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THIRTY-NINTH ANNUAL REPORT

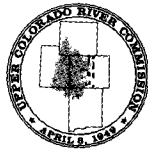
OF THE

Upper Colorado
River Commission

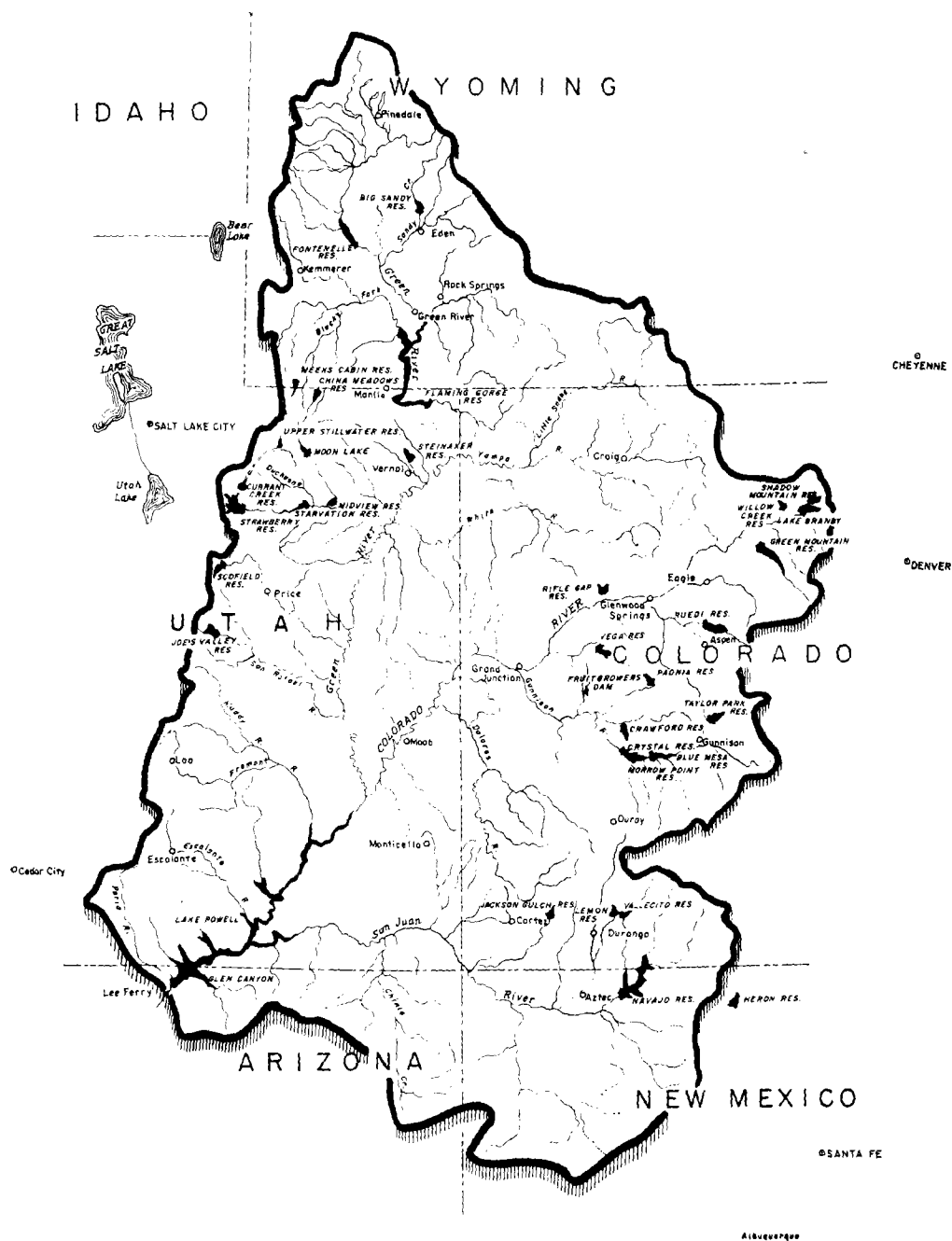


SALT LAKE CITY, UTAH
SEPTEMBER 30, 1987

THIRTY-NINTH ANNUAL REPORT
OF THE
**Upper Colorado
River Commission**



SALT LAKE CITY, UTAH
SEPTEMBER 30, 1987



UPPER COLORADO RIVER BASIN

UPPER COLORADO RIVER
COMMISSION

0 25 50
SCALE OF MILES



UPPER COLORADO RIVER COMMISSION

355 South Fourth East Street
Salt Lake City, Utah 84111

Mr. President:

The Thirty-Ninth Annual Report of the Upper Colorado River Commission, as required by Article VIII(d)(13) of the Upper Colorado River Basin Compact, is enclosed.

The budget of the Commission for fiscal year 1989 (July 1, 1988 - June 30, 1989) is included in this report as Appendix B.

This report has also been transmitted to the Governor of each State signatory to the Upper Colorado River Basin Compact.

Respectfully yours,

A handwritten signature in cursive script, reading "Gerald R. Zimmerman".

Gerald R. Zimmerman
Executive Director

The President
The White House
Washington, D. C. 20500

Enclosure

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PREFACE

Article VIII(d)(13) of the Upper Colorado River Basin Compact requires the Upper Colorado River Commission to “make and transmit annually to the Governors of the signatory States and the President of the United States of America, with the estimated budget, a report covering the activities of the Commission for the preceding water year.”

Article VIII(1) of the By-Laws of the Commission specifies that “the Commission shall make and transmit annually on or before April 1 to the Governors of the states signatory to the Upper Colorado River Basin Compact and to the President of the United States a report covering the activities of the Commission for the water year ending the preceding September 30.”

This Thirty-ninth Annual Report of the Upper Colorado River Commission has been compiled pursuant to the above directives.

This Annual Report includes, among other things, the following:

- Membership of the Commission, its Committees, Advisers, and Staff;

- Roster of meetings of the Commission;

- Brief discussion of the activities of the Commission;

- Engineering and hydrologic data;

- Pertinent legal information;

- Information pertaining to congressional legislation;

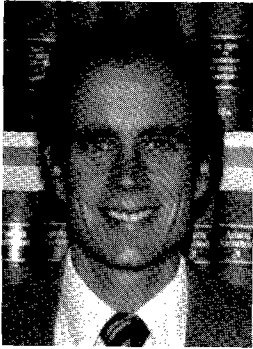
- Map of the Upper Colorado River Basin;

- Status of the Storage Units and participating projects of the Colorado River Storage Project;

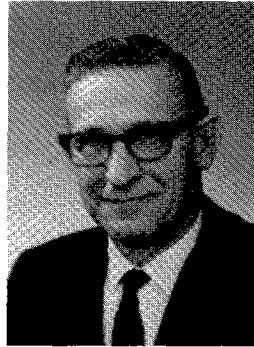
- Appendices containing:

 - Fiscal data, such as: budget, balance sheet, statements of revenue and expense, transmountain diversions, etc.

COMMISSION



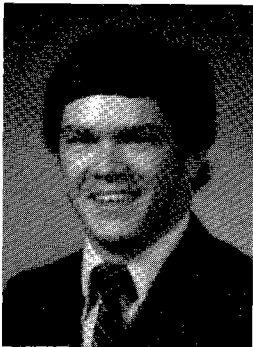
James S. Lochhead
Commissioner for
Colorado*



Stephen E. Reynolds
Commissioner for
New Mexico



Jack F. Ross
Chairman
Commissioner for
United States



Gordon W. Fassett
Commissioner for
Wyoming**



D. Larry Anderson
Commissioner for
Utah

* Appointed February 27, 1987

** Appointed April 1, 1987

ALTERNATE COMMISSIONERS

J. William McDonald	State of Colorado
Philip B. Mutz	State of New Mexico
Dallin W. Jensen	State of Utah
Dan S. Budd	State of Wyoming
Aaron H. McGinnis	State of Wyoming

OFFICERS OF THE COMMISSION

Chairman	Jack F. Ross
Vice Chairman	James S. Lochhead*
Secretary	Gerald R. Zimmerman
Treasurer	Ronald A. Schulthies
Assistant Treasurer	L. Ronald Folkersen

STAFF

Executive Director	Gerald R. Zimmerman
General Counsel	Jane Bird
Chief Engineer	Clinton D. Stevens
Administrative Secretary	Hanna I. Wetmore
Clerk-Typist	Katrina Maria Childs**

** Elected March 24, 1987 to replace Felix L. Sparks*

*** Resigned December 12, 1986*

COMMITTEES

The Committees of the Commission convened when required during the year. Committees and their membership at the date of this report are as follows (the Chairman and the Secretary of the Commission are *ex-officio* members of all committees, Article V(4) of the By-Laws):

Engineering Committee:

Barry C. Saunders, Chairman	Philip B. Mutz
David H. Merritt	Robert L. Morgan
Eugene I. Jencsok	John W. Shields
Stephen E. Reynolds	

Legal Committee:

Frank E. Maynes, Chairman*	Peter White
Duane Woodard	Dallin W. Jensen
J. William McDonald	Jennifer L. Hager
Donald H. Hamburg, Alternate	

Budget Committee

Gordon W. Fassett, Chairman**	Stephen E. Reynolds
J. William McDonald	D. Larry Anderson

* Appointed March 24, 1987 to replace Felix L. Sparks

** Appointed May 27, 1987 to replace Floyd A. Bishop

ADVISERS TO COMMISSIONERS

The following individuals serve as advisers to their respective Commissioner:

COLORADO

Legal:

J. William McDonald, Director
Colorado Water Conservation
Board
Denver, Colorado

Duane Woodard
Attorney General
State of Colorado
Denver, Colorado

Frank E. Maynes
Attorney at Law
Durango, Colorado

Donald H. Hamburg
General Counsel
Colorado River Water
Conservation District
Glenwood Springs,
Colorado

Engineering:

David H. Merritt
Colorado River Water
Conservation District
Glenwood Springs,
Colorado

Eugene I. Jencsok
Colorado Water
Conservation Board
Denver, Colorado

NEW MEXICO

Legal:

Peter White
General Counsel
New Mexico Interstate
Stream Commission
Santa Fe, New Mexico

Engineering

Philip B. Mutz
Interstate Stream Engineer
New Mexico Interstate
Stream Commission
Santa Fe, New Mexico

UTAH

Legal:

Dallin W. Jensen
Solicitor General
Salt Lake City, Utah

Engineering:

Barry C. Saunders
Chief Engineer, Interstate Streams
Division of Water Resources
Salt Lake City, Utah

Robert L. Morgan
State Engineer
Division of Water Rights
Salt Lake City, Utah

General Advisers:

Don A. Christiansen, Manager
Central Utah Water
Conservancy District
Orem, Utah

David Rasmussen, Manager
Uintah Water Conser-
vancy District
Vernal, Utah

WYOMING

Legal:

Jennifer L. Hager
Assistant Attorney General
Cheyenne, Wyoming

Engineering:

John W. Shields
Interstate Streams Engineer
Cheyenne, Wyoming

General Adviser:

George L. Christopoulos
Cheyenne, Wyoming

MEETINGS OF THE COMMISSION

During the water year ending September 30, 1987, the Commission met five times as follows:

Meeting No. 195	November 14, 1986	Adjourned Annual Meeting Salt Lake City, Utah
Meeting No. 196	March 16, 1987	Regular Meeting Salt Lake City, Utah
Meeting No. 197	March 24, 1987	Adjourned Regular Meeting Albuquerque, New Mexico
Meeting No. 198	June 2, 1987	Special Meeting Denver, Colorado
Meeting No. 199	September 21, 1987	Annual Meeting Salt Lake City, Utah

ACTIVITIES OF THE COMMISSION

Within the scope and limitations of Article I(a) of the Upper Colorado River Basin Compact, “. . . to secure the expeditious agricultural and industrial development of the Upper Basin, the storage of water . . .” and under the powers conferred upon the Commission by Article VIII(d) pertaining to making studies of water supplies of the Colorado River and its tributaries and the power to “. . . do all things necessary, proper or convenient in the performance of its duties . . ., either independently or in cooperation with any state or federal agency,” the principal activities of the Commission during the 1987 water year have consisted of: (A) research and studies of an engineering and hydrologic nature of various facets of the water resources of the Colorado River Basin especially as related to operation of the Colorado River reservoirs and salinity control; (B) collection and compilation of documents for a legal library relating to the utilization of waters of the Colorado River System for domestic, industrial and agricultural purposes, and the generation of hydro-electric power; (C) legal analyses of associated laws, court decisions, reports and problems; (D) analyses of environmental statements on water development projects of the Colorado River Storage Project and participating projects; (E) continuation of a general public relations program related to water resources of the Upper Colorado River Basin; (F) cooperation with water quality

and water resources agencies of the Colorado River Basin States on water and water-related problems; (G) an education and information program designed to aid in securing appropriations of funds by the United States Congress for the construction, planning and investigation of storage dams, reservoirs and water resource development projects of the Colorado River Storage Project that have been authorized for construction and to secure authorization for the construction of additional participating projects as the essential investigations and planning are completed; and (H) a legislative program consisting of the analysis and study of water resource bills introduced in the U.S. Congress for enactment, the preparation of evidence and argument, and the presentation of testimony before the Committees of the Congress.

A. ENGINEERING — HYDROLOGY

1. Colorado River Salinity Program

The Upper Colorado River Commission has continued its interest and involvement in the Colorado River Basin salinity problem. The Commission staff has worked with representatives of the Commission's member States in coordinating and correlating activities with other State and Federal agencies, particularly the Colorado River Basin Salinity Control Forum which is composed of representatives from the seven Colorado River Basin States. The Forum has developed water quality standards and a plan of implementation to meet the Environmental Protection Agency Regulation (40 CFR Part 120, Water Quality Standards — Colorado River System: Salinity Control Policy and Standards Procedures).

Section 303 of the Clean Water Act requires that water quality standards be reviewed from time to time and at least once during each three-year period. The Forum in 1987 reviewed the existing State-adopted and Environmental Protection Agency-approved numeric salinity criteria and found no reason to recommend changes for the three lower mainstem stations.

The values are:

	<i>Salinity in mg/l</i>
Below Hoover Dam	723
Below Parker Dam	747
Imperial Dam	879

The Forum is continuing to study salinity conditions and is developing flow versus salt load relationships that will reflect present and anticipated conditions and to develop new salinity projections.

Salinities at each of the three lower mainstem stations for which numeric criteria have been established have decreased since 1972.

2. Forecast of Stream Flow

The April 1, 1987 forecast of inflow to Lake Powell by the National Weather Service, Department of Commerce, for April-July was estimated to be 7,500,000 acre-feet.¹ The unregulated inflow to Lake Powell for the period April-July 1987 amounted to 7,844,000 acre-feet,² which was about 95 percent of the 25-year (1963-1987) average flow.

During the April-July 1987 period, changes in storage in Colorado River Storage Project reservoirs including Lake Powell resulted in an overall increase of 3,551,700 acre-feet, with 303,000 acre-feet of evaporation and a 310,000 acre-foot increase in bank storage.³

Actual regulated inflow to Lake Powell for the period April-July 1987 was 6,728,000 acre-feet.

For the period October 1, 1986 through September 30, 1987, the change in reservoir storage, excluding bank storage and evaporation, at selected reservoirs above Lake Powell was: Fontenelle decreased 4,400 acre-feet; Flaming Gorge increased 561,400 acre-feet; Taylor Park increased 43,900 acre-feet; Blue Mesa increased 441,300 acre-feet; Morrow Point decreased 700 acre-feet; Crystal decreased 700 acre-feet; and Navajo decreased 28,500 acre-feet.

The virgin flow⁴ of the Colorado River at Lee Ferry⁵ for the 1987 water year amounted to 16,620,000 acre-feet.⁶

¹Including water to be stored upstream in other Colorado River Storage Project Reservoirs.

²Adjusted for upstream regulation and depletions.

³Includes Flaming Gorge Reservoir on the Green River.

⁴Virgin flow is the estimated flow of the stream if it were in its natural state and unaffected by the activities of man.

⁵Lee Ferry, Arizona is the division point between the upper and lower basins of the Colorado River as defined in the Colorado River Compact. It is located about one mile downstream from the mouth of the Paria River and about 16 miles downstream from Glen Canyon Dam.

⁶Based on provisional records subject to revision.

3. Summary of Reservoir Levels and Contents

Runoff⁷ during the year ending September 30, 1987 ranged from 83.6 percent of the 74-year (1914-1987) mean at the Green River station at Green River, Utah to 152.7 percent of the 74-year mean at the San Juan River station near San Juan, Utah. The volume of runoff at these stations was 3,735,500 acre-feet and 2,754,600 acre-feet respectively. Runoff of the Colorado River station near Cisco, Utah totaled 6,005,300 acre-feet, which was 88.9 percent of the 74-year mean.

Lake Powell's lowest elevation of the 1987 water year occurred on March 5, 1987 when the lake level was at elevation 3,677.47 feet (live content 21,544,000 acre-feet). Lake Powell was at its highest point on June 25, 1987, at elevation 3,698.47 feet with a content of 24,755,000 acre-feet. A total of 13,603,000 acre-feet was released to the river below Glen Canyon Dam during the 1987 water year. The 1978-1987 (10-year) delivery to the Lower Basin (measured at Lee Ferry) was 131,852,000 acre-feet.

Lake Mead, on September 30, 1987, contained 24,364,000 acre-feet⁸ of available storage water at elevation 1,209.79 feet. On September 30, 1987, the live storage of Lake Mead was 1,255,000 acre-feet more than the storage in Lake Powell.

Table 1 on page 11 shows the Statistical Data for Principal Reservoirs in the Upper Colorado River Basin. Table 2 on page 12 provides the same information for the Lower Colorado River Basin reservoirs.

The results of the long-range reservoir operation procedures adopted by the Secretary of the Interior for Lake Powell, Flaming Gorge, Navajo, and Blue Mesa reservoirs in the Upper Colorado River Basin and for Lake Mead in the Lower Basin are illustrated on pages 13-20 for the 1987 water year.

There was no equalization of storage as dictated by Section 602(a) of Public Law 90-537. The drawdown of Lake Powell was governed by factors other than the equalization criteria.

⁷Adjusted for the change in storage in Colorado River Storage Project Reservoirs.

⁸Based on April 1, 1967 Capacity Table revised according to Sedimentation Survey 1963-1964.

TABLE 1

STATISTICAL DATA FOR PRINCIPAL RESERVOIRS IN COLORADO RIVER BASIN

(Units: Elevation — feet; capacity — 1,000 acre-feet)

UPPER BASIN

**Colorado River Storage Project
(Total Surface Capacity)**

	Fontenelle		Flaming Gorge		Taylor Park		Blue Mesa		Morrow Point		Crystal		Navajo		Lake Powell	
	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.	Elv.	Cap.
River elevation at dam (average tailwater)	—	—	5,603	0	9,174	0	7,160	0	6,775	0	6,534	0	5,720	0	3,138	0
Dead Storage	6,408	0.56	5,740	40	—	—	7,358	111	6,808	0	6,670	8	5,775	13	3,370	1,998
Inactive Storage (minimum power pool)	—	—	5,871	273	—	—	7,393	192	7,100	75	6,700	12	5,990 ¹	673	3,490	6,124
Rated Head	6,491	234	5,946	1,102	—	—	7,438	361	7,108	80	6,740	20	—	—	3,570	11,426
Maximum Storage (without surcharge)	6,506	345	6,040	3,789	9,330	106	7,519	941	7,160	117	6,755	25	6,085	1,709	3,700	27,000

¹ Required for Navajo Indian Irrigation Project.

TABLE 2

**STATISTICAL DATA FOR PRINCIPAL RESERVOIRS
IN COLORADO RIVER BASIN**

(Units: Elevation — feet; capacity — 1,000 acre-feet)

LOWER BASIN

(Usable Surface Capacity)

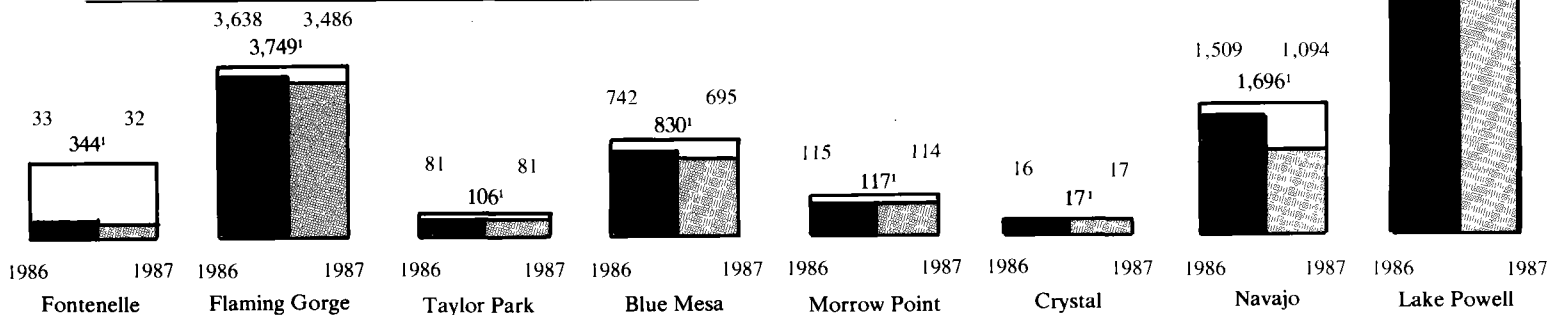
	Lake Mead		Lake Mohave		Lake Havasu	
	Elv.	Capacity	Elv.	Capacity	Elv.	Capacity
River elevation at dam (average tailwater)	646	(-2,378)	506	(-8.5)	370	(-28.6)
Dead Storage	895	0	533.39	0	400	0
Inactive Storage (minimum power pool)	1,050	7,471	570	217.5	440 ¹	439.4
Rated Head	1,122.8	13,633	—	—	—	—
Maximum Storage (without surcharge)	1,221.4	26,159	647	1,809.8	450	619.4

¹ Contractual minimum for delivery to Metropolitan Water District's Colorado River Aqueduct.

