]

3. *Parker Dam.* This structure, located on the main channel of the Colorado River below the mouth of the Bill Williams River, 17 miles above Parker, Arizona, and 155 miles below Hoover Dam, is the diversion point for the Colorado River Aqueduct of the Metropolitan Water District of Southern California. It also regulates the flow

[13]Ariz. Ex. 1000, pp. 18-19.
[14]Ariz. Ex. 1000, pp. 19-20.

of the Bill Williams in excess of local uses in Arizona. The middle of the channel at its site is the common boundary between Arizona and California. Its reservoir, Lake Havasu, has a surface area of 25,100 acres at elevation 450 and its original unsilted storage capacity was 717,000 acre-feet. Lake Havasu is the source of water pumped to the Southern California coastal plain for municipal, industrial and, in limited quantities, for agricultural purposes.

Parker Dam, with a structural height of 320 feet and a hydraulic height of 75 feet, is a concrete variable-radius arch structure with power plant intakes and penstocks through the abutments on the California end. The overflow spillway is controlled by five regulating gates and a power plant with four 30,000 kw. units has been constructed.

Construction of Parker Dam was initiated on October 1, 1934, water was first impounded on June 29, 1938, and the first power was generated on December 13, 1942. The Metropolitan Water District paid substantially all of the cost of Parker Dam and rights of way therefor, and one half the cost of Parker Power Plant. The aggregate cost to the District for these purposes was $14,883,732.[15] Title to the dam is held by the United States and operations are conducted by the Department of the Interior. The Metropolitan Water District receives approximately fifty per cent of the power generated, for use on the Colorado River Aqueduct.[16]

4. *Headgate Rock Dam.* Located 170 miles below Hoover Dam and 15 miles below Parker Dam on the main channel of the Colorado River, this dam, with a structural height of 115 feet, provides no appreciable storage capacity

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[15]Calif. Ex. 477, at p. 4; Calif. Ex. 483; Tr. 9669 (McKinlay).
[16]Ariz. Ex. 1000, pp. 20-21.

but is the diversion point for the Colorado River Indian Reservation in Arizona.

It is owned by the United States and is operated by the Department of the Interior, Bureau of Indian Affairs.[17]

5. *Palo Verde Weir.* This diversion point for the Palo Verde Irrigation District is a temporary rock-filled structure located on the Colorado River 212 miles below Hoover Dam and 42 miles below Headgate Rock Dam. It was constructed at the expense of the United States in 1944 and 1945 and provides no substantial storage capacity.

In authorizing the erection of a permanent dam on or near this site by Act of August 31, 1954,[18] the Congress required the Palo Verde Irrigation District to contribute a share of the cost of construction.[19]

6. *Imperial Dam.* Situated on the main channel of the Colorado River 303 miles below Hoover Dam, about 90 miles below Palo Verde Weir and 18 miles above Yuma, Arizona, this structure is the diversion point for the All-American Canal, the Yuma Project and the Gila Project in Arizona. The middle of the channel at the site of the dam constitutes the common boundary between Arizona and California.

Imperial Dam is a slab and buttress type concrete structure with a structural height of 31 feet at the overflow sections and a hydraulic height of 23 feet. At elevation 191 the overflow spillway has a capacity of 180,000 c.f.s. Extensive desilting works have been provided. The dam provides no appreciable storage capacity.

It was dedicated in October, 1938, but active operations were not instituted for some time thereafter. Title to Im-

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[17]Ariz. Ex. 1000, p. 21.
[18]68 Stat. 1045.
[19]Ariz. Ex. 1000, pp. 21-22.

perial Dam is in the United States and it is operated and maintained by the Department of the Interior.[20]

7. *Laguna Dam.* This structure is located on the main channel of the Colorado River 308 miles below Hoover Dam, 5 miles below Imperial Dam and approximately 13 miles above Yuma, Arizona. It was formerly used as the diversion point for the Yuma and Gila Reclamation Projects. The middle of the channel at its site is the common boundary between Arizona and California.

Laguna Dam is a rock-filled weir with a concrete surface. Its structural height is 43 feet and its hydraulic height is 10 feet. It provides no appreciable storage capacity.

Construction was initiated on July 19, 1905, and water was first diverted on March 14, 1910. Although the major portion of the construction cost of $1,600,000 has been repaid to the United States by the defendants Coachella Valley County Water District, Imperial Irrigation District and the City of San Diego, title is in the United States and it is operated and maintained by the Department of the Interior.[21]

8. *Morelos Dam.* Located just below Pilot Knob, between Arizona and Mexico, in the limitrophe section of the River, this structure was built under the Mexican water treaty and acts as a diversion point for Mexican works.[22] It provides no appreciable storage capacity.

9. *All-American Canal System.* The canal has its headworks at the California end of Imperial Dam.[23] These headworks discharge Colorado River water into a concrete

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[20]Tr. 2361-2365, 7767-7768 (Steenbergen) (Dowd); Ariz. Ex. 1000, p. 22.

[21]Ariz. Ex. 1000, pp. 22-23.

[22]Tr. 590, 7852-7853 (Akin) (Dowd).

[23]Tr. 584 (Akin).

lined channel approximately 360 feet in width which is divided into four channels directing water into desilting basins.[24] The initial capacity of the All-American Canal is 15,155 c.f.s (approximately 30,062 acre-feet per day) and it has a width of 232 feet at normal water surface, a bottom width of 160 feet and a depth of 21 feet.[25]

Its initial capacity remains unchanged for a distance of 14.7 miles to Siphon Drop at which point 2,000 c.f.s. can be delivered to the Yuma Project through the Siphon Drop Power Plant. From that point to Pilot Knob, approximately 6 miles distant, the capacity of the All-American Canal is 13,155 c.f.s. At Pilot Knob, the water may be discharged into the Colorado River through the Pilot Knob Wasteway. Pursuant to section 7 of the Boulder Canyon Project Act and Imperial's 1932 contract, Imperial is given the right to develop the hydroelectric power on the canal below Syphon Drop, including Pilot Knob. Pursuant to the 1952 supplement to this contract, Mexican Treaty water and other water which would otherwise pass over Imperial Dam may be diverted by the District through the All-American Canal to Pilot Knob, and there dropped through Pilot Knob Power Plant back to the Colorado River in the United States. From Pilot Knob, for a distance of 15.5 miles to Drop No. 1, the takeout point of the Coachella Canal, the All-American Canal has a capacity of 10,155 c.f.s. Continuing west, parallel to the Mexican border, for approximately 44 miles the canal gradually reduces in capacity from 7,755 c.f.s. to 2,655 c.f.s.[26]

Construction was initiated by the United States in August, 1934, and the first significant use of the canal was made in 1940.[27] Costs of construction have been allocated

[24]Tr. 7771 (Dowd).
[25]Calif. Ex. 214.
[26]*Ibid.*
[27]Tr. 7767, 7774 (Dowd).

among the several irrigation districts and projects which utilize the facilities.[28] The canal is operated largely by the Imperial Irrigation District. However, the Coachella Valley County Water District operates the Coachella Canal from 6A Check to its terminal point, and the United States operates Imperial Dam, the California Sluiceway, and the Yuma Project turnouts from the canal.[29]

10. *Coachella Canal.* After turning out from the All-American Canal at Drop No. 1, the Coachella Canal proceeds in a northwesterly direction. At the turnout, the canal, which at this point is unlined, has an initial capacity of 2,500 c.f.s.[30] Of this capacity, 1,500 c.f.s. are for Coachella, and 1,000 c.f.s. are for Imperial for irrigation of lands therefrom from Drop No. 1 to 6A Check, a distance of 49 miles. The initial capacity at 6A Check is 1,500 c.f.s.[31] Further on, in the Coachella Valley County Water District, the canal is lined with concrete and has a capacity of 1,300 c.f.s. which is gradually reduced to 425 c.f.s. at its terminal point.[32] The total length of the Coachella Canal is 123 miles.[33] It is operated and maintained from Drop No. 1 to 6A Check by Imperial, with Coachella assuming and paying a proportionate part of the expense thereof. From 6A Check to its terminal point, the Coachella Canal is operated and maintained exclusively by Coachella at its sole expense. Construction on the Coachella Canal was initiated in 1938 and it was completed in 1948.[34]

11. *Colorado River Aqueduct.* This aqueduct diverts water through headworks situated at Parker Dam.[35] It is

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[28]Calif. Ex. 233.
[29]Tr. 7841-7846, 8033-8034 (Dowd).
[30]Tr. 8421 (Weeks); Calif. Ex. 214.
[31]Tr. 7784, 7792-7793, 8034 (Dowd); Calif. Ex. 214.
[32]Tr. 8443 (Weeks).
[33]Tr. 5189 (Meeker).
[34]Tr. 8033-8034 (Dowd); Tr. 8422 (Weeks).
[35]Tr. 632-633 (Akin).

242 miles long, with a designed carrying capacity of 1,605 c.f.s. and an estimated actual carrying capacity of 1,800 c.f.s.[36] It carries Colorado River water to the Metropolitan Water District of Southern California, the City of San Diego and the San Diego County Water Authority.[37] Both the County of San Diego and the San Diego County Water Authority receive this water through the San Diego Aqueduct which turns out from the Colorado River Aqueduct.[38]

Construction was initiated in 1932 and water was first delivered in 1941.[39] The Colorado River Aqueduct was financed, and title is held, by the Metropolitan Water District of Southern California which operates and maintains it.[40]

B. Gila River System Works

1. *Coolidge Dam.* Situated on the Gila River, 26 miles southeast of Globe, Arizona, this reinforced concrete multiple dome structure has a height of 250 feet and creates a reservoir with a capacity of 1,267,447 acre-feet. The water so impounded is utilized to irrigate lands of the Gila River Indian Reservation and privately owned lands adjacent thereto. In addition, the Dam has a generating capacity of 10,000 kw. Construction was completed in 1928 and title is held by the United States.[41]

2. *Ashurst-Hayden Dam.* Performing a purely diversionary function, this diversion point for the San Carlos Project is located on the Gila River approximately 10 miles east of Florence, Arizona.[42]

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[36]Tr. 9530-9531, 9590 (Elder). This translates into approximately 3,570 acre-feet per day, or 1,303,050 acre-feet per year.
[37]Calif. Ex. 455.
[38]Calif. Ex. 457.
[39]Tr. 9535 (Elder).
[40]Calif. Ex. 457.
[41]Ariz. Ex. 1000, p. 23.
[42]*Ibid.*

3. *Buckeye Dam.* This dam is situated on the Gila just below the confluence of the Agua Fria and Gila Rivers, at the lower end of the Salt River Project. It diverts the return flow re-entering the River below the upstream diversion structures.[43]

4. *Painted Rock Dam.* Located on the Gila River, slightly below Gila Bend, Arizona, this structure is designed for flood control in the lower Gila valley and in Mexico.[44]

5. *Roosevelt Dam.* This rubble masonry, arch gravity type dam, with a structural height of 280 feet and a hydraulic height of 225 feet, is situated on the Salt River 30 miles northwest of Globe, Arizona. The overflow spillways at both abutments have a capacity of 150,000 c.f.s. and a seven unit power plant with a generating capacity of 15,400 kw. is situated at the toe of the dam. Roosevelt Reservoir impounds 1,398,430 acre-feet of water and the waters so impounded are utilized to irrigate the Salt River Project. Construction of Roosevelt Dam was initiated in March 1904, water was first impounded in May 1909 and power was first generated on August 1, 1909.[45]

6. *Horse Mesa Dam.* Located on the Salt River 43 miles northeast of Phoenix, Arizona, this concrete variable-radius arch type dam has a structural height of 300 feet and a hydraulic height of 266 feet. Its reservoir, with a capacity of 245,138 acre-feet, is utilized to irrigate the Salt River Project. Over fall spillways at both abutments have a capacity of 150,000 c. f. s. and a 30,000 kw. power plant is located at the toe of the dam.

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[43]Tr. 603-604 (Akin).
[44]Tr. 617-618 (Akin).
[45]Ariz. Ex. 1000, pp. 23-24.

Construction was begun in August, 1924, and water was first impounded on May 27, 1927. Although built by the Salt River Valley Water Users' Association, title is in the United States.[46]

7. *Mormon Flat Dam.* Situated on the Salt River 37 miles northeast of Phoenix, Arizona, this concrete variable-radius arch type dam has a structural height of 224 feet and a hydraulic height of 142 feet. Its reservoir, with a capacity of 57,852 acre-feet, is utilized to irrigate the Salt River Project. The dam has an open channel spillway with a capacity of 150,000 c.f.s. and a 7,000 kw. power plant has been constructed at its toe.

Construction was initiated in February 1923, water was first impounded on January 13, 1925, and the first power was generated on May 19, 1926. Built by the Salt River Valley Water Users' Association, title is held by the United States.[47]

8. *Stewart Mountain Dam.* This concrete variable-radius arch type dam, with a structural height of 207 feet and a hydraulic height of 116 feet, is located on the Salt River 29 miles northeast of Phoenix, Arizona. Its reservoir, with a capacity of 69,765 acre-feet, provides irrigation water for the Salt River Project. The dam has a power plant with a capacity of 10,400 kw. and its open channel spillway has a capacity of 150,000 c.f.s.

Construction was initiated on October 1, 1928, water was first impounded on February 22, 1930, and power was first generated on March 8, 1930. Title to the dam, which was built by the Salt River Valley Water Users' Association, is held by the United States.[48]

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[46]Ariz. Ex. 1000, p. 24.
[47]Ariz. Ex. 1000, pp. 24-25.
[48]Ariz. Ex. 1000, p. 25.

9. *Granite Reef Diversion Dam.* This structure is located on the Salt River 22 miles east of Phoenix, Arizona. It is a concrete weir with a structural height of 29 feet and a hydraulic height of 18 feet.[49]

10. *Cave Creek Dam.* Situated on Cave Creek, a tributary of the Salt River, 20 miles north of Phoenix, Arizona, this concrete multiple arch dam, with a structural height of 109 feet and a hydraulic height of 57 feet, creates a reservoir with a capacity of 11,000 acre-feet. Cave Creek Dam is used primarily for flood control, but waters impounded thereby are utilized to irrigate the Salt River Project.

Construction by the Salt River Valley Water Users' Association was initiated on February 16, 1922, and water was first impounded on March 4, 1923. Title is held by the United States.[50]

11. *Horseshoe Dam.* Situated on the Verde River 55 miles northeast of Phoenix, Arizona, this earth and rock fill type dam has a structural height of 194 feet, a hydraulic height of 145 feet and a spillway capacity of 250,000 c.f.s. Its reservoir, with a capacity of 142,800 acre-feet, impounds waters which are utilized to irrigate the Salt River Project and for municipal purposes in the City of Phoenix.

Construction was initiated on November 30, 1943, and water was first impounded on November 16, 1945. Horseshoe Dam was built by the Phelps-Dodge Corporation under a cooperative agreement with the United States and the Salt River Valley Water Users' Association. Title is held by the United States.[51]

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[49]Ariz. Ex. 1000, p. 27.
[50]Ariz. Ex. 1000, pp. 25-26.
[51]Ariz. Ex. 1000, pp. 26-27.

12. *Bartlett Dam.* Located on the Verde River 36 miles northeast of Phoenix, Arizona, this concrete multiple arch type dam has a structural height of 287 feet, a hydraulic height of 188 feet and an open channel spillway with a capacity of 175,000 c.f.s. Its reservoir has a capacity of 179,480 acre-feet and waters impounded therein are utilized to irrigate the Salt River Project and Salt River Indian Reservation.

Construction was initiated on August 12, 1936, and water was first impounded on February 5, 1939.[52]

13. *Carl Pleasant Dam.* Situated on the Agua Fria River about 30 miles northwest of Phoenix, Arizona, this concrete multiple arch dam impounds the waters forming Lake Pleasant.[53] The dam was built by, and serves, Maricopa County Municipal Conservation District No. 1. Water was first impounded in 1928.[54]

C. Operation of Works on the Mainstream—River Control

The Office of River Control of the Bureau of Reclamation, located at Boulder City, Nevada, is responsible for release of water, river control and reservoir co-ordination on the Colorado River from Hoover Dam to the international boundary. Acting under the Boulder Canyon Project Act, the Office of River Control releases water from reservoirs on the mainstream according to the following priorities: First, flood control; second, irrigation and domestic uses; third, power.

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[52]Ariz. Ex. 1000, p. 26.

[53]The capacity of this reservoir appears to be a subject of dispute. At least two estimates have been given; one of 178,000 acre-feet (Ariz. Ex. 1000, p. 27) and another of 164,000 acre-feet (Tr. 1635-1636 [Raymond]).

[54]Ariz. Ex. 1000, p. 27

Flood control storage space varies during the year. In general, storage space is made available for anticipated floods by releasing water in accordance with the expected inflow at any given time.

Water for irrigation and domestic uses is ordered by the water user agencies. While there may be minor variations of practice from one water user to another, typically, the procedure is as follows. On Wednesday of any given week, the agency orders the daily quantity of water needed for the week beginning on the following Monday. When the water orders have been received, the Office of River Control totals them and then schedules the rate of release per day for the following week. This schedule must be put into effect over the weekend, for it takes 72 hours for water at Parker Dam to reach Imperial Dam. Records are kept of the amount of water ordered and the amount of water actually taken by each water user.

In addition to scheduling water releases for domestic and irrigation users in the United States, water is released for sluicing at Imperial Dam and to service the Mexican water treaty. Mexico is entitled to receive from 1,500,000 to 1,700,000 acre-feet annually depending upon the supply of water. The Mexican order is given one year in advance for delivery on a month by month basis. The monthly order can be changed upon thirty days' notice. Davis Dam is used for making water releases pursuant to the Mexican order.

The last priority for water releases is for generation of power. Prior to June 1, 1955, water in excess of that needed for irrigation and domestic uses was released for power purposes. However, as of that date this practice was discontinued and, as a result, only 62½ per cent of firm energy was delivered during that year.[55]

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[55]Tr. 823-895, 938 (Stanley).

VI. Irrigation Projects and Districts, Indian Reservations and Other Water Users in the Lower Basin

A. Arizona

1. *Salt River Project.* This project, which lies on both sides of the Salt River east of its confluence with the Gila River in central Arizona, is capable of serving 240,000 acres of land. Approximately 200,000 acres were under cultivation in 1955 and portions of the remaining acreage constitute town sites and residential property which are furnished water for domestic uses.[56] The northern portion of the Project, which includes the City of Phoenix, is bounded on the west by the Agua Fria River and on the east by the Arizona Canal. The southern portion is bounded on the south by the Gila Indian Reservation and on the east by the Roosevelt Water Conservation District.[57] The major dams serving the Project are Granite Reef Diversion Dam, Stewart Mountain Dam, Horse Mesa Dam, Mormon Flat Dam and Roosevelt Dam—all on the Salt River; Bartlett Dam and Horseshoe Dam on the Verde River; and a flood control dam on Cave Creek.[58]

The Project is operated by two agencies with a complex interrelation never fully explained in the evidence. It was initiated by the Bureau of Reclamation which conducted operations until 1917 when the Salt River Valley Water Users' Association, organized under Arizona law in 1903, assumed control. Subsequently a district was incorporated as a political subdivision of the State of Arizona; the officers and directors of the district and association are identical.[59]

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[56]Tr. 1806-1807 (Corbell).

[57]See Ariz. Ex. 140.

[58]Tr. 1763-1767 (Corbell). See also pp. 40-43, *supra.*

[59]Tr. 1770-1772, 1756-1757, 1815-1818 (Corbell).

Water supply is derived from both surface and underground sources. For the period 1945-1955 approximately 64% of the supply came from surface sources and 36% from pumping.[60] The Project makes storage water available to its members each year, quantity depending upon supply. From 1952 to 1955 members were allotted three acre-feet per acre.[61] Payment of assessments for project obligations entitled each member to two acre-feet per acre and, upon payment of an additional charge, the member could secure an additional acre-foot.[62] Some of the water used by the Project is subject to a water rights decree administered by a commissioner.[63]

The problem of an adequate water supply has become a serious one. Surface supply has been reduced by drought and by decreasing runoff caused by changed conditions in the watershed. Fire prevention activities have resulted in increased growth of phreatophytic plants which consume water otherwise available for irrigation and domestic uses.[64] As a result of the reduction in surface and ground water supplies, the water table has declined, and in 1955 the static water table reached a depth of 117 feet.[65] These declining water levels have increased pumping costs and necessitated expenditures for deepening wells.[66]

2. *Roosevelt Irrigation District.* Located directly west of the Salt River Project and bounded on the east by the Agua Fria River, on the west by the Hassayampa River and

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[60]Tr. 1884 (McMullin).
[61]Tr. 1788 (Corbell).
[62]Tr. 1808, 1834 (Corbell).
[63]Tr. 1866-1867 (Corbell).
[64]Tr. 2042-2048 (McMullin).
[65]Tr. 1995 (McMullin).
[66]Tr. 2013-2014 (McMullin).

on the south by the Buckeye Water Conservation and Drainage District, this project serves 38,000 acres, all of which are irrigable.[67]

The Roosevelt Irrigation District, because of the complete dearth of available surface water, depends solely on underground water. This water is supplied by 101 wells, 46 of which are located within the District and 55 of which are located within the Salt River Project.[68] Those located within the Salt River Project were purchased at a time when water-logged land was a problem in that project. By agreement, Roosevelt is limited in its pumping from these wells to 145,000 acre-feet per year on an average for a five year period and annual increases cannot exceed 10,000 acre-feet. There is no restriction on drawdown.[69] Thus, it is apparent that the amount of irrigation in the Salt River Project directly affects the water supply of Roosevelt. Water levels have remained stable in the Roosevelt Irrigation District but the water table of the wells located in the Salt River Project has declined substantially.[70]

3. *Maricopa County Municipal Water Conservation District No. 1.* Commonly known as the Beardsley District, Maricopa County Municipal Water Conservation District No. 1 is located in Maricopa County, Arizona, and is bounded on the east by the Agua Fria River and the City of Phoenix, on the west by the White Tank Mountains and on the south by the Roosevelt Irrigation District. The District was organized under Arizona law in 1925 to serve 40,000 acres but the service area was reduced to 35,000

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[67]Tr. 1714-1715 (Van Denburgh); Ariz. Ex. 147.

[68]Tr. 1715-1716 (Van Denburgh). In addition to these wells there are some private wells operated by individuals.

[69]Tr. 1732-1733, 1741 (Van Denburgh).

[70]Tr. 1745-1746 (Van Denburgh).

acres in 1946.[71] In 1955 26,000 acres were under cultivation and 9,000 lay fallow primarily for lack of water.[72]

Water supply is derived from surface and underground sources. The source of surface water is the Agua Fria River which is dammed by Carl Pleasant Dam to form a storage reservoir called Lake Pleasant.[73] One and one-half miles downstream is a diversion dam from which the District's main canal takes out. This canal, which is 34 miles long and is lined for approximately one-half of its length, runs along the west side of the Project. There are 120 miles of laterals in the distribution system. Pump water is supplied by wells, 60 of which were in operation in 1955.[74]

The District has been troubled by a decreasing supply of surface water and a declining water table. In 1955 the average pump lift for the 60 wells in operation was 419 feet. In addition, the static water level declined from 172 feet in 1940 to 329 feet in 1955.[75]

4. *San Carlos Project.* This project lies on both sides of the Gila River in Pinal County, Arizona, southeast of Phoenix and the Salt River Project. Although planned to serve 50,000 acres exclusively within the Gila River Indian Reservation, the Project was later expanded to include an additional 50,000 acres of non-Indian land because of financial considerations. Three agencies operate the facilities of the Project: the Indian Tribal Council operates distribution works on Indian lands; the San Carlos Irrigation and Drainage District operates facilities on non-Indian lands; and the Bureau of Indian Affairs operates facilities, such as dams and main canals, serving both types of land.[76] The

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[71]Tr. 1633-1635 (Raymond); Ariz. Ex. 140.
[72]Tr. 1661 (Raymond).
[73]Tr. 1635-1636 (Raymond). See also p. 43, *supra.*
[74]Tr. 1636-1638, 1641 (Raymond).
[75]Tr. 1658-1659 (Raymond); Ariz. Ex 145.
[76]Tr. 1485-1487, 1489 (Gookin).

full 100,000 acres which the Project was designed to serve have never been under irrigation in any one year. While irrigated acreage varies from year to year, depending upon water supply, the average annual irrigated acreage from 1934 to 1955 was 63,000 acres.[77]

The main works of the Project are Coolidge and Ashurst-Hayden Dams.[78] Coolidge Dam, which is located on the Gila River below its confluence with the San Carlos River, creates the San Carlos Reservoir which has a designed capacity of 1,285,000 acre-feet. This reservoir has never been more than two-thirds full. Ashurst-Hayden Dam is 63 miles further downstream and is a purely diversionary structure serving the Project's canals. Situated within the boundaries of the Project and utilized to catch flash flood waters, excess flows from Ashurst-Hayden Dam, and to regulate canal flow is Picacho Reservoir with a capacity of 18,000 acre-feet.[79]

Water supply is derived from both surface and underground waters.[80] From 1934 to 1955 average annual surface diversions were 187,000 acre-feet. In addition, approximately 99,000 acre-feet were pumped. Thus, about 35% of the water supply comes from ground water.[81] From total supply, the farmers have received 3 to 3½ acre-feet per acre for irrigation. The remainder is lost in transit in the canal system.[82] The Gila River is the primary source of surface water, although summer floods in the San Pedro River occasionally furnish some irrigation water. Pump water comes from wells operated by the Project, 108 of which were active in 1956. Natural flow surface

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[77]Tr. 1559 (Gookin).
[78]See p. 39, *supra.*
[79]Tr. 1492-1495 (Gookin).
[80]Tr. 1498 (Gookin).
[81]Tr. 1537 (Gookin).
[82]Tr. 3375-3377 (Gookin).

water in the Gila River and water stored by Coolidge Dam are subject to, and are administered under, a water rights decree.[83]

The San Carlos Project has been troubled by a shortage of surface water and declining water tables. If present agricultural and water supply conditions persist, some acreage will be forced out of cultivation and the project will eventually stabilize at 50,000 acres under annual cultivation.[84]

5. *Yuma Area.* Several Bureau of Reclamation irrigation projects and an irrigation district are operated on the Arizona side of the Colorado River in the vicinity of Yuma, Arizona. One of these is the Yuma Project, the Valley Division of which is located in Arizona and the Reservation Division in California. The largest of the projects, the Gila Project, has three irrigation units: North Gila Valley Irrigation District; Wellton-Mohawk Irrigation and Drainage District; and Yuma-Mesa Irrigation and Drainage District. Lying between the North Gila Valley and Yuma-Mesa units are privately irrigated lands known as South Gila Valley. Unit B Irrigation and Drainage District is the last of the projects in this area. At one time its lands were within the Yuma Project and it is still referred to as the Yuma Auxiliary Project. All of the surface water for these projects comes from the mainstream of the Colorado River.[85]

(a) *Yuma Project—Valley Division.* The lands within the Valley Division are located south of Yuma, Arizona, and

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[83]Tr. 1497-1501 (Gookin). Water rights are administered under the so-called "Gila River Decree" rendered in United States v. Gila Valley Irrigation District, et al. (Globe Equity No. 59) (D. Ariz. 1935), Ariz. Exs. 103, 300.

[84]Tr. 1539, 1562 (Gookin).

[85]Tr. 2196-2198 (Steenbergen).

run along the east side of the Colorado River to the Mexican Border.[86] Approximately 50,000 acres are served. Water from the Colorado River is diverted for this project at the west end of Imperial Dam through the All-American Canal. Before Imperial Dam was built, diversions had been made at Laguna Dam. Fifteen miles from Imperial the water is turned through Siphon Drop and passes under the Colorado River. On the east side of the River it is turned into the Yuma Project's main canal. This canal is divided into two channels, one running on the east side and the other on the west side of the Project, to the international border. Since 1951 the Yuma County Water Users' Association has been responsible for water deliveries to the Project lands.[87]

(b) *Gila Project.* The common works for the three units of this project are: Imperial Dam, the desilting basin at the east end of the dam and the Gila Gravity Canal, which takes out from the east end[88] and which was constructed between 1936 and 1938.[89] The canal, which has a capacity of 2,200 c.f.s.,[90] runs generally in a southerly direction from Imperial Dam, crosses the Gila River by siphon, and divides into branches, one running south to Yuma-Mesa and then on to Unit B Irrigation District, and one running east along the Gila River to Wellton-Mohawk.[91] The three units of the Project are:

(i) *North Gila Valley Irrigation District.* This project, the lands of which lie along the east side of the Colorado River just north of its confluence with the Gila River, is

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[86]See Ariz. Ex. 110A.

[87]Tr. 2198-2199 (Steenbergen); Ariz. Ex. 1000, p. 22; Calif. Ex. 214.

[88]Tr. 2199-2200 (Steenbergen).

[89]Tr. 2327 (Steenbergen).

[90]Tr. 2283 (Steenbergen).

[91]See Ariz. Ex. 108.

designed to serve 7,000 acres. It receives waters from the Gila Gravity Canal at a turnout with a 150 c.f.s. capacity.[92]

(ii) *Wellton-Mohawk Irrigation and Drainage District.* Located east of the North Gila Project along both sides of the Gila River, this project is designed to serve 75,000 acres[93] although only 30,000 acres were irrigated in 1955.[94] It receives its water from the Gila Gravity Canal at a turnout with a capacity of 1,300 c.f.s. From this turnout the Wellton-Mohawk Canal runs east and southeast, using three pumping plants to lift the water. The last pumping plant lifts the water into the Mohawk Canal, which at this point has a capacity of 900 c.f.s. The District has approximately 300 miles of canal system most of which is lined.[95]

(iii) *Yuma-Mesa Irrigation and Drainage District.* This project, which is now constructed to serve approximately 20,000 acres,[96] is located south of the North Gila Valley Project and east of the Yuma Project. The 14,566 acres irrigated in 1955 had never been irrigated prior to organization of the Project.[97] The Project receives its water from the Gila Gravity Canal at the Yuma-Mesa Pumping Plant which lifts the water 52 feet on to the mesa. The plant has a capacity of 700 c.f.s. and the Mesa Canal has a capacity of 620 c.f.s. The canal network is concrete lined and operates as a closed system.[98]

(c) *Unit B Irrigation and Drainage District.* Also known as the Yuma Auxiliary Project, this district is sit-

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[92]Tr. 2200-2201 (Steenbergen).
[93]Tr. 2203 (Steenbergen).
[94]Tr. 2390 (Steenbergen); Ariz. Ex. 186.
[95]Tr. 2202-2203 (Steenbergen).
[96]Tr. 2206 (Steenbergen).
[97]Tr. 2385, 2387-2389 (Steenbergen); Ariz. Ex. 186.
[98]Tr. 2205-2206 (Steenbergen). A closed system is one in which no provision for regulatory waste is made.

uated between the Yuma Project on the west and the Yuma-Mesa Project on the east. It is designed to serve 3,305 acres. Water is received from the Gila Gravity Canal via the Yuma-Mesa Canal System at the north end of the Project. The District's main canal has an initial capacity of 100 c.f.s. and the closed canal system is partially lined.[99]

(d) *South Gila Valley.* Also known as the Yuma Irrigation District, this organized irrigation project is located between the North Gila Valley and Yuma-Mesa Projects. This district, which is not presently operated as a federal reclamation project, includes approximately 10,000 acres. This acreage is irrigated by private pumping and by Colorado River water obtained under Warren Act contracts.[1] The land so serviced is within the authorized limits of the Gila Project.[2]

B. California

1. *Imperial Irrigation District.* Formed in 1911, at which time it included 513,000 acres, this district lies in the Salton Basin and its southern boundary is the international boundary.[3] Until 1922 deliveries of water were made by the District to mutual water companies on a wholesale basis.[4] Beginning in 1922, however, the District took over the operations of the mutual companies and delivered water on a retail basis directly to the farmer.[5] As of 1956,

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[99]Tr. 2207-2208 (Steenbergen).

[1]Tr. 2209-2210 (Steenbergen).

[2]Tr. 1154-1155 (Lewis); Ariz. Exs. 108, 179; U. S. Ex. 9.

In addition to the projects described above, there are other irrigated lands in Arizona, either organized into districts or privately operated, which were mentioned incidentally in the testimony but which were never the subject of full presentation. Among these are Buckeye, Arlington, Queen Creek, and the Roosevelt Water Conservation District.

[3]Tr. 6468-6469, 6473-6474, 7474-7475 (Dowd).

[4]Tr. 7486 (Dowd).

[5]Tr. 7542, 7558 (Dowd).

there were 905,560 acres within the District[6] and ultimate gross area is expected to be nearly 1,000,000 acres[7]. 474,555 acres were irrigated in 1955.[8]

The area encompassed by the District is arid. It has an average annual rainfall of three inches and there has been less than one-half inch of rain in some years. The mean annual temperature is 72 degrees and 110 days a year, on the average, have maximum temperatures of over 100 degrees. The sole source of irrigation water has been the Colorado River. Availability of underground water for irrigation purposes is in dispute.[9]

Water deliveries from the Colorado River to the Imperial Valley were first made at the turn of the century[10] and, over the years, several diversion points in both the United States and Mexico were employed. In 1907 water was first diverted at Hanlon Heading into the Alamo Canal, which lay partly in Mexico and entered the United States near Mexicali.[11] In 1918 a new diversion point, Rockwood Gate, went into operation upstream from Hanlon Heading and remained the primary diversion point until the All-American Canal was constructed.[12] Construction of the canal was commenced in 1934. However, because of difficulties in the operation of Imperial Dam, which was

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[6]Calif. Ex. 238. For the acreage additions from 1911 to 1956 see Calif. Ex. 238.

[7]Tr. 7902-7903 (Dowd).

[8]Tr. 8115 (Dowd). For annual irrigated acreage figures see Calif. Exs. 270-271.

[9]Dowd, a well qualified California witness, testified that there is no supply of potable underground water in the District. Tr. 6475-6476. In this connection, it should be noted that Imperial Valley, a major portion of the District, is a part of the Colorado River Delta which is a large area of silt deposits sometimes reaching a depth of 1,000 feet. Tr. 6478, 6495 (Dowd).

[10]Tr. 7312-7315 (Dowd).

[11]Tr. 6917 (Dowd).

[12]Tr. 7491, 7799 (Dowd).

dedicated in 1938 and which is the diversion point for the canal, service through the All-American Canal was delayed until 1940 and full service did not occur until February 1942. After this date no further deliveries were made through the Mexican works.[13]

The main works serving the Imperial Irrigation District in 1955 were: Imperial Dam; All-American Canal; Siphon Drop Turnout, the delivery point for the Yuma Project; Pilot Knob Check, Power Plant and Wasteway;[14] Drop No. 1, the turnout for the Coachella Canal; Drop No. 2 and Power Plant; East Highline Canal; and Westside Main Canal.[15]

Diversions through the All-American Canal for the period 1951-1955 averaged 5,232,000 acre-feet per year.[16] On the average, 3,836,000 acre-feet were annually diverted for Imperial Irrigation District and Coachella Valley County Water District and 1,396,000 acre-feet were diverted for the Yuma Project.[17] Deducting canal losses and diversions to Coachella, the total diversion for Imperial Irrigation District at Drop No. 1 on the All-American Canal averaged 3,129,000 acre-feet per year.[18]

2. *Coachella Valley County Water District.* Located in the Salton Basin northwest of the Salton Sea, Coachella Valley lies partly in Riverside County and partly in Imperial County, California. The Valley is surrounded on all sides save the south by mountains and is approximately

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[13]Tr. 7767, 7776, 7783 (Dowd).

[14]Beyond this point drainage is to the Salton Sea rather than to the Colorado River. Tr. 7787 (Dowd).

[15]See Calif. Ex. 212.

[16]Tr. 8096 (Dowd).

[17]Tr. 8103 (Dowd).

[18]Calif. Ex. 268; see Tr. 8089-8107 (Dowd).

50 miles long, one mile wide at the north end and eleven to twelve miles wide in the center.[19] The soil is fertile, light, sandy loam. The Valley enjoys low humidity helpful to agriculture, but its average rainfall of three inches per year falls mostly in cloudbursts harmful to growing crops.[20] Crops raised in the Valley include citrus fruits, grapes, specialty crops[21] and dates.[22] In fact, Coachella Valley is the only locality in the United States where dates are grown commercially.[23] As of 1956 double cropping was practiced on approximately 20% of the land.[24]

Total gross acreage within the District is 267,620 acres. The gross area of the Coachella Service Area, a division of the District, is 161,153 acres and the net area to be irrigated from the Colorado River is approximately 137,900 acres.[25] At the time of trial all irrigation occurred within Improvement District No. 1, the gross acreage of which is 135,275 acres,[26] although only 53,026 acres of this land were actually irrigated in 1955.[27] Approximately 10,500 unirrigated acres in Improvement District No. 1 are Indian lands which can be served by the system should laterals be installed.[28]

Ground water is present in the Valley and almost all farmsteads have private wells for domestic use. The sole

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[19]Tr. 8407 (Weeks).

[20]Tr. 8410-8411 (Weeks).

[21]Specialty crops are vegetables and other truck produce grown out of season which fetch premium prices.

[22]Tr. 8410, 8473 (Weeks).

[23]Tr. 8410 (Weeks).

[24]Tr. 8476-8477 (Weeks).

[25]Tr. 8488-8491 (Rowe); Calif. Ex. 318. The Coachella Service Area is land which is to be served by Colorado River water. The Area is defined in a contract with the United States dated October 15, 1934. Tr. 8377-8378 (Weeks); Ariz. Ex. 36.

[26]Tr. 8377-8379 (Weeks).

[27]Calif. Ex. 318, Table 4.

[28]Tr. 8397 (Weeks).

supply of water for the District as a distributor of water, however, is the Colorado River, and most irrigation is done with water from this source.[29]

The Coachella District is served by the Coachella Branch of the All-American Canal. The Coachella Canal, which was completed in 1947 and 1948, runs in a generally northwesterly direction to the end of Improvement District No. 1 where it swings around the north end of the Valley and follows a southwesterly direction for a short distance.[30] It turns out of the All-American Canal at Drop No. 1, and between Drop No. 1 and Check 6-A the canal is unlined and is shared by both Coachella and Imperial. At Check 6-A complete responsibility for operation and maintenance is assumed by Coachella.[31] For 37 miles after Check 6-A the canal remains unlined but the final 37 miles have been lined with concrete.[32] A settling basin for the removal of debris that accumulates in the unlined portion has been constructed where the canal enters Improvement District No. 1.[33] Beyond this point, on the east side of the canal, levees and detention basins protect the canal from intrusion of storm water.[34]

Distribution of water from the canal is made by an underground closed system of pipelines of which there are 470 miles in Improvement District No. 1. In addition, a high pressure lateral takes water from the canal and traverses the Valley to deliver water to the Oasis Area,

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[29]Tr. 8516-8517 (Rowe); Calif. Ex. 318, Table 4.

[30]Tr. 8387 (Weeks); see Calif. Ex. 306.

[31]Tr. 8422 (Weeks).

[32]Tr. 8424 (Weeks). The capacity of the canal at various points is as follows: Drop No. 1, 2500 c.f.s., 1500 c.f.s. for Coachella and 1,000 c.f.s. for Imperial; Check 6-A, 1500 c.f.s.; beginning of lined portion, 1300 c.f.s.; end of canal, 425 c.f.s. Tr. 8422, 8426, 8443 (Weeks).

[33]Tr. 8388 (Weeks).

[34]See Calif. Ex. 306.

which contains approximately 9,000 acres. Water deliveries to the farmer are measured by meter at each farm turnout.[35] In general, water is distributed by a gravity system, but in a few areas it is pumped to higher elevations.[36] It is the practice in the District, and thought to be a necessity, to deliver water to farmers on demand.[37]

The District's drainage system must account for storm water, discharge from farms and other waste water. Coachella Valley Storm Water Channel is an extension of White Water River and runs through the central part of the District into the Salton Sea. It carries both flood and drainage waters.[38] Open drains and an underground closed system emptying into the Salton Sea constitute the balance of the drainage system. Approximately 25% to 30% of the proposed underground closed drainage system was competed at the time of trial.[39]

3. *Palo Verde Irrigation District.* Palo Verde Valley, in which the defendant Palo Verde Irrigation District is located, is geographically part of a larger valley which also includes the Cibola Valley. Palo Verde Valley lies west of the Colorado River approximately midway between Parker and Imperial Dams[40] and is about 30 miles long and six miles wide. Its principal city is Blythe.[41] On January 1, 1956, there were 103,707 acres of land in the Valley and 17,459 acres on the Mesa within the District[42] Crop reports for 1956 show 72,200 acres under cultiva-

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[35]Tr. 8392-8395 (Weeks).
[36]Tr. 8439 (Weeks).
[37]Tr. 8467 (Weeks).
[38]Tr. 8386 (Weeks).
[39]Tr. 8460-8464 (Weeks).
[40]See Calif. Ex. 301.
[41]Tr. 8552 (Tabor).
[42]Tr. 8549 (Tabor).

tion in that year and a crop value of $20,000,000 exclusive of livestock.[43]

The irrigation history of the Valley goes back to some time before the turn of the century. One witness observed irrigation in the Valley in 1908 and ground conditions indicated to him that irrigation had been practiced at an earlier date.[44] In 1908, when the population of the Valley was approximately 1,100, irrigation water was obtained by direct diversions from the Colorado River, pumping ground water and diversions from sloughs regularly flooded by river overflows.[45] The construction of Laguna Dam aggravated two recurring problems: annual flooding, which was worsened by water backing up above Laguna Dam; and a rising water table, which caused serious drainage problems.[46] Moreover, construction of dams upstream reduced the level of the Colorado River, causing difficulty with the diversion works.[47]

The primary water supply for irrigation in the District is the mainstream of the Colorado River, although two areas on the Palo Verde Mesa are irrigated by wells.[48] Colorado River water is obtained by orders placed by the District with the Office of River Control, Bureau of Reclamation.[49]

The principal diversion work serving the District is Palo Verde Weir, a temporary diversion structure on the Colorado River.[50] Erected in 1944 and 1945, the Weir was made necessary by the lowering of the River's surface due

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[43]Tr. 8715, 8719-8720 (Tabor).
[44]Tr. 8702-8704 (Seeley).
[45]Tr. 8673-8676 (Seeley).
[46]Tr. 8686, 8694 (Seeley).
[47]Tr. 8695-8698 (Seeley).
[48]Tr. 8751 (Tabor).
[49]Tr. 8755-8756 (Tabor).
[50]Tr. 8555 (Tabor); see p. 35, *supra.*

to scouring attributable to construction of upstream dams. It is maintained by the District and the Bureau of Reclamation. The intake at the Weir is a reinforced concrete structure with a capacity of 2100 c. f. s. or more, depending on the height of the River's water surface.[51] The District's main canal takes out at the Weir and carries the water to a settling basin.[52] From the settling basin the water is distributed through 280 miles of canals and laterals and approximately 400 miles of privately owned and maintained ditches. Distribution is effected partly by gravity and partly by pumping canal water to higher elevations. The canal and lateral system is unlined.[53] Drainage from the District is to the Colorado River at a point about eight miles south of the Riverside-Imperial County line. There are approximately 120 miles of drains, very few of which are tiled.[54]

4. *Yuma Project—Reservation Division.* Located wholly within the State of California, this portion of the Yuma Project is located north of, and across the Colorado River from, Yuma, Arizona.[55] Although not a party to this litigation, evidence was nonetheless presented on its behalf by the State of California. Total acreage in the general area of the Reservation Division—the area between the All-American Canal and the Colorado River—is roughly 28,000 acres. At the time of trial approximately 15,700 acres were under the Reservation Division water distribution system. Of this amount, 8,200 acres were Indian land and 7,500 acres non-Indian land. Some land within the Division is irrigated by well water and other lands, although irrigable,

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[51]Tr. 8705-8707 (Tabor).
[52]Tr. 8555 (Tabor).
[53]Tr. 8708-8710 (Tabor).
[54]Tr. 8710-8711 (Tabor).
[55]Tr. 8813 (Steenbergen); see Calif. Ex. 50.

are not served at all. Irrigable acreage under distribution system in 1957 was 14,610 acres.[56] The net area actually irrigated in 1956 was 9,460 acres.[56a]

The Reservation Division receives its surface irrigation water from the Colorado River by means of the All-American Canal. Prior to the construction of this canal, diversions were made at Laguna Dam through the Yuma Main Canal.[57]

The principal works of the water distribution system are a network of canals and laterals taking out from the All-American Canal.[58] In 1957 the wholly unlined distribution system comprised 76.5 miles of canals and laterals.[59] Operation and maintenance are conducted by the Bureau of Reclamation which delivers water to the farmers' headgates.[60]

5. *Metropolitan Water District.* The Metropolitan Water District is located on the coastal plain of Southern California, which is outside the drainage area of the Colorado River. Water is brought into the District from the River by means of trans-mountain diversions.[61] The principal mountain ranges east of the general coastal plain area are the Santa Monica, San Bernardino, San Jacinto, Santa Ana and Laguna Mountains. There is no range of mountains on the coast in Southern California, however, and this factor accounts in part for the tremendous population growth in the area.[62]

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[56]Tr. 8824 (Steenbergen).

[56a]Calif. Ex. 375. Later figures are not in evidence.

[57]Tr. 8817-8818 (Steenbergen).

[58]See Calif. Ex. 371.

[59]Tr. 8833, 8840 (Steenbergen).

[60]Tr. 8819 (Steenbergen).

[61]See Calif. Ex. 401.

[62]Tr. 9404-9406 (Morris).

Seventy per cent of the rainfall in the southern coastal plain occurs during January, February and March and 70% of the run-off occurs in these months and the month of April. Average annual rainfall at Los Angeles is 15 inches and at San Diego it is 10 inches. Precipitation in the upper valleys to the east increases to 15 to 20 inches per annum and annual rainfall in the mountainous areas may be 30 to 40 inches or more. There are, however, great fluctuations from year to year in the rainfall of the area. Indeed, there have been years when Los Angeles has received less than five inches of rain.[63]

A number of streams rise in the mountains to the east of Los Angeles and flow southerly and westerly to the Pacific Ocean. The Los Angeles River System rises in the San Gabriel Mountains and flows out of the San Fernando Valley through the narrows near Elysian Park and thence to the Ocean. The San Gabriel River drains the area north of the San Gabriel Valley, runs through the Valley and then divides, one branch discharging into the sea at Alamitos Bay and the other flowing into the Los Angeles River which discharges at Long Beach, California. The stream with the largest drainage area in the coastal plain is the Santa Ana River, which drains the San Bernardino Mountains and a portion of the San Gabriel Mountains and flows through the Santa Ana Canyon and thence to the Ocean near Newport.[64]

The major ground water basins in the southern California coastal basin are the Orange County and central basin (divided into an easterly and westerly portion, respectively, by the county line between Orange and Los Angeles Counties), and westerly of this basin, the west basin. As water is pumped from these basins, the water level falls

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[63]Tr. 9407-9408 (Morris).
[64]Tr. 9417-9419 (Morris).

below sea level, and the ground water tends to slope downward inland away from the ocean. As a result, salt water intrudes into the basin and moves inland so that portions of these basins nearest the ocean have already been lost. In order to protect the basins, Colorado River water is spread on the ground and percolates to the ground water where it helps to raise the elevation of the ground water table so that the barrier against the salt water intrusion is maintained.[65]

A number of works have been constructed to conserve and store water in the southern coastal plain. Approximately sixty storage reservoirs have been built in the four counties of Los Angeles, San Bernardino, Orange and Riverside, the total storage capacity of which is roughly 620,000 acre-feet. The area is not well suited to the erection of storage reservoirs because of the lack of satisfactory dam sites and because of the friable quality of the mountains which permits substantial accumulation of debris.[66]

The local water supply of the southern coastal plain has been augmented by importation of water from other areas. The first of these trans-basin diversions came with completion in 1913 of construction on the Owens Valley Aqueduct which transports water 240 miles from the Owens River to Los Angeles. Prior to that year the Los Angeles River was virtually the sole source of supply for the City of Los Angeles.[67] The Owens River diversion proved to be inadequate because there was less water in the Owens River than had been expected and because the Los Angeles population became greater than had been anticipated. The water shortage was met by pumping ground water in the Owens Valley Basin, the City of Los Angeles having purchased

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[65]Tr. 9595-9602 (Elder).

[66]Tr. 9421-9422 (Morris).

[67]Tr. 9425 (Morris). For a full description of the Owens River Project see Tr. 9427 *et seq.*

nearly 300,000 acres of land in the basin in order to guarantee its supply of ground water. In addition, Los Angeles extended the Owens Valley Aqueduct into the Mono Basin and took water therefrom through Owens Valley into the City. The local supply in Los Angeles, added to the supply made available by the Owens Valley and Mono Basin diversions, provided an adequate supply for approximately 2,000,000 persons.[68] In 1928 it became apparent that this water supply was no longer adequate and the Metropolitan Water District was formed to obtain a greater supply.[69]

The area of the District, which in 1957 was approximately 3,000 square miles, has expanded steadily and is expected to expand still further in the future. It embraces the territory from a point north of Los Angeles to the Mexican border south of San Diego and includes cities and other municipal corporations lying along the southern coastal plain of California. As of 1957 the following entities were members of the District: in Los Angeles County—Beverly Hills, Burbank, Compton, Glendale, Los Angeles, Long Beach, Pasadena, Santa Monica, San Marino, Torrance, West Basin Municipal Water District, Pomona Valley Municipal Water District, Foothill Municipal Water District, Central Basin Municipal Water District; in Orange County—Anaheim, Fullerton, Santa Ana, Coastal Municipal Water District, Orange County Municipal Water District; in San Diego County—San Diego County Water Authority; in Riverside County—Eastern Municipal Water District, Western Municipal Water District; and in San Bernadino County—Chino Basin Municipal Water District.[70] The Metropolitan Water District acts exclusively as a wholesaler of water, which it

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[68]Tr. 9429-9435 (Morris).
[69]Tr. 9494-9504 (Elder).
[70]See Calif. Ex. 447.

delivers to these constituent members who in turn act as retailers to the consumer.[71]

The principal works serving the Metropolitan Water District are Parker Dam, the Colorado River Aqueduct, Lake Mathews and the distribution system below Lake Mathews.

Parker Dam has been described earlier.[72] Its most important functions from the point of view of the District are: removal of silt to permit pumping of water through the aqueduct to the coastal plain; raising the water level of the Colorado River and thus decreasing the lift necessary to bring water to the aqueduct; and generation of part of the power required to pump the water through the aqueduct. The Metropolitan Water District receives approximately 50% of the electrical energy generated at Parker Dam and all of the power so received, as well as power received from Hoover Dam, is used to lift water through the aqueduct.[73]

Preliminary plans for construction of the Colorado River Aqueduct commenced in 1923 when the chief engineer of the Los Angeles Water and Power Department traveled to the Colorado River for the purpose of locating a suitable diversion point for an aqueduct to carry water to Los Angeles. The early surveying of possible routes and diversion points, which began in 1923, was attended by extreme hardship due to the nature and climate of the country through which the aqueduct was to pass.[74] Enginering and surveying work on the proposed route took place from 1923 to 1933 during which time 50 to 250 men were continually employed on the project.[75]

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[71]Tr. 9565 (Elder).

[72]See pp. 33-34, *supra.*

[73]Tr. 9609-9612 (Elder). For additional details on Parker Dam and its related works see Calif. Ex. 477.

[74]Tr. 9451-9457 (Parratt).

[75]Tr. 9467 (Parratt).

The Colorado River Aqueduct was completed in 1940 and the first actual delivery of water occurred in June, 1941. The 18-month lapse between completion and delivery was attributable to the filling of the reservoirs.[76] The aqueduct as finally constructed diverts water at Lake Havasu, the reservoir created by Parker Dam. Water passes through an intake pump lift of 295 feet at the lake and flows two miles west to the Gene Wash Pump Lift which has an approximate lift of 296 feet. The aqueduct then proceeds 60 miles to the Iron Mountain Pump Lift of 140 feet, thence by gravity, through tunnels and canals, to the Eagle Mountain Pump Lift, which raises the water 440 feet, and finally to the Hayfield Pump Lift of 441 feet. Thus, the total lift of the Colorado River Aqueduct is approximately 1,612 feet. From the Hayfield Pump Lift to the end of the aqueduct water travels by gravity.[77]

Ninety-eight per cent of the length of the aqueduct lies on a right of way obtained from the Federal Government and 2% traverses private land. Its nominal designed capacity is 1,605 c.f.s. but its actual carrying capacity is only 93% of that, or roughly 1,500 c.f.s. The 7% difference is accounted for by operational shutdowns, inspections, cleanups and repairs. As of 1957 actual carrying capacity with the pumps then installed on the aqueduct was 1,000 c.f.s. However, at that time additional pumps were being installed to increase the capacity.[78]

There are a number of small reservoirs and wasteways along the route of the aqueduct. The Gene Wash Reservoir, used for canal regulation to avoid wasting water, is two miles from the Colorado River and has a usable active

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[76]Tr. 9535 (Elder).

[77]Tr. 9527-9528 (Elder); see Calif. Ex. 449.

[78]Tr. 9528-9531 (Elder). For a detailed description of the Aqueduct see Calif. Ex. 455.

capacity of 3,000 acre-feet.[79] Cooper Basin Reservoir has a capacity of 20,000 acre-feet.[80] The aqueduct's wasteways are used for emergencies such as emptying the canal because of a drowning or desert rainstorm. It has been estimated that in recent years losses have never exceeded 50 acre-feet annually.[81]

In addition to reservoirs and wasteways, there are a series of so-called inverted siphons along the aqueduct. These inverted siphons are pipes that dip below the hydraulic gradient of the aqueduct system so that the water is under sufficient pressure to be pushed down one side of a hill and up the side of another. The term "siphon" is inappropriate since these pipes produce no siphonic action at all.[82]

Except for a one-mile section at the east end of Lake Mathews where water is gained by percolation, the entire aqueduct is lined.[83]

Lake Mathews serves as a storage reservoir at the end of the aqueduct and performs two functions: it regulates the fairly uniform inflow in order to supply peak demands occurring in July and August; and it also provides an emergency supply. Lake Mathews is never permitted to have less than 50,000 acre-feet of storage so that a reserve always exists in case of major disaster such as earthquake or fire. The present storage capacity of Lake Mathews is 103,000 acre-feet. The District plans to double this capacity in the near future.[84]

Distribution of Colorado River water brought into the southern coastal plain at Lake Mathews is effected

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[79]Tr. 9537 (Elder).
[80]Tr. 9543 (Elder).
[81]Tr. 9560-9562 (Elder).
[82]Tr. 9540-9542 (Elder).
[83]Tr. 9557 (Elder).
[84]Tr. 9567-9568 (Elder).

entirely by a closed pipeline system operated primarily by gravity. From Lake Mathews a pipeline known as the Upper Feeder follows a northerly course to Fontana, California, at which point it turns west through Ontario and Pomona to the Laverne Softening and Filtration Plant where it divides. From Laverne the main line proceeds northwesterly and westerly through Pasadena, Burbank, Glendale, Beverly Hills and Santa Monica. Just west of Pasadena this line divides again and the other branch takes a southerly direction terminating at the Palos Verdes Reservoir. The other pipeline taking out at the Laverne Softening and Filtration Plant proceeds south to service the main cities of Orange County.[85] The capacity of the Laverne plant is 200,000,000 gallons per day (approximately 614 acre-feet) and water is treated to render it more suitable for industrial and domestic use.[86]

The water distribution system below Lake Mathews includes a number of small regulatory and storage reservoirs. The Orange County Reservoir, which has a capacity of 200 acre-feet, is chiefly used to regulate the flow of the pipeline carrying water from Lake Mathews by equalizing the difference between supply and demand occurring during night and day, summer and winter. The Corona Del Mar Reservoir at the south end of the Orange County pipeline is a small regulatory reservoir designed to prevent waste at the terminus of the pipeline. Morris Dam Reservoir has a capacity of about 35,000 acre-feet which is held solely for emergency use in case of major catastrophe. It is not filled with Colorado River water and under ordinary circumstances neither supplements nor diminishes the supply in the distribution system. The Palos Verdes Reservoir is another regulatory reservoir at the end of one branch of the

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[85]Tr. 9566-9567 (Elder); see Calif. Ex. 447.
[86]Tr. 9574 (Elder).

pipeline and is designed to prevent waste resulting from uneven supply and demand. Finally, Garvey Reservoir in the Monterey Hills just east of the center of Los Angeles has a capacity of 1,500 acre-feet and is used for regulatory and emergency purposes in the downtown area of metropolitan Los Angeles and in the Harper area of Long Beach.[87]

As of 1957 the distribution system of the Metropolitan Water District was not complete; many portions were still under construction and still others were being planned. It has been estimated that the ultimate construction would be finished in 1960.[88]

As noted previously, water supply for the members of the District comes from local sources and from the Owens River, the Mono Basin and the Colorado River. It is clear that the greatest part of the Colorado River water is used for industrial, municipal and domestic purposes.[89] It has been estimated that only 15% of water from the River is used for irrigation.[90] Total diversions from the River to the Colorado River Aqueduct in 1956 were 481,493 acre-feet.[91]

6. *San Diego County Water Authority.* San Diego County is situated on a plateau which begins near the coastline and which rises slightly until it reaches the foothills of a range of mountains whence it rises steeply to a point approximately 40 miles from the coast. At the highest point of this ridge of mountains drainage is to the east into the Imperial Valley. Most of the County's habitable land is found in a belt that begins at the coast and extends 20 or 25 miles inland; further east the terrain is rough. Rainfall

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[87]Tr. 9576-9583 (Elder).
[88]Tr. 9591-9592 (Elder).
[89]Tr. 9594 (Elder).
[90]Tr. 9647 (Elder).
[91]See p. 128, *infra*.

in the County is erratic, varying from 4½ to 26 inches annually.[92]

The San Diego County Water Authority was incorporated in 1944. In 1956 it had 17 member agencies, an area of 678.6 square miles and a population of 754,500. In 1946 the Authority became a member of the Metropolitan Water District by annexation. The Authority obtains water from two sources: local supply and the Colorado River. Approximately 75% of all water used comes from the River and, in 1956, 115,094 acre-feet were received from this source.[93] There are no undeveloped sources of local water in the San Diego area that can be economically exploited and, therefore, present and projected water requirements can be satisfied only by imported water.[94]

Colorado River water reaches the San Diego County Water Authority through the Colorado River Aqueduct and the San Diego Aqueduct. The Colorado River Aqeduct has been described above[95] The San Diego Aqueduct consists of two installations or barrels; the first barrel was installed from 1945 to 1947 and the second in 1954. Both barrels take out of the Colorado River Aqueduct at the San Jacinto Tunnel and follow a southerly course terminating at the San Vicente Reservoir in San Diego County. The capacity of both barrels is 180 c.f.s. at Rainbow, California, and 165 c.f.s. at the terminal point. There are no pumping plants on the aqueduct; water flows by gravity from the Colorado River Aqueduct at San Jacinto to the San Vicente Reservoir. In general, the terrain over which the aqueduct runs is hilly and this factor necessitated the construction of a number of tunnels through which the conduit passes. Title to the aqueduct remains in the United

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[92]Tr. 9676-9681 (Beerman).
[93]Tr. 9715-9721 (Holmgren).
[94]Tr. 9683, 9695-9696 (Beerman).
[95]See p. 38-39, 65-67, *supra.*

States but is presently being purchased by the Authority under a lease-purchase contract. The northerly portion of the aqueduct lying between the San Jacinto take-out and the San Louis Rey River was financed and is operated by the Metropolitan Water District; the portion of the aqueduct south thereof is operated by the San Diego County Water Authority.[96]

Important reservoirs in the system include the San Jacinto Reservoir and the San Vicente Reservoir. The former, which is located two miles below the take-out of the San Diego Aqueduct, has a storage capacity of 1,800 acre-feet and acts as a balancing reservoir between the Colorado River and San Diego Aqueducts. San Vicente Reservoir has a capacity of 90,230 acre-feet and stores water for use in the County.[97]

C. Nevada

1. *Virgin River Drainage Basin.* Irrigation is practiced along the Virgin River in the vicinity of Littlefield, Arizona and Mesquite and Bunkerville, Nevada. In 1954, approximately 2,800 acres in Nevada were irrigated by Virgin River water.[98] During the low flow of the Virgin River from May to October, river flow is derived primarily from saline springs just north of Littlefield and this water has an extremely high salt content—2,500 parts per 1,000,000.[99] Because of the poor quality of the water during these months farmers have found it necessary to use Virgin River water during other parts of the year for leaching purposes.[1]

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[96]See Calif. Ex. 523.
[97]Tr. 9678-9680 (Beerman); see Calif. Ex. 523.
[98]Tr. 16221 (Shamberger).
[99]Tr. 16209-16210, 16368 (Shamberger).
[1]Tr. 16954-16956 (Shamberger).

Main diversions for use in Nevada are made through the Mesquite and Bunkerville Canals; in 1954, 18,100 acre-feet were diverted through the former and 10,530 acre-feet through the latter.[2] The large amount of these diversions, which approximate 10 acre-feet per acre annually, it attributed to the poor quality of the water diverted during much of the year.[3] Some of the waters of the Virgin River used in Nevada are allocated under judicial decrees;[4] decreed rights, together with other established rights, cover 22,430.3 acre-feet of water and 2,834.59 acres of land.[5]

2. *Muddy River Drainage Basin.* The Muddy River drains approximately 1,650 square miles, excluding the drainage area of Meadow Valley Wash. Its permanent flow originates in a series of springs located eleven or twelve miles above Glendale, Nevada. These springs provide a uniform monthly flow which averages approximately 34,000 acre-feet per year. There is no permanent flow above the springs. The water quality is fairly good, containing approximately 700 parts of dissolved solids per 1,000,000.[6] In 1954 roughly 5,240 acres in Nevada were irrigated from the Muddy River. Of this amount, 1,860 acres were irrigated in the Upper Moapa Valley, 3,030 acres in the Lower Moapa Valley and 350 acres in the Overton Wildlife Management Area.[7] Some of the waters of the Muddy River are subject to a court decree.[8]

3. *Meadow Valley Wash.* A dry creek tributary of the Muddy River, Meadow Valley Wash drains an area

[2]Nev. Ex. 6.
[3]Tr. 16885-16886 (Shamberger).
[4]See Nev. Ex. 7.
[5]Tr. 16224 (Shamberger).
[6]Tr. 16231-16232 (Shamberger).
[7]Tr. 16237 (Shamberger).
[8]Nev. Ex. 14.

of 2,540 square miles. Its flow originates in springs but the water is either consumed or lost prior to its reaching the lower reaches of the Wash.[9] Approximately 5,000 acres in the area known as Upper Meadow Valley Wash were under irrigation in 1958 but no acreage was irrigated in the Lower Meadow Valley Wash.[10] In the opinion of the state engineer, the use of water for irrigation on the Upper Meadow Valley Wash has no effect on stream flow conditions in the channel of the Meadow Valley Wash at Glendale or on the amount of water that ultimately reaches the Muddy River because of the great losses that occur in the lower reaches of the Wash.[11] There is no decree adjudicating water rights on the Meadow Valley Wash or its tributaries.[12]

4. *Las Vegas Valley.* Las Vegas Valley runs in a northwesterly-southeasterly direction and is bounded on the west by the Spring Mountains, on the northeast by portions of the Desert, Sheet and Las Vegas Ranges, on the east by Franklin Mountain and on the south by the River Mountains and the northern extremities of the McCullough Range. The Valley embraces approximately 400 square miles.[13] Situated in its center is the principal residential and trading area of Southern Nevada—the City of Las Vegas. Covering an approximate area of 24 square miles the City had a population of 48,500 on January 1, 1956. Other important municipalities in the Valley are North Las Vegas, with an area of 6.25 square miles and a population of 12,900 in 1956, and Henderson, 12 miles southeast of Las Vegas and adjacent to converted war production plants, with an area of 13 square miles and a population of 14,000 in 1956.

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[9]Tr. 16252-16253 (Shamberger).
[10]Tr. 16255-16256 (Shamberger).
[11]Tr. 16287-16288 (Shamberger).
[12]Tr. 16256 (Shamberger).
[13]Tr. 16295-16296 (Shamberger).

In addition, there are several military and defense establishments in the vicinity of Las Vegas.[14]

As of July 1956, approximately 130,000 acres in the Valley were privately owned. The remaining land in the Valley was part of the public domain, some 86,000 acres of which were classified by the Bureau of Land Management as open for small home sites. Since 1956 a number of these home sites have been taken up.[15]

Until recently the primary source of water for most of Las Vegas Valley has been ground water. Since 1945 the ground water supply has been greatly overdrawn. Although estimated average annual replenishment of ground water in the Valley is 27,000 acre-feet,[16] estimated withdrawals were 31,700 acre-feet in 1946, 36,700 acre-feet in 1950, 43,150 acre-feet in 1955 and 47,000 acre-feet in 1956.[17] Pumping of underground supply is regulated in Las Vegas Valley and issuance of well permits has been restricted.[18]

Pursuant to 1947 legislation, the Las Vegas Water District was formed to obtain water from Lake Mead and to provide an expanded water service. In 1956 a total of 21,700 acre-feet of water was pumped from Lake Mead through the Basic Management Industries' pipeline. Of this amount, 1,769 acre-feet were delivered to the Las Vegas County Water District's distribution system. In the same year a total of 68,700 acre-feet of water was used in the Valley.[19]

5. *Boulder City.* Boulder City is located in Nevada, southwest of Hoover Dam. Its water supply is from Lake

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[14]Tr. 16299-16301 (Shamberger).
[15]Tr. 16303-16304 (Shamberger).
[16]Tr. 16307-16308 (Shamberger).
[17]Tr. 16309 (Shamberger); Nev. Ex. 33. See also Nev. Exs. 29-32, 34-36.
[18]Tr. 16324-16326 (Shamberger).
[19]Tr. 16327-16333 (Shamberger).

Mead and, in 1953, 2,400 acre-feet were pumped into the City from that source. The pump lift between the Lake and the City is approximately 1,300 feet.[20]

6. *Miscellaneous Small Areas in Nevada.* These areas are presently undeveloped. However, they are briefly described below in order to complete the picture of actual and potential Nevada water uses.

(a) *Eldorado Valley.* This valley is located to the south and west of Boulder City, Nevada. The State of Nevada is presently negotiating for the purchase of these lands from the United States. Approximately 30,000 acres are suitable for home sites and roughly 19,000 acres can be commercially irrigated. There is no local water supply; water for this area would have to come from Lake Mead.[21]

(b) *Apex Dry Lake Valley.* Situated about 15 miles northeast of Las Vegas, Nevada, this valley embraces between 100,000 and 150,000 acres of land.[22]

(c) *California Wash Area.* This land adjoins the Apex Dry Lake Valley on the north and extends to the Muddy River. Owned by the United States, it contains approximately 77,000 acres below Contour 2300. Water from Apex Valley would flow by gravity into this area.[23]

(d) *Mormon Mesa Area.* This area is located northeast of Glendale, Nevada, between Glendale and Mesquite. Nevada hopes to apply Lake Mead water here to develop irrigated farmland and small home sites.[24]

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[20]Calif. Ex. 2716.
[21]Tr. 16355-16361 (Shamberger).
[22]Tr. 16364 (Shamberger).
[23]Tr. 16365-16366 (Shamberger).
[24]Tr. 16366-16367 (Shamberger).

D. New Mexico

Approximately 10,900 square miles of New Mexico territory lie within the Lower Colorado River Basin, of which roughly 830 square miles lie within a closed basin in the Carrizo area. Thus, about 10,000 square miles in New Mexico are drained by the Lower Colorado River System. This represents almost one-twelfth of the total area of the State. This part of the Lower Basin lies along the western border of New Mexico, measures approximately 312 miles from north to south and has a maximum width east to west of 72 miles.[25] It is divided into two sub-basins: the Little Colorado River sub-basin on the north; and the Gila River sub-basin on the south.

