WATER QUALITY STANDARDS FOR SALINITY

COLORADO RIVER SYSTEM

Prepared by
Colorado River Basin Salinity Control Forum

1987

NOTE – This Review is composed of two parts, namely:

1) Proposed Report on the 1987 Review, *Water Quality Standards for Salinity, Colorado River System*, dated May 1987

2) Supplement Including Modifications to the *Proposed Report on the 1987 Review, Water Quality Standards for Salinity, Colorado River System,* dated August 1987

May 1987

PROPOSED REPORT ON THE

1987 REVIEW

WATER QUALITY STANDARDS FOR SALINITY

COLORADO RIVER SYSTEM

Prepared by

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SUMMARY

Section 303 of the Clean Water Act of 1977 requires that water quality standards be reviewed from time to time, but at least once during each 3-year period. Accordingly, the seven-state Colorado River Basin Salinity Control Forum (Forum) has reviewed the existing state-adopted and Environmental Protection Agency (EPA) approved numeric salinity criteria and plan of implementation for salinity control for the Colorado River system. Changes in hydrologic conditions and water use within the Colorado River Basin have been evaluated, and this report presents the recommended revisions to the plan of implementation which are to be submitted to each of the Basin states for adoption.

The Forum finds no reason to recommend changes in the numeric salinity criteria at the three lower main stem stations. Those values are:

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

The plan of implementation as set forth in the 1987 Review is designed to meet the objective of maintaining the salinity concentrations at or below the above numeric criteria while the Basin states continue to develop their compact-apportioned waters. The plan is based on the assumption of a long term water supply of 15 million acre-feet annually. The Forum recommends that the plan of implementation described in this report be carried out.

The plan of implementation includes:

1. Completion of the salinity control units shown in the following Table, to the extent that each unit remains cost-effective and technically viable. The plan's current remaining federal construction costs for the Bureau of Reclamation (Reclamation) and the Department of Agriculture (USDA) activities are approximately $560 million.

2. Implementation of cost-effective salinity control measures by the Bureau of Land Management to reduce salt contribution from public domain lands.

3. Imposition of effluent limitations, on industrial and muncipal discharges, principally under the National Pollutant Discharge Elimination System (NPDES) permit program provided for in Section 402 of the Clean Water Act of 1977, based on the Forum's policy on salinity control through NPDES permits.

4. Implementation of the Forum-recommended policy for use of brackish and/or saline waters for industrial purposes.

Recommended Salinity Control Plan
Implementation Schedule

	Begin Implementation	Projected Date Complete	Tons/yr Removed Jan 1987	Projected Salt Removed Tons/yr
Meeker Dome (USBR)	Complete	1983	48,000	
Grand Valley Stage One (USBR)	Complete	1984	21,900	
BLM well plugging & nonpoint	Complete	1986	7,600	
Las Vegas Wash Pittman (USBR)	Complete	1985	7,000	
Grand Valley (USDA)	1979	2000	33,600	196,400
Paradox Valley (USBR)	1980	1990		180,000
Uinta Basin (USDA)	1980	2003	22,700	75,500
Grand Valley Stage Two (USBR)	1985	2003		113,100
Las Vegas Wash Whitney (USBR)	1986	1988		1,000
Big Sandy River (USDA)	1989	1996		52,900
Dolores Project (McElmo,USBR)	1989	1994		24,500
Lower Gunnison Wtr (USBR)	1989	1991		74,000
Lower Gunnison 1 (USDA)	1989	2006		82,100
Moapa Valley (USDA)	1990	1993		19,500
Lower Gunnison 2, Mont. (USDA)	1991	2008		81,700
Lower Gunnison 2, Delta (USDA)	1991	2004		104,700
McElmo Creek (USDA)	1990	1999		38,000
Lower Gunnison 3, (USDA)	1992	1995		12,000
Uinta Basin I (USBR)	1993	2000		25,500
1/Price-San Rafael (Coordinated)	1992	1998		52,300
Lower Virgin River (USBR)	1992	1994		44,100
			140,800	1,177,300 2/

Others under consideration, not included in the plan.

San Juan River (USBR)
Sinbad Valley (USBR)
Mancos Valley (USDA)
Lower Gunnison Stage I Balance (USBR)
Lower Gunnison North Fork (USBR)
Grand Valley II Balance (USBR)
Las Vegas Wash Balance (USBR)
Virgin Valley (USDA)

1/ Not included in USDA implementation plan.
2/ Reduction to maintain the numeric criteria through 2010.

5. Implementation of the salinity portion of individual State Section 208 Water Quality Management plans, as approved by EPA.

Although the plan of implementation is designed to maintain the numeric criteria under an assumed long term water supply, many natural and manmade factors affect the river's salinity. Consequently, salinity will vary from year to year and may temporarily exceed the adopted numeric criteria in some years and fall below the criteria in others.

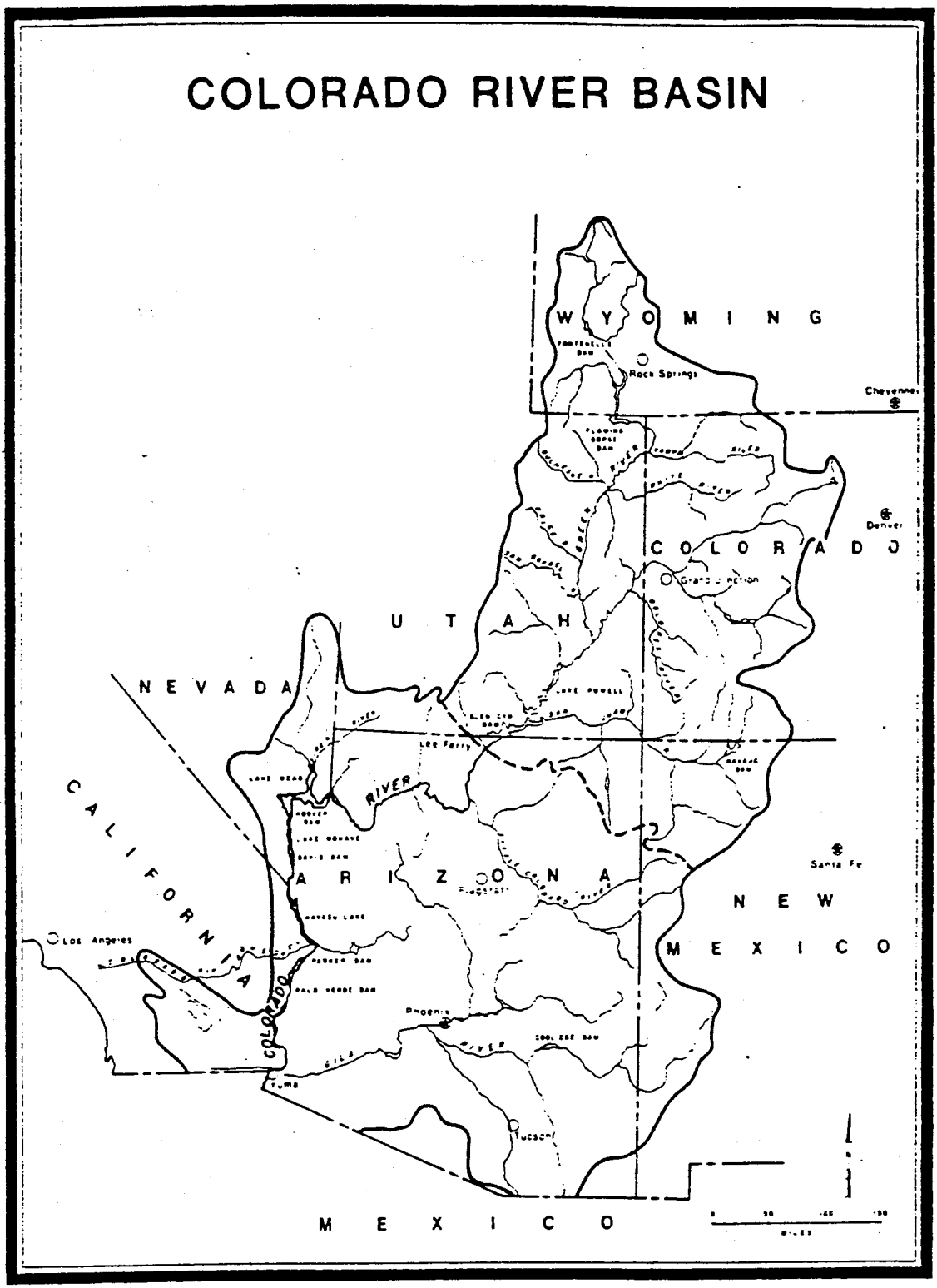
The salinity control plan is designed to keep any temporary increases above the numeric criteria to a minimum as well as reduce the duration of such temporary increases. Any increases in salinity above the criteria resulting from human activities are expected to be small and of short duration. However, should water development projects be completed before control measures are brought on line, temporary increases above the criteria could result and these increases will be deemed in conformance with the standards if appropriate salinity control measures are included in the plan.