STORAGE IN PRINCIPAL RESERVOIRS AT END OF WATER YEAR 1987 UPPER BASIN

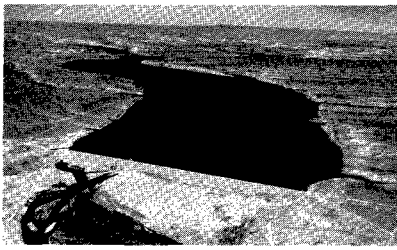
Live Storage Contents*
(1,000 Acre-feet)

Reservoir	Sept. 30 1986	Percent Live Capacity	Sept. 30 1987	Percent Live Capacity	Change in Contents
Fontenelle	33	10	32	9	- 1
Flaming Gorge	3,638	97	3,486	93	- 152
Taylor Park	81	76	81	76	0
Blue Mesa	742	89	695	84	- 47
Morrow Point	115	98	114	97	- 1
Crystal	16	94	17	100	+ 1
Navajo	1,509	89	1,094	65	- 415
Lake Powell	23,365	93	23,109	92	- 256
TOTAL	29,499	93	28,628	90	- 871



*As of September 30 (excludes bank storage)

[†]Maximum live storage (exclusive of surcharge)

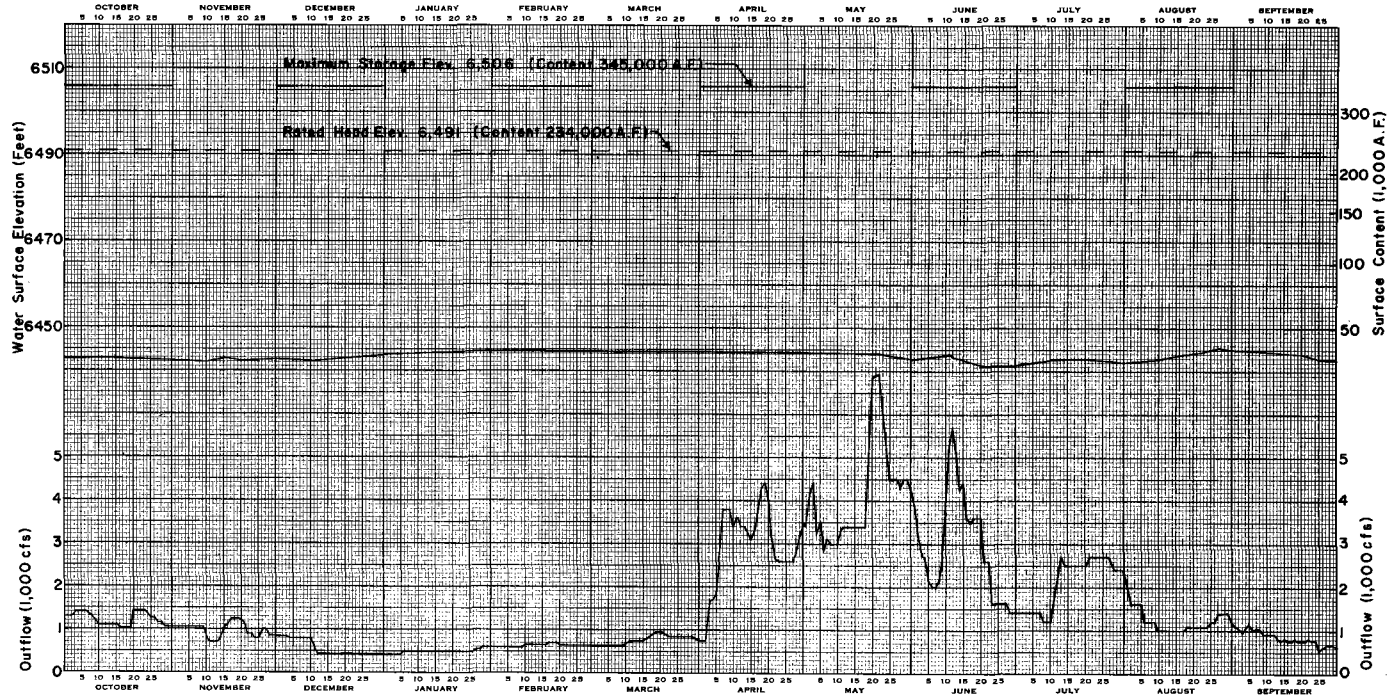


FONTENELLE

Live Storage Capacity — 344,400 acre-feet

Power Generating Capacity — 10,000 KW

Live Storage 9/30/86 — 33,000 acre-feet



FONTENELLE RESERVOIR
Water Year 1986-1987

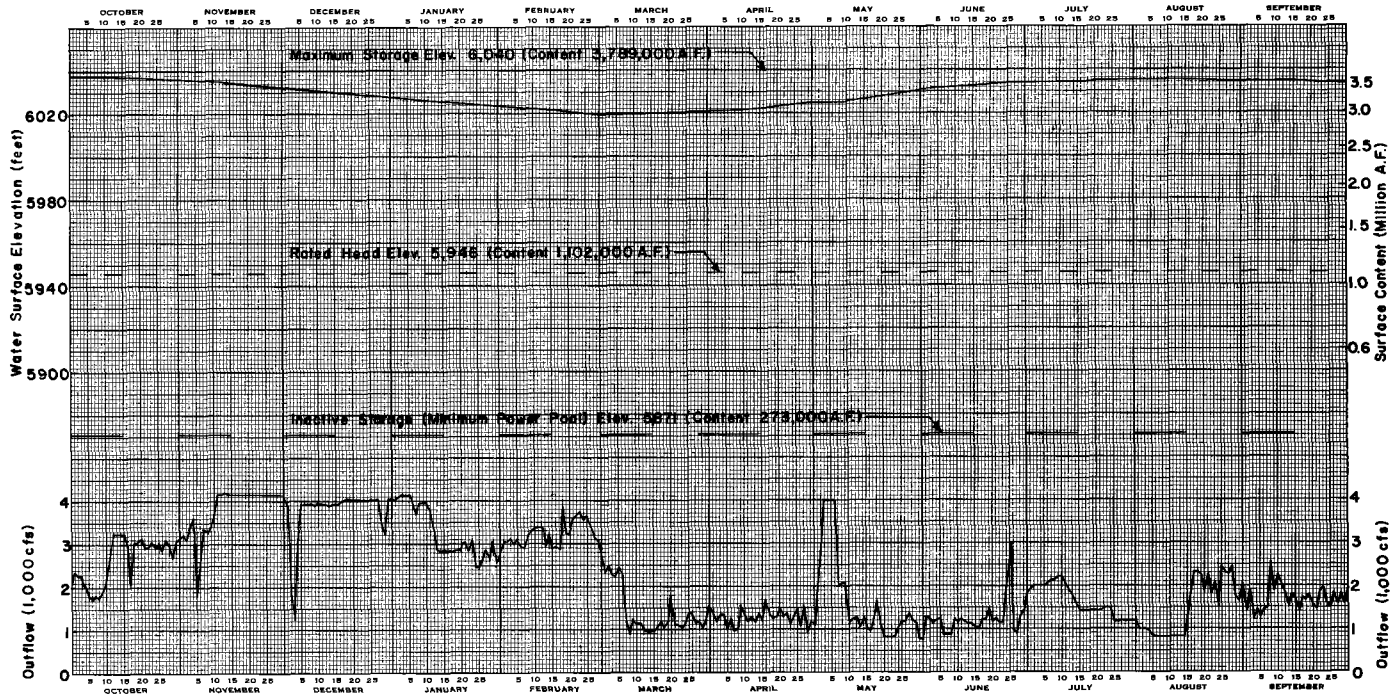


FLAMING GORGE

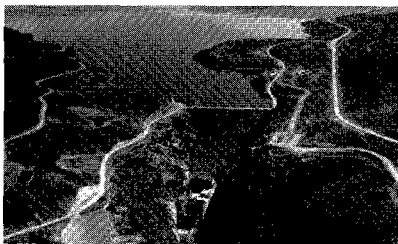
Live Storage Capacity — 3,749,000 acre-feet

Power Generating Capacity — 132,000 KW

Live Storage 9/30/86 — 3,638,000 acre-feet



FLAMING GORGE RESERVOIR
Water Year 1986-1987

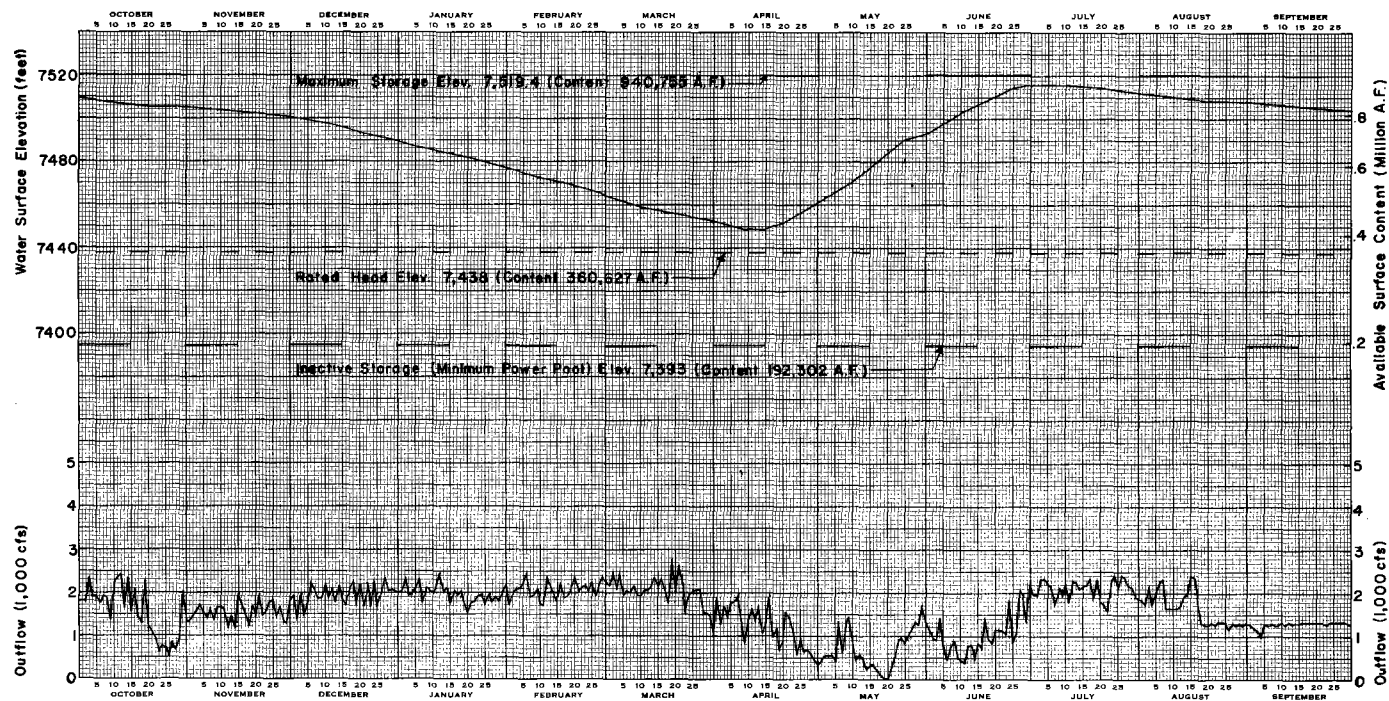


BLUE MESA

Live Storage Capacity — 830,000 acre-feet

Power Generating Capacity — 72,000 KW

Live Storage 9/30/86 — 742,000 acre-feet



BLUE MESA RESERVOIR
Water Year 1986-1987

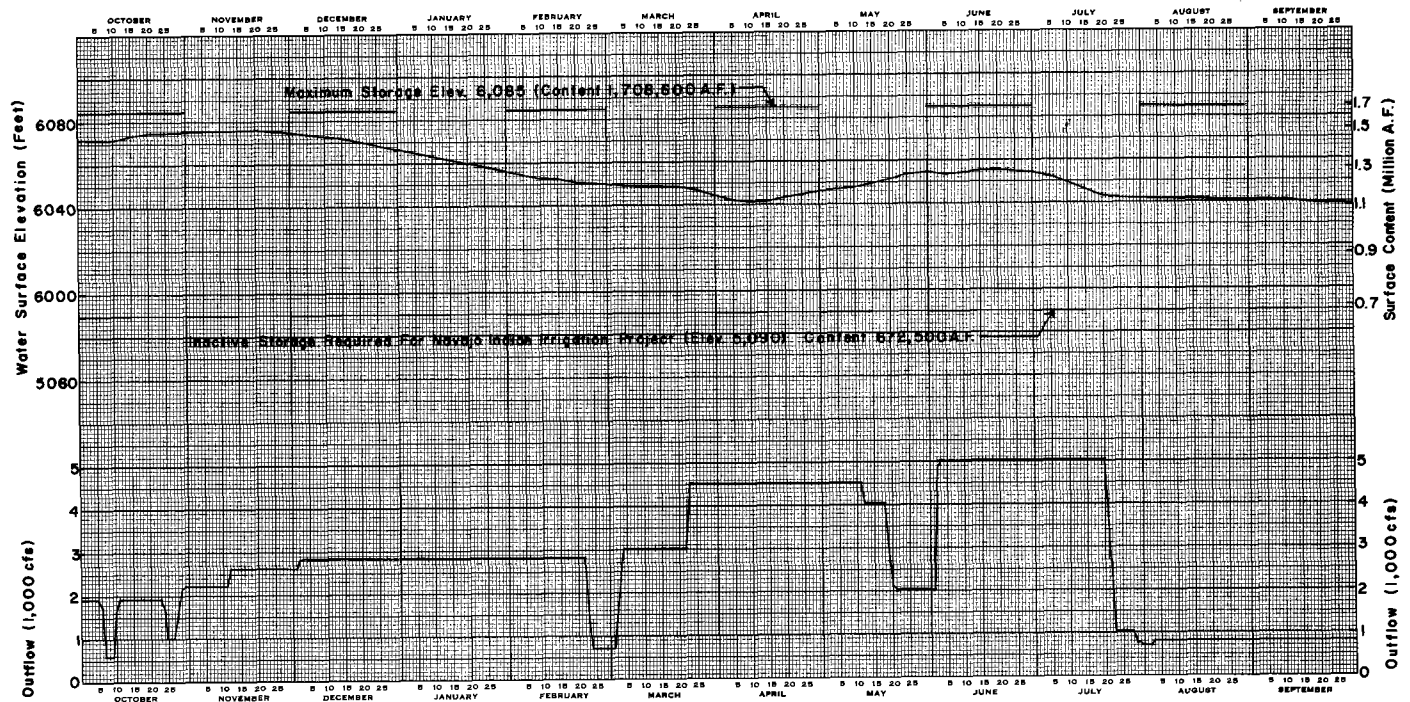


NAVAJO

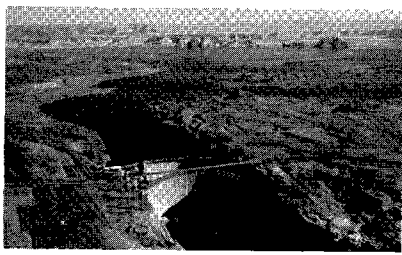
Live Storage Capacity — 1,696,000 acre-feet

Power Generating Capacity — 0

Live Storage 9/30/86 — 1,509,000 acre-feet



NAVAJO RESERVOIR
Water Year 1986-1987

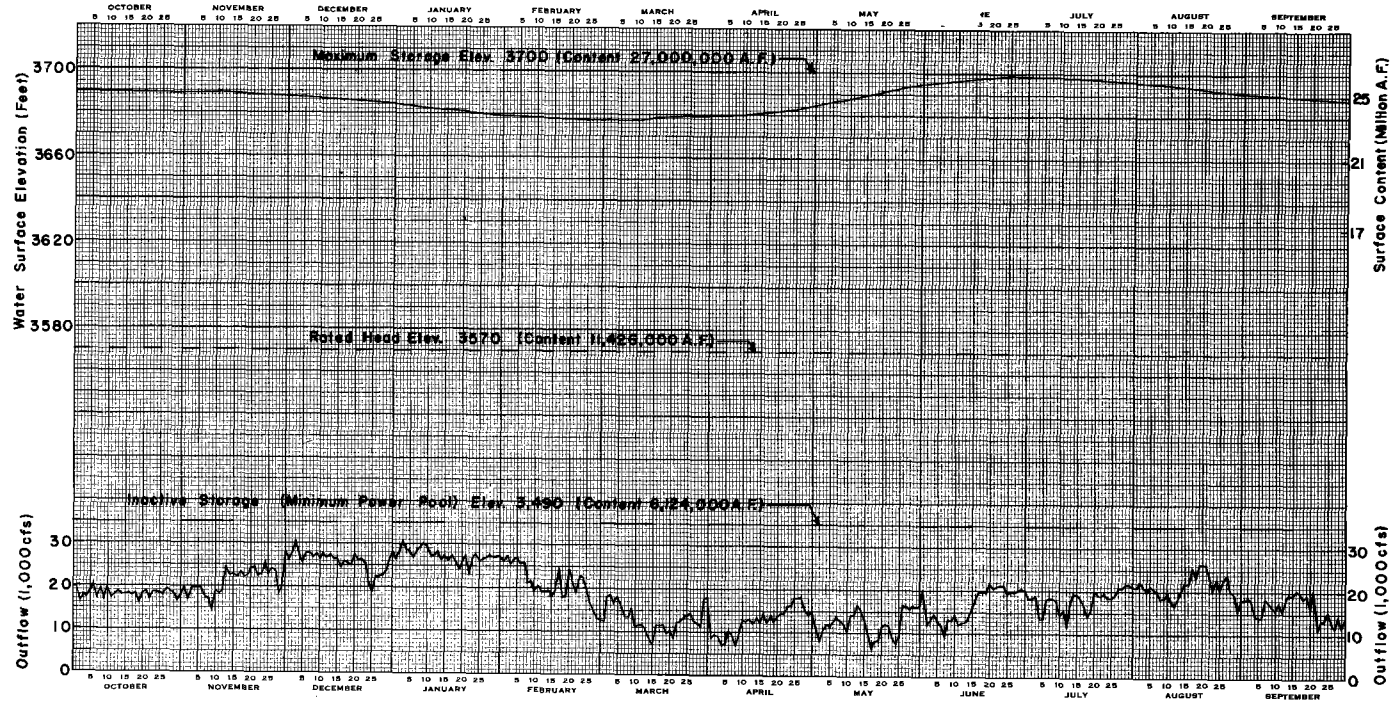


LAKE POWELL — GLEN CANYON DAM

Live Storage Capacity — 25,000,000 acre-feet

Power Generating Capacity — 1,154,000 KW

Live Storage 9/30/86 — 23,365,000 acre-feet



LAKE POWELL

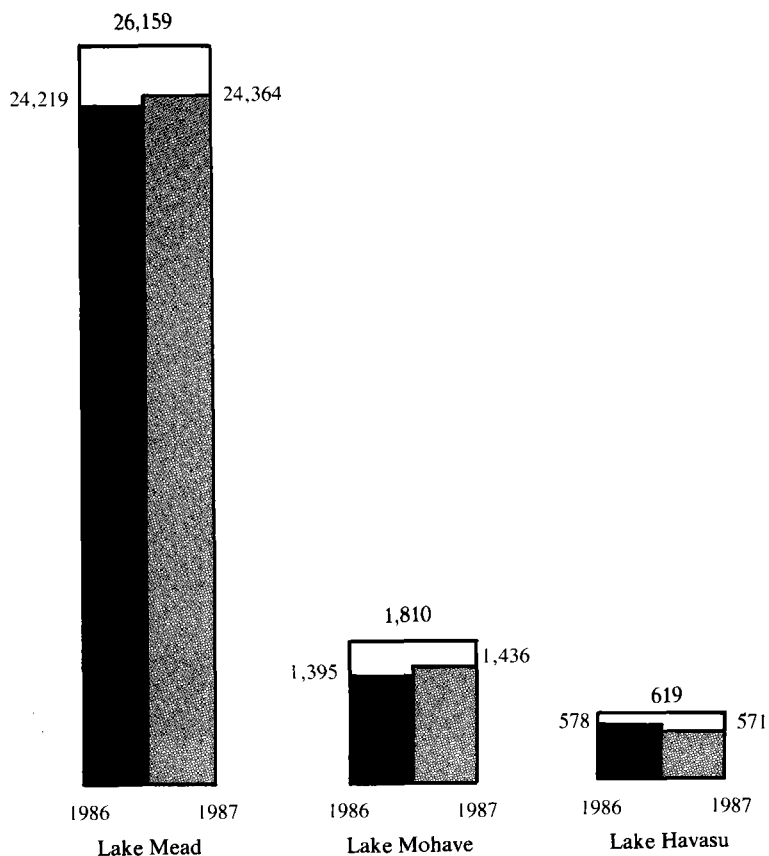
Water Year 1986-1987

STORAGE IN PRINCIPAL RESERVOIRS AT END OF WATER YEAR 1987

LOWER BASIN

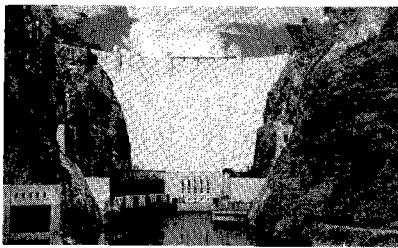
Live Storage Contents*
(1,000 Acre-feet)

Reservoir	Sept. 30 1986	Percent Live Capacity	Sept. 30 1987	Percent Live Capacity	Change in Contents
Lake Mead ¹	24,219	93	24,364	93	+ 145
Lake Mohave	1,395	77	1,436	79	+ 41
Lake Havasu	578	93	571	92	- 7
TOTAL	26,192	92	26,371	92	+ 179



*As of September 30.

¹ Contents based on April 1967 revised capacity tables according to 1963-64 sedimentation survey at Lake Mead.