The Little Colorado River sub-basin contains about 4,200 square miles. Its northern portion is characterized by low mesas, desert cliffs and dry washes. Its southern portion is covered by recent lava flows except in the vicinity of the Gallo Mountains where older lava flows predominate. The principal tributaries of the Little Colorado River in New Mexico are Black and Carrizo Creeks, Rio Puerco and the Zuni River.[26]

The Gila River sub-basin contains approximately 5,800 square miles. It is generally characterized by high mountains, deep canyons and small open valleys. In addition, its southernmost portion is desert-type country. The principal streams of this sub-basin are the Gila River and its tributaries—the San Francisco River and San Simon Creek. The primary sources of water supply for the mainstream of the Gila in New Mexico are several high mountain ranges with elevations up to 10,000 feet.[27]

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[25]Tr. 17264 (Hale).
[26]Tr. 17265-17268 (Hale).
[27]*Ibid.*

A more detailed description of the various areas of the Lower Basin in New Mexico is best effected by separate treatment of the drainage areas of each of the seven principal streams tributary to the Colorado River.[28]

1. *Area 1—Black Creek.* The drainage area of the streams located here, Black Creek and Todilto Wash, is 229 square miles. Area 1 is partly mountainous and Black Creek flows from mountains into rolling, mountain-valley country with elevations of 6,000 to 8,837 feet. Mean average temperature is 48.1 degrees, mean annual precipitation is 12.74 inches and the summer frost-free period is 130 days. The principal occupation in Area 1 is farming and cattle and sheep ranching; there is only one community of any size—the small town of Crystal.[29]

2. *Area 2—Rio Puerco.* The only important stream in this area, Rio Puerco, is fed by numerous dry washes and its flow depends primarily upon occasional rainfall. Its drainage area is 1,083 square miles. The terrain is rolling, dry, hill and cliff country with elevations ranging from 6,000 to 8,837 feet. Mean annual temperature is 50 degrees, annual average precipitation is 13.99 inches and the frost-free period is 153 days. The only substantial city in the area is Gallup, New Mexico, with a population of 11,500.[30]

3. *Area 3—Zuni.* The principal streams here are Atarque Creek and the Rio Pescado and Rio Nutria which form the Zuni River. These streams, which in certain reaches are spring fed, form on the western slope of the Zuni Mountains and flow in a southwesterly direction. After flowing from the mountains they traverse a high, rolling

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[28]See Tr. 17263 (Hale); N. M. Ex. 400.
[29]Tr. 17269-17270 (Hale).
[30]Tr. 17271-17272 (Hale).

plateau. Elevations run from 6,000 to 8,600 feet. Their drainage area is 1,075 square miles. Mean annual temperature in the area is 50 degrees, mean annual precipitation is 12.65 inches and the average frost-free period is 151 days. The principal community is the town of Zuni, with a population of 3,000. In general, the economy is based on cattle and sheep ranching and some irrigation farming. In addition, Indians from the Zuni Reservation manufacture jewelry.[31]

4. *Area 4—Carrizo.* Major streams in this area are the Carrizo, Largo and Agua Fria Creeks which have a drainage area of 1,815 square miles. The land is high rolling plateau country similar to that in Area 3 (Zuni) except for lava flows and a closed basin of 830 square miles in the area. Elevations range from 6,000 to 9,200 feet. Mean annual temperature is 47 degrees, precipitation is 12.76 inches and the frost-free period is 116 days. Quemado, located in the center of the area, is the largest community, with an approximate population of 250. The area's economy is based primarily on lumbering and cattle and sheep ranching.[32]

5. *Area 5—San Francisco.* There are a number of streams in this area, including the San Francisco River and Center Fire, Apache, Tularosa, Mogollon, Mineral, Deep and Mule Creeks. Their drainage area is 1,917 square miles. The area consists of high, mountainous terrain with some sloping hills and valleys. In the Luna area, at elevation 7,050, mean annual temperature is 46 degrees, mean annual precipitation is 16.35 inches and the frost-free period is 94 days. In the lower elevations of Area 5, in the vicinity of Glenwood, elevation is 4,717 feet, mean annual tempera-

[31]Tr. 17273-17274 (Hale).
[32]Tr. 17274-17275 (Hale).

ture is 58 degrees, mean annual precipitation is 17.05 inches and the frost-free period is 168 days. Towns are small; the largest is Reserve, New Mexico, with a population of approximately 500. Stock raising, farming, lumbering and a few recreational enterprises constitute the basis of the economy.[33]

6. *Area 6—Gila.* Of the many streams in this area the most important is the upper reach of the main Gila River. The total drainage in Area 6 is 3,363 square miles. The Gila rises in high mountains, flows through narrow valleys for about 70 miles, traverses Cliff Valley and then flows through intermittent canyons to the Virden Valley at the state line. Elevations range from 3,800 to 10,778 feet. At Cliff Valley elevation is 4,800 feet, mean annual temperature is 56 degrees, mean annual precipitation is 15.12 inches and the frost-free period is 158 days. In addition to Cliff-Gila, population 400, the other center of population in the area is Virden with a population of less than 1,000. Other towns nearby, but outside the basin, are Silver City, population 8,500, and Lordsburg, population 4,000. The area is serviced by railroads and highways and the primary occupations of its inhabitants are mining, cattle raising and irrigation farming.[34]

7. *Area 7—San Simon.* The San Simon Creek in this area is an ill-defined stream draining only 383 square miles. The drainage area is a dish-shaped valley between two mountain ranges and Rodeo is its one village. Mean annual temperature is 55.5 degrees, mean annual precipitation is 18.52 inches and the frost-free period is 178 days.[35]

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[33]Tr. 17275-17277 (Hale).
[34]Tr. 17277-17278 (Hale).
[35]Tr. 17279 (Hale).

E. United States

1. *Indian Reservations—Little Colorado River Area.*

(a) *Navajo Reservation.* Located in the northeast corner of Arizona, the northwest corner of New Mexico and the southeast corner of Utah, this Reservation contains approximately 14,000,000 acres of land. It is an area of very high plateaus, flat-top mesas, inaccessible buttes and deep canyons. Because of this topography, about 1,500,000 acres are inaccessible even to livestock. Elevations range from approximately 2,800 feet at the mouth of the Little Colorado River to 9,000 feet along the drainage divide between the San Juan and Little Colorado Rivers. The climate is very dry, vegetation is sparse and the winters are long and extremely cold, some temperatures dropping as low as 30 degrees below zero. Summer temperatures are also extreme, ranging upwards to 100 degrees. Average annual rainfall over the whole Reservation is about eight inches, most of which falls in torrential summer rains.[36]

The Navajo Indians do not live in villages. Because of the poor range conditions and intermittent arable areas they are scattered over the Reservation and, in some cases, they lead a semi-nomadic existence, moving where water is available for farming and stock raising. The Navajo economy is based largely on subsistence farming, stock raising and seasonal labor off the Reservation. In addition, some of these Indians earn supplemental income as rug weavers and silversmiths.[37]

The Navajo tribe is increasing at the rate of 2.5% per year, and so has doubled within the last thirty years.[38] The population of the Reservation itself is unclear. In 1956, 82,000 Indians were listed on the tribal rolls but 6,000 of

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[36]Tr. 12633-12635 (Head).
[37]Tr. 12635-12636 (Head).
[38]Tr. 12636 (Head).

these lived on the Hopi Reservation and others lived off any reservation.[39] Since 1952, it has been the policy of the Bureau of Indian Affairs to relocate some members of the Navajo tribe and approximately 1,000 Indians have been annually relocated in other areas of the United States, some being absorbed by private economy.[40]

A statutory rehabilitation program for the Navajo and Hopi Indians, enacted by Congress in 1950[41] and administered by the Bureau of Indian Affairs, is known as "The Hopi-Navajo Long Range Program" and authorizes expenditure of $88,000,000 for the development of the Hopi and Navajo Reservations. Expenditures of $9,000,000 were authorized for the development of irrigation on the Reservations and, as of 1957, approximately $4,000,000 had been spent. In administering the Long Range Program attempts have been made to improve soil conditions and to institute a moisture conservation program. In furtherance of these ends, water spreading has been used and stock watering ponds and detention dams have been constructed. In addition, range reseeding has been practiced as well as contouring and brush control. Income from oil and gas lease bonuses and rentals and from royalties on uranium mining has been spent by the Navajo tribe in furtherance of the program. The tribe has deposited about $50,000,000 with the United States, most of which is income from oil and gas leases.[42]

Irrigation water for lands in the Navajo Reservation lying in the Lower Colorado River Basin is derived from springs, seeps and small, permanent and intermittent stream flows. Many small storage reservoirs and diversion structures have been constructed together with appurtenant

[39]Tr. 12699, 12717-12718 (Head).
[40]Tr. 12639 (Head).
[41]64 Stat. 44.
[42]Tr. 12657-12661, 12668-12668A, 12692 (Head).

canals for distribution. Apparently, irrigation on the Reservation is conducted by means of many small irrigation units, each with its separate source of supply.[43]

(b) *Hopi Reservation.* The Hopi Reservation is situated in the northeast portion of Arizona within the exterior boundaries of the Navajo Reservation and includes approximately 2,500,000 acres. Its topography and climate are similar to that of the Navajo Reservation. The Hopi Indians live in a number of small villages most of which are located on high mesas, although in recent years some of the younger Hopis have built homes in the valleys.[44]

Hopi population has grown at a moderate pace and, as of 1957, approximately 5,000 Indians were living on the Reservation. In general, there has been little movement away from the Reservation. Hopi economy is basically agricultural although some income is derived from trading, silver work and other handicraft.[45] As indicated above, the Hopi Reservation is included within the Hopi-Navajo Long Range Program. Irrigation systems in the Reservation are similar to those in the Navajo Reservation.[46]

(c) *Zuni Reservation.* Located in the State of New Mexico, on the boundary line between New Mexico and Arizona, the Zuni Indian Reservation is approximately thirty-two miles south of Gallup, New Mexico. It has an approximate area of 404,000 acres. Elevations in this high plateau country range from 5,900 to nearly 7,000 feet, and high mesas and small valleys spread throughout the Reservation create a broken terrain. Climate is extreme in each season and winter temperatures fall as low as 20

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[43]See Tr. 12815-12856 (Keesee). See also U. S. Exs. 276-295.
[44]Tr. 12640-12642 (Head).
[45]Tr. 12642-12643 (Head).
[46]See Tr. 12795-12814 (Keesee). See also U. S. Exs. 293, 413-421.

degrees below zero. Average rainfall is twelve inches annually, most of which falls within the months of July and August. Most of the Zunis live in small villages or in the Zuni Pueblo and during the farming season they move out to the irrigation projects.[47]

The population of the tribe, which has increased by about 1,000 in twenty years, is approximately 3,000 Indians, most of whom live on the Reservation. Although these Indians engage in silver work and seasonal labor off the Reservation, their economy is primarily based on subsistence farming and stock raising.[48]

Water for irrigation of Reservation land is obtained from the Zuni, Nutria and Pescado Rivers as well as from springs located throughout the Reservation. The irrigation system comprises a number of separate irrigation units which are serviced by various small diversion dams, reservoirs and canal distribution networks.[49]

2. *Indian Reservations—On or Near the Colorado River.*

(a) *Kaibab Reservation.* Inhabited by the Kaibab band of the Paiute Indians, this Reservation, with an approximate area of 120,000 acres, is located just south of, and adjacent to, the northern border of the State of Arizona, about half way between Lee Ferry and the northwest corner of Arizona. The Reservation, lying north of the Grand Canyon, has desert-type terrain. The population of the Kaibab tribe is approximately 100, but the number actually living on the Reservation is not in evidence. Gardening and wage earning in nearby towns constitute the basis of the economy.[50]

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[47]Tr. 12628-12630 (Head).
[48]Tr. 12631-12632 (Head).
[49]Tr. 12775-12793 (Keesee). See also U. S. Exs. 119-147.
[50]Tr. 13760-13761 (Haverland).

Irrigation water for Reservation land is obtained from Moccasin Springs and a stream known as Two Mile Wash.[51] Water from these sources is diverted into several small storage reservoirs and, when enough has accumulated, it is distributed through a system of laterals.[52]

(b) *Havasupai Reservation.* Covering an approximate area of 3,000 acres, this Reservation is located south of the Kaibab Reservation and the Grand Canyon. A portion of its lands is situated at the bottom of the Canyon. The terrain is extremely rugged, desert-type country. No evidence was introduced as to the number of Indians living on the Reservation. The tribe has a population of approximately 250. Tribal economy consists of subsistence gardening in the bottom of the Grand Canyon and wage earning in surrounding communities.[53]

Water for irrigation purposes is diverted from Cataract Creek or Havasu Creek. Two diversion dams serve the two main canals of the distribution system.[54]

(c) *Hualapai Reservation.* The Hualapai Indian Reservation in Arizona consists of three sections, the largest of which abuts on the Colorado River and extends south to the town of Peach Springs, Arizona. The second section, known as the Hualapai School Reserve, is located directly south of the largest section. Finally, the Hualapai Indian Reserve is situated further south on the Big Sandy River. Total combined area is approximately 1,000,000 acres, most of which has a very arid climate and a desert-valley-type of topography. It is unclear how many of the 700 Hualapai Indians live on the Reservation. Although there are a few

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[51]Tr. 14455-14456 (Fortier).
[52]Tr. 14005-14006 (Rupkey). See also U. S. Exs. 604-614.
[53]Tr. 13761-13762 (Haverland).
[54]Tr. 14011 (Rupkey). See also U. S. Exs. 704-717.

business enterprises, Hualapai economy is based primarily on the raising of livestock.[55]

Irrigation water for lands in the Big Sandy area comes from the Big Sandy River and Trout Creek. Water for the other areas comes from springs and wells and is distributed through a system of pipes and laterals.[56]

(d) *Moapa Reservation.* Situated in the southern portion of Nevada 40 to 50 miles northeast of Las Vegas, this Reservation contains about 1,200 acres—most of which are located in the bottom of a valley with desert-type topography. The Reservation is inhabited by the Moapa band of the Paiute Indians whose total population in 1957 was approximately 100. The actual number residing on the Reservation is unclear.[57] Moapa economy consists of subsistence gardening and wage earning in nearby towns.[58] Practically all irrigable land in the Moapa Indian Reservation has been leased to non-Indians.[59]

(e) *Fort Mohave Reservation.* This Reservation is situated in the States of Arizona, California and Nevada in the general area of their common borders. Embracing approximately 38,000 acres, the Reservation's climate and topography are that of an arid desert valley. The total number of the Fort Mohave tribe living on the Reservation is unknown. The tribe's total population in 1957 was approximately 450. The majority of these Indians work for the Santa Fe Railroad in the town of Needles, California.[60]

Irrigation on this Reservation is negligible. Plans have been proposed for a modern irrigation system using both

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[55]Tr. 13762-13763 (Haverland).
[56]Tr. 14014-14015 (Rupkey). See also U. S. Exs. 811-818.
[57]Tr. 13787 (Haverland).
[58]Tr. 13763 (Haverland).
[59]Tr. 13788-13789 (Haverland).
[60]Tr. 13764-13787, 14069 (Haverland) (Rupkey).

surface water from the Colorado River and underground sources.[61]

(f) *Chemehuevi Reservation.* The Chemehuevi Indian Reservation is situated in an arid desert valley area in California, on the west bank of the Colorado River between Parker Dam and the Fort Mohave Indian Reservation. Its total area is approximately 28,000 acres. There are no Indians presently inhabiting the reservation.[62] Tribal population in 1957 approximated 300 Indians.[63]

As of 1957, irrigation was not practiced on the Reservation. However, the Bureau of Indian Affairs has tentatively planned to introduce irrigation systems on the Reservation.[64]

(g) *Colorado River Reservation.* This Reservation, situated on both sides of the Colorado River in Arizona and California, is bounded on the south by Ehrenburg, Arizona. Its approximately 260,000 acres, which extend to the mesas and mountains on the east and northwest, are primarily arid desert valley country. The inhabitants of the Reservation, the Colorado River Indian tribes, have an agricultural economy.[65] It is estimated that 1,100 or 1,200 of the 1957 tribal population of approximately 1,300 live on the Reservation.[66]

Irrigation water for the Arizona portion is diverted from the Colorado River at the northern part of the Reservation. The diversion dam, called Headgate Rock Dam, has been described at pages 34-35, *supra.* It creates a lake

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[61]Tr. 14072-14078 (Rupkey). See also U. S. Exs. 258, 260, 1307-1314.
[62]Tr. 14030 (Rupkey).
[63]Tr. 13765 (Haverland).
[64]Tr. 14023-14031 (Rupkey). See also U. S. Exs. 516, 1204-1205.
[65]Tr. 13765-13766 (Haverland).
[66]Tr. 13792-13793 (Haverland).

which is used for recreational purposes. There is no power plant. Depth of the water in the canal intake is considerably less than the depth of the River so that only top water flows into the diversion works, thus minimizing the silt problem. The dam was completed in 1941 at a cost of approximately $5,000,000. The main canal for this part of the Reservation takes out at the diversion works and proceeds westerly and southwesterly, entering the valley just west of the town of Parker, Arizona. Its total length is approximately 17 miles and it has a capacity of 2,100 c.f.s. at the heading. The canal, which is partially lined, ends in a wasteway. Complete lining of the canal has been planned and the resulting increased capacity will be able to serve approximately 105,000 acres. Water is regulated by a complex distribution and drainage system.[67]

Construction of several irrigation systems on the California side of the Colorado River Indian Reservation has been planned,[68] and some surveying has been completed.[69] It is estimated that over 70,000 acres in the Reservation have been leased to non-Indians.[70]

(h) *Yuma Reservation.* The Yuma Reservation is located in California across the Colorado River from Yuma, Arizona. It also includes the so-called "Yuma Homesteads" situated south and west of Yuma, in Arizona. Its total area, including the "Yuma Homesteads" is approximately 9,000 acres. The topography is typical Colorado River desert land and the climate is arid. The Reservation is inhabited by the Quecham Indians. As of 1957, about 900 of the estimated

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[67]Tr. 13981-14001 (Rupkey).

[68]Tr. 14054-14055 (Rupkey); see U. S. Exs. 558, 562.

[69]Tr. 14127 (Rupkey).

[70]Tr. 13776 (Haverland); see U. S. Ex. 568. See also U. S. Exs. 507-558. Leasing of lands on Indian Reservations is governed by 69 Stat. 539 (1955), U. S. Ex. 564; and 69 Stat. 725 (1955), U. S. Ex. 565.

total tribal population of 1200 lived on the Reservation. Most of these Indians are engaged in agriculture or wage earning.[71]

Irrigation water for these Indian lands was first diverted from the Colorado River at Laguna Dam. When Imperial Dam and the All-American Canal were completed, however, the Reservation was served by these facilities. Water delivered from the River is distributed through a system of canals and laterals.[72]

(i) *Cocopah Reservation.* The Cocopah Reservation is composed of two tracts of land located southwest of Yuma in Arizona. Total approximate area is 500 acres and the climate of this typical Colorado River Valley land is arid. The number of the Cocopah Indian tribe living on the Reservation is unclear. The 1957 tribal population was about 90 Indians. Primary sources of income are agriculture and wage earning.[73]

Both tracts of the Cocopah Reservation receive irrigation water from the Colorado River through the facilities of the Valley Division of the Yuma Project. One tract receives water from the Valley Division's east main canal and the other tract receives water from the west main canal. Reservation laterals distribute water directly to the irrigated lands.[74]

3. *Indian Reservations—Central Arizona Area.*

(a) *Gila Bend Reservation.* Situated on the Gila River about 40 miles southwest of Phoenix, Arizona, this Reserva-

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[71]Tr. 13766-13767, 13791, 13821A (Haverland).

[72]U. S. Ex. 1116. See also U. S. Exs. 258, 510, 1105-1115, 1117.

[73]Tr. 13767-13768 (Haverland).

[74]Tr. 14020-14021 (Rupkey). See also U. S. Exs. 508, 511, 1002-1003, 1005.

tion has an approximate area of 10,000 acres of arid desert valley land and is inhabited by members of the Papago tribe. In 1957, approximately 250 of the total tribal population of 7,500 lived on the Reservation and sustained themselves by working for the railroad serving the area.[75]

Originally, irrigation water was diverted from the Gila River and distributed through the Papago Canal and Indian Lateral. Because of decreasing flows in the Gila these works were discontinued and wells were drilled to provide most of the water supply. Underground water so obtained is distributed through a system of laterals.[76]

(b) *Papago Reservation.* Located in the south central part of Arizona adjoining the Mexican border, this Reservation comprises roughly 2,800,000 acres. Approximately one-half of the Reservation, the northern portion, lies within the Colorado River Basin.[77] The Reservation's climate is arid and it lies in a desert area with rocky, rugged hills on the edge of the valley. It is inhabited by the Papago Indians, some 6,700 of whom live on the Reservation. Their economy is based primarily on cattle raising and wage earnings.[78]

Irrigation water for these Indian lands is provided primarily by wells. Water is discharged into a reservoir or directly into the distribution system which is composed of laterals and partially lined canals.[79]

(c) *San Xavier Reservation.* This Reservation is located on the southwestern edge of the City of Tucson and contains about 71,000 acres. In 1957, it was inhabited

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[75]Tr. 14640-14641 (Haverland).
[76]Tr. 14713-14715 (Rupkey). See also U. S. Exs. 1403-1407.
[77]See Tr. 14540; U. S. Ex. 100.
[78]Tr. 14641-14642 (Haverland).
[79]Tr. 14717-14718 (Rupkey). See also U. S. Exs. 1504-1517.

by 500 to 550 Papago Indians. Its climate and topography are similar to that of the Papago Reservation. These Indians have an agricultural and wage earning economy.[80]

Formerly, irrigation water was obtained from three sources; wells, infiltration galleries, and the Santa Cruz River. Because of flood damage and erratic river flow the diversion dam and canal on the Santa Cruz are no longer in use. Additional wells were drilled to compensate for the diminished surface supply and for the declining water table which rendered the infiltration galleries inoperative.[81]

(d) *Gila River Reservation.* The Gila River Reservation, which includes two small irrigation districts and the Indian lands of the San Carlos Project, is situated approximately 20 miles south of Phoenix, in Arizona, and contains about 370,000 acres of land. Its topography and climate are typical of southwest desert country. In 1957, it was inhabited by approximately 5,700 members of the Pima and Maricopa Indian tribes. Their economy is based upon agriculture and wage earning.[82]

The irrigation system of the Gila Crossing District of the Gila River Reservation includes two diversion dams on the Gila River. Declining surface flow has rendered them almost inoperative, however, and wells have been drilled to compensate for the loss of supply. Well water is distributed through a system of ditches. The Maricopa District of the Reservation has for some time obtained its irrigation water exclusively from wells. A network of ditches serves as a distribution system.[83]

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[80]Tr. 14642-14643 (Haverland).

[81]Tr. 14723-14725 (Rupkey). See also U. S. Exs. 258, 512, 1702-1724.

[82]Tr. 14644 (Haverland).

[83]Tr. 14727-14733 (Rupkey).

(e) *Ak Chin-Maricopa Reservation.* This Reservation is located in Arizona at the southwest corner of the Gila River Reservation and contains approximately 21,000 acres of land. In 1957, it was inhabited by some 140 members of the Ak Chin-Maricopa tribe whose economy is primarily based on agriculture and wage earning.[84] Portions of the Reservation are irrigated by well water distributed through laterals. Other portions are irrigated, in part at least, from surface water which is partially derived from desert runoff and surplus water from irrigation on non-Indian lands.[85]

(f) *San Carlos Reservation.* The 1,600,000 acres of this Reservation lie in eastern Arizona between the Gila and Salt Rivers. Its eastern portion is quite mountainous, its northern portion also has relatively high elevations and its southern portion is low elevation desert land. Climate is hot and arid. The inhabitants are of the San Carlos-Apache tribe whose population in 1957 was approximately 4,500. Their economy consists of stock raising, agriculture and wage earning.[86]

Irrigation water for these Indian lands is primarily obtained from wells which discharge into a distribution system of laterals and pipelines. Two ditches with headings at the San Carlos River provide some surface water.[87]

(g) *Salt River Reservation.* The Salt River Reservation is located in Arizona about 10 miles east of the City of Phoenix on both sides of the Salt River. Its area is approximately 47,000 acres and topography and climate are typical of the Salt River Valley. It is inhabited by members of the Pima and Maricopa Indian tribes. Their

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[84]Tr. 14644-14645 (Haverland).

[85]Tr. 14720-14721 (Rupkey). See also U. S. Exs. 1604-1614.

[86]Tr. 14645-14646 (Haverland).

[87]Tr. 14758-14759 (Rupkey). See also U. S. Exs. 2023-2047.

combined population in 1957 was approximately 1500. The economy is based on agriculture and wage earning.[88]

Irrigation water is obtained from surface and underground sources. The primary source of water is the Salt River from which water is diverted to flow by gravity to the Reservation. The Arizona and South Canals of the Salt River Valley Water Users' Association, which take out at Granite Reef Diversion Dam, bring Salt River water to the edge of the Reservation where pipes and concrete conduits conduct the water on to Indian lands to be distributed through laterals.[89]

(h) *Fort McDowell Reservation.* Located in Arizona along both sides of the Verde River, this Reservation abuts on the northeast corner of the Salt River Indian Reservation and contains about 25,000 acres. Its eastern and western sides are hilly but the central portion lies in the Verde Valley. It is inhabited by the Fort McDowell-Mohave-Apache tribe which numbered approximately 300 in 1957. Their economy is based on stock raising, agriculture and wage earning.[90]

Irrigation water is diverted from the Verde River and conducted to the Indian land by two ditches. At one time, four ditches served the area but flooding destroyed the headings of two of them and they are no longer in use. Consequently the area in the southern portion of the Reservation on each side of the River is not used.[91]

(i) *Camp Verde Reservation.* The Camp Verde Indian Reservation is located in Arizona approximately 40 miles east of Prescott and contains about 500 acres of land.

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[88]Tr. 14646 (Haverland).

[89]Tr. 14768-14770 (Rupkey). See also U. S. Exs. 2109-2119.

[90]Tr. 14646-14647 (Haverland).

[91]Tr. 14775-14776A (Rupkey). See also U. S. Exs. 2206-2210.

Although situated in the Verde Valley, its topography is that of arid desert country. It is inhabited by the Yavapai-Apache tribe, the 1957 population of which approximated 650. Tribal economy is based on agriculture and some wage earning.[92]

The Verde River is the primary source of irrigation water supply. Two ditches conduct water to various turnouts which discharge water into a system of laterals.[93]

(j) *Fort Apache Reservation.* Situated in east central Arizona north of the Salt River, this Reservation contains 1,660,000 acres of land. Its eastern portion is a heavily timbered area of high elevations and both the eastern and northern portions enjoy a temperate climate and good rainfall. The Salt River portion is desert and the climate is arid. The Reservation is inhabited by the White Mountain-Apache tribe, the 1957 population of which was approximately 4,000. This Indian economy is diversified: it includes timber operations, stock raising and subsistence agriculture.[94]

Several ditches and headings divert irrigation water from the North Fork of the White River and from Diamond Creek. Some portions of the Reservation receive North Fork water which is pumped by a pumping plant located on the west bank of the River. The White Mountain section of the Reservation obtains irrigation water through a series of ditches taking out of the East Fork of the White River.[95]

Despite objections by the Salt River Valley Water Users' Association and a lawsuit pending at the time of the hearings in this case, a dam has recently been constructed within

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[92]Tr. 14647-14648 (Haverland).
[93]Tr. 14779-14781 (Rupkey).
[94]Tr. 14648-14649 (Haverland).
[95]Tr. 14783-14788 (Rupkey).

the Fort Apache Indian Reservation which creates the Smith Park Reservoir. It is used for recreational purposes. The dam was constructed with tribal funds with the approval of the Secretary of the Interior. Its capacity is 5,000 acre-feet.[96] Recreation potential of the Reservation is great, particularly along the White River. Indeed, the area is currently popular with vacationers and increased facilities are planned for the future.[97]

4. *Indian Reservations—Coachella Valley.* There are three small Indian Reservations in the Coachella Valley: the Cabazon Reservation, located near Indio, California; the Augustine Reservation; and the Torres-Martinez Reservation. The whole of the Cabazon and Augustine Reservations and part of the Torres-Martinez Reservation are within Coachella Valley Improvement District No. 1. In 1957, the Cabazon tribe listed 17 to 20 Indians on the tribal rolls, the Augustine tribe listed 5; and the Torres-Martinez tribe included approximately 250 Indians. Although these Indians did not, as of 1957, receive water from the Coachella Valley Water District, the District's distribution system is capable of serving the Indian land should proper laterals be installed. It is anticipated that some or all of these lands will be be furnished water in the future.[98]

5. *Fish and Wildlife Service.* Wildlife refuges maintained by the United States are operated for the protection of migratory birds and mammals, for recreation and for the prevention of crop depredations on adjoining farm land. Three of these exist in the Lower Colorado River Basin.[99]

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[96]Tr. 14689-14695 (Haverland). See also U. S. Exs. 2416-2433.
[97]Tr. 15121-15147 (Davis).
[98]Tr. 14969-14986 (Warnock). See also U. S. Exs. 2504-2506, 2510.
[99]Tr. 15656-15657 (Taylor); see U. S. Ex. 2613.

(a) *Havasu Lake National Wildlife Refuge.* This Refuge is the largest in the Lower Colorado River Basin; it extends along both sides of the Colorado River from Needles, California to Parker Dam. The Bureau of Reclamation is channelizing the River in this area and when channelization is complete the natural marsh areas which have served as wildlife refuges will have been destroyed. The Fish and Wildlife Service has formulated a plan to substitute controlled marsh and irrigated land for areas drained by the channelization program.[1]

(b) *Imperial National Wildlife Refuge.* Situated along the Colorado River from a point south of Imperial Dam to the Cibola Valley to the north, this Refuge contains approximately 4,000 acres. The channelization program of the Bureau of Reclamation will also affect this Refuge and substitute marsh areas are planned by the Fish and Wildlife Service. These plans include the development of substitute food plots. Some 35 food plot areas have been selected which range from 20 to 300 acres in size. The plots will be leveled and irrigated and crops will be grown.[2]

(c) *Salton Sea National Wildlife Refuge.* This Refuge was established in 1930 and includes public and leased private lands.[3] It is operated primarily to prevent depredation in the Imperial Valley. This is accomplished by putting approximately 4,000 acres a year to grain which is available for migratory birds just prior to or during the harvesting season on adjacent farm lands. Water for this purpose is purchased from the Imperial Irrigation District.[4]

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[1]Tr. 15671-15672 (Taylor); see U. S. Ex. 2618.
[2]Tr. 15693-15694 (Taylor); see U. S. Ex. 2621.
[3]See U. S. Exs. 2604, 2611-2612.
[4]Tr. 15796-15797 (Taylor).

6. *National Parks, Monuments, and Recreation Areas.* There are twenty-one National Parks and Monuments located within the Lower Colorado River Basin.[5] Local water supplies are used for recreation, stock and wildlife watering, various domestic uses, power and, occasionally, for irrigation.[6] Because of the number of National Parks and Monuments and because of the relatively small amount of water used by them, detailed discussion of their water supply and uses is not set forth herein.

7. *National Forests.* There are eleven National Forests in the Lower Colorado River Basin.[7] They were established for the following purposes: (1) the protection of watersheds and the maintenance of natural flow in streams below the sheds; (2) production of timber; (3) production of forage for domestic animals; (4) protection and propagation of wildlife; and (5) recreation for the general public. Water is used for recreation, domestic purposes, irrigation and stock watering.[8]

8. *Bureau of Land Management.* The Bureau of Land Management is the United States agency in charge of public lands. It has instituted livestock grazing and water spreading programs on public lands. The latter activity is designed to increase the production of forage and to prevent erosion. Flood flows in normally dry washes are diverted and applied as irrigation water to the range. The application of this water increases the growth of forage and prevents erosion by discouraging the concentration of cattle at watering holes.[9]

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[5]See U. S. Ex. 2800.
[6]Tr. 15840 (Dunn).
[7]See U. S. Ex. 2700.
[8]Tr. 16014-16015 (Lyon).
[9]Tr. 16076-16078 (DeJulio).

F. Utah

The portion of the Lower Basin located in Utah lies in the extreme southwest corner of the State in part or all of four counties: Washington, Iron, Kane, and Garfield. This area is situated at the conjunction of the Colorado plateau country and the basin and range province of Nevada. In the lower parts, near the town of St. George, elevations are about 2,500 feet while in the higher portions elevations rise to 10,000 feet. On the upside and to the east of the Hurricane Fault, which runs through the Toquerville-Hurricane area, lies a high plateau. Drainage from this plateau is through narrow, deep, canyon-like channels. Population of the Utah portion of the Lower Basin exceeds 12,000. The principal city is St. George and other towns include Hurricane and Kanab.[10]

The principal streams and drainage basins in the area are: Johnson Creek, which flows into Kanab Creek in Arizona; Kanab Creek; the Virgin River System, which includes the Santa Clara River; and Beaver Dam Wash, which flows into the Virgin River in Arizona.[11] Irrigation was first practiced in the area in the middle of the 19th Century by Mormon colonists.[12]

The main reservoir on the Santa Clara River is Baker Reservoir, which has a capacity of 1,150 acre-feet.[13] The principal diversions on this stream are made from Windsor Dam through the Upper Santa Clara Bench Canal and the Santa Clara Fields Canal. Other smaller canals serve additional acreage along the River. The only trans-basin diversion in the region diverts part of the headwaters of the Santa Clara to the Great Basin area.[14]

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[10]Tr. 17812-17813, 17816 (Bingham); see Utah Ex. 1.
[11]Tr. 17814-17816 (Bingham).
[12]Tr. 17827 (Criddle).
[13]Tr. 17922-17923 (Bingham).
[14]Tr. 17819-17821 (Bingham); see Utah Ex. 8.

Kolob Reservoir, capacity 5,586 acre-feet, is located northeast of the town of Virgin on a tributary of the Virgin River. Diversions from the River are made by: St. George and Washington Fields Diversion Dam and Canal, serving lands near St. George; La Verkin Canal, serving lands in the vicinity of the Town of La Verkin; and Hurricane Canal, serving lands south and west of the Town of Hurricane. Further to the east the Kanab Canal diverts from Kanab Creek to serve lands south of the Town of Kanab.[15]

Some of the waters of the Santa Clara River, the main Virgin River, Leeds or Quail Creek and Kanarra Creek are subject to court decrees.[16] There are no decrees affecting Johnson and Kanab Creeks.[17]

The Bureau of Reclamation has twice reported on a proposed Dixie Project in the Utah portion of the Lower Colorado River Basin. Neither of these reports, dated 1949 and 1953 respectively, had been approved by the Commissioner of Reclamation at the close of hearings in this case. The essential difference between the two is that the latter is designed to serve less land with fewer works. The proposed project is planned to serve the Hurricane Division on the Virgin River and the Santa Clara Division on the Santa Clara River. In addition, the Dixie Project would make possible a trans-basin diversion from Kolob Reservoir to the Cedar City area by providing a substitute water supply.[18]

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[15]Tr. 17818, 17922-17923 (Bingham).
[16]See Utah Exs. 9-19.
[17]Tr. 17871 (Criddle).
[18]Tr. 17923-17928, 17937-17945 (Bingham).

VII. Mainstream Supply

During the course of the hearings in this case evidence was introduced of estimates of future supply of mainstream water which will be available for consumptive use in the Lower Basin. Arizona and the United States take the position that it is neither necessary nor useful to attempt to predict the future Lower Basin supply in order to adjudicate this case. California, on the other hand, urges that supply should be estimated and this estimate used as the basis for decision. Nevada has also presented an estimate of future supply.

I have concluded that a prediction of the future supply of Lower Basin mainstream water would be irrelevant to the legal issues involved in this case, and, moreover, would not be sufficiently accurate to shed light on any equitable considerations which might bear on the decision. Thus no attempt is made to predict future supply in this Report.

A. The Future Supply of Mainstream Water in the Lower Basin is Irrelevant to the Legal Issues in This Case

As will be developed in Part Two of this Report, Congress and the Secretary of the Interior have established a formula for the apportionment of mainstream water among the three states of the Lower Basin with geographic access to the Colorado River; namely, Arizona, California and Nevada.[19] This formula allocates certain percentages of the available supply in any given year to each of the three states. Since the formula is not derived from supply and since it operates on whatever the supply happens to be in any given year, there is no need to predict future supply in order to determine how that supply is to be

[19]This apportionment does not apply to water diverted upstream from Lake Mead. See pp. 183, 225-228, *infra*.

apportioned. In other words, the recommended decree states exactly how water is to be divided among the three states in the future, and it provides for any supply situation which may develop. Thus it is unnecessary to predict future supply conditions in order to adjudicate this case.

California emphasizes that the Supreme Court, in several earlier equitable apportionment cases, has based its decision on an estimate of future supply.[20] She argues that the same procedure should be followed in this case. But in those cases, unlike this case, the Supreme Court did not have a flexible formula, established by Congress and the Secretary of the Interior, which could be used to apportion whatever water supply happened to be available in any particular year in the future. Future supply was estimated in those cases, even though, as the Court specifically recognized, the estimates would necessarily be inaccurate, because the Court considered a finding as to supply useful to its decision. Because a flexible formula authorized by Congress and effectuated by the Secretary of the Interior controls this case, the Report does not estimate a supposedly static total supply and allocate fixed amounts of it to each state. Whether the Court itself could have established a flexible formula as an equitable matter to control the interstate apportionment in those prior cases is of no concern here. This case involves a statutory, not an equitable, apportionment and that statutory apportionment applies irrespective of supply. Given the very erratic flow of the Colorado River, which makes it highly unlikely that the supply of water available for consumption each year will be constant, see pages 107-109, 116-118, *infra,* a percentage allocation not dependent on a fixed supply is more

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[20] *Nebraska* v. *Wyoming,* 325 U. S. 589 (1945); *Wyoming* v. *Colorado,* 259 U. S. 419 (1922).

practicable to apply than a mass allocation based on a supposedly fixed future supply.

The only other suggestion advanced by California to support its contention that a prediction of future supply is relevant to the legal issues in this case is that such a prediction might shed light on the Congressional intention embodied in the Boulder Canyon Project Act. California argues that Congress intended Los Angeles to receive a substantial amount of water from the Colorado River and that the interpretation of the Project Act suggested in this Report is incorrect because, when applied to the future supply of water as estimated by California, it does not provide any mainstream water for Los Angeles. But the supply of water which will actually be available in the future for any state or any project does not provide the slightest insight into the intention of Congress when it passed the act in 1928. Obviously the relevant factor in determining Congressional intention is the supply of mainstream water which Congress thought would be available at the time it enacted the Project Act, not the supply which will in fact be available after 1960. Thus, assuming hypothetically the validity of California's argument that Congress intended Los Angeles to receive a substantial amount of Colorado River water which she would not receive under the interpretation of the Project Act proposed in the Report, this would not cast doubt on the proposed statutory interpretation if Los Angeles would have received the water which Congress intended had the supply conditions which Congress anticipated in 1928 actually prevailed. The Court could not rewrite the Project Act to compensate for an erroneous congressional estimate of water supply. And, for all of the uncertainty over the actual supply of water in the Colorado River, one thing that is clear is that the estimates of supply in 1928 were uniformly and substan-

tially larger than even the most optimistic estimates made today.[21]

B. It is Impossible to Predict Future Mainstream Supply Accurately Enough to Shed Light on the Equities in This Case

California contends that the record in this case supports a finding of fact that the "safe annual yield or dependable supply of water available for mainstream projects in the Lower Basin is probably not less than 5,400,000 nor more than 5,850,000 acre-feet per annum."[22] She contends that application of the apportionment formula recommended in this Report to this supply of water would seriously curtail existing uses of mainstream water in California and might eliminate all diversions by the Metropolitan Water District, which serves Los Angeles and other cities on the Southern California coastal plain.[23]

While legally irrelevant, such a result, if at all probable, would arouse the gravest apprehension. However, the record in this case gives no indication that the "chaotic disaster"[24] which California fears will, or is likely to, materialize. Her dire predictions appear to be unfounded.

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[21]See p. 17, note 56, *supra*. The Colorado River has been in a drought period since 1930. There is a dispute among the experts as to whether this period has now ended.

[22]Cal. Proposed Finding of Fact 5B:101(4).

[23]Metropolitan, under Sections 8 and 9 of the Seven-party Agreement among California water users, may be able to claim some of California's allotment as against other users in the state with a senior priority, but this does not derogate from the validity of California's argument that some existing projects would have to suffer curtailment of their present supply.

[24]Calif. Comment on the Draft Report, p. 20.

1. *The evidence will not support a sufficiently accurate prediction of future supply to determine the effect of the recommended decree on existing uses in California*

The evidence in this case simply does not permit a prediction of future Lower Basin supply with that refined degree of accuracy necessary to show whether existing California uses can be satisfied from the percentage of future supply apportioned to California. On the contrary, the mass of evidence which has been presented shows only that the science of hydrology is not capable of sustaining a prediction accurate enough to shed light on this question.

California contends that future Lower Basin mainstream supply will not exceed 5,850,000 acre-feet per annum and that the proposed apportionment to California will result in severe curtailment of her existing uses. Since California deducts evaporation and channel losses to arrive at her estimate of 5,850,000 acre-feet, this quantity seems to refer to water available for diversion at the various diversion works along the mainstream. Even assuming that such a supply would result in this curtailment,[25] a supply sufficient to satisfy 7,667,770 acre-feet per annum

[25]The supply of available water in the Colorado River has in the past been substantially larger than the demand for it; in short, every project received all the water it requested. In such circumstances it is not surprising that a great deal of water has been wasted, as is apparent, for example, from the very large unused runoff each year into the Salton Sea. Undoubtedly when and if water becomes scarce in this area, its use will be regulated much more efficiently than at present. It appears that such practices as lining canals, reducing over-ordering of water, re-using runoff water, reducing evaporation, and improving channels can be instituted in the future and will effect a substantial reduction in the amount of water needed to satisfy existing California uses. It is impossible to determine exactly how much more efficiently water will be used if the present condition of abundance turns into one of shortage, but it is clear that savings will be such that California's existing uses could be satisfied by substantially less water than is presently diverted.

of consumptive uses in the Lower Basin would fulfill all of California's existing uses.[26] Although it is impossible to determine exactly how much of a supply at the diversion gates is necessary to satisfy 7,667,770 acre-feet of consumptive uses, it will be approximately this same figure, *i.e.*, 7,667,770 acre-feet of supply. This is so because consumptive use is defined as water diverted less return flow to the River which can be used by another project in the Lower Basin or in satisfaction of the Mexican Treaty. See pp. 185-187, 225, *infra*. Since consumptive use is all water diverted less return flow, and return flow becomes available for consumption once it returns to the mainstream, supply and consumptive use will be approximately equal.

This means that a difference in the annual supply of less than two million acre-feet per annum (7,667,770 minus 5,850,000) will mean the difference, even under California's reasoning, between complete satisfaction of all of California's existing uses and serious curtailment of those uses. This simply does not leave enough of a margin of error to make a prediction of future supply useful. On the basis of the evidence received in this case, I cannot determine with any confidence whether the future annual supply will be more or less than 7,667,770 acre-feet.

Accurate determination of future supply in a stream system is difficult in any case,[27] and is especially so in the case of the Colorado River. The reasons are not hard to discover. Determination of future supply is

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[26]According to the evidence presented in this case, existing California projects presently consume 4,483,885 acre-feet of water per annum from the mainstream. See page 128, *infra*. This means, under the apportionment formula proposed in this Report, that a total supply of mainstream water sufficient to satisfy 7,667,770 acre-feet of consumptive uses in the Lower Basin per annum would satisfy all of California's present uses.

[27]See Nebraska v. Wyoming, 325 U.S. 589, 593, 598-599, 604-605 (1945).

at best a prediction—an estimate based on the past. The reliability of the estimate is, of course, conditioned upon the accuracy of the historical data and upon the probability that the past will to a substantial degree repeat itself.

With regard to the historical data, there is the difficulty of measuring stream flow,[28] which always involves a degree of inaccuracy.[29] The reason for the inaccuracy becomes apparent when one considers the measurement process. Stream flow at any particular gauging point is determined by a series of measurements and calculations which involve engineering judgment. It is necessary to determine the cross-sectional area of the stream at the gauging point and to obtain the velocity of the flow for a given stage (*i.e.*, surface level of water) at that point. Some gauging stations have a continuous stage recorder, which gives a continuous measurement of the fluctuating stream level, but others do not. When stages are measured infrequently, some error is necessarily introduced. The calculation of the cross-sectional area depends on the width, depth and contour of the stream bed. Securing of these data involves some uncertainty, partly because of the fact that the cross-sectional area is unstable, since it changes with sedimentation and scouring. Even the determination of flow velocity by current meters is inexact, because of variations in readings depending upon the depth of the meter below the water surface. The United States

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[28]For example, Ariz. Ex. 64 (House Document 419, 80th Cong.) at p. 283 states:

> "Throughout the Gila River Basin the securing of stream-flow records is made difficult by violent floods, shifting channels, and sand and silt. Except in the Phoenix area, where extensive irrigation development has been made, there are no reliable long-time records of the Gila River and its tributaries."

[29]Tr. 4285 (Tipton). The witness also said that even delivery of water through a pipe to municipal water users cannot be measured with complete accuracy.

Geological Survey, which maintains and publishes records of stream flow data, rates its records from excellent (error of 5% or less) to poor (error in excess of 15%).[30]

Determination of diminution of supply resulting from reservoir evaporation loss entails similar inexactitude. Without detailing the methods of measuring reservoir evaporation loss, it is sufficient to say that the process is also one of estimate and calculation, with attendant inaccuracies. One witness characterized the often-used land pan method as reliable only to the extent of "general application on an annual basis."[31] Determining channel losses presents similar problems.

In addition, there is the problem of incomplete stream flow records. Historical flow records suffer not only from the infirmities just described but also from the fact that they often are derived, not from actual measurements on the stream, but from correlations with flows of other streams. In some instances, records were never kept or were lost. In such cases it is common to estimate flows by correlating such records of the stream that do exist with longer records of "adjacent" streams thought to have a relationship to the one in question.[32]

Prediction of future supply depends upon repetition of past conditions in future years. In making these estimates, experts select some portion of the historical record which they expect will recur. But the experts do not agree on which portion of the record to select. Certainly

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[30]Tr. 3836-3845 (Dugan). At the time Mr. Dugan gave his testimony, he was Assistant Chief Development Engineer of the United States Bureau of Reclamation.

[31]Tr. 3914 (Dugan). For a full description of methods used to calculate evaporation losses on Lake Mead, see Tr. 3907-3915A (Dugan).

[32]Tr. 4286 (Tipton). For a detailed account of the technique of correlating two streams, see Tr. 5456-5486 (Dugan).

the period chosen as "representative" determines in large measure the ultimate conclusion regarding supply. In this case, at least four different periods were put forth as the proper standard for analysis. Arizona and California chose the period 1909-1956;[33] Nevada selected 1930-1956.[34] In addition, the periods of 1914-1956[35] and 1922-1956[36] were suggested as appropriate for study. Such disagreement indicates the difficulty in arriving at any reliable conclusion as to which period will be repeated, if any.

The disagreement over the proper period for study is actually merely a reflection of the fundamental difficulty in determining supply of the Basin, namely, the erratic character of the rivers therein. In all of the representative periods selected, there were, from year to year, extreme variations in flow. The tables reproduced at the end of this section show, for example, a flow at Lee Ferry in 1953 of 8,805,000 acre-feet, less than half that of the previous year. Such an erratic supply pattern makes it extremely difficult to predict, even within a very broad range of accuracy, the supply which will be available in any particular year.

In order to overcome the uncertainty of predicting yearly supply, the experts predicted the average annual supply for various periods and assumed that this average would be the actual yearly supply for the period. There is no doubt that Hoover Dam was designed and may be used, to some extent, to translate an uneven yearly inflow into Lake Mead into stable yearly releases of water from Lake Mead. But there is a definite limit on the effectiveness of the dam in this regard. The evaporation losses on stored water in the Lower Basin are substantial, see pp. 124-125, *infra*, and, of

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[33]See Ariz. Exs. 352, 353; Calif. Proposed Finding 5E:101.
[34]See Nev. Proposed Finding XXIX; Nev. Brief, p. 130.
[35]Tr. 21275-21278, 21282-21285, 21331 (Riter).
[36]Tr. 21755-21759 (Hill).

course, the more water that is stored in Lake Mead the more that evaporates. Also, a reservoir must be operated at below its full capacity so that it can be used to impound excessive unexpected flows which may occur in any particular year and thus prevent flooding. Because of considerations such as these Hoover Dam cannot be used to even out fluctuating yearly flows over any considerable period of time.

For example, assume, hypothetically, that the average inflow into Lake Mead over a fifty year period could be predicted as 10,000,000 acre-feet per year. In a year in which 17,000,000 acre-feet flowed into the Lake, only 10,000,000 would be released and the remainder stored to offset future dry years if the purpose was to establish an actual yearly outflow equal to the average yearly inflow during the fifty year period. However, if the reservoir were almost full, prudence would require that more than 10,000,000 acre-feet be released so that the dam could be used to impound any unusually heavy inflows which might occur in the succeeding few years.

In a converse situation, if only 8,000,000 acre-feet flowed into Lake Mead in one year, 10,000,000 acre-feet would still have to be released in order to maintain a yearly outflow equal to average inflow. However, if the reservoir were low, it might be wise to release only 8,000,000 acre-feet so as to reserve a supply for the next few years in case the drought conditions worsened.

The point is that it is unrealistic to take the average yearly inflow into Lake Mead for a thirty or fifty year period and assume that this, less evaporation losses, will in fact be the actual yearly supply released from Lake Mead. Even if the average for the last fifty years were repeated over the next fifty years, which itself is uncertain, nothing supports the conclusion that the yearly average would or could be translated into actual yearly releases.

It might be that over a short period of less than ten years Hoover Dam could be operated flexibly enough to translate the total inflow into an average yearly release. But it is most unlikely that this can be done over a longer period. And the fact is that it is almost as difficult to predict the average flow into Lake Mead for any ten year period as it is to predict the flow into the Lake for any particular year, for the average flows for ten year periods during the recorded history of the Colorado River have been as erratic and unpredictable as the yearly flows. For example, the ten-year cumulative flow at Lee Ferry for the period 1941-1950 was 130,473,700 acre-feet. Five years later, the cumulative flow for the period 1946-1955 was only 111,401,200 acre-feet.[37] The difference in the *average annual* flow between the two periods is nearly 2,000,000 acre-feet. Even greater variations occur if ten or more consecutive years of record are used as a basis for averaging yearly supply. The following table illustrates the variations in flow depending upon the period selected.

COLORADO RIVER AT LEE FERRY[38]

Stream Flow in Acre-Feet

Period	10 Years	20 Years	30 Years
1899-1908	144,870,000	310,743,700	464,360,200
1909-1918	165,873,700		
1919-1928	153,616,500	270,944,900	
1929-1938	117,328,400		
1939-1948	121,532,800	238,088,700	355,417,100
1949-1958	116,555,900		

[37]See note 14, p. 146, Part Two, *infra.*

[38]Source: Ariz. Exs. 77B, table A, p. 25, 197; Calif. Ex. 5582A. Arizona Exhibit 77B is commonly called the White Book Supplement. It is a water supply study of the Lower Colorado River Basin by the Bureau of Reclamation, covering the period 1946-1951. The White Book itself (Ariz. Ex. 77) covered the period 1914-1945.

These figures demonstrate that whatever period is selected, the flows of such period have not been repeated in a later comparable period. There is no basis for assuming that flows of any of these periods will be repeated in a comparable period in the future.

Lastly, Lower Basin supply is affected by Upper Basin uses. Increased Upper Basin uses will diminish the Lower Basin supply except as the Upper Basin is limited by Article III of the Compact. Yet no one can say with certainty what increase may occur in Upper Basin uses or at what time.

In support of her prediction of future mainstream supply in the Lower Basin, California relies on two studies which were received in evidence. One, by Thomas M. Stetson, a California witness, concluded that future Lower Basin mainstream supply will be 6,175,000 acre-feet per annum.[38a] The other, by John R. Erickson, an Arizona witness, predicted a future supply of 6,100,000 acre-feet per annum.[39] The apparent concurrence of the Arizona and California witnesses is deceptive, however. Far from supporting California's position, these studies demonstrate that predictions of future supply are necessarily based on so many significant but unknowable factors that they cannot be accurate enough to be helpful in this case.

Both the Erickson and the Stetson studies are based on a number of assumptions which the witnesses made, either on the instruction of counsel or for some other reason, without any attempt to justify the assumptions and, indeed, without ever stating that they agreed with the assumptions. While each one of these assumptions has a significant effect on the ultimate supply prediction in each

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[38a]Calif. Ex. 2216-A; Tr. 21836 (Stetson).
[39]Tr. 18913-15 (Erickson).

study, no probative evidence was presented to demonstrate that any of the assumptions were correct.

First of all, both Erickson and Stetson based their predictions on the expected repetition of the succession of the annual virgin flows of the Colorado River at Lee Ferry during the period 1909-1956. It is highly unlikely that future yearly flows will even approximately repeat the 1909-1956 pattern. As previously noted, Hoover Dam may, to some extent, permit the translation of unequal yearly inflows into relatively equal yearly releases. But, because of the limits on its storage capacity, the large evaporation losses on stored water, demands of flood control and river regulation and other factors, Hoover Dam has limited utility in this regard. Unless the general pattern of supply conditions on which the studies were based repeats itself in the future, the studies cannot provide a useful guide to future supply. However, as I have pointed out, there is no evidence to indicate that the virgin flow during the period studied, even assuming its accuracy, will repeat itself in the future.

A second and controlling assumption made in the Erickson and Stetson studies on which California relies is that the Upper Basin will deplete the virgin flow at Lee Ferry by between 6,500,000 and 6,800,000 acre-feet per annum. Yet there is nothing to indicate that the Upper Basin depletions, which have never exceeded 2,200,000 acre-feet per annum measured at Lee Ferry,[40] will expand to anywhere near 6,500,000 acre-feet. Again, the witnesses assumed this amount of depletion on instruction from counsel; they did not express the opinion that it would occur. In sharp conflict with this assumption is the estimate expressed in

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[40]The approximate Upper Basin depletion is shown by comparing the historic flow with the virgin flow figures at Lee Ferry in the tables printed at the end of this section. See also Ariz. Ex. 197.

the Report of the Senate Committee which studied the Colorado River Storage Project and potential reservoir construction in the Upper Basin. That Report estimates that future Upper Basin consumptive use will not exceed 4,800,000 acre-feet per annum (depletion of the flow at Lee Ferry would be less), even if the extensive storage capacity envisaged but not as yet authorized for the Upper Basin were eventually constructed.[41]

Other unsupported assumptions on which the Erickson and Stetson studies are based include the manner in which the reservoirs will be operated by the United States in the future,[42] and the extent of the delivery obligation imposed on the states of the Upper Division under Article III(c) of the Colorado River Compact.[43]

The very great significance of each of these assumptions to the prediction of future supply is demonstrated

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[41]Senate Report No. 128, 84th Cong., 1st Sess. (1955), p. 4. See also House Report No. 1087, 84th Cong., 1st Sess. (1955), p. 6.

After the close of oral argument on the Draft Report, California moved to re-open the trial for the taking of evidence on the expected future depletion of the Colorado River at Lee Ferry by the Upper Basin. None of the other parties supports this motion. It is clear that the extent of such future depletion will depend primarily on the action of Congress in authorizing new projects in the Upper Basin, see pp. 114-115, *infra*. It would not prove useful to take evidence on this issue. The only probative evidence as to what action Congress may take in the future is the reports of congressional committees such as the ones referred to in this footnote and other official congressional documents. It is not necessary to conduct a trial to enable the Special Master or the Supreme Court to take cognizance of such documents. Moreover, it would not be expedient to make a finding as to what Congress may or may not do in the future. Therefore, California's motion is denied.

[42]The smaller the amount of water which is kept in storage in a reservoir, the less that is lost to evaporation and spillage, but the greater becomes the risk of inadequate storage to meet future needs. It is impossible to determine how the United States will strike a balance between these competing considerations in the operation of the Colorado River reservoirs in the future.

[43]In the absence of the Upper Basin states this delivery obligation cannot be determined in this case.

by the Erickson study itself. The study on which California relies,[44] which shows the future Lower Basin mainstream supply to be 6,100,000 acre-feet per annum, is only one of a series prepared by Mr. Erickson. His other studies varied certain of the assumptions, such as Upper Basin storage and the interpretation of Article III(c) of the Colorado River Compact. One of these other studies showed future supply to be 6,500,000 acre-feet per annum;[45] another showed it to be 7,400,000 acre-feet per annum.[46] And none of the Erickson studies assumed an Upper Basin depletion at Lee Ferry of less than 6,200,000 acre-feet per annum despite a maximum depletion to date of only 2,200,000 acre-feet and the Senate Committee prediction of less than 4,800,000 acre-feet.

2. *Existing California Uses Cannot Be Jeopardized Except by Congressional Action*

In discussing equities, California's contention that existing uses in that state will be curtailed under the apportionment proposed in this Report must be put in perspective. Her contention involves an assumption that Arizona and Nevada will be using all of the water apportioned to them and that the Upper Basin depletion of the flow at Lee Ferry will increase to more than 5,000,000 acre-feet per annum.[47] Even accepting the correctness of all of the other assumptions on which California's estimate of a future annual supply of 6,100,000 acre-feet is based,

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[44]This study is detailed in the Transcript at pp. 18913-18915.

[45]This study is detailed in the Transcript at pp. 18812-18819.

[46]This study is detailed in Ariz. Ex. 366.

[47]A depletion of the Lee Ferry flow of 5,000,000 acre-feet per annum instead of the depletions assumed in the Erickson and Stetson studies would mean a supply of water for the Lower Basin above what those studies predict of approximately 1,500,000 acre-feet per annum.

there is no possibility whatsoever that existing California uses might be curtailed, until these increased uses actually occur.

At the present time Arizona and Nevada are capable of utilizing only a small part of their apportionments, and the Upper Basin depletion at Lee Ferry is less than 2,200,000 acre-feet per annum. It will require construction of enormous new projects for Arizona and Nevada to fully consume their apportionments. Similarly, many new projects will have to be constructed in the Upper Basin before the flow at Lee Ferry can be depleted to such an extent that California projects would be endangered. Undoubtedly, it will be many decades before all such construction can be authorized, financed and completed. It is impossible to foretell how supply conditions may have changed or what new advances in the conservation or even production of water may have been developed by the time this occurs.

Moreover, if ever the equities between California's existing uses and new uses in the Colorado River Basin have to be resolved, it will be for Congress to resolve them. No new projects, whether in the Lower or Upper Basin, which would affect Lower Basin mainstream supply can be constructed in the Colorado River Basin without Congressional action or acquiescence. Rivers and Harbors Act, 33 U. S. C. §§ 401 *et seq.* See *United States* v. *Arizona,* 295 U. S. 174 (1935); *United States* v. *Rio Grande Irrigation Co.,* 174 U. S. 890 (1899); *Oklahoma* v. *Atkinson,* 313 U. S. 508 (1941); *United States* v. *Grand River Dam Authority,* No. 503-Oct. Term, 1959; *Wisconsin* v. *Illinois,* 278 U. S. 367, 411 (1929); *United States* v. *Republic Steel Corp.,* No. 56-Oct. Term, 1959. Furthermore, as a practical matter, it is virtually impossible to finance such projects without the help of Congress.

No new mainstream projects have been authorized by Congress in Arizona or Nevada, and California herself

recognizes that the Upper Basin depletion at Lee Ferry will not exceed, under existing and presently authorized projects, 3,840,000 acre-feet per annum.[48] Thus unless Congress authorizes new projects, even on California's own assumptions, her existing uses cannot be endangered. It is for Congress to determine the limits of new construction in the Basin and thus the extent to which California's existing uses risk curtailment.

3. *Conclusion*

On the basis of all of the evidence and argument presented in this case, I am convinced that California's apprehension of "chaotic disaster" resulting from the recommended decree is unfounded. Existing California uses are in no danger of curtailment unless and until many vast new projects, some of which are not even contemplated at this time, are approved by Congress and constructed. And even if these projects are eventually constructed, there may well be enough water apportioned to California to satisfy the scale of her existing uses, although greater efficiency may be required. This being the case, there is no justification for California's argument that the legal conclusions discussed in Part Two should be modified because of equitable considerations.

C. Tables

For the convenience of the Court, I append on the following pages several tables showing the erratic flows of streams in the Lower Basin and the annual losses from reservoir evaporation and other causes.

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[48]California's motion to reopen the trial for the taking of evidence of depletion of the Colorado River at Lee Ferry by the Upper Basin, p. 24.

Historic Flow of the Colorado River One Mile Below Hoover Dam[49]

(Stream flow in Acre-feet)

Water Year[50]	Stream flow
1935	5,556,100
1936	6,281,700
1937	5,826,400
1938	6,167,600
1939	8,473,300
1940	7,694,400
1941	11,782,200
1942	17,876,400
1943	12,495,000
1944	14,451,000
1945	12,938,500
1946	11,290,000
1947	10,665,000
1948	12,753,000
1949	13,199,100
1950	12,937,300
1951	9,981,400

[49]Source: Ariz. Ex. 77B, table D, p. 30.

[50]A water year begins on October 1 and ends the following September 30 and is designated by the calendar year in which it terminates.

HISTORIC FLOW OF THE COLORADO RIVER AT LEE FERRY[51]

(Stream flow in acre-feet)

Water Year	Stream Flow	Water Year	Stream Flow
1896	9,760,000	1928	15,323,300
1897	17,500,000	1929	19,223,400
1898	13,300,000	1930	13,070,100
1899	15,250,000	1931	6,387,500
1900	12,600,000	1932	15,286,300
1901	12,900,000	1933	9,745,400
1902	8,740,000	1934	4,396,400
1903	13,950,000	1935	9,912,100
1904	14,700,000	1936	11,970,300
1905	15,000,000	1937	11,896,900
1906	17,964,000	1938	15,440,000
1907	22,003,000	1939	9,393,700
1908	11,763,000	1940	7,081,600
1909	21,706,000	1941	16,052,000
1910	12,969,000	1942	17,029,400
1911	14,622,000	1943	11,263,000
1912	18,880,000	1944	13,221,400
1913	12,994,000	1945	11,545,400
1914	19,334,800	1946	8,744,700
1915	12,500,400	1947	13,514,400
1916	17,324,800	1948	13,687,200
1917	21,893,100	1949	14,359,000
1918	13,649,600	1950	11,057,200
1919	10,858,400	1951	9,830,700
1920	19,738,700	1952	17,980,000
1921	20,714,800	1953	8,805,000
1922	16,302,400	1954	6,116,000
1923	16,261,300	1955	7,307,000
1924	12,481,100	1956	8,754,000
1925	11,341,100	1957	17,347,000
1926	14,008,500	1958	15,000,000
1927	16,586,900		

[51]Sources: Ariz. Exs. 77B, table A, p. 25, 197; Calif. Ex. 5582A.

Undepleted or "Virgin" Flow of the Colorado River at Lee Ferry[52]

(In acre-feet)

Water Year	"Virgin" Flow	Water Year	"Virgin" Flow
1909	23,275,000	1933	11,356,000
1910	14,248,000	1934	5,640,000
1911	16,028,000	1935	11,549,000
1912	20,520,000	1936	13,800,000
1913	14,473,000	1937	13,740,000
1914	21,222,000	1938	17,545,000
1915	14,027,000	1939	11,075,000
1916	19,201,000	1940	8,601,000
1917	24,037,000	1941	18,148,000
1918	15,364,000	1942	19,125,000
1919	12,462,000	1943	13,103,000
1920	21,951,000	1944	15,154,000
1921	23,015,000	1945	13,410,000
1922	18,305,000	1946	10,426,000
1923	18,269,000	1947	15,473,000
1924	14,201,000	1948	15,613,000
1925	13,033,000	1949	16,376,000
1926	15,853,000	1950	12,894,000
1927	18,616,000	1951	11,647,000
1928	17,279,000	1952	20,290,000
1929	21,428,000	1953	10,670,000
1930	14,885,000	1954	7,900,000
1931	7,769,000	1955	9,150,000
1932	17,243,000	1956	10,720,000

Annual Averages for Selected Periods

Period	"Virgin" Flow
1909-1956	15,211,000
1914-1956	14,920,000
1922-1956	14,008,000
1930-1956	13,085,000

[52]Source: Calif. Ex. 2201A.

Historic Flow of the Little Colorado River at Grand Falls, Arizona—96 Miles Upstream From Confluence With Colorado River[53]

(Stream flow in acre-feet)

Water Year	Stream Flow	Water Year	Stream Flow
1914	190,200	1933	129,200
1915	338,800	1934	71,000
1916	859,400	1935	215,300
1917	303,900	1936	165,000
1918	103,700	1937	339,400
1919	261,500	1938	170,200
1920	461,000	1939	83,200
1921	170,600	1940	132,200
1922	308,900	1941	586,900
1923	271,600	1942	149,000
1924	221,800	1943	103,000
1925	150,400	1944	129,100
1926	181,500	1945	159,500
1927	393,800	1946	116,400
1928	87,600	1947	127,000
1929	510,800	1948	182,300
1930	189,300	1949	268,400
1931	165,000	1950	41,100
1932	465,900	1951	48,800

[53]Source: Ariz. Ex. 77B, table B, pp. 26-27.

HISTORIC FLOW OF THE VIRGIN RIVER AT LITTLEFIELD, ARIZONA, APPROXIMATELY 36 MILES ABOVE CONFLUENCE WITH LAKE MEAD[54]

(Stream flow in acre-feet)

Water Year	Stream Flow	Water Year	Stream Flow
1914	307,300	1933	127,500
1915	258,900	1934	78,000
1916	527,700	1935	164,900
1917	277,800	1936	131,000
1918	266,100	1937	240,300
1919	187,100	1938	278,600
1920	279,100	1939	154,900
1921	261,400	1940	173,700
1922	522,300	1941	400,000
1923	286,600	1942	214,900
1924	120,600	1943	178,100
1925	150,000	1944	182,700
1926	138,500	1945	166,300
1927	254,000	1946	121,300
1928	171,600	1947	192,300
1929	226,500	1948	116,400
1930	188,100	1949	155,900
1931	119,300	1950	127,000
1932	381,900	1951	99,900

[54]Source: Ariz. Ex. 77B, table C, pp. 28-29.

Historic Flow of the Bill Williams River at Planet, Arizona, Approximately 6 Miles Above Confluence With Colorado River[55]

(Stream flow in acre-feet)

Water Year	Stream Flow	Water Year	Stream Flow
1914	78,200	1933	13,300
1915	115,800	1934	11,600
1916	312,400	1935	110,200
1917	120,800	1936	21,800
1918	94,800	1937	253,000
1919	202,200	1938	112,900
1920	254,000	1939	231,500
1921	83,000	1940	30,800
1922	209,800	1941	436,800
1923	164,200	1942	26,800
1924	52,400	1943	14,200
1925	115,200	1944	114,400
1926	139,400	1945	60,100
1927	432,400	1946	12,300
1928	21,300	1947	18,600
1929	31,200	1948	7,300
1930	33,000	1949	48,700
1931	108,900	1950	7,900
1932	319,600	1951	56,900

[55]Source: Ariz. Ex. 77B, table E, p. 31.

HISTORIC FLOW OF THE GILA RIVER NEAR DOME, ARIZONA, 12 MILES UPSTREAM FROM MOUTH OF THE GILA RIVER[56]

(Stream flow in acre-feet)

Water Year	Stream Flow	Water Year	Stream Flow
1914	179,800	1933	1,100
1915	2,324,500	1934	200
1916	4,361,100	1935	5,900
1917	1,458,300	1936	0
1918	326,900	1937	153,700
1919	227,000	1938	45,900
1920	1,293,800	1939	3,500
1921	437,700	1940	0
1922	685,800	1941	589,700
1923	329,100	1942	0
1924	686,500	1943	0
1925	64,900	1944	0
1926	270,100	1945	0
1927	763,900	1946	0
1928	24,300	1947	400
1929	3,000	1948	0
1930	15,600	1949	0
1931	102,700	1950	0
1932	266,300	1951	6,000

[56]Source: Ariz. Ex. 77B, table G, p. 33.

Estimated Historic Net Gain to the Colorado River, Lee Ferry to Hoover Dam[57]

(Net gain in acre-feet)

Water Year	Net Gain	Water Year	Net Gain
1909	1,596,000	1933	694,000
1910	1,365,000	1934	475,000
1911	1,949,000	1935	865,000
1912	829,000	1936	725,000
1913	962,000	1937	1,292,000
1914	1,316,000	1938	1,237,000
1915	1,133,000	1939	737,000
1916	1,724,000	1940	756,000
1917	993,000	1941	1,505,000
1918	1,018,000	1942	1,060,000
1919	817,000	1943	792,000
1920	1,030,000	1944	865,000
1921	975,000	1945	731,000
1922	2,053,000	1946	530,000
1923	1,687,000	1947	713,000
1924	609,000	1948	560,000
1925	701,000	1949	725,000
1926	749,000	1950	615,000
1927	975,000	1951	457,000
1928	694,000	1952	1,316,000
1929	822,000	1953	482,000
1930	682,000	1954	658,000
1931	518,000	1955	658,000
1932	1,370,000	1956	457,000

[57]Source: Calif. Ex. 2207. See also Ariz. Exs. 353, 366.

Lake Mead Evaporation[58]

Water Year	Usable Content of Lake Mead at End of Water Year (Acre-feet)	Annual Evaporation (Acre-feet)
1935	4,140,000	106,500
1936	6,414,000	325,100
1937	12,432,000	542,700
1938	21,065,000	737,000
1939	21,749,000	847,300
1940	21,144,000	853,000
1941	26,150,000	938,600
1942	25,430,000	944,400
1943	24,070,000	916,200
1944	22,860,000	879,100
1945	21,620,000	834,600
1946	19,010,000	829,400
1947	21,625,000	794,500
1948	22,002,000	859,700
1949	22,827,000	787,000
1950	19,738,000	825,900

[58]Source: Ariz. Ex. 98, table 645, pp. 571-572; Ariz. Ex. 77B, table D, p. 30. These figures include evaporation from minor upstream reservoirs.

Lake Mohave Evaporation[59]

(Evaporation in acre-feet)

Water Year	Gross Evaporation
1951	144,800
1952	156,800
1953	159,900

Lake Havasu Evaporation[60]

(Evaporation in acre-feet)

Water Year	Gross Evaporation
1951	139,300
1952	138,100
1953	143,100

Channel Losses Between Hoover Dam and the International Boundary[61]

Period	Historic Average Annual Flow Below Hoover Dam (acre-feet)	Historic Average Annual Gross Channel Losses (acre-feet)
1914-1945	13,694,000	1,168,000
1946-1951	11,804,300	971,700

[59]Source: Calif. Ex. 2211.
[60]*Ibid.*
[61]Source: Calif. Ex. 2213A.

VIII. Present Uses on the Mainstream

The tables printed hereafter show the scale of uses of water from the Colorado River in the Lower Basin as of the taking of evidence in this action. These tables would be most helpful if they showed the use of Colorado River water in Arizona, California and Nevada measured in terms of consumptive use (diversions from the mainstream less return flow thereto), since the recommended decree apportions water in those terms. The figures for California and Nevada are given in terms of consumptive use. However, the evidence presented as to uses in Arizona is in terms of diversions which cannot, on this record, be translated into consumptive use. Substantially all the Arizona uses (other than uses on Indian Reservations) occur in the general vicinity of Imperial Dam and are supplied with water diverted by that dam. Figures are available for total diversions.[62] No figures are available, however, for return flow. The Arizona witness who testified regarding these uses said on cross-examination that he had no knowledge of the magnitude of return flow.[63] However, on re-direct examination, the witness estimated return flow from drains to be approximately 150,000 acre-feet.[64] Apparently, even this figure does not purport to be the total return flow from water diverted for use in Arizona at Imperial Dam.

California's method of calculating consumptive use of these Arizona projects is no more helpful. For example, for Wellton-Mohawk, she takes the figure for irrigated acreage from Arizona Exhibit 186. She then applies a consumptive use rate of 3.76 acre-feet per acre. This figure was derived "by dividing minimum project consumptive use requirements . . . of 282,100 acre-feet by 75,000" acres of

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[62]See Ariz. Ex. 186.
[63]Tr. 2376, 2403-2407, 2412-2413, 2525-2534 (Steenbergen).
[64]Tr. 2621-2623 (Steenbergen).

land.[65] These figures depend upon engineering estimates, and are adjusted for certain omissions.[66] No testimony supports the proposed consumptive use figure of 3.76 acre-feet per acre. Even assuming the consumptive use figure of 3.76 acre-feet per acre to be correct, it does not purport to measure consumptive use in terms of diversions less return flow to the mainstream.

Therefore the Arizona figures are given in terms of gross diversions.