Increases above the criteria as a result of unfavorable periods of below normal annual river flows and resulting unfavorable reservoir conditions will also be considered in conformance with the standards, provided that when river flows return to normal and satisfactory reservoir conditions prevail, concentrations can be expected to be at or below the criteria level.

Salinity concentrations at each of the lower main stem stations for which numeric criteria have been established have decreased significantly since 1983. The period 1983-86 has been a period of extremely high runoff and excess flows in the lower river have caused a large temporary reduction in salinity concentrations. Current salinity concentrations at the three salinity criteria stations are:

	Numeric criteria in mg/l	1986 salinity concentration in mg/l	Salinity concentration below numeric criteria in mg/l
Below Hoover Dam	723	519	204
Below Parker Dam	747	559	188
Imperial Dam	879	579	300

It has been estimated that when natural flows return to more normal conditions and excess flows cease, concentrations are expected to increase to pre-1982 levels or greater. However, there is no reason to believe that the numeric criteria will be exceeded during the next 3-year review period. Further, because of the long lead time required to conduct salinity studies, complete feasibility reports, authorize and complete implementation, and achieve full impact at lower main stem stations, it is necessary to continue efforts to implement the recommended plan of implementation for salinity control as set forth in this review.


COLORADO RIVER BASIN
WYOMING
Rock Springs
Cheyenne
Denver
COLORADO
UTAH
NEVADA
Grand Junction
Lee Ferry
RIVER
CALIFORNIA
ARIZONA
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MEXICO
Los Angeles
COLORADO
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Yuma
Tucson
MEXICO

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CHAPTER I. INTRODUCTION

Purpose of Report

This report is in response to Section 303(c) of the Clean Water Act of 1977 (Public Law 92-500 as amended by Public Law 95-217 and Public Law 100-4) referred to in this report as the Clean Water Act.

This report is written as a complete document, but contains historical information only for the 1984-87 period. Background information regarding historical actions relative to the adoption of salinity standards is contained in the 1975 report. The 1978, 1981, and 1984 reports contain information pertaining to the 1975-1978 period, 1978-81 period, and 1981-84 period, respectively.

Section 303(c)(1) of the Clean Water Act requires that:

> "The governor of a state or the state water pollution control agency of such state shall from time to time (but at least once each three-year period beginning with the date of enactment of the Federal Water Pollution Control Act Amendments of 1972) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Results of such review shall be made available to the Administrator."

This report, prepared by the seven-state Colorado River Basin Salinity Control Forum (Forum) is a review of the water quality standards including numeric criteria and plan of implementation previously developed and adopted by the Forum. This is the fifth such report prepared by the Forum. This report includes the modifications to the 1984 Forum report and the July 1984 Supplement that have become necessary as a result of changed conditions and the availability of better information.

The Forum is composed of water resource and water quality representatives from each of the seven Colorado River Basin states (Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming) appointed by the Governors of the respective states. The Forum was established for the purpose of interstate cooperation and to provide the states with the information necessary to meet the Environmental Protection Agency's (EPA) regulation, 40 CFR, Part 120, entitled "Water Quality Standards - Colorado River System: Salinity Control Policy and Standards Procedures," and Section 303(a) and (b) of the Clean Water Act. The four previous Forum reports were prepared by the Forum in response to Section 303(c), as is this report.

The 1975 Forum report includes a detailed discussion of the legislation and events leading up to the establishment of salinity standards for the lower main stem of the Colorado River. The standards were adopted by all of the Basin states and subsequently approved by the EPA.

The 1978, 1981, and 1984 reports reviewed the numeric criteria included in the 1975 report and concluded that no change was indicated; however, the plan of implementation was updated to reflect the circumstances at that time and changes that had taken place in the salinity control projects' status since 1975.

The plan of implementation, as set forth in this and the four earlier Forum reports, includes effluent limitations for industrial point source discharges with the objective of no-salt return whenever practicable. In February 1977, the Forum adopted the "Policy for Implementation of Colorado River Salinity Standards Through the NPDES Permit Program." This policy provides detailed guidance in the application of salinity standards in the regulation of municipal and industrial point source discharges. On September 11, 1980, the Forum adopted a policy to encourage the use of brackish and/or saline waters for industrial purposes where it was environmentally sound and economically feasible. A third policy dealing with intercepted ground water was adopted by the Forum on October 20, 1982. All of the Forum policies are included in Appendix A.

Nothing in this report shall be construed to alter, amend, repeal, interpret, modify, or be in conflict with the provisions of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River Basin Project Act (82 Stat. 885), the Colorado River Compact, the Upper Colorado River Basin Compact, or the Treaty with the United Mexican States (Treaty Series 994).

This report is consistent with the EPA-approved 1975, 1978, 1981, and 1984 reports and deals only with the portion of the Colorado River Basin above Imperial Dam. As used in this report, the lower mainstem of the Colorado River system is defined as that portion of the main river from Hoover Dam to Imperial Dam.

Below Imperial Dam, the river's salinity is controlled to meet the terms of the agreement with Mexico on salinity in Minute No. 242 of the International Boundary and Water Commission, entitled "Permanent and Definitive Solution to the International Problem of the Salinity of the Colorado River." This agreement states that measures will be taken to assure that the waters delivered to Mexico upstream from Morelos Dam will have an annual average salinity concentration of no more than 115 ppm ($\pm$ 30 ppm) total dissolved solids greater than the annual average salinity concentration of Colorado River water arriving at Imperial Dam. Title I of the Colorado River Basin Salinity Control Act, Public Law 93-320 is the legislation which implements the provisions of Minute No. 242. Minute No. 242 and Title I constitute a federal numeric criterion and plan of implementation for the river below Imperial Dam.

Legislative Action Since 1984

1984 Amendments to the Colorado River Basin Salinity Control Act

Beginning in 1981, the Forum, with the support of all Basin senators and many Basin congressmen, urged the enactment of needed amendments to the 1974 Colorado River Basin Salinity Control Act. Much of the legislative history concerning that effort was outlined in the "1984 Review, Water Quality Standards for Salinity, Colorado River System." As a result of the efforts of those supporting revised salinity control legislation through the summer of 1984, the Congress gave further consideration to the proposed legislation. Environmental and cost sharing concerns were discussed at some length with Senators, Congressmen, and special interest groups. The legislation was modified to accommodate environmental concerns, and the amount of cost sharing required of the Basin states was significantly increased.

In its very last days, the 98th Congress passed H.R. 2790 which amended Public Law 93-320. The President signed the bill on October 30, 1984, and that legislative initiative became Public Law 98-569 and is Appendix B of this report. Some of the important amendments made by the Act are described in general terms in the following paragraphs.