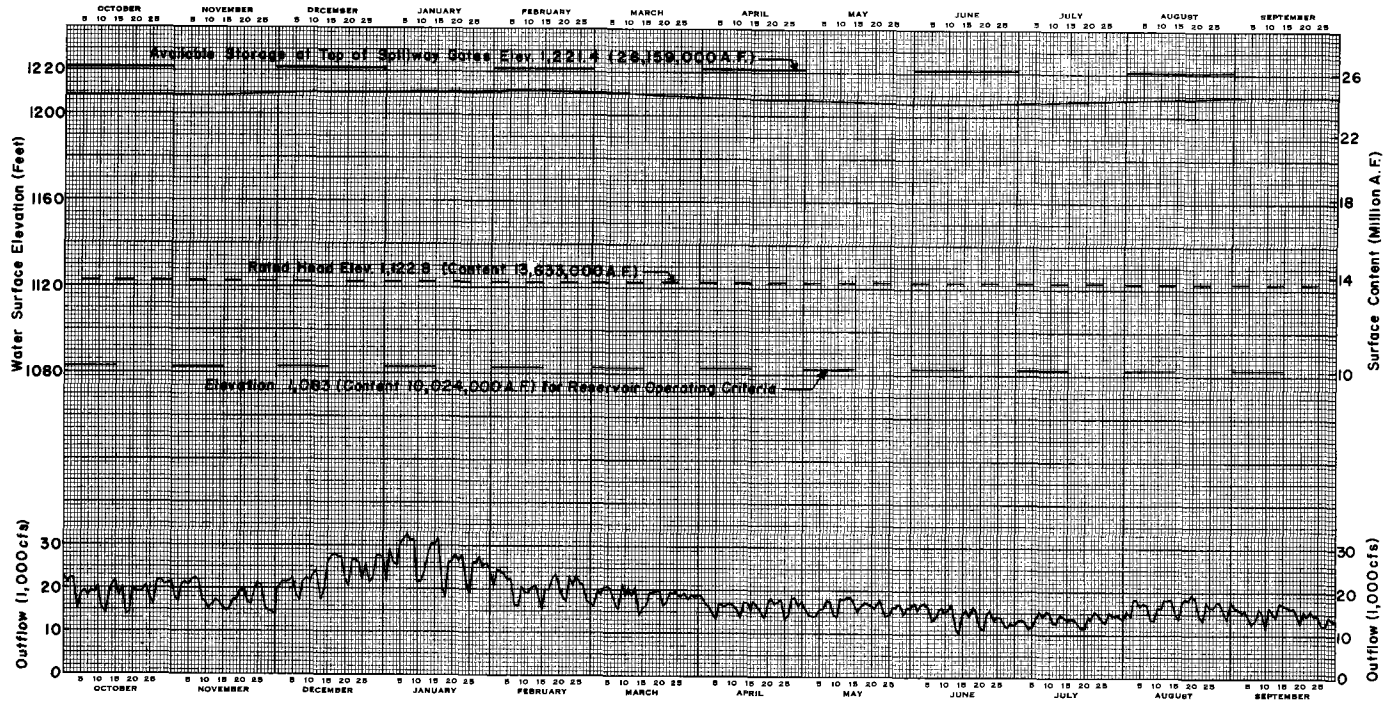


LAKE MEAD — HOOVER DAM

Live Storage Capacity — 26,159,000 acre-feet

Power Generating Capacity — 1,344,800 KW

Live Storage 9/30/86 — 24,219,000 acre-feet



LAKE MEAD

Water Year 1986-1987

4. Flows of Colorado River

Table 3 on pages 22 and 23 shows the estimated virgin flow of the Colorado River at Lee Ferry, Arizona for each water year from 1896 through 1987. Column (4) of the table shows the average virgin flow for any given year within the period computed through water year 1987. Column (5) shows the average virgin flow for a given year within the period computed since water year 1896. Column (6) shows the average virgin flow for each progressive ten-year period beginning with the ten-year period ending on September 30, 1905. The difference between the virgin flow for a given year and the average flow over the 92-year period, 1896 through 1987, is shown in Column (7).

Article III(d) of the Colorado River Compact stipulates that "the States of the Upper Division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years reckoned in a continuing progressive series beginning with the first day of October next succeeding the ratification of this Compact." Prior to the storage of water in the Colorado River Storage Project reservoirs, which began in 1962, the flow of the river at Lee Ferry in any ten consecutive years was greatly in excess of the 75,000,000 acre-feet required by the Compact. Beginning in 1962, Colorado River Storage Project reservoirs have regulated the river above Glen Canyon Dam. Table 4, on page 24, shows the historic flow at Lee Ferry for the period 1953 through 1987. The historic flow for each progressive ten-year period from 1953 through 1987, beginning with the ten-year period ending September 30, 1962, the commencement of storage in Colorado River Storage Project reservoirs, is shown in Column (3).

In each consecutive ten-year period, the total flow equaled or exceeded the 75,000,000 acre-feet required by the Compact. The flow at Lee Ferry during the ten-year period ending September 30, 1987 was 131,852,000 acre-feet.

The charts on pages 25 and 26 illustrate some of the pertinent historical facts related to the amounts of water produced by the Colorado River System above Lee Ferry, Arizona, the compact division point between the Upper and Lower Colorado River Basins. The first chart, on page 25, is entitled *Colorado River Flow at Lee Ferry, Arizona*. The top of each white vertical bar represents the estimated virgin flow of the river, i.e., the

Table 3
ESTIMATED VIRGIN FLOW AT LEE FERRY
(million acre-feet)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Years to 1987	Year Ending Sept. 30	Estimated Virgin Flow	Average to 1987	Average Since 1896	Progressive 10-year Moving Average	Virgin Flow Minus 92-year Average
92	1896	10.1	15.1	10.1		-5.0
91	97	18.0	15.0	14.1		-2.9
90	98	13.8	15.1	14.0		-1.3
89	99	15.9	15.0	14.5		-0.8
88	1900	13.2	15.0	14.2		-1.9
87	01	13.6	15.0	14.1		-1.5
86	02	9.4	15.0	13.4		-5.7
85	03	14.8	14.9	13.6		-0.3
84	04	15.6	14.9	13.8		0.5
83	05	16.0	14.9	14.0	14.0	0.9
82	06	19.1	14.9	14.5	14.9	4.0
81	07	23.4	14.9	15.2	15.5	8.3
80	08	12.9	14.8	15.1	15.4	-2.2
79	09	23.3	14.8	15.7	16.1	-8.2
78	1910	14.2	14.7	15.6	16.2	-0.9
77	11	16.0	14.7	15.6	16.5	0.9
76	12	20.5	14.6	15.9	17.6	5.4
75	13	14.5	14.5	15.8	17.6	-0.6
74	14	21.2	14.5	16.1	18.1	-6.1
73	15	14.0	14.4	16.0	17.9	-1.1
72	16	19.2	14.4	16.1	17.9	-4.1
71	17	24.0	14.4	16.5	18.0	8.9
70	18	15.4	14.3	16.4	18.2	0.3
69	19	12.5	14.3	16.3	17.2	-2.6
68	1920	22.0	14.3	16.5	17.9	6.9
67	21	23.0	14.2	16.8	18.6	7.9
66	22	18.3	14.1	16.8	18.4	3.2
65	23	18.3	14.0	16.9	18.8	-3.2
64	24	14.2	14.0	16.8	18.1	-0.9
63	25	13.0	14.0	16.6	18.0	-2.1
62	26	15.9	14.0	16.6	17.7	0.8
61	27	18.6	14.0	16.7	17.1	3.5
60	28	17.3	13.9	16.7	17.3	2.2
59	29	21.4	13.9	16.8	18.2	6.3
58	1930	14.9	13.8	16.8	17.5	-0.2
57	31	7.8	13.7	16.5	16.0	-7.3
56	32	17.2	13.8	16.6	15.9	2.1
55	33	11.4	13.8	16.4	15.2	-3.7
54	34	5.6	13.8	16.1	14.3	-9.5
53	35	11.6	13.9	16.0	14.2	-3.5
52	36	13.8	14.0	16.0	14.0	-1.3
51	37	13.7	14.0	15.9	13.5	-1.4
50	38	17.5	14.0	16.0	13.5	2.4
49	39	11.1	13.9	15.8	12.5	-4.0
48	1940	8.6	14.0	15.7	11.8	-6.5
47	41	18.1	14.1	15.7	12.9	3.0
46	42	19.1	14.0	15.8	13.1	4.0

Table 3
(continued)
ESTIMATED VIRGIN FLOW AT LEE FERRY
(million acre-feet)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Years to 1987	Year Ending Sept. 30	Estimated Virgin Flow	Average to 1987	Average Since 1896	Progressive 10-year Moving Average	Virgin Flow Minus 92-year Average
45	1943	13.1	13.9	15.8	13.2	-2.0
44	44	15.2	13.9	15.7	14.2	0.1
43	45	13.4	13.9	15.7	14.4	-1.7
42	46	10.4	13.9	15.6	14.0	-4.7
41	47	15.5	14.0	15.6	14.2	0.4
40	48	15.6	13.9	15.6	14.0	0.5
39	49	16.4	13.9	15.6	14.5	1.3
38	1950	12.9	13.9	15.6	15.0	-2.2
37	51	11.6	13.9	15.5	14.3	-3.5
36	52	20.7	13.9	15.6	14.5	5.6
35	53	10.6	13.8	15.5	14.2	-4.5
34	54	7.7	13.9	15.4	13.5	-7.4
33	55	9.2	14.0	15.3	13.1	-5.9
32	56	10.7	14.1	15.2	13.1	-4.4
31	57	20.1	14.2	15.3	13.6	5.0
30	58	16.5	14.0	15.3	13.6	1.4
29	59	8.6	14.0	15.2	12.9	-6.5
28	1960	11.3	14.1	15.1	12.7	-3.8
27	61	8.5	14.2	15.0	12.4	-6.6
26	62	17.3	14.3	15.0	12.1	2.2
25	63	8.4	14.2	15.0	11.8	-6.7
24	64	10.2	14.4	14.9	12.1	-4.9
23	65	18.9	14.5	14.9	13.1	3.8
22	66	11.2	14.3	14.9	13.1	-3.9
21	67	11.9	14.4	14.8	12.3	-3.2
20	68	13.7	14.5	14.8	12.0	-1.4
19	69	14.4	14.5	14.8	12.6	-0.7
18	1970	15.4	14.5	14.8	13.0	0.3
17	71	15.1	14.5	14.8	13.7	0.0
16	72	12.2	14.5	14.8	13.1	-2.9
15	73	19.4	14.6	14.9	14.2	4.3
14	74	13.3	14.4	14.8	14.6	-1.8
13	75	16.6	14.4	14.9	14.3	1.5
12	76	11.6	14.4	14.8	14.4	-3.5
11	77	5.8	14.5	14.7	13.8	-9.3
10	78	15.2	14.8	14.7	13.9	0.1
9	79	17.9	14.8	14.8	14.3	2.8
8	1980	17.5	14.6	14.8	14.5	2.4
7	81	8.2	14.5	14.7	13.8	-6.9
6	82	16.2	14.8	14.7	14.2	1.1
5	83	24.0	14.7	14.8	14.6	8.9
4	84	24.5	14.3	14.9	15.8	9.4
3	85	20.8	13.7	15.0	16.2	5.7
2	86	21.9	13.4	15.1	17.2	6.8
1	87	16.6	12.9	15.1	18.3	1.5
Maximum		24.5			18.8	9.4
Minimum		5.6			11.8	-9.5
Average		15.1			14.9	0.0

Table 4
HISTORIC FLOW AT LEE FERRY
1953-1987

Unit: 1,000 a.f.		
1	2	3
Water Year Ending Sept. 30	Historic Flow	Progressive 10-Year Total
1953	8,805	
1954	6,116	
1955	7,307	
1956	8,750	
1957	17,340	
1958	14,260	
1959	6,756	
1960	9,192	
1961	6,674	
1962 ¹	14,790	99,990
1963 ²	2,520	93,705
1964 ³	2,427	90,016
1965	10,835	93,544
1966	7,870	92,664
1967	7,824	83,148
1968	8,358	77,246
1969	8,850	79,340
1970	8,688	78,836
1971	8,607	80,769
1972	9,330	75,309
1973	10,141	82,930
1974	8,277	88,780
1975	9,274	87,219
1976	8,494	87,843
1977	8,269	88,288
1978	8,369	88,299
1979	8,333	87,782
1980	10,957	90,051
1981	8,316	89,760
1982	8,324	88,754
1983	17,520	96,133
1984	20,518	108,374
1985	19,111	118,211
1986	16,655	126,372
1987	13,749 ⁴	131,852

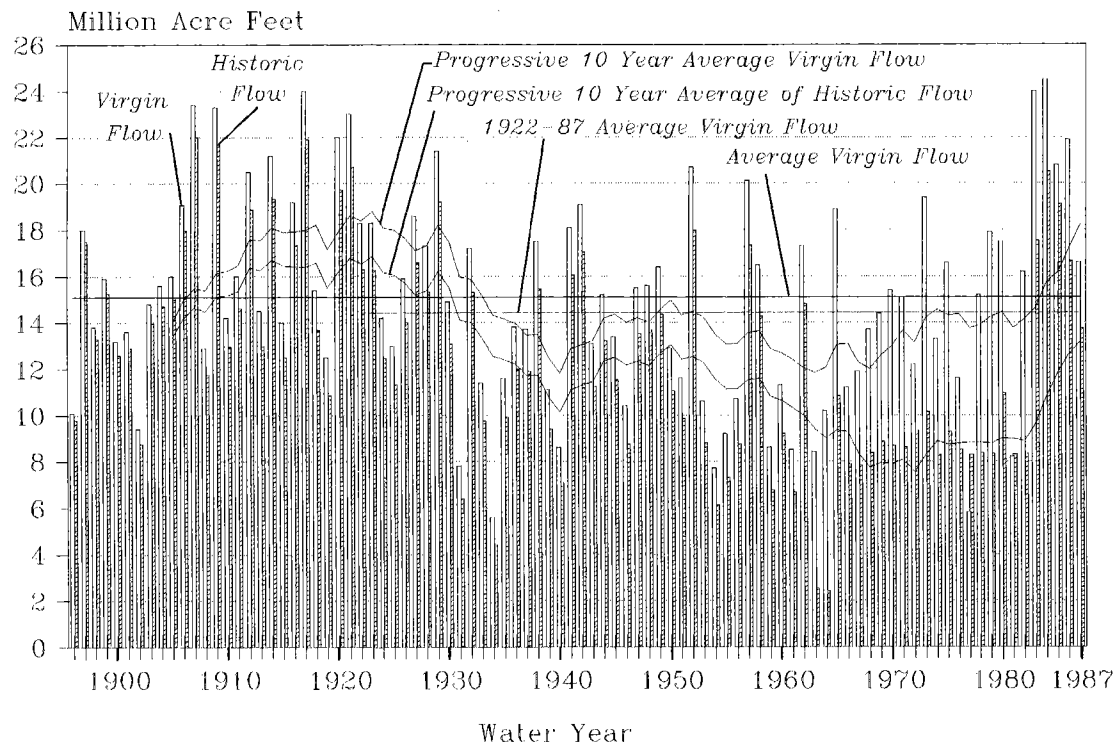
¹ Storage in Flaming Gorge and Navajo Reservoirs began in 1962.

² Storage in Glen Canyon Reservoir began in 1963.

³ Storage in Fontenelle Reservoir began in 1964.

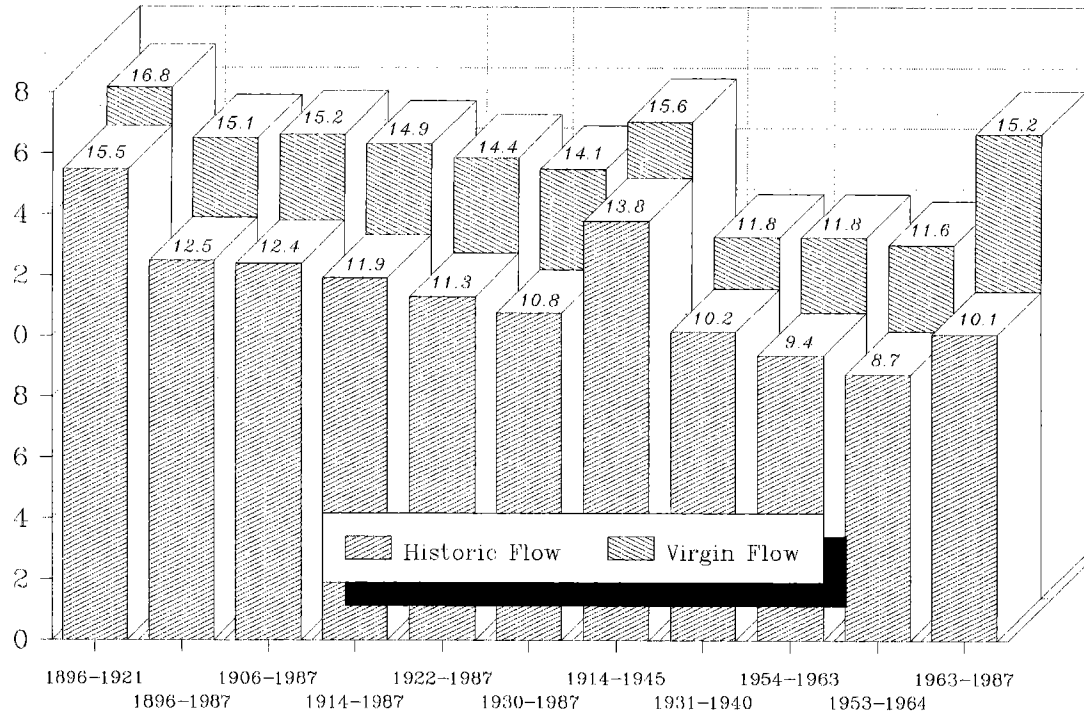
⁴ Based upon provisional streamflow records subject to revision.

Colorado River Flow At Lee Ferry, Arizona



Lee Ferry Average Annual Flow For Selected Periods

Million Acre-Feet



flow of the river in millions of acre-feet past Lee Ferry for a given year had it not been depleted by activities of man. The shaded vertical bars, adjacent to the white bars, represent the estimated or measured historic flow at Lee Ferry, and the difference between the two bars in any given year represents the stream depletion, or the amount of water estimated to have been removed by man from the virgin supply upstream from Lee Ferry. It is worth noting that in 1977 and again in 1981 the historic flow at Lee Ferry exceeded the virgin flow. Beginning in 1962, part of this depletion at Lee Ferry was caused by the retention and storage of water in storage units of the Colorado River Storage Project. The horizontal line (at approximately 15 million acre-feet) shows the long-term average virgin flow from 1896 through 1987. The second vertical line (at approximately 14.4 million acre-feet) shows the average virgin flow since 1922, after the adoption of the Colorado River Compact. Because the Colorado River Compact is administered on the basis of running averages covering periods of ten years, the progressive ten-year average historic and virgin flows are displayed on this chart.

The second chart on page 26, entitled *Lee Ferry Average Annual Flow for Selected Periods*, is a graphical representation of historic and virgin flow averages for several periods of record. The periods of water years selected were those to which reference is usually made for various purposes in documents pertaining to the Colorado River System.

Several important hydrologic facts are apparent from these two charts on pages 25 and 26.

- (1) A vast majority of the high flows occurred prior to 1929.

- (2) Since the 1924-1933 decade, the progressive ten-year average virgin flow has not exceeded the average virgin flow except in the 1941-1950 and the exceptionally wet 1975-1984 through 1978-1987 decades.

- (3) For the period 1896-1921, which is prior to the Colorado River Compact of 1922, the average virgin flow was estimated to be 16.8 million acre-feet per year, which is considerably greater than for any other period selected, including the long-term average. A stream-gaging station at Lees Ferry, Arizona was not installed until 1921. Thus, the virgin flow at Lees Ferry prior to the 1922 Compact is estimated based upon records

obtained at other stations, e.g. the stream gage on the Colorado River at Yuma, Arizona for the period 1902-1921.

(4) For the longest period shown, 1896-1987, the estimated average annual virgin flow is 15.1 million acre-feet and the average annual historic flow is 12.5 million acre-feet.

(5) For the next longest period, 1906-1987, the estimated average annual virgin flow is 15.2 million acre-feet and the average annual historic flow is 12.4 million acre-feet. Many of the early records for this series of years, as well as for the 1896-1987 period, are based upon the estimates of flows made at other gaging stations, as mentioned in (3) above. This average is about equal to the 15.0 million acre-feet estimated for the 1906-1967 period which was used as the basis for justification of a water supply for the Central Arizona Project authorized in 1968.

(6) The estimated average annual virgin flow during the 1914-1987 period is 14.9 million acre-feet. This period is an extension of the 1914-1965 period used in the Upper Colorado Region Comprehensive Framework Studies of 1971. The average annual virgin flow for the 1914-1965 time period is 14.6 million acre-feet.

(7) The average annual virgin flow for the period 1914-1945 is 15.6 million acre-feet. This was the period of record used by the negotiators of the Upper Colorado River Basin Compact of 1948.

(8) For the period 1922-1987, which is the period of record since the signing of the Colorado River Compact, the average annual virgin flow is 14.4 million acre-feet and the average annual historic flow is 11.3 million acre-feet. Records for this series of years are based upon actual measurements of flows at Lees Ferry. The ten-year moving average flow since 1922 is considerably less than the ten-year moving average flow prior to 1922.

(9) For the 58-year period, 1930-1987, the annual average virgin flow dropped to 14.1 million acre-feet.

(10) Two completely unrelated ten-year periods of minimum flows have occurred since 1930. During these periods, 1931-1940 and 1954-1963, the average annual virgin flow amounts to only 11.8 million acre-feet.

(11) For a 12-year period, 1953-1964, the average annual virgin flow amounts to only 11.6 million acre-feet.

(12) Since Glen Canyon Dam was closed in 1963, the estimated virgin flow for the subsequent 25 years is 15.2 million acre-feet. The estimated historical flow for the same period (1963-1987) is 10.1 million acre-feet.

B. LEGAL

1. Water Newsletter

The legal staff continues to inform the Commissioners, their advisers, and other interested parties about developments in the courts, Congress, and certain Federal agencies through the *Water Newsletter*. Current information can be found in the newsletter. In addition, the legal staff has prepared legal memoranda on matters needing more detailed treatment.

2. Court Cases

During the year, action has been taken in a number of cases of importance to the Upper Colorado River Basin States. These cases include:

International Paper Company v. Ouellette, 479 U.S. ___, 93 L.Ed.2d 883, 107 S.Ct. ___, 25 ERC 1457. Petitioner Paper Company operates a paper mill on the New York side of Lake Champlain and, in the course of its business, discharged effluents into the lake through a diffusion pipe that ended shortly before the New York-Vermont border that divides the lake. Respondents, property owners on the Vermont shore, filed a class action against petitioner in Vermont State court under the Vermont common law of nuisance. The U.S. Supreme Court held that both the district court and the court of appeals erred in concluding that Vermont law governs this litigation, since the application of affected-State laws would be incompatible with the Federal Water Pollution Control Act's delegation of authority and its comprehensive regulation of water pollution, and the Act preempts State law to the extent that the State law is applied to an out-of-State point source.

State of Texas v. State of New Mexico, 482 U.S. ___, 96 L.Ed.2d 105, 107 S.Ct. ___. This case, before the U. S. Supreme Court for the fourth time, involves the construction and

enforcement of the 1949 compact between Texas and New Mexico dividing the water of the Pecos River between the two States. Article III(a) of the compact provides that "New Mexico shall not deplete by man's activities the flow of the Pecos River at the New Mexico-Texas state line below an amount which will give to Texas a quantity of water equivalent to that available to Texas under the 1947 condition." The Special Master in this case issued a report finding that for the years 1950-1983, New Mexico should have delivered 340,100 acre-feet more water at the State line than Texas received over those years, and the Master recommended that New Mexico both perform its ongoing compact obligations and make up the past shortfall by delivering 34,010 acre-feet of water for 10 years with a penalty in kind, "water interest," for any bad-faith failure to deliver the additional water. Both sides excepted to the Master's report. The U.S. Supreme Court (1) found no merit in New Mexico's argument that the Court could only require future performance without giving a remedy for past breaches, (2) returned the matter of remedying past shortages to the Master to recommend whether New Mexico should be allowed to pay money damages or make up the past shortfalls by delivering more water, (3) ordered New Mexico to comply with the compact in the future, and (4) ordered the Master to recommend an amendment to the decree to specify the duties of the River Master the Supreme Court found should be appointed.