APPROXIMATE DIVERSIONS OF MAINSTREAM WATER IN ARIZONA

User	Amount (Acre-Fee)	Year
Yuma Project—Valley Division Yuma Auxiliary Project (Unit B)[67]	330,130	1955
Gila Project[68] (plus deliveries to Special use and Warren Act contractors)[69]	578,860	1955
City of Yuma[70]	7,650	1955
Colorado River Indian Reservation[71]	322,500	1955
Total	1,239,140	

[65]See Calif. Proposed Finding 4D:108, note 5.
[66]See Calif. Proposed Finding 4D:106, notes 3-4.
[67]Ariz. Ex. 186.
[68]*Ibid.*
[69]Tr. 2611 (Steenbergen).
[70]Ariz. Ex. 190, table 1.
[71]U. S. Ex. 575. This exhibit contains an incomplete statement of return flow in the amount of 119,600 acre-feet. Thus, maximum consumptive use would be 202,900 acre-feet. Irrigation from the mainstream on the other two Indian reservations in Arizona, Ft. Mohave and Cocopah, is negligible. U. S. Ex. 1319 shows only 23 acres irrigated on the Ft. Mohave Reservation. For the Cocopah Reservation, U. S. Ex. 1009 shows a computed diversion requirement of 1,890 acre-feet for net irrigated acreage of 300 acres. It does not appear from the evidence when, if ever, this amount of mainstream water was actually applied to the land. See Tr. 14483; 14505-14506; 14508 (Criddle).

APPROXIMATE CONSUMPTIVE USE OF MAINSTREAM WATER IN CALIFORNIA

User	Amount of Consumptive Use (Acre-Feet)	Year
All-American Canal Project[72] ..... (Coachella and Imperial Districts)	3,662,000	1955
Metropolitan Water District[73]	481,493	1956
Palo Verde Irrigation District[74]	296,000	1957
Yuma Project—Reservation Division[75]	36,392	1955
Miscellaneous[76]	8,000	1957
Total	4,483,885	

APPROXIMATE CONSUMPTIVE USE OF MAINSTREAM WATER IN NEVADA

User	Amount of Consumptive Use (Acre-Feet)	Year
Boulder City[77]	2,750	1956
Others[78]	21,700	1956
Total	24,450	

[72]Calif. Ex. 275 shows diversions for Imperial and Coachella in 1955 of 3,642,000 acre-feet. Added to this is 20,000 acre-feet of losses chargeable to the districts. See Calif. Ex. 279.

[73]Ariz. Ex. 429. Counsel stated at Tr. 19968 that the Metropolitan diversion for 1957 was 584,000 acre-feet and this was not challenged.

[74]This figure is claimed in Calif. Proposed Finding 4C:102(2) and is based on the consumptive use per acre in 1955, derived from Calif. Ex. 356, multiplied by the irrigated acres in 1957, which increased from 1955. Irrigated acreage in 1957 was approximately 74,000 acres. Tr. 8772. The figure is computed, actual diversion being much greater. California contends that all water diverted by Palo Verde returns to the river except for that consumptively used and that the computed figure accurately represents consumptive use. I have accepted the contention for present purposes.

[75]This figure is also computed and the contention is that the remainder of the water used returns to the River. The figure is taken from Calif. Ex. 376.

[76]Calif. Proposed Finding 4C:110—unspecified non-contractual uses.

[77]U. S. Ex. 35.

[78]Nev. Ex. 502; Tr. 16329.

PART TWO

PART TWO

I. Jurisdiction and Justiciability

None of the parties in this case questions the jurisdiction of the Supreme Court either over the parties or over the subject matter of the controversies which concern the mainstream of the Colorado River. Moreover, either explicitly or implicitly, all of the parties concede that it is appropriate for the Supreme Court to exercise its jurisdiction and adjudicate these mainstream controversies at this time. I agree with the parties that the Supreme Court has jurisdiction over the mainstream controversies which ought to be exercised in this case.[1]

The judicial power of the United States is extended by Article III, Section 2, of the Constitution to "all Cases . . . arising under this Constitution, the Laws of the United States . . . to Controversies to which the United States shall be a party . . . [and] to Controversies between two or more States. . . . In all Cases . . . in which a State shall be Party, the supreme Court shall have original Jurisdiction." It is settled beyond dispute that, under these provisions, a case such as the present one among several states and the United States over the use of water flowing in an interstate stream is within the original jurisdiction of the Supreme Court. *E.g., Colorado* v. *Kansas,* 320 U. S. 383 (1943); *Kansas* v. *Colorado,* 206 U. S. 46 (1907); *Kansas* v. *Colorado,* 185 U. S. 125 (1902); *Missouri* v. *Illinois,* 180 U. S. 208 (1901).

It is also well settled, however, that the Supreme Court will not exercise its original jurisdiction in suits between

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[1]I have concluded, however, that it would not be appropriate to adjudicate in this litigation controversies among the parties over the tributaries of the Colorado River in the Lower Basin, except for the controversies which concern the Gila River System. The reasons for these conclusions are explained *infra,* at pages 318-321, 323-325.

sovereign states unless there are compelling reasons for doing so. The Court has often reiterated the strict standard which must be met before it will adjudicate an interstate controversy. Thus in *New York* v. *New Jersey,* 256 U. S. 296, 309 (1921), the Court stated:

> "Before this court can be moved to exercise its extraordinary power under the Constitution to control the conduct of one State at the suit of another, the threatened invasion of rights must be of serious magnitude and it must be established by clear and convincing evidence."

See also *Colorado* v. *Kansas,* 320 U. S. 383 (1943); *Washington* v. *Oregon,* 297 U. S. 517, 522 (1936); *Arizona* v. *California,* 283 U. S. 423 (1931).

There are compelling reasons which justify an adjudication of the various claims presented in this case to water flowing in the Colorado River. On September 16, 1948, the Secretary of the Interior transmitted to the Congress a report from the Bureau of Reclamation which concluded that a proposed Central Arizona Project, designed to transport water from the Colorado River to an area in central Arizona, was feasible from both an engineering and a financial point of view. However, the Secretary's letter of transmittal warned that if Arizona's claims to mainstream water were not well founded, as was contended by California, then "there will be no dependable water supply available from the Colorado River for this diversion."[2] As previously noted, *supra,* pages 30-31, Arizona sought congressional authorization for this Central Arizona Project during the 79th, 80th, 81st and 82nd Congresses. Although some of Arizona's proposals were adopted by the Senate, none of them passed the House, and,

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[2]Ariz. Ex. 70.

on April 18, 1951, the House Committee on Interior and Insular Affairs adopted a resolution that consideration of bills relating to the Central Arizona Project "be postponed until such time as use of the water in the lower Colorado River Basin is either adjudicated or binding or mutual agreement as to the use of the water is reached by the States of the lower Colorado River Basin."[3] About a year later Arizona instituted the present law suit.

It is apparent from these circumstances that Arizona will not be able to develop the Central Arizona Project without an adjudication by the Supreme Court as to the rights of the several parties to the water in the mainstream of the Colorado River. Congress has indicated it will not authorize construction of the Project until rights to mainstream water are adjudicated; nor can it be financed privately until such rights are fully established. In short, Arizona's utilization of the mainstream water which she argues has been apportioned to her in the Boulder Canyon Project Act is being frustrated by the conflicting claims of the other parties to this suit. This is reason enough for the Supreme Court to exercise its original jurisdiction. If the Supreme Court does not exercise its jurisdiction in this case on the ground that Arizona is not presently in a position to divert the water which she claims, Arizona will be faced with a dilemma: Congress will not authorize the Central Arizona Project until Arizona's right to mainstream water is determined, and the Supreme Court will not determine Arizona's right to the water until Congress authorizes the Project.

Moreover, without the Central Arizona or a similar project, Arizona will not be able to fully utilize the water

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[3] *Hearings on H. R. 1500 and H. R. 1501 Before the Committee on Interior and Insular Affairs, House of Representatives,* 82nd Cong., 1st Sess., pt. 2, pp. 739, 740-756 (1951).

which she claims has been set aside for her in the mainstream. Indeed, Arizona claims that California is already using some of the water to which Arizona is entitled. By increasing the water uses of existing facilities, California will be able to increase substantially her uses of this claimed water in the future. On the other hand, Arizona cannot use the water she claims without the construction of new facilities and she cannot develop new facilities unless her rights in the water are first established. Thus, refusal of the Supreme Court to adjudicate Arizona's rights in the mainstream water will, as a practical matter, have the effect of a decision in favor of California since Arizona will not be able to utilize the disputed water and California will. If Arizona's interpretation of the Boulder Canyon Project Act, which the United States substantially agrees with, is correct, and if California has *de facto* taken part of the water which was forever apportioned to Arizona, then Arizona can remedy the situation only by suit in the Supreme Court.

The circumstances related above are merely illustrative of conditions generally prevalent in regard to the Colorado River in the Lower Basin. The Basin has experienced a veritable population explosion in the past thirty years, accompanied by a comparable development in industry and agriculture.[4] Water uses have expanded rapidly; but the point has now been reached where increased use of water from the Colorado River is being frustrated by a bitter dispute as to the legal availability of such water for use in the several states. That dispute is now before the Court. There appears to be sufficient mainstream water available to satisfy the scale of present uses and enough to satisfy some degree of expansion. But, despite a present unsatis-

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[4]A more detailed description of the conditions in the Lower Basin, summarized in this section of the Report, will be found in Part One.

fied demand for water in the Lower Basin, it is impossible to develop further uses of the water because of the cloud on its legal availability.

Because of the topography and geography of the region, Colorado River water can feasibly and economically be utilized only by the construction of great projects consisting of dams, pumping facilities, desilting basins, canals and other works, the cost of which is enormous. Needless to say, such projects cannot be financed unless there is assurance that water will be not only physically, but legally available for their operation. No such assurance of the legal availability of mainstream water for use in any particular state can today be given. This uncertainty can be removed only by an interstate compact or by the adjudication of the Supreme Court. Congress, in the Boulder Canyon Project Act, encouraged Arizona, California and Nevada to agree to a compact apportioning mainstream water among them, and even suggested a division which it approved in advance. For over thirty years, however, these states have been unable to agree. Time has not cooled the controversy among them, and it seems very unlikely that they will be able to agree in the foreseeable future.

Thus, adjudication of the present action is indispensable to a determination of the legal availability of mainstream water in the Lower Basin. It is an inescapable fact that unless this controversy among the three states and the United States is adjudicated, the full utilization of the Colorado River will be indefinitely delayed. Such a result would frustrate the purposes of Congress in authorizing the construction of Hoover Dam and would seriously hinder development of the entire area.

In addition, the Supreme Court's jurisdiction ought to be exercised in this case for another, related reason. There are a number of existing projects in the Lower Basin for

which plans have been developed calling for the increased use of mainstream water. These projects are already constructed, have irrigable but presently unirrigated lands within their service areas, and, at least some of them, already have delivery contracts with the Secretary of the Interior which provide for enough water to satisfy increased uses if such water is legally available under the interstate apportionment. No further governmental authorization and little additional financing is necessary to enable these projects to increase their mainstream uses. For example, the Imperial Irrigation District embraced 905,568 acres in 1956, of which only approximately 475,000 were irrigated. The District plans to irrigate a substantial part of these unirrigated lands primarily through existing facilities and pursuant to its existing water delivery contracts.[5] Similarly, the Coachella Valley County Water District and Palo Verde Irrigation District presently contain unirrigated land which can be irrigated largely through existing facilities and pursuant to existing delivery contracts.[6] Moreover, as of the close of the evidence in this case, the Metropolitan Water District planned a substantial increase in its diversions of mainstream water, under an existing water delivery contract. Arizona, however, argues that California is presently consuming more than its apportionment of mainstream water under the Project Act, and that existing uses in California should be limited and increased uses forever enjoined. Certainly Arizona's claim should be adjudicated so that the California agencies can make intelligent plans for their future development and operation.

Increased uses of mainstream water would also be rapidly developed in Arizona if the question of legal availability were resolved in her favor, although, as stated above,

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[5]Tr. 8216-8217 (Dowd); Calif. Exs. 275, 285.
[6]Calif. Ex. 318; Tr. 8771-8772 (Tabor); Calif. Ex. 356.

the full amount of the water she claims could not be utilized without a large new project. For example, the United States plans to contract for the delivery of mainstream water pursuant to the federal reclamation laws to the South Gila Valley near Yuma, Arizona. This area, serviced by the Yuma Irrigation District, is presently within the authorized limits of the Gila Reclamation Project. Additional congressional authorization and an appreciable expansion of existing works would not be necessary in order to develop new water uses in the South Gila Valley. California, however, argues that additional diversions of mainstream water for use in the State of Arizona are forbidden by the Colorado River Compact, the Boulder Canyon Project Act and principles of priority of appropriation. As in the case of the California projects, there is a natural reluctance to develop the land when there is a danger that users may be legally barred from applying water to its irrigation.

Manifestly, then, the various claims to mainstream water urged by the parties to this litigation ought to be decided by the Supreme Court so as to remove this controversy as the major obstacle to full development of the Lower Basin of the Colorado River.

II. Arizona's Motion for Leave to File Amended Pleadings

One question of pleading has survived the hearing. On August 13, 1958, shortly before conclusion of the hearing, Arizona moved before the Special Master for leave to file: (1) an amended bill of complaint; (2) an amended reply to the answers of the California defendants; (3) an amended answer to Nevada's petition of intervention; (4) an amended response to the appearance and statement of New Mexico; and (5) an amended response to Utah's complaint and answer in intervention. In short, Arizona desired leave to file substitute pleadings with respect to all parties except the United States.

This motion was opposed by California, Nevada, New Mexico and Utah.[7] The Solicitor General's view that the Special Master "probably does not have jurisdiction to finally rule on a motion to amend the original petition" was reported on his behalf by government counsel.[8] Arizona expressly disavowed any desire to offer any additional proof in support of its amended pleadings.

It is unnecessary to pass on the question of power raised by the view attributed to the Solicitor General. Since Arizona would not be prejudiced by rejection of the proposed amendments, it is unnecessary to receive them. Close inspection reveals that the proposed changes are intended to accomplish two purposes: (1) to conform the pleadings to the proof; and (2) to state legal theories different from those espoused in the original pleadings.

The first objective is superfluous. In a litigation of this character it would be strange to hold the parties strictly to their pleadings. See *Kansas* v. *Colorado,* 185 U. S. 125 (1902), wherein the Court said:

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[7]Tr. 22557-22582.
[8]Tr. 22582-22583.

> ". . . we are unwilling, in this case, to proceed on the mere technical admission made by the demurrer. Nor do we regard it as necessary, whatever imperfections a close analysis of the pending bill may disclose, to compel its amendment at this stage of the litigation."[9]

The second objective is likewise superfluous. The relevant legal principles govern the decision in the light of the facts established, regardless of the law pleaded by the parties.

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[9]185 U. S., at 147. See also United States v. Louisiana, 363 U. S. 1, 84 (1960); United States v. Texas, 339 U. S. 707, 715 (1950).

III. The Claims of the States to Water in the Mainstream of the Colorado River

I have concluded that the claims of Arizona, California and Nevada to water from Lake Mead and from the mainstream of the Colorado River below Hoover Dam are governed by the Boulder Canyon Project Act, 45 Stat. 1057 (1929), the California Limitation Act, Act of March 4, 1929, and the several water delivery contracts which the Secretary of the Interior has made pursuant to the authority vested in him by Section 5 of the Project Act. The Colorado River Compact, the doctrine of equitable apportionment, and the law of appropriation are all irrelevant to the allocation of such water among the three states.

A. The Colorado River Compact

Extensive argument was had on the origin, purposes and meaning of the Colorado River Compact. Some of the parties labored under the conviction that prolonged and faithful exegesis of the text of this historic instrument would somehow yield a solution to the problems of this litigation. The sentiment which promoted this line of thinking seemed to rise from a profound faith that the Compact, venerated for its great contribution to the growth of the Southwest, would in some unexpected manner come to the aid of the disputing states. Reflection has not confirmed these hopes. The Compact does not answer any of the vital questions which must be answered in the disposition of this suit. The Compact contributes some light on the supply of mainstream water, insofar as it regulates the extent to which the River may be depleted by the Upper Basin. Beyond that the Compact has no utility in the adjudication of this case.

The Colorado River Compact represents an accommodation of the conflicting interests of Upper and Lower Basins for the mutual benefit of both. The Lower Basin, especially California, was interested in reaching agreement over water rights among all the states in the entire River Basin so that congressional action could be obtained authorizing a dam on the Colorado River to control floods and to assure a constant supply of water (Ariz. Exs. 48, 51-53). Congress had expressed an interest in the problems of the Imperial Valley, Kincaid Act, 41 Stat. 600 (1920), and was aware of the flood control problems of the area (Fall-Davis Report, Ariz. Ex. 45). The Upper Basin, sympathetic as it may have been with the Lower Basin in its problems downstream, was nevertheless concerned lest construction of such a dam permit the Lower Basin to obtain a disproportionate amount of the water in the River by operation of the law of prior appropriation (Ariz. Exs. 49, 51). An agreement among the affected states could afford protection against this likely development. Thus, both the Upper and Lower Basins had an incentive to enter into a compact to achieve their respective desires (See Ariz. Ex. 51).

The main bone of contention between the two Basins was the division of water. It was foreseen that, once the River was regulated, the Lower Basin would develop more rapidly than the Upper Basin. The problem of the Compact commissioners, therefore, was to safeguard the Upper Basin against this rapid development with its threat of vesting in the Lower Basin appropriative rights enforcible against the Upper Basin, and at the same time to allow sufficient water to the Lower Basin to ensure development there (Ariz. Exs. 49, 55).

This brief history explains why the provisions of the Compact are addressed solely to the relations of basin to basin and not of state to state (See Ariz. Exs. 51, 55). Any

interpretation of the Compact must be confined by this limiting factor. And from this it also follows that the Compact offers no solution to this controversy among states with respect to their Lower Basin interests.[10]

The text of the Compact makes it abundantly clear that inter-basin, not interstate, relations were the subject matter of agreement. Article II of the Compact divides the entire Colorado River Basin into Upper and Lower Basins, and Article III(a) and (b) apportions the use of water between the two Basins and not among states. This apportionment is accomplished by establishing a ceiling on the quantity of water which may be appropriated[11] in each Basin as against the other. Although Article III(a) and (b) is not expressed in terms of appropriative rights, this is the purport of that Article. For example, it is clear that the Lower Basin may utilize and consume more than the 8,500,000 acre-feet of water per annum apportioned to it by subdivisions (a) and (b) of Article III of the Compact, if the water is actually available, but against the Upper Basin it can acquire appropriative rights to no greater quantity than is sufficient to satisfy a consumptive use of that magnitude. This becomes clear from the historical background of the Compact. Throughout the Colorado River Basin, when the Compact was negotiated, the law of prior appropriation governed acquisition of water rights. In 1922, before the opening of the Sante Fe meetings of the Compact commissioners, the Supreme Court had applied the law of prior appropria-

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[10]The extent to which the Compact governs this litigation by reason of references thereto in the Project Act and the water delivery contracts is discussed *infra*.

[11]"To appropriate water means to take and divert a specified quantity thereof and put it to beneficial use in accordance with the laws of the state where such water is found, and, by so doing, to acquire under such laws, a vested right to take and divert from the same source, and to use and consume the same quantity of water annually, forever, subject only to the right of prior appropriations." Arizona v. California, 283 U. S. 423, 459 (1931).

tion as the guiding principle in an equitable apportionment suit on an interstate stream. *Wyoming* v. *Colorado*, 259 U. S. 419, decided June 5, 1922. As appears from the commissioners' reports, Article III(a) and (b) is intended to prevent the application of the priority rule between the two Basins, a result accomplished by placing limits on the acquisition of appropriative or other water rights in each Basin (Ariz. Exs. 49, 51). These limitations, which are 7,500,000 acre-feet and 8,500,000 acre-feet per annum for the Upper and Lower Basins respectively, are controlling until a further apportionment is had pursuant to Article III(f) and (g), which can in no event occur, under the terms of the Compact, prior to October 1, 1963.

Other provisions of the Compact also make clear that it governs inter-basin relations exclusively. Article III(c) divides between the two Basins the burden of delivering water to Mexico pursuant to a prospective treaty obligation of the United States. Article III(d) forbids the states of the Upper Division[12] to cause the flow of the River to be depleted below an aggregate of 75,000,000 acre-feet of water at Lee Ferry, the division point between the two Basins established in Article II(f), for any period of ten consecutive years. Similarly, Articles I and VIII contemplate inter-basin and not interstate operation of the Compact. Nothing in the Compact prescribes a division of water among the Lower Basin states.

I therefore conclude that the provisions of the Compact, unless made operative by relevant statutes or contracts, do not control the disposition of this case. Nevertheless, in view of the urgent arguments of the sovereign parties and against the eventuality that the Court may take a different view of the matter, I set forth my views regarding the meaning of some provisions of the Compact.

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[12]Those states are Colorado, New Mexico, Utah, and Wyoming.

The limits established by the Compact on the acquisition of appropriative rights are applicable to the mainstream of the Colorado River and to its tributaries. Arizona has contended otherwise, claiming that the Compact relates to the mainstream exclusively. To support this contention, Arizona advances a number of arguments:

1. That the events leading to the adoption of the Compact, already mentioned in this Report, reveal an intention to deal with mainstream problems rather than with problems on the tributaries;

2. That the Upper Basin could physically control and acquire rights, against the Lower Basin, in mainstream and Upper Basin tributary water only, and hence was not interested in Lower Basin tributaries;

3. That the Compact purports to apportion only part and not all of the water in the River System;

4. That the obligation specified in Article III(d) necessarily refers to mainstream water only;

5. That subdivisions (a) and (d) of Article III are correlative and that III(b) refers to additional mainstream water;

6. That Article VIII deals with mainstream water.

At best, these arguments suggest two things: (1) that some provisions of the Compact relate to mainstream water exclusively, and (2) that the Compact might have been limited to the mainstream in all of its provisions if the negotiators had chosen to have it so confined. However, the plain words of the Compact permit only one interpretation —that Article III(a), (b), (c), (f) and (g) deal with both the mainstream and the tributaries. Article II(a) states: "The term 'Colorado River System' means that portion of the Colorado River and its tributaries within the United States of America." Article III(a) apportions "from the Colorado River System . . . the exclusive bene-

ficial consumptive use . . . of water." Article III(b) allows the Lower Basin "to increase its beneficial consumptive use of *such waters*. . . ." "Such waters" can only refer to System waters, that is, to mainstream and tributary water as defined in Article II(a). In Article III(c), (f) and (g) System water is specified by name.

The various arguments of Arizona fail before this unmistakable language of the Compact. The historical fact that the Upper Basin was primarily concerned with the mainstream will not nullify language of the Compact that subjugates both mainstream and tributaries to its rule. Nor is the argument persuasive that because some provisions deal only with the mainstream, all provisions are so limited. It is certainly true that the second sentence of Article VIII deals with the mainstream only. It very clearly says so. The preceding and the following sentences, however, speak of the Colorado River System, indicating the draftsmen's intent to distinguish the two terms.

Article I states that "an apportionment of the use of part of the water of the Colorado River System is made" by the Compact, and Article VI speaks of "waters of the Colorado River System not covered by the terms of this Compact". From this Arizona would have me infer that tributaries are not subject to the limitations of Article III(a) and (b). The provisions of Articles I and VI can be given full effect without thus overriding the plain language of Article II(a). Article I is consistent with Article III(f) and (g) which provides for further equitable apportionment of the use of System water. The 1922 Compact apportioned the use of 16,000,000 acre-feet of water to the two Basins; a later compact could make a "further equitable apportionment" of remaining System water. Article VI demonstrates that the Compact governs inter-basin and not interstate relations. If a controversy should arise, for example, between two Lower Basin states over the mainstream, or over a tributary, that Article provides for alter-

native modes of adjusting the dispute. As between Lower Basin states "the waters of the Colorado River System [are] not covered by the terms" of the Compact. (Colorado River Compact, Art. VI(a); see Ariz. Exs. 46, 49.)

Lastly, Arizona argues that Article III(a) relates to the mainstream only because III(a) and III(d) are correlative, III(d) being III(a) multiplied by ten, and Article III(d) is clearly a mainstream measurement. This argument is unacceptable. Since Article III(a) imposes a limit upon appropriation whereas III(d) deals with supply at Lee Ferry, an interpretation which makes these two provisions correlative one to another is inadmissible. Since a substantial quantity of water is lost through reservoir evaporation and channel losses as it flows from Lee Ferry, the point where the III(d) obligation is measured, to the diversion points downstream from Hoover Dam, where most of the appropriations are made, 7,500,000 acre-feet of water at Lee Ferry will supply a considerably smaller amount of appropriations below Hoover Dam. Moreover, III(a) extends to appropriations on Lower Basin tributaries as well as the mainstream. Such appropriations cannot possibly have any relation to the quantitative measurement of the flow of water at Lee Ferry.

The Compact does affect the supply of water available to the Lower Basin. Two provisions of the Compact relate to supply, Article III(c) and Article III(d). Article III(d) presents no questions of interpretation. Under it, the Upper Division states may "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, reckoned in progressive series beginning with the first day of October . . . ."

With the storage provided by Lake Mead, and barring a drought unprecedented in the recorded history of the River, the Lower Basin has, under the guarantee of the Compact, available for use at Hoover Dam a minimum of 7,500,000 acre-feet of water per year, less transit losses

between Lee Ferry and the dam, evaporation loss from Lake Mead, and its share of the Mexican treaty obligation.

The Compact provides for the delivery of water by the states of the Upper Division at Lee Ferry, in addition to the supply guaranteed by III(d), when the obligation to Mexico cannot be satisfied "from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b) [of Article III of the Compact] . . . ." In that event, "the burden of such deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the states of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d)" of Article III. At the time the Compact was signed (1922) and when it became effective (1929), the United States was under no treaty obligation to Mexico and the Compact created no obligation. However, in 1944 the United States and Mexico negotiated a treaty, proclaimed in 1945, under which the United States has the duty to deliver 1,500,000 acre-feet annually to the United States of Mexico at the international boundary.[13]

Several questions arise regarding the effect of Article III(c), and the parties have offered various suggestions regarding its interpretation. These questions include: (1) what is the meaning of the word "surplus"? (2) If surplus is not sufficient to supply Mexico, how should the Upper Basin's further delivery obligation be measured under the language of Article III(c)? In my judgment, the various questions advanced by the parties concerning construction of this subdivision ought not to be answered in the absence of the states of the Upper Basin; nor need they be answered in order to dispose of this litigation affecting only Lower Basin interests. Under the interpretation which I propose of the Boulder Canyon Project Act and the water delivery contracts made by the Secretary of the Interior pursuant

[13]This obligation is subject to several qualifications; the treaty is discussed *infra* at pages 295-296.

thereto, it is unnecessary to predict the supply of water in the mainstream, in the Lower Basin, in order to adjudicate the present controversy.[14]

Arizona argues that Article III(b), relating exclusively to appropriations in the Lower Basin, imposes an additional delivery burden on the Upper Basin. She reasons that after the III(a) apportionment is exhausted, the Lower Basin

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[14]Stream flow at Lee Ferry has historically exceeded the maximum delivery obligation under III (c) and III (d). Whether this condition will continue upon full development of the Upper Basin is a subject of dispute among the experts which need not be resolved here. Historic stream flows at Lee Ferry were as follows:

TEN-YEAR TOTALS OF COLORADO RIVER WATER AT LEE FERRY

(In Acre-Feet)

Ten-Year Period	Stream Flow in Acre-Feet	Ten-Year Period	Stream Flow in Acre-Feet
1896-1905	133,700,000	1923-1932	139,969,500
1897-1906	141,904,000	1924-1933	133,453,600
1898-1907	146,407,000	1925-1934	125,368,900
1899-1908	144,870,000	1926-1935	123,939,900
1900-1909	151,326,000	1927-1936	121,901,700
1901-1910	151,695,000	1928-1937	117,211,700
1902-1911	153,417,000	1929-1938	117,328,400
1903-1912	163,557,000	1930-1939	107,498,700
1904-1913	162,601,000	1931-1940	101,510,200
1905-1914	167,235,800	1932-1941	111,174,700
1906-1915	164,736,200	1933-1942	112,917,800
1907-1916	164,097,000	1934-1943	114,435,400
1908-1917	163,987,100	1935-1944	123,260,400
1909-1918	165,873,700	1936-1945	124,893,700
1910-1919	155,026,100	1937-1946	121,668,100
1911-1920	161,795,800	1938-1947	123,285,600
1912-1921	167,888,600	1939-1948	121,532,800
1913-1922	165,311,000	1940-1949	126,498,100
1914-1923	168,578,300	1941-1950	130,473,700
1915-1924	161,724,600	1942-1951	124,252,400
1916-1925	160,565,300	1943-1952	125,203,000
1917-1926	157,249,000	1944-1953	122,745,000
1918-1927	151,942,800	1945-1954	115,639,600
1919-1928	153,616,500	1946-1955	111,401,200
1920-1929	161,981,500	1947-1956	111,410,500
1921-1930	155,312,900	1948-1957	115,243,100
1922-1931	140,985,600	1949-1958	116,555,900

may, under Article III (b), increase its uses by 1,000,000 acre-feet and that the Upper Basin is obliged to furnish water for this increased III(b) use, subject only to the Upper Basin's first right to 7,500,000 acre-feet of water under Article III(a).

Article III(b) cannot be stretched so far. Whatever may account for its segregation as a separate provision of the Compact, there is nothing to suggest that III(b) imposes an affirmative duty on the Upper Basin. Rather, it imposes for the benefit of the Upper Basin, a ceiling on Lower Basin appropriations, albeit that the Lower Basin is privileged to have a higher ceiling than the Upper Basin.

It is my conclusion that Article III(b) has the same effect as Article III(a), and this conclusion is supported by the reports of the Compact commissioners, who spoke of III(a) and III(b) as apportioning 7,500,000 acre-feet to the Upper Basin and 8,500,000 acre-feet to the Lower Basin. (See Ariz. Exs. 46, 49, 53, 55, 57).

"Beneficial consumptive use" is a term used throughout the Compact although, regrettably, it is not defined in Article II or elsewhere in the document. In the early stages of the hearing, Arizona spent a vast amount of effort in seeking to establish the term as a word of art. She now contends that it has no special meaning and never did.

California argues that the term is used in the Compact as a word of art and means:

> "the loss of Colorado River System water in processes useful to man by evaporation, transpiration or diversion out of the drainage basin, or otherwise, whereby such water becomes unavailable for use within the natural drainage basin in the United States, or unavailable for delivery to Mexico in satisfaction of requirements imposed by the Mexican Treaty. The term includes but is not limited to incidental consumption of water such as evaporation and transpiration from water surfaces and banks

> of irrigation and drainage canals, and on or along seeped areas, when such incidental consumption is associated with beneficial consumptive use of water, even though such incidental consumption is not, in itself, useful."[15]

Further refinements of this definition are contained in a 70-page brief, labeled Appendix 1 of California's Opening Brief. Other parties have contributed suggestions for construing the term.

As used in the Compact, beneficial consumptive use was intended to provide a standard for measuring the amount of water each Basin might appropriate. This was necessary since Article III(a) and (b) imposed limits on appropriative rights. In early applications of the western law of appropriation, diversions were regarded as the measure of water use.[16] By 1922, however, it was recognized that the amount of water diverted for irrigation purposes was not necessarily the amount consumed and lost to the stream. Some water applied to the ground would usually reappear in the stream as return flow. The term beneficial consumptive use as employed in the Compact was intended to give each Basin credit for return flow. Thus whether the limits fixed by Article III(a) and (b) have been reached or exceeded is to be determined by measuring the amount of each Basin's total appropriations through the formula, diversions less return flows. In the Compact, "beneficial consumptive use" means consumptive use (as opposed to non-consumptive use, *e.g.* water power) measured by the formula of diversions less return flows, for a beneficial (that is, non-wasteful) purpose. This understanding of the term is reflected

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[15]Calif. Brief, Vol. II, p. A1-4.

[16]See Hutchins, Selected Problems in the Law of Water Rights in the West 331 (1942).

in several of the commissioners' reports. (See Ariz. Exs. 46, 52, 54, 57.)[17]

As the foregoing discussion indicates, I regard Article III(a) and (b) as a limitation on appropriative rights and not as a source of supply. So far as the Compact is concerned, Lower Basin supply stems from Article III (c) and (d). There are, of course, other sources of supply, for example, Lower Basin tributary inflow, but these are not dealt with as supply items in the Compact. Thus when referring to the Compact, it is accurate to speak of III(c) and III(d) water, but it is inaccurate and indeed meaningless to speak of III(a) and III(b) water. For Compact purposes, Article III(a) and (b) can refer only to limits on appropriations, not to the supply of water itself.

It is true that Congress in Section 4(a) of the Project Act, treated Article III(a) as a source of supply rather than as a limitation on appropriations. The Act speaks of "the waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact . . . ." Later in this Report I shall develop at some length the meaning of this language and the confusion it has produced in this litigation. Suffice it now to say that the congressional meaning is different from the Compact meaning. One may properly speak of III(a) water in the Project Act sense, but not in the Compact sense. Much of the confusion in this case may be traced to this difference between the two writings, for the parties speak of III(a) water without differentiating between the Compact and the Project Act.

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[17]The term has since been adopted by branches of the engineering profession to express highly sophisticated formulae useful in the planning of irrigation projects. One such is the Blaney-Criddle formula U=KF—R. For an explanation of this formula, see Tr. 13417—13428 (Criddle). Such meanings have no bearing on the term as used in the Compact.

One other contention relating to the Compact may be noticed here. Under Section 4(a) of the Project Act, California, in addition to consuming a part of the so-called III(a) water, may share in "excess or surplus waters unapportioned by said Compact." California contends that III(b) uses are unapportioned by the Compact. The argument is based primarily on the fact that Article III(b) does not use the word "apportioned" which appears in Article III(a). Article III(b) gives the Lower Basin "the right to increase its beneficial consumptive use of" water by 1,000,000 acre-feet per annum. I have already indicated my view that subdivisions (a) and (b) of Article III operate in identical fashion; that the net effect of the two sections is to limit appropriations in the Upper Basin to 7,500,000 acre-feet and in the Lower Basin to 8,500,000 acre-feet. That both sections effect an apportionment is made clear by Article III(f), which provides for "further equitable apportionment of the beneficial uses of the waters of the Colorado River System unapportioned by paragraphs (a), (b) and (c)" of Article III. California argues that apportionment has no precise or consistent meaning in the Compact, since in the foregoing provision Article III(a) and (b) are lumped together with Article III(c) which, according to the argument, clearly does not apportion water to Mexico. California's argument has no merit. Article III(c), while apportioning no water to Mexico, does apportion the burden of a deficiency resulting from the Mexican obligation between the Upper and Lower Basins, and hence effects an apportionment. Moreover, as I have previously had occasion to observe, the reports of the Compact commissioners describe Article III(b) as an apportionment (See Ariz. Exs. 46, 49, 53, 55, 57).

By these observations I do not mean to rule on California's rights under Section 4(a) of the Project Act. That III(b) uses are apportioned for Compact purposes does not

control the interpretation of the statute, and I shall discuss its interpretation in this regard later in the Report.

B. The Boulder Canyon Project Act: Sections 1, 5, 6 and 8

The Boulder Canyon Project Act is in my view the source of authority for the allocation and delivery of water to Arizona, California and Nevada from Lake Mead and from the Colorado River below Lake Mead.[18] That the Congress intended the statute to be a source of such authority is made manifest in several sections. Section 1 of the Act authorizes the Secretary of the Interior "to construct, operate, and maintain" Hoover Dam for several purposes, including "for storage and for the delivery of the stored waters thereof for reclamation of public lands and other beneficial uses. . . ."

More specifically, Section 5 authorizes the Secretary "under such general regulations as he may prescribe to contract for the storage of water in said reservoir and for the delivery thereof at such points on the river . . . as may be agreed upon, for irrigation and domestic uses. . . ." To make its intention abundantly clear the Congress declared in Section 5 that: "No person shall have or be entitled to have the use for any purpose of the water stored as aforesaid except by contract as herein stated." The intention to exert authority over the allocation and distribution of water stored in Lake Mead can likewise be derived from Section 8(b) of the Act. That section contemplates that Arizona, California and Nevada, or any two of them, might negotiate a compact for the equitable division of Colorado River water but provides that such a compact shall be subject to water delivery contracts made by the Secretary of the Interior prior to congressional approval of such compact.

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[18]The Project Act does not govern the mainstream of the Colorado River above Lake Mead. See page 183, *infra*.

These provisions, together with the general operational scheme established in the Act and the purposes of the Act explicated in the legislative history, make it clear that the Project Act was designed by Congress to establish the authority for an allocation of all of the available water in Lake Mead and in the mainstream of the Colorado River downstream from Lake Mead among Arizona, California and Nevada, the only states having geographic access to this water. As to this water, principles such as equitable apportionment or priority of appropriation which might otherwise have controlled the interstate division of the River in its natural flow condition were rendered inapplicable by the Project Act.[19]

The Act itself clearly reserves to the United States broad powers over the water impounded in Lake Mead and delegates this power to the Secretary of the Interior, as agent of the United States. He is specifically authorized to impound the water of the Colorado River in Lake Mead and to exercise custody over the water so impounded through his control, management and operation of the dam and reservoir. No user, whether it be a state or an individual, may receive the impounded water unless the Secretary, by contract, agrees to release it for delivery to that user. Nothing in the Act purports to require the Secretary to agree to deliver specific quantities of water to any particular state or user, except that Section 6 requires him to satisfy water rights perfected as of June 25, 1929.[20] On the con-

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[19]Since the Project Act does not affect rights to water flowing in the Colorado River upstream from Lake Mead, see page 183, *infra,* the application of these principles to this reach of the River has not been abrogated by the Project Act.

[20]Section 6 of the Project Act directs that Hoover Dam be operated in "satisfaction of present perfected rights in pursuance of Article VIII of said Colorado River compact. . . ." Article VIII states: "Present perfected rights . . . are unimpaired by this compact." The phrase "present perfected rights" means rights perfected when the Act became effective. A statute speaks as of its effective

trary, the Act clearly contemplates that water unappropriated as of that date is to be made available for use within a state only if the Secretary, within his discretion, contracts for the delivery of the water to that state. In short, no contract, no water, and the Secretary determines how much water he will contract to deliver to each state subject only to the limitations on his discretion expressed in the Project Act itself. Since Congress realized that the dam authorized by the Project Act would impound substantially all the water of the mainstream,[21] Congress legislated that the Project Act was to be the new source of power for the allocation of water so impounded. In Sections 8(b) and 4(a), Congress provided that the water could be divided by compact among the interested states. But failing such a compact, the water need not run to the sea nor be indefinitely stored in Lake Mead; in such event the water was to be divided by the Secretary of the Interior.

This conclusion, that the allocation of unappropriated water impounded in Lake Mead is governed by the Secretary's water delivery contracts, comports with the basic scheme established by Congress in the Project Act. It was

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date. See Cabunac v. National Terminals Corp., 139 F. 2d 853 (7th Cir. 1944); Zimmerman v. United States, 277 Fed. 965 (7th Cir. 1921). Under the terms of the Act, it became effective only when the conditions of Section 4(a) were satisfied and the President so proclaimed. The Presidential Proclamation was made on June 25, 1929.

It has been suggested that "present perfected rights" should be construed to mean rights perfected as of the date the Compact was signed, namely, November 22, 1922. This argument must be rejected. A compact, like a statute, speaks as of its effective date. The Colorado River Compact became effective only upon congressional consent thereto, and such consent was given in the Boulder Canyon Project Act. Thus, the Compact became effective when the Act took effect, which, as noted, was June 25, 1929.

[21] *See Hearings on H. R. 9826 Before the House Committee on Irrigation and Reclamation,* 69th Cong., 1st Sess. 163-164 (1926); Legislative History of Sections 4(a), 5 (1st Paragraph), and 8, Boulder Canyon Project Act as compiled by the State of Arizona [hereinafter cited as "Ariz. Legis. Hist."] p. 6.

apparent that water from Lake Mead would be utilized for a great variety of purposes in three different states, as well as on United States projects and in satisfaction of United States treaty obligations. A great many conflicting interests, as between different sovereigns and competing uses, would have to be resolved in order to operate the reservoir and dam. In this context, it is understandable that Congress designed the Project Act itself as the source of the authority and guiding standards necessary for the operation of the dam and reservoir, including the interstate division of the unappropriated water to be impounded by the dam, except only as the Act itself expressly provided otherwise. Congress obviously felt that once the water was within the custody and control of the United States, in default of interstate agreement, the duty would devolve upon the United States, and particularly the Secretary of the Interior, to provide for the allocation of the water.

This conclusion is also supported by the legislative history of the Project Act. The congressional debates are almost unintelligible except on the premise that the legislators considered that they were providing, in the Project Act itself, the authority for the allocation of impounded water among the states. Thus Senator Pittman of Nevada carefully pointed out on the floor of the Senate that Section 4(a) of the Project Act provided the basis for an apportionment of the water stored in Lake Mead. See pages 176-177, *infra*. Section 4(a) authorized the three interested states themselves to enter into the compact therein defined for the division of this water. Alternatively, the states could, if they chose, formulate a different scheme of allocation subject to congressional approval. Section 8(b). But if the states would not agree to the one or the other, then Congress clearly intended that the limitation on California in Section 4(a) and the Secretary's water delivery contracts made pursuant to Section 5 would impose a federal apportionment on the states.

Senator Pittman explained why it was necessary for Congress to provide authority for the allocation of the water among the three states.

> "Mr. President, this question has been here now for seven years. The seven States have been attempting to reach an agreement. Apparently the Senate of the United States is about to reach an agreement as to what ought to be done. The Senate has already stated exactly what it thinks about the water. That might have been an imposition on some States. Why do we not leave it to California to say how much water she shall take out of the river or leave it to Arizona to say how much water she shall take out of the river? It is because it happens to become a duty of the United States Senate to settle this matter, and that is the reason."[22]

Senator Hayden of Arizona who, like Senator Pittman, was one of those most interested in the Project Act, emphasized a number of times that the bill provided a basis for the apportionment of water among Arizona, California and Nevada regardless of state law and interstate priorities, but that it would not affect intrastate water rights. Senator Hayden stated:

> "The only thing required in this bill is contained in the amendment that I have offered, that there shall be apportioned to each State its share of the water. Then, who shall obtain that water in relative order of priority may be determined by the State courts."[23]

The amendment referred to was the basis for a substitute amendment by Senator Phipps of Colorado which, in turn, was enacted as the first paragraph of Section 4(a) of the Project Act.

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[22]70 Cong. Rec. 471 (1928), Ariz. Legis. Hist. p. 84.

[23]70 Cong. Rec. 169 (1928), Ariz. Legis. Hist. p. 30. For similar statements by Senator Hayden see 70 Cong. Rec. 163 (1928), Ariz. Legis. Hist. p. 18.

The following colloquy also makes clear that Congress intended that the Secretary of the Interior, in the exercise of the discretion vested in him by Section 5, could, by means of water delivery contracts, effectuate an interstate allocation, in default of allocation by the states themselves.

> "Mr. Walsh of Montana. If the city of Los Angeles has this enormous appropriation of the waters of the Colorado River, a perfected appropriation of [*sic*] an inchoate appropriation, does it follow; if the Government erects this dam across the Colorado River and creates a great storage basin, that it must yield up that amount of water to the city of Los Angeles?
>
> "Mr. Johnson. I rather think so, just exactly as if it were a perfected right for irrigation purposes.
>
> "Mr. Walsh of Montana. Yes; but I always understood that the interest that stores the water has a right superior to prior appropriations that do not store.
>
> "Mr. Johnson. Possibly so. What is the point?
>
> "Mr. Walsh of Montana. The point is that apparently, if that is correct, then this expenditure is being made with no right in the Government of the United States to control the water which is stored, but that it must go to those appropriators.
>
> "Mr. Johnson. No; the bill provides that a contract in advance must be made for the storage of water by the Secretary of the Interior.
>
> "Mr. Walsh of Montana. A contract with whom?
>
> "Mr. Johnson. With those who utilize and take and appropriate the water.
>
> "Mr. Walsh of Montana. That is to say, the Government may dispose of the stored water as it sees fit?
>
> "Mr. Johnson. Yes; under the terms of this bill.
>
> "Mr. Walsh of Montana. Then how can it be said that the city of Los Angeles has a perfected interest?

"Mr. Johnson. It has a perfected right there unquestionably, but the bill requires the city of Los Angeles to conform to it, and the city of Los Angeles is perfectly willing to conform to it just exactly as if it had no perfected right.

"Mr. Walsh of Montana. Am I correct in the assumption, that the Government of the United States must distribute the water to the various appropriators in accordance with their several appropriations?

"Mr. Johnson. If they contract.

"Mr. Walsh of Montana. Yes; but to contract means a liberty of contract. That is what I want to know. Can the Secretary give the water to them or withhold it from them as he sees fit?

"Mr. Johnson. Certainly, because before he begins work upon the dam he has to have the contract in his possession for its payment, and he is the one who is to fix the sums that are to be paid.

"Mr. Walsh of Montana. Yes, but that is quite contradictory. It seems to me that the city of Los Angeles has no rights by virtue of this appropriation.

"Mr. Johnson. Certainly it has, but those rights unquestionably will be controlled by this bill.

* * *

"Mr. Walsh of Montana. I directed the inquiry merely for the purpose of trying to find out, if I can, under what kind of obligation the Government of the United States, should it build this dam, would be to those who have the appropriations.

"Mr. Johnson. The Government would be under no obligations until it makes its terms. I seem unable to make that plain. But here is everything in this scheme, plan, or design: Everything is dependent upon the Secretary of the Interior contracting with those who desire to obtain the benefit of the construction, and he is not to undertake any expenditure nor to undertake any construction until that shall have been accomplished.

"Mr. Walsh of Montana. Let us suppose the Arizona people are perfectly willing to meet the requirements and that the Los Angeles people are perfectly willing to meet the requirements and other people who have not even attempted to make any appropriation are perfectly able and willing to meet the requirements. Who then has the right?

"Mr. Johnson. The Secretary of the Interior and the Government have the right.

"Mr. Walsh of Montana. The Secretary of the Interior may utterly ignore those appropriations?

"Mr. Johnson. Possibly so.

"Mr. Walsh of Montana. That is what I am curious to find out about."[24]

Arizona v. *California,* 283 U. S. 423 (1931), does not, as California urges, conflict with the conclusion here recommended. In that case Arizona filed an original bill of complaint to enjoin the construction of the dam authorized by the Project Act on the ground, *inter alia,* that the Secretary of the Interior would operate the dam in such a manner as to invade "Arizona's quasi-sovereign right to prohibit or to permit appropriation, under its own laws, of the unappropriated water of the Colorado River flowing within the State." 283 U. S., at 451. The bill was dismissed "without prejudice to an application for relief in case the stored water is used in such a way as to interfere with the enjoyment by Arizona, or those claiming under it, of any rights already perfected or with the right of Arizona to make additional legal appropriations and to enjoy the same." 283 U. S., at 464. The Court's reason for dismissing the bill, stated at page 464, was:

"As we hold that the grant of authority to construct the dam and reservoir is a valid exercise of

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[24]70 Cong. Rec. 168 (1928), Ariz. Legis. Hist. pp. 26-29. See also the statements of Senator Pittman at 69 Cong. Rec. 10259 (1928), Ariz. Legis. Hist. pp. 13-14; and Senator Hayden at 70 Cong. Rec. 382, Ariz. Legis. Hist. pp. 56-56c.

> Congressional power, that the Boulder Canyon Project Act does not purport to abridge the right of Arizona to make, or permit, additional appropriations of water flowing within the State or on its boundaries, and that there is now no threat by Wilbur, or any of the defendant States, to do any act which will interfere with the enjoyment of any present or future appropriation, we have no occasion to consider other questions which have been argued."

I interpret *Arizona* v. *California* as holding nothing more than that the United States could, under the Constitution, construct a dam on the territory of Arizona and Nevada and impound the waters of the Colorado River, a navigable stream. Arizona's objections, that the dam might be operated in such a way as to trespass on her sovereignty, were dismissed as premature since it was by no means certain that the dam and other works would be so operated as to invade Arizona's rights. This is the only explanation of the dismissal without prejudice to a new application for relief if the dam were operated so as to adversely affect Arizona's appropriations from the Colorado River. The Court reasoned that the constitutional issues which might be raised, depending on how the Secretary operated the dam, were best left to await the outcome of its construction and operation. The Court recognized that when the dam impounded water this might affect Arizona's rights to appropriate it by reducing the supply which would flow on her borders, but the Court held that such an infringement was justified under the constitutional power of the Federal Government to regulate navigable streams. Thus the Court stated, at pages 462-463 of the opinion:

> "There is no allegation of definite physical acts by which Wilbur is interfering, or will interfere, with the exercise by Arizona of its right . . . . to make future appropriations by means of diversions below the dam, or limiting the enjoyment of rights

> so acquired, unless it be by preventing an adequate quantity of water from flowing in the river at any necessary point of diversion."

Beyond this the Court considered it unnecessary to go. The Court thus decided not to deal with the question, which must be answered in this litigation, of the extent of the Secretary's authority under the Project Act to control the allocation of water among the states. The fact that this and other questions are ripe for decision now, although they were not in 1931 when *Arizona* v. *California* was decided, gives some indication of the vast difference between the two cases. The prior case was decided before Hoover Dam was built and the sole issue was whether construction of the dam should be enjoined. The present case, of course, necessarily involves an adjudication of the claims and interests of the several states and the United States as they have developed during some twenty-five years of operation of Hoover Dam. For example, one of Arizona's primary fears in 1931 was that she would be required to conform to the Colorado River Compact in order to receive stored water; but she has since ratified the Compact, and, indeed, has relied on that ratification in this litigation. In short, *Arizona* v. *California* was concerned with different issues and different circumstances from those presented in this case.

The argument has been advanced that the Project Act, as I would construe it, constitutes an unconstitutional assumption of power by the United States. The argument does not survive scrutiny. Clearly the United States may construct a dam and impound the waters of the Colorado River, a navigable stream. *Arizona* v. *California,* 283 U. S. 423 (1931); see *United States* v. *Twin City Power Co.,* 350 U. S. 222 (1956); *United States* v. *Chandler-Dunbar Co.,* 229 U. S. 53 (1913); *United States* v. *Rio Grande Irrigation Co.,* 174 U. S. 690 (1899). Clearly, also, once the United States impounds the water and thereby obtains

physical custody of it, the United States may control the allocation and use of unappropriated water so impounded. *Ivanhoe Irrigation District* v. *McCracken,* 357 U. S. 275 (1958); *United States* v. *Gerlach Live Stock Co.,* 339 U. S. 725 (1950). Since Section 6 instructs the Secretary to satisfy property rights in mainstream water perfected as of June 25, 1929, the effective date of the Act, these rights are not in jeopardy. Rights that might be recognized as of that date under state law but that do not qualify as perfected rights under Section 6 do not receive this protection. See pages 306-309, *infra.* Despite this fact, however, there is no need to pass on questions of ownership of water in navigable streams or of the validity against the United States of rights therein recognized by state law. There has been no showing that non-perfected rights recognized by state law as of June 25, 1929, if any, have not been satisfied since Hoover Dam was constructed. If it develops that such rights are not satisfied in the future, that will be time enough to determine whether they are of such character as require compensation for their taking.

In order to sustain the Project Act as applied in this case, it need only be held that the United States may, under the Commerce clause of the Constitution, impound waters in a navigable stream and regulate the disposition thereof so long as perfected rights are satisfied, leaving open the question whether non-perfected rights recognized under state law must be compensated if they are not satisfied.

Not much can be said of the argument that the Project Act constitutes an unconstitutional delegation of legislative power to the Secretary of the Interior because there are insufficient standards to govern his allocation of the water impounded in Lake Mead. The premise is wrong. The Act imposes substantial limitations on the Secretary's discretion. He may not contract with California for more than 4,400,000 acre-feet out of 7,500,000 acre-feet of consumptive use of mainstream water nor for more than one-half

of surplus. Section 4(a). He must satisfy present perfected rights. Section 6. Contracts for water for irrigation and domestic uses must be for permanent service. Section 5. The Secretary, his permitees, licensees and contractees, "shall observe and be subject to and controlled by" the Colorado River Compact. Sections 8(a), 13(b) and 13(c). The Secretary and those claiming under him are subject to any compact between Arizona, California and Nevada, or any two of them, approved by Congress. Section 8(b).[25] The Secretary is subject to the provisions of the reclamation law in the operation and management of the works authorized by the Project Act, except as otherwise provided therein. Section 14.

The Secretary has in fact exercised his discretion, as will be more fully explained later, by making contracts which apportion the water available in Lake Mead substantially along the lines which Congress proposed in Section 4(a) of the Project Act as a fair and equitable division among Arizona, California and Nevada.

For these reasons I have concluded that the delegation of authority to the Secretary of the Interior to apportion Lake Mead water is constitutional and that the Secretary has exercised this authority in a reasonable manner.

Only two other contentions of the parties regarding the proper interpretation of the Secretary's authority under the Project Act need be discussed at this point. Arizona, while agreeing with the United States that the Project Act constitutionally delegates to the Secretary of the Interior the power to allocate mainstream water among the claimant states, argues that the second paragraph of Section 4(a) establishes a formula for the allocation which the Secretary is required precisely to follow, and that those clauses in her water delivery contract which deviate from the for-

[25]Compacts approved by Congress after January 1, 1929, are subject to contracts made by the Secretary prior to congressional approval of such compacts.

mula are void. This argument is premised on the language in Section 5 that "contracts respecting water for irrigation and domestic uses . . . shall conform to paragraph (a) of section 4 of this act." The second paragraph, Arizona points out, is included within Section 4(a). But the second paragraph of Section 4(a) is plain in that it merely *authorizes* a tri-state compact for the division of water; it does not compel it; nor does it condition approval of the Colorado River Compact upon acceptance of the proposed tri-state compact. Indeed, the second paragraph was specifically amended on the floor of the Senate to make the suggested division permissive rather than mandatory.[26] The suggested compact which Congress was willing to approve in advance is of no compelling force or effect since no such compact has ever been agreed to. In so far as Section 5 refers to the second paragraph of Section 4(a) it is for the purpose of requiring the Secretary to respect the compact if ratified by the states. See also Section 8(b). Arizona's contention in this respect must therefore be rejected.

Nevada contends that the congressional consent to the Colorado River Compact embodied in the Project Act includes consent to Article IV (a) of the Compact which declares that the Colorado River is no longer navigable. From this premise, she contends that Section 5 cannot empower the Secretary to divide and allocate water and that such a division can be accomplished in two ways only, by compact or adjudication. If Section 5 purports to provide a third method of apportionment, by contract, it is unconstitutional. Accordingly, Nevada argues that she is not bound by her contract limit of 300,000 acre-feet per annum and she seeks an equitable apportionment of the waters of the Lower Basin. This contention does violence to the Act. Section 1 of the Project Act authorized the construction

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[26]See 70 Cong. Rec. 469 (1928), Ariz. Legis. Hist. pp. 83-84.

of the dam for the purpose of "improving navigation" and Section 6 provides that the dam is to be used "First, . . . for improvement of navigation . . ." Congress thus rejected the declaration of non-navigability in Article IV (a) of the Compact. That Article specifically provides that: "If the Congress shall not consent to this paragraph, the other provisions of this compact shall nevertheless remain binding."

C. The Boulder Canyon Project Act: Section 4(a) and the California Limitation Act

The first paragraph of Section 4(a) establishes a limitation on California's consumptive use of mainstream water, and, as will be developed later, this limitation forms an integral part of the interstate allocation which the water delivery contracts have made. Section 4(a) provides, in part, that the Act shall not take effect and the proposed dam shall not be constructed unless and until (1) all seven of the interested states had ratified the Colorado River Compact, or:

> "(2) [I]f said States fail to ratify the said compact within six months from the date of the passage of this Act then, until six of said States, including the State of California, shall ratify said compact and shall consent to waive the provisions of the first paragraph of Article XI of said compact, which makes the same binding and obligatory only when approved by each of the seven States signatory thereto, and shall have approved said compact without conditions, save that of such six-State approval, and the President by public proclamation shall have so declared, and, further, until the State of California, by act of its legislature, shall agree irrevocably and unconditionally with the United States and for the benefit of the States of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, as an express covenant and in consideration of the passage

> of this Act, that the aggregate annual consumptive use (diversions less returns to the river) of water of and from the Colorado River for use in the State of California, including all uses under contracts made under the provisions of this Act and all water necessary for the supply of any rights which may now exist, shall not exceed four million four hundred thousand acre-feet of the waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact, plus not more than one-half of any excess or surplus waters unapportioned by said compact, such uses always to be subject to the terms of said compact."

The reason that Congress imposed this limitation on California's consumptive use of mainstream water in the event that all seven states did not agree to the Colorado River Compact within six months of the date of enactment of the Project Act is apparent from the statutory language itself. It was for the benefit of the other six states.

Absent seven-state ratification of the Compact, the Upper Basin required protection against appropriations in the Lower Basin in excess of the Compact apportionment. The Upper Basin feared that Arizona might not ratify, in which event California, unless limited, would be able to appropriate from the mainstream substantially all of the Lower Basin apportionment, leaving Arizona free to make further appropriations from the mainstream outside the Compact ceilings. The limitation on California left a sufficient margin for exploitation by Arizona so as to secure the Upper Basin against undue encroachment by the nonratifying state.

Similarly, Arizona and Nevada were concerned that California's rapid development would enable that state to appropriate most of the mainstream water available in the Lower Basin. The California limitation afforded these states protection against this eventuality. Unless California

agreed with them to an acceptable division of mainstream water such as that suggested in the second paragraph of Section 4(a), they could, simply by delaying ratification for six months, bring the limitation into effect.

Seven states did not ratify the Colorado River Compact within six months of the date of enactment of the Project Act. California, in compliance with the statutory condition, passed its Limitation Act on March 4, 1929.[27] The California Limitation Act recites that it was enacted in order to comply with Section 4(a) of the Project Act, and it limits California's diversions of Colorado River water in language that is substantially identical to the Project Act limitation.

The limitation on California's use of Colorado River water, contained in the Project Act and the California Limitation Act, and incorporated into the Secretary's water delivery contracts with California users, is valid and binding on California. California argues that if it be held that Arizona effectively ratified the Compact, then California should be absolved of the limitation upon her. California's argument is based upon the premise that her act of self-limitation was exacted of her only in the event of a six-state compact, not of a seven-state compact. However, the natural reading of the language of the statute does not support her contention. The condition stated is the failure of seven states to ratify within six months. That contingency occurred.

Nor is there much to be said for California's alternative argument that Arizona did not effectively ratify the Compact. This is founded on the premise that the Compact, having been proclaimed as a six-state compact, could not fifteen years later become a seven-state compact. The premise is unsound. It was not proclaimed as a six-state compact. It never became a six-state compact. Article XI

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[27]Calif. Stats. and Amendments to the Codes, ch. 16, pp. 38-39 (1929). For the complete text of the Limitation Act, see Appendix 4.

of the Compact was never stricken or amended. The Congress and six of the states "waived" compliance with Article XI. Certainly Congress contemplated the future adherence of Arizona. Section 13(a) of the Project Act provides: "[T]his approval shall become effective when the State of California and *at least* five of the other States mentioned, shall have approved or *may hereafter* approve said compact as aforesaid and shall consent to such waiver, as herein provided." (emphasis added) Nothing has been called to my attention to indicate that California or any of the other signatory states expressed itself differently.

Under ordinary contract law it may be that fifteen years is too long a time within which an invitation to agree may be said to remain open. But that is always a question of fact to be determined from all the circumstances reflecting the understanding of the parties. 1 Williston on Contracts § 54 (3rd ed. 1957); 1 Corbin on Contracts § 36 (1950). Considering what has already been said, coupled with the perpetual character of the Compact and the very long-range interests which it embraced, I do not think Arizona outwaited her invitation.

Interpretation of the limitation on California.

We turn now to the construction of the language of Section 4(a) of the Project Act and the substantially identical phraseology which appears in California's Limitation Act. Although the problems inherent in those words do not leap to the eye, nevertheless so troublesome are they, that each of the parties which has dealt with them has construed them quite differently, and none of the parties advocates a literal reading of all the statutory language.

What is meant by the words "waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact"?

Article III(a) of the Compact reads as follows:

> "(a) There is hereby apportioned from the Colorado River System in perpetuity to the Upper Basin and to the Lower Basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist."

Read literally, the phrase in Section 4(a) limiting California to 4.4 million acre-feet "of the waters apportioned to the lower basin States by paragraph (a) of Article III" means that, of the 7,500,000 acre-feet apportioned to the entire Lower Basin, California's aggregate annual consumptive use shall not exceed 4,400,000 acre-feet.

What is meant by the words "excess or surplus waters unapportioned by said compact"?

Article III(f) reads as follows:

> "(f) Further equitable apportionment of the beneficial use of the waters of the Colorado River System unapportioned by paragraphs (a), (b), and (c) may be made in the manner provided in paragraph (g) at any time after October 1, 1963, if and when either Basin shall have reached its total beneficial consumptive use as set out in paragraphs (a) and (b)."

The word "surplus" occurs in Article III(c) where it is used as follows: ". . . waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b)."

Thus read literally, the phrase limiting California to one-half of any "excess or surplus waters unapportioned by said compact" means that California may consume half of any water above that referred to in Article III(a) and (b).

California would have us read the first phrase literally so that all uses, both from the mainstream and the tributaries, in the Lower Basin will be included in the accounting.

But not so the second phrase, for if the second is read literally she has no share in the uses specified in Article III(b).[28]

Arizona would have us read the second phrase literally so as to exclude California from the 1,000,000 acre-feet allotted, or as she says, apportioned, by Article III(b). But not so the first phrase. Arizona argues that Article III(a) of the Compact, despite its plain language to the contrary, was construed by the Congress and should now be construed as apportioning to the Lower Basin not System water but mainstream water.

Nevada reads the language so that it makes no difference how the "surplus" language in California's limitation is construed. She argues that California can have no more than 4,400,000 acre-feet out of the available water in the mainstream, and since there is in fact no surplus, which Nevada defines as the excess over 10,000,000 acre-feet (8,500,000 acre-feet for the Lower Basin and 1,500,000 for Mexico), the question of how the language is to be read is moot. Nevada overlooks that her reasoning has in fact excluded California from so-called III(b) water.

The United States once suggested a totally different reading. It construed the first mentioned phrase as if it read "apportioned to the lower basin states by paragraph (*d*) of Article III." Such a construction relates the phrase to the obligation of the states of the Upper Division not to cause a depletion of the River at Lee Ferry below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years. The United States considers "surplus" to be "the waters in the main stream available for use in the Lower Basin in excess of 7,500,000 acre-feet per year."[29]

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[28]That Article reads: "(b) In addition to the apportionment in paragraph (a), the Lower Basin is hereby given the right to increase its beneficial consumptive use of such waters by 1,000,000 acre-feet per annum."

[29]U. S. proposed conclusion 11.17.

The reason for such diversity of opinion is that the words of Section 4(a), despite their superficial simplicity, cannot bear their literal meaning. This becomes apparent in the attempt to apply the language of Section 4(a) to the factual situation in the Colorado River Basin.

First of all, Section 4(a), if read literally, authorizes a compact which would deprive two states, New Mexico and Utah, of the use of Lower Basin tributary waters which are presently being consumed in those states and which were being consumed there in 1928 when the Project Act was enacted. Section 4(a) contemplates the division of the water referred to therein only among the three states of the Lower Basin which have geographic access to water flowing in the mainstream of the Colorado River, namely, Arizona, California and Nevada. This becomes clear when we read the first and second paragraphs of Section 4(a) together. The first paragraph limits California to not more than "four million four hundred thousand acre-feet of the waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact, plus not more than one-half of any excess or surplus waters unapportioned by said compact. . . ." The second paragraph authorizes a compact between Arizona, California and Nevada "which shall provide (1) that of the 7,500,000 acre-feet annually apportioned to the lower basin by paragraph (a) of Article III of the Colorado River compact, there shall be apportioned to the State of Nevada 300,000 acre-feet and to the State of Arizona 2,800,000 acre-feet for exclusive beneficial consumptive use in perpetuity, and (2) that the State of Arizona may annually use one-half of the excess or surplus waters unapportioned by the Colorado River compact. . . ." These two paragraphs are clearly correlative and contemplate allocation of all the available water among the three states. See pages 174-175, *infra*. Reading the two paragraphs together, it becomes apparent that the pro-

posed compact to which Congress gave advance approval in the second paragraph was for a division of the available annual supply of water so that of the first 7,500,000 acre-feet of consumptive use, 4,400,000 is allocated to California, 2,800,000 to Arizona and 300,000 to Nevada; any excess is divided half to California and half to Arizona. There is no water left for any other states.

Yet, if read literally, Section 4(a) applies to all of the water "apportioned to the lower basin states by paragraph (a) of Article III of the Colorado River compact." The water apportioned to the Lower Basin by Article III(a) of the Compact is water in the "Colorado River System," which is defined in Article II(a) of the compact as "that portion of the Colorado River and its tributaries within the United States of America." New Mexico and Utah are presently consuming water, as they were in 1928, from tributaries of the Colorado River in the Lower Basin. Thus, a literal reading of Section 4(a) would authorize Arizona, California and Nevada to enter into a compact for the division among themselves of all of the Lower Basin system water, including the water being used by New Mexico and Utah. The unlikelihood of such a congressional intention indicates that Section 4(a) should not be given its literal meaning.

Secondly, Section 4(a), if read literally, authorizes a compact which would prohibit the states of the Upper Basin from utilizing any of the water unapportioned by the Colorado River Compact despite the fact that Article III(f) of the Compact specifically contemplates a future apportionment of this water between the two Basins and Congress purported to ratify the Compact in the Project Act. The tri-state compact authorized by Congress in Section 4(a) provides for the division of all "waters unapportioned by the Colorado River compact" among Arizona and California. Yet that phrase, if given its literal Compact meaning, includes all unapportioned water throughout the entire

Colorado River Basin, in both the Upper and Lower Basins. See pages 194-195, *infra*. It is unlikely, particularly in view of Article III(f) of the Compact, that Congress intended to authorize Arizona and California to agree to divide among themselves all of the water in the Colorado River System unapportioned by the Compact, thus leaving nothing for the Upper Basin beyond its III(a) apportionment.

Finally, Section 4(a), if read literally, would prohibit California from consuming water from the Colorado River in excess of 4,400,000 acre-feet of consumptive uses per annum until consumptive uses throughout the Colorado River Basin totaled 16,000,000 acre-feet per annum, a figure which is approximately twice the present total of consumptive uses. Thus, California is limited by Section 4(a) to 4,400,000 acre-feet per annum plus "not more than one-half of any excess or surplus waters unapportioned by" the Colorado River Compact. Surplus waters unapportioned by the Compact, if taken literally, means water in excess of that "apportioned" in Article III(a) and (b), which means water in excess of 16,000,000 acre-feet of consumptive use in the Colorado River Basin.[30] Again it is extremely unlikely that Congress intended this literal result to apply.

For the reasons stated above, Section 4(a) of the Project Act cannot be given a literal interpretation. Such an interpretation would fly in the face of what must have been the congressional intention; it would make no practical sense whatsoever. This being the case, I have construed Section 4(a) so as to comport with the purposes of Congress in enacting it and to effectuate a result which makes sense when the section is applied to the factual situation existing in the Colorado River Basin.

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[30]See p. 195, *infra*.

Interpretation of the phrase, waters apportioned by Article III(a).

I have concluded that Congress intended, in limiting California to 4.4 million acre-feet of "the waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact," simply to limit California's annual uses[31] of water to 4.4 out of 7.5 million acre-feet. Congress referred to Article III(a) of the Compact solely as a shorthand way of saying "7,500,000 acre-feet per annum." This inappropriate reference to the Compact has been the cause of seeming inconsistency in the Act and of much confusion in its interpretation. Reflection has led to the conviction that the statutory language does not accurately express the true congressional intention.

Thus I hold that Section 4(a) of the Project Act and the California Limitation Act refer only to the water stored in Lake Mead and flowing in the mainstream below Hoover Dam, despite the fact that Article III(a) of the Compact deals with the Colorado River *System,* which is defined in Article II(a) as including the entire mainstream and the tributaries.

It is clear that Congress intended Section 4(a) of the Project Act to apply only to the mainstream, where the works authorized by the Act were to be constructed.[32] The United States cannot by its operation and control of Hoover

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[31]Measured by diversions less returns.

[32]It is true that certain sections of the Project Act apply to the Colorado River System. The explanation for this is that in those sections Congress was dealing with problems which had system-wide application. Thus Section 13 applies system-wide because it approved the Colorado River Compact, which itself applies system-wide. Similarly, Section 16 applies to the entire river system because it deals with a possible *future* comprehensive development plan for the entire river system. But it is clear that many other sections of the Project Act apply only to the mainstream, and this is understandable because in them Congress was dealing only with mainstream problems.

Dam regulate the flow of water in the tributaries, nor can it deliver water on any of these streams.

Certainly Congress intended that the water, to a portion of which California was limited by Section 4(a), would be mainstream water only. The very language of the Section—it refers to the Colorado River and not to the System—points in this direction. But more important, the second paragraph of Section 4(a) demonstrates that Congress considered the limitation on California to be part of an overall allocation of the entire quantity of water dealt with in that Section among three states only: of the first 7.5 million acre-feet—4.4 to California, 2.8 to Arizona, and .3 to Nevada; the balance to California and Arizona equally. This intention is clearly stated in the legislative history. Thus Senator Hayden of Arizona made the following comments about an amendment to the Project Act which he offered and which subsequently became the second paragraph of Section 4(a). The Phipps Amendment, which is referred to in the quotation, became the first paragraph of Section 4(a).