The legislation directs the Secretaries of the Interior and Agriculture to give preference to the salinity control units that reduce salinity at the least cost per unit of salinity reduction. It provides for replacing canals and laterals with pipes, if found the most cost-effective, in the Grand Valley Unit of Colorado. Stage I of the Lower Gunnison Basin Unit, Colorado, and the McElmo Creek Unit (as a part of the Dolores Participating Project, Colorado) were both authorized. The Crystal Geyser Unit, Utah, authorized in 1974, was deauthorized by the legislation.

Provisions were made for replacment of some incidental fish and wildlife values foregone resulting from the implementation of the Department of the Interior salinity control units. The legislation gives the Secretary of the Interior authority to contract with irrigation entities for long-term operation and maintenance of canal and lateral systems. The legislation requires that irrigation facility operators continue to carry the normal operation and maintenance costs that would have been associated with their facilities prior to improvements for salinity control purposes and provides that they would be reimbursed for costs in excess of those that normally would have been incurred. It also authorized the Secretary of the Interior to fund the organization of private canals and laterals through grants or contracts.

The legislation instructed the Secretary of the Interior to develop a comprehensive BLM salinity control program and report back to the Congress by July 1, 1987. The Secretary was also given authority to undertake advance planning in the Sinbad Valley Unit of Colorado and to undertake feasibility investigations with respect to the use of saline waters for industrial purposes.

A major provision of the legislation was the enactment of an onfarm salinity control program. The Secretary of Agriculture was instructed to establish a voluntary salinity control program with land owners. Specifically, the Secretary of Agriculture was instructed to identify irrigation and watershed salt sources and to develop plans for salinity control through improved irrigation water management. Further, the Secretary was directed to allow for the voluntary replacement of fish and wildlife values foregone as irrigation improvements are implemented. The Secretary of Agriculture is authorized to provide technical and cost sharing assistance to individuals, groups, and other local government and non-government agencies, such as irrigation districts and canal companies. The legislation provides that operation and maintenance must be paid by the agricultural entities at no additional cost to the federal government.

Cost sharing between the federal government and the land owner will be based upon the degree of on-site and off-site benefits with a minimum of 30 percent provided by the participating operators, unless it is determined otherwise by the Secretary of Agriculture that a higher level of federal cost sharing is necessary in order to insure the implementation of the onfarm program. The Secretary of Agriculture is to report back to the Congress starting on January 1, 1988, and at intervals of every five years thereafter on the progress achieved under this program.

Water Quality Control Act of 1987
(Clean Water Act Amendments)

The Water Quality Control Act of 1987 (PL 100-4) may offer additional opportunities to implement salinity control measures. In particular, the Section 319 program, which addresses nonpoint source pollution control, authorizes funding for implementation of nonpoint source pollution control measures. The states have the lead with the Section 319 program, wherein salinity control needs must be identified in the State Assessment Report (Section 319 (a)) and also included in the State Management Program (Section 319 (b)) before applying for funding. The states are responsible for identifying their nonpoint source control priorities and submitting them to EPA for review and funding decisions.

Program Funding

The success of the federal/state cooperative Colorado River Basin salinity control program is contingent upon sufficient funding to allow the plan of implementation to proceed as scheduled.

The Colorado River Basin states urged the Congress in FY 86, FY 87, and FY 88 to provide the Secretary of the Interior, and more specifically the Bureau of Reclamation, with adequate funds to implement the authorized salinity control program. Adequate funds were provided in FY 86 and FY 87, and planning and construction have proceeded in a timely manner. However, the President has subsequently requested what the Basin states view as an inadequate amount of funding for FY 88. The Basin states and the Forum's Executive Director are continuing to keep Congress informed of the need for funding of the Department of the Interior's salinity control program at a level which will maintain the salinity concentrations at or below the adopted criteria.

For the past several years, the Department of Agriculture has been using the already existing Agricultural Conservation Program (ACP) monies to allow irrigators in the Uinta Basin of Utah and the Grand Valley of Colorado to improve irrigation practices on their farms. Through the use of the ACP funds that the Congress designated to be spent on Colorado River Basin salinity, it has been demonstrated that the Department of Agriculture's programs are a most cost-effective overall way of controlling salinity.

During FY 84 and FY 85, prior to the enactment of P.L. 98-569, the Administration had requested that over $12 million be appropriated each year for onfarm improvements, anticipating the authorization of the onfarm program. Because the legislation was enacted in the last few days of the Congressional session, there was no opportunity to secure budget line item funding from the Congress for FY 85. In FY 85, through Congressional directives, additional funds were made available through the ACP program.

In FY 86, the Administration did not request funds for the newly established onfarm program, but the Congress did again designate ACP funds to be spent on Colorado River salinity control. Similarily, in FY 87, the Administration did not request funds for the newly established onfarm program, but at the urging of the Basin states, the Congress did appropriate $3.8 million for line item funding for the program. With designated ACP funding of $2.2 million, the amount available for the onfarm program in FY 87 is $6 million. For FY 88, the Administration again did not request funding. The Basin states are actively seeking in an effort to convince the Congressional inclusion of $6 million should again be made available for this program for FY 1988. In recognition of the current fiscal situation, this represents a reduction for FY 88 of $2.5 million over the amount originally identified by the combined federal agency review and supported by the Basin states as necessary to maintain continuity in the onfarm program.

CHAPTER II. SALINITY OF THE RIVER

The Colorado River system drains 244,000 square miles of the western United States and a small portion of northern Mexico. Its waters serve some 2.5 million people within the United States portion of the Basin and through export provides full or supplemental water supply to another 16.0 million people outside the Basin. The regional economy is based on irrigated agriculture, livestock grazing, mining, forestry, manufacturing, oil and gas production, and tourism. About 2.5 million acres are irrigated within the Basin and hundreds of thousands of acres are irrigated by waters exported from the Basin. The Colorado River also serves about 1.5 million people and 500,000 irrigated acres in Mexico.

Salinity[1/] has long been recognized as one of the major problems of the river. The Colorado, like most western rivers, increases in salinity from its headwaters to its mouth, carrying a salt load of about 9 million tons annually past Hoover Dam. In addition to total salt load (tons), this report also examines salinity in terms of concentration (mg/l). The river's salt load is the result of both natural and human causes. Natural causes include salt contribution of saline springs, non-point ground water flow into the river system, erosion and dissolution of sediments, and the concentrating effects of evaporation and transpiration. Human-caused increases in salinity concentration result from the diversion (including out-of-basin exports), consumptive water use, and salt loading. Studies of the hydrosalinity of the river indicate that about half of the salinity of the river can be attributed to natural sources and the other half are the result of human activities, as shown in Figure 1.

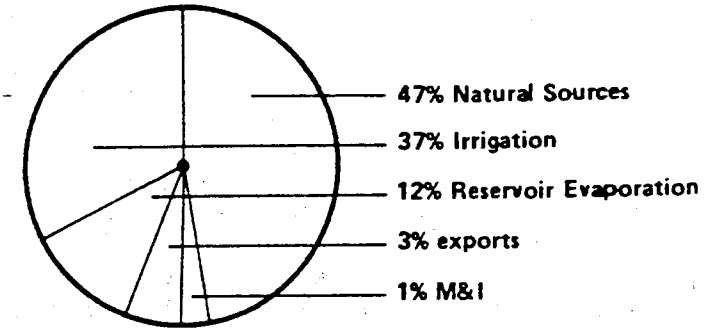


Figure 1. - Salinity sources.

1/ Salinity is a measure of the total dissolved solids of a water sample including all inorganic material in solution, whether ionized or not. The principal constituents found in Colorado River water are: calcium, magnesium, sodium, sulfate, chloride and bicarbonate. The terms salinity and total dissolved solids are considered equivalent.

Of the land within the Colorado River Basin, about 75 percent is owned and administered by the federal government or held in trust for Indians Tribes. By far the greatest portion of natural salt load originates on these federally owned and administered lands. Of the salinity resulting from human activities, irrigated agriculture accounts for the largest share. Much of this contribution is from federally developed irrigation projects.