Utah Division of State Lands v. United States, 482 U.S. ___, 96 L.Ed.2d 162, 107 S.Ct. ___. When the Bureau of Land Management issued oil and gas leases for lands underlying Utah Lake, the State of Utah brought suit seeking a declaratory judgment that it, rather than the United States, had title to the lake bed, claiming that such title passed to the State under the equal footing doctrine upon Utah's admission to the Union. The United States answered that title to the lake bed remained in Federal ownership because in 1889 the lake was selected as a reservoir site pursuant to the Sundry Appropriations Act of 1888 (the 1888 Act). The district court granted summary judgment for the United States, and the Tenth Circuit affirmed. The U. S. Supreme Court reversed, holding that (1) Congress will defeat a future State's entitlement to land under navigable waters only in "exceptional instances" when "the intention was definitely declared or otherwise made plain" (quoting from *United States v. Holt State Bank*, 270 U.S. 49, 55 (1926)), (2) neither the

1888 Act nor the Sundry Appropriations Act of 1890 (the 1890 Act) definitely declare or make very plain Congress' intentions to reserve the lake bed, and (3) even if Congress did intend to reserve the bed of Utah Lake in either the 1888 Act or the 1890 Act, it did not clearly express its intention to defeat Utah's claim to the lake bed under the equal footing doctrine upon Utah's entry into statehood. Therefore, the Supreme Court concluded that title to the bed of Utah Lake passed to Utah on January 4, 1896 when Utah became a State.

Sierra Club v. Lyng, D. Colo., 661 F.Supp. 1490, 17 ELR 21127. Ruling on what it considered to be a motion by intervenors Colorado Water Congress for reconsideration of its earlier opinion and order (see 622 F.Supp. 842), the District Court held that, notwithstanding a provision in the Wilderness Act that nothing in the Act constitutes an express or implied claim or denial on the part of the Federal government as to its exemption from State water laws, Federal water rights were impliedly reserved in previously unappropriated water in wilderness areas. The Court also held that (1) the plan submitted by the Federal defendants in response to the Court's order of compliance with defendants' statutory obligations regarding protection and preservation of the wilderness water resources in Colorado was inadequate, and (2) the portion of the plan listing alternative methods of protecting wilderness area water resources without seeking an adjudication of the extent of Federal reserved water rights was an abuse of discretion. The Court struck the defendants' current plan and remanded the action for submission of a plan on or before September 1, 1987 in compliance with both the instant opinion and the Court's November 25, 1985 opinion and order. The Court ordered defendants to consider the arguments of intervenors and plaintiff Sierra Club in formulating the plan "or face sanctions of formidable magnitude."

Gwaltney of Smithfield v. Chesapeake Bay Foundation, Inc., 484 U.S. ___, 98 L.Ed.2d 306, 108 S.Ct. ___, 26 ERC 1857. The U.S. Supreme Court held that section 505 of the Federal Water Pollution Control Act does not confer Federal jurisdiction over citizen suits for wholly past violations. The Court also held that section 505 confers citizen-suit jurisdiction on Federal district courts when plaintiffs make a good-faith allegation of continuous or intermittent violation. Since the court of appeals declined to decide whether the complaint in this case contained

such an allegation, the Supreme Court remanded the case for consideration of this question.

3. Legislation

In the First Session of the 100th Congress (without regard to the water year), Congress enacted the following statutes that are important to the Upper Colorado River Basin States:

Public Law 100-202, approved December 22, 1987, Omnibus Budget Reconciliation Act of 1987, an Act to provide fiscal 1988 spending authority for all Federal programs for which Congress had not passed fiscal 1988 appropriations bills including Energy and Water Development, Interior and Related Agencies, and Agriculture and Related Agencies.

Public Law 100-4, approved February 4, 1987, Water Quality Act of 1987, an Act to amend the Federal Water Pollution Control Act to provide for the renewal of the quality of the Nation's waters, and for other purposes.

C. EDUCATION — INFORMATION

1. General Cooperation

The Upper Colorado River Commission has directed its Education and Information program toward promoting interstate cooperation, harmony, and united efforts; developing an understanding in other sections of the United States of the problems of the Upper Colorado River Basin; and the creation of a favorable attitude on the part of Congress with respect to the development of the industrial and agricultural resources of the Upper Colorado River Basin.

The Commission has continued to cooperate with members of the Congressional delegations from the Upper Colorado River Basin States and with officials of the Department of the Interior and the Bureau of Reclamation in seeking appropriations of funds by the Congress for the construction of the Storage Units and participating projects authorized for construction, as well as funds for the investigations of additional participating projects that are given priority in planning in the Colorado River Storage Project Act. As part of this cooperation, the Commission's Executive Director has been in Washington, D.C. at intermittent periods, acting as liaison between the Congress and the States

and various departments of government, supplying information, arranging and taking part in Congressional hearings, and providing other assistance requested.

2. Library

Efforts are being continued to accumulate all types of engineering, legal, economics, and semi-technical documents related to the Colorado River Basin to comprise a well-equipped and efficiently-operating permanent library. As materials are collected for inclusion in the library, they are cataloged in the Commission's computer system. Many thousands of pages of documents have been placed on microfiche. Information in the Commission's library will be available to any of its member States on short notice should a need arise. Studies are being made, supplemented, or collected to address the many problems associated with the development, utilization, and conservation of water and hydroelectric resources of the Colorado River Basin.

The continuing program of library expansion has been maintained. Emphasis is placed on the acquisition of information which illumines that growing body of law known as the "law of the river." Since the Environmental Protection Agency and the Western Area Power Administration have assumed an increasing importance in the water development field, documents from those agencies are being monitored and acquired as a part of the Commission's library.

3. Relief Model

The Relief Model of the Upper Colorado River Basin and the adjacent areas is available for display at conventions and other public events.

COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

A. AUTHORIZED STORAGE UNITS

(Information relative to Storage Units and participating projects has been obtained from reports on investigations and activities of the United States Department of the Interior, Bureau of Reclamation.)

The Colorado River Storage Project was authorized for construction by the United States Congress in the Act of April 11, 1956 (70 Stat. 105). Four storage units were authorized by this Act: Glen Canyon Dam and Lake Powell on the Colorado River in Arizona and Utah, Navajo Dam and Reservoir on the San Juan River in New Mexico and Colorado, Flaming Gorge Dam and Reservoir on the Green River in Utah and Wyoming, and the Wayne N. Aspinall Storage Unit, formerly named the Curecanti Storage Unit and rededicated in July 1981, on the Gunnison River in Colorado. The Wayne N. Aspinall Storage Unit consists of three dams and reservoirs: Blue Mesa, Morrow Point, and Crystal. Combined, the four storage units provide about 33,583,000 acre-feet of water storage capacity.

The Act authorized the construction of eleven participating irrigation projects. Ten additional participating projects have been authorized by subsequent congressional legislation.

The storage units and participating projects are described in the twenty-seventh and earlier annual reports of the Upper Colorado River Commission. Progress in construction, planning, and investigation of the storage units and participating projects accomplished during the past water year are briefly outlined as follows:

1. Glen Canyon Storage Unit

Glen Canyon Dam and Reservoir (Lake Powell) comprises the key storage unit and is the largest of the initial four, providing about 80 percent of the storage capacity and 85 percent of the generating capacity. Glen Canyon Dam was completed in 1964.

a. Glen Canyon Environmental Studies

The five-year Glen Canyon Environmental Studies project is nearing its conclusion. The work began December 8, 1982 with a decision by the Secretary of the Interior to analyze the effects

of the operation of Glen Canyon Dam on the downriver environment of Grand Canyon National Park.

The decision to undertake the studies came following the completion of an environmental assessment (EA) on the uprating and rewinding of the generators at Glen Canyon Dam. There were substantial public comments on the EA raising questions concerning the impacts of the operation of the power plant under the present operating criteria.

The studies have two specific objectives. First, to determine and quantify the impact of the operation of Glen Canyon Dam on the downstream natural and recreational resources of the Grand Canyon. Second, to determine if, within existing Colorado River Storage Project institutional constraints and operational mandates, there exist viable alternatives for modification that could reduce negative impacts defined in the studies.

It is of equal importance to clarify what the studies document is not. It is not a National Environmental Policy Act (NEPA) compliance document (EA or Environmental Impact Statement (EIS)). Therefore, it is not a decision document to change operations. It does not include a trade-off analysis of economic values and does not include full public involvement. That public involvement will come later if a decision is made to examine specific changes in operations.

The document is a technical study to identify the impacts of existing operations and to determine the feasibility of studying specific operational changes. The studies may lead to a NEPA process that will consider possible changes in operations.

At the conclusion of 1987, the 43 separate technical studies within five broad areas were concluded. These areas include: sediment transport and river hydrology, aquatic biology, terrestrial biology, river recreation, and dam operations. An "integration" report summarizing the 43 studies has been prepared in draft form and will be finalized by late January of 1988.

The National Academy of Sciences will complete an independent review of the studies and produce a written report with recommendations by February of 1988.

Finally, the Executive Review Committee composed of policy-level representatives of participating Interior agencies plus the Western Area Power Administration, Department of Energy, will complete its review of the studies and its recommendations to the Department of the Interior by March of 1988. The Executive Review Committee has three objectives: (1) to identify the

policy issues for each agency involved in the management of the Colorado River through Grand Canyon; (2) to identify the important constituent groups who need to be included in the information/decision process; and (3) to develop a position on the importance of the impacts identified in the technical report. The Executive Review Committee report will address the necessity for any additional analysis, identify for the Department of the Interior the potential conflict areas that may be present, and develop recommendations for Departmental consideration.

Reclamation identified the Upper Colorado River Commission as one of its constituent groups, sponsored a discussion among the Commission's Legal and Engineering Committees and the leaders of the sub-teams that wrote the Glen Canyon Environmental Studies Draft Report, and encouraged the Commission to submit comments on the Draft Report. The comments received from all constituent groups were to be used by the Executive Review Committee in preparing its report and recommendations to the Secretary of the Interior. One of the conclusions in the letter the Commission submitted to Reclamation in response to its request for comments is that the Glen Canyon Environmental Studies Draft Report "does not present evidence that the operation of Glen Canyon Dam should be changed."

There are three broad Departmental decision scenarios possible. First, the department could decide that the impacts are acceptable and no changes in the basic operating criteria are indicated. Second, the Department may decide there is still a lack of sufficient data to make a decision. For example, the Department might decide that there are insufficient data on low and fluctuating flows, since the studies were conducted during years of record high flows. Finally, the Department may decide to explore new operating criteria and order the NEPA process to begin. That decision would lead to identification of alternative criteria including a no-action alternative. All impacts, including physical, social, and economic impacts, would then be evaluated, and full public involvement would be initiated.

b. Generator Upgrading Program

The generator upgrading program started in the fall of 1983 at Glen Canyon and was completed in April of 1987. Upgrading the generators added 266.7 megawatts of capacity and increased the plant nameplate capacity from 1,021.3 megawatts to 1,288 megawatts.

c. Recreational Use

The extensive recreational use of Glen Canyon National Recreation Area which surrounds Lake Powell is demonstrated by the fact that during 1987 approximately 2,884,024 people visited the area. The National Park Service has concession-operated facilities at Wahweap, Rainbow Bridge, Halls Crossing, Hite, Lees Ferry, and Bullfrog Basin.

From 1909 through 1961, a total of 20,972 vacationers visited Rainbow Bridge. When access to the Bridge by water was made available through completion of the dam in 1963, visitation rapidly increased. In 1966, 20,468 people visited Rainbow Bridge, almost as many as the total 20,972 who viewed it during the 53 years prior to the construction of the dam. During 1987, 210,708 visitors came to the site.

2. Flaming Gorge Storage Unit

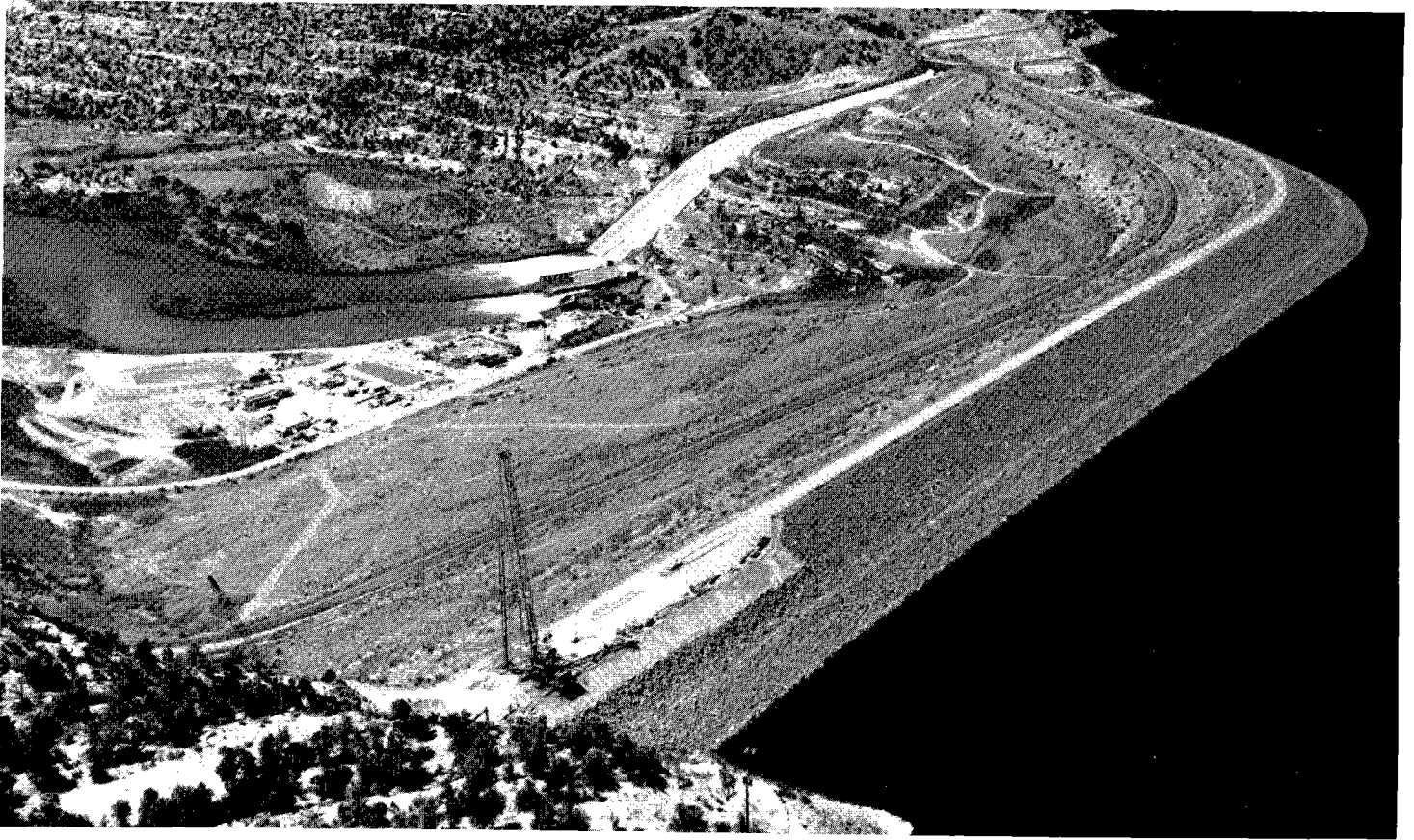
Flaming Gorge Dam and Powerplant were completed in 1963. A request for proposals for uprating the Flaming Gorge Powerplant generators is planned to be issued in fiscal year 1988, with uprating to begin in August of 1989. An Environmental Assessment/Finding of No Significant Impact for the uprate was prepared and approved in October of 1986. When the uprating is completed in 1991, the plant will have a maximum capacity of 150 megawatts versus the present maximum of 132 megawatts.

Flaming Gorge National Recreation Area, which surrounds Flaming Gorge Dam and Reservoir, recorded about 1,733,649 visitors during 1987. Fishing is an important recreational activity at Flaming Gorge Reservoir and in the Green River below the Dam.

3. Navajo Storage Unit

The major purposes of the Navajo Dam and Reservoir are to regulate the flows of the San Juan River and to provide a water supply for the authorized Navajo Indian Irrigation Project near Farmington, the San Juan-Chama participating project in the Rio Grande Basin, and the Hammond participating project, all in New Mexico. Part of the water is also used for industrial and municipal purposes in northwestern New Mexico. Navajo Dam was completed in 1963.

Work to repair Navajo Dam has begun under two contracts totaling slightly over \$16 million. Soletanche Inc. is continuing



An upstream view across the crest of Navajo Dam shows the hydrofraise cutting a diaphragm wall on the left abutment.

— Bureau of Reclamation photo.

construction of the diaphragm wall in the left abutment of the dam. This \$9.8 million contract is for two years; the contract is about 50 percent completed.

A different approach is being used on the dam's right abutment. Here there is a \$6.5 million contract for construction of a drainage and seepage control tunnel. Frontier-Kemper Constructors Inc. completed excavating the drainage tunnel on September 29, 1987. Conditions in the tunnel were essentially as predicted by geological investigations. Drainage elements will be installed in the tunnel in the coming months.

The reservoir is being held at elevations near 6,040 feet during the fall of 1987 and early spring of 1988 to facilitate construction. Releases will be in the range of 600 cubic feet per second (cfs) through the spring of 1988. The reservoir is scheduled to be restored to normal operating levels during the summer of 1988.

The City of Farmington, New Mexico, which has a Federal Energy Regulatory Commission (FERC) license to construct a power plant at Navajo Dam, started construction of a 30,000 kilowatt power plant in the fall of 1986.

Navajo Reservoir draws visitors from many areas. Approximately 527,602 people visited the reservoir during 1987.

4. Wayne N. Aspinall Storage Unit

The Wayne N. Aspinall Storage Unit includes three major dams and power plants in the canyon of the Gunnison River downstream from Gunnison, Colorado, and upstream from the Black Canyon of the Gunnison National Monument. The three dams are Blue Mesa, Morrow Point, and Crystal.

A contract was awarded at Blue Mesa Powerplant to uprate each of its two generators by about 12 megawatts. Up-rating began August 17, 1987 and is expected to be completed in the spring of 1988. When uprating is completed, plant capacity will increase from 72 megawatts to 96 megawatts.

At Crystal Powerplant, a contract was awarded for replacing the existing turbine runner. This modification should increase plant capacity from 28 megawatts to about 31 megawatts and should be completed by the spring of 1988.

The National Park Service administers recreational facilities that were constructed with Reclamation funds on Blue Mesa Reservoir at Elk Creek adjacent to U.S. Highway 50, at the Iola

1

site across the lake, and at Lake Fork near the dam. In 1987, 1,114,756 visitors came to the several Aspinall recreation areas.

5. Storage Units Fishery Information

The Flaming Gorge, Aspinall, Glen Canyon, and Navajo Storage Units continue to provide excellent warm- and cold-water fishing, both in the reservoirs and in the tailwater streams below the dams. Use of the reservoirs currently totals over one million angler days each year. Lake Powell provides over half of the total use, with the remainder coming equally from the three remaining reservoirs.

Lake Powell is almost exclusively a warm-water fishery. Striped bass, crappie, walleye, channel catfish, and largemouth bass are the harvested species. Navajo and Flaming Gorge provide both warm-water and cold-water fishing. Trout and kokanee are the predominant cold-water species harvested, and catfish, bass, and crappie (at Navajo) are the preferred warm-water fishes. The Aspinall reservoirs provide exclusively cold-water fishing, with kokanee and rainbow trout the predominant catch.

The four tailwaters have provided "blue ribbon" trout fishing that many view as some of the best in the western United States. Combined, the annual use of the tailwaters exceeds 200,000 angler days annually. The San Juan River below Navajo Dam receives about half of the total use with the Colorado River (below Glen Canyon), the Green River (below Flaming Gorge), and the Gunnison River (below Aspinall) providing the remainder.

Restrictions on fishery gear and the allowable harvest have been required on these rivers to insure quality use as fishing pressure increases annually. Estimates of the value of a day's fishing on these quality streams ranges from \$20 to \$100 per day, based on travel cost studies.

Based on the above estimates, the value of these tailwater fisheries could approach \$20 million annually. Even more important, however, these values seemingly increase each year as fishermen become aware of the tailwaters' availability and their use increases for trout fishing.

B. TRANSMISSION DIVISION

The power system includes high voltage transmission lines that interconnect the Colorado River Storage Project hydropower plants and deliver power to major load centers or to other delivery points. The system is interconnected with adjacent Federal, public, and private utility transmission systems. The Transmission Division was transferred to the Western Area Power Administration, Department of Energy, in fiscal year 1978.

Generation at Colorado River Storage Project (CRSP) power plants amounted to 8.1 billion kilowatt hours during water year 1987. The major portion, 6.5 billion kilowatt hours, was produced at Glen Canyon; the balance was produced at Flaming Gorge, Blue Mesa, Morrow Point, and Crystal power plants. Fontenelle Powerplant did not produce electricity during 1987 because of the necessity to keep the reservoir level below the minimum power pool while construction continues on the concrete diaphragm wall.

The following table lists the gross generation for fiscal years 1986 and 1987:

Reservoir	Gross Generation KWh		Percent Change
	FY 1986	FY 1987	
Blue Mesa . . .	398,093,000	344,153,000	- 14 percent
Crystal	243,501,000	234,084,000	- 4 percent
Flaming Gorge .	722,967,000	590,788,000	- 18 percent
Fontenelle	0	0	0 percent
Glen Canyon . .	7,687,245,000	6,549,920,000	- 15 percent
Morrow Point .	510,233,000	426,084,000	- 16 percent
TOTAL	9,562,039,000	8,144,029,000	- 15 percent

C. AUTHORIZED PARTICIPATING PROJECTS

Twenty-one participating projects have been authorized by Congress. Eleven were authorized by the initial authorizing Act of April 11, 1956 (70 Stat. 105); two were authorized by the Act of June 13, 1963 (76 Stat. 96); three were authorized by the Act of September 2, 1964 (78 Stat. 852); and five by the Act of September 30, 1968 (82 Stat. 886). Eleven are in Colorado, three in New Mexico, two in Utah, three in Wyoming, one in both Colorado and Wyoming, and one in both Colorado and New Mexico. Participating projects develop water of the Upper

Colorado River System for irrigation and municipal and industrial purposes and participate in the use of revenues in the Upper Colorado River Basin Fund to help repay the costs of irrigation features that are beyond the ability of the water users to repay. The participating projects are described in the twenty-seventh and earlier annual reports.