> "MR. HAYDEN. Mr. President, an examination of the amendment offered by the Senator from Colorado [Mr. Phipps] will disclose that it proposes that the State of California shall agree with the United States, for the benefit of the States of Arizona and Nevada, that the aggregate annual consumptive use of water from the Colorado River by the State of California shall not exceed 4,400,000 acre-feet. Further, that the State of California may have one-half of any excess of [*sic*] surplus waters unapportioned by the Colorado River compact.
>
> "The first part of my amendment is a mere corollary to the amendment offered by the Senator from Colorado. It provides that of the remainder of the seven and one-half million acre-feet there

> shall be apportioned to the State of Nevada 300,000 acre-feet, and to the State of Arizona 2,800,000 acre-feet, which, combined with 4,400,000 acre-feet which the State of California will use, completely exhausts the seven and one-half million acre-feet apportioned in perpetuity to the lower basin.
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> "The second proposal in my amendment is that the State of Arizona may annually use one-half of the surplus or unapportioned water, which is likewise a corollary to the proposal made by the Senator from Colorado, which likewise disposes of the total quantity of surplus or unapportioned waters in the lower basin."[33]

To maintain that Congress intended to adopt, in Section 4(a), the Compact concept of apportioning all of the water uses in the entire Colorado River System, in the Lower Basin, requires that I attribute to Congress an intent to deprive two of the states having Lower Basin interests of any participation in the Lower Basin apportionment. Such a deprivation would have divested even perfected rights in New Mexico and Utah. In the light of the fact that Congress expressly protected perfected rights in Section 6, it is extremely unlikely that Congress intended to divest such rights in Section 4(a). Moreover, it is preposterous to suggest that such a result would have been accomplished with the active support of Senator Bratton [34] of New Mexico, one of the principal architects of Section 4(a). If Congress had intended to adopt the system wide method of accounting used in the Compact, it would have divided the III(a) and (b) apportionment of appropriative rights made by the Compact among all five states

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[33]70 Cong. Rec. 459-460 (1928), Availability of Article III(b) Waters For Use in California: Legislative History of Section 4(a) (submitted by the California Defendants) [hereinafter cited as "Calif. Legis. Hist."] pp. 148-149.

[34]In 1933 Senator Bratton was appointed to the Court of Appeals for the Tenth Circuit and, in 1953, he became Chief Judge.

having Lower Basin interests. Thus, Congress would have said: "The Lower Basin is entitled to a total appropriation in the amount of 8,500,000 acre-feet. This apportionment is divided among the *five* states having Lower Basin interests as follows," giving ceilings on appropriations within the Lower Basin for each of the five states. But Congress did no such thing. It dealt only with three of the five Lower Basin states, the three states which, significantly, are geographically accessible to mainstream water. This strongly indicates that the congressional intention was to provide only for the apportionment of mainstream water.

Furthermore, Senator Pittman made it perfectly clear that Section 4(a) of the Project Act was designed by Congress to apply only to the mainstream and to apportion water only among the three states that could utilize mainstream water. Thus Senator Pittman, in discussing the Phipps amendment, stated:

> "The Senate has already determined upon the division of water between those States. How? It has been determined how much water California may use, and the rest of it is subject to use by Nevada and Arizona. Nevada has already admitted that it can use only . . . 300,000 acre-feet. That leaves the rest of it to Arizona. As the bill now stands it is just as much divided as if they had mentioned Arizona and Nevada and the amounts they are to get . . . ."[35]

This statement by Senator Pittman obviously reflected the congressional understanding that the limitation on California in the first paragraph of Section 4(a), along with the fact that Nevada could use no more than 300,000 acre-feet of water from the mainstream because of physical limitations, as her representatives continually stated to the Congress, would leave the remaining water available to Ari-

[35] 70 Cong. Rec. 468 (1928), Ariz. Legis. Hist. p. 80.

zona, the only other state having access to mainstream water. Since the first paragraph limited California to 4,400,000 acre-feet of the 7,500,000 acre-feet of water "apportioned . . . by paragraph (a) of Article III," and Nevada could only use 300,000 acre-feet, there would be left 2,800,000 of the 7,500,000 acre-feet for Arizona if the apportionment were intended to be only of mainstream water among these three states. Senator Pittman confirmed this when he concluded that:

> "... Arizona today has practically allocated to it 2,800,000 acre-feet of water in the *main Colorado River*."[36] (emphasis added)

Similarly, since California was limited to one-half of "excess or surplus waters," and since Nevada represented that she could not utilize any of this water, Arizona became the inevitable beneficiary of the other half.

This construction of Section 4(a) as applying only to the mainstream of the Colorado River requires rejection of California's principal contention. The crux of her case lies in the view that the Project Act adopts and applies the Compact method of accounting. Thus California would total all uses of System water in the Lower Basin until the sum of 7,500,000 has been reached, after which she would assign all remaining uses to "excess or surplus waters unapportioned by said compact." There being no tributaries in California, the effect of this thesis is, of course, to exhaust the 7,500,000 apportionment with the help of tributary uses outside of California and to leave a large supply of mainstream water which California shares as "surplus." The effect of California's accounting system is disclosed in Part XII of her Proposed Findings and Conclusions. The California position is there revealed as follows:

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[36]70 Cong. Rec. 469 (1928), Ariz. Legis. Hist. p. 82.

1. Art. III(a) of the Compact apportioned 7,500,000 acre-feet of uses to the Lower Basin;

2. Congress limited California to not more than 4,400,000 acre-feet of uses from this apportionment;

3. California is using all of the 4,400,000 acre-feet;

4. Thus, 3,100,000 acre-feet of uses remain for other Lower Basin states out of the III(a) apportionment;

5. The 3,100,000 acre-feet of uses are exhausted in other states, as follows:

(1) Gila River	1,750,000
(2) Other tributaries	200,000
(3) Mainstream, other than California	1,150,000
Total	3,100,000;

6. Any water remaining in the *mainstream* in excess of 5,550,000 acre-feet (4,400,000 for California and 1,150,00 for others) is surplus, of which California may take as much as one-half.

Under this hypothesis California argues that she is privileged to take as surplus up to 978,000 acre-feet[37] from the mainstream in addition to taking 4,400,000 acre-feet, also from the mainstream, out of what she interprets to be the Article III(a) System apportionment. The effect of this argument is to give California 5,378,000 acre-feet out of the first 7,500,000 acre-feet available from the mainstream, leaving only 2,122,000 acre-feet for Arizona and Nevada.

[37]California arrives at this figure by dividing her contract amount of 5,362,000 acre-feet between 4,400,000 acre-feet of III(a) water and 962,000 acre-feet of surplus and by adding to the latter 16,000 acre-feet of other uses. See note 71, page 208, *infra*.

Nothing in the words or the legislative history of Section 4(a) lends countenance to this hypothesis. The second paragraph of Section 4(a) contemplates that Arizona could receive 2,800,000 acre-feet of the 7,500,000 acre-feet *in addition* to the exclusive use of the Gila River within her boundaries.[38] Under the California hypothesis, over one-half of Arizona's 2,800,000 acre-feet is used up by appropriations on the Gila.

After the prolonged dispute between Arizona and California, which was uniformly described as a difference over whether California should be limited to 4,200,000 or

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[38]The second paragraph of Section 4(a) authorizes a compact among Arizona, California and Nevada which would allocate 2,800,000 acre-feet plus one half of surplus to Arizona. It then further provides that "the State of Arizona shall have the exclusive beneficial consumptive use of the Gila River and its tributaries within the boundaries of said State. . . ." This language must mean that Arizona may consume Gila River water *in addition* to the 2,800,000 plus half of surplus. California's explanation of the language, that it ensures Arizona exclusive use of Gila River water *as part of* her 2,800,000 plus half of surplus, makes it redundant since that would necessarily be the result even without this language.

This is so because Gila River water flowing in Arizona can, as a matter of geography, be consumed only in that state, California or Mexico. California had no diversion works as of 1928 capable of diverting Gila River water for use in that state nor were there any contemplated at that time. Indeed, California has not used Gila River water since 1928, and she has no facilities for the diversion of that water today. Also another clause in the second paragraph of section 4(a), clause (4), specifically provides that Gila River water shall never be used to satisfy the Mexican treaty. Thus, even without the above quoted language, Gila River water could be consumed only in Arizona, and the language, if it is to be given some effect, must mean that Arizona may consume this water *in addition* to the 2,800,000 plus half of surplus allocated to it from the mainstream.

This necessary interpretation of the second paragraph of section 4(a) was recognized by Senators Johnson and Hayden during the debates in the Senate. Senator Johnson was interpreting the second paragraph when he stated that: "When Arizona says that she has but 2,800,000 acre-feet of water, to that must be added the Gila River with its 3,500,000 acre-feet. . . ." And Senator Hayden agreed with Senator Johnson that Arizona's use of Gila River water would be in addition to its allocation of mainstream water under the language of the second paragraph of section 4(a). 70 Cong. Rec. 466, Calif. Legis. Hist. p. 175.

4,600,000 out of the first 7,500,000 acre-feet of mainstream water, it would be remarkable indeed to discover at this late date that Congress intended to give California up to 5,378,000 acre-feet of the first 7,500,000 acre-feet of mainstream water and to assure Arizona of only 1,822,000 acre-feet.[39]

The one claim that can be made for the California contention is that it makes the congressional reference to the III(a) apportionment consistent with the Compact meaning, but at the expense of inconsistency between the first and second paragraphs of Section 4(a) of the Project Act itself, and in the face of every expression of intent made by any Senator who had anything to do with the legislation.[40] Accordingly, the California hypothesis is rejected.

California advances one more argument to support her contention that Section 4(a) should be interpreted as applying to both the mainstream and the tributaries. She strenuously urges "the contractual character of the California Limitation Act."[41] On the premise that Section 4(a) of the Project Act is "an offer to the Legislature of California of a statutory compact,"[42] California states that "the issue must be what the California Legislature understood from the words used [in Section 4(a)]."[43] California's conclusion then follows:

> "In enacting it [the Limitation Act], the California Legislature accepted a communicated offer plain on its face."[44]

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[39]Congress contemplated that the other 300,000 acre-feet would go to Nevada.

[40]In addition, California's position on Article III(a) is incompatible with her position on III(b). If the Project Act reference to III(a) is to be read literally, in a Compact sense, then "surplus" and "unapportioned" must be read literally, and California would be excluded from III(b) uses, since they are apportioned by the Compact. See pages 147, 150-151, *supra,* and 197-200, *infra.*

[41]Calif. Comment on Draft Report, p. 2.

[42]*Id.* at p. 5.

[43]*Id.* at p. 40.

[44]*Id.* at p. 5.

The plain meaning California ascribes to Section 4(a) is, of course, the adoption in the Project Act of the Compact method of system-wide accounting.

I cannot accept California's premise, nor if I did would I reach her conclusion.

California's premise is faulty in that it characterizes Section 4(a) as an offer and the California Limitation Act as an acceptance, which together constitute a binding contract or compact between the United States and California. This analysis misreads both the Project Act and the Limitation Act.

Properly analyzed, Section 4(a) is not an offer but a condition precedent to the effectiveness of the Project Act. Section 4(a) provides: "This Act shall not take effect and . . . no work shall be begun . . . in connection with the works or structures provided for in this Act . . . unless and until [California enacts the required legislation]." The meaning of the condition is necessarily determined by the congressional intent, just as the interpretation of other provisions of the statute is governed by such intent.

Whether the condition has been satisfied is determined by examining the California Limitation Act to see whether it meets the congressional requirement. The wording of the Limitation Act is substantially identical to the limitation provision of Section 4(a). But California did not stop with the enactment of the congressional words. It went further to provide that the statute was intended to satisfy the congressional condition and should be so construed. Specifically Section 2 of the California Limitation Act provides:

> "By this Act the State of California intends to comply with the conditions respecting limitation on the use of water specified in subdivision 2 of Section 4(a) of the said 'Boulder Canyon Project Act' and this act shall be so construed."

This language reflects an understanding that the construction of the dam and other works depended on California's compliance with the terms of the condition as imposed by Congress and as understood by Congress. The language "and this act shall be so construed," can have no other purpose.

However, even if the Project Act can be interpreted as an offer, it does not follow that the Limitation Act and Section 4(a) must be construed as adopting the Compact method of accounting. California contends that the intent of the California Legislature controls. But there is no evidence whatsoever that the California Legislature understood the Limitation Act to adopt the Compact accounting system. Indeed, there is no evidence of the California Legislature's understanding of the meaning of the Section 4(a) "offer" nor of its intention in its acceptance of that "offer". To fill this void, California argues that the Legislature "accepted a communicated offer plain on its face."[45] Thirty years of unabated controversy give unchallenged testimony that the language is *not* plain on its face.

As explained at pages 170-172, *supra,* it is impossible to interpret the language of Section 4(a) literally, and none of the parties in this case has suggested a literal interpretation. That the California Legislature was aware of this ambiguity in the statutory language is suggested by Section 2 of the California Limitation Act. Section 2 provides, in effect, that the Limitation Act is to be interpreted in the same way that Section 4(a) of the Project Act is ultimately interpreted, hardly a necessary clause if the California Legislature understood the Project Act to be "plain on its face".

Whether the congressional limitation be regarded as an offer or as a condition, California bound itself by that limitation when it adopted the California Limitation Act. It did so, aware of the risks of litigation, in return

[45]Calif. Comment on Draft Report, p. 5.

for a dam that would regulate the river and eliminate the threat of disastrous floods and for a canal wholly within the United States, free from control by a foreign power.

The water to a portion of which California is limited by Section 4(a) is that part of the mainstream which consists of Lake Mead and the River below. Water consumed from the mainstream above Lake Mead is not relevant in computing the limit that Section 4(a) places on California's use of mainstream water. The Project Act was concerned primarily with the construction and operation of Hoover Dam, and most of its provisions relate to this basic purpose. Hoover Dam gives the United States physical control over the water stored in Lake Mead and over the use of substantially all of the water in the mainstream below, but it does not enable the United States physically to control the use of water from the mainstream above Lake Mead. Consistently with this physical fact, the provisions of the Project Act do not purport to govern the mainstream above Lake Mead. Section 5 authorizes the Secretary of the Interior to contract for the delivery of water stored in Lake Mead at points which may be agreed upon along the Lake and the mainstream below; that section specifically applies only to water in Lake Mead and to water released therefrom. Also Sections 6 and 8 of the Project Act apply in terms to water controlled by the United States by means of Hoover Dam.

Section 4(a) must be interpreted within the context just described. Consistent with the other provisions of the Project Act, I interpret Section 4(a) as applying only to Lake Mead and the mainstream below. Water in the mainstream above Lake Mead is treated precisely like water in the tributaries above Lake Mead; it is a potential source of supply and is not within the scope of the Project Act unless and until it finds its way into Lake Mead.[45a]

[45a] Consistent with this interpretation of Section 4(a), the water delivery contracts of the Secretary of the Interior effectuate an apportionment of water in Lake Mead and the mainstream below. See pp. 225-228, *infra*.

The only water available for diversion from the mainstream of the Colorado River below Hoover Dam is the water released from Lake Mead and the tributary inflow from the Bill Williams River.[46] The annual inflow from the Bill Williams River, which varied during the period 1944 to 1951 from a minimum contribution to the mainstream of 7,300 acre-feet to a maximum contribution of 114,400 acre-feet,[47] is stored by Parker Dam, and is available for use in Arizona and California. Consumption of this water, after it reaches the mainstream, is chargeable to the state within which it is consumed under the Section 4(a) limitation and the Arizona water delivery contract. As an administrative matter, it would be impossible to reach a different result, for water from the Bill Williams commingles with water released from Lake Mead in the mainstream, and diversions of water below Parker Dam could not be broken down into water which was supplied from Lake Mead and water which was supplied from the Bill Williams. Since it is impossible to segregate water supplied from each source, it is impractical to treat the two sources differently.

Furthermore, even if such a demarcation were possible, Section 4(a) and the Arizona water delivery contract provide that consumption of the inflow from the Bill Williams is charged to the states. Article 7(1) of the Arizona contract specifically provides for this result. The Project Act treats the Bill Williams inflow as *de minimis* in comparison to releases from Lake Mead, and assumes that this inflow will not be accounted for separately. Indeed, the Section 4(a) limitation specifically limits Cali-

[46]The Gila River is the only other tributary which has its confluence with the mainstream below Lake Mead. It is already overappropriated, however, and the occasional inflow which it does supply to the mainstream cannot be captured for use in the United States by any existing works.

[47]See Part One, page 121.

fornia's use of water diverted from the Colorado River without excluding the water supplied from the Bill Williams River.

For these reasons I have concluded that the limitation on California's consumption of water from the Colorado River contained in Section 4(a) of the Project Act and the correlative apportionment of this water among Arizona, California and Nevada effectuated by the water delivery contracts, which apportionment is discussed *infra,* apply only to water diverted from Lake Mead and from the mainstream of the Colorado River below Lake Mead. Hereafter, reference to the "mainstream", except where otherwise specifically indicated, means Lake Mead and the Colorado River downstream from Lake Mead within the United States.

The limitation on California is measured at points of diversion.

The foregoing conclusion leaves open the question of the points of measurement for the application of the California limitation. The United States, as will more fully appear, once suggested Lee Ferry as the point of measurement. I come to a different conclusion.

The language of Section 4(a) of the Project Act makes plain its intention that the limitation on California's use of water from the Colorado River is to be measured in terms of consumptive use of water, which is defined as diversions from the River less return flow thereto. Thus Section 4(a) provides:

> ". . . the aggregate annual consumptive use (diversions less returns from the river) of water of and from the Colorado River for use in the State of California . . . shall not exceed four million four hundred thousand acre-feet . . . plus not more than one-half of any excess or surplus. . . ."

This language clearly states that California is limited to 4,400,000 acre-feet, not of water, but of the consumptive use of water measured by diversions less return flow. Congress did not purport in Section 4(a) to limit California to a portion of the water flowing at Lee Ferry or stored in Lake Mead. While Congress could have limited California to 4,400,000 acre-feet of consumptive use out of a body of water at some point along the River, no such point is specified in Section 4(a), and the more natural reading of the language is that Congress limited California to a portion of the total amount of consumptive uses made of mainstream water in the United States each year.

The most rational way to measure consumptive use of water as defined in Section 4(a) is to measure diversions made from the mainstream and to measure or calculate how much of the diverted water returns to the mainstream. Segregating water at Lee Ferry or Lake Mead cannot contribute to the measurement of "diversions less returns to the river." And the consistent administrative interpretation of Section 4(a) supports the conclusion that the limitation on California is not to be measured at Lee Ferry or at Lake Mead, but rather at points of diversion. All of the water delivery contracts entered into by the Secretary of the Interior on behalf of the United States, including the contracts with California users which incorporate the Section 4(a) limitation and the contracts with other states which are correlated to it, provide that the delivery obligation under each contract shall be measured at the points of diversion.

For the reasons stated, I interpret Section 4(a) as limiting California annually to 4,400,000 acre-feet of consumptive use of mainstream water out of the first 7,500,000 acre-feet of consumptive use annually of such water in Arizona, California and Nevada. Consumptive use is to be measured by diversions at each diversion point on the mainstream less returns to the mainstream, meas-

ured or estimated by appropriate engineering methods, available for use in the United States or in satisfaction of the Mexican treaty obligation.

Section 4(a) as here interpreted does not charge California for evaporation and channel losses on water in the mainstream which occur before the water is diverted for use within the state. California is charged only for the amount of water which she actually diverts and which does not return to the mainstream. Losses of water which occur before diversion are a diminution of the available supply under Section 4(a), not a consumptive use.

The United States at one time urged a different conclusion, namely, that Section 4(a) limits California to a part of the water flowing at Lee Ferry.[48] It would necessarily follow that this water must be segregated for California at Lee Ferry and traced downstream, through Lake Mead, to California's diversion works. This interpretation measures the Section 4(a) limitation, not to a portion of aggregate consumptive use, but to a portion of a body of water 650 miles upstream from some of California's diversion works, and 355 miles upstream from Hoover Dam, the operation of which the Project Act was designed to regulate. Furthermore, it charges California for evaporation and channel losses which occur before the water is diverted from the mainstream for use in California, despite the statutory language which limits California to a quantity determined by the measurement of "diversions less returns to the river."

The argument to justify overriding the statutory language in this manner is that Congress, in limiting California's consumption to a part of "the waters apportioned . . . by paragraph (*a*) of Article III of the Colorado River compact," really meant to say "paragraph (*d*) of

[48]The United States, in its Comment on the Draft Report, although it recognizes that this position is fairly implied from its opening brief, says that it altered its position in its reply brief.

Article III" of the Compact, which refers to the flow at Lee Ferry. The support for interpreting III(a) to mean III(d) is (1) that the 7.5 million acre-feet per annum, which is the figure found in Article III(a), is one-tenth of the 75 million acre-feet mentioned in Article III(d), and (2) that the Upper Basin governors, in a meeting held in Denver in the summer of 1927, recommended a division of III(d) water at Lee Ferry among Arizona, California and Nevada.

While there is some basis for this interpretation of Section 4(a), I have after careful reflection rejected it, for it requires that "Article III(a)" be interpreted to mean "Article III(d)," and I do not believe there is sufficient support for rewriting the statutory language in this manner.

As I have pointed out before, subdivisions (a) and (d) of Article III are not correlative despite the coincidence that the number mentioned in (d) happens to be ten times the number mentioned in (a). See page 144, *supra*. Moreover, the legislative history tends to demonstrate that Congress did not intend Article III(a) to mean Article III(d). It is true that the Upper Basin governors recommended a division of water at Lee Ferry in the following language:

> "1. Of the average annual delivery of water to be provided by the States of the upper division at Lees [*sic*] Ferry under the terms of the Colorado River compact: (a) To the State of Nevada, 300,000 acre-feet. (b) To the State of Arizona, 3,000,000 acre-feet. (c) To the State of California, 4,200,000 acre-feet."[49]

The recommendations of the governors' conference designated a body of water out of which the allocation would be made by reference to the contemplated deliveries

[49]70 Cong. Rec. 172 (1928), Ariz. Legis. Hist. p. 34.

derived from the Upper Division performance of its obligation under Article III(d) of the Compact.

However, Congress never clearly understood this, and, indeed, seems never to have considered the relationship of the limitation on California to some actual body of water. Thus Senator Pittman of Nevada reported the governors' recommendation as follows:

> ". . . when we assembled at Denver the governors of the four upper Colorado River basin states, trying to reconcile the differences on water between California and Arizona, finally made this proposition. California 4,200,000 acre-feet of water, Arizona 3,000,000, Nevada 300,000"[50]

This report by Senator Pittman did not adopt, or perhaps failed to grasp, that portion of the governors' resolution which expressly found the source of the allocated waters in the Article III(d) obligation of the Upper Division. Instead, Senator Pittman related the limitation to Article III(a), not III(d), as appears from the very next sentence of his statement, which reads as follows:

> "How did they get at that? Under what is called the seven-state agreement, we find this clause in Article III:
>
> " '(a) There is hereby apportioned from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.'
>
> "In other words, those State governors believed that there was only 7,500,000 acre-feet of water to divide, and they proposed to divide it, as I have said

[50] 69 Cong. Rec. 10259 (1928), Ariz. Legis. Hist. p. 14.

> 4,200,000 acre-feet to California, 3,000,000 acre-feet to Arizona, and 300,000 acre-feet to Nevada."[51]

Thus Senator Pittman used Article III(a) to define the area against which the limitation was to operate. He did this in apparent misunderstanding of the governors' recommendation. All subsequent discussion in the Senate flowed in the same channel.

One of the major issues in the Senate debates (Section 4(a) was adopted on the floor of the Senate and was not debated in the House) was whether California should be limited to 4.6 or 4.2 out of 7.5 million acre-feet per annum. This dispute was finally compromised at the enacted limitation of 4.4 million acre-feet. Throughout the debates on this subject the Senators clearly revealed an understanding that this limitation was to be applied against the 7.5 million acre-feet which they identified by reference to Article III(a). "Article III(a)" became a shorthand expression for the quantitative measurement of 7.5 million acre-feet. Similarly, the Senators participating in the debate used "Article III(b)" as a shorthand method of designating a quantity of one million acre-feet of water. The debates indicate that the Senate considered the water designated by "Article III(a) and (b)" as being undifferentiated. For example, Senator Hayden stated:

> "Mr. Hayden. I shall offer the amendment in a few moments.
>
> "At the time to which I have just referred the Senator from Nevada stated that at a conference held in the city of Denver during the summer of 1927, at the instance of the Governors of the States of New Mexico, Colorado, Utah, and Wyoming, there were present governors and commissioners from the States of Nevada, Arizona, and California. The subject of paramount importance, the subject

[51] *Ibid.*

that was the most discussed at that conference, was an adjustment of the differences between the States of Arizona and California with respect to an apportionment of the waters of the lower Colorado River Basin, in order that, if those two States might be brought into accord, the Colorado River compact, which affected the entire seven States, might be ratified and approved by all of the States.

"Each of the States in the lower basin was called upon to submit to the Denver conference a statement of the quantity of water they desired to obtain out of the Colorado River. At the time the conference was held it was thought that there were but seven and a half million acre-feet of water to divide, and upon that basis the senior Senator from Nevada stated to the Senate that the governors of the upper-basin States recommended that there be awarded to the State of California 4,200,000 acre-feet, to the State of Arizona 3,000,000 acre-feet, and to the State of Nevada 300,000 acre-feet.

"The Senator explained in his remarks how the four governors arrived at that apportionment, and said that it was done under article 3 of the Colorado River compact, paragraph (a) of which reads as follows:

* * * *

"The Senator then stated that subsequently it was discovered that there was an additional million acre-feet of water apportioned to the lower basin which could be divided. The idea of dividing that additional apportionment of water did not occur to the governors and the representatives of the lower basin States at the time of the Denver conference.

"The Senator then read to the Senate this provision of the compact, which is paragraph (b) of article 3:

> 'In addition to the apportionment in paragraph (a), the lower basin is hereby given the

> right to increase its beneficial consumptive use of such waters by 1,000,000 acre-feet per annum.'
>
> "Senator Pittman stated further that at conferences held in his office during the last session of Congress the suggestion had been made that the additional million acre-feet be divided equally between Arizona and California, and that if that were done the total quantity of water apportioned to the State of California under the Colorado River compact out of the total amount allocated to the lower basin would be 4,700,000 acre-feet, or 100,000 acre-feet more than California had asked for at Denver, and that by adding 500,000 acre-feet to the 3,000,000 acre-feet apportioned to Arizona on the basis recommended by the four upper basin governors that State would receive 3,500,000 acre-feet, or within 100,000 acre-feet of what had been requested by her commissioners at Denver.
>
> "The Senator from Nevada then stated that, based upon the recommendations made by the upper basin governors plus an equal division of the additional 1,000,000 acre-feet, Mr. Francis B. Wilson, interstate river commissioner of the State of New Mexico, had prepared an amendment which the Senator asked to have printed in the Record. He did not offer it at that time, but merely asked to have it printed for the information of the Senate. I now offer that amendment to the bill."[52]

That amendment clearly stated that the limitation was 4.2 out of the 7.5 million acre-feet referred to in Article III(a) plus 500,000 out of the million acre-feet referred to in Article III(b). The Hayden amendment provided that California should be limited to:

> ". . . 4,200,000 acre-feet of the water apportioned to the lower basin by paragraph (a) of Article III of said compact, . . . 500,000 acre-feet of the water apportioned by the compact to the lower basin by

[52]70 Cong. Rec. 161-162 (1928), Calif. Legis. Hist. pp. 55-57.

> paragraph (b) of said Article III; and that the use by California of the excess or surplus waters unapportioned by the Colorado River compact shall never exceed annually one-half of such excess or surplus water. . . ."[53]

Senators Pittman and Hayden could not have referred to an extra million acre-feet of water to be divided among Arizona and California if they were thinking of Article III(d), which can be said to guarantee only an average of 7.5 million acre-feet of water per year. Since the Senators equated Article III(a) and III(b), they could not have equated III(a) and III(d), because III(d) has no relationship to III(b).

Furthermore, this suggested interpretation would create very difficult administrative problems. Even after each state's share of the flow at Lee Ferry and the Lower Basin tributary flow into the mainstream were segregated, it would be necessary to determine the channel and evaporation losses sustained by such water, as it flowed in the mainstream and was stored in Lake Mead, in order to calculate the amount left for each state to divert below Lake Mead. An accurate determination of the total losses on all the water flowing in the mainstream and stored in Lake Mead is extremely difficult if not impossible to make. Yet, even if such a determination were possible, it would not be possible to calculate the losses on each state's share of water simply by allocating total losses among the states in the same proportions as the total water is allocated among them. This is so because the amount of loss depends on such factors as volume and flow of water, and because the allocation of water among the three states varies depending on whether or not particular water is surplus.

On the other hand, it is unnecessary to compute losses on water flowing in the mainstream above Lake Mead

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[53]70 Cong. Rec. 162 (1928), Ariz. Legis. Hist. p. 17.

or stored in Lake Mead, much less to allocate these losses among the states, if the California limitation and the correlative apportionment among the three states are measured by consumptive use and applied at the diversion points.

Interpretation of the phrase, excess or surplus waters.

I turn now to a consideration of the phrase "plus not more than one-half of any excess or surplus waters unapportioned by said compact." Our task of defining "excess or surplus waters unapportioned by said compact" is not aided by looking at the Compact. It uses the word "surplus" just once, in Article III(c), which provides that the Mexican burden "shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b)" of Article III. Article III(f) makes equally clear the uses of water that are "unapportioned" for Compact purposes, by providing for "further equitable apportionment of the beneficial uses of the waters of the Colorado River system unapportioned by paragraphs (a), (b) and (c)" of Article III. Thus by a literal Compact reading, the phrase would mean System water in excess of the aggregate of the apportionments of Article III(a), (b) and (c). But such a literal meaning is unacceptable.

In the Compact sense, surplus is System water; that is, it is water in both the mainstream and the tributaries, and is water in both the Upper and Lower Basins. If the Project Act is given a literal Compact meaning, one-half of such surplus could be appropriated by California. Moreover, the proposed tri-state compact authorized Arizona to agree with California and Nevada for Arizona to take the other half. It is incredible that the Senators of the other five states in the Basin intended this act of generosity. Not one word of the legislative history suggests such an intention. The Upper Basin Senators, who originated the first para-

graph of Section 4(a), and who supported the second paragraph, obviously did not intend to divide surplus in the entire System between two Lower Basin states.

It might be thought that appropriations of surplus would not be firm rights since these appropriations are subject to divestment in the event of a further equitable apportionment by compact after 1963, and therefore that Congress was not concerned about the matter. But congressional concern can not be brushed off so lightly. There is nothing to compel any state to ratify a compact making such further apportionment. Moreover, in answer to questions about the Compact propounded by Senator Hayden, Herbert Hoover stated that appropriations from surplus would doubtless be recognized in a future equitable apportionment.[54] Whether or not this position is, in fact, correct, it could hardly be expected that the Upper Basin Senators were willing to run the risk that it would prevail.

Surplus in a Compact sense means, in quantitative terms, water in the System in excess of appropriations of 16,000,000 acre-feet in the United States plus 1,500,000 acre-feet of water delivered to Mexico. Hence, appropriations from surplus could not commence until the 17,500,000 acre-feet were exhausted. Even putting aside the Mexican burden because it did not exist in 1928, it is not credible that Congress considered surplus in the Project Act sense to be water in the System in excess of 16,000,000 acre-feet. To attribute this view to Congress would ascribe to it an intent that no surplus would be available to Arizona and California until there were 16,000,000 acre-feet of appropriations, which, of course, did not exist in 1928 and seemed unlikely to occur in the foreseeable future.[55]

This is not to say that "surplus" and "unapportioned water" have no rational meaning as used in the Compact.

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[54]Special Master's Ex. No. 4, The Hoover Dam Documents, p. A36, Ariz. Ex. 55.

[55]*Ibid.*

On the contrary, their meaning is clear and consistent with other Compact provisions. The Compact puts an embargo upon the acquisition of appropriative rights in excess of the limits set by Article III(a) and (b). The first call upon any remaining water goes to supply Mexico. Thereafter, any remaining water anywhere in the System is available for further equitable apportionment after 1963. Thus a new compact might raise the III(a) and (b) limits from 16 million acre-feet as they presently stand to, for example, 20 million acre-feet. The Compact thus makes sense when it deals with surplus unapportioned water of the Colorado River System, although it specifies no point of measuring this water, because, for Compact purposes, the accounting is made at the point of diversion. In effect, Article III(a) and (b) establishes quotas of allowable appropriations. When these quotas have been exhausted, any remaining water in the System (surplus) may be further apportioned by compact so as to increase the quotas. But the phrase as used in the Compact makes no sense in the Project Act, and thus the Compact interpretation must be rejected.

Since I rejected the Compact definition of the phrase "excess or surplus waters unapportioned by said compact," its meaning must be derived from the Act itself and in harmony with the construction of the phrase "waters apportioned to the lower basin States by paragraph (a) of Article III." On the basis of my interpretation of the latter phrase, the words "excess or surplus waters" must necessarily mean all consumptive use in the United States in any year from the mainstream in the Lower Basin in excess of 7.5 million acre-feet. This is so because Congress intended that any consumptive uses in addition to the first 7.5 million acre-feet should be disposed of under the surplus accounting. In short, surplus was intended by Congress to complete the universe, the first part of which was the 7.5 million acre-feet. This universe consists of all consumptive

use of water diverted from Lake Mead or the mainstream below.

Arizona and Nevada disagree. They argue that Section 4(a) bars California from any share of what is described as Article III(b) water. This argument is based on an interpretation of the words "excess or surplus waters unapportioned by said compact" as meaning water above the 8,500,000 acre-feet referred to in Article III(a) and (b) of the Compact. Thus Section 4(a), Arizona and Nevada contend, permits California to consume 4,400,000 of the 7,500,000 acre-feet "apportioned" in Article III(a), none of the million acre-feet "apportioned" in Article III(b), and half of the "excess or surplus" above the 8,500,000 acre-feet "unapportioned by" Article III(a) and (b).

This contention must be rejected. Questions regarding the proper interpretation of the words "surplus" and "apportioned" as used in the Compact aside, the legislative history of the Project Act makes it crystal clear that Congress did not intend to delimit an amount of water above 7.5 million acre-feet per annum which was not "excess or surplus water" and thus to which California could have no access. Rather, Congress intended that once the 7.5 million acre-feet of consumptive use were allocated, the surplus accounting would commence and California would be eligible to receive 50% of all other allocations.

As explained at pages 190-193, the amendment proposed by Senator Hayden, based on the suggestion of Senator Pittman, clearly apportioned half of the million acre-feet referred to in Article III(b) to California. So did an amendment suggested by Senator Bratton of New Mexico,[56] which was similar to the Hayden amendment. The amendment offered by Senator Phipps of Colorado,[57] which was ultimately enacted as the first paragraph of Section 4(a),

[56]Calif. Ex. 2013.
[57]70 Cong. Rec. 324 (1928), Ariz. Legis. Hist. pp. 48-48A.

was intended to adopt this feature of the Hayden and Bratton amendments. Indeed, it was recognized by all of the Senators participating in the debates that the only major difference between the three amendments having relevance to this case was the amount of water to which California would be limited out of the first 7,500,000 acre-feet; the Hayden amendment limited California to 4,200,000, the Bratton amendment to 4,400,000, and the Phipps amendment to 4,600,000. Thus Senator Bratton observed that, other than the difference of 200,000 acre-feet, his amendment and Senator Phipps' were "quite similar."[58] This is also made clear by the parliamentary maneuver in the Senate, carried out without opposition, substituting the Phipps amendment for the Hayden amendment in order to permit a vote on whether California should be limited to 4,200,000 acre-feet or 4,600,000 acre-feet.[59] Senators Hayden and Phipps specifically agreed that there were only three substantive differences between their amendments: (1) the difference between 4,200,000 and 4,600,000 acre-feet; (2) a provision, unrelated to this litigation, involving the Federal Power Commission; and (3) whether Congress would approve a six-state ratification of the Colorado River Compact. This definitively excludes the possibility that the Phipps amendment, unlike the Hayden amendment, could have been intended to exclude California from any part of the million acre-feet referred to in Article III(b). Since, under the Phipps amendment, California was limited to 50% of all water above 7.5 million acre-feet of consumptive use, and Nevada disclaimed any intention of taking more than her share of the 7.5 million acre-feet, the language of that amendment had exactly the same effect as the language of the Hayden amendment which specifically

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[58] 70 Cong. Rec. 333 (1928), Calif. Legis. Hist. p. 87.

[59] 70 Cong. Rec. 382 (1928), Ariz. Legis. Hist. pp. 56-56C.

Senator Hayden's motion to change 4.6 to 4.2 lost; Senator Bratton's motion to change the figure to 4.4 carried. 70 Cong. Rec. 384-387 (1928).

gave California 500,000 acre-feet and Arizona 500,000 acre-feet of the million acre-feet referred to in Article III(b). The intended effect of the Phipps amendment, like the Hayden amendment, was to limit California to 4.4 out of the 7.5 million acre-feet referred to in Article III(a), plus 50% of the million acre-feet referred to in Article III(b), plus 50% of any additional water that might be available above 8.5 million acre-feet. In order to clarify that his amendment limited California to 4.4 out of 7.5 million acre-feet, not out of 8.5 million acre-feet as Arizona and Nevada in effect contend, Senator Phipps perfected his amendment, by adding the italicised language, to specify that the 4.4 million acre-foot limitation on California was from the water "apportioned to the lower basin States by *paragraph (a) of Article III of* the Colorado River compact."[60]

This conclusion is also supported by the following colloquy between Senator King of Utah and Senator Johnson of California:

> "MR. KING. If I may have the attention of the Senator from California and the Senator from Colorado, I direct attention to line 5, page 3, of the amendment offered by the Senator from Colorado. Let me read back a few words:
>
> > plus not more than one-half of any excess or surplus waters unapportioned by said compact.
>
> I was wondering if there might not be some uncertainty as to what surplus waters were therein referred to. I think it was the intention to refer to the surplus waters mentioned in paragraph (b) of article 3 of the compact, being the 1,000,000 acre-feet supposed to be unappropriated.
>
> MR. JOHNSON. No; that is not quite my understanding. It is by no means certain that there is any other, and it is by no means certain that there

[60]70 Cong. Rec. 459-460 (1928), Ariz. Legis. Hist. pp. 64-67.

> is the 1,000,000; but the language referred to any other waters.
>
> MR. KING. Speaking for myself, I have no objection; but I was under the impression that the purpose was to link it with paragraph (b) so as to be sure that California was to receive one-half of the 1,000,000 acre-feet.
>
> MR. JOHNSON: Not necessarily. This gives one-half of the unapportioned water, and I think it is a better way to leave the matter.
>
> MR. KING. If it is sufficiently certain to suit the Senators of the lower basin, I have no objection.
>
> MR. JOHNSON. I think it is."[61]

Whatever Senator Johnson may have meant by his replies, he obviously was not suggesting that Senator King was incorrect in his assumption that California could share in so-called III(b) water.

This is apparent also from the second paragraph of Section 4(a) which allocates to Arizona half of the "excess or surplus waters unapportioned by the Colorado River compact." As pointed out by Senator Hayden, this language was corollary to the limitation on California in the first paragraph. See pages 174-175, *supra*. Thus if Article III(b) water was barred to California under the first paragraph, neither was it allocated to Arizona in the second paragraph. Since Nevada represented that she could not utilize this water, Arizona's and Nevada's construction would impute to Congress an intention to have one million acre-feet go to waste.

The reasons given compel the conclusion that "excess or surplus waters unapportioned by said compact" as used in Section 4(a) includes all consumptive use above the first 7.5 million acre-feet of mainstream water in the Lower Basin, in the United States, in one year.

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[61]70 Cong. Rec. 459 (1928), Ariz. Legis. Hist. pp. 64-65.

D. Water Delivery Contracts Made By the Secretary of the Interior

Since Arizona, California and Nevada have not entered into compacts for the allocation of mainstream water pursuant to Sections 4 and 8 of the Project Act, the several water delivery contracts made by the Secretary of the Interior, on behalf of the United States, govern this allocation. The Secretary has contracted with the states of Arizona and Nevada. He has also entered into contracts with California users which incorporate a so-called Seven-party Agreement setting forth priorities among them. The Secretary has further contracted with a number of water users in Arizona and California for the delivery of water to federal reclamation projects, lands bordering these projects and special users in the Yuma, Arizona, area. All of the Secretary's contracts, except one Special Use contract, recite that deliveries under them are subject to the availability of the water under the Colorado River Compact and the Boulder Canyon Project Act.

After consideration of the arguments bearing on the validity of the Secretary's water delivery contracts, I am persuaded that, with the exception of a provision in the Arizona and Nevada contracts[62] and one Special Use contract,[62a] they are valid and binding both on the United States and the other contracting parties.

The contentions of the parties respecting the contracts may be divided into two categories: those respecting their own contracts; and those respecting the contracts of other parties.

Arizona contends that her contract is unenforceable to the extent that it departs from the statutory formula

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[62]Article 7(d) of the Arizona Contract and Article 5(a) of the Amended Nevada Contract, discussed *infra,* at pp. 237-247.

[62a]This contract, between the United States and the Arizona-Edison Company, Inc., is discussed at pp. 220-221, *infra.*

of the second paragraph of Section 4(a) of the Project Act. The provisions she regards as invalid are Article 7(b), (f) and (g), which provide for Arizona's recognition of rights in Nevada, New Mexico and Utah, and Article 7(d), which in effect reduces the quantity of water available for consumption in Arizona below Lake Mead by the amount that diversions in Arizona on tributaries and the mainstream itself above Lake Mead deplete the flow of water into the reservoir.[63]

I have rejected the contention that the second paragraph of Section 4(a) of the Act established a mandatory formula governing the amount of water Arizona must receive. See pages 162-163, *supra*. The contention respecting Article 7(d) is dealt with hereafter at pages 237-247.

Arizona does not contest the validity of the contracts of other parties except as she seeks to aid Nevada in contending that Nevada's contract is invalid to the extent that it reduces Nevada's diversions of Lake Mead water by the amount of Nevada's tributary uses.[64]

With respect to the California contracts, Arizona argues only that they must be read according to Arizona's construction of the limitation provision in Section 4(a) of the Project Act. This contention presents the same issues already disposed of by the discussion of the Act in the next preceding section of this Report.

California does not contest the validity of her contracts and indeed pays scant attention to them. California's view is that appropriative rights are decisive of the case and the contracts do not amount to appropriative rights but constitute only licenses to appropriate, which licenses must be perfected by beneficial use of the water. Similarly, California contends that the Arizona contract does not establish a water right in Arizona, is not a muniment of title,

[63]Ariz. Opening Brief, pp. 55-56.
[64]*Id.*, at 55.

and cannot be the basis of a decree in this suit. California's contentions appear in Appendix 4 of her brief, and in summary present these three points:

(1) The Arizona contract is dependent upon Arizona's ratification of the Colorado River Compact and Arizona has not effectively ratified the Compact. The reasons for the rejection of this contention appear *supra,* at pages 166-167 of this Report.

(2) No water right exists under the Arizona contract because "no right to the use of water can be acquired in the absence of a specific project, or use lawfully initiated and diligently prosecuted."[65] If this argument means that the possession of a water right is necessary before one is eligible for a delivery contract, it puts the cart before the horse. In effect it says, no contract without a water right. Under the Act, however, the reverse is true: no new water right without a contract. Congress certainly understood in 1928 that all of the water to be impounded in Lake Mead was not then appropriated. I cannot ascribe to the Congress an intention to bring all further development in the Lower Basin to a halt, as this contention would require me to do. On the other hand, if the California contention means only that a water delivery contract does not amount to a perfected water right, then it is not an attack on the contract at all. I do not think it necessary to decide whether the various contractees have water rights in addition to their contractual rights for the delivery of water from Lake Mead; I have not been shown any situation in which the distinction, if any, is material in this case. Since interstate rights and priorities are controlled by the delivery contracts themselves (see pages 151 *et seq., supra*) and since intrastate rights and priorities, including the question whether a contractual right constitutes a water right, are controlled by state law, with

[65]Calif. Appendix 4, p. 5.

which we are not concerned in this litigation (see pages 216-218, *infra*), there is no need to decide the question. California asserts a similar objection to the Nevada contract,[66] and it is overruled for the same reasons.

(3) A third objection to the Arizona contract raised by California rests on Article 7(1), which provides that deliveries of the water allocated to Arizona by her master contract will be made only to users who contract therefor with the Secretary. California argues that this exposes the contract merely as an agreement to agree and accordingly that is unenforceable. She also claims that the contract is unenforceable for vagueness, since essential terms are yet to be agreed upon. This argument will be considered when I reach my discussion of the terms of each of the contracts, at pages 206-207, *infra*.

Nevada complains about her water delivery contracts, but does not contest those of the other parties. Nevada's theory, if adopted, would, however, nullify all of the contracts, at least so far as they purport to fix the quantities of water to which the parties are entitled. As was pointed out earlier in this Report, Nevada regards the Project Act as an unconstitutional delegation of judicial power if construed to empower the Secretary to make contracts fixing the allotment of water to each state. See pages 163-164. She avoids the constitutional problem by regarding the contracts as "neither floors nor ceilings. The contracts are merely service or delivery contracts for such amounts of water as each of the states shall ultimately be judicially determined to be entitled, in the absence of a compact among the states."[67] The answer to this contention was given in upholding the Project Act and sustaining the power of the Secretary to allocate the unappropriated water impounded in Lake Mead.

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[66]Calif. Response to Nevada, pp. 51-53.
[67]Nev. Answering Brief, p. 46.

In the alternative, Nevada argues that if the contracts are held to govern, Nevada is not bound by the amendment to Article 5(a) contained in her supplemental contract of 1944. That amendment provides for delivery from Lake Mead of "so much water, *including all other waters diverted for use within the State of Nevada from the Colorado River system,* as may be necessary to supply the state a total quantity not to exceed three hundred thousand (300,000) acre-feet each calendar year." Nevada contends that the debit imposed by the italicized words for use of tributary water was beyond the Secretary's authority to impose on Nevada under the Project Act.[68] This contention is considered *infra,* at pages 237-247.

Finally, the United States asserts the validity of all of the water delivery contracts and declares that Arizona and Nevada are bound by the provisions to which they object.[69] The only reservation made by the United States is its claim that the contracts are subject to certain paramount rights of the United States. These claims of superiority are dealt with in the section of the Report commencing at page 254.

1. *The Arizona Contract.* A water delivery contract between the United States and the State of Arizona was entered into on February 9, 1944.[69a]

Subdivisions (a) and (b) of Article 7 specify the quantity of water Arizona is to receive, subject to certain deductions set forth in Article 7(d), (f) and (g). Article 7(a) promises the delivery, from storage in Lake Mead, of so much water as may be necessary to supply a maximum of 2,800,000 acre-feet of consumptive use in the state each year, and Article 7(b) grants an additional amount denominated as one-half of surplus, both subject to the availability thereof

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[68]Nev. Reply Brief, pp. 9-12.

[69]U. S. Brief, pp. 7-22.

[69a]The complete text of the contract appears in Appendix 5, page 399.

for use in Arizona under the Colorado River Compact and the Boulder Canyon Project Act. Article 7(f) reserves to the United States the right to contract with Nevada for the delivery to her of 4% of surplus with a consequent reduction in Arizona's share. The contract nowhere defines "surplus," and I construe the word as used in the contract to mean the same thing as it does in Section 4(a) of the Boulder Canyon Project Act. In addition, by Article 7(g), Arizona recognizes rights in New Mexico and Utah to "equitable shares" of Lower Basin water, but no amount is specified in the contract. Article 7(d) provides in part that the obligation to deliver water "shall be subject to such reduction on account of evaporation, reservoir and river losses, as may be required to render this contract in conformity with said compact and said act." As I construe this provision, questions of allocation of losses are expressly left undetermined by the contract; such determination is to be made on the basis of the Compact and Project Act, without reference to other terms of the contract.

Article 7(1) contemplates the making of further contracts between the Secretary of the Interior and the users of the water allocated for use in Arizona under the master contract with the State. California contends that this provision renders the agreement illusory, that it becomes an unenforceable agreement to agree. I do not think Article 7(1) has this far-reaching effect. The Secretary's water delivery contracts should not be viewed as ordinary, private agreements for the sale of goods. Indeed, none of the contracts satisfies the elementary rules governing private agreements. For example, the Imperial Irrigation District contract does not obligate the District to take any water at all, nor is any charge made for the water delivered. What then, is the consideration for the Secretary's promise to deliver the water? Something of the same difficulty is encountered in the Nevada contract. Although that agreement specifies a

charge of 50 cents per acre-foot, it does not oblige Nevada to take any water. Such an agreement might fail for lack of consideration under the principles governing ordinary private contracts. The *Restatement of Contracts* illustrates the point in Section 79, illustration 3:

> "A offers to deliver to B at $2 a bushel as many bushels of wheat, not exceeding 5,000, as B may choose to order within the next thirty days. B accepts, agreeing to buy at that price as much as he shall order of A within the specified time. B's acceptance involves no promise by him and is not sufficient consideration."

If the *Restatement* requirements were to apply to the contracts made by the Secretary, many, if not all of them, would fail.

The answer then to the California contention is that Section 5 water delivery contracts are not contracts in the ordinary sense. They are arrangements whereby the Secretary, acting for the United States, consents to the release of water from his custody. The contracts set the terms upon which the Secretary will release the water. The Secretary is bound by those terms, as are the contractees, not because of the legal chemistry of offer, acceptance and consideration, but because they are part of the statutory scheme provided for in the Boulder Canyon Project Act. Hence, Article 7(1) does not render the Arizona contract nugatory, any more than failure of consideration destroys the Imperial Irrigation District contract or the Nevada contract.

I hold that the Arizona contract is valid, except for a provision in Article 7(d) which is discussed hereafter at pages 237-247.

2. *The California Contracts.* There is no water delivery contract between the United States and the State of Cali-

fornia. Rather, the Secretary of the Interior has contracted with a number of agencies within the State, incorporating in each such contract the so-called Seven-party Agreement among all the users which governs their priorities *inter sese* to California's share of water from the Colorado River.[70]

In her answer to the bill of complaint, California alleges that the Secretary's contracts with the California users call for the delivery of sufficient water to satisfy 5,362,000 acre-feet of consumptive use per year.[71] No party contests this allegation.[72] Since all of the California contracts contain the proviso that the Secretary's water delivery obligation is "subject to the availability thereof for use in California under the Colorado River Compact and the Boulder Canyon Project Act," the amount of water legally available to California depends upon the interpretation of Section 4(a) of the Project Act. California can in no event demand more water than her contracts permit, and she may receive less under Section 4(a) of the Project Act.

No other questions are raised by the parties regarding the California contracts, and they need not be further considered.

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[70]The Seven-party Agreement is incorporated in Article (6) of the Palo Verde contract, printed in Appendix 8, page 423.

[71]California's Answer to the Bill of Complaint, pp. 1, 33.

The California Proposed Findings of Fact barely mention the California contracts, but it may be inferred from California's Proposed Conclusion of Law 7A:201, Table 2 at Note 4, that California adheres to the allegation of the answer that the contracts call for a total of 5,362,000 acre-feet of water. California claims, in addition, 16,000 acre-feet of "water for existing projects . . . for which no water right, either under state law appropriations or federal water delivery contracts, was proved but which is chargeable to the state" and for United States wildlife refuges.

[72]Ariz. Proposed Finding of Fact No. 122: "Those contracts call for delivery for use in California of an aggregate of 5,362,000 acre-feet of water." See also United States Proposed Conclusion of Law No. 1.4.

I hold that the California contracts are valid and that the California defendants are entitled to demand water in the amounts specified in the recommended decree.

3. *The Nevada Contract.* The United States entered into a contract with the State of Nevada and its Colorado River Commission on March 30, 1942.[72a] Therein the United States undertook "subject to the availability thereof for use in Nevada under the Colorado River Compact and the Boulder Canyon Project Act" to deliver from storage in Lake Mead "so much water as may be necessary to supply the state a total quantity not to exceed 100,000 acre-feet each calendar year."

On January 3, 1944, the same parties entered into a supplemental contract which increased the quantity of water to be delivered to 300,000 acre-feet described in the following words: "so much water, including all other waters diverted for use within the State of Nevada from the Colorado River system, as may be necessary to supply the State a total quantity not to exceed Three Hundred Thousand (300,000) acre-feet each calendar year."[72b]

I have heretofore noted various contentions respecting this contract and it is unnecessary to review them here.

Nevada would disavow her contract, claiming that the Supreme Court, in an equitable apportionment suit, can award her water in excess of the contract maximum of 300,000 acre-feet. Projecting her needs to the year 2,000, Nevada prays for an apportionment of approximately 530,000 acre-feet of water per year.[73] Having determined that a contract with the Secretary of the Interior is a pre-

[72a]The complete text of the contract appears in Appendix 6, page 409.

[72b]The complete text of the contract appears in Appendix 7, page 419.

[73]Nev. Petition of Intervention, p. 25. See also Nev. Answering Brief, pp. 26-27, 94-96.

requisite for the delivery of water from Lake Mead, and that to the Secretary has constitutionally been delegated power to allocate the unappropriated water impounded in Lake Mead, I must reject Nevada's prayer for water in excess of 300,000 acre-feet, unless and until the Secretary sees fit to amend the Nevada contract to allow an increase in the amount of water delivered to her.

It should be noted that the Nevada contract, unlike the Arizona contract, does not require additional subcontracts between each water user and the Secretary of the Interior. On the contrary, the State of Nevada is free to determine who shall use the water, subject only to the Secretary's approval of the points of diversion.

I hold the Nevada contract to be valid, with the exception of a provision in Article 5(a) which is discussed hereafter at pages 237-247.

4. *Contracts For Reclamation Projects, Adjoining Lands and Miscellaneous Special Uses.* The United States has entered into water delivery contracts with various users in Arizona and California pursuant to the Reclamation Act of 1902, 32 Stat. 388, and acts amendatory thereof, 43 U. S. C. §§ 371 *et seq.* (1958), which obligate the United States to deliver water from the mainstream to lands on federal reclamation projects. The United States has also contracted with users in the Yuma, Arizona, area to deliver water to lands bordering federal reclamation projects pursuant to the Warren Act, 36 Stat. 925 (1911), 43 U. S. C. §§ 523-525 (1958), and to various special users pursuant to the Miscellaneous Special Use Act of February 25, 1920, 41 Stat. 451, 43 U. S. C. § 521 (1958).

There are four federal reclamation projects located within the Lower Basin to which the Secretary is obligated to deliver water from the mainstream. These projects are described in detail at pages 50-58, 60-61, *supra.*

One is the Yuma Reclamation Project which is located on both sides of the Colorado River downstream from Yuma, Arizona; the Valley Division is on the Arizona side of the River and the Reservation Division on the California side. The Valley Division is serviced by the Yuma County Water Users' Association. The non-Indian landowners on the Reservation Division have entered into individual water right application contracts with the United States for the irrigation of the particular acreage which they severally own.

A second project is the Yuma Auxiliary Reclamation Project which is located in Arizona, south of Yuma and east of the Valley Division of the Yuma Project. The Yuma Auxiliary Project is serviced by the Unit B Irrigation and Drainage District.

A third is the Gila Reclamation Project located in Arizona near the confluence of the Gila and Colorado Rivers. It contains three areas: North Gila Valley, Yuma Mesa, and Wellton-Mohawk. The North Gila Valley Unit is serviced by the North Gila Valley Irrigation District, the Yuma Mesa Division by the Yuma Mesa Irrigation and Drainage District, and the Wellton-Mohawk Division by the Wellton-Mohawk Irrigation and Drainage District. The South Gila Valley, while not presently operated as a federal reclamation project, is within the authorized limits of the Gila Project. It is serviced by the Yuma Irrigation District.

The fourth federal reclamation project constitutes the All-American Canal System and the Coachella Distribution System in California. The All-American Canal System is serviced by the Imperial Irrigation District; the Coachella Distribution System by the Coachella Valley County Water District.

The contracts which the United States has made for delivery of water to these Reclamation Act projects, to lands bordering these projects and to special users are as follows:

(1) Contract dated June 15, 1951 between the United States and the Yuma County Water Users' Association for delivery of water to the Valley Division of the Yuma Project in such quantities "as may be ordered by the Association and as may be reasonably required and beneficially used for the irrigation of the irrigable lands situate within the division . . . subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Act of December 21, 1928 (45 Stat. 1057). . . ."[74]

(2) Water right application contracts providing for the delivery of water to non-Indian users on the Reservation Division of the Yuma Project located in California.[75] Substantially all of the non-Indian users on the Reservation Division have so contracted with the United States.

(3) Contract dated December 22, 1952 between the United States and Unit B Irrigation and Drainage District for the delivery of water to the Yuma Auxiliary Project in such quantities "as may be reasonably required and beneficially used for the irrigation of those irrigable lands which are situate within the . . . limited auxiliary project . . . subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Act of December 21, 1928 (45 Stat. 1057). . . ."[76]

(4) Contract dated May 12, 1953 between the United States and the North Gila Valley Irrigation District for the delivery of water to the North Gila Valley Unit of the Gila Reclamation Project in such quantities "as may be ordered by the District and as may be reasonably required and beneficially used for the irrigation of the irrigable land situate within the District . . . subject to the

[74]Ariz. Ex. 92.
[75]Calif. Ex. 379.
[76]Ariz. Ex. 94.

availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Act of December 21, 1928 (45 Stat. 1057) and subject to: (a) The availability of the water for the division under the provisions of . . . the Act of July 30, 1947 (61 Stat. 628). . . ."[77]

(5) The United States is planning to enter into a contract with the Yuma Irrigation District providing for the delivery of water from the Colorado River for use in the South Gila Valley.

(6) Contract dated May 26, 1956 between the United States and the Yuma Mesa Irrigation and Drainage District providing for the delivery of water to the Yuma Mesa Division of the Gila Project in such quantities "as may be ordered by the District . . . and as may be reasonably required and beneficially used for the irrigation of not to exceed 25,000 irrigable acres situate therein; subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Act of December 21,1928 (45 Stat. 1057) and subject to: (a) The availability of the water for the division under the provisions of . . . the Act of July 30, 1947 (61 Stat. 628). . . ."[78]

(7) Contract dated March 4, 1952 between the United States and the Wellton-Mohawk Irrigation and Drainage District for the delivery of water to the Wellton-Mohawk Division of the Gila Project in such quantities "as may be ordered by the District . . . and as may be reasonably required and beneficially used for the irrigation of not to exceed 75,000 irrigable acres . . . subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Act of December 21, 1928 (45 Stat. 1057) and subject to: (a) The availability

[77]Ariz. Ex. 95.
[78]Ariz. Ex. 96.

of the water for the division under the provisions of . . . the Act of July 30, 1947 (61 Stat. 628). . . ."[79]

(8) Contracts concluded between 1951 and 1956 under the Warren Act for the delivery of water from the facilities of the Yuma, Yuma Auxiliary, and Gila reclamation projects by the United States to individual users on lands bordering the reclamation projects.[80]

(9) Contracts concluded between 1945 and 1956 under the Miscellaneous Special Use Act of February 25, 1920 for the delivery of water from the facilities of the Yuma, Yuma Auxiliary, and Gila reclamation projects by the United States to various special users in the Yuma, Arizona, area.[80a]

(10) Contracts between the United States and the Imperial Irrigation District and between the United States and the Coachella Valley County Water District for delivery of water to those districts in the amounts and with the priorities stated in the Seven-party Agreement among various California users, subject to the availability thereof for use in California under the Colorado River Compact and the Boulder Canyon Project Act.[81]

The United States seeks a decree adjudging that it has the right and power to release for diversion from the mainstream of the Colorado River the amount of water necessary to fulfill the contractual obligations detailed above. Arizona objects. She argues that, under the Project Act, the Secretary of the Interior must contract for the delivery of water directly with each state, and that the division of each state's allotment of water among individual users is controlled by the state. Arizona says that the

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[79]Ariz. Ex. 93.
[80]Ariz. Exs. 163, 165.
[80a]*Ibid.*
[81]Ariz. Exs. 34, 35.

Secretary has contracted to deliver certain amounts of water to Arizona and it is for the State to decide which projects within Arizona will receive the State's allotment of water. Thus Arizona argues that the Secretary of the Interior cannot deliver water from the mainstream pursuant to his Reclamation Act delivery contracts unless the State agrees to the intrastate allotment.

California joins Arizona in seeking to accomplish the same result, but on different grounds. California suggests that the Reclamation Acts give the Secretary of the Interior power only to build dams and diversion works, not to vest rights to water in individual owners of land on the reclamation projects. California argues that even though the contracts be valid, they, by themselves, do not give individual landowners, water users' associations, or project lands the right to receive water. That right, California states, vests under state law, and it would not be appropriate to decide in this case the various rights and priorities under state law.

Arizona's objection to the United States' claims is not well taken. I interpret the Boulder Canyon Project Act as empowering the Secretary of the Interior to contract for delivery of mainstream water to states and to individual users, whether private or public. The Project Act does not require or even suggest that the delivery contracts must be made only with states. It is certainly within the discretion of the Secretary, under the Project Act, to contract directly with individual users in the various states for the delivery of water. He is not confined to contracting with each state and permitting the state to allocate its share of the water to various individual users. Section 5 of the Project Act states that "no person" shall receive water without a contract. Assuming that the word "person" includes a state, it certainly includes entities other than states. If additional support were necessary for this proposition,

the action of the Secretary in entering into contracts with political subdivisions in California[82] immediately after enactment of the Project Act is evidence of the contemporaneous understanding. Indeed, in the case of California, the Secretary has made no contract with the State itself.

The Secretary's contract with Arizona obligates him to deliver a certain quantity of water for use within the state, but this contract leaves it to the Secretary to decide with which users within Arizona he will contract for the delivery of all or part of Arizona's allotment. Article 7(1) of that contract specifically provides that deliveries of water to Arizona users "shall be made for use within Arizona to such individuals, irrigation districts, corporations or political subdivisions . . . as may contract therefor with the Secretary, and as may qualify under the Reclamation Law. . . ." In other words, the Secretary has agreed with the State of Arizona that he will deliver a certain amount of water to Arizona users, but he has reserved to himself discretion to decide with which users he will contract. This being the case, the Secretary is free, subject to statutory limitations, to contract with users in Arizona qualifying under the reclamation law for delivery to them of certain amounts of water out of the total amount allocated to Arizona. This is precisely what the Secretary has done in the contracts which are before us in this case.

California's objection to the United States claims is on a different footing. For reasons hereinafter stated, I am of the view that state law governs intrastate rights and priorities to water diverted from the Colorado River. The application of such law presents issues which have not been tried and it would be inappropriate in any event to determine in this litigation the water rights of the various federal reclamation projects, adjoining lands and special users under the relevant state law.

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[82]For a representative California contract see Appendix 8.

Section 18 of the Project Act provides:

> "Nothing herein shall be construed as interfering with such rights as the states now have either to the waters within their borders or to adopt such policies or enact such laws as they may deem necessary with respect to the appropriation, control, and use of waters within their borders, except as modified by the Colorado River compact or other interstate agreement."

Under this section, Congress has specifically declined to give the Secretary of the Interior authority to deliver water to users within a state in disregard of the state's water law. Although a contract with the Secretary is necessary under Section 5 of the Project Act for a user to receive mainstream water, the user must also, under Section 18, be under no disability to receive such water under the applicable state law. And, state law governs priorities between various users within a state who have delivery contracts with the Secretary.[83] This is apparent from the language of Section 18 and is corroborated by the legislative history. See page 155, *supra*.

This scheme is similar to the one employed by Congress in the federal reclamation laws, to which the Project Act is specifically stated to be supplementary. Section 8 of the Reclamation Act of 1902 provides:

> ". . . that nothing in this act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any state or territory relating to the control, appropriation, use, or distribution of water used in irrigation . . . and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws. . . ."

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[83] All I hold is that under the Project Act state law governs intrastate water rights; I do not pass on whether other federal statutes such as the Gila Project Reauthorization Act, 61 Stat. 628 (1947), supersede state law in particular cases.

Under the Reclamation Acts the Secretary is authorized to build dams and irrigation canals and to store and deliver water. Nobody may receive the stored water without a delivery contract. But the water rights of lands in reclamation projects are, under Section 8, governed, at least to some extent, by state law. *Ickes* v. *Fox,* 300 U. S. 82 (1937), on remand, *Fox* v. *Ickes,* 137 F.2d 30 (D.C. Cir. 1943); *Nebraska* v. *Wyoming,* 325 U.S. 589, 612-615 (1945). And, as the Supreme Court has but recently indicated, the water rights and priorities as between a reclamation project and other users within the same state are governed by state law. See *Ivanhoe Irrigation District* v. *McCracken,* 357 U. S. 275, 291 (1958). The fact that the Project Act is denominated as a supplement to the Reclamation Acts buttresses the conclusion, apparent from the plain language of Section 18 itself, that state law governs rights and priorities among intrastate users.

The various delivery contracts made by the Secretary for delivery of water to reclamation projects, adjoining lands and special users are, with one exception, authorized by the Reclamation Acts, the Miscellaneous Special Use Act and the Project Act and are therefore valid. How much water a particular project or user may receive out of a state's total apportionment as against other users in the state who also have or may in the future obtain delivery contracts with the Secretary of the Interior must be decided under state law. The relevant issues for such a decision have not been tried and it would be impossible to determine here all of the relevant rights and priorities under the applicable state laws which would affect a project's water rights. Furthermore, persons who are the most concerned with this decision are other users or potential users in the states, who are not parties to this suit. Therefore, I have declined to accept the United States' invitation to determine the right of any reclamation

project or other user to receive water as against competing users in the same state.

California contends that the Warren Act contracts and the Special Use contracts described at page 214, *supra,* are invalid because they are not for permanent service as required by Section 5 of the Project Act.[83a] All of the Warren Act contracts and all but three of the Special Use contracts recite that they are made pursuant to the Project Act and further recite that they are for permanent service.[84] Nothing in the Warren Act or in the Miscellaneous Special Use Act prevents contracts made pursuant thereto from being for permanent service. Hence, as to all but three Special Use contracts, no problem is presented with respect to the requirements of Section 5.

Of these three Special Use contracts, one, dated June 12, 1951, is between the Bureau of Reclamation and the Department of the Army and provides that the Bureau will supply water from the Gila Gravity Main Canal of the Gila Project for the use of an Army test station.[84a] This contract states, in paragraph 4, that it "shall extend so long as the Army requires said service." Another of the three contracts, dated November 1, 1953, is between the Bureau of Reclamation and the Department of the Air Force and provides that the Bureau will supply water from the facilities of the Gila Project for the use of the Air Force base at Yuma, Arizona.[84b] This contract states, in paragraph 8, that it "shall extend from the date hereof until such time as Air Force no longer requires said service and so advises Bureau." Both of these contracts conform to Section 5 and are valid. Both specifically state that they are made pursuant to the Project Act and that deliveries of water under

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[83a]The permanent service requirement of Section 5 is discussed at pp. 237-240, *infra.*

[84]The contracts are reproduced in Ariz. Ex. 165.

[84a]Ariz. Ex. 165, Contract No. 176r-696.

[84b]Ariz. Ex. 165, Contract No. 14-06-300-330.

them are governed and limited by the Project Act. Furthermore, although neither specifically uses the words "permanent service", both provide for continued deliveries for as long as the user needs water. As is true of all Warren Act and Special Use contracts, the contractees' rights to receive water are "subordinate to the rights of" lands within the reclamation project, but this merely establishes priority; it does not violate the permanent service requirement of Section 5.

The third contract, dated June 12, 1945, is between the United States and the Arizona Edison Company, Inc. and provides for the delivery of water from the Yuma Main Canal of the Yuma Project for the municipal water supply of Yuma, Arizona.[84c] This contract is the only one of all of the Warren Act and Special Use contracts in evidence which does not state that it was made pursuant to the Project Act. It provides, in paragraph 13, that "the term of this contract shall extend from the date hereof to and including December 31, 1970." Paragraph 14 provides:

> "It is understood and agreed that the furnishing of water hereunder to the Company shall not be taken or construed as binding the United States after the termination of this contract to furnish water to the said Company or to any one claiming through or under it, nor shall it under any circumstances become the basis of a permanent water right."

It is clear that this contract between the United States and the Arizona Edison Company, Inc. is not for permanent service; it unequivocally states that deliveries of water under it shall end on December 31, 1970, and that the United States shall be under no obligation to continue deliveries beyond that date. It is equally clear that it is a con-

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[84c]Ariz. Ex. 165, Contract No. 176r-40.

tract for the delivery of water stored in Lake Mead and flowing in the mainstream below. The only water in the Yuma Main Canal of the Yuma Project, and thus the only water which can be delivered under this contract, is mainstream water which has been diverted at Imperial Dam. See pages 35, 50-51, *supra*. Since Section 5 of the Project Act commands that no person may receive mainstream water "except by contract made as herein stated", and since the Arizona Edison contract is not "as herein stated" because it is not for permanent service, the contract is invalid and the Secretary may not deliver water pursuant to it.

Water deliveries under the Arizona Edison contract have constituted a "supplemental water supply" for the City of Yuma. If the city requests a Section 5 contract to replace the deliveries which have been made under the Arizona Edison contract nothing has been called to my attention which would prevent the Secretary of the Interior from entering into such a contract if he so desired.

5. *The Contractual Allocation System.* The water delivery contracts into which the Secretary has entered with the states of Arizona and Nevada and with the California users constitute an allocation of mainstream water. Although the Arizona contract is written in terms of the "maximum" amount to be delivered and the Nevada contract in terms of "a total quantity not to exceed" the specified amount, I think that the Secretary has delivery obligations under these contracts. Otherwise they would be illusory and would make little sense. Of course, the Secretary is not required to drain Lake Mead dry in fulfilling demands for delivery of water. In the exercise of a reasoned discretion he will decide how much water is to be released from the reservoir each year, and his decision may be based on any reasonably relevant factors. Clearly he has this power under Sections 1, 5 and 6 of the Project Act, and I can find nothing in the

water delivery contracts to indicate that he has surrendered it. But once water is released for consumption in the United States, the delivery contracts oblige the Secretary to apportion certain quantities to each state.

The aggregate delivery obligation under the Secretary's contracts with California users constitutes a duty similar to the one which the Secretary has undertaken to Arizona and Nevada. Those contracts call for total deliveries of sufficient water to satisfy 5,362,000 acre-feet of consumptive use per annum, subject to the availabilty thereof for use in California under the Project Act. These contracts mean that the Secretary is required to apportion to California users, in accordance with the system of priorities stated in all of the California contracts, 4.4 million acre-feet of the first 7.5 million acre-feet of consumptive use of water from the mainstream in one year, plus one-half of any additional uses apportioned in that year, until a maximum of 5,362,000 acre-feet per annum is consumed in California. As in the case of the Arizona and Nevada contracts, however, I find nothing which indicates that the Secretary has relinquished his discretion to determine in the light of his multiple obligations how much water is to be released from the reservoir for consumptive use in the United States.