Evaluations of the salinity of the Colorado River have been made by Reclamation, U.S. Geological Survey (USGS), Environmental Protection Agency (EPA), and Bureau of Land Management (BLM). Appendix C is a list of selected federal reports prepared on salinity related studies conducted in the Colorado River Basin.

In order to evaluate changes in salinity, water quality and streamflow data are obtained on a daily, weekly, monthly, or quarterly basis at various points on streams throughout the Basin by the USGS in cooperation with the states and other federal agencies. Average salinity concentrations and salt loads are determined on a flow weighted basis using the most frequent data available. Gaging stations in the Basin that are of significance to this report and for which streamflow and water quality records are available are listed on Table 1. This table shows the availability of streamflow and water quality data for key stations during the period 1941-1986 and the current frequency of sampling as classified by the USGS. Where the water quality information is not complete, the missing data have been estimated by correlation with data from other stations.

Historical Salinity Conditions

Historically salinity concentrations of the river have fluctuated significantly over the period of record, 1941-1986. Figure 2 depicts the mean annual historical river salinity contentration at Imperial Dam. Salinity concentrations generally decrease in periods of high flows and increase in periods of low flow. Figure 3 shows the mean annual flow of the Colorado River at Imperial Dam.

Salinity concentrations at Imperial Dam decreased steadily from 1970-79, increased in 1981-82, and decreased significantly from 1983-86. The period 1983 through 1986 was a period of above normal Basin runoff. Each of the four years had a natural flow in excess of 20.0 million acre-feet, with the four year average of 22.6 million acre-feet. Only one other period has had 20 million acre-feet of natural flow for two or more consecutive years--1920 and 1921, and only one period--1920-23 had an average natural flow exceeding 20.0 maf (20.4 million). During 1983-86, the annual calendar year flow to Mexico exceeded scheduled deliveries by 12.6, 13.8, 10.1, and 9.2 million acre-feet, respectively, for a total of 45.7 maf.

The record high flows during the period 1983-86 have resulted in a significant reduction in salinity concentrations in the lower main stem by approximately 250

Table 1. - Summary of streamflow and dissolved-solids data at major gaging stations in the Colorado River Basin

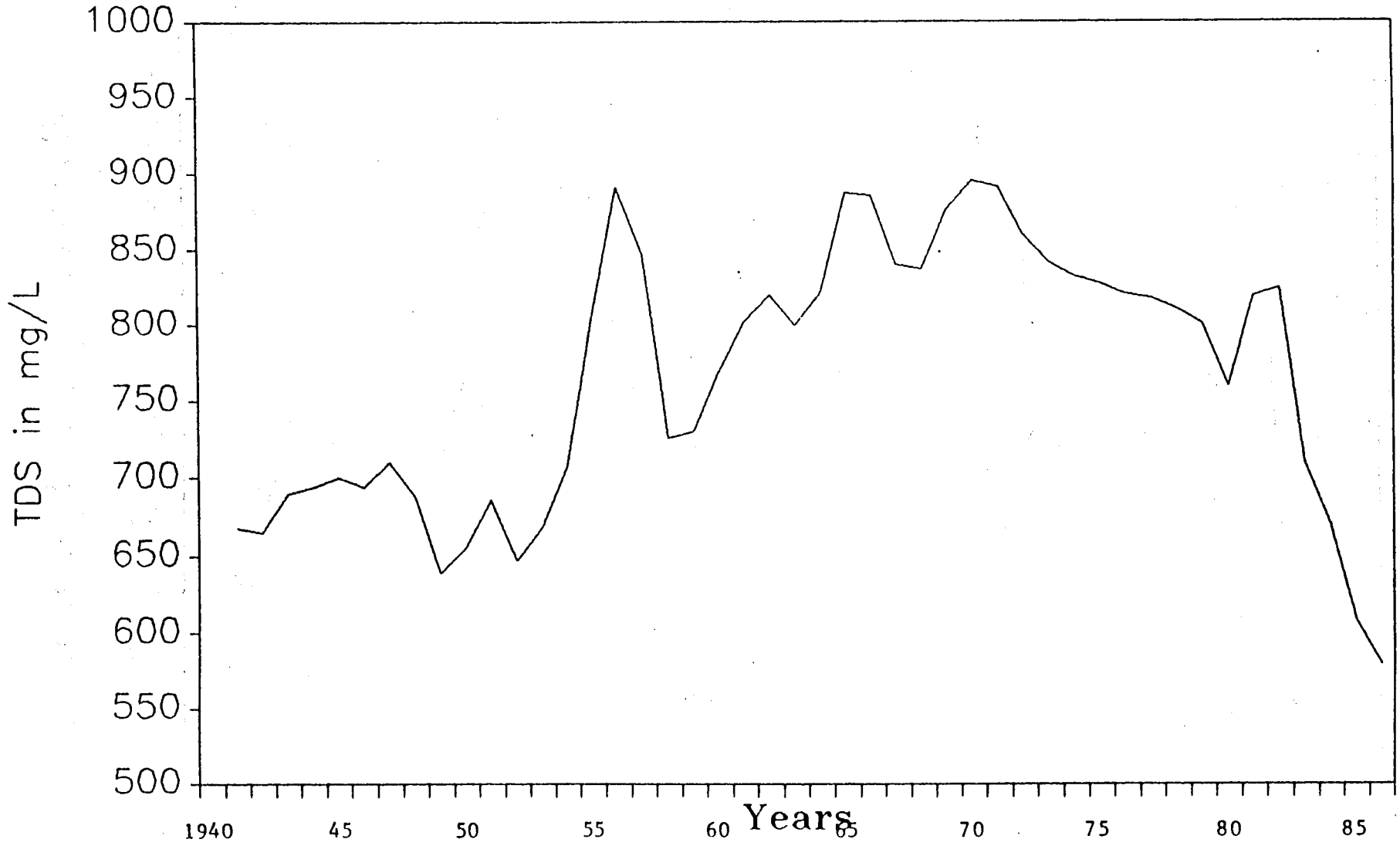
Station	Beginning of water-quality record	Mean streamflow (acre-ft/yr)	Flow-weighted mean dissolved-solids concentration* (mg/L)
Colorado R. near Glenwood Springs, CO	1941	1,655,000	255
Colorado R. near Cameo, CO	1933	2,854,000	385
Gunnison R. near Grand Junction, CO	1931	1,763,000	555
Dolores R. near Cisco, UT	1951	618,000	568
Colorado R. near Cisco, UT	1928	5,161,000	576
Green R. below Fontenelle Dam, WY	1967	1,260,000	220
Green R. near Green River, WY	1951	1,274,000	304
Green R. near Greendale, UT	1956	1,531,000	463
Yampa R. near Maybell, CO	1950	1,126,000	161
Duchesne R. near Randlett, UT	1956	420,000	629
White R. near Watson, UT	1950	510,000	427
Green R. at Green River, UT	1928	4,205,000	443
San Rafael R. near Green River, UT	1946	98,000	1,490
San Juan R. near Archuleta, NM	1955	876,000	164
San Juan R. near Bluff, UT	1929	1,651,000	429
Colorado R. at Lees Ferry, AZ	1941	10,514,000	544
Colorado R. near Grand Canyon, AZ	1934	10,973,000	596
Virgin R. near Littlefield, AZ	1948	169,000	1,530
Colorado R. below Hoover Dam, AZ-NV	1934	10,024,000	679
Colorado R. below Parker Dam, AZ-CA	1963	8,414,000	691
Colorado R. above Imperial Dam, AZ-CA	1942	8,418,000	751