The following are completed or nearly completed participating projects:

Project	State	Dam	Year Completed
Paonia	Colorado	Paonia	1962
Smith Fork	Colorado	Crawford	1962
Florida	Colorado	Lemon	1963
Silt	Colorado	Rifle Gap	1967
Bostwick Park . . .	Colorado	Silver Jack	1971
Hammond	New Mexico	—	1962
Vernal Unit, CUP .	Utah	Steinaker	1962
Emery County . . .	Utah	Joes Valley	1966
Eden	Wyoming	Big Sandy, Eden	1960
Lyman	Wyoming	Meeks Cabin, Stateline	1981

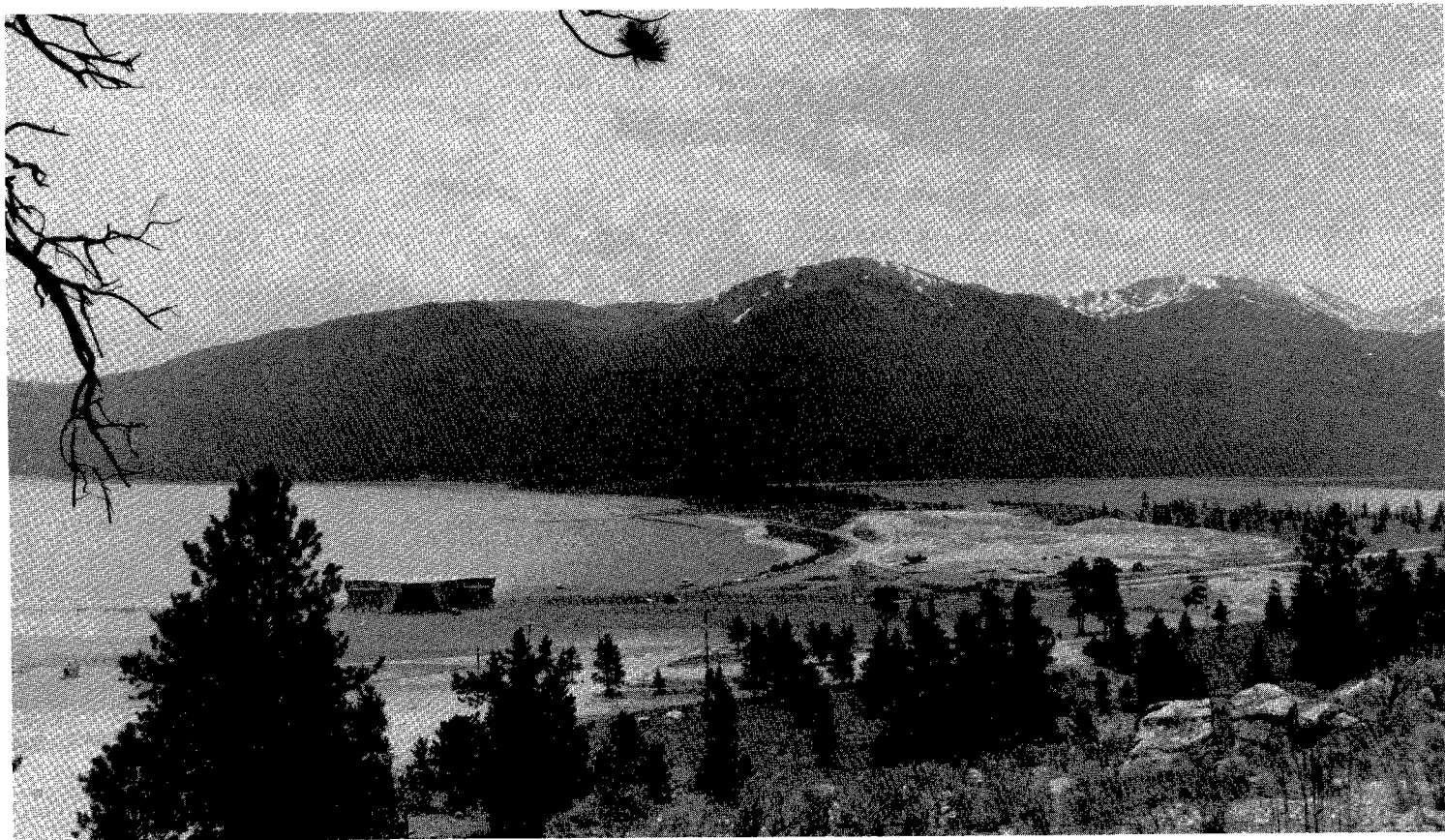
The present status of construction or investigation for each of the remaining participating projects and activities on completed projects follows:

1. Colorado

a. Fryingpan-Arkansas Project

Although the Fryingpan-Arkansas Project is not a participating project of the Colorado River Storage Project because it does not participate in the Upper Colorado River Basin Fund, it is sometimes referred to as a limited participating project because it does utilize water diverted from the Upper Colorado River System to the eastern slope of Colorado.

The Eastern Colorado Projects Office, located in Loveland, Colorado, directs the operation and maintenance activities of the Colorado-Big Thompson and Fryingpan-Arkansas Projects. A field office is located in Pueblo to coordinate with the Southeastern Colorado Water Conservancy District and the State Division Engineer and to administer remaining construction contracts in the area.



A view of Mt. Elbert Powerplant looking south across the lower Twin Lake.

— *Bureau of Reclamation photo.*

During the year work progressed on the Pueblo Fish Hatchery. When completed, the hatchery will supply both warm- and cold-water fish for stocking throughout the Fryingpan-Arkansas Project.

Contract negotiations for the sale of an additional 51,500 acre-feet of water from Ruedi Reservoir have been suspended pending completion of NEPA compliance. Reclamation executed four contracts in 1982 for the sale of 7,850 acre-feet annually from Ruedi.

Contents of reservoirs within the Fryingpan-Arkansas Project as of September 30, 1987 were as follows: Ruedi Reservoir, 95,706 acre-feet; Turquoise Lake, 126,067 acre-feet; Mt. Elbert Forebay, 7,690 acre-feet; Twin Lakes, 122,636 acre-feet; and Pueblo Reservoir, 229,777 acre-feet.

Transmountain diversions from the Colorado River Basin in Colorado during water year 1987 for the Colorado-Big Thompson and Fryingpan-Arkansas Projects were as follows: Alva B. Adams Tunnel, 246,300 acre-feet; and Charles H. Boustead Tunnel, 3,330 acre-feet.

b. Dallas Creek Project

Ridgway Dam and the Dallas Creek Project were dedicated on August 22, 1987. Initial filling of the reservoir began in the spring of 1987. On July 29, 1987, the reservoir reached an elevation of 6,836.48 feet (46,506 acre-feet). The elevation was lowered to 6,780.23 feet to allow completion of a sewage outfall line.

Plans for the 1988 runoff are for the elevation to be increased by the rate of one foot per day to 6,850 feet (59,984 acre-feet), where it will be held for 30 days. If there is any more runoff following that, the elevation will be raised an additional 5 feet to 6,855 feet and held there until the next runoff season. When full, the reservoir will be at elevation 6,871.3 feet (80,000 acre-feet).

If 1988 runoff conditions permit the filling to elevation 6,850.55 feet, temporary water could be made available for irrigation purposes to mitigate irrigation shortage conditions that may exist.

Administrative and recreation facilities are presently being constructed. These facilities include campgrounds, day-use areas, a boat ramp and marina, and associated roads and utilities.

c. Dolores Project

Testing for the Fairview and Cahone pumping plants and laterals commenced during the summer of 1987. CRSP power was delivered to the project by the Western Area Power Administration across Federal and private transmission systems, and project water was made available for irrigation of about 2,200 acres of primarily alfalfa and beans.

The contract for construction of the Pleasant View, Ruin Canyon, and Hovenweep pumping plants and laterals is scheduled for fiscal year 1988.

Development block notice no. 1 was issued on March 23, 1987 for all irrigable land using supplemental water within the Montezuma Valley Irrigation Company's system. The development period will begin in January of 1988, with the first payment due in February of 1989.

Development block notice no. 2 was issued on May 29, 1987 for the first block of municipal, industrial and miscellaneous users within the City of Cortez and the rural boundaries of the Dolores Water Conservancy District. This block notice established January 1, 1987 as the date municipal and industrial (M&I) water became available. The District made its first payment upon its concurrence with the notice, and water delivery will begin in January of 1988.

Concerning salinity features of the Dolores Project, an advance draft of the supplement to the Definite Plan Report (DPR) and Final Environmental Statement (FES) have been reviewed and comments incorporated. Draft supplements are scheduled for release in February of 1988, with the draft supplement to the FES to be filed in March of 1988. The final supplements to the DPR and FES are scheduled for release in January of 1989.

d. Fruitland Mesa Project

No activity has occurred on Fruitland Mesa since 1977.

e. San Miguel Project — West Divide Project

The San Miguel and West Divide Projects have been found to be economically unjustified at this time. The State of Colorado is continuing to review those decisions with Reclamation's assistance through the Technical Assistance to the States program.

f. Bostwick Park Project

No Federal activity occurred on this project in water year 1987.

2. Colorado and New Mexico

a. Animas-La Plata Project

On June 30, 1986, the Secretary of the Interior approved the "Agreement in Principle Concerning the Colorado Ute Indian Water Rights Settlement and Binding Agreement for Animas-La Plata Project Cost Sharing." The legislation implementing that agreement is now before Congress. On December 8, 1987, voters in the Animas-La Plata Water Conservancy District will have an opportunity to approve the Animas-La Plata repayment contract.

3. Colorado and Wyoming

a. Savery-Pot Hook Project

The Savery-Pot Hook Project has been found to be economically unjustified at this time. No activity has occurred on this project since 1977.

4. New Mexico

a. Navajo Indian Irrigation Project

Work by Columbia Engineering Corporation on construction of Block 6, Stage I, continued throughout the year and was 97.7 percent completed on September 30, 1987. The contractor delivered water to 3,521 acres during the irrigation season.

A negotiated contract in the amount of \$478,860 was awarded on August 7, 1987 to Brewer Associates, Inc. to provide field engineering oversight of separate contracts to construct Block 6, Stage II, and to repair concrete canal lining. The construction contracts for this work were awarded to Mingus Constructors, Inc. in the amount of \$3,168,942.10 on September 18, 1987 and to Columbia Engineering Corporation in the amount of \$654,745.50 on September 22, 1987.

b. San Juan-Chama Project

Heron Reservoir began the 1987 water year at elevation 7,185.91 feet, with a total content of 400,210 acre-feet. Total San Juan-Chama water diverted for the year totaled 83,050 acre-feet. The reservoir reached its maximum operating level of elevation 7,185.95 feet on July 3, 1987. Diversions of San

Juan-Chama water continued until July 20, 1987 to offset evaporative losses.

Due to winter operating restrictions at El Vado Dam, the reservoir was held at approximately elevation 6,895.85 feet until the beginning of the spring runoff period. Reclamation allowed the San Juan-Chama contractors to carry over their 1986 allotments stored in the reservoir, extending the deadline from December 31, 1986 to April 30, 1987. This provided benefits to the fishery below El Vado Dam by supplementing the natural flows with San Juan-Chama water deliveries to Abiquiu Reservoir, thereby maintaining steady riverflows during the critical spawn and hatch periods. This operation also provided added operational flexibility in delivery of the San Juan-Chama water to downstream destinations.

The R. H. Gunn Mine Development Company completed construction at Azotea Tunnel on March 6, 1987. A total of 3 miles of concrete tunnel invert repair was completed on the lower end of the tunnel. Concrete repair work on the Azotea Tunnel baffle drop structure was also accomplished under the contract.

Hastings Excavating was awarded a contract on July 13, 1987 for hauling and placing gravel surfacing on approximately 5.9 miles of operation and maintenance roads along Azotea Creek and Willow Creek.

Divide Constructors, Inc. was awarded a contract on September 22, 1987 for the repair of approximately 3 miles of eroded concrete tunnel invert in Azotea Tunnel. The work is situated approximately 3½ to 6½ miles into the tunnel from the outlet portal. Work conducted under the \$300,000 contract is expected to be completed by February 22, 1988.

5. Utah

a. Central Utah Project (Initial Phase)

The Central Utah Project will provide water for irrigation, municipal and industrial uses, and power generation. Benefits also will be realized in the fields of outdoor recreation, fish and wildlife conservation, flood control, water quality control, and area redevelopment. The Initial Phase consists of six units. Largest of these is the Bonneville Unit, which involves the diversion of water from the Uinta Basin, a part of the Colorado River Basin, to the Bonneville Basin, with associated resource developments in both Basins. The other five units, Vernal,

Uintah, Upalco, Jensen, and Ute Indian, provide for local development in the Uinta Basin.

i. Bonneville Unit. Work on the Bonneville Unit is progressing. The Draft Supplement to the Definite Plan Report is scheduled to be completed in mid-1988. The Draft Supplement to the Final Environmental Statement for the Diamond Fork Power System and the Draft Environmental Impact Statement for the Irrigation and Drainage System is scheduled to be filed in mid-1988.

A panel of independent experts was convened in September of 1986 to review geologic and seismic data and design concepts for Jordanelle Dam. The panel's final report in December 1986 supported Reclamation's assessment of the geology and designs required to meet the need to build a safe dam. This was the second panel to concur; the first panel concurred with Reclamation in 1982.

A \$15.95 million contract for Stage I construction of Jordanelle Dam was awarded on June 12, 1987 to Torno America, Inc. On June 27, 1987 ground was broken and construction began. The State of Utah also awarded contracts to relocate U.S. Highway 40 around Jordanelle Dam and Reservoir.

The contract for Upper Stillwater Dam, Reclamation's first "roller-compacted concrete" dam, was awarded in December of 1983. The last placement of roller-compacted concrete was made and the dam topped out on August 12, 1987. Filling of the reservoir began in the fall of 1987.

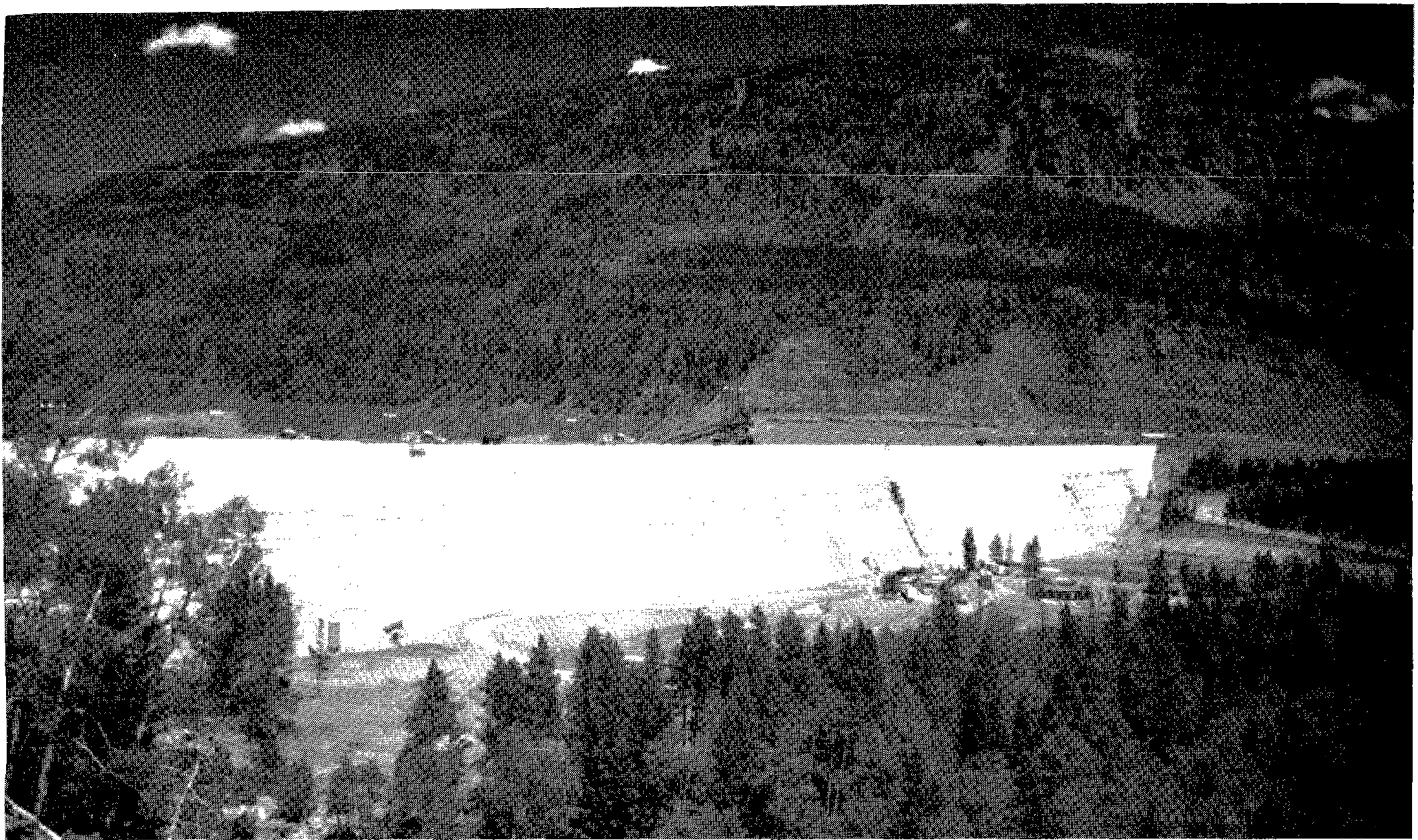
The North Fork Siphon of the Strawberry Aqueduct was substantially completed on June 11, 1987 and will be completed during the 1988 runoff season.

The Hades Feeder pipeline was completed on October 9, 1987. Water is now in the pipeline.

Strawberry operation and maintenance (O&M) facilities were completed on October 17, 1987.

Docs Feeder pipeline construction progress is satisfactory. Completion is scheduled for July of 1988.

As a result of the Deer Creek Strawberry Exchange and the acquisition of the Olmstead Flowline from Utah Power & Light Company and the use of the newly-completed Jordan Aqueduct Reach 4, Central Utah Project (CUP) municipal water was delivered to meet critical summer needs in Salt Lake County in 1987.



Upper Stillwater Dam, part of the Bonneville Unit of the Central Utah Project, is the Bureau of Reclamation's first "roller compacted concrete" dam.

— *Bureau of Reclamation photo.*

CUP water delivered during the past summer and fall helped significantly in relieving critical water shortages.

ii. Upalco Unit. No activity occurred on the Upalco Unit during fiscal year 1987.

iii. Uintah Unit. No activity occurred on the Uintah Unit during fiscal year 1987.

iv. Jensen Unit. There was no activity on the Jensen Unit during fiscal year 1987.

6. Wyoming

a. Lyman Project

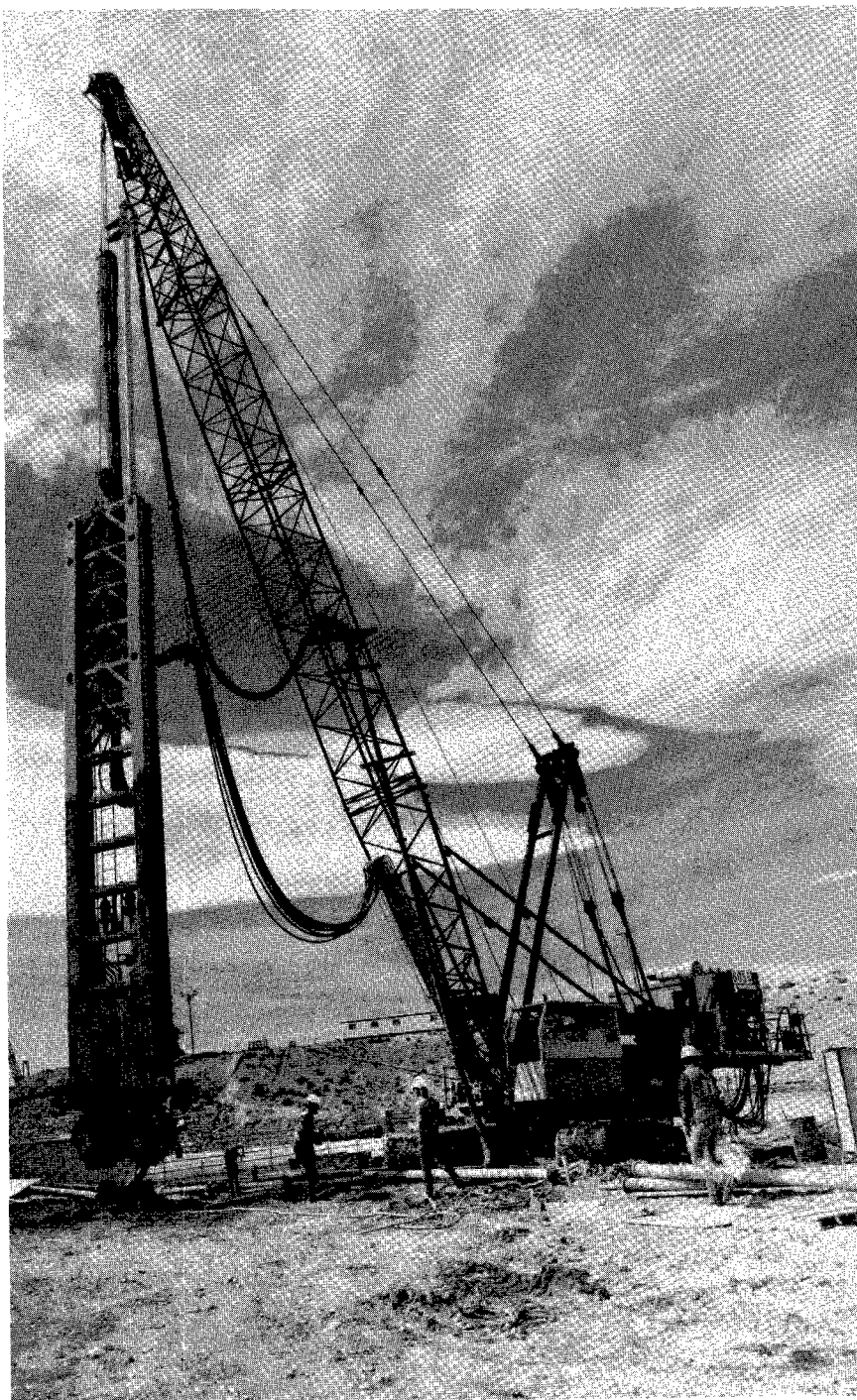
The Lyman Project, located in Uinta County in southwestern Wyoming, was dedicated on September 25, 1981. The project will deliver supplemental water to 42,674 acres of irrigated lands. Two dams, Meeks Cabin and Stateline, are the principal features of this project. The operation and maintenance responsibility for the two dams and the appurtenant irrigation works of the Lyman Project was transferred to the Bridger Valley Water Conservancy District on May 1, 1982.

Drilling activities at Meeks Cabin Dam under the Safety of Dams program concluded during the summer of 1987. A Modification Decision Analysis Report is scheduled to be completed in September 1988.

b. Seedskaadee Project

Proposals for the construction of a concrete diaphragm wall at Fontenelle Dam were received on March 31, 1987. After completion of negotiations, a contract was awarded to a joint venture of Soletanche Inc. and Obayashi-Gumi on May 26, 1987. The contract's total is \$23,938,200 and is scheduled to be completed on June 1, 1989. During the summer of 1987, workers using two hydrofraise units began construction of the diaphragm wall.

A cost-sharing agreement with the State of Wyoming was signed on May 21, 1987. The agreement provides for payment of about \$4.1 million by Wyoming concurrent with construction. An additional \$247,300 has also been paid for the first quarter of fiscal year 1988.