The water delivery contracts substantially effectuate the apportionment contemplated by Congress in Section 4(a) of the Project Act. It can be no accident that the obligation to deliver 2.8 million acre-feet per annum found in Arizona's contract and the obligation to deliver .3 million acre-feet found in Nevada's contract, when added to the 4.4 million acre-feet to which California is limited out of 7.5 million acre-feet, total that 7.5 million acre-feet. Similarly, it is more than fortuitous that Arizona and Nevada, under their contracts, may share in the half of surplus which California cannot receive under the Section 4(a) limitation. The Secretary's intention must have been that Ari-

zona's 2.8, Nevada's .3 and the 4.4 to which California is limited would all come from the same 7.5 million acre-feet, and that Arizona's 46% of surplus, Nevada's 4% and the 50% to which California is limited would come out of any available water in addition to the 7.5 million acre-feet per annum. This is precisely the way that Senator Pittman interpreted Section 4(a) on the floor of the Senate; he assumed that California would receive the full 4.4 million acre-feet which was the maximum she could receive out of 7.5 million acre-feet and that Arizona would receive 2.8 and Nevada .3 million acre-feet to round out the full 7.5. Senator Pittman also assumed that California would receive all of the 50% of surplus that she was eligible to receive and that Arizona would receive the rest. See pages 176-177, *supra*. This seems also to have been the understanding of Senator Hayden and of other Senators who participated in the debate. See pages 174-175, *supra*. This correlation demonstrates that the Secretary obligated himself in his contracts with the California agencies to satisfy 5,362,000 acre-feet of consumptive use out of the water allocated to California under the three-state apportionment.

It is true that the California contracts do not in terms call for the delivery of half of surplus and therefore that they do not expressly apportion to California the maximum amount of water she can receive under her limitation. This does not impugn the conclusion that the water delivery contracts substantially effectuate the apportionment contemplated by Congress. The fact that the Secretary based the contractual apportionment on Section 4(a) and that he was careful to ensure that Nevada's 4% of surplus was to come from Arizona's share demonstrates that he intended to reserve 50% of surplus for California in making the contractual apportionment. The Secretary made no master contract with the State of California, but rather made a number of contracts for specific quantities of water with

the several California users. So far as appears, California users have not requested contracts for additional water out of surplus, probably for the reason that they have never been in a position to utilize the full amount of their present allotments. This explains why California's share of surplus has not yet been fully contracted for. In years in which "surplus" exceeds twice 962,000 acre-feet,[85] the Secretary is not required by his existing contracts with California users to deliver to them out of such surplus more than the 962,000 acre-feet. New contracts can, of course, change this situation.

Since the Secretary has intentionally bound himself to a contractual apportionment substantially (although not precisely) along the lines suggested by Congress as fair and equitable in the two paragraphs of Section 4(a) of the Project Act, that section has been used as a guide for interpreting and defining the contractual allocation. Applying this gloss to the contracts, I interpret them as establishing the following water delivery scheme: The Secretary, in his discretion, decides how much water is to be released from mainstream reservoirs in any particular period. The amount available for consumption in the United States in any one year will be the amount so released less the amount necessary to satisfy higher priorities. The contracts do not limit the Secretary's discretion; they operate only upon mainstream water which is available for consumption in the United States. They require that this water be apportioned as follows: of the first 7.5 million acre-feet of consumptive use in one year, 4.4 for use in California, 2.8 in Arizona and .3 in Nevada; of the remaining consumptive uses during that year, 50% for use in California and 50% in Arizona, subject to the possibility that Arizona's share

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[85]The 5,362,000 acre-feet for which California users have contracted must be satisfied as follows: 4,400,000 acre-feet out of the first 7,500,000 acre-feet; and 962,000 acre-feet out of surplus.

may be reduced to 46% if the Secretary contracts to allocate 4% of surplus for use in Nevada.

The Section 4(a) limitation which is incorporated into the California contracts measures California's apportionment in terms of consumptive use, see pages 185-187, *supra,* and the delivery contract between the United States and Arizona also specifies that Arizona's apportionment is measured by consumptive use. The Nevada delivery contract is not so specific, but it must be interpreted in the same manner since it was intended to correlate to the California contract and the prospective Arizona contract and also to approximate the apportionment suggested in Section 4(a). Consumptive use means, in all of the contracts, diversions from the mainstream less return flow thereto. Thus a state is not charged for water diverted by it which ultimately finds it way back to the Colorado River and which is available for use within the United States or which is available for delivery to Mexico in satisfaction of obligations imposed by the Mexican treaty.

It should also be pointed out that the apportionment made by the delivery contracts applies to water stored in Lake Mead and flowing in the mainstream below Lake Mead. In other words, a state is charged for consumption of water released from Lake Mead and water which flows into the mainstream below Lake Mead from the Bill Williams River. The Section 4(a) limitation which is incorporated in the California contracts clearly provides for this result, see pages 184-185, *supra,* as does Article 7(1) of the Arizona delivery contract. Nevada, of course, does not have access to the inflow from the Bill Williams River; under her contract she is charged for all the mainstream water she utilizes.

Furthermore, it is clear that the mainstream apportionment among Arizona, California and Nevada effectuated by the Secretary's water delivery contracts in conjunction

with Section 4(a) applies only to water diverted from Lake Mead and the mainstream below. The argument advanced by the United States and California, that diversions from the mainstream between Lake Mead and Lee Ferry are chargeable under the apportionment, cannot be sustained.

As heretofore explained, page 183, *supra,* diversions from this reach of the River are outside the scope of the Section 4(a) limitation on California. Furthermore, Section 4(a), even if applicable to the mainstream above Lake Mead, cannot limit diversions by Arizona and Nevada because it is solely a limitation on California. Since Arizona and Nevada are the only states geographically in a position to divert water from the mainstream between Lake Mead and Lee Ferry, the water delivery contracts between those states and the United States are the only authority on the basis of which diversions from this reach of the river could be limited.

But the Arizona and Nevada contracts do not limit diversions in those states above Lake Mead. This is consistent with Section 5 of the Project Act which authorizes the Secretary to enter into contracts only for the delivery of "water in said reservoir," *i.e.,* Lake Mead.

Thus the Arizona water delivery contract, in paragraph 7(a), purports to affect only deliveries of water "from storage in Lake Mead," not diversions above Lake Mead. It is true that paragraph 7(d) of the Arizona contract provides that the United States' obligation to deliver water from Lake Mead or the mainstream below "shall be diminished to the extent that consumptive uses now or hereafter existing in Arizona above Lake Mead diminish the flow into Lake Mead. . . ." But even this paragraph does not purport to limit Arizona's diversions from the mainstream above Lake Mead. If, for example, Arizona diverted 3,000,000 acre-feet from this stretch of

the mainstream this would not be a violation of paragraph 7(d) although the Secretary could reduce Arizona's consumptive uses of water below Lake Mead to the extent of such uses. At any rate, for the reasons detailed at pages 237-247, *infra,* paragraph 7(d) is invalid, and thus it cannot limit Arizona's diversions from the mainstream above Lake Mead. Similarly, nothing in the Nevada water delivery contract purports to limit diversions by that state above Lake Mead, except for part of Article 5(a) which is invalid for the same reasons that Article 7(d) of the Arizona contract is invalid.

One of the proposed plans for the Central Arizona Project contemplated the diversion of water at Bridge Canyon or Marble Canyon, both of which are on the mainstream between Lake Mead and Lee Ferry. California and the United States are concerned lest Arizona be permitted to divert a substantial quantity of water for the Central Arizona Project from one of these sites in addition to the water apportioned to her from Lake Mead and the mainstream below. But this cannot occur without the specific authorization of Congress. First of all, there is no indication that the Central Arizona Project can be financed other than by Congress. Secondly, under the Rivers and Harbors Act, 33 U. S. C. §§ 401 *et seq.* (1958), the dam necessary for the Project could not be constructed in the Colorado River without the approval of Congress. *United States* v. *Arizona,* 295 U. S. 174 (1935); *Wisconsin* v. *Illinois,* 278 U. S. 367, 411-414 (1929).

When Congress, in the Project Act, authorized the construction of Hoover Dam, it focused its attention on the problem of how the water impounded and released by that dam should be distributed, authorizing the Secretary of the Interior to apportion that water among the interested states. Congress did not focus its attention on the diver-

sion of water above Lake Mead. If Congress authorizes a dam and diversion works on the mainstream above Lake Mead, its attention will then be directed to the problem of apportioning the water diverted by those structures. At that time Congress can determine whether or not Arizona's diversions above Lake Mead shall be chargeable to her under the present contractual apportionment.[86]

California strenuously urges that the contractual apportionment explained in this section of the Report is contrary to the "bargain" she made with Congress in enacting the California Limitation Act. According to California, she was assured of 4.4 million acre-feet out of the first 7.5 million acre-feet of consumptive uses of water diverted throughout the entire Colorado River System in the Lower Basin. She calls this "III(a) water," referring to the allocation of 7.5 million acre-feet of system-wide consumptive uses made to the Lower Basin by Article III(a) of the Colorado River Compact. The apportionment suggested in this Report, of course, allocates to California 4.4 million acre-feet out of 7.5 million acre-feet of mainstream uses only. Since California, which has no tributaries, would receive substantially more water under a system-wide apportionment, see pp. 177-178, *supra,* she claims that the suggested mainstream apportionment diminishes the fruits of her bargain. Since consumptive use of water from the Gila River System in Arizona accounts for most of the tributary uses in the Lower Basin, the real thrust of California's argument is that Arizona's mainstream uses should be curtailed, for the benefit of California uses, to the extent of Arizona uses on the Gila River.

California has never clearly designated the ground on which she bases her claim to 4.4 million acre-feet out of a

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[86]The doctrine of equitable apportionment may affect diversions in this reach of the River. See pages 316-318, *infra.*

Lower Basin system-wide apportionment. There are only four possible sources for this claim: (1) the law of prior appropriation or equitable apportionment, (2) the Colorado River Compact, (3) the Boulder Canyon Project Act, or (4) the water delivery contracts executed by the Secretary of the Interior under Section 5 of the Project Act. None of these sustains California's position.

(1) Prior Appropriation and Equitable Apportionment. Since the doctrines of prior appropriation and equitable apportionment were rendered inapplicable to the Colorado River below Lake Mead by the Project Act, see pp. 151-162, *supra,* California's claim to Colorado River water cannot be grounded on them. But even if those doctrines did apply, they would not support California's claim.

The appropriation doctrine holds merely that a junior appropriator can neither demand nor withhold water required for beneficial use by a senior appropriator. Under this rule, the total quantity of uses in any state is immaterial to the rights of appropriators in other states. It is true that junior appropriators on tributaries can be shut down if the water they would consume has been appropriated by senior appropriators on a mainstream. But that rule of the law of appropriation does not justify California's claim that Gila River water uses are to be charged to Arizona so as to reduce Arizona's claims to the mainstream, since it does not appear that California users have any appropriative rights in waters of the Gila River, their points of diversion all being upstream from the confluence of the Gila with the mainstream.

This result is not changed by the modification of strict priority of appropriation that has been made by the Supreme Court in equitable apportionment suits. None of the equitable apportionment cases establishes an accounting system

comparable to the one that California urges for adoption here. Perhaps the simplest way to demonstrate this is to assume that the Project Act and the Colorado River Compact do not exist. In an equitable apportionment suit over mainstream water between Arizona and California, the Gila River would not be in issue because its waters have not been appropriated by California and there are no diversion works in California which permit the utilization of this water in that state. The Supreme Court has never yet based an apportionment of one stream on the water available to one party but not to the other, from another stream. Presumably the apportionment would be based on the supply in the main Colorado River, not that river and the Gila, which California cannot use.

(2) The Colorado River Compact. As explained at pp. 139-141, *supra,* the Compact operates inter-basin and not interstate. It does not purport on its face and it cannot be construed to affect rights between Arizona and California. Although the Compact in Article III(a) and (b) apportions system waters to each Basin, it gives no direction regarding which uses are III(a) or III(b) or some other category, as among states of either Basin. The Upper Basin states recognized that the Compact did not control the intra-basin division of water when, in 1948, they apportioned by compact their share of Colorado River Basin water among themselves. How the Lower Basin states should divide their Compact apportionment, their surplus and the water not covered by the Compact was left to those states, as they themselves recognized in their various efforts to reach agreement and as Congress recognized in the second paragraph of Section 4(a).

(3) The Boulder Canyon Project Act. Nothing in the Project Act establishes an apportionment of all Lower Basin

uses, both mainstream and tributary. The only section which purports to effect a specific allocation of water is Section 4(a), and that, as explained at pp. 173-183, *supra,* applies only to the mainstream. But even if Section 4(a) applied to the entire river system, it would not support California's claim.

The first paragraph of Section 4(a) is a limitation on California, not a grant to her, and hence cannot be a source of her rights to water as against the other Lower Basin states. The critical words in the first paragraph state that consumptive uses of water in California "shall not exceed" certain quantities per annum. This provision, that California's uses "shall not exceed" the specified quantity, does not mean that she is entitled to that quantity. California relies on the language in the first paragraph which states that the amount of water to which she is limited shall include "all water necessary for the supply of any rights which may now exist. . . ." She argues that this is a grant to her. But even if it were a grant, the language would give California only water to which she had rights derived from another source and would not constitute an independent basis for claiming water as against the other Lower Basin states. Furthermore, the natural reading of these words indicates not a grant, but a double limitation: California's consumptive uses shall not exceed 4.4 million acre-feet of 7.5 million acre-feet, and this is true despite her claims in 1928 that her existing rights exceeded 4.4 million acre-feet.

The second paragraph of Section 4(a) authorizes a compact which was never consummated and hence it cannot be a source of California's right to water as against the other Lower Basin states. Moreover, that paragraph makes clear that Arizona uses of Gila River water are in addition to the apportionment authorized therein. See note 38, p. 179.

(4) The Water Delivery Contracts. The water delivery contracts which the Secretary of the Interior has entered into with the California defendants constitute the only possible basis for California's claim to mainstream water. Those contracts do allocate water to California, see pp. 221-225, *supra,* but only from a three-state apportionment limited to the mainstream.

The California contracts, together with the Arizona and Nevada contracts, constitute an apportionment among the three states. California's major contention, that Arizona is to be charged for her uses of Gila River water under the tri-state apportionment, fails before the clear language of the Arizona water delivery contract. Paragraph 7 of that contract explicitly apportions to Arizona "from storage in Lake Mead at a point or points of diversion on the Colorado River" 2.8 million acre-feet plus half of surplus. Paragraph 7(1) also provides that: "All consumptive uses of water by users in Arizona, *of water diverted from Lake Mead or from the main stream of the Colorado River below Boulder Dam* . . . shall be deemed, when made, a discharge pro tanto of the obligation of this contract." (Emphasis added) Nothing in the Arizona water delivery contract can be interpreted, even with the most vivid imagination, as charging Arizona for her consumptive uses of Gila River water. Rather, the language of that contract explicitly and unmistakably allocates water to Arizona only from the mainstream, leaving her free to consume water from the Gila in addition to the contractual apportionment.

Thus far the Report has described that part of the contractual allocation scheme that governs two distinct supply situations: (1) where there is sufficient mainstream water to satisfy 7.5 million acre-feet of consumptive use in the United States in one year; and (2) where there is surplus because of sufficient water to satisfy uses in excess of the

7.5 million acre-feet. The contractual allocation scheme also determines each state's apportionment in the event of insufficient mainstream water to supply 7.5 million acre-feet of consumptive use in one year. In such event, the allocation scheme requires each state to share the burden of the shortage ratably. This is to say that the contracts, executed by the Secretary in conformity with the apportionment contemplated by Congress in Section 4(a), apportion to each state a pro rata share of the available water. The interstate ratios are determined by the contractual apportionment to each state of the first 7.5 million acre-feet of consumptive uses. Thus in the event of shortage, to Arizona is apportioned by her contract $\frac{2.8}{7.5}$ of the aggregate consumptive use in the three states; to California is apportioned by her contracts $\frac{4.4}{7.5}$ of such use; and to Nevada is apportioned by her contract $\frac{.3}{7.5}$ of such use. Priority of appropriation is nullified by the Project Act and by the contracts, and this ratable apportionment is substituted in lieu thereof.[87]

It is demonstrable that the Project Act and the water delivery contracts contemplate a pro rata allocation of mainstream water among Arizona, California and Nevada in times of short supply. As explained above, the three states' apportionments are on a parity whenever the annual supply is sufficient to satisfy 7.5 million acre-feet or more of consumptive use in the United States. Thus California and Arizona are each allocated 50% of surplus, under existing contracts, and necessarily without regard to priority of appropriation. Even if, hypothetically, California were to

[87] As is explained hereafter (pp. 306 *et seq., infra*) Section 6 of the Act makes an exception to this rule.

have appropriations of 5 million acre-feet which are prior in time to any of Arizona's and some of these California appropriations were unsatisfied, the two states would nevertheless share surplus equally. And there is, with one exception, nothing in the Project Act or the Secretary's delivery contracts which suggests that a similar parity as between the states does not prevail if there is less than 7.5 million acre-feet of consumptive use to be apportioned among them.

That single exception, the command in Section 6 that "present perfected rights" shall be satisfied, further emphasizes that Congress did not intend that principles of priority of appropriation should apply in times of short supply to control the interstate allocation of mainstream water. The purpose of Section 6, as explained more fully at pages 306 *et seq.*, is to protect mainstream uses in existence at the time the Project Act was enacted against the possibility that their water would be impounded by the proposed dam and delivered to other uses developed after the dam was constructed. Since these early uses are prior in time to uses developed in reliance on Hoover Dam, there would be no need to protect them against this possibility if priority of appropriation governed the interstate delivery of water in periods of short supply.

Furthermore, the priority scheme established by Section 6, which is based on "perfected rights," is in certain particulars inconsistent with principles of priority of appropriation. Thus, it is quite possible that a right "perfected" as of June 25, 1929, and thus protected by Section 6 is junior in priority to a right recognized under state law but not "perfected" as of that date. In such a case, Section 6 would reverse the order of state priorities. If Congress had intended priority of appropriation to retain interstate significance after the enactment of the Project Act, it might

be expected that it would have suggested that priority of appropriation was still to govern in circumstances in which it was not inconsistent with Section 6.

Moreover, the Project Act approved the Colorado River Compact, and thus the Compact provides the background for the enactment of the Project Act. The Compact treats the Upper and Lower Basins on a parity one to the other in regard to the division of water; priority of appropriation is not an operative factor under the Compact. Thus subdivisions (a) and (b) of Article III apportion consumptive use of water to each Basin in fixed quantities with the manifest intention that priority of appropriation as between Basins shall be irrelevant to the apportionment. It is true that the greater development in the Lower Basin may have been taken into account when that Basin was apportioned an extra million acre-feet, but, the division having been made, each Basin's apportionment is, under the Compact, of the same quality, regardless of priority of appropriation. This is made clear by Article III(c) which provides that, if there is not enough water in excess of the III(a) and (b) apportionment to fulfill United States treaty obligations to Mexico, "then the burden of such deficiency shall be equally borne by the Upper Basin and the Lower Basin . . . ." The respective Basins do not bear the loss of water in such a period of short supply on the basis of priority of appropriation, but on the basis of parity.

As I have pointed out, the second paragraph of Section 4(a) gives advance approval to a compact among Arizona, California and Nevada containing an allocation of water which was substantially effectuated by the contractual allocation established by the Secretary. Under this proposed compact, each state's apportionment would be of equal quality, precisely like the inter-basin apportionment in the Colorado River Compact. Surely Congress did not intend

that such an interstate compact would give California superior priorities to water because of the earlier dates of her uses. A compact is ordinarily thought of as an agreement between sovereigns with the rights of each standing on equal footing. The sensible interpretation of the proposed compact is that California's more advanced development was taken into account in allocating to her a larger share of water than to her sister states, and that once the ratio of 4.4 to 2.8 to .3 was established, it would be applied to all of the water consumed, regardless of dates of appropriation. Since Congress intended the second paragraph of Section 4(a) to be correlative to the first paragraph, the latter must be interpreted in the same manner as the former, to provide for a pro rata apportionment in periods of shortage.

In short, Congress contemplated inequality in the quantities allocated to each of the states, but parity in their rank. Interstate priorities were rejected. The principle of sovereign parity was established.

As pointed out above, it is patent that the Secretary was profoundly influenced in his water delivery contracts by the apportionment suggested in Section 4(a). Therefore, it must be concluded that these contracts embody the pro rata system of apportionment that is incorporated in Section 4(a). None of the contracts suggests that a system other than pro rata distribution is to be applied. Although the Secretary's contracts with California users specify a system of priorities among them, they do not mention interstate priorities, nor do any of the Secretary's other water delivery contracts. Indeed, in order to apply an interstate priority system it would be necessary for the Secretary to establish the priority date for each use diverting water from the mainstream as against all of the other uses diverting such water. So far as appears, the

Secretary has not considered it necessary to compile such a complicated list in order to deliver water pursuant to his contracts. Furthermore, as noted at pages 233-234, *supra,* the contracts adopt a pro rata system of distribution of surplus.

6. *Deductions for Uses above Lake Mead Invalid.* The contractual allocation scheme detailed above, which has been deduced from the Secretary's water delivery contracts, does not take into account the provisions of Article 7(d) of the Arizona contract and Article 5(a) of the amended Nevada contract which reduce the Secretary's obligation to deliver water from Lake Mead for use in those states to the extent that consumption of water in those states diminishes the flow of water into Lake Mead.[88] These provisions are in violation of the Project Act; they are unenforceable. They are contrary to the command of Section 5 that "contracts respecting water for irrigation and domestic uses shall be for permanent service . . .," they violate Section 18, which directs that state law shall govern intrastate water rights and priorities, and they result in an allocation of mainstream water totally out of harmony with the limitation on California contained in Section 4(a).

These contract provisions require that deliveries of water from the mainstream to users in Arizona and Nevada be reduced as depletions in those states above Lake Mead increase, regardless of the supply of water in Lake Mead. For example, assume that annual deliveries from Lake

[88]Article 7(d) of the Arizona contract clearly states that the Secretary's delivery obligation is reduced to the extent that consumption diminishes the flow into Lake Mead. Article 5(a) of the Nevada contract is worded differently, however, and could be interpreted as reducing the delivery obligation to Nevada by the total amount of tributary diversions in that state regardless of the effect on the flow into Lake Mead. Since I have concluded that these provisions are unenforceable, it is unnecessary to differentiate between the two versions, and I have treated Article 7(d) and Article 5(a) as synonymous for purposes of the following discussion.

Mead to users in Nevada aggregate 300,000 acre-feet of consumptive use, the full contract allotment. It will be noted that the present Nevada contract does not call for delivery of any surplus. If thereafter a consumptive use from the Virgin River in Nevada were to occur which reduced the flow into Lake Mead by 50,000 acre-feet, the Secretary's obligation, under his contract to deliver water to Nevada from Lake Mead, would be reduced by this amount, and this would result in the cancellation of deliveries to those junior-most Nevada users who had been receiving the last 50,000 acre-feet under the contract, even though the supply of Lake Mead water was sufficient to satisfy all demands.[89] This would be true despite the fact that the Secretary has absolutely no control over consumptive uses on the Virgin River. For these junior Nevada users, the Nevada contract cannot be regarded as one for permanent service.

Since Section 5 requires the Secretary's water delivery contracts to be "for permanent service," the contract provisions in question are in violation thereof. The requirement of permanent service has no antecedent in the prior Reclamation Acts, and the legislative history sheds very little light on its meaning. Clearly a contract for a stated term of years would not be for "permanent service." However, the general context suggests that Congress intended to do more than outlaw term contracts. This requirement was placed in the Project Act also to ensure that deliveries of water from Lake Mead would be on a stable and annually re-

[89]Consumption of water on any particular tributary above Lake Mead affects the supply of water in Lake Mead and hence the amount of water that can be released for consumption each year. But it is only one of many factors that affect supply, and is clearly not among the most important ones, which are the mainstream flow into Lake Mead and storage from prior years. Thus, it is quite likely that the Secretary would be able to release the same amount of water for consumption from the mainstream in successive years despite an intervening project which depleted the flow into Lake Mead from one of the tributaries.

curring basis, insofar as this is possible under the physical conditions existing in the River Basin. Because of the topography and geography of the Lower Basin, water from the mainstream can be feasibly diverted and utilized for irrigation only by the construction of immense projects consisting of dams, pumping facilities, canals and other necessary works. Needless to say, the cost of such projects is enormous, and they can be financed only if a relatively constant and dependable supply of water seems likely to be available once they are completed. Similarly, existing projects cannot be economically operated unless a dependable supply of water is available.

There will necessarily be some uncertainty of supply of mainstream water because of the very large fluctuation in the flow of water into Lake Mead each year.[90] Legislation could not, of course, affect the geography of the region or the amount of precipitation. But the primary purpose of the Project Act in providing for the construction of Hoover Dam was to regulate this erratic flow so as to provide, so far as physically possible, a stable supply of water on the basis of which the economy of the Lower Basin could be developed.[91] While Congress could not legislate away the uncertainties of supply created by nature, it could reduce them by means of the great reservoir and by pursuing a policy of permanent service contracts. In conformity with this purpose, the requirement of permanent service in Section 5 seems to have been intended to instruct the Secretary to contract for water deliveries in such a way as to assure users, as far as is physically possible, of a stable supply of water. Having authorized the dam to overcome the physical conditions which resulted in uncertainty of supply, Congress did not want the Secretary's contracts

[90]See Part One, pp. 117-120.

[91]Hoover Dam cannot be entirely successful in this regard. See Part One, pp. 107-110.

to generate new causes of uncertainty. Congress undoubtedly realized that unless Hoover Dam and Lake Mead were operated so as to make deliveries of water as dependable as possible it would be extremely difficult to develop new projects, existing projects might fail, and the effective utilization of the River would be seriously impaired.

But the provisions charging Arizona and Nevada for depletions above Lake Mead create this very uncertainty of supply that Hoover Dam and the Section 5 command were explicitly designed to avoid. For under these provisions, deliveries to projects below Lake Mead would be reduced on the basis of fluctuating factors which neither the Secretary nor the downstream users can control.[92]

It is true that deliveries to users in a particular state below Lake Mead are reduced, under Articles 7(d) and 5(a), only as consumption within that state on the System above Lake Mead increases, and thus, in a sense, the total amount of water used within the state remains relatively constant. But Section 5 clearly requires that individual users be assured permanent service, regardless of overall state allocations. Furthermore, Section 5 deals with the mainstream only and thus it must have been intended to require permanent service in regard to mainstream deliveries regardless of consumption on the tributaries.

These provisions also violate Section 18 of the Project Act. That section, set forth and discussed at pages 216-218, *supra,* provides in effect that state law shall govern water rights and priorities intrastate. The example given above illustrates the violation of Section 18. The example assumed

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[92]It may be that in some instances a user below Lake Mead could obtain an injunction under state law prohibiting consumption of water above Lake Mead because of the collateral effect on deliveries to that user. However, nothing has been brought to my attention to indicate that this would be true in all, or even some, cases. Besides, Section 5 requires that the Secretary's contracts themselves must ensure permanent service.

that, after the full 300,000 acre-feet of Nevada's Lake Mead water had been appropriated and put to beneficial use, a project was developed on the Virgin River in Nevada that depleted the flow into Lake Mead annually by 50,000 acre-feet. Under the law of prior appropriation, the Virgin River project would be junior to all users of the 300,000 acre-feet. The contract provisions, if enforced, would reverse this order of priority. The users of the last 50,000 acre-feet of mainstream water under the Nevada contract would be deprived of water, while the Virgin River project continued to use water, despite the fact that the tributary user was, under state law, junior to the mainstream users. No more flagrant violation of Section 18 can be conceived. The Secretary has attempted, by his contracts, to intervene within the States of Nevada and Arizona to dictate who shall receive water and in what order of priority. Moreover, in this attempt, the Secretary has adopted a rule of priority exactly the reverse of the state rules; the contract provisions would displace senior downstream users for the benefit of junior upstream users.

Since the Secretary's power to make water delivery contracts under Section 5 of the Project Act is limited by Section 18 of the Act, and since the provisions in question violate Section 18, those provisions must be stricken on this ground also.

In addition to violating Sections 5 and 18 of the Project Act, Articles 7(d) and 5(a) are inconsistent with the Section 4(a) limitation on California's use of mainstream water, and indeed, defeat the basic purpose of the delivery contracts themselves; namely, to provide for the allocation in fixed proportions among Arizona, California and Nevada of all the mainstream water released for use in the United States.

Congress intended, in Section 4(a), to provide for an apportionment of the first 7,500,000 acre-feet of consump-

tive use of mainstream water plus a further apportionment of surplus water in the mainstream. Consumption of water diverted from the Lower Basin tributaries is irrelevant to the Section 4(a) apportionment. The Secretary's water delivery contracts, except for the provisions in question, substantially adopt and effectuate the congressional apportionment. Except for these provisions, the several water delivery contracts provide for the disposition of all the 7,500,000 acre-feet and all surplus. See pages 222-224, *supra*. But Articles 7(d) and 5(a) defeat the mainstream allocation, otherwise completely provided for in the contracts, by introducing System, *i.e.*, tributary, considerations in a mainstream apportionment. To enforce these provisions would distort the mainstream apportionment and leave some mainstream water undisposed of.

The resulting incomplete allocation may be demonstrated by the following example: Assume that the Secretary decided to release in a particular year enough mainstream water to permit consumption of 7.7 million acre-feet in the three states. Assume, also, that Arizona's diversions from the Little Colorado River depleted the flow into Lake Mead by .1 million acre-feet. Under the interstate apportionment established by the Section 4(a) limitation on California and the delivery contracts with Arizona and Nevada, of the first 7.5 million acre-feet of mainstream consumption, Arizona would be allocated 2.8 million acre-feet, California 4.4, and Nevada .3. Of the .2 million acre-feet constituting surplus, Arizona and California would each be allocated one-half. Thus to California would be apportioned a total consumption of 4.5 million acre-feet for the year in question. She could not consume more than this amount because of the Section 4(a) limitation, which is based on mainstream considerations only. To Nevada would be apportioned a total consumption of .3 million acre-feet, and she could not utilize more than this since that constitutes

her full contractual allotment. To Arizona would be apportioned a total consumption of 2.9 million acre-feet. But if Article 7(d) of her contract were applied in this situation, the Secretary's delivery obligation of 2.9 million acre-feet would be reduced by the amount of the depletion of the flow into Lake Mead, and Arizona could consume only a total of 2.8 million acre-feet from the mainstream. Thus, although 7.7 million acre-feet were released for consumption within the three states for the year, only 7.6 million acre-feet could be utilized under the statutory and contractual limitations. 100,000 acre-feet of water released for consumption could not be used.

The United States suggests that the solution for this dilemma is simply to consider the uses above Lake Mead as part of the total supply of available consumptive uses under the apportionment, and to charge them to Arizona and Nevada. Thus the United States, in the example, would add the 100,000 acre-feet of depletions from the Little Colorado to the total of available consumptive uses from the mainstream, giving a total of 7.8 million acre-feet of available consumptive uses, and 300,000 acre-feet of surplus. The United States then would allocate this total supply among the three states according to the apportionment formula, giving California 4,550,000 acre-feet of consumptive uses, Arizona 2,950,000 (including the 100,000 from the Little Colorado), and Nevada 300,000.[93]

There are two flaws in this suggestion. First of all, the United States would equate consumptive use measured by diversions less returns, which is the apportionment measurement, with depletion of the flow into Lake Mead, which is the measurement under Article 7(d) of the Arizona contract. But the two measurements are not similar; for example, 100,000 acre-feet of consumptive use on the Little

[93]Letter of the Solicitor General commenting on the Draft Report, p. 8

Colorado will result in a depletion of the flow into Lake Mead by a substantially smaller quantity of water.

Secondly, the United States' suggestion would violate the interpretation of Section 4(a) proposed in this Report, an interpretation to which the United States herself agrees. Thus Section 4(a) limits California to 4.4 plus half of surplus out of the total consumptive use of water diverted from the *mainstream;* it establishes a mainstream, not a system-wide, method of accounting. But the United States' suggestion would import tributary considerations into the Section 4(a) limitation. In the example, there are only 7.7 million acre-feet of consumptive uses of water diverted from the mainstream and Section 4(a) would limit California to 4,500,000 acre-feet of this. However, the United States' solution, because it takes tributary uses into account, would result in California receiving 4,550,000 acre-feet of consumptive use, 50,000 acre-feet more than she is permitted to take under Section 4(a).

The reason for the existence of this body of available water which cannot be utilized by any of the interested states under the contractual apportionment created by the provisions in question is quite clear. Articles 7(d) and 5(a) dictate that Arizona and Nevada cannot receive mainstream water to the extent that they deplete the tributaries above Lake Mead. But California cannot use this water that is denied to her sister states because the statutory limitation on her consumption is based on consumption of mainstream water only. Under Section 4(a), California cannot receive more mainstream water because of depletions on the tributaries even though, under the Arizona and Nevada contracts, those states receive less. In other words, because of the lack of correlation between the Arizona and Nevada contracts on one hand and the California contracts on the other, all of the apportioned water physically available for consumption cannot be legally utilized.

It is significant that under the apportionment suggested in Section 4(a) itself all of the available water could be consumed in the three states. This is because Congress intended the limitation on California in the first paragraph and the allocations to Arizona and Nevada in the second paragraph to correlate perfectly; both were to apply to mainstream water only. Indeed, it seems that the Secretary himself intended the delivery contracts to provide for the apportionment of all of the available mainstream water among Arizona, California, and Nevada, since that apportionment was based on the one suggested by Congress in Section 4(a) of the Project Act.

It is unlikely that the Secretary intended that the formula established by his contractual apportionment would call for the delivery of water to California which California could not receive under the Section 4(a) limitation, and, conversely, that Arizona and Nevada would not be able to receive, under their contracts, water which California could not use under the statutory limitation. But this is precisely the result of applying the provisions in the Arizona and Nevada contracts which inject System considerations into the scheme for apportioning mainstream water. Rather, the Secretary seems to have intended that California should receive, out of the available supply, all of the water she was eligible to receive under the statutory limitation, at least until the 5,362,000 acre-feet of consumptive uses per annum called for in the existing delivery contracts with California users is provided, and that Arizona and Nevada would receive all of the rest.

Perhaps it was not apparent at the time that the Arizona and Nevada contracts were entered into that, because of Articles 7(d) and 5(a), they would not correlate with the California contracts. Certainly it is clear that none of the interested parties intended that the Arizona and Nevada contracts would waive the limitation on California's con-

sumption contained in the Project Act, or that they would operate so as to prevent Arizona and Nevada users from eventually consuming the full amount of water that was barred to California. The Arizona and the amended Nevada contracts were executed within six weeks of each other, and Article 10 of the Arizona contract specifically provides that the entire contract, and Article 7 in particular, "is without prejudice to, any of the respective contentions of said states [which term includes Nevada] and water users as to (1) the intent, effect, meaning, and interpretation of said compact and said act . . . (5) what limitations on use, rights of use and relative priorities exist as to the waters of the Colorado River system. . . ." And in a memorandum issued by Secretary of the Interior Ickes on February 10, 1944, the day following the execution of the Arizona contract, he stated that "Article 10 was purposely designed to prevent Arizona, or any other state, from contending that the proposed contract, or any provision of the proposed contract, resolves any issue on the amounts of waters . . . available to the respective states under the compact and the act. It expressly reserves for future judicial determination any issue involving the intent, effect, meaning and interpretation of the compact and act."[94]

Whatever the reason for the incorporation of Articles 7(d) and 5(a) into the contracts, it is apparent that, in light of the interpretation here proposed for Section 4(a), those provisions defeat the basic purpose of the delivery contracts in that they, and they alone, prevent the contracts from establishing a rational and easily administered scheme for the apportionment of all the available mainstream water among the three interested states.

In this posture, failure to give effect to the provisions charging Arizona and Nevada for depletions above Lake

[94]Special Master's Exhibit No. 4, The Hoover Dam Documents, p. A568.

Mead is consistent with the general scheme of the delivery contracts and enables the Secretary to operate Lake Mead efficiently. It would be unconscionable to uphold a delivery scheme which required, on a permanent basis, that water flowing in the mainstream and available for use could not be consumed in any of the three states.

As a final matter, it should be pointed out that voiding these provisions does not impair the Secretary's control and management of Hoover Dam and Lake Mead, nor does it leave California helpless to protect her interests. The Secretary will still be able to control the supply of water in Lake Mead since it is within his reasoned discretion to determine how much water is to be released for use in the three states each year. And California will be able to protect herself against undue depletions on the tributaries and the mainstream above Lake Mead by compact, or, if the necessity arises, by suit.

7. *United States Uses Charged to States.* All consumption of mainstream water within a state is to be charged to that state, regardless of who the user may be. Thus, consumption of mainstream water on United States Indian Reservations, National Parks, Forests, Monuments, and Recreation Areas, lands under the control of the Bureau of Land Management, reclamation projects, wildlife refuges, and other United States projects within the Lower Basin, all of which will be treated subsequently, is chargeable to the state within which the use is made. All of the parties seem to agree to this accounting, and it is required by the contracts and the Project Act. Article 7(1) of the Arizona contract specifically provides that Arizona's apportionment includes the consumptive use of all water diverted from the mainstream "whether made under this contract or not." Similarly, Section 4(a) of the Project Act limits diversions of water "for use in the

State of California" and nothing indicates that this language does not include all uses, including federal uses. The Nevada contract was intended to be correlative with the Arizona and California contracts and hence should be interpreted in the same manner. Furthermore the Nevada contract provides for the delivery of "so much water . . . as may be necessary to supply the state a total quantity not to exceed [300,000 acre-feet per annum]." Clearly this "total quantity" includes all mainstream water consumed in Nevada by any user.

E. California's Offer of Proof.

In connection with the oral argument on the Draft Report, California made an Offer of Proof, consisting of about 60 papers, which, she asserts, show thirty years of legislative and administrative interpretation of the Project Act contrary to the conclusions reached in the Report. California contends that these papers, if admitted in evidence, would establish:

> (1) That state and federal officials concerned with the administration of the Project Act construed Section 4(a) to be applicable to the tributaries as well as to the mainstream, as California contends, see pp. 177-178;
>
> (2) That the Secretary of the Interior had no intention of apportioning water when he entered into water delivery contracts with the several California defendants and with Arizona and Nevada.

Careful consideration of the Offer of Proof leads to the conclusion that the papers proffered do not establish either of these contentions.

First, as to the correct interpretation of Section 4(a), the papers tend to show only that Arizona and California have for over thirty years disagreed over the meaning of

this provision, and that neither of the states, through its officials, has exhibited a uniform consistency in positions taken regarding its meaning. Arizona's changes of position are fully documented in the several litigations affecting the River. Similarly, the exigencies of the moment seem to affect the interpretation of the Project Act advanced by California. For example, in opposing ratification of the Mexican Water Treaty, Mr. James H. Howard (then as now counsel for Metropolitan Water District) advanced these contentions:

> MR. HOWARD. Section 5 of the Boulder Canyon Project Act announced that the Secretary of the Interior was authorized to contract for the storage and delivery of water from the Boulder project, and it provided that those contracts should be for permanent serivce. It was also provided that no right in the stored waters of Boulder should be acquired by a method other than contract with the Secretary of the Interior. The value of that clause to the State of California may not be immediately apparent, but I want to develop that it is important.[95]
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> * * *
>
> MR. HOWARD. No. The statement is, in fact, that California will never claim more than 4,400,000 acre-feet plus one-half of the waters apportioned by the compact.
>
> THE CHAIRMAN. You are right. There is nothing in this act, as I see it, in that clause, that guarantees to give California that; it merely requires California to acquit anybody of any claim in connection with that; is not that true?
>
> MR. HOWARD. Yes; the act does not give California any water.
>
> THE CHAIRMAN. How much water of that 4,400,000 acre-feet——

[95]Senate Hearings on Mexican Water Treaty, Committee on Foreign Relations, vol. 8, 79th Cong., 1st Sess. (1945), pp. 865-66.

SENATOR JOHNSON of California. Let him answer.

THE CHAIRMAN. He has already answered, but I will let him answer again.

MR. HOWARD. *That is a limitation, I take it, not a grant. The grant to California came in contracts with the Secretary of the Interior, authorized by the Boulder Canyon Project Act. It is upon those contracts that we rely for our affirmative right to water.*[96] (Italics added.)

* * *

THE CHAIRMAN. I do not like to interrupt you, but this contract with the Secretary of the Interior is more in the nature of a license to use so much water, is it not?

MR. HOWARD. No, sir; these are contracts.

THE CHAIRMAN. Is there any binding obligation on the Secretary to deliver that amount of water?

MR. HOWARD. Yes; there is.[97]

* * *

SENATOR MILLIKIN. Let me ask a question, please. Is there a compact at the present time between Nevada, Arizona, and California, and the lower basin States?

MR. HOWARD. No, sir; there is none.

SENATOR MILLIKIN. You have not decided on your allocation of water among yourselves?

MR. HOWARD. No. We have a rather complicated situation there, sir. In a way, the California Limitation Act constitutes a substitute for such an apportionment. That is, they held our side down, but there was no agreement between California and Arizona in the matter.

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[96] *Id.*, at 876.
[97] *Id.*, at 880.

> MR. HOWARD. The Secretary of the Interior and the State of Arizona have entered into a contract which in a way is a substitute already, a three-State compact.[98]

The purpose in 1945 was, of course, to convince Congress that it would be a breach of the California contracts to allocate any Lake Mead water to Mexico; hence, the reliance on the contract as a grant. In the posture of this litigation, however, California rejects the contracts as a source of right, since the contracts clearly relate to mainstream water and not to tributary water.

A further example of inconsistency is found in the testimony of Attorney General Kenny of California. His opposition to the Mexican Treaty was based on the proposition that California would be deprived of some of its 4.4 million acre-feet. General Kenny stated:

> SENATOR WILEY. Then is the nub of this argument that you are presenting (1) that you are getting the water, 4,400,000 acre-feet; (2) that you feel, if this treaty should become the law of the land, your rights will be prejudiced and that you will not get that water?
>
> MR. KENNY. Definitely.[99]

In oral argument in this case, on the other hand, California advanced the contention that the apportionment formula adopted in this Report errs in that it permits, in times of shortage, some of California's 4.4 million acre-feet to go to Mexico, whereas, according to California, Congress intended in the Project Act that water to be forever free from the Mexican Treaty burden. Since Congress ratified the Mexican Treaty despite General Kenny's admonition that it subjected California's 4.4 to diminution in order to

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[98] *Id.*, at 886.
[99] *Id.*, at 379

fulfill the treaty obligation, it is somewhat inconsistent for California to argue in this litigation that Congress intended her 4.4 to be free from this obligation.

My conclusion is that both Arizona and California have, with respect to the meaning of Section 4(a), taken various positions from time to time as their immediate interests dictated and that the Offer of Proof fails to show a consistent interpretation of the Act by either.

So far as United States government officials are concerned, the dominant note sounded in the proffered papers is the avowed refusal of these officials to take sides in the Arizona-California controversy. The papers show a firm refusal of federal officials to state the effect of the Compact and the Project Act on the rights of Arizona and California. One need not burrow through all the papers to discover that this has been the position of the Interior Department. It is explicitly set forth in Article 10 of the Arizona contract.

From this hands-off attitude of the Secretary, California argues her second proposition that the Secretary could not have intended his contracts to apportion the water in Lake Mead. This proposition is in error. The circumstances of the time and the terms of the contracts show that the Secretary did intend to make an apportionment. The situation facing the Secretary was clear. He had to apportion the water because it was physically in Lake Mead and nobody could use it unless he did so. He had a dam capable of storing nearly 30 million acre-feet. He had clear authority under Section 5 to contract for the use of that water; indeed he was directed by the statute to make contracts, both for power and irrigation, to pay for the dam. Moreover, if contracts were not made, the water would be wasted, for no person was, according to the Act, entitled to the use of water without a contract. It would have been impractical for the Secretary to await judicial resolution of the Arizona-California controversy, since the Supreme Court had held

the United States to be an indispensable party in such litigation[99a] and the United States had refused to join as a party. Nor could the Secretary apportion water on a temporary basis, pending such an adjudication, since Section 5 of the Project Act required his contracts to be for permanent service. Accordingly, the Secretary made contracts for delivery of the water, necessarily intending thereby to allocate it.

California's Offer of Proof does not contradict this conclusion. It shows only that the contracts were intended not to be the basis for any contention respecting the meaning of the Compact or the Project Act in future litigation. Although the Secretary was forced to interpret the Project Act in order to make the contracts, he did not want his interpretation to influence future judicial construction of the Compact and the Act. The Secretary's contractual allocation scheme was to govern water deliveries to the several states unless and until it was held invalid by this Court, but the fact that he made the allocation was not to be evidence of its validity. If the scheme was valid, it was to prevail forever, unless changed as authorized by Section 8(b) of the Project Act.

Thus California's Offer of Proof shows no more than what is made explicit by Article 10 of the Arizona contract; it fails to show that the Secretary did not intend his contracts to apportion water. Since California's Offer of Proof, assuming the competence of the proffered papers, fails to establish any proposition that would affect the disposition of the issues in this litigation, it would not be provident to reopen the hearings for the purpose of receiving them as well as any evidence which might then be tendered by the other parties in contradiction.

[99a] Arizona v. California, 298 U. S. 558 (1936).

IV. The Claims of the United States to Water in the Mainstream of the Colorado River

The United States claims, in addition to control of the mainstream by reason of the Boulder Canyon Project Act and its ownership and management of the various dams and works which regulate mainstream water, the use of water in the Lower Basin for a variety of its projects and needs. The United States urges that it has reserved water for the use of the various Indian Reservations, National Forests, Parks, Recreational Areas, Monuments, Memorials and lands under the control of the Bureau of Land Management located in the Lower Basin. The United States also claims the right to fulfill its treaty obligations by delivering 1,500,000 acre-feet of water per annum in the Colorado River at the Mexican border, and by consuming water on wildlife refuges and management areas located in the Lower Basin. Finally, the United States claims the right to deliver water from Lake Mead to Boulder City, Nevada, pursuant to a federal statute.

A. Indian Reservations

The United States argues that it has reserved water flowing in the Colorado River and its tributaries in the Lower Basin for the needs of all of the Indian Reservations located within the Lower Basin. Thus the United States claims that each Indian Reservation has the right to divert and consume the amount of water necessary to irrigate all irrigable acreage on the Reservation and to satisfy related needs, subject only to the priority of appropriative rights established before a particular Reservation was created and water reserved for its benefit.

Arizona argues that the rights of the various Indian Reservations on the tributaries ought not to be adjudi-

cated in this case.[1] I agree with Arizona that there is no need in this litigation to adjudicate the rights or priorities of Indian Reservations diverting water from the Lower Basin tributaries, except for the Gila River. For the reasons detailed at pages 318-321, 323-324, *infra,* it would be inappropriate at this time to apportion water in any of these tributaries, except the Gila River. Moreover, it would certainly be inappropriate to attempt a determination of the rights and priorities between each Indian Reservation and the myriad individual users who divert water from these tributaries.[2] As to Indian Reservations on the Gila River System, I have made recommendations concerning the United States claims in a subsequent section of this Report at pages 332-334.

As to the mainstream Indian Reservations, I have concluded that it is necessary to determine their water rights, and I have done so in the Findings of Fact and Conclusions of Law which conclude this section of the Report. The United States claims it has reserved mainstream water for Indian Reservations under federal law, independently of the state law of appropriation, in quantities sufficient to irrigate all the irrigable acreage in each of the Reservations and to satisfy related uses. Arizona and California resist this claim. Arizona asserts that the quantity of water reserved for an Indian Reservation is no more than that amount necessary to satisfy the requirements of Indians living on the Reservation at any particular time. California also denies that the United States intended to reserve water for all irrigable lands on an Indian Reservation.[3]

This disagreement presents a justiciable controversy between the United States and the States of Arizona and California which ought to be adjudicated in this case in order

[1]Ariz. Answering Brief, pp. 92-108.
[2]See Tr. 13796-13810.
[3]Calif. Brief, pp. 177-195; Calif. Response to U. S., pp. 112-127.

that the Secretary may know how much water he may release for consumption on each Indian Reservation. Thus in periods when there is insufficient water for the Secretary to fulfill all of his delivery obligations to users in a particular state, he will have to satisfy them according to priority. In such a case it will be necessary for him to know the rights and priorities of Indian Reservations as against other users within the state.[4] What these rights and priorities are can be determined only by resolving the controversy between the United States and the States of Arizona and California over the validity and scope of the reservations of mainstream water which the United States claims to have made. Indeed, if the Indian Reservations can acquire water rights only pursuant to state law, the Secretary may be prohibited from delivering any mainstream water to some of them since, so far as the evidence shows, some of the Reservations have never complied with the formalities required by the applicable state law in order to obtain a water right. Furthermore, the claims of the United States to water from the Colorado River for the benefit of Indian Reservations are of such great magnitude that failure to adjudicate them would leave a cloud on the legal availability of substantial amounts of mainstream water for use by non-Indian projects.

Since the Secretary cannot know how to operate Hoover Dam and the mainstream works below unless the controversy between the United States and the States of Arizona and California is resolved, since failure to adjudicate it will leave non-Indian users in doubt as to the water available for their use, and since this controversy has been prop-

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[4]It should be noted that, under similar circumstances, the Secretary may need to know the water rights intrastate of other users. In the case of the California agencies who are parties to this suit these rights are set out in the Seven-party Agreement. Such rights of other users not parties to this suit obviously cannot be determined herein.

erly presented in this case, it is appropriate to adjudicate it here.

The United States claims are sustained.

It has been established that the United States has the power to reserve water for the benefit of an Indian Reservation, created out of public lands, and that such a reservation of water creates a water right good against subsequent appropriators even if they beneficially use the water before the Reservation uses it. In short, the United States has the power to create a water right appurtenant to such lands without complying with state law. *Winters* v. *United States,* 207 U. S. 564 (1908), involved a suit by the United States on behalf of the Fort Belknap Indian Reservation, which was created by treaty between the United States and various Indian tribes on May 1, 1888. The land set apart for the Indians under the treaty was arid, but susceptible of sustaining agriculture if irrigated from the Milk River, a non-navigable stream which formed the northern border of the Reservation. The Court found that it was the intention of the United States and the Indians that the Indians should settle on the Reservation and change from a nomadic to a "pastoral and civilized people." 207 U. S., at 576. Subsequent to the establishment of the Indian Reservation, the defendants in the case acquired lands along the Milk River upstream from the Reservation under the Desert Land Act, 19 Stat. 377 (1877), by settling on the land and putting it to productive use by irrigation with water diverted from the Milk River. Some of the defendant farmers diverted water from the Milk River and obtained appropriative rights thereto under the Desert Land Act and the local law of Montana as early as 1895. 143 Fed. 740, 742 (1906). According to the opinion of the Circuit Court of Appeals, the Indians were diverting, at the time of trial, 5,000 miners' inches of water, most of which they began to use after appropriative rights of some of the defendants

had vested. The United States successfully sued to enjoin the upstream farmers from interfering with the flow of water to the Fort Belknap Reservation.

The Supreme Court affirmed the trial court's holdings that "there was reserved to said Indians the right to use the water of Milk River to an extent reasonably necessary to irrigate the lands included in the reserve created by the said treaty . . .," and that the defendants would be enjoined from interfering with the flow of 5,000 miners' inches of Milk River water to the Reservation. 143 Fed., at 743. The Supreme Court thus held that the reservation of water was effective as of the date that the Fort Belknap Reservation was created, 207 U. S., at 577, and that the appropriative rights obtained by the defendants subsequent to the time that the water was reserved but prior to the time that it was put to use on the Reservation were subordinate to the Reservation's rights.

The Supreme Court supported this result with the following reasoning, at p. 577:

> "The power of the Government to reserve the waters and exempt them from appropriation under the state laws is not denied, and could not be. . . . That the Government did reserve them we have decided, and for a use which would be necessarily continued through the years."

The *Winters* case has been cited many times as establishing that the United States may, when it creates an Indian Reservation, reserve water for the future needs of that Reservation, and that appropriative water rights of others established subsequent to the reservation must give way when it becomes necessary for the Indian Reservation to utilize additional water for its expanding needs. *United States* v. *Powers,* 305 U. S. 527 (1939); *United States* v. *Ahtanum Irrigation District,* 236 F.2d 321 (9th Cir. 1956), *cert. denied,* 352 U. S. 988 (1957); *United States*

v. *Walker River Irrigation District,* 104 F.2d 334 (9th Cir. 1939); *Conrad Investing Co.* v. *United States,* 161 Fed. 829 (9th Cir. 1908). In the *Winters* case the United States exercised its power to reserve water by a treaty; but the power itself stems from the United States' property rights in the water, not from the treaty power. Since the United States has the power to reserve water, by treaty, against appropriation under state law, there is no reason why it lacks the power to do so by statute or executive order. In the *Walker River* case, the Court of Appeals squarely held that the United States had reserved water for an Indian Reservation which had been created by executive order.

It is unnecessary, for the purposes of this case, to explore the origin or limits of such power to reserve water against subsequent appropriators. The authorities cited above sufficiently sustain the validity of such a reservation to preserve the Indians' rights here under consideration.

The question to be decided, therefore, as to each Indian Reservation which can divert water from the mainstream of the Colorado River is whether the United States exercised the power to reserve such water for the Reservation's future needs. As stated in the *Walker River* case, 104 F. 2d, at 336:

> "The power of the Government to reserve the waters and thus exempt them from subsequent appropriation by others is beyond debate.... The question is merely whether in this instance the power was exercised."

The United States need not expressly reserve waters for the benefit of an Indian Reservation; an implied reservation is effective. Indeed, in all of the cases cited above, including *Winters* v. *United States* itself, the intent to reserve water was never explicitly stated at the time the Indian Reservation was established; rather that intent was implied from the circumstances surrounding the creation of the Reservation. In the present case I have found that the

United States intended to reserve mainstream water for the reasonable future needs of the following Indian Reservations: Chemehuevi, Cocopah, Yuma, Colorado River and Fort Mohave. As to each it is apparent that it was intended that the Indians would settle on the Reservation land and develop an agricultural economy. The land, however, is too arid to support such an economy without irrigation from the Colorado River. It would be unconscionable for the United States to have coerced or induced Indians onto a Reservation without providing the water necessary to make the lands habitable. I refuse to accept this possibility as to any of the mainstream Indian Reservations since there is no evidence as to any of them that such was the case. As the Court of Appeals stated in the *Walker River* case, at page 339: "It would be irrational to assume that the intent was merely to set aside the arid soil without reserving the means of rendering it productive."

Also, wherever I have found an intent to reserve water, I have inferred, absent evidence to the contrary, that the reservation was not limited to the needs of the population then resident upon the land, nor to the acreage being irrigated when the Reservation was created. I have concluded that enough water was reserved to satisfy the future expanding agricultural and related water needs of each Indian Reservation. Invariably the United States intended that the Indian tribes settled on a Reservation would remain there for generations, and the possibility that other Indians would be settled on the Reservation could not be excluded. Certainly the possibility of expanding populations, expanding agricultural development, and hence expanding water needs must have been apparent at the time each Reservation was created. It is unreasonable to attribute to the United States an intention or an expectation that the Indians would remain stagnant or die out when they were settled on a Reservation. Since the Indians could remain

on these Reservations and develop their society and economy only if water from the Colorado River was available to meet their future needs, I have found that the United States, when it reserved water, reserved it for all of such needs.

This conclusion comports with the holdings in the three cases decided by the Court of Appeals for the Ninth Circuit which are cited above. As that Court stated in *United States* v. *Ahtanum Irrigation District,* 236 F.2d 321, 327 (9th Cir. 1956):

> "It is plain from our decision in the *Conrad Investing Co.* case, *supra,* that the paramount right of the Indians to the waters of Ahtanum Creek was not limited to the use of the Indians at any given date but this right extended to the ultimate needs of the Indians as those needs and requirements should grow to keep pace with the development of Indian agriculture upon the reservation."

The conclusion reached here is also consistent with the holding in the *Winters* case that the upstream farmers could not interfere with uses on the Indian Reservation which were initiated subsequent to the farmers' diversions.

The suggestion is unacceptable that the United States intended that the Indians would be required to obtain water for their future needs by acquiring appropriative rights under state law. The Indians were not an agricultural people and it was necessary for them to develop their agricultural skills after settling on the Reservations. It must have been apparent that if they were thrown into competition with the more advanced non-Indians in a race to acquire rights to water by putting it to beneficial use, they would have lost the match before it was begun. Rather than assuming that the United States intended to put the Indians in the position of having to leave their Reservations as their water needs increased if they were unable to satisfy these needs by acquiring appro-

priative rights under state law, I have concluded that reservations of water by the United States included enough to supply expanding needs regardless of state water law.

This brings us to the question of quantity. This is sharply debated, and many conflicting views have been advanced. I have concluded that the United States effectuated the intention to provide for the future needs of the Indians by reserving sufficient water to irrigate all of the practicably irrigable lands in a Reservation and to supply related stock and domestic uses. The magnitude of the water rights created by the United States is measured by the amount of irrigable land set aside within a Reservation, not by the number of Indians inhabiting it. At the times of the creation of the five Indian Reservations in question, it was impossible to predict the future needs of the Indians who might inhabit them. Indeed, in some instances it was not clear which Indian tribes would ultimately be settled on a particular Reservation. What the United States did, in withdrawing public lands for these Indian Reservations, was to establish areas that could be used in the indefinite future to satisfy the needs of Indian tribes in the United States as those needs might develop. It follows from this that the United States intended to reserve enough water to make the lands productive, in other words, enough to irrigate all of the practicably irrigable acreage. Only by reserving water in this manner could the United States ensure that the Reservation lands would be usable when needed to support an Indian economy. This conclusion is also supported by the fact that the irrigable land originally withdrawn for each of the five Indian Reservations was considerably more extensive than was necessary to support the Indians who inhabited the Reservations immediately after their establishment. The only explanation for this withdrawal of excess irrigable acreage is that the United States intended it to be utilized in the future.

It must have been apparent that unless the United States reserved water for the land at the time of withdrawal, there might be no water left to appropriate at the time that the land was needed for the purposes for which it was withdrawn.

Arizona argues that the United States reserved water for the Indians themselves and not for the lands withdrawn for a Reservation. Arizona seems to envisage that the United States intended to create water rights in gross which would fluctuate in magnitude as the Indian population and needs fluctuated, the water right being measured by the amount of water needed at any particular time by the Indians actually inhabiting a particular Reservation. As pointed out above, the more sensible conclusion is that the United States intended to reserve enough water to irrigate all of the practicably irrigable lands on a Reservation and that the water rights thereby created would run to defined lands, as is generally true of water rights.

But even if Arizona were correct in her contention, the most feasible way to give full effect to the water rights created by the United States, as Arizona defines them, would be to decree to each Reservation enough water to irrigate all of the practicably irrigable acreage. It is clear that the water rights of the five Reservations in question cannot be fixed at present uses for this would defeat the basic purpose of reserving water to meet future requirements. Even if, as Arizona argues, the reservation of water was in gross for Indians and not Reservation lands, the Indians' needs may well increase in the future and these increased needs would have to be provided for. Thus, under the Arizona theory, there are two possible methods of framing the decree in this action, other than in terms of irrigable acreage.

One possibility would be to adopt an open-end decree, simply stating that each Reservation may divert at any

particular time all the water reasonably necessary for its agricultural and related uses as against those who appropriated water subsequent to its establishment. However, such a limitless claim would place all junior water rights in jeopardy of the uncertain and the unknowable. Financing of irrigation projects would be severely hampered if investors were faced with the possibility that expanding needs on an Indian Reservation might result in a reduction of the project's water supply. Moreover, it would not give the United States any certainty as to the extent of its reserved rights, which would undoubtedly hamper the United States in developing them. Since, under the Arizona theory, United States water rights vary with changes in Indian population, the planning of works to serve future needs would be difficult because the United States could never know whether sufficient water to operate the works economically would be legally available.

The other possibility, which would avoid the serious disadvantage of creating uncertainty as to the extent of the reserved rights, would be to predict the ultimate needs of each Reservation and to decree that much water for its future uses. The shortcoming of this solution, however, lies in the difficulty of predicting the future needs of Indian Reservations. Failure to foresee expanding requirements would result in a forfeiture of the Indians' water rights and would stultify development of the Reservations. Whether it is ever possible accurately to predict the future needs of an Indian Reservation, it is clearly not possible in this case where the attention of the parties has been directed to a great many complex and important issues quite apart from those relating to the Indians. Whatever might be possible in a case involving solely the issue of the reserved rights of a

single Indian Reservation,[5] it would not be possible to predict future Reservation needs in this litigation.

Therefore, the most feasible decree that could be adopted in this case, even accepting Arizona's contention, would be to establish a water right for each of the five Reservations in the amount of water necessary to irrigate all of the practicably irrigable acreage on the Reservation and to satisfy related stock and domestic uses. This will preserve the full extent of the water rights created by the United States and will establish water rights of fixed magnitude and priority so as to provide certainty for both the United States and non-Indian users.

The amount of water reserved for the five Reservations, and the water rights created thereby, are measured by the water needed for agricultural, stock and related domestic purposes. The reservations of water were made for the purpose of enabling the Indians to develop a viable agricultural economy; other uses, such as those for industry, which might consume substantially more water than agricultural uses, were not contemplated at the time the Reservations were created. Indeed, the United States asks only for enough water to satisfy future agricultural and related uses. This does not necessarily mean, however, that water reserved for Indian Reservations may not be used for purposes other than agricultural and related uses. The question of change in the character of use is not before me. I hold only that the amount of water reserved, and hence the magnitude of the water rights created, is determined by agricultural and related requirements, since when the water was reserved that was the purpose of the reservation.

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[5]Even in such cases, courts have not attempted to bind the Indians on the basis of a prediction as to future needs. See Conrad Investment Co. v. United States, 161 Fed. 829 (9th Cir. 1908).

The water rights established for the benefit of the five Indian Reservations and enforced in the recommended decree are similar in many respects to the ordinary water right recognized under the law of many western states: They are of fixed magnitude and priority and are appurtenant to defined lands. They may be utilized regardless of the character of the particular user. Thus Congress has provided for the leasing of certain Reservation lands to non-Indians,[6] and these lessees may exercise the water rights appurtenant to the leased lands. *Skeem* v. *United States,* 273 Fed. 93, 96 (9th Cir. 1921). The measurement used in defining the magnitude of the water rights is the amount of water necessary for agricultural and related purposes because this was the initial purpose of the reservations, but the decree establishes a property right which the United States may utilize or dispose of for the benefit of the Indians as the relevant law may allow. See *United States* v. *Powers,* 305 U. S. 527 (1939).

[6]See 26 Stat. 794 (1891), 31 Stat. 229 (1900), 39 Stat. 128 (1916), 41 Stat. 1232 (1921) and, the general leasing statute presently in force, 69 Stat. 539 (1955), 25 U. S. C. § 415 (Supp. 1959), 25 U. S. C. §§ 415a-d (1958).

1. *Chemehuevi Indian Reservation*

FINDINGS OF FACT

1. The Chemehuevi Indian Reservation was established by an order of withdrawal from entry made by the Secretary of the Interior dated February 2, 1907.[7]

2. In withdrawing lands for the Chemehuevi Indian Reservation the United States intended to reserve rights to the use of so much water from the Colorado River as would be necessary to irrigate all of the practicably irrigable acreage therein and to satisfy related uses.[8]

3. There are 1,900 acres of irrigable Reservation land all located within the State of California which, together with related uses, have a maximum annual diversion requirement of 11,340 acre-feet.[9]

CONCLUSION OF LAW

For the benefit of the Chemehuevi Indian Reservation, the United States has the right to the annual diversion of a maximum of 11,340 acre-feet of water from the Colorado River or to the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 1,900 acres and for the satisfaction of related uses, whichever is less, with a priority of February 2, 1907.

2. *Cocopah Indian Reservation*

FINDINGS OF FACT

1. The Cocopah Indian Reservation was established by an Executive Order of September 27, 1917.[10]

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[7]U. S. Ex. 1201. This withdrawal was made pending congressional approval. Although the United States has not furnished evidence of such congressional action, I have assumed, absent evidence to the contrary, that approval was given.

[8]U. S. Exs. 1201, 1204, 1205, 1207.

[9]U. S. Ex. 1210.

[10]U. S. Ex. 1001.

2. In withdrawing lands for the Cocopah Indian Reservation the United States intended to reserve rights to the use of so much water from the Colorado River as would be necessary to irrigate all of the practicably irrigable acreage therein and to satisfy related uses.[11]

3. Colorado River water is delivered to the Reservation lands through the facilities of the Yuma Reclamation Project.[12]

4. There are 431 acres of irrigable Reservation land all located within the State of Arizona which, together with related uses, have a maximum annual diversion requirement of 2,744 acre-feet.[13]

CONCLUSION OF LAW

For the benefit of the Cocopah Indian Reservation, the United States has the right to the annual diversion of a maximum of 2,744 acre-feet of water from the Colorado River or to the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 431 acres and for the satisfaction of related uses, whichever is less, with a priority of September 27, 1917.

3. *Yuma Indian Reservation*

FINDINGS OF FACT

1. The Yuma Indian Reservation was established by an Executive Order of January 9, 1884.[14]

2. In withdrawing lands for the Yuma Indian Reservation the United States intended to reserve rights to the use

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[11]*Ibid.*, U. S. Exs. 258, pp. 386-387; 510, p. 301; 513, p. 152.
[12]Tr. 14020 (Rupkey); U. S. Ex. 1006.
[13]U. S. Ex. 1009.
[14]U. S. Ex. 1101.

of so much water from the Colorado River as would be necessary to irrigate all of the practicably irrigable acreage therein and to satisfy related uses.[15]

3. There are 7,743 acres of irrigable Reservation land all located within the State of California which, together with related uses, have a maximum annual diversion requirement of 51,616 acre-feet.[16]

CONCLUSION OF LAW

For the benefit of the Yuma Indian Reservation, the United States has the right to the annual diversion of a maximum of 51,616 acre-feet of water from the Colorado River or to the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 7,743 acres and for the satisfaction of related uses, whichever is less, with a priority of January 9, 1884.

4. *Colorado River Indian Reservation*

FINDINGS OF FACT

1. The Colorado River Indian Reservation was established by an Act of March 3, 1865 (13 Stat. 541, 559) which set apart 75,000 acres in the Territory of Arizona for an Indian Reservation.[17]

2. By an Executive Order of November 22, 1873, adjoining bottom lands in the Territory of Arizona were added to the Reservation.[18]

3. By an Executive Order of November 16, 1874, the Reservation was enlarged to include lands on the westerly side

[15] *Ibid.*, U. S. Exs. 258, p. 387; 512, p. 20.
[16] U. S. Ex. 1121.
[17] U. S. Ex. 501.
[18] U. S. Ex. 503.

of the Colorado River in the State of California. The boundaries were defined as follows:

> "Beginning at a point where the La Paz Arroyo enters the Colorado River, 4 miles above Ehrenberg; thence easterly with said arroyo to a point south of the crest of La Paz Mountain; thence with said crest of mountain in a northerly direction to the top of Black Mountain; thence in a northwesterly direction across the Colorado River to the top of Monument Peak, in the State of California; thence southwesterly in a straight line to the top of Riverside Mountain, California; thence in a southeasterly direction to the point of beginning. . . ."[19]

4. On January 31, 1876, the United States Indian Agent reported to the Commissioner of Indian Affairs that the boundaries as defined by the Executive Order of 1874 crossed the Colorado River twice and cut off a large tract of land on the east side of the River which was being settled by non-Indians for unlawful and improper purposes. The Agent requested that an Executive Order be obtained making the Colorado River the boundary line. The Commissioner of Indian Affairs and the Secretary of the Interior approved the recommendation that the boundary be redefined.[20]

5. Thereafter, on May 15, 1876, an Executive Order issued which redefined the boundaries of the Reservation and which contained the following description of the western boundary:

> ". . . thence southwesterly in a straight line to the top of Riverside Mountain, California; thence in a direct line toward the place of beginning *to the*

[19]U. S. Ex. 504.
[20]U. S. Exs. 505A, 505B, 505C.

west bank of the Colorado River; thence down said west bank to a point opposite the place of beginning. . . ." (italics added)[21]

6. The southern boundary of the Reservation was subsequently adjusted by an Executive Order of November 22, 1915.[22]

7. In withdrawing lands for the Colorado River Indian Reservation the United States intended to reserve rights to the use of so much water from the Colorado River as would be necessary to irrigate all of the practicably irrigable acreage therein and to satisfy related uses.[23]

8. Except at one point, the Colorado River now flows east of its 1876 course.[24]

9. The "Olive Lake Cut-off" was constructed across the neck of a large loop in the existing channel of the Colorado River in 1920. By 1921, the entire river flow passed through the new channel.[25]

10. As a result of this cut-off the River now flows east of its 1920 course.[26]

11. There are 2,058 acres of irrigable Reservation land lying west of the present west bank of the Colorado River and east of the west bank of the River as it existed in 1920 prior to the "Olive Lake Cut-off."[27]

12. The "Ninth Avenue Cut-off" was constructed across the neck of a loop in the existing channel of the Colorado

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[21]U. S. Ex. 505.
[22]U. S. Ex. 506.
[23]See U. S. Exs. 501, 503-507, 513.
[24]See U. S. Ex. 560.
[25]Tr. 20121-20128 (Engle).
[26]U. S. Ex. 592.
[27]Tr. 20211-20212 (Rupkey); U. S. Ex. 592.

River in 1943. By February, 1944, 80-90% of the River flowed through the cut and, after August 1944, substantially all of the river flow passed through the new channel. As a result of this cut-off the River now flows east of its 1943 course.[28]

13. There are 222 acres of irrigable Reservation land lying west of the present west bank of the Colorado River and east of the west bank of the River as it existed in 1943 prior to the "Ninth Avenue Cut-off."[29]

14. There are 5,933 acres of irrigable Reservation land in the Northern West Side Area to the north of the intersection of the Reservation's westerly boundary and the west bank of the Colorado River.[30]

15. Thus there is an aggregate of 8,213 acres of irrigable Reservation land west of the present west bank of the Colorado River which, together with related uses, have a maximum annual diversion requirement of 54,746 acre-feet.[31]

16. There are 99,375 acres of irrigable Reservation land east of the present west bank of the Colorado River which, together with related uses, have a maximum annual diversion requirement of 662,402 acre-feet.[32]

17. Thus there is an aggregate of 107,588 acres of irrigable Reservation land which, together with related uses, have a maximum annual diversion requirement of 717,148 acre-feet.