*For the entire period of record

Historical Salinity Levels

at Imperial Dam

Flow-weighted average annual estimates



Lotus-Flow
Hsalt

FIGURE 4

Historical Flows

at Imperial Dam

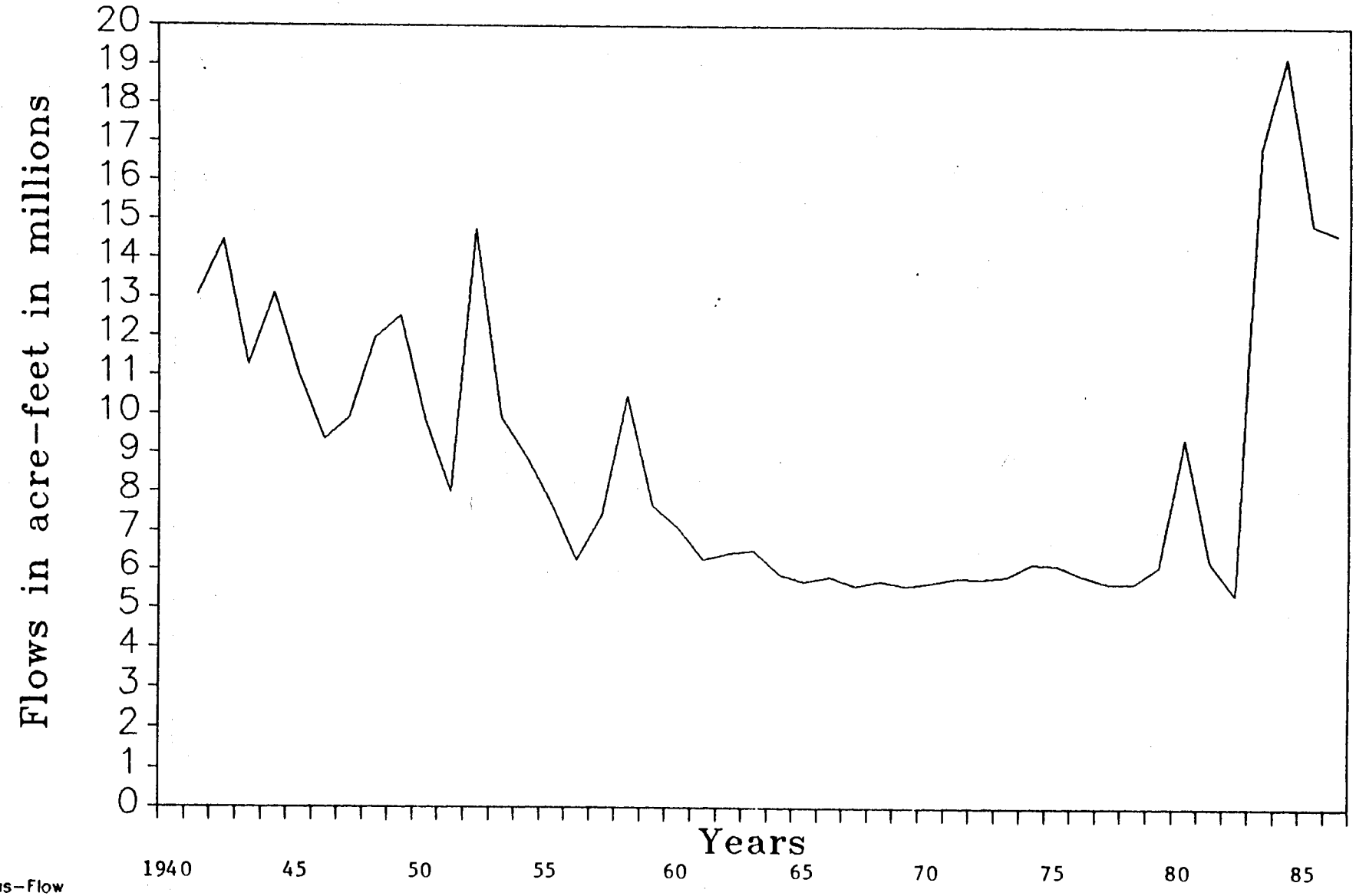


Figure 5

mg/l at Imperial Dam. Reclamation estimates that when natural flows return to more normal conditions and flows to Mexico no longer exceed scheduled deliveries, concentrations will increase quickly to pre-1982 levels of 800 mg/l, or greater.

The flow-weighted annual average salinity at the stations for which numeric criteria have been set are shown in the following tabulation.

FLOW-WEIGHTED AVERAGE ANNUAL SALINITY CONCENTRATIONS AT SELECTED STATIONS
(Total Dissolved Solids in mg/l*)

	Numeric Criteria	Calendar Year 1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Below Hoover Dam	723	675	681	680	674	665	678	688	691	681	679	665	611	500**	519**
Below Parker Dam	747	709	702	702	690	687	688	701	712	716	713	678	611	580**	559**
At Imperial Dam	879	843	834	829	822	819	812	802	760	821	826	710	675	607**	579**

*Determined by the USGS from data collected by Reclamation and the U.S. Geological Survey and published in "Quality of Water - Colorado River Basin," Progress Report No. 13, January 1986.

**Provisional records.

Projections of Future Water Use

One of the significant factors affecting salinity concentrations is water use. Estimates of both 1986 water use and projected future use through the year 2010 for each of the seven states were developed jointly by the states and Reclamation.

Table 2 presents a summary of projected water use in the Upper Colorado River Basin, and from the main stem of the Lower Colorado River. Figure 4 presents the total use in graphical form for the Basin. Presented in Appendix D are data on 1986 base conditions and projected future uses by state and by specific categories of use.

Table 2
Summary of Estimated Water Use in the
Colorado River Basin[1/] [2/]
(1,000 acre-feet)

	1986 base condition	1990	2000	2010
Upper Basin[3/]	3,527	3,894	4.454	4,771
Lower Basin[4/]	6,343	7,378	7,450	7,450
Total	9,870	11,272	11,904	12,221

1/ Does not include deliveries to Mexico.
2/ Lower main stem only.
3/ Depletions at point use. Does not include CRSP reservoir evaporation estimated by Reclamation to average 520,000 acre-feet per year under full development.
4/ Diversions from the main stem less returns. Does not include main stem reservoir evaporation and stream losses.