A view looking toward the west or right abutment of Fontenelle Dam shows the overall hydrofraise setup.

— *Bureau of Reclamation photo.*

D. RECREATIONAL USES AT PARTICIPATING PROJECT RESERVOIRS

The following estimated recreation days occurred at the reservoirs set forth below:

Reservoir	Year First Visited	1987
Curecanti (Aspinall)	1966	1,114,756
Currant Creek	1982	42,792
Crawford	1963	78,000
Flaming Gorge	1962	1,733,649
Fontenelle	1965	25,000
Heron	1973	145,853
Huntington North	1967	78,487
Joes Valley	1967	81,072
Lake Powell	1962	2,884,024
Lemon	1964	32,100
Meeks Cabin	1973	2,125
McPhee	1985	25,936
Navajo	1963	527,602
Paonia	1962	19,057
Red Fleet	1982	14,228
Rifle Gap	1967	96,561
Silver Jack	1973	43,368
Starvation	1970	40,554
Stateline	1982	5,600
Steinaker	1962	72,768
Strawberry Enlargement . . .	1985	446,600
TOTAL		7,510,132

E. POTENTIAL PARTICIPATING PROJECTS

In carrying out further investigations of projects under Federal Reclamation laws in the Upper Colorado River Basin, the Secretary of the Interior is directed to give priority to completion of planning reports on a number of potential projects. The Bureau of Reclamation, so far as limited funds and personnel will permit, is continuing studies on these projects.

1. Colorado

a. Grand Mesa Project

No activity has occurred on this project since 1982. A Planning Report concluding the study was approved July 13, 1982.

2. Utah

a. Central Utah Project, Ute Indian Unit

No activity has occurred on this unit since 1980. A concluding report was approved on May 30, 1980.

3. Wyoming

a. Sublette Project

A concluding report was approved on April 24, 1980.

F. STATUS OF OTHER BUREAU OF RECLAMATION PROJECTS IN THE UPPER COLORADO RIVER BASIN

1. Colorado

a. Fruitgrowers Dam Project

Work on the \$1,982,587 Fruitgrowers Dam Project under the Safety of Dams program started in October of 1985. Construction was completed in the fall of 1986. However, the spillway was completed several inches below the elevation required to maintain a full reservoir. A small additional contract was awarded in 1987 to raise the spillway. Work will be completed prior to the spring runoff of 1988.

b. Uncompahgre Project — Rehabilitation and Betterment Project

Construction will continue on the south canal. Work will begin on both replacement of the concrete floor in the Gunnison Tunnel and replacement of two needle valves at Taylor Park Dam.

2. Utah

a. Strawberry Valley Project

Repair work under the \$7.6 million Strawberry Rehabilitation and Betterment Project, which began in

1984, is essentially completed. The entire project will be completed prior to the summer of 1988, and the water users will make their first payment in 1989.

G. INVESTIGATIONS

1. Colorado

a. General Investigations

i. Mesa Delta M&I Ground Water Study. Studies were completed in fiscal year 1987. The studies report is now being completed. It was determined to terminate the studies due to the low aquifer yield.

ii. High Mountain Aquifer Study. This study is being conducted primarily by the Missouri Basin Region of Reclamation with assistance from the Upper Colorado Region. Fifty percent of the money for the study is coming from private industry.

The purpose of the study is to determine the feasibility of using high mountain glacial aquifers as storage facilities. The water would be stored in the winter months, either through pumping or gravity recharge, and used in the summer months. The benefits of such a project could include lower costs than dam building and potentially fewer environmental impacts. The purpose of the first phase of the study is to determine the technical feasibility of the project and not the marketplace for the water.

A draft Environmental Assessment on potential test site alternatives is nearing completion.

iii. Florida Project Rehabilitation and Betterment Investigation. In 1987 Reclamation completed a canal inventory and an analysis of the repayment capacity for potential rehabilitation and betterment work on the project.

b. Technical Assistance to the States

i. Upper Gunnison-Uncompahgre Basin Study. The study, sponsored by the Colorado Water Resources and Power Development Authority, covers recreation and water supply development opportunities in the basin. It also includes a study of the transmountain diversion of water to the east slope for M&I uses.

A draft appraisal-level report is scheduled to be completed by the Colorado Water Resources and Power Development

Authority with assistance from Reclamation in September of 1988, with a final report in December of 1988. If studies show a viable project, investigation funding will be requested by Reclamation. Reclamation is now developing a basin model and hydrologic record to determine any flows in the basin excess to current water rights.

ii. Grand Junction Hydropower Study. The final report has been presented to the City of Grand Junction. No viable alternative has been found based on costs and benefits.

2. Utah

a. Rehabilitation and Betterment Investigations

i. Moon Lake Project. Both an environmental analysis and the Final Rehabilitation and Betterment Report have been completed. A repayment contract is scheduled to be signed in fiscal year 1988. Two obsolete needle valves at Moon Lake Dam will be replaced by jet-flow gates. The outlet works pipeline will be recoated. The O&M road alongside several miles of the Yellowstone Feeder Canal will be rehabilitated and improved.

H. RESERVOIR OPERATIONS

1. Annual Operating Plan Development

In September of 1987, technical agreement was reached between the seven Colorado River Basin States and Reclamation concerning the annual operating plans for the Colorado River System.

In 1985, representatives of the seven States and Reclamation began to discuss a possible review of the operating criteria for the Colorado River System reservoirs. Reclamation maintained that the system could be operated more effectively within the constraints of the existing criteria. It was felt that a more even release pattern from Lake Mead throughout the year would provide substantial benefits to river channel maintenance and power production without impinging on essential conservation storage.

Reclamation proposed to redistribute the releases of water forced out of the system by the flood control criteria. Normally those releases are made over a short period of time in the winter months. Reclamation proposed distributing them over a longer period, including the previous summer and fall months.

The September 1987 agreement imposed three constraints on releases for water year 1988 in an effort to protect the conservation interest of each of the States. These constraints include: (1) a storage buffer between the contents of Lakes Mead and Powell; (2) a targeted Lake Mead flood control release of 19,000 cfs in January; and (3) a commitment to restrict Lake Mead releases to downstream requirements if necessary to protect the integrity of the annual operating plan.

An important part of the plan is that there will always be a monthly assessment of Basin conditions. Should conditions change from what is expected, adjustments will be made in operations to insure that mainstream reservoirs are kept at appropriate levels. Equally important is the premise that these excess releases not affect the operation of Glen Canyon Dam. The current operating philosophy, including the January 1 Lake Powell storage target of at least 22.6 maf, has not changed.

2. Runoff, and Reservoir Contents and Releases

The 1987 snowmelt runoff into Lake Powell during the April through July period totaled 7.84 million acre-feet, which is approximately 95 percent of normal. The computed unregulated discharge at Lee Ferry for the water year ending September 30, 1987 was 13,594,000 acre-feet. The following tabulation lists the breakdown of this discharge:

	<u>Acre-feet</u>
Net change in surface storage	— 871,000
Net change in bank storage	730,000
Net evaporation	116,000
Glen Canyon releases	13,603,000
Paria River discharge	<u>16,000</u>
Total Unregulated Discharge at Lee Ferry	13,594,000

In water year 1987, Upper Basin reservoirs had a decrease of 871,000 acre-feet in storage, and Lake Mead increased storage by 145,000 acre-feet.

a. Lake Powell

Lake Powell reached its high of 3,698.47 feet on June 25, 1987, with a usable surface storage of 24,755,000 acre-feet. By September 30, 1987, the elevation was drawn down to 3,687.95 feet with a content of 23,109,000 acre-feet. The total releases were 13,603,000 acre-feet, all of which went through the power

plant. The annual discharge of the Paria River was approximately 16,000 acre-feet, making a total discharge at Lee Ferry of 13,619,000 acre-feet as calculated from releases at Glen Canyon Dam.

b. Flaming Gorge Reservoir

The water surface of Flaming Gorge Reservoir on the Green River was at its highest elevation of the year on August 15, 1987, with usable surface storage of 3,561,000 acre-feet at elevation 6,035.45 feet. The April through July unregulated runoff was approximately 952,000 acre-feet, which is about 75 percent of average.

c. Fontenelle Reservoir

Fontenelle Reservoir is still under filling restrictions due to modification work on the dam. The elevation of the reservoir was at or near the target elevation of 6,443 feet all year. April through July unregulated inflow to Fontenelle was 734,000 acre-feet, which is approximately 84 percent of average.

d. Navajo Reservoir

Navajo Reservoir was at its maximum content of 1,509,000 acre-feet at elevation 6,072.35 feet at the start of the water year. Its end-of-year content was 1,101,000 acre-feet at elevation 6,039 feet, having been drawn down for modification work. About 2,181,000 acre-feet were released from Navajo Dam, with 137,000 acre-feet delivered to the Navajo Indian Irrigation Project. April through July inflow was 1,073,000 acre-feet, which is about 140 percent of normal.

e. Blue Mesa Reservoir

Blue Mesa Reservoir reached a high elevation of 7,516.23 feet on July 3, 1987, with a content of 801,000 acre-feet. Total power plant releases from Blue Mesa were 1,161,000 acre-feet. The elevation on September 30, 1987 was 7,506.77 feet, with a content of 718,000 acre-feet. April through July inflow was 787,000 acre-feet, which is approximately 113 percent of normal.

f. Morrow Point Reservoir

Morrow Point Reservoir was operated between 109,000 and 117,000 acre-feet, its full-stage capacity, during water year

g. Crystal Reservoir

Total releases from Crystal Dam were 1,435,000 acre-feet, with 1,221,000 acre-feet going through the power plant and 214,000 acre-feet being bypassed.

I. FISH AND WILDLIFE

Reclamation is continuing to work with the U.S. Fish and Wildlife Service to meet joint legal obligations to protect and recover threatened and endangered species of fish.

The Fish and Wildlife Service, in close cooperation with Reclamation and the Upper Division States of Colorado, Wyoming, and Utah, has developed a recovery program for the protection of the four rare or endangered Colorado River fish species (the Colorado squawfish, bonytail chub, and humpback chub are listed as endangered; and the razorback sucker, a rare fish or a candidate species for listing). The goal of the Recovery Implementation Program is to recover and delist the three endangered fish species and manage the rare fish species so it would not need the protection of the Endangered Species Act. This goal is to be accomplished in a manner that allows water development to proceed and does not disrupt State water rights systems, interstate compacts, and court decrees that allocate rights to use Colorado River water among the States.

It is expected that early in fiscal year 1988, the involved Federal agencies and States will sign a resolution recommending that the Recovery Implementation Program be implemented. Subsequently, it is expected that a formal agreement implementing the recovery program will be signed by the Secretary of the Interior and the three States' governors.

Five elements to the recovery program include: habitat management; habitat development and maintenance; stocking of native fish species; non-native species and sportfishing management; and research, monitoring, and data management.

The recovery program carries a \$2.3 million annual cost, which will be shared by the participating agencies. Reclamation's portion will come from both appropriated funds (Section 8 funds) and power revenues for up to 15 years. Power revenues will be used exclusively for operation studies, while the money

for construction of physical facilities and other capital expenditures will come from appropriated funds. Congress will be asked to provide \$10 million for water rights acquisition, and private water developers will pay a one-time depletion charge of \$10 for each acre-foot of future water developed.

With implementation of the recovery program, all existing jeopardy opinions by the Fish and Wildlife Service on major Reclamation projects which result from indirect impacts caused by depletions will be changed to non-jeopardy opinions.

J. APPROPRIATION OF FUNDS BY THE UNITED STATES CONGRESS

1. Colorado River Storage Project Appropriations Ceiling

H.R. 3408 was introduced on October 1, 1987 to increase the authorized ceiling for appropriations for the Colorado River Storage Project under Public Law 84-485 as amended by Public Law 92-370. The current indexed appropriation ceiling is \$2,171,308,000. The current estimate of the total appropriations required is \$2,925,744,000, which is an increase of \$754,436,000. The ceiling increase is necessary to provide for completion of the balance of construction for the units of the Colorado River Storage Project authorized by Public Law 84-485, as amended.

2. Congressional Appropriations

The funds appropriated for fiscal year 1988 for construction of the Colorado River Storage Project, participating projects, and recreational and fish and wildlife activities totaled \$147,979,000. The largest item was for construction of participating projects, which amounted to \$143,143,000, including \$496,000 for drainage and minor construction. Recreation and fish and wildlife activities received a total of \$4,836,000, with \$3,236,000 for recreation and the balance for fish and wildlife. In addition, \$8,525,000 were appropriated for the Grand Valley Unit, and \$11,383,000 for the Paradox Valley Unit under the Colorado River Basin Salinity Control Program.

Table 5

COLORADO RIVER STORAGE PROJECT
FISCAL YEAR 1988 PROGRAM

Project and State	Budget Estimate	House Allowance	Senate Allowance	P.L. 100-202 Dec. 22, 1987
Colorado River Storage Project				
Participating Projects:				
Animas-La Plata - Colorado	\$ 1,955,000	\$ 6,155,000	\$ 3,000,000	\$ 3,000,000
Central Utah Project - Utah				
Bonneville Unit	134,474,000	120,000,000	120,000,000	120,000,000
Uintah Unit	100,000	100,000	100,000	100,000
Dallas Creek Project - Colorado	8,500,000	8,500,000	8,500,000	8,500,000
Dolores Project - Colorado	<u>11,047,000</u>	<u>11,047,000</u>	<u>11,047,000</u>	<u>11,047,000</u>
	\$156,076,000	\$145,802,000	\$142,647,000	\$142,647,000
Drainage and Minor Construction				
Modifications and Additions to				
Completed Facilities	\$ 396,000	\$ 396,000	\$ 396,000	\$ 396,000
Central Utah Project - Utah				
Jensen Unit	<u>100,000</u>	<u>100,000</u>	<u>100,000</u>	<u>100,000</u>
	\$ 496,000	\$ 496,000	\$ 496,000	\$ 496,000
 TOTAL - Upper Colorado River Basin Fund	 <u>\$156,572,000</u>	 <u>\$146,298,000</u>	 <u>\$143,143,000</u>	 <u>\$143,143,000</u>
 Recreational and Fish and Wildlife Facilities				
Recreational Facilities	\$ 3,236,000	\$ 3,236,000	\$ 3,236,000	\$ 3,236,000
Fish and Wildlife Facilities	<u>600,000</u>	<u>600,000</u>	<u>3,400,000</u>	<u>1,600,000</u>
	\$ 3,836,000	\$ 3,836,000	\$ 6,636,000	\$ 4,836,000
 TOTAL - Colorado River Storage Project	 <u>\$160,408,000</u>	 <u>\$150,134,000</u>	 <u>\$149,779,000</u>	 <u>\$147,979,000</u>

Table 6

APPROPRIATIONS BY THE CONGRESS
for the
COLORADO RIVER STORAGE PROJECT AND
PARTICIPATING PROJECTS

<u>Fiscal Year</u>	<u>Amount</u>
1957	\$ 13,000,000
1958	35,142,000
1959	68,033,335
1960	74,459,775
1961	58,700,000
1962	52,534,500
1963	108,576,000
1964	94,036,700
1965	55,800,000
1966	45,328,000
1967	46,648,000
1968	39,600,000
1969	27,700,000
1970	25,740,000
1971	24,230,000
1972	27,284,000
1973	45,770,000
1974	24,426,000
1975	22,967,000
1976	38,160,000
Transition Quarter (July, August, September 1976).	15,562,000
1977	55,200,000
1978	67,051,000
1979	76,799,000
1980	81,502,000
1981	125,686,000
1982	130,063,000
1983	132,942,000
1984	161,104,000
1985	163,503,000
1986	97,412,000
1987	110,929,000
1988	<u>143,143,000</u>
 TOTAL	 \$2,289,031,310
 Plus: Navajo Indian Irrigation Project Appropriations	 253,138,385
 TOTAL APPROPRIATIONS	 \$2,542,169,695

Exclusive of non-reimbursable funds for fish and wildlife, recreation,
etc., under Section 8 of P. L. 485, 84th Congress.

WATER QUALITY PROGRAM IN THE UPPER COLORADO RIVER BASIN

(Information relative to the Water Quality Program in the Upper Colorado River Basin has been obtained from the United States Department of the Interior, Bureaus of Reclamation and Land Management, and the United States Department of Agriculture, Soil Conservation Service.)

Title II of the Colorado River Basin Salinity Control Act, Public Law 93-320 (approved June 24, 1974), authorized and directed the Secretary of the Interior to construct, operate and maintain four salinity control units as the initial stage of the Colorado River Basin Salinity Control Program and to expedite completion of the planning reports on twelve units. Title II also provided for the establishment of the Colorado River Basin Salinity Control Advisory Council. Public Law 98-569, the Colorado River Basin Salinity Control Act, Amendment, was passed by the 98th Congress and signed by the President on October 30, 1984.

In fiscal year 1987 Congress appropriated initial funding to implement the U.S. Department of Agriculture's (USDA) "... voluntary cooperative salinity control program . . ." authorized by Public Law 98-569. Therefore, the USDA's onfarm program now operates with broader authority and more flexibility than was available previously under existing authorities.

The 1984 Amendments to the Colorado River Basin Salinity Control Act required the Secretary of the Interior to develop a comprehensive salinity control program including implementation actions for the lands administered by the Bureau of Land Management (BLM) and submit a report which describes the program to Congress and the Advisory Council by July 1, 1987. The BLM met this congressional mandate. A report entitled "Salinity Control on BLM-Administered Public Lands in the Colorado River Basin" was completed and sent to Congress and the Advisory Council in July. BLM's Salinity Control Program, as described in the report to Congress, will be accomplished through the soil, water, and air subactivity.

Salt contribution to the Colorado River from public lands will be minimized through proper land use in a way that enhances other resource values. Proper land use, with objectives for increasing ground cover, stabilizing stream banks, controlling accelerated gully erosion, and minimizing surface disturbing activities is the BLM's preferred method of achieving salinity

control. In the report to Congress, BLM identified 14 projects that incorporate these land-use objectives. In addition, the report recommends seven implementation actions to minimize salt contributions from the public lands.

BLM has developed a resource management planning process to make basic land use decisions. BLM's planning process is the principal mechanism from which salinity control problems are identified and addressed. Through the planning process, resource management plans are developed that examine management alternatives for all resources and land uses on public lands. Impacts resulting from management decisions are addressed through environmental impact statements prior to approval of plans. Prior to project implementation, activity plans and associated environmental analyses are conducted. Public involvement is encouraged throughout the process.

Salts enter tributaries of the Colorado River from surface runoff, erosion and ground water flows (nonpoint sources), and from point sources such as saline springs, spoil piles at mines, and oil and gas production sites. Most salt contributions to the Colorado River from public lands occur from nonpoint sources.

Controlling salinity in surface runoff from rangelands is closely related to controlling soil erosion. Vegetation cover is usually the most important management variable influencing runoff and erosion rates on rangelands. Vegetation management, either indirectly through the design and implementation of livestock grazing plans, or directly through vegetation manipulation, is an important erosion and salinity control technique. However, on the most highly saline rangelands, maximum potential cover is often too low to provide meaningful control of surface runoff and erosion.

Proper land use, including grazing systems that incorporate increased cover, appropriate seasons of use, and stream protection as objectives, is the BLM's preferred method of achieving salinity control.

In situations where a watershed's condition is so severely degraded that recovery will be inefficient under normal land management practices, mechanical land treatments and structural alternatives may be the most effective salinity control techniques. Mechanical land treatments involve soil tillage techniques such as contour furrowing, ripping, and pitting. Common structural techniques include rangeland dikes, retention plugs, retention and detention reservoirs, and gully plugs.

Many point sources exist on public lands. Point sources can occur as either wells or springs. Several wells have been plugged, and future flowing wells will be plugged as the situation warrants. BLM has developed and currently maintains a water-use inventory to identify and characterize water uses and respective sources on the public lands. Saline springs will be identified through this program. Control of saline springs will be analyzed through BLM's planning process, with major sources brought to the attention of Reclamation. An example of this is the Sinbad Valley Unit in western Colorado. In September 1986, all advance planning activities for the Sinbad Valley Unit were transferred to Reclamation.

A. Colorado River Basin Salinity Control Program

Section 202 of Title II of Public Law 93-320 authorized the Secretary of the Interior to construct, operate, and maintain four salinity control units as the initial stage of the Colorado River Basin Salinity Control Program. The four units are Paradox Valley, Grand Valley, Crystal Geyser, and Las Vegas Wash. Public Law 98-569, dated October 30, 1984, deauthorized Crystal Geyser.

1. Paradox Valley Unit

The contractor has completed drilling the injection test well to a final depth of 15,970 feet.

Final designs for the collection well field facilities and disposal well surface facilities are complete. The first contract for those facilities was awarded in fiscal year 1987, and a second contract will be awarded in fiscal year 1988.

2. Grand Valley Unit

Operation and maintenance of Stage I has been turned over to the water users. The Grand Valley Irrigation Company (GVIC) shareholders voted to allow the GVIC Board authority to continue to develop a lateral improvement implementation program for Stage II with Reclamation.

A five-year master cooperative agreement has been negotiated among Reclamation and Palisade and Mesa County Irrigation Districts to provide funds to the districts for establishment of a joint salinity coordination office. The office's salinity coordinator will assist Reclamation in obtaining water-user participation in the lateral improvement program. On September 3, 1987

the GVIC Board voted against performing a three-year study to gather data that would be used to develop a method of determining base O&M costs for the laterals within GVIC's service area. Other means to determine these costs are currently being explored by Reclamation and GVIC.

The contractor had completed half of the membrane lining of the West End Government Highline Canal by April 6, 1987, when the water was turned into the canal. The rest of the canal will be lined in the winter after the water is out. A major siphon, Mack Wash Siphon, was completed just before water was turned into the canal.

Mitigation land for Stage I and a portion of Stage II is scheduled to be acquired during fiscal year 1988.

About 34 percent of the USDA's project goal for onfarm improvements and 29 percent of the goal for off-farm lateral improvements have been achieved as of September 30, 1987. As a result of these improvements, annual onfarm seepage and deep percolation have been reduced by 4,800 acre-feet, giving a salt load reduction of about 19,000 tons per year. Annual seepage from off-farm laterals has been reduced by about 4,400 acre-feet, for a salt load reduction of about 16,200 tons per year.

B. Colorado River Water Quality Improvement Program

Section 203 of Title II of Public Law 93-320 authorized and directed the Secretary of the Interior to expedite completion of the planning reports on twelve units.

1. Uintah Basin Unit

The Planning Report/Final Environmental Impact Statement (FEIS) was filed June 25, 1987.

Phase II Data Collection is underway. A field review of all data needed for a salt and water budget for canals in the area was completed. Also completed were initial seepage tests on canals and drilling of observation holes in the Brush Creek area to monitor salinity. Reclamation and USDA are working to develop a combined sprinkler irrigation plan. A preliminary Findings Memorandum is scheduled for release in March of 1988.