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[28]Tr. 20171-20181 (Wilson); U. S. Exs. 590-592.
[29]Tr. 20215 (Rupkey); U. S. Ex. 592.
[30]Calif. Ex. 3546; U. S. Ex. 570.
[31]*Ibid.*
[32]*Ibid.* This includes 461 acres of land formed by accretion. Tr. 20216 (Rupkey); U. S. Ex. 592.

CONCLUSIONS OF LAW

1. The Executive Order of 1876 established the west bank of the Colorado River as the western boundary of the Colorado River Indian Reservation.

2. The Executive Order of 1876 established a boundary which changes as the course of the Colorado River changes, except when such changes are due to avulsion.

3. In the case of avulsion, the boundary remains at the west bank of the River as it existed immediately prior to the avulsive change.

4. The west bank, along which the boundary line is drawn, is the fast land along the west side of the Colorado River which serves to confine the waters within the bed and tends to preserve the course of the River. In the case of avulsion, the west bank, along which the boundary line is drawn, is the fast land along the west side of the former course of the River which served to confine the waters within the bed and tended to preserve the course of the River immediately prior to the avulsive change.

5. The 1920 "Olive Lake Cut-off" was an avulsion and worked no change in the western boundary of the Colorado River Indian Reservation.

6. The 1943 "Ninth Avenue Cut-off" was an avulsion and worked no change in the western boundary of the Colorado River Indian Reservation.

7. For the benefit of the Colorado River Indian Reservation, the United States has the right to the annual diversion of a maximum of 717,148 acre-feet of water from the Colorado River or to the quantity of mainstream water necessary to supply the consumptive use required for irriga-

tion of 107,588 acres and for the satisfaction of related uses, whichever is less, with priority dates of March 3, 1865 for lands reserved by the Act of March 3, 1865 (13 Stat. 541, 559); November 22, 1873, for lands reserved by the executive order of said date; November 16, 1874, for lands reserved by the executive order of said date, except as later modified; May 15, 1876 for lands reserved by the executive order of said date; November 22, 1915 for lands reserved by the executive order of said date.[33]

BOUNDARY DISPUTE—OPINION

A dispute concerning a portion of the west boundary of the Colorado River Indian Reservation arose between the United States and California when the United States sought to establish irrigable acreage within that Reservation. An Executive Order of May 15, 1876,[34] established the "west bank of the Colorado River" as the boundary of the Reservation. The United States contends that this language established a permanent, unchanging boundary defined by the west bank of the River as it existed in 1876.[35] California contends that the language established a changing boundary, defined by the west bank of the River as it may exist at any point of time.[36] Since the Colorado River has in this area moved eastward since 1876, California's contention, if sustained, would reduce the amount of irrigable acreage within the Reservation below the amount claimed by the United States.

In the alternative, the United States contends that if the west bank of the River as it presently exists is held to be the correct boundary, then certain land west of the present

[33]The evidence does not permit greater specificity regarding priority.
[34]U. S. Ex. 505.
[35]U. S. Brief, pp. 31-35.
[36]Calif. Proposed Findings and Conclusions 18D: 112-18D: 209.

west bank should nevertheless be held to be within the Reservation, since two changes in the course of the river were caused by avulsion. The United States points to two artificial changes made in the channel of the River, both of which eliminated large loops or horseshoes in the river and caused its channel to move to the east. If the United States contention is accepted, the irrigable acreage in the Reservation will be somewhat greater than California concedes.

I hold that California is correct in its assertion that the present boundary of the Reservation is the west bank of the River as it now exists, but that the United States is correct in claiming that the two artificial channel changes were avulsive and that such changes did not affect the Reservation's western boundary.

The call in the Executive Order of 1876 "to the west bank of the Colorado River; thence down said west bank" clearly established the west bank of the River as the boundary line. *Alabama* v. *Georgia,* 64 U. S. (23 How.) 505 (1859); *Howard* v. *Ingersoll,* 54 U. S. (13 How.) 380 (1851). That bank is defined as the fast land along the west side of the Colorado River which serves to confine the waters within the bed and tends to preserve the course of the River.[87] See *Oklahoma* v. *Texas,* 260 U. S. 606, 631-32 (1923); *Howard* v. *Ingersoll, supra,* at 416.

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[87]The United States claims 1800 acres lying on the west side of the present channel of the River but east of the 1876 west bank (*i.e.* the lands in question lie roughly between the old channel and the present channel of the River). This contention seems to be based on the proposition that the 1876 west bank and the present west bank are the same, because in an unregulated state, the River would extend to the 1876 line. See U. S. Finding 4.4.102; Tr. 20068-20069. However, it is clear that the flow of the River does not now in fact extend to the 1876 line. *Id.* See also U. S. Exs. 560, 562. Since "bank" is defined as the fast land that serves to confine the waters of the stream to its bed, the 1876 line does not represent the present west bank of the River. Hence the 1800 acres, which lie west of the present west bank of the River, are outside the boundaries of the Reservation, and the claim of water therefor is disallowed.

It is equally clear that the boundary established along the west bank changes as the course of the River changes, except in cases of avulsion. In *Oklahoma* v. *Texas, supra,* the Court defined the south bank of the South Fork of the Red River, which was the boundary between Oklahoma and Texas. After setting forth its definition of the south bank the Court said:

> "The boundary as it was in 1821, when the treaty became effective, is the boundary of today, subject to the right application of the doctrine of erosion and accretion and of avulsion to any intervening changes."[38]

There is substantial evidence that the Executive Order of 1876 did not intend to establish a fixed boundary and, certainly, a flexible boundary is not inconsistent with the purpose of the Order, which was to prevent the acquisition by non-Indians of land proximate to Indian land on the east side of the River.[39] The evidence establishes that various officers and departments of the United States have considered the Colorado River itself and not the 1876 meander line to be the western boundary of the Reservation.[40]

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[38]260 U. S., at 636. *Cf.* Railroad Co. v. Schurmeir, 74 U. S. (7 Wall.) 272 (1868); United States v. Boynton, 53 F.2d 297 (9th Cir. 1931); United States v. 11,993.32 Acres of Land More or Less, 116 F. Supp. 671 (D. N. D. 1953).

[39]See U. S. Exs. 505A, 505B, 505C.

[40]Various maps prepared by agencies of the United States (General Land Office; Office of Indian Affairs; Indian Irrigation Service) show no Indian land west of the River in the disputed area. Calif. Exs. 3532-3534.

In acquiring land for the construction of Palo Verde Dam, the Palo Verde Irrigation District was required by Congress to furnish easements over land other than that owned by the United States or within the Reservation. The United States was required to pay for Indian land conveyed by the Secretary of the Interior. 68 Stat. 1045 (1954). A portion of the land over which an easement was granted by Palo Verde lay east of the 1876 meander line and west of the course of the River. A portion of the land paid for by the United

Evidence of such an understanding by officers and departments of the United States may properly be considered in determining the intent of the Executive Order of 1876. See *Stewart* v. *United States,* 316 U. S. 354 (1942); *cf. United States* v. *Hill,* 120 U. S. 169 (1887). In *Stewart* v. *United States,* Mr. Justice Roberts, in interpreting the extent of a Mexican grant under which the United States claimed title, considered various maps and charts prepared by United States officers and departments subsequent to the grant as probative of the amount of land to which the United States obtained title.

Finally, the understanding of the various officers and departments of the United States that the 1876 Executive Order did not establish a fixed boundary at the 1876 meander line was apparently shared by the defendant Palo Verde Irrigation District which has, for various periods of time beginning in 1927, assessed lands within the disputed area for purposes of taxation.[41] It is also worthy of note that no evidence was introduced to demonstrate that the United States has ever asserted title to the area in controversy prior to this litigation.

It having been concluded that the west bank of the River, as presently located, is the boundary of the Reservation, the question arises of avulsive changes in the course of the River since 1876. An avulsive change is a sudden,

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States and conveyed by the Secretary lay west of the 1876 meander line and east of the course of the River. Tr. 20269-20274; Calif. Exs. 3535-3537. It is at this point that the River flows west of the 1876 meander line. Calif. Ex. 3537.

In 1934 the California Department of Public Works obtained a right of way for construction of what later became United States Highway 95. Although the State was required to pay for Indian land traversed by the project, California was not required to pay for land lying in the disputed area. The United States officials involved in the various stages of the transaction were the Secretary of Agriculture, the Secretary of the Interior, the Commissioner of the General Land Office and the Superintendent of the Colorado River Indian Agency. Tr. 20305-20309; Calif. Exs. 3543-3543G.

[41]Tr. 20435-20439 (Shipley); Calif, Ex. 3547.

perceptible change in the course of a river; it does not affect existing boundaries. See, e.g., *Missouri* v. *Nebraska,* 196 U. S. 23 (1904); *Nebraska* v. *Iowa,* 143 U. S. 359 (1892). The doctrine of avulsion includes both natural changes in course and changes caused by artificial means. *Arkansas* v. *Tennessee,* 246 U. S. 158, 173 (1918); *cf. County of St. Clair* v. *Lovingston,* 90 U. S. (23 Wall.) 46, 68 (1874).

The United States seeks to invoke the doctrine of avulsion with respect to two artificial changes in the course of the Colorado River in the area in question. I find that in the period 1920-1921, a man-made change in the Olive Lake reach of the River caused the River to change course to the east, and I further find that a similar artificial change in the course of the River was made in the period 1943-1944 by the so-called "Ninth Avenue Cut-Off" in the Palo Verde Valley. Both of these changes being avulsive, the land that now lies west of the present west bank of the River but east of the west bank as it existed before these changes occurred is Reservation land and should be counted in determining the amount of irrigable acreage within the Reservation.

With reference to these avulsive changes, California requests that the findings, conclusions and decree specifically disclaim any intention to pass on land titles of occupants of these areas. Of necessity, a determination of the amount of irrigable acreage within the Reservation and the consequent award of a quantity of water based on this determination requires adjudication of the boundaries of the Reservation. The findings herein made are therefore binding on the parties. Nevertheless, in the hearings and in this Report, I did not inquire into or determine the right of any occupant, whoever he might be, to the possession of lands within the questioned areas.

5. *Fort Mohave Indian Reservation*

FINDINGS OF FACT

1. The Hay & Wood Military Reserve at Camp Mohave was created by an Executive Order of March 30, 1870, as follows:

> "The reservations at Camps *Mojave, Verde, Date Creek, McDowell, Grant, Bowie* and *Crittenden,* Arizona, as described in the accompanying plats and notes of survey—approved by the *Secretary of War,* are made for military purposes, and the *Secretary of the Interior* will cause the same to be noted in the General Land Office to be reserved as military posts."[42]

2. The western boundary of the Reserve was defined by the notes of survey as follows:

> "Thence S. 76° 17′ 28″ W.228.50 chains to a post marked U. S. in mound of earth near the left bank of the Colorado River. Thence N.23° 01′ 32″ W.362.70 chains to a post marked U. S. in a mound of earth near the left bank of the Colorado River. Thence S.88° 45′ 32″ E.369.00 chains to the post at the point of commencement. The said boundaries containing 9114.81 acres, more or less."[43]

3. When laid out, the call to the artificial monuments and the calls for specified courses and distances conflict. Adherence to the latter would require a boundary line in the foothills to the west of the Colorado River. The call to monuments would fix a line at or near the left or east bank of the River.[44]

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[42]U. S. Ex. 1323.

[43]*Ibid.*

[44]Tr. 20240; Calif. Ex. 2616, pp. 8-9.

4. An Executive Order of September 18, 1890, transferred the Fort Mohave Military Reservation, which included the Hay & Wood Military Reserve, to the Department of the Interior for Indian school purposes.[45] This Reservation is presently known as the Fort Mohave Indian Reservation.

5. An Executive Order of February 2, 1911, which superseded an Order of December 1, 1910, reserved additional lands for the Reservation.[46]

6. In 1896, pursuant to the Swamp and Overflowed Lands Act [9 Stat. 519 (1850); 43 U. S. C. §§ 982-984 (1958)], the United States conveyed lands to California, some of which lay in the area in dispute in this case. These lands were subsequently conveyed to private owners prior to 1928.[47]

7. In 1923, pursuant to the Act of July 27, 1866 (14 Stat. 292), the United States conveyed certain lands in the disputed area to the Southern Pacific Railroad.[48]

8. In 1928, the United States Field Surveying Service, under the direction of the General Land Office, surveyed the boundaries of the Fort Mohave Indian Reservation. The survey was approved by the General Land Office in 1931.[49]

9. The 1928 General Land Office survey resolved the conflict between the call to the monuments and the calls for specified courses and distances in favor of the former.[50]

10. The locations of the monuments defining the western boundary of the Hay & Wood Reserve, which now con-

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[45]U. S. Ex. 1303.
[46]U. S. Exs. 1304-1305.
[47]Calif. Ex. 3511.
[48]Tr. 20367-20369 (Pratt); Calif. Ex. 3512.
[49]Calif. Exs. 2611, 2616.
[50]Calif. Ex. 2616, pp. 4, 7-9.

stitutes part of the western boundary of the Fort Mohave Indian Reservation, were established by the 1928 General Land Office survey by reference to a survey map of the Reserve, dated 1870, and set forth in California Exhibit 3501.[51]

11. The 1870 map of the Hay & Wood Reserve, to which reference was made in surveying the western boundary of the Reserve in 1928, is one of the plats which accompanied the Executive Order of March 30, 1870.[52]

12. In withdrawing lands for the Fort Mohave Indian Reservation the United States intended to reserve rights to the use of so much water from the Colorado River as would be necessary to irrigate all of the practicably irrigable acreage therein and to satisfy related uses.[53]

13. There are 14,916 acres of irrigable Reservation land in the State of Arizona which, together with related uses, have a maximum annual diversion requirement of 96,416 acre-feet.[54]

14. There are 2,119 acres of irrigable land in the State of California and within the exterior boundaries of the Reservation as determined by the 1928 General Land Office survey, exclusive of the tract covered by the patents referred to in Finding 6. A portion of the 2,119 acres may be land which has accreted to patented land which was riparian to the Colorado River at the time of patent and such land shall not be included within the Reservation. The 2,119 acres, together with related uses, have a maximum annual diversion requirement of 13,698 acre-feet, said maximum diversion requirement to be reduced by the

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[51]Calif. Exs. 2616, pp. 3, 8-9; 3501.
[52]See Tr. 20343-20346 (Pratt); U. S. Ex. 1323.
[53]See U. S. Exs. 520, 1205, 1303-1305, 1308-1310.
[54]Calif. Ex. 3517; U. S. Ex. 1322.

quantity of 6.4 acre-feet per acre of irrigable accreted lands owned by owners of such patented lands.[55]

15. There are 1,939 acres of irrigable Reservation land in the State of Nevada which, together with related uses, have a maximum annual diversion requirement of 12,534 acre-feet.[56]

16. There is, in the aggregate, a maximum of 18,974 acres of irrigable Reservation land which, together with related uses, have a maximum annual diversion requirement of 122,648 acre-feet. There should be subtracted from this 18,974 acres of irrigable land the number of irrigable acres within the exterior boundaries of the Reservation as determined by the 1928 General Land Office survey that have accreted to patented lands and that are owned by the owners of such patented lands, and the diversion requirement of 122,648 acre-feet is to be reduced by the amount of 6.4 acre-feet per acre of such land that is irrigable.[56a]

CONCLUSIONS OF LAW

1. The General Land Office had jurisdiction to survey the boundaries of the Fort Mohave Indian Reservation.

2. The General Land Office survey of 1928 is conclusive as to the western boundary line of the Hay & Wood Reserve of the Fort Mohave Indian Reservation.

3. The call to artificial monuments prevails over conflicting calls for courses and distances or acreage specified in the notes of survey accompanying the Executive Order of March 30, 1870.

4. The General Land Office survey of 1928 adequately located the western boundary of the Hay & Wood Reserve

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[55]Calif. Ex. 3517; Tr. 20375-20376. See also Calif. Ex. 3515; U. S. Exs. 1320, 1322.

[56]Calif. Ex. 3517; U. S. Ex. 1322.

[56a]The evidence does not permit greater specificity regarding irrigable acreage.

by reference to the artificial monuments called for and, therefore, established the correct western boundary of that portion of the Fort Mohave Indian Reservation.

5. Lands lying between the correct western boundary of the Reserve and the Colorado River which have been patented pursuant to congressional authorization, as well as any accretions thereto to which the owners of such land may be entitled, shall not be included in the irrigable acreage of the Fort Mohave Indian Reservation.

6. For the benefit of the Fort Mohave Indian Reservation, the United States has the right to the annual diversion of a maximum of 122,648 acre-feet of water from the Colorado River or to the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 18,-974 acres and for the satisfaction of related uses, whichever is less, with priority dates of September 18, 1890, for lands transferred by the executive order of said date; February 2, 1911 for land reserved by the executive order of said date; provided, however, that lands conveyed to the State of California pursuant to the Swamp and Overflowed Lands Act [9 Stat. 519 (1850)], as well as any accretions thereto to which the owners of such land may be entitled, and lands patented to the Southern Pacific Railroad pursuant to the Act of July 27, 1866 (14 Stat. 292) shall not be included within the above described rights.[57]

BOUNDARY DISPUTE—OPINION

A dispute concerning the western boundary of the Hay & Wood Reserve of the Fort Mohave Indian Reservation arose when the United States attempted to establish irrigable acreage within the Reservation. The Hay & Wood

[57]The evidence does not permit greater specificity regarding priority.

Reserve was initially established as a military post by an Executive Order of 1870,[58] and the western boundary thereof was described in notes of survey accompanying the order. When laid out on the ground the calls in the notes of survey conflict. The call to artificial monuments in the notes of survey would place the western boundary on a line near the east bank of the Colorado River, but the call for courses and distances in the notes of survey would place the boundary farther west, in foothills west of the River. In 1928, a General Land Office survey resolved this conflict in favor of the call to the artificial monuments, thus establishing the boundary on the east side of the Colorado River. California contends that the 1928 survey correctly establishes the western boundary of the Hay & Wood Reserve portion of the Reservation.[59] The United States contends that the proper boundary is farther west, as prescribed by the calls for courses, distances and acreage given in the 1870 notes of survey.[60] The California contention is sustained. In my view the 1928 General Land Office survey is conclusive of the boundary location, and, in any event, the 1928 survey is the best evidence of the proper location of the boundary and, therefore, the correct boundary is as determined therein.

It has been established beyond question that a General Land Office survey, when made within the jurisdiction of that department, is conclusive and cannot be collaterally assailed. *United States* v. *Coronado Beach Co.,* 255 U. S. 472 (1921); *Stoneroad* v. *Stoneroad,* 158 U. S. 240 (1895); *Knight* v. *United States Land Assoc.,* 142 U. S. 161 (1891); *Cragin* v. *Powell,* 128 U. S. 691 (1888); *Smelting Co.* v. *Kemp,* 104 U. S. (14 Otto) 636 (1881);

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[58]U. S. Ex. 1323.

[59]Calif. Proposed Conclusion 18E:204.

[60]Memorandum of United States Re Fort Mohave Indian Reservation Boundary (December 1958) (*passim*); see U. S. Finding 4.5.8.

Beard v. *Federy,* 70 U. S. (3 Wall.) 478 (1865). In *Cragin* v. *Powell, supra,* the Court said:

> " . . . the power to make and correct surveys of the public lands belongs to the political department of the government and that, whilst the lands are subject to the supervision of the General Land Office, the decisions of that bureau in all such cases . . . are unassailable by the courts, except by a direct proceeding; and that the latter have no concurrent or original power to make similar corrections, if not an elementary principle of our land law, is settled by such a mass of decisions of this court that its mere statement is sufficient."[61]

It is equally clear that the 1928 survey was made within the jurisdiction of the General Land Office. At the time of the survey that department was vested with authority to supervise the surveying and sale of the public lands of the United States. Rev. Stat. § 453 (1875). Moreover, by Section 6 of the Act of April 8, 1864, the Congress provided that:

> " . . . hereafter, when it shall become necessary to survey any Indian or other reservations, or any lands, the same shall be surveyed under the direction and control of the general land-office, and as nearly as may be in conformity to the rules and regulations under which other public lands are surveyed."[62]

A General Land Office survey of an Indian Reservation made pursuant to this statute has been held not subject to collateral attack. *French* v. *United States,* 49 Ct. Cls. 337 (1914).

Even if the 1928 survey is not conclusive as to the correct western boundary of the Hay & Wood Reserve, it nevertheless constitutes the best and most substantial

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[61] 128 U. S., at 698-99.
[62] 13 Stat. 41 (1864); 25 U.S.C. § 176 (1958).

evidence of the western boundary as established by the Executive Order of March 30, 1870, and the accompanying notes of survey.

Because the description of the western boundary is internally inconsistent justification exists for resort to applicable rules of construction. These rules are clear. Generally, monuments, whether artificial or natural, prevail over courses and distances or acreage for the purpose of determining the location of a boundary,[63] and quantity is less reliable than any other element of description, particularly where the words "more or less" are added.[64] The 1928 Survey applied these principles, giving control to the call for monuments in the 1870 notes of survey. Thus, if the 1928 survey properly located these monuments, it correctly established the boundary of the Reservation.

The field notes of the 1928 survey[65] demonstrate that the surveyor, in attempting to establish the width of the Colorado River as of 1869 for purposes of locating the monuments, referred to "the official map" of the Hay & Wood Reserve. He then restored the monuments for the purposes of the survey with the aid of that "official map."[66] The "official map" could only have been the 1870 map of the Reserve which is California Exhibit 3501. The surveyor was aware of the 1869 survey upon which the 1870 map was based.[67] Indeed, he indicated knowledge of only one other survey[68] and that survey purports only to represent

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[63]United States v. Investment Co., 264 U. S. 206 (1924); Ayers v. Watson, 113 U. S. 594 (1885); Land Co. v. Saunders, 103 U. S. (13 Otto) 316 (1880); Higueras v. United States, 72 U. S. (5 Wall.) 827 (1864); Kruger & Birch Inc. v. DuBoyce, 241 F.2d 849 (3d Cir. 1957); County of St. Clair v. Lovingston, 90 U. S. (23 Wall.) 46, 62 (1874) (dictum); Patton on Titles §§ 149-50 (1957); 6 Thompson on Real Property § 3327 (1940).

[64]6 Thompson on Real Property § 3344 (1940).

[65]Calif. Ex. 2616.

[66]Calif. Ex. 2616, pp. 8-9.

[67]Calif. Ex. 2616, p. 3.

[68]*Ibid.*

certain lands in the State of Arizona.[69] Other evidence compels the conclusion that the "official map" (California Exhibit 3501) referred to in making the 1928 survey was the Fort Mohave plat accompanying the Executive Order of March 30, 1870.[70]

Because the 1928 General Land Office survey located the western boundary of the Reserve by reference to the map set forth as California Exhibit 3501, which map accompanied the Executive Order of March 30, 1870, it can safely be said that the 1928 survey adequately identified the location of the monuments and that the boundary line set forth therein is the correct western boundary of the Hay & Wood Reserve of the Fort Mohave Indian Reservation.

Manifestly, lands within the disputed area which have been patented pursuant to Congressional authorization cannot be considered as part of the irrigable acreage of the Reservation, title having passed from the United States. See *United States* v. *State Investment Co.*, 264 U. S. 206, 212 (1924).

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[69]Tr. 20326-20328 (Pratt); Calif. Ex. 3518.

[70]U. S. Ex. 1323.

The map is dated February 1870; the survey upon which it was based was made in 1869; and the letter requesting withdrawal, dated March 12, 1870, transmitted a plat of the Hay & Wood Reserve. *Ibid.* Moreover, California Exhibit 3501 was drawn by military engineers at the Head Quarters Department, California, and the letter requesting withdrawal was written by the United States Military Commander at San Francisco. In addition, the courses and distances and acreage specified in a table on the map correspond exactly to those set forth in the notes of survey accompanying the Executive Order of 1870. Tr. 20343-20344 (Pratt). *Compare* Calif. Ex. 3501 *with* U. S. Ex. 1323. Finally, the southwest and northwest corners of the tract shown on the map correspond to courses and distances specified in the notes of survey and the plat could be prepared from the description given in the notes of survey. Tr. 20344-20346 (Pratt).

6. *Coachella Indian Reservations*

FINDINGS OF FACT

1. An agreement between the Coachella Valley County Water District and the Secretary of the Interior provides:

> "After any major part of such irrigation distribution system and drainage works has been turned over to the District for care, operation and maintenance, the District shall deliver water to the lands within Improvement District No. 1 that are listed on Schedule A [the Indian lands] and that can be irrigated through such part of the system under the same conditions, rules, regulations, to the same extent, without discrimination, and for the same charges, including standby charges, as water is delivered by the District to other lands similarly located within the District. . . ."[71]

2. The agreement became effective upon the enactment of the Act of August 28, 1958. (72 Stat. 968)

3. There is no evidence that any major part of the extension of the irrigation system has been turned over to the District as provided in the agreement above cited.

4. There is no evidence that the District has repudiated the agreement or has in any way threatened to violate it.

CONCLUSION OF LAW

There is no controversy between the United States and the Coachella Valley County Water District with respect to an obligation to deliver water to the Indian Reservations within said District which requires adjudication at this time.

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[71]U. S. Ex. 2510C.

OPINION

The United States claims the right to the use of a certain quantity of Colorado River water, through the facilities of the Coachella Valley County Water District, for the irrigation of a specified number of irrigable acres of the Cabazon, Augustine and Torres-Martinez Indian Reservations located within the District.[72] This claim is based upon the Boulder Canyon Project Act, various federal statutes and several contracts to which the Coachella Valley County Water District is a party.

It is clear that the geographic relationship of these Reservations to the Colorado River—they are outside the River's drainage basin—leaves no room for a presumption, absent a specific showing, that the United States intended to reserve water from the Colorado River for use on these Reservations. Indeed, the United States does not rely on the "reservation" theory in claiming water for these Reservations.

The Boulder Canyon Project Act does not specifically invest the Coachella Reservations, or indeed any Indian Reservation, with rights to water from the Colorado River. Nor can any such rights be reasonably inferred from the Act's authorization of the Secretary of the Interior to deliver water to the Coachella Valley.

The same conclusion follows upon examination of two contracts between the Coachella Valley County Water District and the United States dated 1934 and 1947. The 1934 contract[73] provides for the construction of Imperial Dam and the All-American Canal for the benefit, *inter alia,* of lands within the Coachella Valley. The 1947 contract[74] provides for the construction of distribution and drainage

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[72]See U. S. Proposed Conclusion 4.9.
[73]Ariz. Ex. 36
[74]Calif. Ex. 309.

works for the benefit of lands within the Coachella Service Area. Neither of these contracts purports in any manner to deal with water rights of the Coachella Indian Reservations and they cannot form the basis for assertion of such rights.

The Act of August 25, 1950, 64 Stat. 470[75] is of no aid either. That statute directs the Secretary of the Interior to designate the lands of the Coachella Reservations which could be irrigated by the facilities of the Coachella Valley County Water District and authorizes him to enter into a contract with the District for the benefit of the Indian lands. The Act does not create rights to water in favor of the Indians; it merely serves as a preliminary step towards possible acquisition of rights. It is apparent, therefore, that up to and including 1950 the Coachella Reservations had no enforceable right to water from the Colorado River.

In 1957 the Coachella Valley County Water District entered into an agreement[76] with the Secretary of the Interior whereby the Secretary undertook to construct irrigation distribution works connected to the District's system to serve Indian lands designated by the Secretary. Paragraph 5 of the contract provides as follows:

> "After any major part of such irrigation distribution system and drainage works has been turned over to the District for care, operation, and maintenance, the District shall deliver water to the lands within Improvement District No. 1 that are listed on Schedule A and that can be irrigated through such part of the system under the same conditions, rules, and regulations, to the same extent, without discrimination, and for the same charges, . . . as water is delivered by the District to other lands similarly located within the District. . . ."

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[75]Calif. Ex. 254.
[76]U. S. Ex. 2510C.

The agreement was to become effective when the Congress authorized the Secretary to fulfill the obligations undertaken by him. Authorization was given by the Act of August 28, 1958.[77]

From the foregoing it is clear that rights of the Coachella Reservations to water from the Colorado River can be derived only from the 1957 contract between the Secretary and the District. But there has been no showing that the Indian distribution system has been constructed. Nor has it been established that "any major part of such irrigation distribution system . . . has been turned over to the District. . . ." The obligation of the District to deliver water to the Coachella Reservations under the contract with the Secretary, therefore, cannot be said to have matured. Thus, there is no occasion on the facts and circumstances presented for a determination of what rights may accrue to the Coachella Reservations should the District become obligated to deliver water to them in the future.

B. National Forests, Recreation Areas, Parks, Memorials, Monuments and Lands Administered By the Bureau of Land Management

The United States claims water rights for its "forests, parks, monuments, memorial, recreation area and lands under the jurisdiction of the United States Bureau of Land Management in the lower Colorado River Basin," both under state law and by reservation of water for each project when that project was established.[78] I have concluded that it is not necessary or appropriate to determine various water rights under state law in this litigation, see pages 216-218, *supra,* nor to determine water rights on

[77]72 Stat. 968.
[78]U. S. Brief, pp. 56-61.

tributaries other than the Gila River, see pages 318-321, 323-324, *infra*. The United States' interests on the Gila are disposed of in a subsequent section of this Report.

Therefore, it is necessary to treat here only the single national recreation area which presently diverts water from the Colorado River. Except for the Lake Mead National Recreation Area, no National Forests, Parks, Monuments, Memorials or lands administered by the Bureau of Land Management divert water from the mainstream of the Colorado River.[79] The United States does not claim water specifically from the Colorado River for any of its Forests, Parks, Monuments, Memorials, or lands administered by the Bureau of Land Management; rather it proposes conclusions of law to the effect that the United States establishments have rights to the water generally available in the Lower Basin.[80] I think it would be inappropriate to predict which of such federal establishments might attempt to utilize water from the mainstream in the future. It may well be that none of the others will ever need to use mainstream water and there would be no point in determining their rights to this water until it appears that it may be necessary to exercise those rights.

It is necessary to adjudicate the water rights of the Lake Mead National Recreation Area for the same reason that the rights of the mainstream Indian Reservations must be adjudicated. I conclude that the United States had the power to reserve water in the Colorado River for use in the Lake Mead National Recreation Area for the same reasons that it could reserve such water for Indian Reservations. Although the authorities discussed above which establish the reservation theory all involved Indian Reserva-

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[79]See U. S. Exs. 2700-2722, 2800-2821, 2900-2911; U. S. Proposed Conclusion 11.4.

[80]U. S. Proposed Conclusions 8.1, 9.1, 10.1.

tions, the principles seem equally applicable to lands used by the United States for its other purposes. If the United States can set aside public land for an Indian Reservation and, at the same time, reserve water for the future requirements of that land, I can see no reason why the United States cannot equally reserve water for public land which it sets aside as a National Recreation Area. *Cf. F.P.C.* v. *Oregon,* 349 U. S. 435 (1955). Certainly none of the parties has suggested a tenable distinction between the two situations.

In determining whether the United States intended to reserve water for the future reasonable needs of the Lake Mead National Recreation Area, I have followed the course outlined in regard to Indian Reservations. Since the purposes of the Recreation Area could not be fully carried out without the use of water from the mainstream of the Colorado River, I have found that the United States intended to reserve such water for use within the Recreation Area. Furthermore, having found that the United States intended to reserve water for the Area, I have assumed, since there is no evidence to the contrary, that the reservation was for reasonable future requirements. As in the case of Indian Reservations, it is not likely that the United States intended that any future development of the Area would have to depend on appropriative rights to water obtained under state law.

I have not set maximum limits on the amount of mainstream water that the Lake Mead National Recreation Area can consume as I did in the case of the Indian Reservations. First, it would be very difficult to predict accurately the future requirements of the Area. Indeed, even to attempt such a prediction would require more evidence than the parties have introduced in this litigation. Second, there is no need whatsoever to predict future needs or to put an outside limit on the amount of water that can be diverted from the mainstream. The pres-

ent consumption of water diverted from the mainstream on the Lake Mead National Recreation Area is less than 300 acre-feet per annum.[81] Furthermore, from all that appears, its future requirements, whatever they may precisely be, will be of the same general order of magnitude as present uses. Unlike the mainstream Indian Reservations, the potential future uses of the Recreation Area do not cast a cloud on the continuing availability of any appreciable amount of water. This being the case, I have concluded that it would be unwise to attempt to limit the Area to a specific quantity of mainstream water for its future needs.

FINDINGS OF FACT

1. The Lake Mead National Recreation Area in Arizona and Nevada is the only one of the National Forests, Parks, Recreation Areas, Monuments, Memorials and lands administered by the Bureau of Land Management currently diverting water from the mainstream of the Colorado River in the Lower Basin.[82]

2. Executive Orders dated May 3, 1929 (No. 5105) and April 25, 1930 (No. 5339) withdrew lands in Arizona and Nevada pending determination as to the advisability of including such lands in a national monument. In 1936, the Congress appropriated funds for the operation of the Boulder Canyon Project Area which included these lands. 49 Stat. 1794. Lake Mead National Recreation Area was established on the basis of agreements between the Bureau of Reclamation and the National Park Service, dated October 13, 1936 and July 18, 1947, governing administration of the Boulder Canyon Project Area.[83]

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[81]U. S. Ex. 2802.
[82]See U. S. Exs. 2700-2722, 2800-2821, 2900-2911.
[83]U. S. Ex. 2802.

3. In withdrawing lands now constituting the Lake Mead National Recreation Area the United States intended to reserve rights to the use of so much water from the Colorado River as might thereafter be reasonably needed by the National Park Service for appropriate purposes.[84]

4. There is not sufficient evidence to make a finding of the ultimate water requirements of the Lake Mead National Recreation Area in Arizona and Nevada.

CONCLUSION OF LAW

The United States has the right to divert water from the mainstream of the Colorado River in quantities reasonably necessary to fulfill the purposes of the Lake Mead National Recreation Area in Arizona and Nevada with priority dates of May 3, 1929, for lands reserved by the executive order of said date (No. 5105), and April 25, 1930, for lands reserved by the executive order of said date (No. 5339).

C. United States Obligations Under the Mexican Water Treaty and Treaties for the Protection of Wildlife

Pursuant to a treaty between the United States and Mexico, dated February 3, 1944,[85] the United States is obligated to deliver to Mexico 1,500,000 acre-feet of water per annum in the limitrophe section of the Colorado River.[86] All of the parties to this litigation concede, as they must, that the Secretary may deliver this amount of water from the mainstream.

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[84]Executive Order 5105 (May 3, 1929); Executive Order 5339 (April 25, 1930); 49 Stat. 1794 (1936).

[85]59 Stat. 1219 (1945), Ariz. Ex. 4.

[86]This obligation may vary in certain circumstances; it is more precisely defined in Articles 10, 11 and 15 of the treaty.

The treaty obligation has priority over other water rights in the Basin. If the United States, in fulfilling this treaty obligation, divests water rights, compensation may be due. In this connection, however, Article III(c) of the Compact may be significant.[87] The question of compensation is not before me because there has been no claim of a taking under the treaty.

The United States also claims the right to divert certain quantities of water from the Colorado River for use on the Havasu Lake National Wildlife Refuge, the Imperial National Wildlife Refuge and the proposed Cibola Valley Waterfowl Management Area. The United States urges that these refuges and management areas were or will be established in fulfillment of its treaty obligations under a Convention dated August 16, 1916, between the United States and Great Britain for the protection of migratory birds[88] and a Convention dated February 7, 1936 between the United States and Mexico for the protection of migratory birds and game mammals.[89] Congress has enacted legislation to give effect to both of these Conventions.[90] The Executive Orders establishing the several

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[87]Article III(c) provides:

> "If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River System, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then, the burden of such deficiency shall be equally borne by the Upper Basin and the Lower Basin, and whenever necessary the States of the Upper Division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d)."

[88]39 Stat. 1702 (1916), U. S. Ex. 2601.

[89]50 Stat. 1311 (1937), U. S. Ex. 2605.

[90]40 Stat. 755 (1918), U. S. Ex. 2602; 45 Stat. 1222 (1929), U. S. Ex. 2603; 49 Stat. 1555 (1936), U. S. Ex. 2606.

refuges are detailed in the Findings of Fact which conclude this section of the Report.

Although the United States undoubtedly has the power to take property, including water rights, in order to fulfill its treaty obligations, there is no indication that it has chosen to do so in order to operate the two wildlife refuges currently diverting water from the Colorado River. The Executive Orders creating these refuges simply reserve public lands owned by the United States for use as a wildlife refuge. Nothing in these orders purports to authorize the Secretary of the Interior to utilize water from the Colorado River previously appropriated by others.

Rather, the intention of the United States, as expressed in the Executive Orders, was to reserve enough of the unappropriated water available in the River to satisfy the reasonable requirements of the Refuges. I have previously concluded that the United States had the power to reserve unappropriated water in the Colorado River for the future requirements of Indian Reservations and a National Recreation Area and I can perceive no material distinction between them and wildlife refuges. Furthermore, it is abundantly clear that the Havasu Lake National Wildlife Refuge and the Imperial National Wildlife Refuge could not successfully be operated without diverting water from the Colorado River. Thus I find that the United States intended to reserve water from the mainstream for the reasonable future needs of these Refuges.

The United States suggests that it will need to divert no more than 41,839 acre-feet of water per annum and consumptively use no more than 37,339 acre-feet per annum for the Havasu Refuge. The United States also suggests it will need to divert no more than 28,000 acre-feet per annum and consumptively use no more than 23,000 acre-feet per annum for the Imperial Refuge. I find that diver-

sions and consumptive use in these amounts are reasonably necessary for the operation of the Refuges and that the necessary water was reserved by the United States for the Refuges when they were created. Thus I hold that the United States may divert and consume the stated quantities of water from the Colorado River as against all appropriations made subsequent to the dates that the water was reserved. If the United States requires water appropriated by others before these Refuges were created, it will have to take the necessary steps to acquire it.

Since lands within the proposed Cibola Valley Waterfowl Management Area have not as yet been withdrawn for this purpose, the United States has not reserved water for use on this management area.

1. *Havasu Lake National Wildlife Refuge.*

FINDINGS OF FACT

1. An Executive Order of January 22, 1941 (No. 8647) established the Havasu Lake National Wildlife Refuge and set apart approximately 37,370 acres of land owned by the United States in Mohave and Yuma Counties, Arizona and San Bernardino County, California, as a refuge and breeding ground for migratory birds and other wildlife.[91]

2. On February 11, 1949, the Assistant Secretary of the Interior, by Public Land Order 559, added approximately 1,677 acres in Arizona and approximately 1,080 acres in California to the Havasu Lake National Wildlife Refuge.[92]

3. In withdrawing lands for the Havasu Lake National Wildlife Refuge the United States intended to reserve rights

[91]U. S. Ex. 2607.
[92]U. S. Ex. 2610.

to the use of so much water from the Colorado River as might be reasonably needed to fulfill the purposes of the Refuge.[93]

4. The Fish and Wildlife Service of the United States Department of Interior has formulated a development plan for the Havasu Lake National Wildlife Refuge.[94]

5. Annual diversions of 41,839 acre-feet and annual consumptive use of 37,339 acre-feet of water from the Colorado River will satisfy the estimated water requirement of the development plan for the Havasu Lake National Wildlife Refuge.[95]

CONCLUSION OF LAW

The United States has the right to the annual diversion of a maximum of 41,839 acre-feet or to the annual consumptive use of 37,339 acre-feet (whichever is less) of water from the Colorado River for use in the Havasu Lake National Wildlife Refuge, with a priority of January 22, 1941 as to land reserved by Executive Order No. 8647, and a priority of February 11, 1949 as to land reserved by Public Land Order 559.

2. *Imperial National Wildlife Refuge.*

FINDINGS OF FACT

1. An Executive Order of February 14, 1941 (No. 8685) established the Imperial National Wildlife Refuge and set apart approximately 51,090 acres of land owned by the United States in Yuma County, Arizona and Imperial

[93]U. S. Exs. 2607, 2610; see U. S. Exs. 2601-2603; 2605-2606.
[94]U S. Ex. 2618.
[95]U. S. Ex. 2619.

County, California, as a refuge and breeding ground for migratory birds and other wildlife.[96]

2. In withdrawing lands for the Imperial National Wildlife Refuge the United States intended to reserve rights to the use of so much water from the Colorado River as might be reasonably needed to fulfill the purposes of the Refuge.[97]

3. The Fish and Wildlife Service of the United States Department of Interior has formulated a development plan for the Imperial National Wildlife Refuge.[98]

4. Annual diversions of 28,000 acre-feet and annual consumptive use of 23,000 acre-feet of water from the Colorado River will satisfy the estimated water requirement of the development plan for the Imperial National Wildlife Refuge.[99]

CONCLUSION OF LAW

The United States has the right to the annual diversion of a maximum of 28,000 acre-feet or to the annual consumptive use of 23,000 acre-feet (whichever is less) of water from the Colorado River for use in the Imperial National Wildlife Refuge with a priority of February 14, 1941.

D. United States Water Rights Limited by Each State's Apportionment

It has previously been concluded that consumptive uses of mainstream water by the United States on federal establishments are chargeable to the state within which the use occurs. See pages 247-248, *supra*. As a corollary to this proposition, I have also concluded that United States' uses

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[96]U. S. Ex. 2608.
[97]*Ibid;* see U. S. Exs. 2601-2603.
[98]Tr. 15693 (Taylor); U. S. Ex. 2621.
[99]U. S. Ex. 2621; Tr. 15,737 (Taylor).

in each state are limited by the apportionment to the state in which the uses occur.[1] Thus the United States receives water in accordance with its priorities, and if the state apportionment is insufficient to satisfy all uses within the state, including federal uses, junior rights, whether acquired under state or federal law, must yield to senior rights within the state. In other words, United States projects must be fitted into a schedule of priorities along with other uses within a state, and the state's mainstream apportionment will be used to satisfy uses within the state, beginning with the senior priority. If the apportionment is not sufficient to satisfy all uses, junior priorities will not receive water.

This conclusion is required by the Project Act and the Secretary's water delivery contracts. The Project Act's limitation on California's consumption is written in terms of "the *aggregate* annual consumptive use . . . in the state of California," which language clearly includes all uses, both federal and state. Furthermore, the second paragraph of Section 4(a) contemplates a compact which apportions total consumptive use of mainstream water in the Lower Basin: Arizona is to receive 2.8 million acre-feet plus half of surplus and Nevada is to receive .3 million acre-feet. With California permitted (and expected) to take the other 4.4 million acre-feet of consumptive use plus half of surplus, total annual consumptive use is accounted for. See pages 174-177, 222-224, *supra*. Nothing is left out of the accounting; nothing remains, therefore, for the United States, except as its uses come within a state's apportionment. The Project Act, in short, contemplates a division of total uses among three parties, Arizona, California and Nevada. No separate provision is made for the United States. If Congress had intended the apportionment to be made among

[1]Such federal uses as constitute "present perfected rights" within the meaning of Section 6 are, like other perfected rights within the state, an exception to this rule.

four parties rather than the three it named, surely it would have said so.

As noted before, the Secretary's contracts substantially effectuate the apportionment authorized by Congress, and therefore should be construed in conformity with the congressional intent. Moreover, the Arizona contract, by its express terms, requires this result. Article 7(1) of the contract provides as follows: "All consumptive uses of water by users in Arizona, of water diverted from Lake Mead or from the mainstream of the Colorado River below Boulder [Hoover] Dam, whether made under this contract or not, shall be deemed, when made, a discharge pro tanto of the obligation of this contract." This provision requires federal uses in Arizona to be limited by the contractual apportionment. The Secretary, having apportioned total consumptive use of mainstream water among the three states, has safeguarded himself by this contract provision, which says in substance: the contract apportionment is the maximum that can be consumed in Arizona, whoever the user may be, whether or not a contractee.

Although the Nevada contract is not as explicit in limiting United States' uses to the state's apportionment as is the language of the California limitation and the Arizona contract, the Nevada contract was intended to carry out the apportionment contemplated by Congress and to correlate Nevada's apportionment to those of the other two states. Hence, the same result must follow as to United States' uses in Nevada.

In the light of my earlier conclusion that consumptive uses by the United States are to be charged to the states, and of the provisions and purposes of the Project Act and water delivery contracts, I hold that the uses of the United States within each state are limited by that state's apportionment, except to the extent that such uses are protected by Section 6 of the Project Act.

E. Boulder City, Nevada

By an Act of September 2, 1958, 72 Stat. 1726, Congress provided that the Secretary of the Interior shall:

> "supply water to . . . [Boulder City, Nevada] for domestic, industrial, and municipal purposes. . . . Such delivery shall be subject to the availability of water for use in the State of Nevada under the provisions of the Colorado River compact and the Project Act and . . . shall be in accordance with the terms of . . . [Nevada's water delivery contract]."

The United States claims the right to deliver water from Lake Mead to Boulder City for the purposes recited in the statute. Since the offices of the Boulder Canyon Project, Region Three of the Bureau of Reclamation and a number of other United States agencies are located in Boulder City, the United States has a substantial interest in the deliveries of such water. Nevada has acquiesced in water deliveries under this statute and I hold that the United States may deliver water to Boulder City pursuant to its terms.

The statute in effect instructs the Secretary to deliver water to Boulder City as if he had contracted for such deliveries. Thus these deliveries are clearly limited under the statute by the total amount of water available to Nevada under the Secretary's contractual apportionment. Boulder City's priorities are to be determined in the same manner as those of all other Nevada users, under Nevada law, and the city may receive only as much of Nevada's 300,000 acre-feet as is available after senior priorities have been satisfied. Conversely, consumption of mainstream water by Boulder City is chargeable to Nevada for purposes of applying the interstate apportionment. The Act of September 2, 1958 states that deliveries to Boulder City "shall be in accordance with the terms of . . . [the Nevada delivery con-

tract]." That contract specifically limits the "use in Nevada" of all water delivered from Lake Mead to 300,000 acre-feet per annum and thus deliveries to Boulder City, being for use in Nevada, are chargeable to the state under the contract. Nevada has not objected to this charge.

V. Mainstream Allocation: Conclusion

It may be useful at this point to summarize the apportionment which controls the consumption of water diverted from Lake Mead and from the mainstream of the Colorado River below Lake Mead for use in Arizona, California and Nevada under the decree recommended in this Report.

The Secretary of the Interior determines the total amount of water to be released from Lake Mead and from the several reservoirs on the mainstream of the Colorado River below Hoover Dam for consumptive use in Arizona, California and Nevada. That determination is solely within the Secretary's reasoned discretion and presumably is based on the amount of water in Lake Mead and the reservoirs below, the amount necessary to satisfy the United States treaty obligations to Mexico, necessities of "river regulation, improvement of navigation, and flood control," predictions as to future supply, and other relevant conditions in the River Basin. The only specific limitation on his discretion is that he must follow the priorities set forth in Section 6 of the Project Act. The supply of water available for consumptive use in the three states, then, is neither more nor less than the quantity of water that the Secretary annually releases for this purpose.

Of the mainstream water released for consumptive use in the United States, the first 7,500,000 acre-feet of annual consumptive use is apportioned as follows: 2,800,000 acre-feet for use in Arizona; 4,400,000 acre-feet in California; 300,000 acre-feet in Nevada.

If sufficient mainstream water is released in one year to satisfy more than 7,500,000 acre-feet of consumptive use in the three states, such additional consumptive use is surplus and is apportioned as follows: 50% to California[1a]

[1a]Subject, at the present time, to a total maximum consumption in California of 5,362,000 acre-feet under existing contracts. See pp. 208, 223-224, *supra*.

and 50% to Arizona, unless and until the Secretary makes a contract with Nevada for 4% of surplus, in which event, to Nevada shall be apportioned 4% of surplus and to Arizona 46% of surplus.

In the event that insufficient water is released from the mainstream reservoirs to satisfy 7,500,000 acre-feet of consumptive use in the United States in one year, the supply must be prorated among the three mainstream states. Each state's allocation is that proportion of the consumptive uses which can be satisfied by the available water which its apportionment of the first 7,500,000 acre-feet of mainstream consumption bears to the aggregate apportionment to all three states. Thus, if in one year water is available to satisfy an aggregate of only 6,000,000 acre-feet of consumptive use in the three states, each state's apportionment will be determined by the ratios described above, *viz:*

$$\frac{2.8}{7.5} \times 6 \text{ million acre-feet to Arizona;}$$

$$\frac{4.4}{7.5} \times 6 \text{ million acre-feet to California;}$$

$$\frac{.3}{7.5} \times 6 \text{ million acre-feet to Nevada.}$$

The Secretary of the Interior is required to make deliveries of water in accordance with the apportionments outlined above; the one exception to this requirement is prescribed by Section 6 of the Project Act, which directs that the dam and reservoir be operated in "satisfaction of present perfected rights in pursuance of Article VIII of said Colorado River compact. . . ." I have heretofore construed "present perfected rights" to mean rights perfected as of June 25, 1929, the effective date of the Project Act. See note 20, page 152, *supra.*

Before turning to the meaning of the term "perfected rights" as used in the Act, it should be noted that if California receives in one year 4,400,000 acre-feet of consump-

tive use or more, her perfected rights are deemed by Section 4(a) to be satisfied. That section limits California to 4,400,000 acre-feet of consumptive use plus half of surplus, which shall include "all water necessary for the supply of any rights which may now exist." I construe this language to mean that California's consumptive use may not exceed the specified amount, whatever her "present perfected rights" might have been in 1929. In short, Section 4(a) limits the operation of Section 6 in the case of California.

No such statutory provision limits the protection extended by Section 6 to Arizona and Nevada. It is clear from the evidence, however, that if water is made available to satisfy an aggregate of 7,500,000 acre-feet of consumptive use in one year, the Arizona and Nevada apportionments will substantially exceed the amount of "present perfected rights" in the respective states.

In the event that sufficient water is not made available to satisfy an aggregate consumptive use of 7,500,000 acre-feet in the United States in one year, Section 6 may come into play. California will not be allotted as much as 4.4 million acre-feet of consumptive use and can, therefore, rely on the protection afforded by Section 6 until she receives sufficient water to satisfy present perfected rights, up to the maximum of 4.4 million acre-feet fixed by Section 4(a). Since it is possible for these circumstances to occur, it becomes necessary to interpret the phrase "perfected rights" in Section 6.

Neither the Compact nor the Project Act defines "perfected rights." It seems clear, however, that the term was not used in either of these enactments to refer to notices of appropriation which had not yet become the foundation of a going economy—mere paper filings on the River. The use of the term "perfected rights" rather than the more familiar "appropriative rights" suggests that Congress intended to limit the protection of Section 6 to rights of a more sub-

stantial character than paper filings sometimes recognized as an appropriative right under state law. Congress was concerned that those who were actually using water from the Colorado River and who relied on such water for their existing needs should not be deprived of it because of the proposed dam. But Congress was aware that many paper appropriations had been filed and claims of various sorts made to Colorado River water which, whatever their legal status under state law, were worthless as a practical matter unless and until the dam was built. Congress was not concerned to protect such claims. Projects and water uses developed by virtue of the construction of the dam did not need to be protected against its consequences.[2] Of course, a water right is not a "present perfected" right within the meaning of Section 6 unless it is recognized under the applicable state law, for if it cannot be vindicated under state law there would be no reason to protect it in the Project Act.

Hence I conclude that a water right is a "present perfected right" and is within the protection of Section 6 only if it was, as of the effective date of the Project Act (June 25, 1929), acquired in compliance with the formalities of state law and only to the extent that it represented, at that time, an actual diversion and beneficial use of a specific quantity of water applied to a defined area of land or to a particular domestic or industrial use.

It has been suggested by the Imperial Irrigation District that state law would treat as "perfected" the right to take water in an amount measured by the capacity of existing works, even though such amount of water had never yet been actually diverted and applied to beneficial use. It is highly unlikely that Congress intended to adopt this broader

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[2]See 70 Cong. Rec. 167-169 (1928), Ariz. Legis. Hist., pp. 22-31.

definition. Congress must have realized that following construction of Hoover Dam new diversion works would be built for most downstream uses. The Project Act authorized not only the erection of the dam but also the construction of the All-American Canal to serve Imperial and Coachella Valleys, thus relieving them of dependence on diversions through Mexico. Since the Project Act authorized structures designed to replace existing diversion works, it is unlikely that Congress intended to define perfected rights in terms of the carrying capacity of these obsolete works. More natural is a congressional intention to protect, as present perfected rights, those uses which were actually in existence and which were the basis of a going economy. As stated before, the congressional intention was to insure that persons actually applying water to beneficial use would not have their uses disturbed by the erection of the dam and the storage of water in the reservoir.

Under the proposed definition of perfected rights a question arises with respect to water reserved from the mainstream for use on federal establishments in the Lower Basin. I have held that the United States has the power to reserve water for the reasonable future needs of federal establishments and that certain statutes, executive orders and other orders of withdrawal were intended to exercise this power. The water rights created by such a federal reservation do not depend upon state law or upon the actual diversion and beneficial use of a specific quantity of water. On the contrary, they are superior to subsequent appropriations under state law, although the subsequent appropriator may be first to divert and use the water. See pages 257 *et seq., supra.*

The question that arises is whether a reservation of water by the United States before June 25, 1929, is accorded the protection given by Section 6 to present perfected rights,

even though, as of that date, the rights were not acquired under state law and all the water reserved had not been put to beneficial use. I have concluded that they are so protected.

Although not acquired in conformity with state law, these rights are protected by Section 6, since their creation and existence are valid independent of state law.

Moreover, they receive this protection although none or only part of the reserved water had been put to use as of June 25, 1929. The fundamental nature of a reserved water right is that it is fully vested at the time of its creation; nothing further need be done to perfect it. It differs radically from appropriative rights under state law, which may be initiated by a filing but which must be perfected by actual diversion and beneficial use of water within a reasonable time after the filing. Thus a reserved water right created before June 25, 1929, is, by its very nature, "perfected" as of that date. Furthermore, failure to include reserved water rights within the protection of Section 6 could have the effect of divesting them. For example, I have concluded that the United States reserved the right to divert annually a maximum of 11,340 acre-feet of mainstream water for the Chemehuevi Indian Reservation, with a priority of February 2, 1907. The Reservation was not consuming all of this water in 1929. If the right is not considered a present perfected right under Section 6, then present perfected rights acquired under California law would have seniority, even though initiated after 1907. Thus, in certain times of shortage, water would be supplied in satisfaction of the California rights and the Reservation would not receive the full amount of its reserved water, despite its needs.

To hold that Congress did not include reserved water within the protection of Section 6 would require a holding

that Congress, without saying so expressly, and without ever considering the matter,[3] intended to nullify, in times of shortage, the very purpose of the reservation. The cases cited at pp. 258-259, *supra,* demonstrate that reservation of water was made by the United States to assure an adequate supply of water for the future needs of the federal establishments, in order that they could fulfill their purposes. It would frustrate this intent to deny the United States the use of this reserved water in times of shortage.

I do not believe that Congress, when directing that the dam be operated in "satisfaction of present perfected rights", intended these consequences, and accordingly, I conclude that water rights reserved before June 25, 1929, for federal establishments are "perfected rights" within the meaning of Section 6.

In the unlikely event that water is so short that a state's apportionment is insufficient to satisfy present perfected rights therein, the Secretary must deliver water to satisfy such rights from the other states' apportionments. Each of the other two states contributes water from its apportionment for this purpose in the proportion that its apportionment of the first 7.5 million acre-feet of mainstream consumption bears to the aggregate apportionment to the two states. In the example stated, in which annual consumptive use was limited to 6 million acre-feet, California's apportionment would be $\frac{4.4}{7.5}$ x 6 million acre-feet or 3,520,000 acre-feet of consumptive use. If, hypothetically, California has present perfected rights of 3,600,000 acre-feet, she would be entitled under Section 6 of the Project Act to consumption of 3,600,000 acre-feet, and thus, ex-

[3]The legislative history reveals nothing concerning the status of federal water rights as perfected rights.

ceed her apportionment by 80,000 acre-feet of consumptive use. Arizona and Nevada would have to contribute water to supply this 80,000 acre-feet in proportion to their interstate ratios; that is, Arizona would contribute $\frac{2.8}{3.1}$ of the water necessary to supply the 80,000 acre-feet of consumption in California, and Nevada would contribute $\frac{.3}{3.1}$ of this water.

Of course, if two states' apportionments were not sufficient to satisfy present perfected rights in those states in one year, the third state would have to contribute all of the necessary water. In the extremely improbable event that releases do not satisfy the rights perfected in any of the states as of the effective date of the Act, deliveries must be made in accordance with the priority of "present perfected rights" regardless of state lines.

The water apportioned to each state is delivered to users within the state according to the provisions of the several delivery contracts. No user may consume mainstream water unless there is a contract with the Secretary providing for the delivery of such water.[3a] Under the Project Act, state law governs rights and priorities among users within a single state, except for federal establishments for which water has been reserved independent of state law. As to such establishments, the priorities recommended herein control.

Water consumed on Indian Reservations, National Forests, Parks, Monuments, Memorials, Recreation Areas, lands under the control of the Bureau of Land Management, Federal Reclamation Projects, Wildlife Refuges and Management Areas, and in Boulder City, Nevada, is

[3a]Of course the Secretary need not contract with himself, and hence no contracts are required for Indian Reservations and similar federal establishments.

chargeable to the state within which the water is consumed, and this consumption is included within each state's apportionment. Conversely, each state's apportionment is an overriding limitation on all consumptive use within the state, including uses claimed by the United States for federal establishments.

Consumptive use is measured at the several points of diversion in each state by a determination of the amount of water diverted from the mainstream less return flow thereto available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation. The Secretary must keep an account of diversions for each state. He must compute, as accurately as possible, the amount of usable return flow from water diverted and credit this amount to each state. Reservoir evaporation, channel and other losses sustained prior to the diversion of water from the mainstream are not chargeable to the states but are to be treated as diminution of supply. Only after water is diverted from the mainstream are losses on it chargeable to a state as consumption.

The interstate allocation outlined above is based on the conclusion that the Secretary has used his water delivery contracts in conjunction with the Section 4(a) limitation on California to effectuate an apportionment among Arizona, California and Nevada of all of the water he determines to release in any year from Lake Mead and from downstream reservoirs for consumption in the United States. Of the first 7.5 million acre-feet of annual consumptive use of water from Lake Mead and the mainstream below, the Secretary has forever allocated $\frac{2.8}{7.5}$ to Arizona. Of the excess consumption, he has allocated to Arizona 50%, subject to reduction to 46% if he contracts to allocate 4% to Nevada. Similarly, out of the first 7.5 million acre-

feet of such use, he has forever allocated $\frac{4.4}{7.5}$ to California plus 50% of any excess each year up to a total annual consumption in California of 5,362,000 acre-feet. Finally, of such 7.5 million acre-feet, he has forever allocated $\frac{.3}{7.5}$ to Nevada.

However, until a state is prepared to apply to beneficial use all of its apportioned water, it has no cause for complaint if the water within its allocation is consumed elsewhere. Thus if, in any one year, water apportioned for consumptive use in a state will not be consumed in that state, whether for the reason that there are no delivery contracts outstanding for the full amount of the state's apportionment, or that users cannot apply all of such water to beneficial uses, or for any other reason, nothing herein shall be construed as prohibiting the Secretary of the Interior from releasing such apportioned but unused water during such year for consumptive use in the other states. No rights to the recurrent use of such water shall accrue by reason of the use thereof.[4]

California and Nevada have suggested that it would be useful for the Court to provide for a permanent commission or commissioner to administer the decree. I do not regard this as necessary. In view of the control of the mainstream vested in the Secretary of the Interior, he will in effect administer the decree.

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[4]For comparable provisions see Colorado River Compact, Article III(e); Boulder Canyon Project Act, Section 4(a), second paragraph, subdivision 5.

VI. Claims to Water in the Tributaries

There are five principal tributaries of the Colorado River in the Lower Basin. They are: the Virgin River System, the Kanab and Johnson Creek System, the Little Colorado River System, the Bill Williams River, and the Gila River System. All but the Gila River make regularly recurring contributions to mainstream supply.[5] Inflow from the Virgin and Little Colorado Rivers and from Kanab Creek is stored in Lake Mead. Inflow from the Bill Williams River is impounded by Parker Dam and stored in Lake Havasu. The Gila River empties into the mainstream near the Mexican border, and there is no dam capable of impounding its inflow.

The controversies arising over tributary water may be divided into two general categories. First, there is the controversy between mainstream states and tributary states regarding rights in tributary supply.[6] California expressed concern in this litigation that increased uses on the tributaries will decrease mainstream supply. The mainstream state-tributary state controversy is treated in subdivision A of this section of the Report. Second, there are controversies among the tributary states *inter sese*. These controversies, which concern the Virgin, Little Colorado and Gila River systems, and Johnson and Kanab Creeks, present the usual questions that arise in the traditional equitable apportionment suit. They are dealt with in subdivision B herein. Present tributary uses do not exhaust the available water supply in any of the tributaries, except the Gila River System; therefore the considerations that apply to the Gila differ from those applicable to the other tributaries. For

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[5]See Part One, pp. 119-123.

[6]It should be noted that two states, Arizona and Nevada, are both mainstream states (*i.e.*, they share in mainstream supply) and tributary states (*i.e.*, their tributaries contribute to mainstream supply and users therein divert water from the tributaries).

this reason, the discussion in subdivision B is divided into two parts.

A. Controversies Between Mainstream States and Tributary States

Absent the Colorado River Compact and the Boulder Canyon Project Act, it is clear that principles of equitable apportionment would control the disposition of a controversy between downstream states using mainstream water and upstream tributary states. See *Nebraska* v. *Wyoming,* 325 U. S. 589, 617-619 (1945); *Colorado* v. *Kansas,* 320 U. S. 383, 393-394 (1943); *New Jersey* v. *New York,* 283 U. S. 336, 342-343 (1931). Thus, junior uses on the tributaries might well be enjoined for the benefit of senior uses on the mainstream. *Nebraska* v. *Wyoming, supra,* at 665. Therefore, unless the Compact, the Project Act or the Secretary's delivery contracts made pursuant to Section 5 of the Project Act have somehow displaced the law that would otherwise be applicable, the principles of equitable apportionment still control rights of mainstream states in water of the tributaries of the Colorado River in the Lower Basin.

The Compact does not govern the relations, *inter sese,* of the states having Lower Basin interests.[7] Therefore, it could not have displaced the principles of equitable apportionment as decisive of the question of rights in Lower Basin tributary supply.

It is equally clear that the Project Act and the California Limitation Act have not rendered the principles of equitable apportionment inapplicable to the tributaries or the mainstream above Lake Mead. The limitation in Section 4(a) of the Project Act applies only to California. It does not affect possible claims by Arizona and Nevada to tributary water. With respect to California, Section

[7]See pp. 139-141, *supra.*

4(a) is concerned with consumption and not with supply and therefore does not affect any rights of that state to demand that tributary water be permitted to flow into the mainstream. Furthermore, it has been demonstrated that Section 4(a) regulates the mainstream only. Nothing in that section may reasonably be said to affect the question of tributary supply. It is difficult to believe that Congress, including the California senators who voted for the Project Act, and the California Legislature which passed the Limitation Act, intended that California should waive all claims to the substantial tributary contributions to the mainstream supply. It is unlikely that they intended that the states in the Lower Basin through which the tributaries flowed could consume all of the water in those tributaries without regard for California's claims, needs or existing uses.

Similarly, the contracts for delivery of mainstream water which the Secretary of the Interior has made with Arizona, Nevada and the California defendants have no bearing on the question of tributary supply. The contracts are solely for delivery of water after it has found its way into the mainstream; they do not affect inflow into the mainstream. Nor can they reasonably be construed to include the waiver of any rights mainstream states may have to tributary inflow.

In the light of the foregoing, the conclusion is inescapable that principles of equitable apportionment still control rights of mainstream states in waters of the tributaries of the Colorado River in the Lower Basin. At the present time the tributaries which empty into the Colorado River in the Lower Basin, other than the Gila River, make a substantial contribution to the supply of water in the mainstream. Once this tributary water commingles with the mainstream water it is governed by the Project Act and the Secretary's water delivery contracts and may be consumed only according to the interstate apportionment created by them. The mainstream users most certainly

have a substantial interest in tributary inflow, for the greater the quantity of water entering the mainstream, the greater the quantity of water likely to be available for use by them.

There is, however, no occasion at this time to apportion water of the tributaries of the Colorado River in the Lower Basin between mainstream and tributary states. An equitable apportionment of the tributaries at the instance of mainstream states could only accomplish either or both of two objects: (1) the enjoining of existing junior tributary uses for the benefit of senior mainstream uses; (2) the enjoining of increased uses on the tributaries for the benefit of existing mainstream uses.

There is no basis in the record for closing down existing tributary uses. The mainstream states have neither asked that present tributary uses be limited nor presented evidence that would justify such a limitation.

Nor, indeed, have they asked that increased future uses on the tributaries be enjoined. Arizona expressly declares that adjudication of rights in tributary water would be premature and unwarranted.[8] California proposes to treat present tributary inflow as part of the dependable supply in the mainstream, but does not seek a determination of rights in this water.[9] Similarly, Nevada does not ask that increased uses on the tributaries be enjoined; on the contrary she seeks a decree in favor of tributary users as against the mainstream interests.[10]

Even if the mainstream states had asked for an injunction against increased tributary uses, it would be inappropriate to adjudicate the request at this time. Mainstream users are presently enjoying the use of tributary inflow, and there is no indication that such enjoyment is in imme-

[8]Ariz. Proposed Conclusions 20-22.
[9]See Calif. Proposed Decree, pp. 7-9.
[10]Nev. Proposed Conclusion 33.

diate danger of being interfered with. There is no evidence that there will be, in the immediately forseeable future, any substantial increase in uses on the tributaries. Indeed, except for the proposed Dixie Project on the Virgin River in Utah, there is no evidence of any pending proposals or plans for the construction of specific works involving the increased use of water on any of the tributaries. At best, the evidence shows only vague general hopes for growth and development on the tributaries.

The Dixie Project itself cannot be considered an immediate threat to the continuation of present tributary inflow into the mainstream. There is no evidence that the Dixie Project will be developed except as a federal reclamation project, yet its authorization by the United States is far from certain. The Regional Director of the Bureau of Reclamation for Region Three has twice issued favorable reports on the proposed project to the Commissioner of Reclamation, but the latter has not yet approved it.[11] So far as the evidence shows, the proposed project has not even been brought to the attention of the Secretary of the Interior or of Congress,[12] and congressional approval is required before the project can be developed. Moreover, the Regional Director's approval of the Dixie Project was conditioned on Utah fulfilling certain conditions which have not yet been met.[13]

In this state of the record, principles established by the Supreme Court dictate that mainstream rights to tributary inflow ought not now be adjudicated. As the Court has stated:

> " 'Before this court can be moved to exercise its extraordinary power under the Constitution to control the conduct of one State at the suit of another, the threatened invasion of rights must be of serious

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[11]Calif. Exs. 2901, 2902; Utah Exs. 31, 31A.
[12]Tr. 17925-17937, 17949-17954 (Bingham); Calif. Ex. 2904.
[13]*Ibid.*

> magnitude and it must be established by clear and convincing evidence.' New York v. New Jersey, 256 U. S. 296, 309; North Dakota v. Minnesota, 263 U. S. 365, 374; Connecticut v. Massachusetts, 282 U. S. 660, 669; Missouri v. Illinois, 200 U. S. 496, 521."[14]

There has been no showing that, at the present time, tributary users are threatening mainstream rights to continued tributary inflow within the meaning of this principle.

Furthermore, it is clear that up to the present time, no existing mainstream project has been refused water, the delivery of which it has demanded. That this condition will continue at least until another large project using mainstream water is constructed cannot, on this record, be doubted. Should this condition change in the future then will be the time to consider the problem.

Since, then, there is no occasion to determine mainstream rights to tributary inflow at the present time, since such an occasion may never arise, and since, even if it should arise, a more intelligent determination can be made in the future, it would violate precedent to adjudicate these rights in this case. See *Nebraska* v. *Wyoming,* 325 U. S. 589, 608 (1945); *Colorado* v. *Kansas,* 320 U. S. 383, 398 (1943); *New York* v. *Illinois,* 274 U. S. 488, 489-490 (1927); *Missouri* v. *Illinois,* 200 U. S. 496, 521 (1906); *cf. Arizona* v. *California,* 283 U. S. 423, 463-464 (1931).

One other aspect of the mainstream-tributary controversy requires comment. Three tributary states, New Mexico, Nevada and Utah, seek a decree confirming existing uses and reserving to them rights to water for use in the future. Tributary users are not now being challenged by mainstream states in the enjoyment of their existing uses and therefore there is no controversy over their continued enjoyment. Moreover, since no new tributary uses appear

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[14]Washington v. Oregon, 297 U. S. 517, 522 (1936).

imminent, it is unnecessary to determine whether there is water available for such uses. The Supreme Court has clearly stated that it will not exercise its original jurisdiction to apportion water in an interstate stream in order to reserve it for consumption at an unspecified time in the future by one state against the possibility that another state might utilize the water first. See cases cited at page 320, *supra*.

Even assuming that an equitable apportionment of tributary water between mainstream and tributary uses would be appropriate, it is extremely doubtful that the evidence is sufficient to form the basis for decision. Arizona is an important tributary state and yet there is little evidence of the extent or seniority of her uses on tributaries other than the Gila. Moreover, the full effect of the decree in this case upon the Lower Colorado River Basin may not be immediately apparent. Undoubtedly, a more "equitable" apportionment might be achieved if apportionment is postponed at least until all practical consequences of the decree are ascertained.

B. Controversies Among the Tributary States Inter Sese

1. *Tributaries Other Than the Gila River.*

Controversies among the tributary states have arisen over four tributary systems which flow into the Colorado River in the Lower Basin, namely, the Little Colorado River System, the Virgin River System, Johnson and Kanab Creeks, and the Gila River System. The latter is dealt with in the next following section of this Report. Controversies over the other three can be disposed of on a single ground and are dealt with together in this section.