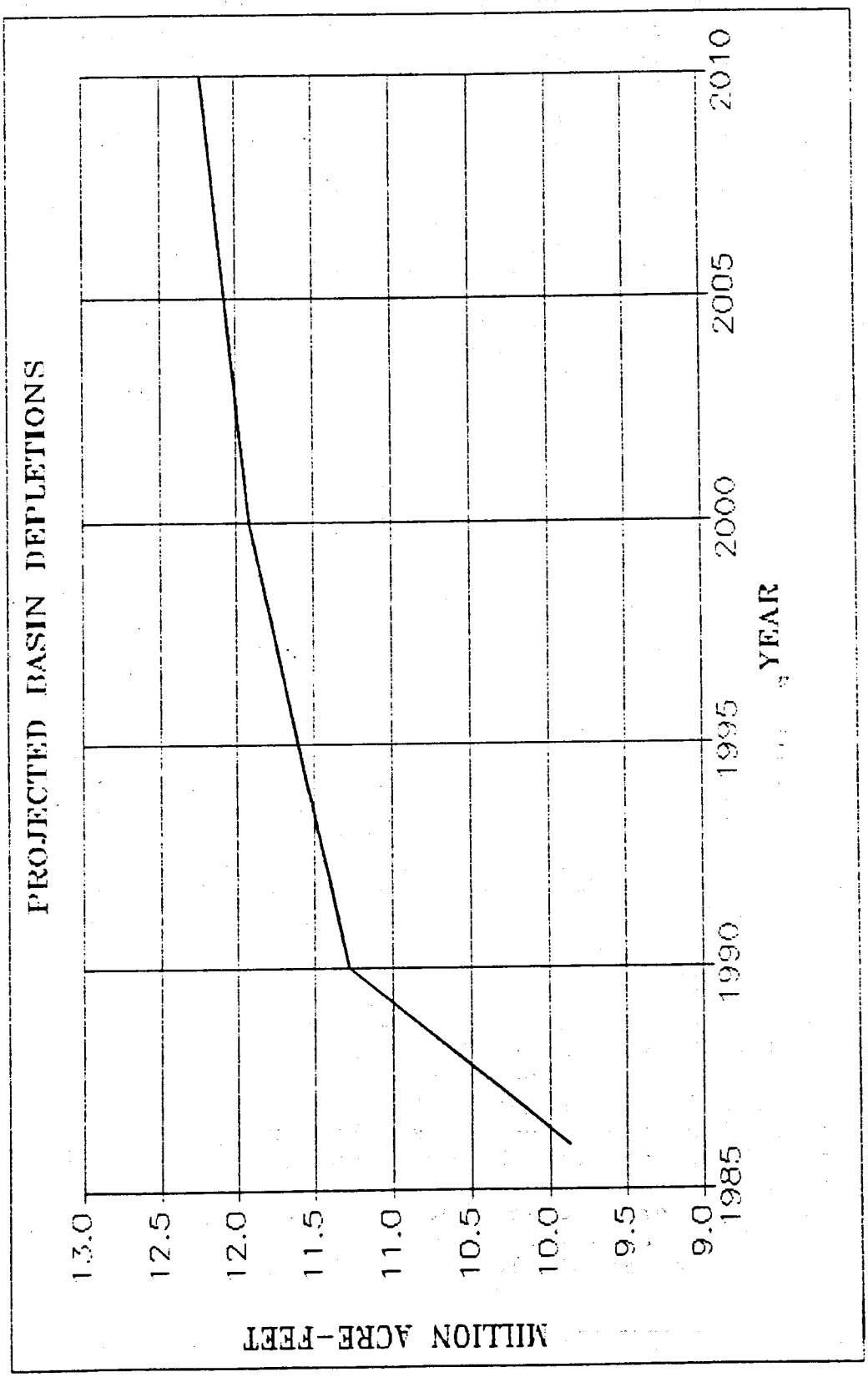
Salt Routing Studies

Salt routing studies were made for the 1987 Review using the Colorado River Simulation System (CRSS) developed by the Bureau of Reclamation.[1/] The CRSS is a package of computer programs and data bases developed by Reclamation as a tool for use by water resource managers dealing with water related issues and problems in the Colorado River Basin. The central feature of the CRSS is a computer program which simulates the flow of water and salt through the system and the operation of the reservoirs including hydroelectric power plants.

The salt routing studies were conducted to provide estimates of future flow-weighted average annual salinity concentrations for each year of the 1986 through 2010 study period at selected points in the Lower Basin using the future water use projections described earlier and an average annual long term water supply of 15 million acre-feet.

1/ Detailed information on CRSS is presented in: "Colorado River Simulation System, An Executive Summary," (October 1981); "Colorado River Simulation System, Users Manual," (June 1982); and Colorado River Simulation System, System Overview" (1984) all by the Bureau of Reclamation.

Figure 4



1/ Excludes CRSP and lower main stem reservoir evaporation and deliveries to Mexico.

Projected Salinity Concentrations

Projected 1990, 2000, and 2010 flow-weighted average annual salinity concentrations, for Hoover, Parker, and Imperial Dams with existing completed salinity control measures only are presented in Figures 5, 6, and 7.

As described earlier, the basin experienced a series of years of extremely high runoff since 1983. Should a series of dry years similar to those that occurred from 1958-64, be repeated in the immediate future, this too would have no impact on long range projections but would cause significant increases in salinity concentrations in the near term. This places a greater urgency on the recommended plan of implementation for salinity control.

Future salinity concentrations will depend not only upon human activities but upon natural phenomena, such as runoff conditions, natural evapotranspiration, and precipitation, dissolution, and mixing within the major storage reservoirs. Except for deviations caused by factors beyond human control, average annual salinity levels can be maintained through 2010 at or below the 1972 levels with the recommended plan of implementation.

Baseline Values

The 1975 Forum Report called for the development of baseline values for monitoring points on the main stem and and major tributaries of the Colorado River as part of the process of identifying and evaluating changes in river salinity.

The baseline values, which are relationships between salt load and flow, were developed and adopted by the Forum in 1980, and are used to assess the effects of development, salinity control measures and/or other activities in the area upstream of the baseline value stations. There is no intent to make baseline values standards nor are they to be considered or interpreted as standards for salinity.

Baseline values were developed for the following thirteen stations in the Colorado River Basin[1]:

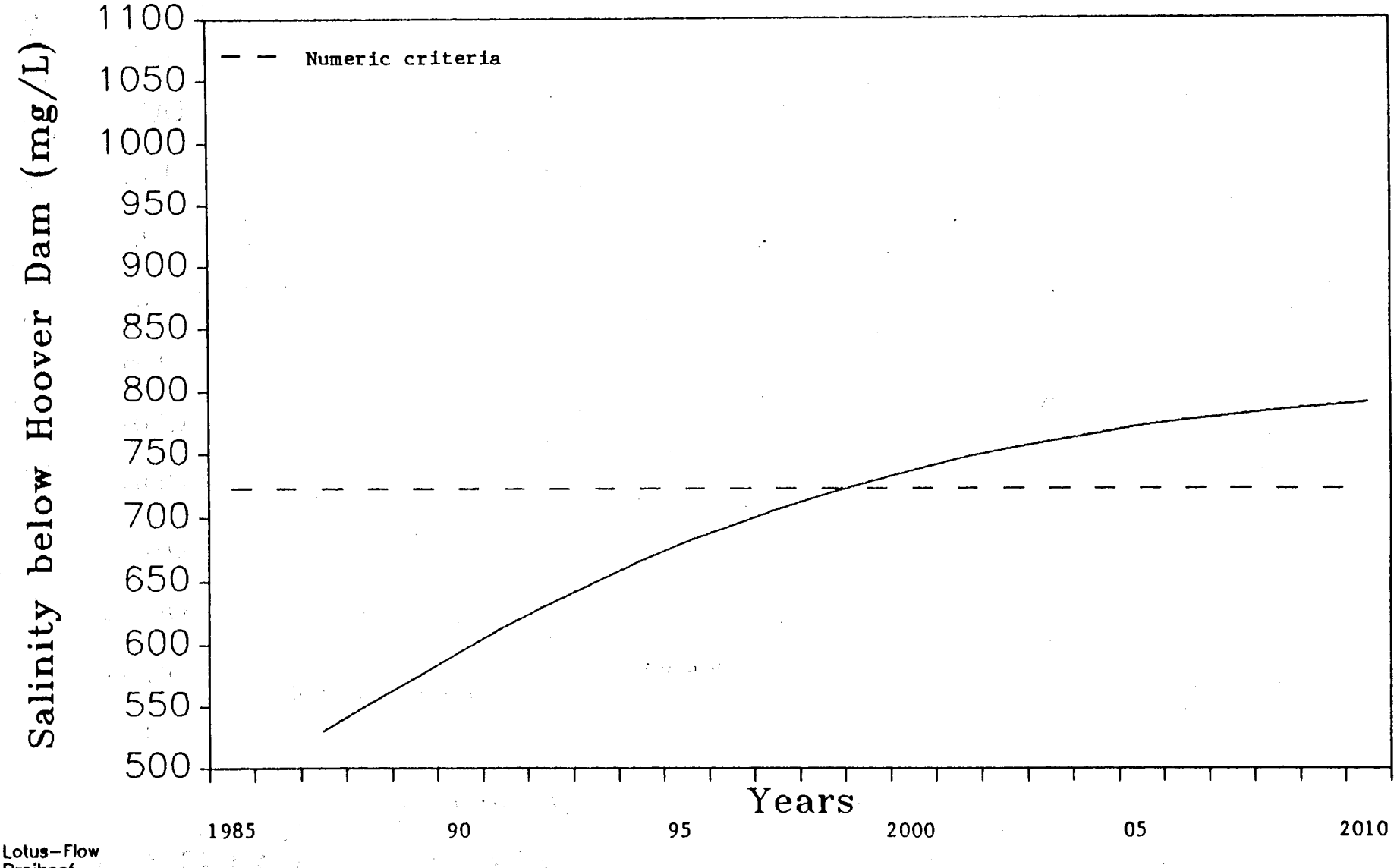
Colorado River near Cameo, Colorado
Gunnison River near Grand Junction, Colorado
Colorado River near Cisco, Utah
San Juan River near Archuleta, New Mexico
San Juan River near Bluff, Utah
Colorado River at Lees Ferry, Arizona
Duchesne River near Randlett, Utah
Green River near Green River, Wyoming
Green River at Green River, Utah
San Rafael River near Green River, Utah
Dolores River at Cisco, Utah
White River at Watson, Utah
Virgin River at Littlefield, Arizona

1/ A description of the methodology for developing these values and the values themselves can be found in the Baseline Value Report adopted by the Forum September 11, 1980, and is summarized in the 1981 Review.