Under authority of Public Law 98-569 a special "first contract" signing ceremony was held in Roosevelt, Utah on July 2, 1987, heralding the broader authority and increased level of funding for the USDA's onfarm salinity control program. Nine contracts signed during the ceremony will provide onfarm improvements for 1,528 acres and will reduce salt load contributions to the river by about 1,500 tons per year when the work is completed. As of September 30, 1987, the USDA program has achieved an estimated 25,300 tons per year reduction in salt loading contributed to the Colorado River.

2. Big Sandy River Unit

No viable cost-effective plan was found for Reclamation's portion of the Big Sandy River Unit. The draft planning report concluding the study is nearing completion, and the final report is scheduled for release in June of 1988.

The final Environmental Impact Statement for the USDA portion of the Big Sandy Unit was released by the Soil Conservation Service (SCS) in September of 1987. That document supplements the Colorado River Water Quality Improvement Program Final Environmental Statement dated May 17, 1977. Filing of the Record of Decision and the appropriation of funds will open the way for this onfarm project to be implemented.

3. Lower Gunnison Basin Unit

The Lower Gunnison Basin Unit has met prerequisites for implementation and is awaiting funding for staged implementation of the four cost-effective subareas having a high priority for implementation.

The preconstruction winter water report was approved in August of 1987. Negotiations are now being held with Tri-County Water Conservancy District, Chipeta and Menoken Water Companies, and Project 7 Water Authority on the operation, maintenance and replacement contracts for the proposed expansion of the domestic water systems. Reclamation has awarded a contract to perform work designed to resolve Project 7's claim that project implementation would adversely impact its raw water supply system.

North Fork Area data collection is underway. Potential alternatives include removing winter stock water from the canals and delivering it through gravity pipelines parallel to existing canals

and laterals. It also appears that selectively lining canals and laterals and plugging some highly saline flowing wells may be cost effective.

4. Price-San Rafael Rivers Unit

A progress report on the coordinated Reclamation/SCS planning activities was presented on September 25, 1987 to the Colorado River Basin Salinity Control Forum. The Forum work group found the status report to be very favorable and recommended that Reclamation and USDA continue in their investigations. The work group also recommended separate habitat replacement programs for Reclamation and USDA. A revised plan formulation working document with the recommended plan is scheduled for release in February of 1988.

5. Dirty Devil River Unit

A planning report concluding the study was approved in June of 1987.

6. San Juan River Unit

The preliminary findings memorandum/work plan was approved in April of 1987. It recommended that investigations continue.

Analysis of Hammond Canal ponding test data shows some sections of the system have high leakage rates. The potential use of saline subsurface return flows from the Navajo Indian Irrigation Project to supply water for a proposed new coal-fired power plant was also discussed.

By interagency agreement, the United States Geological Survey will do detailed analysis of saline groundwater sources along the San Juan River in New Mexico.

7. McElmo Creek Unit

Coordination of planning between Reclamation and the SCS is continuing and will assure construction and operational compatibility of the off-farm and onfarm improvements proposed for this unit. Based on review comments received on its environmental assessment, the SCS will prepare an Environmental Impact Statement (EIS) for its onfarm improvement program supplementing the Colorado River Water Quality Improvement Program Final Environmental Statement dated May 17, 1977. Work on the draft EIS has been started.

WEATHER MODIFICATION

Research experiments and operational cloud seeding projects indicate that weather modification has the potential to increase mountain snowfall, thus augmenting water supplies in the Colorado River Basin.

Seeding winter orographic clouds to increase snowfall may be the best major alternative to help meet long-range problems in the Colorado River area. Before this can happen, the remaining scientific uncertainties need to be resolved to develop an improved technology and a practical demonstration and evaluation of water production. A comprehensive augmentation demonstration program, including research experiments, coordinated operational seeding, and associated impact studies, could be conducted within the next ten years.

FINDINGS OF FACT

No findings of fact pursuant to Article VIII of the Upper Colorado River Basin Compact have been made by the Upper Colorado River Commission. No part of this Annual Report is to be construed as a finding of fact by the Commission.

ACKNOWLEDGMENTS

The Upper Colorado River Commission wishes to thank the Governors of Colorado, New Mexico, Utah, and Wyoming for their interest in and support of the Upper Colorado River Commission.

The Commission especially wishes to give recognition to the difficult and able work of the members of the United States Congress from the Upper Division States of the Colorado River Basin and to acknowledge with appreciation the assistance it has received from agencies of the Executive Branch of the Federal Government, the Department of the Interior, Bureau of Reclamation, Bureau of Land Management, Geological Survey, Bureau of Indian Affairs, Western Area Power Administration, the National Weather Service, and the Department of Agriculture.

The diligent devotion to duty by departments of health and environment, water pollution control commissions, and counterpart organizations of the Upper Division States in aiding in the resolution of pollution and salinity problems of the Upper Colorado River System deserves special commendation.

Special recognition and appreciation is due to the Colorado River Basin Salinity Control Forum, several of whose members are advisers closely associated with the Commission, for the excellent work accomplished on the difficult salinity problems of the Colorado River.

Officers and personnel of many State agencies having their primary interests in various phases of water resources have also aided materially with cooperative efforts and information.

RESOLUTIONS
of
UPPER COLORADO RIVER COMMISSION

RESOLUTION
of the
UPPER COLORADO RIVER COMMISSION

Re: Proposed "Hydrologic Determination, 1987--
Water Availability from Navajo Reservoir and the
Upper Colorado River Basin for Use in New Mexico"

WHEREAS, the Upper Colorado River Commission supports water resource development in the Upper Colorado River Basin to enable the Upper Division States to fully develop their compact apportionments of Colorado River water while meeting their compact water delivery requirements at Lee Ferry; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that, with the delivery at Lee Ferry of 75 million acre-feet of water in each period of ten consecutive years, the water supply available in the Colorado River System below Lee Ferry is sufficient to meet the apportionments to the Lower Basin provided for in Article III (a) and (b) of the Colorado River Compact and the entire Mexican Treaty delivery obligation; and

WHEREAS, it is the understanding and expectation of the Upper Colorado River Commission and the Upper Division States that appropriate authorities will take all actions necessary to ensure that all States have access to their respective apportionments as specified in the Upper Colorado River Basin Compact; and

WHEREAS, the Commission resolved at its Special Meeting in Denver, Colorado on June 2, 1987 that it ". . . would not object to a determination by the Bureau [of Reclamation] that the Upper Basin yield is at least 6.0 million acre feet annually, rather than 5.8 million acre feet as previously determined":

NOW, THEREFORE, BE IT RESOLVED by the Upper Colorado River Commission at its Adjourned Annual Meeting in Denver, Colorado, on October 22, 1987, that while the Commission does not endorse the projected Upper Basin depletions, study assumptions, or analytical methodologies set forth in the proposed "Hydrologic Determination, 1987--Water Availability from Navajo Reservoir and the Upper Colorado River Basin for Use in New Mexico," and while it specifically disagrees with the assumption of a minimum Upper Basin delivery of 8.23 million acre-feet annually at Lee Ferry, the Commission does not object to a determination by the Secretary of the Interior that 94,500 acre-feet annually, in addition to the amount to be contracted for the San Juan-Chama Project, the Hammond Project, and the Navajo Indian Irrigation Project, are reasonably likely to be available for contract from the Navajo Reservoir supply for use in New Mexico without causing New Mexico to exceed its compact apportionment of Colorado River System water.

BE IT FURTHER RESOLVED, that the Commission asks that all long-term municipal and industrial water service contracts for water in Navajo Reservoir entered into upon the basis of the subject determination: (1) extend no later than through the year 2039, (2) specify that in the event curtailment of use of water by the States of the Upper Division shall become necessary at any time in order that the flow at Lee Ferry will not be depleted below that required by Article III of the Colorado River Compact, such curtailment shall be determined as specified in Article IV of the Upper Colorado River Basin Compact, and (3) specify that such contracts will be treated in accordance with New Mexico's doctrine of prior appropriation and are subject to the Upper Colorado River Basin Compact.

BE IT FURTHER RESOLVED that the Commission reaches no conclusion at this time on the interpretation and application of Article III(b)(3) of the Upper Colorado River Basin Compact because the Commission believes that New Mexico will be within its compact entitlement based on the position set forth in the second "WHEREAS" clause hereof.

BE IT FURTHER RESOLVED, that this resolution be transmitted to the Regional Director, Upper Colorado Region, Bureau of Reclamation, Salt Lake City, Utah, and, as appropriate, to other Federal, State, and Congressional officials who may consider this "Hydrologic Determination."

CERTIFICATE

I, GERALD R. ZIMMERMAN, Executive Director and Secretary of the Upper Colorado River Commission, do hereby certify that the above Resolution was adopted by the Upper Colorado River Commission at an Adjourned Annual Meeting held in Denver, Colorado on October 22, 1987.

WITNESS my hand this 23rd day of October, 1987.


GERALD R. ZIMMERMAN
Executive Director and Secretary

RESOLUTION
of
UPPER COLORADO RIVER COMMISSION

Honoring Felix L. Sparks

WHEREAS, Felix L. Sparks has served with distinction on various standing committees of the Upper Colorado River Commission, particularly on its Legal Committee, since April 23, 1957; as Chairman of the Legal Committee since September 17, 1962; as Colorado since November 19, 1979; and as Vice Chairman of the Commission from October 22, 1984 until February 27, 1987; and

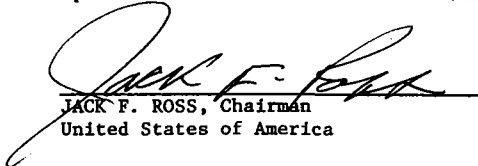
WHEREAS, Felix L. Sparks brought to the Upper Colorado River Commission a special expertise resulting from his experiences as a practicing attorney, a member of the Colorado State Supreme Court, legal counsel and Director of the Colorado Water Conservation Board, and an expert in the legislative process at both the State and national levels; and

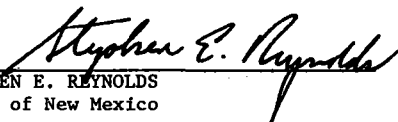
WHEREAS, Felix L. Sparks has rendered long, faithful, and meritorious service to both the Upper Colorado River Commission and the State of Colorado in negotiations relating to the conservation, utilization, and development of the water and related land resources of the Upper Colorado River Basin involving numerous water organizations, Federal agencies, and the seven Colorado River Basin States; and

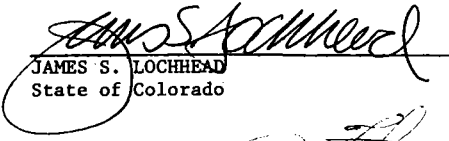
WHEREAS, Felix L. Sparks always honorably and vigorously performed his duties with the Upper Colorado River Commission in a manner that generated the respect of the members of the Commission, its advisers, and staff:

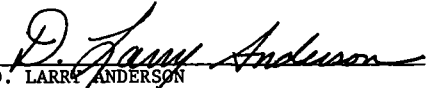
NOW, THEREFORE, BE IT RESOLVED that the Upper Colorado River Commission, at its Adjourned Regular Meeting held in Albuquerque, New Mexico on March 24, 1987, does hereby express the gratitude and appreciation of the Commission and its staff for the untiring service and wise counsel rendered by Felix L. Sparks in solving the many technical and political water resource problems that have confronted the Commission during his tenure as a member and Chairman of the Upper Colorado River Commission's Legal Committee and as Colorado's Alternate Commissioner and Commissioner; and that the Upper Colorado River Commission, its advisers, and staff sincerely wish Felix L. Sparks, his loving wife, Mary, and his family the best of health, happiness, and prosperity in all their future endeavors;

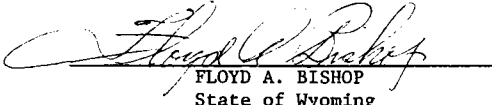
BE IT FURTHER RESOLVED that the Executive Director of the Upper Colorado River Commission is directed to send a copy of this Resolution to Mr. and Mrs. Felix L. Sparks and to the Governor of the State of Colorado.


JACK F. ROSS, Chairman
United States of America


STEPHEN E. REYNOLDS
State of New Mexico


JAMES S. LOCHHEAD
State of Colorado


D. LARRY ANDERSON
State of Utah


FLOYD A. BISHOP
State of Wyoming

RESOLUTION
of the
UPPER COLORADO RIVER COMMISSION

Re: Amendments to the 401(k) Profit Sharing Plan
of the Upper Colorado River Commission

WHEREAS, the Internal Revenue Service has made a favorable determination on the 401(k) Profit Sharing Plan of the Upper Colorado River Commission subject to the Commission's adoption of proposed amendments submitted by its representative Pension Administrators, Inc.; and

WHEREAS, the power to amend the 401(k) Profit Sharing Plan is granted to the Upper Colorado River Commission pursuant to the provisions of the Plan:

NOW, THEREFORE, BE IT RESOLVED that the Upper Colorado River Commission, at its Adjourned Regular Meeting in Albuquerque, New Mexico on March 24, 1987 does hereby adopt the following amendments to its 401(k) Profit Sharing Plan:

A2.08 of the Adoption Agreement shall be amended as follows:

A2.08 RETIREMENT DATES. For purposes of the Plan, a Participant's retirement date shall be his Normal, Early, Disability, or Deferred Retirement Date, as follows:

"NORMAL RETIREMENT DATE" shall mean the first day of the month which is coincident with or next following the date on which the Participant attains Normal Retirement Age, Sixty Five (65).

"EARLY RETIREMENT DATE" shall not be provided for in this Plan.

"DISABILITY RETIREMENT DATE" is not applicable to this Plan.

"DEFERRED RETIREMENT DATE" shall mean the first day of any month in which he actually retires after attaining Normal Retirement Age.

A3.05 of the Adoption Agreement shall be amended and the following added:

For purposes of this Section retroactive years of service will be defined as commencing on the re-employment commencement date. Re-employment commencement date shall be the first day on which the employee is entitled to be credited with an hour of service after the first eligibility computation period in which the employee incurs a one year break in service following an eligibility computation period in which the employee is credited with more than 500 hours of service.

A5.03 of the Adoption Agreement shall be amended to read as follows:

A5.03 EXCESS AMOUNT. Disposition of any Excess Amount under Section 5.02(b)(2) shall be as follows:

The Excess Amount shall be held unallocated in a suspense account. The suspense account shall be applied as the first portion of the Employer's contribution for all Participants in the next Limitation Year pursuant to this Section, it shall not participate in the allocation of the Trust's investment gains and losses.

A6.02 of the Adoption Agreement shall be deleted and replaced as follows:

A6.02 FORFEITURES. A forfeiture shall occur under the Plan as of the Anniversary Date of the Plan Year in which or subsequent to which Participant's termination of employment results in five (5) consecutive one-year Breaks in Service, or if earlier and if applicable, the date on which Participant receives a distribution of the nonforfeitable portion of his Regular Account in accordance with the provisions of Article VII.

Section 3.03(c)(1)(B) of the Plan Document shall be deleted and replaced as follows:

(B) The number of consecutive one-year breaks in service (or the period of break in service, if the elapsed time method was selected) does not equal or exceed the greater of (i) five (5) (or, with respect to any Plan Year commencing prior to January 1, 1985, one (1)), or (ii) the aggregate number of years of service before such period (or the period of aggregate years of service, if the plan uses the elapsed time method); or

Section 3.03(c)(2) shall be deleted.

6.03 of the Plan Document shall be amended and the following added:

This section shall not apply in non-top heavy years if percentages minimums under Section 416 were achieved in prior years.

6.05 of the Plan Document shall be amended and the following shall be added:

If the value of the Participant's Vested Account balance derived from Employer and Employee contributions (other than accumulated Qualified Voluntary Employee Contributions pursuant to Section 8.04) exceeds (\$3,500 [\$1,750] with respect to Plan Years commencing after January 1, 1985), the Participant and the Participant's Spouse (or Beneficiary of a deceased Participant) must consent to the accelerated payment or distribution by means of a written election which conforms to the requirements of a Qualified Election pursuant to Section 7.02(c).

6.05 of the Plan Document shall be amended and the following sentence added at the end of 6.05:

Distribution will be in a Lump Sum.

In 6.05(b) of the Plan Document, the following shall be deleted from the first amendment:

Whether or not such amount had been forfeited and reallocated.

In 6.05(b)(1) of the Plan Document, the following shall be deleted from the first amendment:

Whether or not such amount had been forfeited and reallocated.

6.05(b)(1) of the Plan Document shall be amended and the following sentence added at the end:

Restoration shall first come from any forfeitures available for that plan year. If forfeitures are not sufficient the Employer shall make an additional contribution sufficient to reinstate the Employer contribution account balance.

6.06 of the Plan Document shall be amended and the following sentence added at the end of 6.06:

Distribution will be in a Lump Sum.

In 7.02(d)(2) of the Plan Document, the second paragraph shall be deleted and replaced as follows:

If a Participant enters the Plan after the first day of the Plan Year in which the Participant attained age thirty-two (32), the Plan Administrator shall provide a written explanation no later than the end of the three (3) year period beginning on the first day of the Plan Year in which the Participant enters the Plan. In the case of a Participant who separates from service prior to age thirty-two (32), the Plan Administrator shall provide a written explanation of the Qualified Pre-Retirement Survivor Annuity within one (1) year after separation from employment.

(a) QUALIFIED ELECTION. A waiver of a Qualified Joint and Survivor Annuity or a Qualified Pre-Retirement Survivor Annuity. The waiver must be in writing and must be consented to by the Participant's Spouse. The Spouse's consent to a waiver must be witnessed by a Plan representative or notary public and must be limited to a benefit for a specific alternate Beneficiary. Notwithstanding this consent requirement, if the Participant establishes to the satisfaction of a Plan representative that such written consent may not be obtained because there is no Spouse or the Spouse cannot be located, a waiver will be deemed a Qualified Election. Any consent necessary under this provision will not be valid with respect to any other Spouse. Additionally, a revocation

of a prior waiver may be made by a Participant without the consent of the Spouse at any time before the commencement of benefits. The number of revocations shall not be limited. Any new waiver or change of Beneficiary will require a new spousal consent.

(b) ELECTION PERIOD. The period which begins on the first day of the Plan Year in which the Participant attains age thirty-five (35) and ends on the date of the Participant's death. If a Participant separates from service prior to the first day of the Plan Year in which age thirty-five (35) is attained, with respect to the account balance as of the date of separation, the Election Period shall begin on the date of separation.

14.04 of the Plan Document shall be amended and the following added:

Under no circumstances shall those Participants or Beneficiaries affected by the partial termination receive a distribution earlier than upon retirement, death, disability or separation from service, hardship (if permitted under A7.02), attainment of age 59 1/2, and will not be distributable merely by reason of the completion of a stated period of participation or the lapse of a fixed number of years;

The effective date of these amendments shall be July 1, 1985.

BE IT FURTHER RESOLVED that copies of this Resolution be sent to Pension Administrators, Inc.; the trustees of the 401(k) Profit Sharing Plan; and representatives of the Internal Revenue Service.

CERTIFICATE

I, GERALD R. ZIMMERMAN, Executive Director and Secretary of the Upper Colorado River Commission, do hereby certify that the above Resolution was adopted by the Upper Colorado River Commission at the Adjourned Regular Meeting held in Albuquerque, New Mexico on March 24, 1987.

WITNESS my hand this 25th day of March, 1987.


GERALD R. ZIMMERMAN
Executive Director and Secretary

RESOLUTION
OF
UPPER COLORADO RIVER COMMISSION
HONORING FLOYD A. BISHOP

WHEREAS, Floyd A. Bishop has worked for over 40 years in professional engineering in the State of Wyoming, including his service as State Engineer from May 1, 1963 until December 1, 1974; and

WHEREAS, Floyd A. Bishop began his service with the Upper Colorado River Commission in 1964 when he was appointed to its Engineering Committee; and

WHEREAS, Floyd A. Bishop was appointed to the Budget Committee of the Upper Colorado River Commission in 1975, became Chairman of that Committee on May 23, 1980, and served as Chairman of the Budget Committee until April 1, 1987; and

WHEREAS, Floyd A. Bishop was appointed Upper Colorado River Commissioner for the State of Wyoming on December 20, 1974 and served as Wyoming's Commissioner until April 1, 1987; and

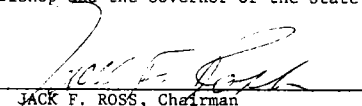
WHEREAS, Floyd A. Bishop was elected Vice Chairman of the Upper Colorado River Commission on October 14, 1977 and served in that position until October 22, 1984; and

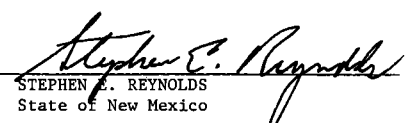
WHEREAS, Floyd A. Bishop has rendered long, meritorious service to the Upper Colorado River Commission and the State of Wyoming in negotiations relating to the conservation, utilization, and development of the water and related land resources of the Upper Colorado River Basin involving numerous water organizations and seven States of the Colorado River Basin; and

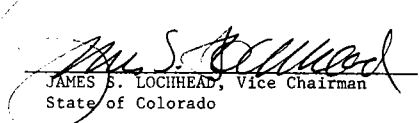
WHEREAS, Floyd A. Bishop always ably and honorably performed his duties with the Commission with a deep respect for the integrity and abilities of his fellow Commissioners, Committee members, Commission staff, and other interested parties with whom he was associated in the affairs of the Upper Colorado River Commission:

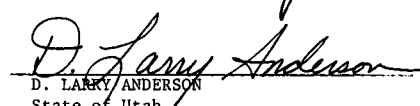
NOW, THEREFORE, BE IT RESOLVED that the Upper Colorado River Commission, at a Special Meeting held in Denver, Colorado on June 2, 1987 does hereby express the gratitude and appreciation of the Commission and its staff for the untiring service and wise counsel rendered for over 23 years by Floyd A. Bishop as a member of the Budget and Engineering Committees, Chairman of the Budget Committee, Upper Colorado River Commissioner for the State of Wyoming, and Vice Chairman of the Upper Colorado River Commission and that the Upper Colorado River Commission, its advisers and staff sincerely wish him and his family the best of health, happiness, and prosperity in all future endeavors;

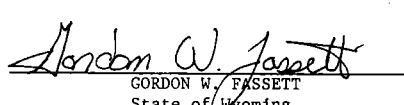
BE IT FURTHER RESOLVED that the Executive Director of the Upper Colorado River Commission is hereby directed to send a copy of this Resolution to Mr. and Mrs. Floyd A. Bishop and the Governor of the State of Wyoming.