The Little Colorado River rises in Arizona at the New Mexico border and flows through the State of Arizona, joining the Colorado River upstream from Grand Canyon. Rio Puerco, the Zuni River, Black Creek and Carrizo Creek, the principal tributaries of the Little

Colorado River which originate in the State of New Mexico, join the Little Colorado River in Arizona. The Little Colorado River System drains a total of 26,930 square miles.[15]

The Virgin River rises in Utah, and flows through that state and the states of Arizona and Nevada, entering the Colorado River at Lake Mead. Important tributaries of the Virgin in Utah are the North Fork of the Virgin River, North Creek and the Santa Clara River. The principal tributary of the Virgin in Nevada was the Muddy River, which now flows directly into Lake Mead. Meadow Valley Wash is a Nevada tributary of the Muddy River. The Virgin River System drains 11,000 square miles.[16]

Kanab and Johnson Creeks rise in the eastern portion of the Lower Colorado River Basin in Utah, each having an individual drainage basin within Utah. Johnson Creek has its confluence with Kanab Creek in the State of Arizona. Kanab Creek flows into the Colorado River at Grand Canyon, midway between Lake Mead and the confluence of the Colorado and Little Colorado Rivers.[17]

The States of Nevada, New Mexico and Utah have asked for a decree confirming present uses and reserving water for future requirements on various interstate tributaries of the Colorado River flowing within their borders. Nevada asserts rights in the Virgin River System; New Mexico asserts rights in the Little Colorado and Gila Systems; and Utah asserts rights in the Virgin River System as well as in Kanab and Johnson Creeks. Arizona, the only other tributary state in the Lower Basin, does not ask that any of her rights in the tributaries be adjudicated in this case, other than the Gila. The United States claims

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[15]Ariz. Exs. 106, 1000, p. 11; N. M. Ex. 400.
[16]Ariz. Ex. 1000, p. 11; Nev. Ex. 1; Utah Ex. 1.
[17]Tr. 17814 (Bingham); Ariz. Ex. 77, p. 60; Utah Ex. 1.

rights to the use of water from these tributaries for Indian Reservations and other federal establishments.[18]

As stated above, the Supreme Court will not apportion the waters of an interstate stream unless the state seeking the adjudication establishes "by clear and convincing evidence" that there exists a substantial conflict over the present use of the water. The burden is on the state seeking the adjudication to prove the necessity for it. See cases cited at page 320, *supra.*

Neither Nevada, New Mexico nor Utah has met this burden as to any of the tributaries except the Gila River. None of the downstream tributary states contests existing upstream uses on any of the tributaries. Arizona, a downstream state on each of the tributaries, maintains that existing upstream uses on the tributaries do not interfere with her uses,[19] and she does not challenge existing uses on any of the tributaries. Nor does Nevada, the only other downstream state, contest existing upstream uses on the Virgin River System in Utah.

Thus Nevada, New Mexico (except as to the Gila) and Utah are, in effect, asking for a declaratory decree confirming their respective existing tributary uses despite the fact that such uses are unchallenged. Such a decree would be wholly without precedent. Indeed, an unbroken line of decisions requires that jurisdiction not be exercised. See *e.g., Colorado* v. *Kansas,* 320 U. S. 383 (1943); *New York* v. *Illinois,* 274 U. S. 488 (1927); *Missouri* v. *Illinois,* 200 U. S. 496 (1906).

It is equally clear that rights of tributary users *inter sese* to make increased uses of tributary water in the future ought not to be adjudicated. There is presently unused tributary water regularly flowing into the mainstream from all of the tributaries except the Gila. The record

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[18]See U. S. Proposed Conclusions 4.1, 4.2, 4.3, 4.12, 4.13, 4.21, 4.22.2, 8.1, 9.1.

[19]Ariz. Proposed Findings 159, 161, 163-164.

indicates that none of the tributary states will be able to utilize this water in the immediate future, and Supreme Court precedent requires that it not be reserved for one user against the possibility that another may appropriate it first. See cases cited at page 320, *supra*.

The considerations set forth above also control disposition of the claims of the United States. Present United States uses on the tributaries, other than the Gila, are not contested by any of the parties to this suit, and the record indicates that there is no danger of insufficient water to supply them in the future. No substantial increased United States uses appear imminent. If such uses are developed in the future, and other tributary users contest them, it will then be time to determine the extent of United States rights in the tributaries. Unlike the mainstream, the tributaries are not subject to the legal and physical control of the Secretary of the Interior, and hence with them there is no necessity of determining priorities so that the Secretary may know how to discharge his duties. There is, therefore, no occasion for declaring the extent of rights to water in the tributaries asserted for the benefit of Indian Reservations and National Forests, Parks, Recreation Areas, Memorials, and Monuments as well as lands administered by the Bureau of Land Management.

2. *The Gila River System.*

The interstate reaches of the Gila River System consist of parts of three streams, the Gila River proper and its tributaries, the San Francisco River and San Simon Creek. All of these streams have their headwaters in or near New Mexico, flow for a distance through that state and then enter Arizona.

The State of New Mexico seeks in this action a decree apportioning a quantity of water from the Gila River System sufficient to satisfy present and future requirements

for water in that part of the Gila River drainage basin located in New Mexico.[20]

Both Arizona and the United States oppose New Mexico's claims. First, they assert that New Mexico present uses are junior to those of the other parties and should not be confirmed out of priority.[21] Second, they maintain that actual present uses in New Mexico are substantially less than those claimed by New Mexico.[22] Third, they argue that confirmation of estimated New Mexico future requirements is completely unjustified.[23]

The Gila River System is overappropriated; the supply of water presently available and which seems likely to be available in the future is not sufficient to satisfy the needs and demands of existing projects. Under such circumstances, it is appropriate to adjudicate the controversy among New Mexico, Arizona and the United States over the right to water in the Gila System. *Nebraska* v. *Wyoming,* 325 U. S. 589 (1945). None of the parties opposes such an adjudication.

As noted in this Report, neither the Colorado River Compact nor the Boulder Canyon Project Act bears upon the question of the apportionment of water in the Lower Basin tributaries, see pages 316-317, *supra,* and hence they are of no help in deciding this controversy over the Gila River System. The doctrine of equitable apportionment is decisive of this controversy, as all the parties agree, although they differ as to its proper application.[24]

a. Present Uses

New Mexico seeks a confirmation of existing uses in that state from the Gila River System. Despite the fact

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[20]N. M. Brief, Point III.

[21]Ariz. Answering Brief, pp. 82-86; U. S. Reply Brief, pp. 54-60.

[22]Ariz. Special Appendix, pp. 1-8; U. S. Reply Brief, pp. 54-59.

[23]Ariz. Special Appendix, pp. 9-13; U. S. Reply Brief, pp. 60-61.

[24]Ariz. Opening Brief, pp. 62-63; N. M. Brief, pp. 4-5, 10-33; U. S. Brief, pp. 42-43.

that many of these uses are junior in time to uses downstream in Arizona, I conclude that they should not be disturbed.

Although priority of appropriation has been characterized as the guiding principle of equitable apportionment in the arid regions of the United States, *Nebraska* v. *Wyoming,* 325 U. S. 589 (1945); *Wyoming* v. *Colorado,* 259 U. S. 419 (1922), it is by no means necessarily conclusive of the rights in dispute. In *Nebraska* v. *Wyoming, supra,* at 618, the Court said:

> "Priority of appropriation is the guiding principle. But physical and climatic conditions, the consumptive use of water in the several sections of the river, the character and rate of return flows, the extent of established uses, the availability of storage water, the practical effect of wasteful uses on downstream areas, the damage to upstream areas as compared to the benefits to the downstream areas if a limitation is imposed on the former—these are all relevant factors. They are merely an illustrative, not an exhaustive catalogue. They indicate the nature of the problem of apportionment and the delicate adjustment of interests which must be made."

It is worthy of note that the Court, in an equitable apportionment suit, has never reduced junior upstream existing uses by rigid application of priority of appropriation. Indeed, the tendency has been to protect existing uses wherever possible. See *Washington* v. *Oregon,* 297 U. S. 517 (1936); *Kansas* v. *Colorado,* 206 U. S. 46 (1907).

In *Nebraska* v. *Wyoming, supra,* at 621-622, junior upstream existing uses were confirmed despite the fact that the North Platte, as the Gila is here, was overappropriated. The Court stated:

> "We are satisfied that a reduction in present Colorado uses is not warranted. The fact that the same amount of water might produce more in

> lower sections of the river is immaterial. [citations omitted] The established economy in Colorado's section of the river basin based on existing use of the water should be protected. [citations omitted] Appropriators in Colorado junior to Pathfinder have made out-of-priority diversions of substantial amounts. Strict application of the priority rule might well result in placing a limitation on Colorado's present use for the benefit of Pathfinder. But as we have said, priority of appropriation, while the guiding principle for an apportionment is not a hard and fast rule. Colorado's countervailing equities indicate it should not be strictly adhered to in this situation."

It is clear that the agricultural economy of the Gila River Basin in New Mexico is dependent upon water from the system and that reduction of present uses will result in commensurate contraction of that economy. Furthermore, some of the water which is used beneficially in New Mexico would be lost enroute to users in Arizona.[25] In addition, it seems that New Mexico uses only a relatively small portion of the water she contributes to the Gila River System.[26] I am satisfied, therefore, that a reduction of present New Mexico uses is not warranted. The presently irrigated acreage figures for lands in New Mexico outside the Virden Valley, set forth in the Findings of Fact and recommended decree, represent a compromise between Arizona and New Mexico to which the United States has interposed no objection. This compromise has been adopted in the decree.

This does not mean, however, that priorities as to present uses are entirely without force. On the contrary, the Gila Decree, *United States* v. *Gila Valley Irrigation District, et al* (Globe Equity No. 59),[26a] which adjudicated priorities

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[25]Tr. 1403 (Gookin).
[26]See Ariz. Ex. 77, table 23.
[26a]Ariz. Ex. 103.

on an interstate reach of the Gila River, including the Virden Valley in New Mexico, is not abrogated. Certainly confirmation of present uses requires adherence to the priorities presently being administered under that Decree. The major justification for refusing to reduce existing junior uses is to avoid disrupting going economies. Since the economy of the Virden Valley is largely based on the Gila Decree, enforcement of that decree will not disrupt the existing economy. Furthermore, the State of New Mexico is bound by that Decree to the extent that her citizens, whom she represents *parens patriae* in this suit, are bound. See *Brooks* v. *United States,* 119 F.2d 636, 643 (9th Cir.), cert. *denied,* 313 U. S. 594 (1941); *cf. Hinderlider* v. *La Plata,* 304 U. S. 92 (1938); *Wyoming* v. *Colorado,* 286 U. S. 494 (1932). If this were not the case then the rights of individual citizens, when asserted by them, would be limited by the Gila Decree, whereas their rights would not be so limited if asserted by the State as their representative.

The so-called Greenlee County and Cave Creek Decrees[27] are not binding upon New Mexico as they purport only to adjudicate water rights appurtenant to land located within Greenlee County and Cochise County, Arizona.

The decree in this cause will, of necessity, limit uses of both underground and surface water, as New Mexico's proof of irrigated acreage included acreage irrigated from surface and underground sources without distinction. This would be the proper course in any event since it appears that there is such a close relationship between surface and underground waters in this part of the System that failure to limit uses of underground water might well provide New Mexico an opportunity for further reduction of the surface flow of the Gila River System by allowing unrestricted depletion of underground sources.[28]

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[27]Ariz. Exs. 301-302A.

[28]See Tr. 2659-2660, 2674-2675 (Turner); 17745-17746 (Reynolds).

Two questions have been raised with respect to the use of underground, pumped water on lands in the Virden Valley in New Mexico. One question is whether lands specified in the Gila Decree may be irrigated by pumped water in addition to the surface diversions from the Gila River permitted by the Decree. The resolution of this question, which requires an interpretation of the Gila Decree, is best left to the court which rendered and administers that Decree. It is sufficient in this case to hold that the Gila Decree governs all uses of water on lands in the Virden Valley specified in the Decree, and that the interpretation of the Decree is left to the United States District Court for the District of Arizona. The recommended decree is to be so construed.

The other question is whether the use of underground, pumped water on lands in the Virden Valley which are not specified in the Gila Decree should be prohibited. Arizona and New Mexico have stipulated that there are 380.81 acres of land within the Virden Valley which are not specified in the Gila Decree and which are presently being irrigated with water from the underground water sources of the Gila River. The United States does not dispute this figure.

Arizona and New Mexico have compromised this question by agreeing that these non-decree lands, or other lands or uses in the Virden Valley to which their water rights may be transferred, may consumptively use not more than 838.2 acre-feet of underground water per annum "unless and until such uses are adjudged by a court of competent jurisdiction to be an infringement or impairment of rights confirmed by the Gila Decree." The United States objects to this compromise, asserting that the use of this water may reduce the surface supply in the Gila River available for storage in the San Carlos Reservoir, which in turn would reduce the water available for the Gila River Indian Reservation.

Despite this opposition from the United States, I have decided to adopt the Arizona-New Mexico settlement. The total quantity of ground water involved is only 838.2 acre feet. While I have found that pumping of ground water in the Gila River System basin affects the surface supply, there is no evidence regarding the extent that out-of-decree pumping in the Virden Valley affects United States interests in Arizona. The maximum effect would be in the amount of the 838.2 acre-feet, and in all probabilty the diminution of surface supply available to the Gila River Indian Reservation would be much less. Moreover, the United States is not foreclosed. It is protected from injury if it can show that pumping from lands outside the Gila Decree impairs rights confirmed to it under the Decree. For similar reasons I have also adopted in the recommended decree a compromise between Arizona and New Mexico which permits the domestic use of a maximum of 265 acre-feet per annum of water diverted from the Gila River or its underground sources in the Virden Valley in addition to the uses confirmed by the Gila Decree, "unless and until such uses are adjudged by a court of competent jurisdiction to be an infringement or impairment of rights confirmed by the Gila Decree."

Both San Simon Creek and the San Francisco River have their confluence with the Gila River in Arizona. In order to ensure that Arizona users on the Gila and on those tributaries of the Gila will not be adversely affected by increased use, diversions from one of these streams may not be transferred to any of the other streams, nor may uses for irrigation purposes within any area on one of the streams be transferred for use for irrigation purposes to any other area on that stream.[29] The recommended decree so provides.

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[29]The areas on the San Francisco River System are: Luna, Apache Creek-Aragon, Reserve, and Glenwood (including Mule Creek). The Luna, Apache Creek-Aragon, and Reserve areas are

b. Future Uses

New Mexico also claims the right to water for future requirements. It is here, however, that priority of appropriation has its greatest effect. It would be unreasonable in the extreme to reserve water for future use in New Mexico when senior downstream appropriators in Arizona remain unsatisfied. It was so held as to Colorado's claim in *Nebraska* v. *Wyoming,* 325 U. S. 589 (1945).

New Mexico seeks to mitigate the effect of her claim by attempting to establish that, should additional water storage facilities be constructed sometime in the uncertain future, increased uses in New Mexico would not diminish the supply for downstream Arizona users.[30] To formulate a decree on the basis of such hypothetical facts would not be prudent. In *Nebraska* v. *Wyoming, supra,* at 620, the Court said:

> "There is no reliable basis for prediction. But a controversy exists; and the decree which is entered must deal with conditions as they obtain today. If they substantially change, the decree can be adjusted to meet the new condition."

Of course, the decree will provide for modification should a change of condition warrant it.

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as shown on Arizona Exhibit 334. Glenwood (including Mule Creek) embraces the area delineated on Arizona Exhibit 334 as the Glenwood area and in addition thereto all of the San Francisco River System in New Mexico to the south of the Glenwood area as shown on said Exhibit 334.

The areas on the Gila River System are: Upper Gila, Cliff-Gila and Buckhorn-Duck Creek, Red Rock, and Virden Valley. The Red Rock area is as shown on Arizona Exhibit 328. The Cliff-Gila and Buckhorn Duck-Creek area is as shown on Arizona Exhibit 328 and in addition thereto embraces all areas on Mangas Creek and tributaries thereto. The Upper Gila area embraces the entire Gila River System upstream from the Cliff-Gila and Buckhorn-Duck Creek area as herein defined. The Virden Valley is that portion of the Gila River System in New Mexico (excluding the San Francisco River and San Simon Creek and their tributaries) downstream from the area delineated as Red Rock on Arizona Exhibit 328.

[30]N. M. Proposed Findings 18-21.

c. United States Claims

The United States asserts rights to water from sources within the drainage of the Gila River System for use on various Indian Reservations as well as on National Forests, Parks, Monuments and lands administered by the Bureau of Land Management.

A number of Indian Reservations and several other federal establishments are situated on tributaries of the Gila which flow exclusively within the State of Arizona. The United States claims on these Arizona tributaries assume the posture of claims against other individual users within the State of Arizona. It would be inexpedient in this case to adjudicate such purely local claims. Moreover, there is no such collision between competing uses on these tributaries as to warrant judicial interference in this litigation. And even if there were such a dispute, it would not be necessary or helpful to resolve it in order to make the apportionment between Arizona and New Mexico.

Different considerations govern the claims of the United States to water from the Gila River and its interstate tributaries. These streams are overappropriated. The controversy with respect to them is real and immediate; and the disposition of these claims materially affects the interstate allocation as between Arizona and New Mexico. Thus New Mexico's claim for confirmation of existing uses out-of-priority conflicts with the United States claim that it has reserved water of the Gila River and its interstate tributaries for the use of its establishments downstream in Arizona.

There are three Indian Reservations on behalf of which the United States claims the right to water from the Gila River proper; they are the Gila River, the San Carlos and the Gila Bend Indian Reservations.[31] The United States

[31]See U. S. Proposed Conclusions 4.21, 4.22.2, 4.23.4.

does not claim any rights to divert water for Indian Reservations from the San Francisco River and San Simon Creek, the other two interstate streams of the Gila System. The interests of both the Gila River Indian Reservation and San Carlos Indian Reservation were represented by the United States in *United States* v. *Gila Valley Irrigation District, et al.* (Globe Equity No. 59)[32] and the United States concedes that rights to divert water from the mainstream of the Gila River asserted on behalf of these Reservations are governed by the Gila Decree.[33] However, rights of the Gila Bend Indian Reservation, which is located below the confluence of the Salt and Gila Rivers approximately 40 miles southwest of Phoenix, are not subject to the Gila Decree.

Assuming *arguendo* that this Reservation has the senior priority on the Gila River, proper application of the principles of equitable apportionment would still compel a finding that reduction of present New Mexico uses for its benefit would be unwarranted. The Gila is a wasting stream below Ashurst-Hayden Dam, see note 45, page 338, *infra*. Water required to be released at potential points of use in New Mexico would have to travel through part of that state and through half of Arizona, across hot deserts, before reaching the Reservation, and a substantial amount of it would be lost en route. Moreover, the United States admits that "an adequate water supply, primarily from underground sources . . . is presently available for the irrigation of lands of the Gila Bend Indian Reservation."[34] It is apparent, therefore, that no reasonable purpose can be served in an equitable apportionment by allocating water to the Reservation at the expense of present New Mexico uses.

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[32]Ariz. Ex. 103.
[33]See U. S. Proposed Conclusions 4.22.1, 4.23.2.
[34]U. S. Proposed Finding 4.21.5.

Any claims that the Reservation might have as against Arizona users on the Salt and Gila Rivers are, as discussed above, matters of intrastate rights and priorities which should not be adjudicated in this case.

The United States also claims rights to water from sources within the drainage area of the Gila River System for use in National Forests, Parks, Memorials and Monuments as well as for lands administered by the Bureau of Land Management. For reasons already stated, only claims to water of the Gila River and its interstate tributaries will be here considered. Ten federal establishments fall within this category.

With the exception of the Gila National Forest, it is unnecessary to pass on the claims of the United States for water for any of the other nine federal establisments, because the United States has not demonstrated, except as to the Gila National Forest, that it presently utilizes or requires water from the mainstream of the Gila or its interstate tributaries in order to carry out the purposes of these establishments. Nor has the United States demonstrated, again excepting the Gila National Forest, that it will in the future require water from these sources. There is, therefore, no controversy over uses by these federal establishments to be adjudicated. Certainly it would be inappropriate to adjudicate the claims of the United States (with the exception noted) at this time since those claims may never be exercised much less questioned. Moreover, it would be impossible on the basis of this record to determine the water rights of the United States (except for the Gila National Forest) either on the basis of state law or on the basis of federal reservation of water. Of course, the rights of Arizona and New Mexico adjudicated herein are subject to possible superior rights of the United States asserted on behalf of National Forests, Parks, Memorials, Monuments and lands administered by the Bureau of

Land Management, as such rights may be determined hereafter.

The Gila National Forest presently diverts water from the mainstream of the Gila and San Francisco Rivers. The finding is warranted that the United States intended, when it withdrew this Forest from entry, to reserve the water necessary to fulfill the purposes for which the Forest was created. Support for this finding lies in the following facts: The Gila and San Francisco Rivers are the only substantial streams which flow within the boundaries of the Forest; the purposes of the Forest cannot be fulfilled without an adequate water supply; and the United States presently utilizes water from these sources in order to maintain the Forest. The power of the United States to make such a reservation with respect to the Forest cannot be logically differentiated from the power of the United States with respect to Indian Reservations and Recreation Areas.

Having found that the United States intended to reserve water from these sources in quantities reasonably necessary to fulfill the purpose of withdrawal, and having concluded that the United States has the power to make such a reservation, it follows that water rights in the Gila River System recognized by the recommended decree herein are subordinate to the right of the United States to divert water for the Gila National Forest to the extent that the former rights are junior in time. As in the case of the Lake Mead National Recreation Area, the future water requirements of the Gila National Forest appear to be so modest that it is unnecessary to put maximum limits on the reserved water rights created for its benefit.

FINDINGS OF FACT

1. The Gila River rises in the mountainous areas of southwestern New Mexico near the towns of Cliff and Gila. It flows southwesterly—entering Arizona between Virden,

New Mexico and Duncan, Arizona. Thence it flows westerly across Arizona to its confluence with the Colorado River below Imperial and Laguna Dams near Yuma, Arizona. Its major tributaries are San Simon Creek and the San Francisco, San Carlos, San Pedro, Santa Cruz, Salt, Verde (a tributary of the Salt), Agua Fria and Hassayampa Rivers. The Gila River System drains a total of 57,800 square miles.[35]

2. The San Francisco River, which rises in Arizona near the town of Alpine, enters New Mexico near Luna and thence flows easterly, southerly and then westerly to re-cross the state line and enter Arizona near Clifton. Its confluence with the Gila River lies below Clifton and west of Guthrie, Arizona. The San Francisco River drains a total of 2,800 square miles.[36]

3. San Simon Creek is formed in New Mexico by tributaries which rise in southeastern Arizona and southwestern New Mexico. It enters Arizona in the San Simon-Cienaga area north of Rodeo, New Mexico and thence flows northwesterly for over 100 miles to its confluence with the Gila River below Solomonsville, Arizona. San Simon Creek drains a total of 2,280 square miles.[37]

4. There are ten Indian Reservations on the Gila River System, all within the State of Arizona. They are the Ak Chin, Camp Verde, Fort Apache, Fort McDowell, Papago, Salt River, San Xavier, Gila Bend, Gila River and San Carlos Reservations.[38]

5. The Gila Bend, Gila River and San Carlos Reservations are situated on the Gila River. The other seven Reserva-

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[35]Ariz. Exs. 106, 328, 1000, p. 12; N. M. Exs. 400, 402B, 402D.
[36]Ariz. Exs. 106, 334, 1000, p. 12; N. M. Exs. 400, 402C.
[37]Ariz. Exs. 106, 1000, p. 12; N. M. Exs. 400, 402A.
[38]See Part One, pp. 88-94.

tions are situated on tributaries of the Gila which flow entirely within the State of Arizona.[39]

6. The Gila Bend Indian Reservation is situated below the confluence of the Salt and Gila Rivers in Arizona, approximately 40 miles southwest of Phoenix.[40]

7. Coolidge Dam is the sole water storage facility on the Gila River between its headwaters and its confluence with the Salt River. Situated 26 miles southeast of Globe, Arizona, it creates the San Carlos Reservoir which serves the San Carlos Project in Arizona.[41]

8. The flow of the Gila River and its tributaries has been erratic.[42]

9. On June 29, 1935, the United States District Court for the District of Arizona entered a final decree which determined rights to divert and use water from the Gila River from a point in New Mexico (above the Virden Valley) ten miles east of the eastern boundary of Arizona to the Gila River Crossing, located a short distance upstream from the joinder of the Gila and Salt Rivers southwest of Phoenix, Arizona. *United States* v. *Gila Valley Irrigation District, et al.* (Globe Equity No. 59).[43]

10. The Gila River, San Francisco River, and San Simon Creek are overappropriated, supply being insufficient to satisfy existing needs.[44]

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[39]See U. S. Ex. 100.
[40]See U. S. Exs. 1408-1409.
[41]See Part One, p. 39.
[42]See *e.g.*, Ariz. Ex. 98, pp. 604-605, 609-610, 626-627.
[43]Ariz. Exs. 103, 300.
[44]Ariz. Answering Brief p. 83; N. M. Rebuttal Brief, p. 5. For example, under the Gila Decree (Globe Equity No. 59) the United States has the right to divert up to 603,276 acre-feet per annum at Ashurst-Hayden Dam for the use of the San Carlos Project and

11. The Gila River is a losing or wasting stream below Ashurst-Hayden Dam.[45]

12. Lands within the Gila River System drainage basin in New Mexico are irrigated with surface and underground water.[46]

13. There are 2,900 acres presently being irrigated with water from San Simon Creek, its tributaries and underground water sources in New Mexico.[47]

14. Present annual consumptive uses of water from San Simon Creek, its tributaries and underground water sources in New Mexico are 7,200 acre-feet.[48]

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certain federal and Arizona agencies. Ariz. Ex. 103 p. 98. However, diversions at Ashurst-Hayden Dam from 1934 to 1955 averaged 187,000 acre-feet per year. Ariz. Ex. 139, p. 1. The 1951-1955 diversion figures were as follows:

1951	47,000 acre-feet
1952	226,000 acre-feet
1953	53,000 acre-feet
1954	121,000 acre-feet
1955	113,000 acre-feet

Similarly, the Gila Decree authorized the storage in San Carlos Reservoir of 1,285,000 acre-feet. Ariz. Ex. 103, p. 105. Storage in the Reservoir, however, has never exceeded 800,000 acre-feet and storage, from 1934 to 1955, averaged 168,000 acre-feet. Ariz. Ex. 139, p. 5. Storage figures as of May 1 for the years 1951 through 1955 were:

1951	—0— acre-feet
1952	160,000 acre-feet
1953	9,000 acre-feet
1954	26,000 acre-feet
1955	—0— acre-feet

An average of 63,000 acres of the 100,546 acre San Carlos Project were irrigated from 1934 to 1955. Most of the unirrigated acreage would have been irrigated had the water supply been adequate. Tr. 1560-1562 (Gookin); see Ariz. Ex. 139. See also Part One, pp. 48-50.

[45]Tr. 1399-1402 (Gookin); 5584-5590 (Dugan); Ariz. Ex. 77B, p. 33, Table G.

[46]See Tr. 17389-17407 (Sorenson); N. M. Ex. 517.

[47]Tr. 17389-17407 (Sorenson).

[48]N. M. Ex. 517.

15. There are 225 acres presently being irrigated in the Luna area of the San Francisco River System in New Mexico.

16. There are 316 acres presently being irrigated in the Apache Creek-Aragon area of the San Francisco River System in New Mexico.

17. There are 725 acres presently being irrigated in the Reserve area of the San Francisco River System in New Mexico.

18. There are 1,003 acres presently being irrigated in the Glenwood area (including Mule Creek) of the San Francisco River System in New Mexico.

19. Thus there is an aggregate of 2,269 acres presently being irrigated with water from the San Francisco River, its tributaries and underground water sources in New Mexico.

20. Present annual consumptive uses of water from the San Francisco River, its tributaries and underground water sources in New Mexico, for all uses, are 3,187 acre-feet.

21. There are 287 acres presently being irrigated in the Upper Gila area of the Gila River in New Mexico.

22. There are 1,456 acres presently being irrigated in the Red Rock area (including the Fuller Ranch) of the Gila River in New Mexico.

23. There are 5,314 acres presently being irrigated in the Cliff-Gila and Buckhorn-Duck Creek area of the Gila River in New Mexico.

24. Thus there is an aggregate of 7,057 acres (exclusive of the Virden Valley) presently being irrigated with water

from the Gila River and its underground water sources in New Mexico.

25. Present annual consumptive uses of water from the Gila River and its underground water sources in New Mexico (exclusive of the Virden Valley), for all uses, are 13,662 acre-feet.

26. There are 380.81 acres of land within the Virden Valley, New Mexico, with no rights confirmed by the Gila Decree (Globe Equity No. 59) which are presently being irrigated with water from the underground water sources of the Gila River, to-wit, the following designated and described parcels owned by the following persons:

Owner	Subdivision	Legal Description	Sec.	Twp.	Rng.	Acreage
Marvin Arnett and J. C. O'Dell	Part Lot 3		6	19S	21W	33.84
	Part Lot 4		6	19S	21W	52.33
	NW¼ SW¼		5	19S	21W	38.36
	SW¼ SW¼		5	19S	21W	39.80
	Part Lot 1		7	19S	21W	50.68
	NW¼ NW¼		8	19S	21W	38.03
Hyrum M. Pace, Ray Richardson, Harry Day, and N. O. Pace, Est.	SW¼ NE¼		12	19S	21W	8.00
	SW¼ NE¼		12	19S	21W	15.00
	SE¼ NE¼		12	19S	21W	7.00
C. C. Martin	S. part SE¼SW¼SE¼		1	19S	21W	0.93
	W½W½W½NE¼NE¼		12	19S	21W	0.51
	NW¼NE¼		12	19S	21W	18.01
A. E. Jacobson	SW part Lot 1		6	19S	21W	11.58
W. LeRoss Jones	E. Central part	E½E½E½NW¼NW¼	12	19S	21W	0.70
	SW part NE¼NW¼		12	19S	21W	8.93
	N. Central part	N½N½NW¼SE¼NW¼	12	19S	21W	0.51
Conrad and James R. Donaldson	N½N½N½SE¼		18	19S	20W	8.00
James D. Freestone	Part W½NW¼		33	18S	21W	7.79

Owner	Subdivision	Legal Description	Sec.	Twp.	Rng.	Acreage
Virgil W. Jones	N½SE¼NW¼; SE¼NE¼NW¼		12	19S	21W	7.40
Darrell Brooks	SE¼SW¼		32	18S	21W	6.15
Floyd Johns	Part N½SE¼NE¼		13	19S	21W	4.00
	Part NW¼SW¼NW¼		18	19S	20W	1.70
L. M. Hatch	SW¼SW¼		32	18S	21W	4.40
——	Virden Townsite					3.90
Carl M. Donaldson	SW¼SE¼		12	19S	21W	3.40
Mack Johnson	Part NW¼NW¼NE¼		10	19S	21W	2.80
	Part NE¼NW¼NE¼		10	19S	21W	0.30
	Part N½N½S½NW¼NE¼		10	19S	21W	0.10
Chris Dotz	SE¼SE¼; SW¼SE¼		3	19S	21W)	
	NW¼NE¼; NE¼NE¼		10	19S	21W)	2.66
Roy A. Johnson	NE¼SE¼SE¼		4	19S	21W	1.00
Ivan and Antone Thygerson	NE¼SE¼SE¼		32	18S	21W	1.00
John W. Bonine	SW¼SE¼SW¼		34	18S	21W	1.00
Marion K. Mortenson	SW¼SW¼SE¼		33	18S	21W	1.00
	TOTAL					380.81

27. New Mexico has not established that her claimed rights are senior in time to rights of Arizona and the United States.[49]

28. The Gila National Forest is the only one of the National Forests, Parks, Memorials, Monuments and lands administered by the Bureau of Land Management which presently diverts water from the mainstream of the Gila or its interstate tributaries.[50]

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[49]See N. M. Opening Brief, pp. 6-10; N. M. Rebuttal Brief, p 4; N. M. Proposed Finding 12.

[50]See U. S. Exs. 2706, 2708, 2710, 2712, 2716, 2718, 2720A, 2720B, 2803, 2815, 2821, 2908-2911.

29. The Gila National Forest was created as a public reservation by a Presidential Proclamation dated March 2, 1899. Its area was subsequently enlarged and modified.[51]

30. In withdrawing lands for the Gila National Forest the United States intended to reserve rights to the use of so much water from the Gila and San Francisco Rivers as might be reasonably needed to fulfill the purposes of the Forest.[52]

31. There is not sufficient evidence to make a finding of the ultimate water requirements of the Gila National Forest.

CONCLUSIONS OF LAW

1. The Colorado River Compact does not give New Mexico any rights to the use of water from the Gila River System as against any of the other states of the Lower Basin.

2. The Boulder Canyon Project Act, 45 Stat. 1057 (1929), does not give New Mexico any rights to the use of water from the Gila River System as against any of the other states of the Lower Basin.

3. This controversy is governed by the principles of equitable apportionment.

4. An equitable apportionment of the waters of the Gila River System does not justify reduction of present New Mexico uses. Such uses as are specified in the foregoing Findings of Fact should be confirmed.

5. An equitable apportionment of the waters of the Gila River System requires that uses in excess of those specified in the foregoing Findings of Fact should be enjoined.

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[51]See U. S. Exs. 2720A-2720B.

[52]Presidential Proclamation of March 2, 1899, U. S. Exs. 2719A-2720B.

6. For purposes of this equitable apportionment, the State of New Mexico, as well as her citizens, is bound by the Gila Decree (Globe Equity No. 59) and priorities therein specified shall continue to be administered thereunder.

7. The decree herein recommended applies both to surface and underground water.

8. Uses recognized on particular streams may not be transferred so as to justify additional uses on other streams.

9. Rights to water from the Gila River for the benefit of the San Carlos and Gila River Indian Reservations are governed by the Gila Decree (Globe Equity No. 59).

10. Claims of the United States on behalf of the Gila Bend Indian Reservation against New Mexico users are rejected. Similar claims against Arizona users are not determined herein.

11. The United States has the right to divert water from the mainstream of the Gila and San Francisco Rivers in quantities reasonably necessary to fulfill the purposes of the Gila National Forest with priority dates as of the date of withdrawal for forest purposes of each area of the Forest within which the water is used.

PART THREE

PART THREE

Recommended Decree

It is ORDERED, ADJUDGED AND DECREED that

I. For purposes of this decree:

(A) "Consumptive use" means diversions from the stream less such return flow thereto as is available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation;

(B) "Mainstream" means Lake Mead and the mainstream of the Colorado River downstream from Lake Mead within the United States;

(C) Consumptive use from the mainstream within a state shall include all uses of water of the mainstream within that state, including but not limited to, uses made by persons, by agencies of the state, and by the United States for the benefit of Indian Reservations and other federal establishments within the state;

(D) "Regulatory structures controlled by the United States" refers to Hoover Dam, Davis Dam, Parker Dam, Headgate Rock Dam, Palo Verde Weir, Imperial Dam, Laguna Dam and all other dams and works controlled or operated by the United States which regulate the flow of water in the mainstream or the diversion of water from the mainstream;

(E) "Water controlled by the United States" refers to the water in Lake Mead, Lake Mohave, Lake Havasu and all other water in the mainstream below Hoover Dam and within the United States of America;

(F) "Tributaries" means all stream systems in the Lower Basin of the Colorado River the waters of which

naturally drain into the main Colorado River and also means that portion of the main Colorado River in the Lower Basin above Lake Mead;

(G) "Perfected right" means a water right acquired in accordance with state law, which right has been exercised by the actual diversion of a specific quantity of water that has been applied to a defined area of land or to definite municipal or industrial works, and in addition shall include water rights created by the reservation of mainstream water for the use of federal establishments under federal law whether or not the water has been applied to beneficial use;

(H) "Present perfected rights" means perfected rights, as here defined, existing as of June 25, 1929, the effective date of the Boulder Canyon Project Act;

(I) "Domestic use" shall include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but shall exclude the generation of electrical power;

(J) "Annual" and "Year," except where the context may otherwise require, refer to calendar years;

(K) Consumptive use of water diverted in one state for consumptive use in another state shall be treated as if diverted in the state for whose benefit it is consumed.

II. The United States, its officers, attorneys, agents and employees, be, and they are hereby severally enjoined:

(A) From operating regulatory structures controlled by the United States and from releasing water controlled by the United States other than in accordance with the following order of priority:

(1) For river regulation, improvement of navigation, and flood control,

(2) For irrigation and domestic use, and

(3) For power;

Provided, however, that the United States may release water in satisfaction of its obligations to the United States of Mexico under the treaty dated February 3, 1944, without regard to the priorities specified above;

(B) From releasing water controlled by the United States for irrigation and domestic use in the States of Arizona, California and Nevada, except as follows:

(1) If sufficient mainstream water is available for release, as determined by the Secretary of the Interior, to satisfy 7,500,000 acre-feet of annual consumptive use in the aforesaid three states, then of such 7,500,000 acre-feet of consumptive use, there shall be apportioned 2,800,000 acre-feet for use in Arizona, 4,400,000 acre-feet for use in California, and 300,000 acre-feet for use in Nevada;

(2) If sufficient mainstream water is available for release, as determined by the Secretary of the Interior, to satisfy annual consumptive use in the aforesaid states in excess of 7,500,000 acre-feet, such excess consumptive use is surplus, and 50% thereof shall be apportioned for use in Arizona and 50% for use in California; provided, however, that if the United States so contracts with Nevada, then 46% of such surplus shall be apportioned for use in Arizona and 4% for use in Nevada;

(3) If insufficient mainstream water is available for release, as determined by the Secretary of the In-

terior, to satisfy annual consumptive use of 7,500,000 acre-feet in the aforesaid three states, then the available annual consumptive use shall be apportioned as follows:

(a) For use in Arizona $\frac{2.8}{7.5}$,

(b) For use in California $\frac{4.4}{7.5}$,

(c) For use in Nevada $\frac{.3}{7.5}$;

(4) Any mainstream water consumptively used within a state shall be charged to its apportionment, regardless of the purpose for which it was released;

(5) If the water apportioned for consumptive use in any of said states in any year is insufficient to satisfy present perfected rights in that state, the deficiency shall first be supplied out of water apportioned for use in the other two states but not consumed in those states, and any remaining deficiency shall be supplied by each of the remaining states, out of water apportioned for consumptive use in such states which is in excess of the quantity necessary to satisfy present perfected rights in such states, in proportion to the ratios heretofore established between them, to wit: if water must be supplied to satisfy present perfected rights in two of the three states, then the third state shall, out of such excess, supply all the necessary water, and if water must be supplied to satisfy present perfected rights in one state, then each of the other two states shall out of such excess supply that proportion of the necessary water that its apportionment of the first

7,500,000 acre-feet of consumptive use bears to the aggregate apportionment of the two states;[1] provided, however, that present perfected rights in California shall not exceed 4,400,000 acre-feet of consumptive use per annum;

(6) If the mainstream water apportioned for consumptive use in any year is insufficient to satisfy present perfected rights in each and all of the three states, then such water shall be allocated for consumptive use in accordance with the priority of present perfected rights without regard to state lines; provided, however, that present perfected rights in California shall not exceed 4,400,000 acre-feet of consumptive use per annum;

(7) Notwithstanding the provisions of Paragraphs (1) through (6) of this subdivision (B), mainstream water shall be delivered to users in Arizona, California and Nevada only if contracts have been made by the Secretary of the Interior, pursuant to Section 5 of the Boulder Canyon Project Act, for delivery of such water;

(8) If, in any one year, water apportioned for consumptive use in a state will not be consumed in that state, whether for the reason that delivery contracts for the full amount of the state's apportionment are not in effect or that users cannot apply all of such water to beneficial uses, or for any other reason, nothing in this decree shall be construed as prohibiting the Secretary of the Interior from releasing such apportioned but unused water during such year for consumptive use in the other

[1]Thus if water is to be supplied to California from the other states' apportionment, Arizona shall contribute $\frac{2.8}{3.1}$ and Nevada $\frac{.3}{3.1}$ of the total amount supplied.

states. No rights to the recurrent use of such water shall accrue by reason of the use thereof;

(C) From releasing water controlled by the United States for use in the States of Arizona, California and Nevada for:

(1) Any use or user in violation of state law, except as specified in Article II (B) (5) and (6) of this decree and except as federal statutes may otherwise specifically direct;

(2) The benefit of any federal establishment, except as specified hereinafter; provided, however, that such release may be made notwithstanding the provisions of Paragraph (7) of subdivision (B) of this Article and of Paragraph (1) of this subdivision (C) and provided further that nothing herein shall prohibit the United States from making future additional reservations of unappropriated mainstream water as may be authorized by law:

(a) The Chemehuevi Indian Reservation in annual quantities not to exceed (i) 11,340 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 1,900 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less, with a priority date of February 2, 1907;

(b) The Cocopah Indian Reservation in annual quantities not to exceed (i) 2,744 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 431 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less, with a priority date of September 27, 1917;

(c) The Yuma Indian Reservation in annual quantities not to exceed (i) 51,616 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 7,743 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less, with a priority date of January 9, 1884;

(d) The Colorado River Indian Reservation in annual quantities not to exceed (i) 717,148 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 107,588 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less, with priority dates of March 3, 1865, for lands reserved by the Act of March 3, 1865 (13 Stat. 541, 559); November 22, 1873, for lands reserved by the Executive Order of said date; November 16, 1874, for lands reserved by the Executive Order of said date, except as later modified; May 15, 1876, for lands reserved by the Executive Order of said date; November 22, 1915, for lands reserved by the Executive Order of said date;

(e) The Fort Mohave Indian Reservation in annual quantities not to exceed (i) 122,648 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 18,974 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less, and, subject to the next succeeding proviso, with priority dates of September 18, 1890, for lands transferred by the Executive Order of said date;

February 2, 1911, for lands reserved by the Executive Order of said date; provided, however, that lands conveyed to the State of California pursuant to the Swamp and Overflowed Lands Act [9 Stat. 519 (1850)] as well as any accretions thereto to which the owners of such land may be entitled, and lands patented to the Southern Pacific Railroad pursuant to the Act of July 27, 1866 (14 Stat. 292) shall not be included as irrigable acreage within the Reservation and that the above specified diversion requirement shall be reduced by 6.4 acre-feet per acre of such land that is irrigable;

(f) The Lake Mead National Recreation Area in annual quantities reasonably necessary to fulfill the purposes of the Recreation Area, with priority dates of March 3, 1929, for lands reserved by the Executive Order of said date (No. 5105), and April 25, 1930, for lands reserved by the Executive Order of said date (No. 5339);

(g) The Havasu Lake National Wildlife Refuge in annual quantities reasonably necessary to fulfill the purposes of the Refuge, not to exceed (i) 41,839 acre-feet of water diverted from the mainstream or (ii) 37,339 acre-feet of consumptive use of mainstream water, whichever of (i) or (ii) is less, with a priority date of January 22, 1941, for lands reserved by the Executive Order of said date (No. 8647), and a priority date of February 11, 1949, for land reserved by the Public Land Order of said date (No. 559);

(h) The Imperial National Wildlife Refuge in annual quantities reasonbly necessary to fulfill

the purposes of the Refuge not to exceed (i) 28,000 acre-feet of water diverted from the mainstream or (ii) 23,000 acre-feet of consumptive use of mainstream water, whichever of (i) or (ii) is less, with a priority date of February 14, 1941.

Provided further, that consumptive uses for the benefit of the above named federal establishments shall be satisfied only out of water allocated, as provided in subdivision (B) of this Article, to each state wherein such uses occur, and only to the extent that their priorities specified herein are senior to other priorities within the state.

III. The States of Arizona, California and Nevada, Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego, and County of San Diego, their officers, attorneys, agents and employees, be and they are hereby severally enjoined:

(A) From interfering with the management and operation, in conformity with Article II of this decree, of regulatory structures controlled by the United States;

(B) From interfering with or permitting the interference with releases and deliveries, in conformity with Article II of this decree, of water controlled by the United States;

(C) From diverting or permitting the diversion of water from the mainstream the diversion of which has not been authorized by the United States for use in the respective states; and provided further that none of the above named political subdivisions of the State of California shall divert or permit the diversion of water

from the mainstream the diversion of which has not been authorized by the United States for its particular use;

(D) From consuming or permitting the consumptive use of water from the mainstream in excess of the quantities specified in Article II of this decree.

IV. The State of New Mexico, its officers, attorneys, agents and employees, be and they are after four years from the date of this decree hereby severally enjoined:

(A) From diverting or permitting the diversion of water from San Simon Creek, its tributaries and underground water sources for the irrigation of more than a total of 2,900 acres during any one year, and from exceeding a total consumptive use of such water, for whatever purpose, of 72,000 acre-feet during any period of ten consecutive years; and from exceeding a total consumptive use of such water, for whatever purpose, of 8,220 acre-feet during any one year;

(B) From diverting or permitting the diversion of water from the San Francisco River, its tributaries and underground water sources for the irrigation within each of the following areas of more than the following number of acres during any one year:

Luna Area	225
Apache Creek-Aragon Area	316
Reserve Area	725
Glenwood Area	1,003;

and from exceeding a total consumptive use of such water, for whatever purpose, of 31,870 acre-feet during any period of ten consecutive years; and from exceeding a total consumptive use of such water, for whatever purpose, of 4,112 acre-feet during any one year;

(C) From diverting or permitting the diversion of water from the Gila River, its tributaries (exclusive of the San Francisco River and San Simon Creek and their tributaries) and underground water sources for the irrigation within each of the following areas of more than the following number of acres during any one year:

Upper Gila Area	287
Cliff-Gila and Buckhorn-Duck Creek Area	5,314
Red Rock Area	1,456;

and from exceeding a total consumptive use of such water (exclusive of uses in Virden Valley, New Mexico), for whatever purpose, of 136,620 acre-feet during any period of ten consecutive years; and from exceeding a total consumptive use of such water (exclusive of uses in Virden Valley, New Mexico), for whatever purpose, of 15,895 acre-feet during any one year;

(D) From diverting or permitting the diversion of water from the Gila River and its underground water sources in the Virden Valley, New Mexico, except for use on lands determined to have the right to the use of such water by the decree entered by the United States District Court for the District of Arizona on June 29, 1935, in *United States* v. *Gila Valley Irrigation District, et al.* (Globe Equity No. 59) (herein referred to as the Gila Decree), and except pursuant to and in accordance with the terms and provisions of the Gila Decree; provided, however, that:

(1) This decree shall not enjoin the use of underground water on any of the following lands:

Owner	Subdivision	Legal Description	Sec.	Twp.	Rng.	Acreage
Marvin Arnett and J. C. O'Dell	Part Lot 3		6	19S	21W	33.84
	Part Lot 4		6	19S	21W	52.33
	NW¼ SW¼		5	19S	21W	38.36
	SW¼ SW¼		5	19S	21W	39.80
	Part Lot 1		7	19S	21W	50.68
	NW¼ NW¼		8	19S	21W	38.03
Hyrum M. Pace, Ray Richardson, Harry Day and N. O. Pace, Est.	SW¼ NE¼		12	19S	21W	8.00
	SW¼ NE¼		12	19S	21W	15.00
	SE¼ NE¼		12	19S	21W	7.00
C. C. Martin	S. part SE¼SW¼SE¼		1	19S	21W	0.93
	W½W½W½NE¼NE¼		12	19S	21W	0.51
	NW¼NE¼		12	19S	21W	18.01
A. E. Jacobson	SW part Lot 1		6	19S	21W	11.58
W. LeRoss Jones	E. Central part E½E½E½NW¼NW¼		12	19S	21W	0.70
	SW part NE¼NW¼		12	19S	21W	8.93
	N. Central part N½N½NW¼SE¼NW¼		12	19S	21W	0.51
Conrad and James R. Donaldson	N½N½N½SE¼		18	19S	20W	8.00
James D. Freestone	Part W½NW¼		33	18S	21W	7.79
Virgil W. Jones	N½SE¼NW¼; SE¼NE¼NW¼		12	19S	21W	7.40
Darrell Brooks	SE¼SW¼		32	18S	21W	6.15
Floyd Jones	Part N½SE¼NE¼		13	19S	21W	4.00
	Part NW¼SW¼NW¼		18	19S	20W	1.70
L. M. Hatch	SW¼SW¼		32	18S	21W	4.40
——	Virden Townsite					3.90
Carl M. Donaldson	SW¼SE¼		12	19S	21W	3.40
Mack Johnson	Part NW¼NW¼NE¼		10	19S	21W	2.80
	Part NE¼NW¼NE¼		10	19S	21W	0.30
	Part N½N½S½NW¼NE¼		10	19S	21W	0.10
Chris Dotz	SE¼SE¼; SW¼SE¼		3 10	19S 19S	21W 21W	2.66

Owner	Subdivision	Legal Description	Sec.	Twp.	Rng.	Acreage
Roy A. Johnson	NE¼SE¼SE¼		4	19S	21W	1.00
Ivan and Antone Thygerson	NE¼SE¼SE¼		32	18S	21W	1.00
John W. Bonine	SW¼SE¼SW¼		34	18S	21W	1.00
Marion K. Mortenson	SW¼SW¼SE¼		33	18S	21W	1.00
	TOTAL					380.81

or on lands or for other uses in the Virden Valley to which such use may be transferred or substituted on retirement from irrigation of any of said specifically described lands, up to a maximum total consumptive use of such water of 838.2 acre-feet per annum, unless and until such uses are adjudged by a court of competent jurisdiction to be an infringement or impairment of rights confirmed by the Gila Decree; and

(2) This decree shall not prohibit domestic use of water from the Gila River and its underground water sources on lands with rights confirmed by the Gila Decree, or on farmsteads located adjacent to said lands, or in the Virden Townsite, up to a total consumptive use of 265 acre-feet per annum in addition to the uses confirmed by the Gila Decree, unless and until such use is adjudged by a court of competent jurisdiction to be an infringement or impairment of rights confirmed by the Gila Decree;

(E) Provided, however, that nothing in this Article IV shall be construed to affect rights as between individual water users in the State of New Mexico; nor shall anything in this Article be construed to affect possible superior rights of the United States asserted on behalf of National Forests, Parks, Memorials, Monuments and

lands administered by the Bureau of Land Management; and provided further that in addition to the diversions authorized herein the United States has the right to divert water from the mainstream of the Gila and San Francisco Rivers in quantities reasonably necessary to fulfill the purposes of the Gila National Forest with priority dates as of the date of withdrawal for forest purposes of each area of the Forest within which the water is used.

V. The United States shall prepare and maintain, or provide for the preparation and maintenance of, and shall make available, annually and at such shorter intervals as the Secretary of the Interior shall deem necessary or advisable, for inspection at all reasonable times and at a reasonable place or places, complete, detailed and accurate records of:

(A) Releases of water through regulatory structures controlled by the United States;

(B) Diversions of water from the mainstream, return flow of such water to the stream as is available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation, and consumptive use of such water. These quantities shall be stated separately as to each diverter from the mainstream, each point of diversion, and each of the States of Arizona, California and Nevada;

(C) Releases of mainstream water pursuant to orders therefor but not diverted by the party ordering the same, and the quantity of such water delivered to Mexico in satisfaction of the Mexican Treaty or diverted by others in satisfaction of rights decreed herein. These quantities shall be stated separately as to each diverter from the mainstream, each point of diversion, and each of the States of Arizona, California and Nevada;

(D) Deliveries to Mexico of water in satisfaction of the obligations of Part III of the Treaty of February 3, 1944, and, separately stated, water passing to Mexico in excess of treaty requirements;

(E) Diversions of water from the mainstream of the Gila and San Francisco Rivers and the consumptive use of such water, for the benefit of the Gila National Forest.

VI. Within two years from the date of this decree, the States of Arizona, California, and Nevada shall furnish to this Court and to the Secretary of the Interior a list of the present perfected rights, with their priority dates, in waters of the mainstream within each state, respectively, in terms of consumptive use, except those relating to federal establishments. The Secretary of the Interior shall supply similar information, within a similar period of time, with respect to federal establishments within each state. If the three states and the Secretary of the Interior are unable at that time to agree on the present perfected rights to the use of mainstream water in each state, any state or the United States may apply to the Court for the determination of such rights by the Court.

VII. The State of New Mexico shall, within four years from the date of this decree, prepare and maintain, or provide for the preparation and maintenance of, and shall annually thereafter make available for inspection at all reasonable times and at a reasonable place or places, complete, detailed and accurate records of:

(A) The acreages of all lands in New Mexico irrigated each year from the Gila River, the San Francisco River, San Simon Creek and their tributaries and all of their underground water sources, stated by legal description and component acreages and sepa-

rately as to each of the areas designated in Article IV of this decree and as to each of the three streams;

(B) Annual diversions and consumptive uses of water, in New Mexico, from the Gila River, the San Francisco River and San Simon Creek and their tributaries, and all their underground water sources, stated separately as to each of the three streams.

VIII. This decree shall not affect:

(A) The relative rights *inter sese* of water users within any one of the states, except as otherwise specifically provided herein;

(B) The rights or priorities to water in any of the Lower Basin tributaries of the Colorado River in the States of Arizona, California, Nevada, New Mexico and Utah except the Gila River System;

(C) The rights or priorities, whether under state law or federal law, except as specific provision is made herein, of any Indian Reservation; National Forest, Park, Recreation Area, Monument or Memorial; or lands administered by the Bureau of Land Management.

IX. Any of the parties may apply at the foot of this decree for its amendment or for further relief. The Court retains jurisdiction of this suit for the purpose of any order, direction, or modification of the decree, or any supplementary decree, that may at any time be deemed proper in relation to the subject matter in controversy.

This Report, together with the Findings of Fact and Conclusions of Law therein contained, and the recommended decree thereto annexed are .

Respectfully submitted,

SIMON H. RIFKIND
Special Master

New York, N. Y.
December 5, 1960

APPENDIX 1

Appendix 1

PLEADINGS, BRIEFS, AND ORDERS OF THE COURT

Filing Date	
1952	
August 13	Motion for Leave to File Bill of Complaint and Bill of Complaint.
October 13	Rule Ordered to Issue, Returnable Within 60 days, Requiring Defendants to Show Cause Why Leave to File Bill of Complaint Should Not Be Granted. 344 U. S. 806.
December 8	Return of Defendants to Rule to Show Cause and Brief in Support of Return.
December 31	Motion on Behalf of the United States for Leave to Intervene and Brief in Support of Motion.
1953	
January 19	Motion for Leave to File Bill of Complaint Granted and Process Ordered to Issue, Returnable Within 60 Days. Motion of United States for Leave to Intervene Granted. 344 U. S. 919.
February 10	Motion on Behalf of Sidney Kartus et al. for Leave to File Petition to Intervene.
March 4	Complainant's Objections to Motion on Behalf of Sidney Kartus et al. for Leave to File Petition to Intervene.
March 16	Motion of Sidney Kartus et al. for Leave to Intervene Denied. 345 U. S. 914.
May 19	Answer of Defendants to Bill of Complaint.
May 20	Motion of Colter Water Project Assn., Inc., for Leave to File Brief Amicus Curiae.

Appendix 1

Filing Date	
May 22	Arizona's Motion for Leave to File Objections to Motion of Colter Water Project Assn., Inc., for Leave to File Brief Amicus Curiae.
June 1	Answer to Bill of Complaint Filed and Leave Granted the Complainant to Reply Thereto on or Before September 1, 1953. Motion for Leave to File Brief of Colter Water Project Assn., Inc., as Amicus Curiae, Denied. 345 U. S. 968.
August 28	Reply to Defendants' Answer.
October 7	Rejoinder of Defendants to Complainant's Reply to Defendants' Answer.
December 8	Petition of Intervention on Behalf of the United States.
December 14	Motion on Behalf of the State of Nevada for Leave to Intervene and Petition Intervention on Behalf of the State of Nevada.
1954	
February 5	Response of Complainant the State of Arizona to Motion of State of Nevada for Leave to Intervene.
February 11	Answer of Complainant State of Arizona to Petition of Intervention on Behalf of the United States.
April 5	Answer of California Defendants to Petition of Intervention on Behalf of the United States and Summary of the Controversy.
April 5	Response of California Defendants to Motion on Behalf of the State of Nevada for Leave to Intervene and Answer of California Defendants to Petition of Intervention on Behalf of the State of Nevada.

Appendix 1

Filing Date	
May 13	Memorandum of United States Requesting Pre-Trial Conference.
May 26	Response of Arizona to Memorandum of United States Requesting Pre-Trial Conference.
May 28	Memorandum of California Defendants in Reply to Memorandum of United States Requesting a Pre-Trial Conference.
June 1	Motion of the State of Nevada for Leave to Intervene Granted. 347 U. S. 985. George I. Haight Appointed Special Master. 347 U. S. 986.
June 1	Reply of the State of Nevada to Answer of California Defendants to Petition of Intervention on Behalf of the State of Nevada.
June 17	Memorandum of Nevada in Reply to Memorandum Requesting Pre-Trial Conference by the United States.
July 14	Answer of Complainant State of Arizona to Petition of Intervention on Behalf of the State of Nevada.
July 15	Motion on Behalf of the California Defendants for Leave to File an Amended Answer to the Bill of Complaint of Arizona and Amendatory Answer.
July 15	California Defendants' Motion to Join, as Parties, the States of Colorado, New Mexico, Utah, and Wyoming.
July 29	Answer of the State of Nevada to Petition of Intervention on Behalf of the United States.

Appendix 1

Filing Date	
August 13	Response of Complainant State of Arizona to Defendants' Motion to Join as Parties the States of Colorado, New Mexico, Utah, and Wyoming.
August 27	Reply of the State of Nevada to Answer of the State of Arizona to Petition of Intervention of the State of Nevada.
October 7	California Defendants' Appendices to the Answer, Volume II.
October 7	Brief of the California Defendants in Support of Their Motion to Join, as Parties, the States of Colorado, New Mexico, Utah, and Wyoming.
December 27	Brief of New Mexico Opposing Motion of California to Join as Parties the States of Colorado, New Mexico, Utah, and Wyoming.
December 27	Brief of the State of Utah Opposing the Motion of the California Defendants to Join the State of Utah as a Party to This Action.
December 27	Brief of the State of Colorado and of the State of Wyoming Opposing the Motion of the State of California to Join the States of Colorado and Wyoming as Parties to This Action.
1955	
January 10	Order of the Court Granting California Defendants 30 Days From January 10, 1955, to File Brief in Response to Briefs of Colorado, Wyoming, Utah, and New Mexico.

Appendix 1

Filing Date	
February 7	Brief of the State of Nevada, Intervener, in re Motion of California to Join as Parties the States of Colorado, New Mexico, Utah, and Wyoming.
February 9	Reply Brief of California Defendants in Support of Their Motion to Join, as Parties, the States of Colorado, New Mexico, Utah, and Wyoming.
February 28	Order Granting California Defendants Leave to File Amended Answer. 348 U. S. 947.
February 28	Order Referring Joinder Motion to Special Master for Hearing and Recommendation. 348 U. S. 947.
July 18	Special Master's Report on the Motion of California Defendants to Join as Parties the States of New Mexico, Utah, Colorado, and Wyoming. 350 U. S. 812.
October 10	Order Appointing Simon Hirsch Rifkind Special Master in Place of George I. Haight, Deceased. 350 U. S. 812.
October 14	Exceptions of Intervening State of Nevada to Report and Recommendations of Special Master Concerning California's Motion to Join Colorado, New Mexico, Utah, and Wyoming.
October 20	Motion of the United States for Determination of Questions of Law Presented by the Pleadings in the Cause and the Report of the Special Master.
October 20	Exceptions of California Defendants to Report and Recommendations of the Special Master with Respect to Their Motion to Join the States of Colorado, New Mexico, Utah, and Wyoming and Brief in Support of Exceptions.

Filing Date	
October 21	Memorandum of the California Defendants in Reply to Motion of the United States for Determination of Questions of Law Presented by the Pleadings in This Cause and the Report of the Special Master.
November 1	Memorandum of Arizona (a) in Reply to Motion of the United States for Preliminary Determination of Questions of Law; and (b) in Reply to California's and Nevada's Exceptions to the Master's Report on the Question of Joinder of Four States.
November 4	Reply of California Defendants to Arizona's Memorandum Filed November 1, 1955, Directed to the Report of Special Master.
November 4	Response of the States of Colorado, Wyoming, Utah, and New Mexico to Motion of the United States for Determination of questions of Law Prior to Determination of Joinder Motion.
November 7	Order Setting Joinder Motion for Argument on Exceptions and Order Denying Motion of the United States for Determination of Legal Points. 350 U. S. 880.
December 12	Order Denying California Defendants' Motion to Join Colorado and Wyoming. Motion to Join Utah and New Mexico as Parties Granted Only to the Extent of Their Interest in Lower Basin Waters. 350 U. S. 114.
1956	
January 3	California Defendants' Petition for Rehearing of Decision Denying Motion to Join the States of Colorado, New Mexico, Utah, and Wyoming.

Appendix 1

Filing Date	
January 23	Order Denying California Defendants' Petition for Rehearing. 350 U. S. 955.
February 13	Complaint and Answer in Intervention by the State of Utah.
February 29	Answer of California Defendants to Complaint and Answer in Intervention by the State of Utah and Interrogatories Addressed to the State of Utah by the California Defendants.
March 2	Appearance and Statement in Behalf of New Mexico of Its Claim of Interest in and to Lower Basin Waters.
March 12	Answer of the State of Nevada to Complaint and Answer in Intervention by the State of Utah.
March 14	Answer of California Defendants to Appearance and Statement in Behalf of New Mexico of Its Claim of Interest in and to Lower Basin Waters and Interrogatories Addressed to the State of New Mexico by the California Defendants.
March 15	Response of State of Arizona to Complaint and Answer by the State of Utah.
March 15	Response of State of Arizona to Appearance and Statement of New Mexico.
March 19	Answer of the State of Nevada to the Appearance and Statement in Behalf of New Mexico of Its Claim of Interest in and to Lower Basin Waters.
June 11	Order Fixing Compensation of George I. Haight as Special Master Awarded to Kathleen Haight, Executrix of the Estate of George I. Haight, Deceased. 351 U. S. 977.

Appendix 1

Filing Date	
1957	
June 17	Order Fixing Payment on Account of the Fees to Be Awarded as Compensation for the Services of Simon H. Rifkind, Special Master, and Approving Expense Funds. 354 U. S. 918.
1958	
June 9	Order Fixing Payment on Account of the Fee to Be Awarded as Compensation for the Services of Simon H. Rifkind, Special Master. 357 U. S. 902.
August 13	Complainant's Motion for Leave to File Amended Pleadings. (Filed with Special Master.)
August 13	Complainant's Proposed Amended Bill of Complaint.
August 13	Complainant's Proposed Amended Reply to California Defendants' Answer.
August 13	Complainant's Proposed Amended Answer to Petition of Intervention on Behalf of the State of Nevada.
August 13	Complainant's Proposed Amended Response to Appearance and Statement of New Mexico.
August 13	Complainant's Proposed Amended Response to the Complaint and Answer in Intervention by the State of Utah.
1960	
May 5	Circulation of Draft Report.

APPENDIX 2

Appendix 2

COLORADO RIVER COMPACT

The States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, having resolved to enter into a compact under the Act of the Congress of the United States of America approved August 19, 1921 (42 Statutes at Large, page 171), and the Acts of the Legislatures of the said States, have through their Governors appointed as their Commissioners:

W. S. Norviel for the State of Arizona
W. F. McClure for the State of California
Delph E. Carpenter for the State of Colorado
J. G. Scrugham for the State of Nevada
Stephen B. Davis, Jr., for the State of New Mexico
R. E. Caldwell for the State of Utah
Frank C. Emerson for the State of Wyoming

who, after negotiations participated in by Herbert Hoover appointed by The President as the representative of the United States of America, have agreed upon the following articles:

Article I

The major purposes of this compact are to provide for the equitable division and apportionment of the use of the waters of the Colorado River System; to establish the relative importance of different beneficial uses of water; to promote interstate comity; to remove causes of present and future controversies; and to secure the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from floods. To these ends the Colorado River Basin is divided into two Basins, and an apportionment of the use of part of the water of the Colorado River System is made to each of them with the provision that further equitable apportionments may be made.

Appendix 2

ARTICLE II

As used in this compact—

(a) The term "Colorado River System" means that portion of the Colorado River and its tributaries within the United States of America.

(b) The term "Colorado River Basin" means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied.

(c) The term "States of the Upper Division" means the States of Colorado, New Mexico, Utah, and Wyoming.

(d) The term "States of the Lower Division" means the States of Arizona, California, and Nevada.

(e) The term "Lee Ferry" means a point in the main stream of the Colorado River one mile below the mouth of the Paria River.

(f) The term "Upper Basin" means those parts of the States of Arizona, Colorado, New Mexico, Utah, and Wyoming within and from which waters naturally drain into the Colorado River System above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the System above Lee Ferry.

(g) The term "Lower Basin" means those parts of the States of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River System below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the System below Lee Ferry.

(h) The term "domestic use" shall include the use of water for household, stock, municipal, mining, milling, in-

dustrial, and other like purposes, but shall exclude the generation of electrical power.

ARTICLE III

(a) There is hereby apportioned from the Colorado River System in perpetuity to the Upper Basin and to the Lower Basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.

(b) In addition to the apportionment in paragraph (a), the Lower Basin is hereby given the right to increase its beneficial consumptive use of such waters by one million acre-feet per annum.

(c) If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River System, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then, the burden of such deficiency shall be equally borne by the Upper Basin and the Lower Basin, and whenever necessary the States of the Upper Division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d).

(d) 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 reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification of this compact.

(e) The States of the Upper Division shall not withhold water, and the States of the Lower Division shall not

require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses.

(f) Further equitable apportionment of the beneficial uses of the waters of the Colorado River System unapportioned by paragraphs (a), (b), and (c) may be made in the manner provided in paragraph (g) at any time after October first, 1963, if and when either Basin shall have reached its total beneficial consumptive use as set out in paragraphs (a) and (b).

(g) In the event of a desire for a further apportionment as provided in paragraph (f) any two signatory States, acting through their Governors, may give joint notice of such desire to the Governors of the other signatory States and to The President of the United States of America, and it shall be the duty of the Governors of the signatory States and of The President of the United States of America forthwith to appoint representatives, whose duty it shall be to divide and apportion equitably between the Upper Basin and Lower Basin the beneficial use of the unapportioned water of the Colorado River System as mentioned in paragraph (f), subject to the legislative ratification of the signatory States and the Congress of the United States of America.

ARTICLE IV

(a) Inasmuch as the Colorado River has ceased to be navigable for commerce and the reservation of its waters for navigation would seriously limit the development of its Basin, the use of its waters for purposes of navigation shall be subservient to the uses of such waters for domestic, agricultural, and power purposes. If the Congress shall not consent to this paragraph, the other provisions of this compact shall nevertheless remain binding.

(b) Subject to the provisions of this compact, water of the Colorado River System may be impounded and used for the generation of electrical power, but such impounding and

use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

(c) The provisions of this article shall not apply to or interfere with the regulation and control by any State within its boundaries of the appropriation, use, and distribution of water.

ARTICLE V

The chief official of each signatory State charged with the administration of water rights, together with the Director of the United States Reclamation Service and the Director of the United States Geological Survey shall cooperate, ex-officio:

(a) To promote the systematic determination and coordination of the facts as to flow, appropriation, consumption, and use of water in the Colorado River Basin, and the interchange of available information in such matters.

(b) To secure the ascertainment and publication of the annual flow of the Colorado River at Lee Ferry.

(c) To perform such other duties as may be assigned by mutual consent of the signatories from time to time.

ARTICLE VI

Should any claim or controversy arise between any two or more of the signatory States: (a) with respect to the waters of the Colorado River System not covered by the terms of this compact; (b) over the meaning or performance of any of the terms of this compact; (c) as to the allocation of the burdens incident to the performance of any article of this compact or the delivery of waters as herein provided; (d) as to the construction or operation of works within the Colorado River Basin to be situated in two or more States, or to be constructed in one State for the bene-

fit of another State; or (e) as to the diversion of water in one State for the benefit of another State; the Governors of the States affected, upon the request of one of them, shall forthwith appoint Commissioners with power to consider and adjust such claim or controversy, subject to ratification by the Legislatures of the States so affected.

Nothing herein contained shall prevent the adjustment of any such claim or controversy by any present method or by direct future legislative action of the interested States.

ARTICLE VII

Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.

ARTICLE VIII

Present prefected rights to the beneficial use of waters of the Colorado River System are unimpaired by this compact. Whenever storage capacity of 5,000,000 acre-feet shall have been provided on the main Colorado River within or for the benefit of the Lower Basin, then claims of such rights, if any, by appropriators or users of water in the Lower Basin against appropriators or users of water in the Upper Basin shall attach to and be satisfied from water that may be stored not in conflict with Article III.

All other rights to beneficial use of waters of the Colorado River System shall be satisfied solely from the water apportioned to that Basin in which they are situate.

ARTICLE IX

Nothing in this compact shall be construed to limit or prevent any State from instituting or maintaining any action or proceeding, legal or equitable, for the protection of any right under this compact or the enforcement of any of its provisions.

Appendix 2

ARTICLE X

This compact may be terminated at any time by the unanimous agreement of the signatory States. In the event of such termination all rights established under it shall continue unimpaired.

ARTICLE XI

This compact shall become binding and obligatory when it shall have been approved by the Legislatures of each of the signatory States and by the Congress of the United States. Notice of approval by the Legislatures shall be given by the Governor of each signatory State to the Governors of the other signatory States and to the President of the United States, and the President of the United States is requested to give notice to the Governors of the signatory States of approval by the Congress of the United States.

IN WITNESS WHEREOF, the Commissioners have signed this compact in a single original, which shall be deposited in the archives of the Department of State of the United States of America and of which a duly certified copy shall be forwarded to the Governor of each of the signatory States.

DONE at the City of Santa Fe, New Mexico, this twenty-fourth day of November, A. D. One Thousand Nine Hundred and Twenty-two.

(Signed) W. S. NORVIEL.
(Signed) W. F. MCCLURE.
(Signed) DELPH E. CARPENTER.
(Signed) J. G. SCRUGHAM.
(Signed) STEPHEN B. DAVIS, JR.
(Signed) R. E. CALDWELL.
(Signed) FRANK C. EMERSON.

Approved:

(Signed) HERBERT HOOVER.