Salinity Projections below Hoover

Annual Discharge-Weighted TDS

CRSS - April 29, 1987



Lotus-Flow
Projhoof

Figure 5

Figure 6

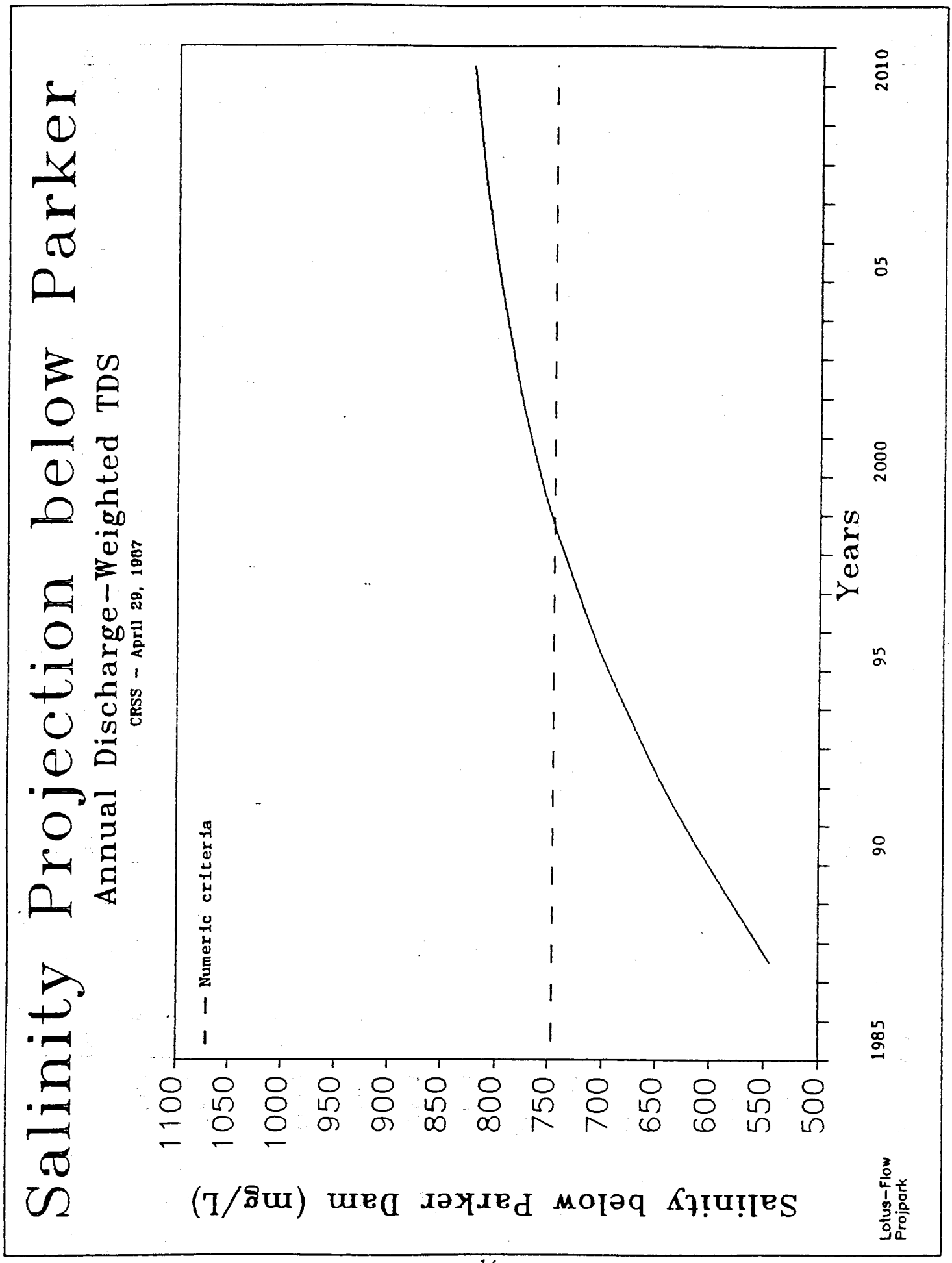
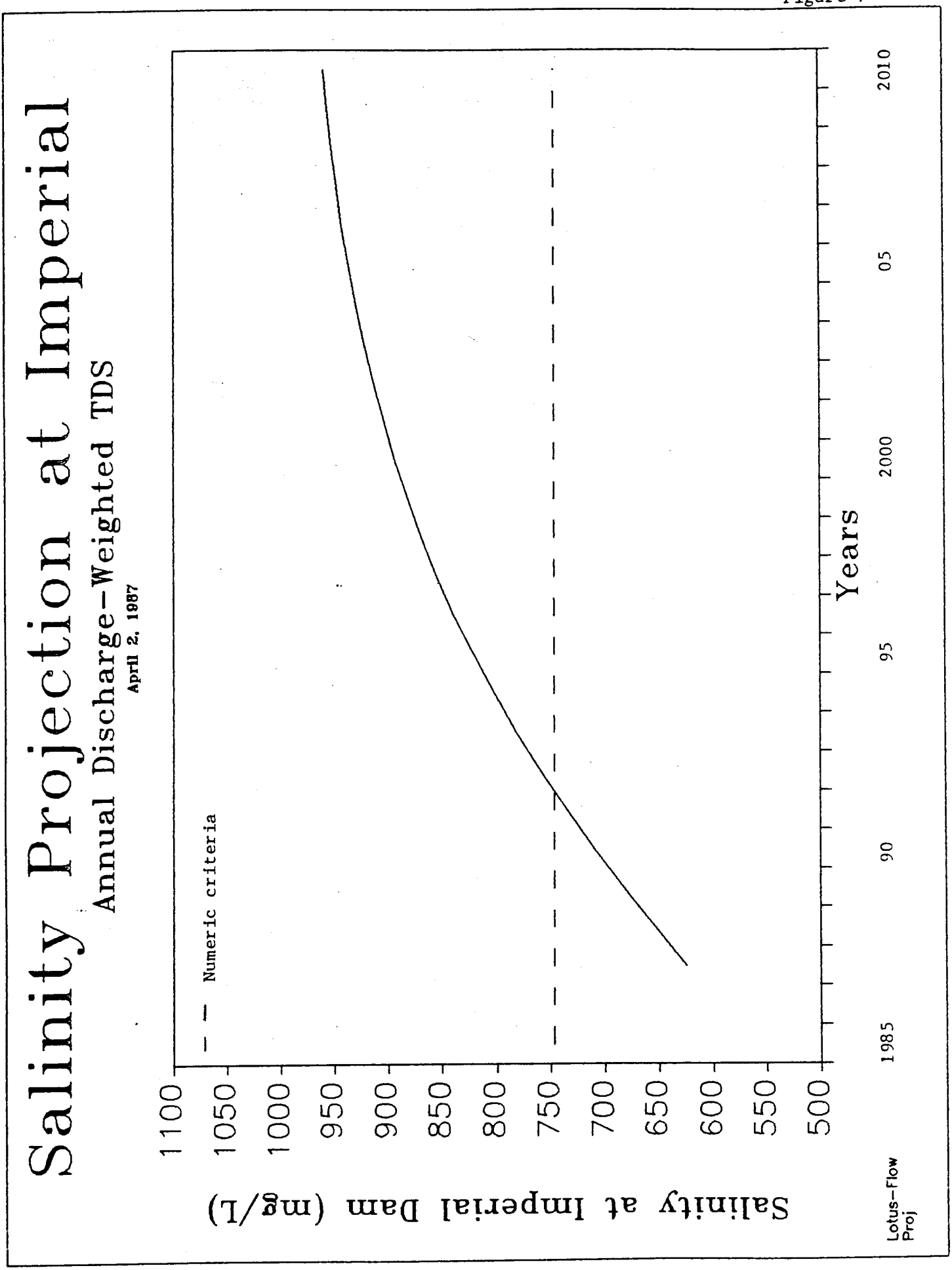