JACK F. ROSS, Chairman
United States of America


STEPHEN E. REYNOLDS
State of New Mexico


JAMES S. LOCHHEAD, Vice Chairman
State of Colorado


D. LARRY ANDERSON
State of Utah


GORDON W. FASSETT
State of Wyoming

RESOLUTION
OF
UPPER COLORADO RIVER COMMISSION
RE: "UPPER COLORADO RIVER BASIN YIELD STUDY--
HYDROLOGIC DETERMINATION"

WHEREAS, the Upper Colorado River Commission supports water resource development in the Upper Colorado River Basin to enable the Upper Division States to fully develop their compact apportionments of Colorado River water while meeting their compact water delivery requirements at Lee Ferry; and

WHEREAS, it is the position of the Upper Colorado River Commission and the Upper Division States that with the delivery at Lee Ferry of 75 million acre-feet of water in each period of ten consecutive years, the water supply available in the Colorado River System below Lee Ferry is sufficient to meet the apportionments to the Lower Basin provided for in Article III (a) and (b) of the Colorado River Compact and the entire Mexican Water Treaty delivery obligation; and

WHEREAS, the Upper Colorado River Commission and the Upper Division States will call upon appropriate authorities to take all actions necessary to ensure that all States have access to their respective apportionments as specified in the Upper Colorado River Basin Compact:

NOW, THEREFORE, BE IT RESOLVED by the Upper Colorado River Commission at its Special Meeting in Denver, Colorado, on June 2, 1987, that while the Commission does not endorse the projections of depletions, the study assumptions or the analytical methodologies, particularly the assumption of a minimum Upper Basin delivery of 8.23 million acre-feet annually at Lees Ferry, contained in the "Upper Colorado River Basin Yield Study--Hydrologic Determination" as transmitted by letter dated March 9, 1987, from the Upper Colorado Region of the Bureau of Reclamation, the Commission would not object to a determination by the Bureau that the Upper Basin yield is at least 6.0 million acre-feet annually, rather than 5.8 million acre-feet as previously determined.

BE IT FURTHER RESOLVED that the Commission encourages the Bureau of Reclamation to redetermine the amount of water available for contract from the Navajo Reservoir supply based on an Upper Basin yield of 6.0 million acre-feet annually.


BE IT FURTHER RESOLVED that the Commission is not, at this time, taking any position on the amount of water which is reasonably likely to be available from any given Federal reservoir for long-term water service contracts without causing an Upper Division State to exceed its compact apportionment based upon a determination by the Bureau of Reclamation that the Upper Basin yield is at least 6.0 million acre-feet annually.

BE IT FURTHER RESOLVED that this resolution be transmitted to the Regional Director, Upper Colorado Region, Bureau of Reclamation, Salt Lake City, Utah, and, as appropriate, to other Federal, State, and congressional officials who may consider the "Upper Colorado River Basin Yield Study--Hydrologic Determination."

CERTIFICATE

I, GERALD R. ZIMMERMAN, Executive Director and Secretary of the Upper Colorado River Commission, do hereby certify that the above Resolution was adopted by the Upper Colorado River Commission at the Special Meeting held in Denver, Colorado on June 2, 1987.

WITNESS my hand this 4th day of June, 1987.


Gerald R. Zimmerman
Executive Director and Secretary

APPENDIX A

UPPER COLORADO RIVER COMMISSION

ACCOUNTANTS' REPORT
AND
FINANCIAL STATEMENTS

June 30, 1987

UPPER COLORADO RIVER COMMISSION

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Financial Statements:	
Combined Balance Sheet - June 30, 1987	2
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Summary of Personal Services with Budget Comparisons	9
Summary of Current Operating Expenditures with Budget Total Comparison	9
Summary of Insurance Coverage	10

HANSEN, BARNETT & MAXWELL

A PROFESSIONAL CORPORATION

CERTIFIED PUBLIC ACCOUNTANTS

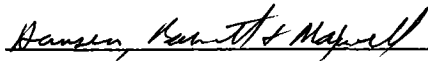
(801) 532-2200
345 EAST BROADWAY
SALT LAKE CITY, UTAH 84111-2693

The Commissioners
Upper Colorado River Commission
Salt Lake City, Utah

We have examined the combined balance sheet of the Upper Colorado River Commission as of June 30, 1987, and the related general fund statement of revenues and expenditures and changes in fund balance - budget and actual, for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the financial statements referred to above, present fairly the financial position of the Upper Colorado River Commission at June 30, 1987, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

Our examination was made for the purpose of forming an opinion on the combined financial statements taken as a whole. The accompanying information listed in the table of contents is presented for purposes of additional analysis and is not a required part of the combined financial statements of the Upper Colorado River Commission. The information has been subjected to the auditing procedures applied in the examination of the combined financial statements and, in our opinion, is fairly stated in all material respects in relation to the combined financial statements taken as a whole.



August 19, 1987

UPPER COLORADO RIVER COMMISSION
COMBINED BALANCE SHEET
JUNE 30, 1987

ASSETS

	Governmental	Account		Total
	Fund Type	General	General	
	General	Fixed	Long-Term	(Memorandum
	Fund	Assets	Debt	only)
Petty Cash	\$ 25	\$ -	\$ -	\$ 25
Cash in bank	34,404	-	-	34,404
Time certificates - Note 4	275,000	-	-	275,000
Deposit - United Airlines	425	-	-	425
Property and equipment: Notes 1 and 2				
Land and land improvements	-	26,551	-	26,551
Building	-	56,339	-	56,339
Furniture and fixtures	-	44,957	-	44,957
Library	-	1,366	-	1,366
Engineering equipment	-	1,411	-	1,411
Upper Colorado River Basin relief model	-	5,938	-	5,938
Maps	-	255	-	255
Amount to be provided for payment of compensated absences - Note 1	-	-	15,232	15,232
 Total Assets	 \$309,854	 \$136,817	 \$15,232	 \$461,903

LIABILITIES AND FUND EQUITY

Liabilities:				
Accounts payable	\$ 216	\$ -	\$ -	\$ 216
Assessment received in advance	20,812	-	-	20,812
Obligation for compensated absences - Note 1	-	-	15,232	15,232
 Total Liabilities	 21,028	 -	 15,232	 36,260
 Fund Equity:				
Investment in general fixed assets	-	136,817	-	136,817
Fund balance - Note 5	288,826	-	-	288,826
 Total Fund Equity	 288,826	 136,817	 -	 425,643
 Total Liabilities and Fund Equity	 \$309,854	 \$136,817	 \$15,232	 \$461,903

The accompanying notes are an integral part of these financial statements.

UPPER COLORADO RIVER COMMISSION
GENERAL FUND
STATEMENT OF REVENUES, EXPENDITURES AND CHANGES IN
FUND BALANCE - BUDGET AND ACTUAL
YEAR ENDED JUNE 30, 1987

	<u>Budget</u>	<u>Actual</u>	<u>Favorable (Unfavorable) Variance</u>
Revenues:			
Assessments - Note 1	\$178,000	\$178,000	\$ -
Interest	<u>-</u>	<u>20,985</u>	<u>20,985</u>
	<u>178,000</u>	<u>198,985</u>	<u>20,985</u>
Expenditures:			
Personal services	180,630	164,529	16,101
Travel	18,000	7,297	10,703
Current operating expenditures	41,400	30,761	10,639
Capital outlay	8,000	7,632	368
Education and information	500	-	500
Contingencies	<u>5,000</u>	<u>-</u>	<u>5,000</u>
	<u>253,530</u>	<u>210,219</u>	<u>43,311</u>
Revenues over (under) expenditures	(75,530)	(11,234)	64,296
Fund Balance - June 30, 1986 - Note 5	<u>300,060</u>	<u>300,060</u>	<u>-</u>
Fund Balance - June 30, 1987	<u>\$224,530</u>	<u>\$288,826</u>	<u>\$ 64,296</u>

The accompanying notes are an integral part of these financial statements.

UPPER COLORADO RIVER COMMISSION
NOTES TO FINANCIAL STATEMENTS
JUNE 30, 1987

NOTE 1 Summary of Significant Accounting Policies

This summary of significant accounting policies of the Upper Colorado River Commission (the Commission) is presented to assist in understanding the Commission's financial statements. The financial statements and notes are representations of the Commission's management, which is responsible for their integrity and objectivity.

History and Activities

The Upper Colorado River Commission was formed pursuant to the terms of the Upper Colorado River Basin Compact on October 11, 1948, and consented to by the Congress of the United States of America by Act on April 6, 1949, as an administrative agency representing the Colorado River Basin States, namely Colorado, New Mexico, Utah and Wyoming. The Commission consists of one commissioner representing each of the four states and one representing the United States of America. The activities of the Commission are conducted for the purpose of promoting and securing agricultural and industrial development of the Upper Basin's water resources.

The Commission is exempt from Federal income taxes under provisions of Section 501(c)(1) of the Internal Revenue Code. The Commission is also exempt from state income taxes.

Basis of Accounting

The financial statements are presented on the modified accrual basis of accounting. Under the modified accrual basis of accounting, expenditures are recorded at the time liabilities are incurred. Revenues are recognized as received in cash except for revenue susceptible to accrual and revenues of a material amount that have not been received at the normal time of receipt. Revenues susceptible to accrual are those that are both measurable and available to finance the Commission's operations during the year.

Budgets and Budgetary Accounting

Annual budgets are prepared on the modified accrual basis of accounting and adopted as required by law. Certain budgetary information has been modified to conform to financial statement presentation.

Assessments

The Commission's major source of revenue consists of assessments levied against the four states and apportioned among them on the basis of the formula contained in the Upper Colorado River Basin Compact.

UPPER COLORADO RIVER COMMISSION
NOTES TO FINANCIAL STATEMENTS (CONTINUED)
JUNE 30, 1987

NOTE 1 Summary of Significant Accounting Policies (continued)

Property and Equipment

Property and equipment purchased in an amount greater than \$100 is recorded as capital outlay in the general fund at time of purchase and capitalized at cost in the general fixed assets account group. Cost of maintenance, repairs and minor renewals are expensed as incurred. When assets are retired or otherwise disposed of, the related cost is removed from the accounts. No provision for depreciation is provided on assets in the general fixed assets account group.

Compensated Absences

According to Commission policy (effective July 1, 1960, as amended), each employee is expected to take annual leave of 15 days each calendar year during which period of time regular salary payments are continued. Employees may accumulate a maximum of 30 days of unused annual leave, which is paid in cash upon termination of employment. A June 2, 1987 amendment authorizes the secretary to grant additional carryover to employees planning summer vacations provided: (1) the employee requests the carryover in writing prior to June 30, and (2) the employee uses the additional carryover within 90 days of the start of the fiscal year.

The Obligation for Compensated Absences has been classified as part of the General Long-Term Debt Account Group because presently the obligation is not expected to be paid from spendable available resources. The current addition was \$2,333.

Total Column on the Combined Statements

The total column on the combined statement is captioned "Memorandum Only" to indicate that it is presented only to facilitate financial analysis. The data in this column does not present financial position in conformity with generally accepted accounting principles. Neither are such data comparable to a consolidation.

NOTE 2 Changes in Investment in General Fixed Assets

Changes in the components of general fixed assets are as follows:

	Fixed Assets July 1, 1986	Additions	Retirements and Disposals	Fixed Assets June 30, 1987
Land and land improvements	\$ 26,551	\$ -	\$ -	\$ 26,551
Building	53,406	2,933	-	56,339
Furniture and fixtures	40,503	4,454	-	44,957
Library	1,121	245	-	1,366
Engineering equipment	1,411	-	-	1,411
Upper Colorado River Basin relief model	5,938	-	-	5,938
Maps	255	-	-	255
	<u>\$129,185</u>	<u>\$7,632</u>	<u>\$ -</u>	<u>\$136,817</u>

UPPER COLORADO RIVER COMMISSION
NOTES TO FINANCIAL STATEMENTS (CONTINUED)
JUNE 30, 1987

NOTE 3 Pension Plan

On July 1, 1985, the Commission terminated its defined benefit pension plan, and initiated a new pension plan. The cash surrender values of the insurance policies of the old plan were transferred to the new plan in the name of each respective participant. The new plan is a 401(K) defined contribution plan, and covers substantially all of the employees. The commission contributes 7% of the employees' gross salaries. In addition, the Commission will match contributions made by employees up to a maximum of 3%. Accordingly, the maximum allowable contribution by the Commission is 10%. The employees are allowed to contribute a maximum of 5% to the plan. The pension plan contribution by the Commission for the year ended June 30, 1987 was \$13,664.

NOTE 4 Time Certificates of Deposit

The Commission had four time certificates of deposit of \$50,000, \$100,000, \$100,000 and \$25,000 with four different banks as of June 30, 1987. The certificates mature in 92, 184, 365 and 62 days, respectively, and bear interest at 5.75%, 6.50%, 7.30% and 5.75%, respectively. The Commission adopted a policy to restrict the amount held or invested at any one bank to \$100,000, to maintain full FDIC insurance for all investments.

NOTE 5 Adjusted Beginning Fund Balance

The beginning fund balance of the General Fund was adjusted to reflect a reclassification of Reserve for Annual Leave to Obligation for Compensated Absences in the General Long-Term Debt Account Group. This change had the following effect on the beginning fund balance.

Balance previously reported - June 30, 1986	\$287,161
Adjustment - Reserve for Annual Leave	<u>12,899</u>
Adjusted beginning fund balance	<u>\$300,060</u>

UPPER COLORADO RIVER COMMISSION
 SCHEDULE OF CASH RECEIPTS AND DISBURSEMENTS - GENERAL FUND
 FOR THE YEAR ENDED JUNE 30, 1987

Cash at July 1, 1986		\$318,433
Cash receipts:		
Assessments	\$178,788	
Interest on time deposits	<u>22,489</u>	
		<u>201,277</u>
		519,710
Cash disbursements:		
Personal services	164,529	
Travel	7,297	
Current operating expenditures	30,823	
Capital outlay	<u>7,632</u>	
		<u>210,281</u>
Cash at June 30, 1987		<u><u>\$309,429</u></u>

UPPER COLORADO RIVER COMMISSION
EXPENSE SUMMARY SCHEDULES
FOR THE YEAR ENDED JUNE 30, 1987

			Favorable (Unfavorable)
	<u>Budget</u>	<u>Actual</u>	<u>Variance</u>
<u>Summary of personal services with budget comparisons</u>			
Engineering salary	\$ 33,260	\$ 33,260	\$ -
Administrative salaries	72,640	72,640	-
Legal salary	28,130	28,130	-
Clerical salaries	11,680	2,205	9,475
Social security	10,420	9,223	1,197
Pension fund contributions	16,000	13,664	2,336
Employee medical insurance	5,500	3,847	1,653
Janitorial	3,000	1,560	1,440
	<u>\$180,630</u>	<u>\$164,529</u>	<u>\$ 16,101</u>

Summary of current operating expenditures with budget total comparison

Accounting and auditing	\$ 1,400	
Telephone and telegraph	2,652	
Insurance	3,230	
Printing	3,519	
Secretarial service	14	
Office supplies and postage	7,746	
Library	4,590	
Meetings, including reporter	954	
Utilities	3,185	
Building repair and maintenance	1,624	
Memberships and meeting registrations	1,780	
Miscellaneous	68	
	<u>\$ 41,400*</u>	<u>\$ 30,762</u>
		<u>\$ 10,638</u>

* The budgeted amount for operating expenditures is not broken down into specific expenditures. The total budgeted amount is shown as a comparison against total actual expenses.

UPPER COLORADO RIVER COMMISSION
SUMMARY OF INSURANCE COVERAGE
FOR THE YEAR ENDED JUNE 30, 1987

Coverage		
	Type	Amount
Treasurer	Fidelity bond	\$ 40,000
Assistant Treasurer	Fidelity bond	40,000
Office contents	Fire and comprehensive (B)	
On premises		150,000
Intransit		1,000
Money and securities:		
On premises		10,000
Off premises		2,000
Loss of income due to building and personal property damage		12 months actual cash loss
Office premises	Liability (B)	
Business liability		300,000 each occurrence
Fire legal liability		50,000 each occurrence
Exterior signs		500
Medical payments		1,000 each person
Exterior glass		10,000 each accident replacement cost
Non-owned automobile	Liability (B)	300,000
Building	Special multi-peril (A) & (B)	264,000

(A) This coverage is automatically increase by 2% each quarter of the year and covers actual replacement cost.

(B) The amount of fire and comprehensive, liability, and special multi-peril coverages are subject to a \$100 deductible clause.

BUDGET

UPPER COLORADO RIVER COMMISSION
Fiscal Year ending June 30, 1989

PERSONAL SERVICES

Administrative Salaries	
Executive Director	\$ 52,780
Administrative Secretary	23,930
Professional Services	
Chief Engineer	35,110
Legal Counsel	29,690
Clerical Salary	7,000
Janitor	2,600
Pension Trust	16,100
Social Security	11,540
Health Insurance	<u>6,300</u>
	\$185,050

TRAVEL \$ 13,000

CURRENT EXPENSES \$ 37,000

CAPITAL OUTLAY \$ 4,000

EDUCATION AND INFORMATION \$ 500

CONTINGENCIES \$ 5,000

TOTAL BUDGETED EXPENSES \$244,550

APPENDIX C

Transmountain Diversions
Upper Colorado River Basin

1978-1987

TRANSMOUNTAIN DIVERSIONS FROM
COLORADO RIVER BASIN IN COLORADO
1978 - 1987

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987 ¹	Average (10-year)
TO PLATTE RIVER BASIN											
Grand River Ditch	25,230	17,940	13,330	13,700	21,860	12,670	17,620	20,820	24,481	17,246	19,390
Eureka Ditch	42	60	0	0	0	0	36	0	0	0	14
Alva B. Adams Tunnel	263,700	198,500	157,400	252,800	248,500	165,800	195,500	285,200	273,800	246,300	228,750
Berthoud Pass Ditch	677	373	777	463	426	674	1,120	567	911	271	626
Moffat Water Tunnel	81,590	55,740	39,260	53,920	87,840	36,510	50,150	78,870	80,720	49,970	61,457
Boreas Pass Ditch	174	154	33	0	0	0	0	0	0	0	36
Vidler Tunnel	256	627	376	880	619	396	704	358	493	396	511
Harold D. Roberts Tunnel	133,800	73,850	51,940	110,200	68,010	8,000	0	27	980	14,640	46,145
TO ARKANSAS RIVER BASIN											
Hoosier Pass Tunnel	9,750	9,910	5,700	5,650	10,590	6,160	7,290	7,500	11,940	8,450	8,294
Columbine Ditch	1,990	2,040	1,780	921	1,910	2,460	3,190	1,920	1,920	1,210	1,934
Ewing Ditch	1,280	1,590	1,160	428	1,120	1,910	2,700	1,360	1,070	813	1,343
Wurtz Ditch	3,840	4,310	3,340	851	3,780	3,710	5,730	3,830	3,860	2,200	3,545
Homestake Tunnel	0	30,780	31,960	21,290	19,720	22,740	27,930	10,180	16,930	20,420	20,195
Twin Lakes Tunnel	51,770	47,060	22,810	34,330	54,010	60,450	8,790	8,016	50,600	18,110	35,595
Charles H. Boustead Tunnel	49,960	54,020	55,390	34,180	75,490	87,500	107,600	71,800	31,750	3,330	57,102
Busk-Ivanhoe Tunnel	7,470	6,710	5,950	4,560	6,840	9,390	9,760	6,270	5,510	3,580	6,604
Larkspur Ditch	54	241	371	127	120	338	407	329	220	77	228
TO RIO GRANDE BASIN											
Tarbell Ditch	503	296	542	291	735	0	283	172	0	55	288
Tabor Ditch	719	1,300	894	671	1,600	1,250	1,190	1,440	1,330	1,310	1,170
Treasure Pass Ditch	304	392	290	233	390	450	305	613	411	0	339
Don La Font Ditches No. 1 & 2	92	196	33	215	210	0	66	447	13	361	163
William Creek-Squaw Pass Ditch	0	0	0	0	134	149	282	253	242	530	159
Pine River-Weminuche Pass Ditch	63	228	150	361	629	804	971	873	961	575	562
Weminuche Pass Ditch	1,570	1,240	1,930	1,980	1,590	2,020	2,110	2,090	3,150	0	1,768
TOTAL	634,834	507,557	395,416	538,051	606,123	432,381	443,734	502,935	511,292	389,844	496,218

TRANSMOUNTAIN DIVERSIONS FROM
COLORADO RIVER BASIN IN UTAH ²
1978 - 1987

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987 ¹	Average (10-year)
TO GREAT BASIN											
Fairview Tunnel	2,498	2,766	2,579	2,030	3,050	2,226	3,058	2,760	3,194	2,260	2,642
Ephraim Tunnel	4,633	4,992	5,799	3,468	6,288	1,287	1,213	563	1,625	901	3,077
Spring City Tunnel	2,795	2,427	2,876	1,574	3,623	1,867	2,260	2,270	1,869	1,490	2,305
Strawberry Tunnel	64,680	70,413	116,000	74,562	47,329	9,931	16,252	52,465	48,441	83,192	58,327
Duchesne Tunnel	20,096	30,508	14,800	17,310	13,359	696	0	1,063	11,094	29,523	13,845
TOTAL	94,702	111,106	142,054	98,944	73,649	16,007	22,783	59,121	66,223	117,366	80,196

TRANSMOUNTAIN DIVERSION FROM
THE GREAT BASIN IN UTAH TO
COLORADO RIVER BASIN IN UTAH
1978 - 1987

Tropic and East Fork Canal	4,589	5,191	5,588	5,717	5,982	5,137	6,083	6,148	5,724	6,155	5,631
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TRANSMOUNTAIN DIVERSIONS FROM
COLORADO RIVER BASIN IN COLORADO
TO RIO GRANDE BASIN IN NEW MEXICO
1978 - 1987

San Juan-Chama Diversions	105,040	164,200	143,580	53,960	127,100	130,310	113,630	91,790	89,180	83,050	110,184
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TRANSMOUNTAIN DIVERSIONS FROM
COLORADO RIVER BASIN TO NORTH
PLATTE BASIN IN WYOMING ³
1978 - 1987

	6,933	8,211	7,730	5,451	9,581	5,027	2,482	9,807	12,107	8,379	7,571
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¹Based on preliminary streamflow records obtained from U.S. Bureau of Reclamation, U.S. Geological Survey, Central Utah Water Conservancy District, Colorado Division of Water Resources, New Mexico Interstate Stream Commission, and Wyoming State Engineer's Office--subject to revision.

²Streamgaging of the following small transmountain diversions in Utah was discontinued in 1959 but the flow is estimated to be as follows: Candland Ditch - 200 acre-feet, Horseshoe Tunnel - 600 acre-feet, Larsen Tunnel - 690 acre-feet, Coal Fork Ditch - 260 acre-feet, Twin Creek Tunnel - 220 acre-feet, Cedar Creek Tunnel - 340 acre-feet. Black Canyon Ditch - 290 acre-feet, Reeder Ditch - 250 acre-feet, Madsen Ditch - 40 acre-feet, and John August Ditch - 200 acre-feet. These diversions are from the San Rafael River in the Colorado River Basin to the Great Basin in Utah and total about 3,100 acre-feet annually.

³Does not include diversions for Enlargement Continental Divide Ditch which services 473 acres or Ranger Ditch which services 391 acres. Neither ditch is gaged, and suitable estimates of diversion amounts are currently unavailable.