APPENDIX 3

Appendix 3

BOULDER CANYON PROJECT ACT

[PUBLIC—No. 642—70TH CONGRESS]
[H. R. 5773]

AN ACT To provide for the construction of works for the protection and development of the Colorado River Basin, for the approval of the Colorado River compact, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of controlling the floods, improving navigation and regulating the flow of the Colorado River, providing for storage and for the delivery of the stored waters thereof for reclamation of public lands and other beneficial uses exclusively within the United States, and for the generation of electrical energy as a means of making the project herein authorized a self-supporting and financially solvent undertaking, the Secretary of the Interior, subject to the terms of the Colorado River compact hereinafter mentioned, is hereby authorized to construct, operate, and maintain a dam and incidental works in the main stream of the Colorado River at Black Canyon or Boulder Canyon adequate to create a storage reservoir of a capacity of not less than twenty million acre-feet of water and a main canal and appurtenant structures located entirely within the United States connecting the Laguna Dam, or other suitable diversion dam, which the Secretary of the Interior is hereby authorized to construct if deemed necessary or advisable by him upon engineering or economic considerations, with the Imperial and Coachella Valleys in California, the expenditures for said main canal and appurtenant structures to be reimbursable, as provided in the reclamation law, and shall not be paid out of revenues derived from the sale or disposal of water power or electric energy at the dam authorized to be constructed at said Black Canyon or Boulder Canyon, or for water for potable purposes outside

of the Imperial and Coachella Valleys: *Provided, however,* That no charge shall be made for water or for the use, storage, or delivery of water for irrigation or water for potable purposes in the Imperial or Coachella Valleys; also to construct and equip, operate, and maintain at or near said dam, or cause to be constructed, a complete plant and incidental structures suitable for the fullest economic development of electrical energy from the water discharged from said reservoir; and to acquire by proceedings in eminent domain, or otherwise, all lands, rights-of-way, and other property necessary for said purposes.

SEC. 2. (a) There is hereby established a special fund, to be known as the "Colorado River Dam fund" (hereinafter referred to as the "fund"), and to be available, as hereafter provided, only for carrying out the provisions of this Act. All revenues received in carrying out the provisions of this Act shall be paid into and expenditures shall be made out of the fund, under the direction of the Secretary of the Interior.

(b) The Secretary of the Treasury is authorized to advance to the fund, from time to time and within the appropriations therefor, such amounts as the Secretary of the Interior deems necessary for carrying out the provisions of this Act, except that the aggregate amount of such advances shall not exceed the sum of $165,000,000. Of this amount the sum of $25,000,000 shall be allocated to flood control and shall be repaid to the United States out of 62½ per centum of revenues, if any, in excess of the amount necessary to meet periodical payments during the period of amortization, as provided in section 4 of this Act. If said sum of $25,000,000 is not repaid in full during the period of amortization, then 62½ per centum of all net revenues shall be applied to payment of the remainder. Interest at the rate of 4 per centum per annum accruing during the year upon the amounts so advanced and remaining unpaid shall be paid annually out of the fund, except as herein otherwise provided.

(c) Moneys in the fund advanced under subdivision (b) shall be available only for expenditures for construction and the payment of interest, during construction, upon the amounts so advanced. No expenditures out of the fund shall be made for operation and maintenance except from appropriations therefor.

(d) The Secretary of the Treasury shall charge the fund as of June 30 in each year with such amount as may be necessary for the payment of interest on advances made under subdivision (b) at the rate of 4 per centum per annum accrued during the year upon the amounts so advanced and remaining unpaid, except that if the fund is insufficient to meet the payment of interest the Secretary of the Treasury may, in his discretion, defer any part of such payment, and the amount so deferred shall bear interest at the rate of 4 per centum per annum until paid.

(e) The Secretary of the Interior shall certify to the Secretary of the Treasury, at the close of each fiscal year, the amount of money in the fund in excess of the amount necessary for construction, operation, and maintenance, and payment of interest. Upon receipt of each such certificate the Secretary of the Treasury is authorized and directed to charge the fund with the amount so certified as repayment of the advances made under subdivision (b), which amount shall be covered into the Treasury to the credit of miscellaneous receipts.

SEC. 3. There is hereby authorized to be appropriated from time to time, out of any money in the Treasury not otherwise appropriated, such sums of money as may be necessary to carry out the purposes of this Act, not exceeding in the aggregate $165,000,000.

SEC. 4. (a) This Act shall not take effect and no authority shall be exercised hereunder and no work shall be begun and no moneys expended on or in connection with the works or structures provided for in this Act, and no

water rights shall be claimed or initiated hereunder, and no steps shall be taken by the United States or by others to initiate or perfect any claims to the use of water pertinent to such works or structures unless and until (1) the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming shall have ratified the Colorado River compact, mentioned in section 13 hereof, and the President by public proclamation shall have so declared, or (2) if said States fail to ratify the said compact within six months from the date of the passage of this Act then, until six of said States, including the State of California, shall ratify said compact and shall consent to waive the provisions of the first paragraph of Article XI of said compact, which makes the same binding and obligatory only when approved by each of the seven States signatory thereto, and shall have approved said compact without conditions, save that of such six-State approval, and the President by public proclamation shall have so declared, and, further, until the State of California, by act of its legislature, shall agree irrevocably and unconditionally with the United States and for the benefit of the States of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, as an express covenant and in consideration of the passage of this Act, that the aggregate annual consumptive use (diversions less returns to the river) of water of and from the Colorado River for use in the State of California, including all uses under contracts made under the provisions of this Act and all water necessary for the supply of any rights which may now exist, shall not exceed four million four hundred thousand acre-feet of the waters apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact, plus not more than one-half of any excess or surplus waters unapportioned by said compact, such uses always to be subject to the terms of said compact.

The States of Arizona, California, and Nevada are authorized to enter into an agreement which shall provide (1) that of the 7,500,000 acre-feet annually apportioned to the lower basin by paragraph (a) of Article III of the Colorado River compact, there shall be apportioned to the

State of Nevada 300,000 acre-feet and to the State of Arizona 2,800,000 acre-feet for exclusive beneficial consumptive use in perpetuity, and (2) that the State of Arizona may annually use one-half of the excess or surplus waters unapportioned by the Colorado River compact, and (3) that the State of Arizona shall have the exclusive beneficial consumptive use of the Gila River and its tributaries within the boundaries of said State, and (4) that the waters of the Gila River and its tributaries, except return flow after the same enters the Colorado River, shall never be subject to any diminution whatever by any allowance of water which may be made by treaty or otherwise to the United States of Mexico but if, as provided in paragraph (c) of Article III of the Colorado River compact, it shall become necessary to supply water to the United States of Mexico from waters over and above the quantities which are surplus as defined by said compact, then the State of California shall and will mutually agree with the State of Arizona to supply, out of the main stream of the Colorado River, one-half of any deficiency which must be supplied to Mexico by the lower basin, and (5) that the State of California shall and will further mutually agree with the States of Arizona and Nevada that none of said three States shall withhold water and none shall require the delivery of water, which cannot reasonably be applied to domestic and agricultural uses, and (6) that all of the provisions of said tri-State agreement shall be subject in all particulars to the provisions of the Colorado River compact, and (7) said agreement to take effect upon the ratification of the Colorado River compact by Arizona, California, and Nevada.

(b) Before any money is appropriated for the construction of said dam or power plant, or any construction work done or contracted for, the Secretary of the Interior shall make provision for revenues by contract, in accordance with the provisions of this Act, adequate in his judgment to insure payment of all expenses of operation and maintenance of said works incurred by the United States and the repayment, within fifty years from the date of the com-

pletion of said works, of all amounts advanced to the fund under subdivision (b) of section 2 for such works, together with interest thereon made reimbursable under this Act.

Before any money is appropriated for the construction of said main canal and appurtenant structures to connect the Laguna Dam with the Imperial and Coachella Valleys in California, or any construction work is done upon said canal or contracted for, the Secretary of the Interior shall make provision for revenues, by contract or otherwise, adequate in his judgment to insure payment of all expenses of construction, operation, and maintenance of said main canal and appurtenant structures in the manner provided in the reclamation law.

If during the period of amortization the Secretary of the Interior shall receive revenues in excess of the amount necessary to meet the periodical payments to the United States as provided in the contract, or contracts, executed under this Act, then, immediately after the settlement of such periodical payments, he shall pay to the State of Arizona 18¾ per centum of such excess revenues and to the State of Nevada 18¾ per centum of such excess revenues.

Sec. 5. That the Secretary of the Interior is hereby authorized, under such general regulations as he may prescribe, to contract for the storage of water in said reservoir and for the delivery thereof at such points on the river and on said canal as may be agreed upon, for irrigation and domestic uses, and generation of electrical energy and delivery at the switchboard to States, municipal corporations, political subdivisions, and private corporations of electrical energy generated at said dam, upon charges that will provide revenue which, in addition to other revenue accruing under the reclamation law and under this Act, will in his judgment cover all expenses of operation and maintenance incurred by the United States on account of works constructed under this Act and the payments to the United States under subdivision (b) of section 4. Contracts respecting water for irrigation and domestic uses shall be for

permanent service and shall conform to paragraph (a) of section 4 of this Act. No person shall have or be entitled to have the use for any purpose of the water stored as aforesaid except by contract made as herein stated.

After the repayments to the United States of all money advanced with interest, charges shall be on such basis and the revenues derived therefrom shall be kept in a separate fund to be expended within the Colorado River Basin as may hereafter be prescribed by the Congress.

General and uniform regulations shall be prescribed by the said Secretary for the awarding of contracts for the sale and delivery of electrical energy, and for renewals under subdivision (b) of this section, and in making such contracts the following shall govern:

(a) No contract for electrical energy or for generation of electrical energy shall be of longer duration than fifty years from the date at which such energy is ready for delivery.

Contracts made pursuant to subdivision (a) of this section shall be made with a view to obtaining reasonable returns and shall contain provisions whereby at the end of fifteen years from the date of their execution and every ten years thereafter, there shall be readjustment of the contract, upon the demand of either party thereto, either upward or downward as to price, as the Secretary of the Interior may find to be justified by competitive conditions at distributing points or competitive centers, and with provisions under which disputes or disagreements as to interpretation or performance of such contract shall be determined either by arbitration or court proceedings, the Secretary of the Interior being authorized to act for the United States in such readjustments or proceedings.

(b) The holder of any contract for electrical energy not in default thereunder shall be entitled to a renewal thereof upon such terms and conditions as may be authorized or required under the then existing laws and regulations, unless the property of such holder dependent for its usefulness on a continuation of the contract be purchased

or acquired and such holder be compensated for damages to its property, used and useful in the transmission and distribution of such electrical energy and not taken, resulting from the termination of the supply.

(c) Contracts for the use of water and necessary privileges for the generation and distribution of hydroelectric energy or for the sale and delivery of electrical energy shall be made with responsible applicants therefor who will pay the price fixed by the said Secretary with a view to meeting the revenue requirements herein provided for. In case of conflicting applications, if any, such conflicts shall be resolved by the said Secretary, after hearing, with due regard to the public interest, and in conformity with the policy expressed in the Federal Water Power Act as to conflicting applications for permits and licenses, except that preference to applicants for the use of water and appurtenant works and privileges necessary for the generation and distribution of hydroelectric energy, or for delivery at the switchboard of a hydroelectric plant, shall be given, first, to a State for the generation or purchase of electric energy for use in the State, and the States of Arizona, California, and Nevada shall be given equal opportunity as such applicants.

The rights covered by such preference shall be contracted for by such State within six months after notice by the Secretary of the Interior and to be paid for on the same terms and conditions as may be provided in other similar contracts made by said Secretary: *Provided, however,* That no application of a State or a political subdivision for an allocation of water for power purposes or of electrical energy shall be denied or another application in conflict therewith be granted on the ground that the bond issue of such State or political subdivision, necessary to enable the applicant to utilize such water and appurtenant works and privileges necessary for the generation and distribution of hydroelectric energy or the electrical energy applied for, has not been authorized or marketed, until after a reasonable time, to be determined by the said Secretary, has been

given to such applicant to have such bond issue authorized and marketed.

(d) Any agency receiving a contract for electrical energy equivalent to one hundred thousand firm horsepower, or more, may, when deemed feasible by the said Secretary, from engineering and economic considerations and under general regulations prescribed by him, be required to permit any other agency having contracts hereunder for less than the equivalent of twenty-five thousand firm horsepower, upon application to the Secretary of the Interior made within sixty days from the execution of the contract of the agency the use of whose transmission line is applied for, to participate in the benefits and use of any main transmission line constructed or to be constructed by the former for carrying such energy (not exceeding, however, one-fourth the capacity of such line), upon payment by such other agencies of a reasonable share of the cost of construction, operation, and maintenance thereof.

The use is hereby authorized of such public and reserved lands of the United States as may be necessary or convenient for the construction, operation, and maintenance of main transmission lines to transmit said electrical energy.

SEC. 6. That the dam and reservoir provided for by section 1 hereof shall be used: First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of present perfected rights in pursuance of Article VIII of said Colorado River compact; and third, for power. The title to said dam, reservoir, plant, and incidental works shall forever remain in the United States, and the United States shall, until otherwise provided by Congress, control, manage, and operate the same, except as herein otherwise provided: *Provided, however,* That the Secretary of the Interior may, in his discretion, enter into contracts of lease of a unit or units of any Government-built plant, with right to generate electrical energy, or, alternatively, to enter into contracts of lease for the use of water for the generation of

electrical energy as herein provided, in either of which events the provisions of section 5 of this Act relating to revenue, term, renewals, determination of conflicting applications, and joint use of transmission lines under contracts for the sale of electrical energy, shall apply.

The Secretary of the Interior shall prescribe and enforce rules and regulations conforming with the requirements of the Federal Water Power Act, so far as applicable, respecting maintenance of works in condition of repair adequate for their efficient operation, maintenance of a system of accounting, control of rates and service in the absence of State regulation or interstate agreement, valuation for rate-making purposes, transfers of contracts, contracts extending beyond the lease period, expropriation of excessive profits, recapture and/or emergency use by the United States of property of lessees, and penalties for enforcing regulations made under this Act of penalizing failure to comply with such regulations or with the provisions of this Act. He shall also conform with other provisions of the Federal Water Power Act and of the rules and regulations of the Federal Power Commission, which have been devised or which may be hereafter devised, for the protection of the investor and consumer.

The Federal Power Commission is hereby directed not to issue or approve any permits or licenses under said Federal Water Power Act upon or affecting the Colorado River or any of its tributaries, except the Gila River, in the States of Colorado, Wyoming, Utah, New Mexico, Nevada, Arizona, and California until this Act shall become effective as provided in section 4 herein.

SEC. 7. That the Secretary of the Interior may, in his discretion, when repayments to the United States of all money advanced, with interest, reimbursable hereunder, shall have been made, transfer the title to said canal and appurtenant structures, except the Laguna Dam and the main canal and appurtenant structures down to and including Syphon Drop, to the districts or other agencies of the United States having a beneficial interest therein in propor-

tion to their respective capital investments under such form of organization as may be acceptable to him. The said districts or other agencies shall have the privilege at any time of utilizing by contract or otherwise such power possibilities as may exist upon said canal, in proportion to their respective contributions or obligations toward the capital cost of said canal and appurtenant structures from and including the diversion works to the point where each respective power plant may be located. The net proceeds from any power development on said canal shall be paid into the fund and credited to said districts or other agencies on their said contracts, in proportion to their rights to develop power, until the districts or other agencies using said canal shall have paid thereby and under any contract or otherwise an amount of money equivalent to the operation and maintenance expense and cost of construction thereof.

SEC. 8. (a) The United States, its permittees, licensees, and contractees, and all users and appropriators of water stored, diverted, carried, and/or distributed by the reservoir, canals, and other works herein authorized, shall observe and be subject to and controlled by said Colorado River compact in the construction, management, and operation of said reservoir, canals, and other works and the storage, diversion, delivery, and use of water for the generation of power, irrigation, and other purposes, anything in this Act to the contrary notwithstanding, and all permits, licenses, and contracts shall so provide.

(b) Also the United States, in constructing, managing, and operating the dam, reservoir, canals, and other works herein authorized, including the appropriation, delivery, and use of water for the generation of power, irrigation, or other uses, and all users of water thus delivered and all users and appropriators of waters stored by said reservoir and/or carried by said canal, including all permittees and licensees of the United States or any of its agencies, shall observe and be subject to and controlled, anything to the contrary herein notwithstanding, by the terms of such

compact, if any, between the States of Arizona, California, and Nevada, or any two thereof, for the equitable division of the benefits, including power, arising from the use of water accruing to said States, subsidiary to and consistent with said Colorado River compact, which may be negotiated and approved by said States and to which Congress shall give its consent and approval on or before January 1, 1929; and the terms of any such compact concluded between said States and approved and consented to by Congress after said date: *Provided,* That in the latter case such compact shall be subject to all contracts, if any, made by the Secretary of the Interior under section 5 hereof prior to the date of such approval and consent by Congress.

SEC. 9. All lands of the United States found by the Secretary of the Interior to be practicable of irrigation and reclamation by the irrigation works authorized herein shall be withdrawn from public entry. Thereafter, at the direction of the Secretary of the Interior, such lands shall be opened for entry, in tracts varying in size but not exceeding one hundred and sixty acres, as may be determined by the Secretary of the Interior, in accordance with the provisions of the reclamation law, and any such entryman shall pay an equitable share in accordance with the benefits received, as determined by the said Secretary, of the construction cost of said canal and appurtenant structures; said payments to be made in such installments and at such times as may be specified by the Secretary of the Interior, in accordance with the provisions of the said reclamation law, and shall constitute revenue from said project and be covered into the fund herein provided for: *Provided,* That all persons who served in the United States Army, Navy, Marine Corps, or Coast Guard during World War II, the War with Germany, the War with Spain, or in the suppression of the insurrection in the Philippines, and who have been honorably separated or discharged therefrom or placed in the Regular Army or Naval Reserve, shall have the exclusive preference right for a period of three months to enter said lands, subject, however, to the provisions of sub-

section (c) of section 4 of the Act of December 5, 1924 (43 Stat. 672, 702; 43 U. S. C., sec. 433); and also, so far as practicable, preference shall be given to said persons in all construction work authorized by this chapter: *Provided further,* That the above exclusive preference rights shall apply to veteran settlers on lands watered from the Gila canal in Arizona the same as to veteran settlers on lands watered from the All-American canal in California: *Provided further,* That in the event such an entry shall be relinquished at any time prior to actual residence upon the land by the entryman for not less than one year, lands so relinquished shall not be subject to entry for a period of sixty days after the filing and notation of the relinquishment in the local land office, and after the expiration of said sixty-day period such lands shall be open to entry, subject to the preference in this section provided.[1]

SEC. 10. That nothing in this Act shall be construed as modifying in any manner the existing contract, dated October 23, 1918, between the United States and the Imperial Irrigation District, providing for a connection with Laguna Dam; but the Secretary of the Interior is authorized to enter into contract or contracts with the said district or other districts, persons, or agencies for the construction, in accordance with this Act, of said canal and appurtenant structures, and also for the operation and maintenance thereof, with the consent of the other users.

SEC. 11. That the Secretary of the Interior is hereby authorized to make such studies, surveys, investigations, and do such engineering as may be necessary to determine the lands in the State of Arizona that should be embraced within the boundaries of a reclamation project, heretofore commonly known and hereafter to be known as the Parker-Gila Valley reclamation project, and to recommend the most practicable and feasible method of irrigating lands within said project, or units thereof, and the cost of the

[1]As amended by act of March 6, 1946 (60 Stat. 36).

same; and the appropriation of such sums of money as may be necessary for the aforesaid purposes from time to time is hereby authorized. The Secretary shall report to Congress as soon as practicable, and not later than December 10, 1931, his findings, conclusions, and recommendations regarding such project.

SEC. 12. "Political subdivision" or "political subdivisions" as used in this Act shall be understood to include any State, irrigation or other district, municipality, or other governmental organization.

"Reclamation law" as used in this Act shall be understood to mean that certain Act of the Congress of the United States approved June 17, 1902, entitled "An Act appropriating the receipts from the sale and disposal of public land in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," and the Acts amendatory thereof and supplemental thereto.

"Maintenance" as used herein shall be deemed to include in each instance provision for keeping the works in good operating condition.

"The Federal Water Power Act," as used in this Act, shall be understood to mean that certain Act of Congress of the United States approved June 10, 1920, entitled "An Act to create a Federal Power Commission; to provide for the improvement of navigation; the development of water power; the use of the public lands in relation thereto; and to repeal section 18 of the River and Harbor Appropriation Act, approved August 8, 1917, and for other purposes," and the Acts amendatory thereof and supplemental thereto.

"Domestic" whenever employed in this Act shall include water uses defined as "domestic" in said Colorado River compact.

SEC. 13. (a) The Colorado River compact signed at Santa Fe, New Mexico, November 24, 1922, pursuant to Act of Congress approved August 19, 1921, entitled "An Act to permit a compact or agreement between the States of Arizona, California, Colorado, Nevada, New Mexico,

Utah, and Wyoming respecting the disposition and apportionment of the waters of the Colorado River, and for other purposes," is hereby approved by the Congress of the United States, and the provisions of the first paragraph of article 11 of the said Colorado River compact, making said compact binding and obligatory when it shall have been approved by the legislature of each of the signatory States, are hereby waived, and this approval shall become effective when the State of California and at least five of the other States mentioned, shall have approved or may hereafter approve said compact as aforesaid and shall consent to such waiver, as herein provided.

(b) The rights of the United States in or to waters of the Colorado River and its tributaries howsoever claimed or acquired, as well as the rights of those claiming under the United States, shall be subject to and controlled by said Colorado River compact.

(c) Also all patents, grants, contracts, concessions, leases, permits, licenses, rights-of-way, or other privileges from the United States or under its authority, necessary or convenient for the use of waters of the Colorado River or its tributaries, or for the generation or transmission of electrical energy generated by means of the waters of said river or its tributaries, whether under this Act, the Federal Water Power Act, or otherwise, shall be upon the express condition and with the express covenant that the rights of the recipients or holders thereof to waters of the river or its tributaries, for the use of which the same are necessary, convenient, or incidental, and the use of the same shall likewise be subject to and controlled by said Colorado River compact.

(d) The conditions and covenants referred to herein shall be deemed to run with the land and the right, interest, or privilege therein and water right, and shall attach as a matter of law, whether set out or referred to in the instrument evidencing any such patent, grant, contract, concession, lease, permit, license, right-of-way, or other privilege from the United States or under its authority, or not, and

shall be deemed to be for the benefit of and be available to the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, and the users of water therein or thereunder, by way of suit, defense, or otherwise, in any litigation respecting the waters of the Colorado River or its tributaries.

SEC. 14. This Act shall be deemed a supplement to the reclamation law, which said reclamation law shall govern the construction, operation, and management of the works herein authorized, except as otherwise herein provided.

SEC. 15. The Secretary of the Interior is authorized and directed to make investigation and public reports of the feasibility of projects for irrigation, generation of electric power, and other purposes in the States of Arizona, Nevada Colorado, New Mexico, Utah, and Wyoming for the purpose of making such information available to said States and to the Congress, and of formulating a comprehensive scheme of control and the improvement and utilization of the water of the Colorado River and its tributaries. The sum of $250,000 is hereby authorized to be appropriated from said Colorado River Dam fund, created by section 2 of this Act, for such purposes.

SEC. 16. In furtherance of any comprehensive plan formulated hereafter for the control, improvement, and utilization of the resources of the Colorado River system and to the end that the project authorized by this Act may constitute and be administered as a unit in such control, improvement, and utilization, any commission or commissioner duly authorized under the laws of any ratifying State in that behalf shall have the right to act in an advisory capacity to and in cooperation with the Secretary of the Interior in the exercise of any authority under the provisions of sections 4, 5, and 14 of this Act, and shall have at all times access to records of all Federal agencies empowered to act under said sections, and shall be entitled to have copies of said records on request.

SEC. 17. Claims of the United States arising out of any contract authorized by this Act shall have priority over all others, secured or unsecured.

SEC. 18. Nothing herein shall be construed as interfering with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control, and use of waters within their borders, except as modified by the Colorado River compact or other interstate agreement.

SEC. 19. That the consent of Congress is hereby given to the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming to negotiate and enter into compacts or agreements, supplemental to and in conformity with the Colorado River compact and consistent with this Act for a comprehensive plan for the development of the Colorado River and providing for the storage, diversion, and use of the waters of said river. Any such compact or agreement may provide for the construction of dams, headworks, and other diversion works or structures for flood control, reclamation, improvement of navigation, division of water, or other purposes and/or the construction of power houses or other structures for the purpose of the development of water power and the financing of the same; and for such purposes may authorize the creation of interstate commissions and/or the creation of corporations, authorities, or other instrumentalities.

(a) Such consent is given upon condition that a representative of the United States, to be appointed by the President, shall participate in the negotiations and shall make report to Congress of the proceedings and of any compact or agreement entered into.

(b) No such compact or agreement shall be binding or obligatory upon any of such States unless and until it has been approved by the legislature of each of such States and by the Congress of the United States.

SEC. 20. Nothing in this Act shall be construed as a denial or recognition of any rights, if any, in Mexico to the use of the waters of the Colorado River system.

SEC. 21. That the short title of this Act shall be "Boulder Canyon Project Act."

Approved, December 21, 1928.

APPENDIX 4

Appendix 4

CALIFORNIA LIMITATION ACT

(Act of March 4, 1929; Ch. 16, 48th Sess.; Statutes and Amendments to the Codes, 1929, pp. 38-39)

CHAPTER 16

An act to limit the use by California of the waters of the Colorado river in compliance with the act of congress known as the "Boulder canyon project act," approved December 21, 1928, in the event the Colorado river compact is not approved by all of the states signatory thereto

(Approved by the Governor March 4, 1929; in effect August 14, 1929)

The people of the State of California do enact as follows:

SECTION 1. In the event the Colorado river compact signed at Santa Fe, New Mexico, November 24, 1922, and approved by and set out at length in that certain act entitled "An act to ratify and approve the Colorado river compact, signed at Santa Fe, New Mexico, November 24, 1922, to repeal conflicting acts and resolutions and directing that notice be given by the governor of such ratifications and approval," approved January 10, 1929 (statutes 1929, chapter 1), is not approved within six months from the date of the passage of that certain act of the congress of the United States known as the "Boulder canyon project act," approved December 21, 1928, by the legislatures of each of the seven states signatory thereto, as provided by article eleven of the said Colorado river compact, then when six of said states, including California, shall have ratified and approved said compact, and shall have consented to waive the provisions of the first paragraph of article eleven of said compact which makes the same binding and obligatory when approved by each of the states signatory thereto, and shall have approved said compact without conditions save that of

such six states approval and the President by public proclamation shall have so declared, as provided by the said "Boulder canyon project act," the State of California as of the date of such proclamation agrees irrevocably and unconditionally with the United States and for the benefit of the states of Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming as an express covenant and in consideration of the passage of the said "Boulder canyon project act" that the aggregate annual consumptive use (diversions less returns to the river) of water of and from the Colorado river for use in the State of California including all uses under contracts made under the provisions of said "Boulder canyon project act," and all water necessary for the supply of any rights which may now exist, shall not exceed four million four hundred thousand acre-feet of the waters apportioned to the lower basin states by paragraph "a" of article three of the said Colorado river compact, plus not more than one-half of any excess or surplus waters unapportioned by said compact, such uses always to be subject to the terms of said compact.

SEC. 2. By this act the State of California intends to comply with the conditions respecting limitation on the use of water as specified in subdivision 2 of section 4 (a) of the said "Boulder canyon project act" and this act shall be so construed.

APPENDIX 5

Appendix 5

ARIZONA CONTRACT OF FEBRUARY 9, 1944 (EFFECTIVE FEBRUARY 24, 1944)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

BOULDER CANYON PROJECT
ARIZONA-CALIFORNIA-NEVADA

CONTRACT FOR DELIVERY OF WATER

THIS CONTRACT made this 9th day of February 1944 pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplemental thereto, all of which acts are commonly known and referred to as the Reclamation Law, and particularly pursuant to the Act of Congress approved December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, and acts amendatory thereof or supplementary thereto, between THE UNITED STATES OF AMERICA, hereinafter referred to as "United States," acting for this purpose by Harold L. Ickes, Secretary of the Interior, hereinafter referred to as the "Secretary," and the STATE OF ARIZONA, hereinafter referred to as "Arizona," acting for this purpose by the Colorado River Commission of Arizona, pursuant to Chapter 46 of the 1939 Session Laws of Arizona,

Witnesseth that:

EXPLANATORY RECITALS

2. Whereas for the purpose of controlling floods, improving navigation, regulating the flow of the Colorado River, providing for storage and for the delivery of stored waters for the reclamation of public lands and other beneficial uses exclusively within the United States, the Secretary acting under and in pursuance of the provisions of the Colorado River Compact and Boulder Canyon Project Act, and acts amendatory thereof or supplementary thereto, has constructed and is now operating and maintaining in the

main stream of the Colorado River at Black Canyon that certain structure known as and designated Boulder Dam and incidental works, creating thereby a reservoir designated Lake Mead of a capacity of about thirty-two million (32,000,000) acre-feet; and

3. Whereas said Boulder Canyon Project Act provides that the Secretary, under such general rules and regulations as he may prescribe, may contract for the storage of water in the reservoir created by Boulder Dam, and for the delivery of such water at such points on the river as may be agreed upon, for irrigation and domestic uses, and provides further that no person shall have or be entitled to have the use for any purpose of the water stored, as aforesaid, except by contract made as stated in said Act; and

4. Whereas it is the desire of the parties to this contract to contract for the storage of water and the delivery thereof for irrigation of lands and domestic uses within Arizona; and

5. Whereas nothing in this contract shall be construed as affecting the obligations of the United States to Indian tribes:

6. Now, therefore, in consideration of the mutual covenants herein contained, the parties hereto agree as follows, to wit:

DELIVERY OF WATER

7. (a) Subject to the availability thereof for use in Arizona under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, the United States shall deliver and Arizona, or agencies or water users therein, will accept under this contract each calendar year from storage in Lake Mead, at a point or points of diversion on the Colorado River approved by the Secretary, so much water as may be necessary for the beneficial consumptive use

for irrigation and domestic uses in Arizona of a maximum of 2,800,000 acre-feet.

(b) The United States also shall deliver from storage in Lake Mead for use in Arizona, at a point or points of diversion on the Colorado River approved by the Secretary, for the uses set forth in subdivision (a) of this Article, one-half of any excess or surplus waters unapportioned by the Colorado River Compact to the extent such water is available for use in Arizona under said compact and said act, less such excess or surplus water unapportioned by said compact as may be used in Nevada, New Mexico, and Utah in accordance with the rights of said states as stated in subdivisions (f) and (g) of this Article.

(c) This contract is subject to the condition that Boulder Dam and Lake Mead shall be used: First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of perfected rights in pursuance of Article VIII of the Colorado River Compact; and third, for power. This contract is made upon the express condition and with the express covenant that the United States and Arizona, and agencies and water users therein, shall observe and be subject to and controlled by said Colorado River Compact and the Boulder Canyon Project Act in the construction, management, and operation of Boulder Dam, Lake Mead, canals and other works, and the storage, diversion, delivery, and use of water for the generation of power, irrigation, and other uses.

(d) The obligation to deliver water at or below Boulder Dam shall be diminished to the extent that consumptive uses now or hereafter existing in Arizona above Lake Mead diminish the flow into Lake Mead, and such obligation shall be subject to such reduction on account of evaporation, reservoir and river losses, as may be required to render this contract in conformity with said compact and said act.

(e) This contract is for permanent service, subject to the conditions stated in subdivision (c) of this Article, but

as to the one-half of the waters of the Colorado River system unapportioned by paragraphs (a), (b), and (c) of Article III of the Colorado River Compact, such water is subject to further equitable apportionment at any time after October 1, 1963, as provided in Article III (f) and Article III (g) of the Colorado River Compact.

(f) Arizona recognizes the right of the United States and the State of Nevada to contract for the delivery from storage in Lake Mead for annual beneficial consumptive use within Nevada for agricultural and domestic uses of 300,000 acre-feet of the water apportioned to the Lower Basin by the Colorado River Compact, and in addition thereto to make contract for like use of 1/25 (one twenty-fifth) of any excess or surplus waters available in the Lower Basin and unapportioned by the Colorado River Compact, which waters are subject to further equitable apportionment after October 1, 1963, as provided in Article III (f) and Article III (g) of the Colorado River Compact.

(g) Arizona recognizes the rights of New Mexico and Utah to equitable shares of the water apportioned by the Colorado River Compact to the Lower Basin and also water unapportioned by such compact, and nothing contained in this contract shall prejudice such rights.

(h) Arizona recognizes the right of the United States and agencies of the State of California to contract for storage and delivery of water from Lake Mead for beneficial consumptive use in California, provided that the aggregate of all such deliveries and uses in California from the Colorado River shall not exceed the limitation of such uses in that State required by the provisions of the Boulder Canyon Project Act and agreed to by the State of California by an act of its Legislature (Chapter 16, Statutes of California of 1929) upon which limitation the State of Arizona expressly relies.

(i) Nothing in this contract shall preclude the parties hereto from contracting for storage and delivery above Lake Mead of water herein contracted for, when and if authorized by law.

(j) As far as reasonable diligence will permit, the water provided for in this contract shall be delivered as ordered and as reasonably required for domestic and irrigation uses within Arizona. The United States reserves the right to discontinue or temporarily reduce the amount of water to be delivered, for the purpose of investigation and inspection, maintenance, repairs, replacements, or installation of equipment or machinery at Boulder Dam, or other dams heretofore or hereafter to be constructed, but so far as feasible will give reasonable notice in advance of such temporary discontinuance or reduction.

(k) The United States, its officers, agents, and employees shall not be liable for damages when for any reason whatsoever suspensions or reductions in the delivery of water occur.

(l) Deliveries of water hereunder shall be made for use within Arizona to such individuals, irrigation districts, corporations or political subdivisions therein of Arizona as may contract therefor with the Secretary, and as may qualify under the Reclamation Law or other federal statutes or to lands of the United States within Arizona. All consumptive uses of water by users in Arizona, of water diverted from Lake Mead or from the main stream of the Colorado River below Boulder Dam, whether made under this contract or not, shall be deemed, when made, a discharge pro tanto of the obligation of this contract. Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this contract.

(m) Rights-of-way across public lands necessary or convenient for canals to facilitate the full utilization in Arizona of the water herein agreed to be delivered will be granted by the Secretary subject to applicable federal statutes.

POINTS OF DIVERSION: MEASUREMENTS OF WATER

8. The water to be delivered under this contract shall be measured at the points of diversion, or elsewhere as the

Secretary may designate (with suitable adjustment for losses between said points of diversion and measurement), by measuring and controlling devices or automatic gauges approved by the Secretary, which devices, however, shall be furnished, installed, and maintained by Arizona, or the users of water therein, in manner satisfactory to the Secretary; said measuring and controlling devices or automatic gauges shall be subject to the inspection of the United States, whose authorized representatives may at all times have access to them, and any deficiencies found shall be promptly corrected by the users thereof. The United States shall be under obligation to deliver water only at diversion points where measuring and controlling devices or automatic gauges are maintained, in accordance with this contract, but in the event diversions are made at points where such devices are not maintained, the Secretary shall estimate the quantity of such diversions and his determination thereof shall be final.

CHARGES FOR STORAGE AND DELIVERY OF WATER

9. No charge shall be made for the storage or delivery of water at diversion points as herein provided necessary to supply present perfected rights in Arizona. A charge of 50¢ per acre-foot shall be made for all water actually diverted directly from Lake Mead during the Boulder Dam cost repayment period, which said charge shall be paid by the users of such water, subject to reduction by the Secretary in the amount of the charge if it is concluded by him at any time during said cost-repayment period that such charge is too high. After expiration of the cost-repayment period, charges shall be on such basis as may hereafter be prescribed by Congress. Charges for the storage or delivery of water diverted at a point or points below Boulder Dam, for users, other than those specified above, shall be as agreed upon between the Secretary and such users at the time of execution of contracts therefor, and shall be paid by such users; provided such charges shall, in no event, exceed 25¢ per acre-foot.

Appendix 5

RESERVATIONS

10. Neither Article 7, nor any other provision of this contract, shall impair the right of Arizona and other states and the users of water therein to maintain, prosecute or defend any action respecting, and is without prejudice to, any of the respective contentions of said states and water users as to (1) the intent, effect, meaning, and interpretation of said compact and said act; (2) what part, if any, of the water used or contracted for by any of them falls within Article III (a) of the Colorado River Compact; (3) what part, if any, is within Article III (b) thereof; (4) what part, if any, is excess or surplus waters unapportioned by said Compact; and (5) what limitations on use, rights of use, and relative priorities exist as to the waters of the Colorado River system; provided, however, that by these reservations there is no intent to disturb the apportionment made by Article III (a) of the Colorado River Compact between the Upper Basin and the Lower Basin.

DISPUTES AND DISAGREEMENTS

11. Whenever a controversy arises out of this contract, and if the parties hereto then agree to submit the matter to arbitration, Arizona shall name one arbitrator and the Secretary shall name one arbitrator and the two arbitrators thus chosen shall meet within ten days after their selection and shall elect one other arbitrator within fifteen days after their first meeting, but in the event of their failure to name the third arbitrator within thirty days after their first meeting, such arbitrator not so selected shall be named by the Senior Judge of the United States Circuit Court of Appeals for the Tenth Circuit. The decision of any two of the three arbitrators thus chosen shall be a valid and binding award.

RULES AND REGULATIONS

12. The Secretary may prescribe and enforce rules and regulations governing the delivery and diversion of waters

hereunder, but such rules and regulations shall be promulgated, modified, revised or extended from time to time only after notice to the State of Arizona and opportunity is given to it to be heard. Arizona agrees for itself, its agencies and water users that in the operation and maintenance of the works for diversion and use of the water to be delivered hereunder, all such rules and regulations will be fully adhered to.

AGREEMENT SUBJECT TO COLORADO RIVER COMPACT

13. This contract is made upon the express condition and with the express covenant that all rights of Arizona, its agencies and water users, to waters of the Colorado River and its tributaries, and the use of the same, shall be subject to and controlled by the Colorado River Compact signed at Santa Fe, New Mexico, November 24, 1922, pursuant to the Act of Congress approved August 19, 1921 (42 Stat. 171), as approved by the Boulder Canyon Project Act.

EFFECTIVE DATE OF CONTRACT

14. This contract shall be of no effect unless it is unconditionally ratified by an Act of the Legislature of Arizona, within three years from the date hereof, and further, unless within three years from the date hereof the Colorado River Compact is unconditionally ratified by Arizona. When both ratifications are effective, this contract shall be effective.

INTEREST IN CONTRACT NOT TRANSFERABLE

15. No interest in or under this contract, except as provided by Article 7(1), shall be transferable by either party without the written consent of the other.

APPROPRIATION CLAUSE

16. The performance of this contract by the United States is contingent upon Congress making the necessary appropriations for expenditures for the completion and the operation and maintenance of any dams, power plants or

other works necessary to the carrying out of this contract, or upon the necessary allotments being made therefor by any authorized federal agency. No liability shall accrue against the United States, its officers, agents, or employees by reason of the failure of Congress to make any such appropriations or of any federal agency to make such allotments.

MEMBER-OF-CONGRESS CLAUSE

17. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

DEFINITIONS

18. Wherever terms used herein are defined in Article II of the Colorado River Compact or in Section 12 of the Boulder Canyon Project Act, such definitions shall apply in construing this contract.

19. In witness whereof the parties hereto have caused this contract to be executed the day and year first above written.

THE UNITED STATES OF AMERICA,

By (s) HAROLD L. ICKES,
Secretary of the Interior.

STATE OF ARIZONA, acting by and through its COLORADO RIVER COMMISSION,

By (s) HENRY S. WRIGHT, *Chairman.*
By (s) NELLIE T. BUSH, *Secretary.*

Approved this 11th day of February 1944:

(s) SIDNEY P. OSBORN,
Governor of the State of Arizona.

APPENDIX 6

Appendix 6

NEVADA CONTRACT OF MARCH 30, 1942

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

BOULDER CANYON PROJECT

ARIZONA-CALIFORNIA-NEVADA

CONTRACT FOR DELIVERY OF WATER

1. THIS CONTRACT, made this 30th day of March, nineteen hundred forty-two, pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all of which acts are commonly known and referred to as the Reclamation Law, and particularly pursuant to the Act of Congress approved December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, and acts amendatory thereof or supplementary thereto, between THE UNITED STATES OF AMERICA (hereinafter referred to as "United States"), acting for this purpose by Abe Fortas, Acting Secretary of the Interior (hereinafter referred to as the "Secretary"), and the STATE OF NEVADA, a body politic and corporate, and its Colorado River Commission (said Commission acting in the name of the State, but as principal in its own behalf as well as in behalf of the State; the term State as used in this contract being deemed to be both the State of Nevada and its Colorado River Commission), acting in pursuance of an act of the Legislature of the State of Nevada, entitled "An Act creating a commission to be known as the Colorado river commission of Nevada, defining its powers and duties, and making an appropriation for the expenses thereof, and repealing all acts and parts of acts in conflict with this act," approved March 20, 1935 (Chapter 71, Stats. of Nevada, 1935);

Witnesseth that:

EXPLANATORY RECITALS

2. Whereas for the purpose of controlling floods, improving navigation, regulating the flow of the Colorado River, providing for storage and for the delivery of stored waters for the reclamation of public lands and other beneficial uses exclusively within the United States, the Secretary, acting under and in pursuance of the provisions of the Colorado River Compact and the Boulder Canyon Project Act, and acts amendatory thereof or supplementary thereto, has constructed and is now operating and maintaining in the main stream of the Colorado River at Black Canyon that certain structure known as and designated Boulder Dam and incidental works, creating thereby a reservoir designated Lake Mead; and

3. Whereas the State is desirous of entering into a contract for the delivery to it of water from Lake Mead:

4. Now, therefore, in consideration of the mutual covenants herein contained, the parties hereto agree as follows, to wit:

DELIVERY OF WATER BY THE UNITED STATES

5. (a) Subject to the availability thereof for use in Nevada under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, the United States shall, from storage in Lake Mead, deliver to the State each year at a point or points to be selected by the State and approved by the Secretary, so much water as may be necessary to supply the State a total quantity not to exceed One Hundred Thousand (100,000) acre-feet each calendar year. The right of the State to contract for the delivery to it from storage in Lake Mead of additional water is not limited by this contract. Said water may be used only within the

State of Nevada, exclusively for irrigation, household, stock, municipal, mining, milling, industrial, and other like purposes, but shall not be used for the generation of electric power.

(b) Water agreed to be delivered to the State hereunder shall be delivered continuously as far as reasonable diligence will permit, but the United States shall not be obligated to deliver water to the State when for any reason, as conclusively but not arbitrarily determined by the Secretary, such delivery would interfere with the use of Boulder Dam or Lake Mead for river regulation, improvement of navigation, flood control, and/or satisfaction of perfected rights, in or to the waters of the Colorado River, or its tributaries, in pursuance of Article VIII of the Colorado River Compact.

(c) The United States reserves the right, for the purpose of investigation, inspection, maintenance, repairs and replacement or installation of equipment or machinery at Boulder Dam, to discontinue temporarily or reduce the amount of water to be delivered hereunder, but so far as feasible the United States will give the State reasonable notice in advance of such temporary discontinuance or reduction. The United States, its officers, agents, and employees shall not be liable for damages when, for any reason whatsoever, suspensions or reductions in delivery of water occur.

(d) This contract is for permanent service, and is made subject to the express condition that the State, upon request of the Secretary, shall submit in writing prior to January 1st of any year, an estimate of the amount of water to be required under this contract for the succeeding calendar year.

RECEIPT OF WATER BY THE STATE

6. The State shall receive the water to be diverted by or delivered to it by the United States under the terms hereof at the point or points of delivery to be hereafter designated as

stated in the next preceding article hereof, and shall perform all acts required by law or custom in order to maintain control over such water and to secure and maintain its lawful use and proper diversion from Lake Mead. The diversion and conveyance of such water to places of use shall be without expense to the United States.

MEASUREMENT OF WATER

7. The water to be delivered to the State hereunder shall be measured at the point or points of diversion from Lake Mead, or at such point or points in any works used by the State to convey water from Lake Mead to its place or places of use as shall be satisfactory to the Secretary, and by such measuring and controlling devices or such automatic gauges or otherwise as shall be satisfactory to the Secretary. Said measuring and controlling devices, or automatic gauges, shall be furnished, installed, and maintained in manner satisfactory to the Secretary, by and at the expense of the State, but they shall be and remain at all times under the complete control of the United States. The State's authorized representative shall be allowed access at all times to said measuring and controlling devices or automatic gauges.

RECORD OF WATER DIVERTED

8. The State shall make full and complete written monthly reports as directed by the Secretary on forms to be supplied by the United States of all water delivered to or diverted by the State from Lake Mead. Such reports shall be made by the fifth day of the month immediately succeeding the month in which the water is diverted.

CHARGE FOR DELIVERY OF WATER

9. A charge of fifty cents ($.50) per acre-foot shall be made for the diversion by or delivery of water to the State

hereunder during the Boulder Dam cost-repayment period, subject to reduction by the Secretary in the amount of the charge if studies show to his satisfaction that the charge is too high. Thereafter, charges shall be on such basis as may hereafter be prescribed by the Congress. Charges shall be made against the State only for the number of acre-feet of water actually delivered to or diverted by it from Lake Mead.

BILLING AND PAYMENTS

10. The State shall pay monthly for all water delivered to it hereunder, or diverted by it from Lake Mead, in accordance with the charge in Article nine (9) hereof established. The United States will submit bills to the State by the tenth day of each month immediately following the month during which the water is delivered or diverted and payments shall be due on the first day of the month immediately succeeding. If such charges are not paid when due, an interest charge of one per centum (1%) of the amount unpaid shall be added thereto as liquidated damages and, thereafter, as further liquidated damages, an additional interest charge of one per centum (1%) of the principal sum unpaid shall be added on the first day of each succeeding calendar month until the amount due, including such interest, is paid in full.

REFUSAL OF WATER IN CASE OF DEFAULT

11. The United States reserves the right to refuse to deliver water to the State, or to permit water to be diverted by the State from Lake Mead, in the event of default for a period of more than twelve (12) months in any payment due or to become due to the United States under this contract.

INSPECTION BY THE UNITED STATES

12. The Secretary or his representatives shall at all times have the right of ingress to and egress from all works of the

State for the purpose of inspection, repairs, and maintenance of works of the United States, and for all other proper purposes. In each contract made by the State for the redelivery of any part of the water agreed to be delivered to the State hereunder, it shall be provided, for the use and benefit of the United States, that the authorized representatives of the United States shall at all times have access to measuring and controlling devices, or automatic gauges, over the lands and rights of way of the contractee. The Secretary or his representatives shall also have free access at all reasonable times to the books and records of the State relating to the diversion and distribution of water delivered to or diverted by the State from Lake Mead with the right at any time during office hours to make copies of or from the same.

RULES AND REGULATIONS

13. There is reserved to the Secretary the right to prescribe and enforce rules and regulations governing the delivery and diversion of water hereunder. Such rules and regulations may be modified, revised, and/or extended from time to time after notice to the State and opportunity for it to be heard, as may be deemed proper, necessary, or desirable by the Secretary to carry out the true intent and meaning of the law and of this contract, or amendments hereof, or to protect the interests of the United States. The State hereby agrees that in the operation and maintenance of its diversion works and conduits, all such rules and regulations will be fully adhered to.

AGREEMENT SUBJECT TO COLORADO RIVER COMPACT

14. This contract is made upon the express condition and with the express understanding that all rights hereunder shall be subject to and controlled by the Colorado River Compact, being the compact or agreement signed at Santa Fe, New Mexico, November 24, 1922, pursuant to

an Act of Congress approved August 19, 1921, entitled "An Act to permit a compact or agreement between the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, respecting the disposition and apportionment of the waters of the Colorado River, and for other purposes", which compact was approved in section 13 (a) of the Boulder Canyon Project Act.

PRIORITY OF CLAIMS OF THE UNITED STATES

15. Claims of the United States arising out of this contract shall have priority over all others, secured or unsecured.

CONTRACT CONTINGENT UPON APPROPRIATIONS

16. This contract is subject to appropriations being made by Congress from time to time of money sufficient to provide for the doing and performance of all things on the part of the United States to be done and performed under the terms hereof, and to there being sufficient money available in the Colorado River Dam Fund for such purposes. No liability shall accrue against the United States, its officers, agents, or employees, by reason of sufficient money not being so appropriated, or on account of there not being sufficient money in the Colorado River Dam Fund for such purposes.

EFFECT OF WAIVER OF BREACH OF CONTRACT

17. All rights of action for breach of any of the provisions of this contract are reserevd to the United States as provided in Section 3737 of the Revised Statutes of the United States. The Waiver of a breach of any of the provisions of this contract shall not be deemed to be a waiver of any provision hereof, or of any other subsequent breach of any provision hereof.

Appendix 6

REMEDIES UNDER CONTRACT NOT EXCLUSIVE

18. Nothing contained in this contract shall be construed as in any manner abridging, limiting, or depriving the United States or the State of any means of enforcing any remedy either at law or in equity for the breach of any of the provisions hereof which it would otherwise have.

TRANSFER OF INTEREST IN CONTRACT

19. No voluntary transfer of this contract, or of the rights of the State hereunder, shall be made without the written approval of the Secretary; and any successor or assign of the rights of the State, whether by voluntary transfer, judicial sale, trustee's sale, or otherwise, shall be subject to all the conditions of the Boulder Canyon Project Act, and also subject to all the provisions and conditions of this contract to the same extent as though such successor or assign were the original contractor hereunder; provided, that the execution of a mortgage or trust deed, or judicial or trustee's sale made thereunder, shall not be deemed a voluntary transfer within the meaning of this Article.

NOTICES

20. (a) Any notice, demand, or request required or authorized by this contract to be given or made to or upon the United States shall be delivered, or mailed postage prepaid, to the Director of Power, United States Bureau of Reclamation, Boulder City, Nevada, except where, by the terms hereof, the same is to be given or made to or upon the Secretary, in which event it shall be delivered, or mailed postage prepaid, to the Secretary, at Washington, D. C.

(b) Any notice, demand or request required or authorized by this contract to be given or made to or upon the

State shall be delivered, or mailed postage prepaid, to the Secretary of the Colorado River Commission of Nevada, Carson City, Nevada.

(c) The designation of any person specified in this article or in any such request for notice, or the address of any such person, may be changed at any time by notice given in the same manner as provided in this article for other notices.

OFFICIALS NOT TO BENEFIT

21. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

UNCONTROLLABLE FORCES

22. Neither party shall be considered to be in default in respect to any obligation hereunder, if prevented from fulfilling such obligation by reason of uncontrollable forces, the term "uncontrollable forces" being deemed, for the purposes of this contract, to mean any cause beyond the control of the party affected, including but not limited to inadequacy of water, failure of facilities, flood, earthquake, storm, lightning, fire, epidemic, war, riot, civil disturbance, labor disturbance, sabotage, and restraint by court or public authority, which by exercise of due diligence and foresight, such party could not reasonably have been expected to avoid. Either party rendered unable to fulfill any obligation by reason of uncontrollable forces shall exercise due diligence

In witness whereof the parties hereto have caused this contract to be executed the day and year first above written.

THE UNITED STATES OF AMERICA,

By ABE FORTAS,
Acting Secretary of the Interior.

STATE OF NEVADA, acting by and through its Colorado River Commission,

By E. P. CARVILLE, *Chairman.*

Attest:

ALFRED MERRITT SMITH, *Secretary.*

By E. P. CARVILLE, *Chairman.*
COLORADO RIVER COMMISSION OF NEVADA,

[SEAL]

Attest:

ALFRED MERRITT SMITH, *Secretary.*

Ratified and approved this 21st day of April 1943.

E. P. CARVILLE,
Governor of the State of Nevada.

[GREAT SEAL OF THE STATE OF NEVADA]

Attest:

MALCOLM MCEACHIN,
Secretary of State.

Approved as to form:

ALAN BIBLE,
Attorney General of Nevada.

[Resolution and certificate omitted.]

APPENDIX 7

Appendix 7

NEVADA CONTRACT OF JANUARY 3, 1944

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

BOULDER CANYON PROJECT

ARIZONA-CALIFORNIA-NEVADA

SUPPLEMENTAL CONTRACT FOR DELIVERY OF WATER

1. THIS SUPPLEMENTAL CONTRACT made this 3rd day of January nineteen hundred forty-four, pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all of which acts are commonly known and referred to as the Reclamation Law, and particularly pursuant to the Act of Congress approved December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, and acts amendatory thereof or supplementary thereto, between THE UNITED STATES OF AMERICA (hereinafter referred to as "United States"), acting for this purpose by Harold L. Ickes, Secretary of the Interior (hereinafter styled "Secretary"), and STATE OF NEVADA, a body politic and corporate, and its Colorado River Commission (said Commission acting in the name of the State, but as principal in its own behalf as well as in behalf of the State; the term State as used in this supplemental contract being deemed to be both the State of Nevada and its Colorado River Commission), acting in pursuance of an act of the Legislature of the State of Nevada, entitled "An Act creating a commission to be known as the Colorado river commission of Nevada, defining its powers and duties, and making an appropriation for the expenses thereof, and repealing all acts and parts of acts in conflict with this act," approved March 20, 1935 (Chapter 71, Stats. of Nevada, 1935);

Witnesseth:

EXPLANATORY RECITALS

2. Whereas, under date of March 30, 1942, the parties hereto entered into a contract providing, among other things, for the delivery of water to the State each year, from storage in Lake Mead, subject to the availability thereof for use in Nevada under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, so much water as may be necessary to supply the State a total quantity not to exceed One Hundred Thousand (100,000) acre-feet each calendar year, and it is now desired to amend said contract so as to provide for the delivery each calendar year of not to exceed an additional 200,000 acre-feet of water to the State;

3. Now, therefore, in consideration of the mutual covenants herein contained, the parties hereto agree as follows, to wit:

DELIVERY OF WATER BY THE UNITED STATES

4. Article 5 (a) of the aforesaid contract of date March 30, 1942, is hereby amended to read as follows:

"Subject to the availability thereof for use in Nevada under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, the United States shall, from storage in Lake Mead, deliver to the State each year at a point or points to be selected by the State and approved by the Secretary, so much water, including all other waters diverted for use within the State of Nevada from the Colorado River system, as may be necessary to supply the State a total quantity not to exceed Three Hundred Thousand (300,000) acre-feet each calendar year. Said water may be used only within the State of Nevada, exclusively for irrigation, household, stock, municipal, mining, milling,

industrial, and other like purposes, but shall not be used for the generation of electric power."

MODIFICATION OF PRIOR CONTRACT

5. Except as expressly herein amended, the aforesaid contract of date March 30, 1942, shall be and remain in full force and effect.

EFFECTIVE DATE OF SUPPLEMENTAL CONTRACT

6. This supplemental contract shall be of full force and effect immediately upon its execution for and on behalf of the United States.

OFFICIALS NOT TO BENEFIT

7. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

In witness whereof, the parties hereto have caused this supplemental contract to be executed the day and year first above written.

THE UNITED STATES OF AMERICA,

By /s/ HAROLD L. ICKES,
Secretary of the Interior.

STATE OF NEVADA, acting by and through its Colorado River Commission,

By /s/ E. P. CARVILLE, *Chairman.*

Attest:

/s/ ALFRED MERRITT SMITH, *Secretary*

Appendix 7

COLORADO RIVER COMMISSION OF NEVADA,

By /s/ E. P. CARVILLE, *Chairman.*

Attest.

/s/ ALFRED MERRITT SMITH, *Secretary*

Ratified and approved this 3rd day of January 1944:

/s/ E. P. CARVILLE
Governor of the State of Nevada.

Attest:

/s/ MALCOLM MCEACHIN,
Secretary of State.

Approved as to form:

/s/ ALAN BIBLE,
Attorney General of Nevada.

APPENDIX 8

Appendix 8

PALO VERDE IRRIGATION DISTRICT CONTRACT OF FEBRUARY 7, 1933

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

BOULDER CANYON PROJECT

UNITED STATES AND PALO VERDE IRRIGATION DISTRICT CONTRACT FOR DELIVERY OF WATER

(1) THIS CONTRACT, made this 7th day of February nineteen hundred thirty-three, pursuant to the Act of Congress approved June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all of which acts are commonly known and referred to as the reclamation law, and particularly pursuant to the Act of Congress approved December 21, 1928 (45 Stat. 1057), designated the Boulder Canyon Project Act, between THE UNITED STATES OF AMERICA, hereinafter referred to as the United States, acting for this purpose by Harold L. Ickes, Secretary of the Interior, hereinafter styled the Secretary, and PALO VERDE IRRIGATION DISTRICT, an irrigation district created, organized, and existing under and by virtue of an act of the Legislature of the State of California approved June 21, 1923 (Chapter 452, Statutes of California, 1923), as amended, known as and designated "Palo Verde irrigation district act", with its principal office at Blythe, Riverside County, California, hereinafter referred to as the District;

Witnesseth:

EXPLANATORY RECITALS

(2) Whereas, for the purpose of controlling the floods, improving navigation and regulating the flow of the Colorado River, providing for storage and for the delivery of

the stored waters for reclamation of public lands and other beneficial uses exclusively within the United States, the Secretary, subject to the terms of the Colorado River Compact, is authorized to construct, operate and maintain a dam and incidental works in the main stream of the Colorado River at Black Canyon or Boulder Canyon, adequate to create a storage reservoir of a capacity of not less than twenty million acre-feet of water; and

(3) Whereas, after full consideration of the advantages of both the Black Canyon and Boulder Canyon dam sites, the Secretary has determined upon Black Canyon as the site of the aforesaid dam, hereinafter styled the Hoover Dam, creating thereby a reservoir to be hereinafter styled the Boulder Canyon Reservoir; and

(4) Whereas, the District is desirous of entering into a contract for the delivery to it of water from Boulder Canyon Reservoir, and it is to the mutual interest of the parties hereto that such contract be executed and the rights of the District in and to waters of the river be hereby defined.

(5) Now, therefore, in consideration of the mutual covenants herein contained, the parties hereto agree as follows, to wit:

DELIVERY OF WATER BY THE UNITED STATES

(6) The United States shall, from storage available in the Boulder Canyon Reservoir, deliver to the District each year at a point in the Colorado River immediately above the District's point of diversion known as Blythe Intake (or as relocated within two miles of the present intake) so much water as may be necessary to supply the District a total quantity, including all other waters diverted for use of the District from the Colorado River, in the amounts and with priorities in accordance with the recommendation of the Chief of the Division of Water Resources of the State of California, as follows (subject to availability thereof for

use in California under the Colorado River Compact and the Boulder Canyon Project Act):

"The waters of the Colorado River available for use within the State of California under the Colorado River Compact and the Boulder Canyon Project Act shall be apportioned to the respective interests below named and in amounts and with priorities therein named and set forth, as follows:

"SECTION 1. A first priority to Palo Verde Irrigation District for beneficial use exclusively upon lands in said District as it now exists and upon lands between said District and the Colorado River, aggregating (within and without said District) a gross area of 104,500 acres, such waters as may be required by said lands.

"SEC. 2. A second priority to Yuma Project of the United States Bureau of Reclamation for beneficial use upon not exceeding a gross area of 25,000 acres of land located in said project in California, such waters as may be required by said lands.

"SEC. 3. A third priority (a) to Imperial Irrigation District and other lands under or that will be served from the All-American Canal in Imperial and Coachella Valleys, and (b) to Palo Verde Irrigation District for use exclusively on 16,000 acres in that area known as the 'Lower Palo Verde Mesa,' adjacent to Palo Verde Irrigation District, for beneficial consumptive use, 3,850,000 acre-feet of water per annum less the beneficial consumptive use under the priorities designated in Sections 1 and 2 above. The rights designated (a) and (b) in this section are equal in priority. The total beneficial consumptive use under priorities stated in Sections 1, 2, and 3 of this article shall not exceed 3,850,000 acre-feet of water per annum.

"SEC. 4. A fourth priority to the Metropolitan Water District of Southern California and/or the City of Los Angeles, for beneficial consumptive use, by themselves

and/or others, on the Coastal Plain of Southern California, 550,000 acre-feet of water per annum.

"SEC. 5. A fifth priority (a) to The Metropolitan Water District of Southern California and/or the City of Los Angeles, for beneficial consumptive use, by themselves and/or others, on the Coastal Plain of Southern California, 550,000 acre-feet of water per annum and (b) to the City of San Diego and/or County of San Diego, for beneficial consumptive use, 112,000 acre-feet of water per annum. The rights designated (a) and (b) in this section are equal in priority.

"SEC. 6. A sixth priority (a) to Imperial Irrigation District and other lands under or that will be served from the All-American Canal in Imperial and Coachella Valleys, and (b) to Palo Verde Irrigation District for use exclusively on 16,000 acres in that area known as the 'Lower Palo Verde Mesa,' adjacent to Palo Verde Irrigation District, for beneficial consumptive use, 300,000 acre-feet of water per annum. The rights designated (a) and (b) in this section are equal in priority.

"SEC. 7. A seventh priority of all remaining water available for use within California, for agricultural use in the Colorado River Basin in California, as said basin is designated on Map No. 23000 of the Department of the Interior, Bureau of Reclamation.

"SEC. 8. So far as the rights of the allottees named above are concerned, the Metropolitan Water District of Southern California and/or the City of Los Angeles shall have the exclusive right to withdraw and divert into its aqueduct any water in Boulder Canyon Reservoir accumulated to the individual credit of said District and/or said City (not exceeding at any one time 4,750,000 acre-feet in the aggregate) by reason of reducing diversions by said District and/or said City; provided, that accumulations shall be subject to such conditions as to accumulation, retention, release and withdrawal as the Secretary of the In-

terior may from time to time prescribe in his discretion, and his determination thereof shall be final; provided further, that the United States of America reserves the right to make similar arrangements with users in other States without distinction in priority, and to determine the correlative relations between said District and/or said City and such users resulting therefrom.

"Sec. 9. In addition, so far as the rights of the allottees named above are concerned, the City of San Diego and/or County of San Diego shall have the exclusive right to withdraw and divert into an aqueduct any water in Boulder Canyon Reservoir accumulated to the individual credit of said City and/or said County (not exceeding at any one time 250,000 acre-feet in the aggregate) by reason of reduced diversions by said City and/or said County; provided, that accumulations shall be subject to such conditions as to accumulations, retention, release and withdrawal as the Secretary of the Interior may from time to time prescribe in his discretion, and his determination thereof shall be final; provided further, that the United States of America reserves the right to make similar arrangements with users in other States without distinction in priority, and to determine the correlative relations between the said City and/or said County and such users reulting therefrom.

"Sec. 10. In no event shall the amounts allotted in this agreement to the Metropolitan Water District of Southern California and/or the City of Los Angeles be increased on account of inclusion of a supply for both said District and said City, and either or both may use said apportionments as may be agreed by and between said District and said City.

"Sec. 11. In no event shall the amounts allotted in this agreement to the City of San Diego and/or to the County of San Diego be increased on account of inclusion of a supply for both said City and said County, and either or both may use said apportionments as may be agreed by and between said City and said County.

"SEC. 12. The priorities hereinbefore set forth shall be in no wise affected by the relative dates of water contracts executed by the Secretary of the Interior with the various parties."

The Secretary reserves the right to, and the District agrees that he may, contract with any of the allottees above named in accordance with the above stated recommendation. The District reserves the right to establish, at any time, by judicial determination, its rights to divert and/or use water from the Colorado River. In the event the above stated recommendation as to the District is superseded by an agreement between all the above allottees or by a final judicial determination, the parties hereto reserve the right to further contract in accordance with such agreement or such judicial determination; *Provided,* that priorities numbered fourth and fifth shall not thereby be disturbed.

As far as reasonable diligence will permit said water shall be delivered as ordered by the District, and as reasonably required for potable and irrigation purposes within the areas for which the District is allotted water as described in the above-stated recommendation. This contract is for permanent water service but is subject to the condition that Hoover Dam and Boulder Canyon Reservoir shall be used: First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of perfected rights in pursuance of Article VIII of the Colorado River Compact; and third, for power. This contract is made upon the express condition and with the express covenant that the District and the United States shall observe and be subject to, and controlled by, said Colorado River Compact in the construction, management, and operation of Hoover Dam, and other works and the storage, diversion, delivery, and use of water for the generation of power, irrigation, and other purposes. The United States reserves the right to temporarily discontinue or reduce the amount of water to be delivered for the purpose of investigation, inspection, maintenance, repairs, replacements, or installation of equipment and/or machinery at Hoover Dam, but as far as feasible the United States will

give the District reasonable notice in advance of such temporary discontinuance or reduction. The United States, its officers, agents, and employees shall not be liable for damages when, for any reason whatsoever, suspension or reductions in delivery of water occur. This contract neither prejudices nor admits any claim of the District on account of alleged changes in elevation of the river bed, howsoever caused, or the effect of such alleged changes on the District's diversion of water delivered hereunder. This contract is without prejudice to any other or additional rights which the District may now have not inconsistent with the foregoing provisions of this article, or may hereafter acquire in or to the waters of the Colorado River.

RECEIPT OF WATER BY DISTRICT

(7) The District shall receive the water to be delivered to it by the United States under the terms hereof at the point of delivery above stated, and shall at its own expense convey such water to its distribution system, and shall perform all acts required by law or custom in order to maintain its control over such water and to secure and maintain its lawful and proper diversion from the Colorado River.

MEASUREMENT OF WATER

(8) The water to be delivered hereunder shall be measured at Blythe Intake by such measuring and controlling devices or such automatic gauges or both, as shall be satisfactory to the Secretary. Said measuring and controlling devices, or automatic gauges, shall be furnished, installed, and maintained by and at the expense of the District, but they shall be and remain at all times under the complete control of the United States, whose authorized representatives may at all times have access to them over the lands and rights-of-way of the District.

RECORD OF WATER DIVERTED

(9) The District shall make full and complete written reports as directed by the Secretary, on forms to be supplied

by the United States, of all water diverted from the Colorado River, and the disposition thereof. The records and data from which such reports are made shall be accessible to the United States on demand of the Secretary.

NO CHARGE FOR DELIVERY OF WATER

(10) The District shall not be required to pay to the United States any tolls, rates, or charges of any kind for or on account of the storage or delivery of water hereunder.

INSPECTION BY THE UNITED STATES

(11) The Secretary or his representatives, shall at all times have the right of ingress to and egress from all works of the District for the purpose of inspection, repairs and maintenance of works of the United States, and for all other proper purposes. The Secretary or his representatives shall also have free access at all reasonable times to the books and records of the District relating to the diversion and distribution of water delivered to it hereunder with the right at any time during office hours to make copies of or from the same.

DISPUTES OR DISAGREEMENTS

(12) Disputes or disagreements as to the interpretation or performance of the provisions of this contract shall be determined either by arbitration or court proceedings, the Secretary being authorized to act for the United States in such proceedings. Whenever a controversy arises out of this contract, and the parties hereto agree to submit the matter to arbitration, the District shall name one arbitrator and the Secretary shall name one arbitrator, and the two arbitrators thus chosen shall elect three other arbitrators, but in the event of their failure to name all or any of the three arbitrators within thirty (30) days after their first meeting, such arbitrators not so elected, shall be named by the Senior Judge of the United States Circuit Court of Appeals for the Ninth Circuit. The decision of any three

of such arbitrators shall be a valid and binding award of the arbitrators.

RULES AND REGULATIONS

(13) There is reserved to the Secretary the right to prescribe and enforce rules and regulations not inconsistent with this contract, governing the diversion and delivery of water hereunder to the District and to other contractors. Such rules and regulations may be modified, revised and/or extended from time to time after notice to the District and opportunity for it to be heard, as may be deemed proper, necessary or desirable by the Secretary to carry out the true intent and meaning of the law and of this contract, or amendments thereof, or to protect the interests of the United States. The District hereby agrees that in the operation and maintenance of its diversion works at Blythe Intake, all such rules and regulations will be fully adhered to.

AGREEMENT SUBJECT TO COLORADO RIVER COMPACT

(14) This contract is made upon the express condition and with the express understanding that all rights based upon this contract shall be subject to and controlled by the Colorado River Compact, being the compact or agreement signed at Santa Fe, New Mexico, November 24, 1922, pursuant to Act of Congress approved August 19, 1921, entitled "An Act to permit a compact or agreement between the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, respecting the disposition and apportionment of the waters of the Colorado River, and for other purposes", which compact was approved by the Boulder Canyon Project Act.

PRIORITY OF CLAIMS OF THE UNITED STATES

(15) Claims of the United States arising out of this contract shall have priority over all others, secured or unsecured.

CONTINGENT UPON APPROPRIATIONS

(16) This contract is subject to appropriations being made by Congress from year to year of moneys sufficient to do the work contemplated hereby, and to there being sufficient moneys available in the Colorado River Dam fund to permit allotments to be made for the performance of such work. No liability shall accrue against the United States, its officers, agents, or employees, by reason of sufficient moneys not being so appropriated nor on account of there not being sufficient moneys in the Colorado River Dam fund to permit of said allotments. This agreement is also subject to the condition that if for any reason construction of Hoover Dam is not prosecuted to completion with reasonable diligence, then and in such event either party hereto may terminate its obligations hereunder upon one (1) year's written notice to the other party hereto.

RIGHTS RESERVED UNDER SECTION 3737, REVISED STATUTES

(17) All rights of action for breach of any of the provisions of this contract are reserved to the United States as provided in Section 3737 of the Revised Statutes of the United States.

REMEDIES UNDER CONTRACT NOT EXCLUSIVE

(18) Nothing contained in this contract shall be construed as in any manner abridging, limiting or depriving the United States or the District of any means of enforcing any remedy either at law or in equity for the breach of any of the provisions hereof which it would otherwise have. The waiver of a breach of any of the provisions of this contract shall not be deemed to be a waiver of any other provision hereof or of a subsequent breach of such provision.

INTEREST IN CONTRACT NOT TRANSFERABLE

(19) No interest in this agreement is transferable, and no sublease shall be made, by the District without the writ-

ten consent of the Secretary, and any such attempted transfer or sublease shall cause this contract to become subject to annulment, at the option of the United States.

MEMBER OF CONGRESS CLAUSE

(20) No Member of or Delegate to Congress or Resident Commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom. Nothing, however, herein contained shall be construed to extend to this contract if made with a corporation for its general benefit.

In witness whereof, the parties hereto have caused this contract to be executed the day and year first above written.

THE UNITED STATES OF AMERICA,

By RAY LYMAN WILBUR,
Secretary of the Interior.

Attest:

NORTHCUTT ELY.
RICHARD J. COFFEY.

PALO VERDE IRRIGATION DISTRICT,
By L. A. HAUSER, *President.*

Attest:

O. W. MALMGREN,
Assistant Secretary.

Approved as to form, February 7, 1933:

(Sgd.) RAY LYMAN WILBUR,
Secretary of the Interior.

[Acknowledgments and resolution omitted.]