Salinity Projection below Parker
Annual Discharge-Weighted TDS
CRSS - April 29, 1987
- - Numeric criteria
Salinity below Parker Dam (mg/L)
1100
1050
1000
950
900
850
800
750
700
650
600
550
500
1985
90
95
2000
05
2010
Years
Lotus-Flow
Projpark

Figure 7


Salinity Projection at Imperial
Annual Discharge-Weighted TDS
April 2, 1987
Numeric criteria
Salinity at Imperial Dam (mg/L)
1100
1050
1000
950
900
850
800
750
700
650
600
550
500
1985
90
95
2000
05
2010
Years
Lotus-Flow
Proj

Salinity levels at the baseline value stations between 1980 and 1983 fell within the range of values adopted in the 1980 Baseline Value Report. During 1984 and 1985, salinity levels at several stations fell outside of the adopted range of values. As required by the 1980 Baseline Value Report, the Forum will make an investigation to determine the cause of the observed changes from the adopted range of values and will recommend revisions or modifications if appropriate.

CHAPTER III. WATER QUALITY STANDARDS FOR SALINITY

Criteria

The Forum developed and agreed upon basinwide water quality standards for salinity, including numeric criteria and a plan of implementation for salinity control in 1975 (1975 Forum report). In order to provide for sound water quality objectives, based on a basinwide approach, numeric criteria were established at three key stations (below Hoover, below Parker, and at Imperial Dams).

The key stations were selected due to their proximity to major diversions in the Lower Basin. The State of Nevada diverts Colorado River main stem water from Lake Mead for municipal and industrial uses in the Las Vegas area. The Metropolitan Water District of Southern California and the Central Arizona Project divert water from Lake Havasu for all uses. The large agricultural areas in the Imperial and Coachella Valleys in California and the Yuma area in Arizona and California are served by diversions at Imperial Dam.

The flow-weighted average annual salinity for the year 1972, as determined by the Bureau of Reclamation from daily flow and salinity data collected by the U.S. Geological Survey and the Bureau of Reclamation, were selected as the numeric criteria. They are as follows[1/]:

Below Hoover Dam	723 mg/l
Below Parker Dam	747 mg/l
Imperial Dam	879 mg/l

Each of the Basin states adopted the 1975 Forum report as its standards for salinity. The state-adopted water quality standards were subsequently approved by EPA.

In response to Section 303(c) of the Clean Water Act, the Forum in 1978, 1981, and 1984 reviewed the standards. After each review, the Forum determined that the 1975 criteria were still appropriate. The Forum also reviewed and modified the plan of implementation in 1978, 1981, and again in 1984. Appropriate documents were adopted by the states.

Again, in 1987, the Forum, in response to Section 303(c), reviewed the criteria and determined that the 1975 criteria are still appropriate.

1/ The weighted average annual salinity at the three locations in the lower mainstem of the Colorado River where numerical criteria have been established was and continues to be computed by the Bureau of Reclamation utilizing salinity data determined by the "calculation method" (sum of constituents). The calculation method is described in the latest edition of the U.S. Geological Survey Techniques of Water Resources Investigations - "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments."

In 1987, the plan of implementation was reviewed and modified to reflect changes that have occurred since 1984. The plan is described in Chapters IV and V.

Temporary Increases

The plan of implementation as set forth in this Review is designed to meet the objective of maintaining the salinity concentrations in the lower mainstem at or below those found in 1972 (numeric criteria) while the Basin states continue to develop their compact apportioned waters. The plan of implementation is based on the assumption of a long term mean water supply of 15 maf/yr. However, many natural and manmade factors affect the river's salinity. Consequently, salinity will vary from year to year and may exceed the adopted numeric criteria on occassions and fall below them on others. In recognition of this, the approved standards permit temporary increases above the criteria levels if appropriate salinity control measures are included in the plan. The salinity control plan is designed to meet the criteria and to miminize the magnitude and duration of temporary increases.

In Figure 2, Chapter 2, the annual average flow weighted salinity concentrations can fluctuate greatly. Recent analyses have shown that impact of natural variations in the hydrologic cycle can have a significant impact on salinity. The above normal runoff of 1983-86 has resulted in a temporary decrease in salinity concentration of about 300 mg/l TDS at Imperial Dam. By contrast, the plan of implementation, as set forth in this Review, will reduce salinity concentration by approximately 85 mg/l at Imperial by 2010.

Efforts to determine the time and magnitude of temporary increases are not practicable because of the uncertainty of accurately projecting the complex and natural variations in river conditions. To date the numeric criteria have not been exceeded nor are they expected to be exceeded in the near future.

Uses and Associated Impacts of Salinity

The Colorado River, from its headwaters in the Rocky Mountains to its mouth in the Gulf of California, is utilized for a wide variety of purposes. A portion of the flow is transported out of the Colorado Basin for use in adjacent river basins. In the Colorado River Basin irrigation, municipal and industrial, powerplant cooling, fish and wildlife, and recreation are the major uses of river water.

Many uses of the waters of the Colorado River are adversely affected by increasing salinity concentrations. Colorado River water users in the lower Basin have suffered significant economic impacts due to elevated salinity levels. These damages have been estimated to have reached over $100 million per year. If the proposed plan of implementation for salinity control, as set forth in this review, is not implemented these damages could double early in the twenty-first century.

Agricultural water users suffer from higher salinity waters through reduced crop yields, added labor costs for irrigation management and automated water delivery equipment, and added drainage requirements. The urban user incurs additional cost due to early replacement of plumbing and water using appliances, use of water softeners and the purchase of bottled water. Industrial users and water treatment and waste water utilities incur reductions in the useful life of system facilities and equipment from increased levels of salinity. A significant impact in the Lower Basin is that imposed by local and regional water quality standards and management programs which have placed restrictions on the reuse of, or recharge of, waters that exceed specified salinity levels. These regulatory actions would result, if the river's salinity continues to increase, in expensive treatment of water prior to reuse or the disposal of such waters. If disposal options are selected, additional costly alternative sources of water must be developed or imported to meet the demands previously met or that could be met by water reuse.

To date, salinity activities have been directed toward decreasing total dissolved solids and the impacts on the basin's water users. Salinity is represented by a combination of individual constituents, some of which may have a greater impact on a specific beneficial use than others. Future research efforts would be needed to address the impacts of individual constituents on specific beneficial uses.

Salinity Monitoring Points

The salinity control plan includes a water quality monitoring and analysis program which provides information on a basinwide basis for plan evaluation. The monitoring and analysis program is essential to maintain a data base for future studies, to support state and regional planning activities, and to evaluate the effectiveness of salinity control measures.

River monitoring stations maintained by the USGS that are used for the salinity control program are shown on Figure 8. Data collection at these stations include: streamflow, specific conductance, and periodic sampling of dissolved solids concentration.

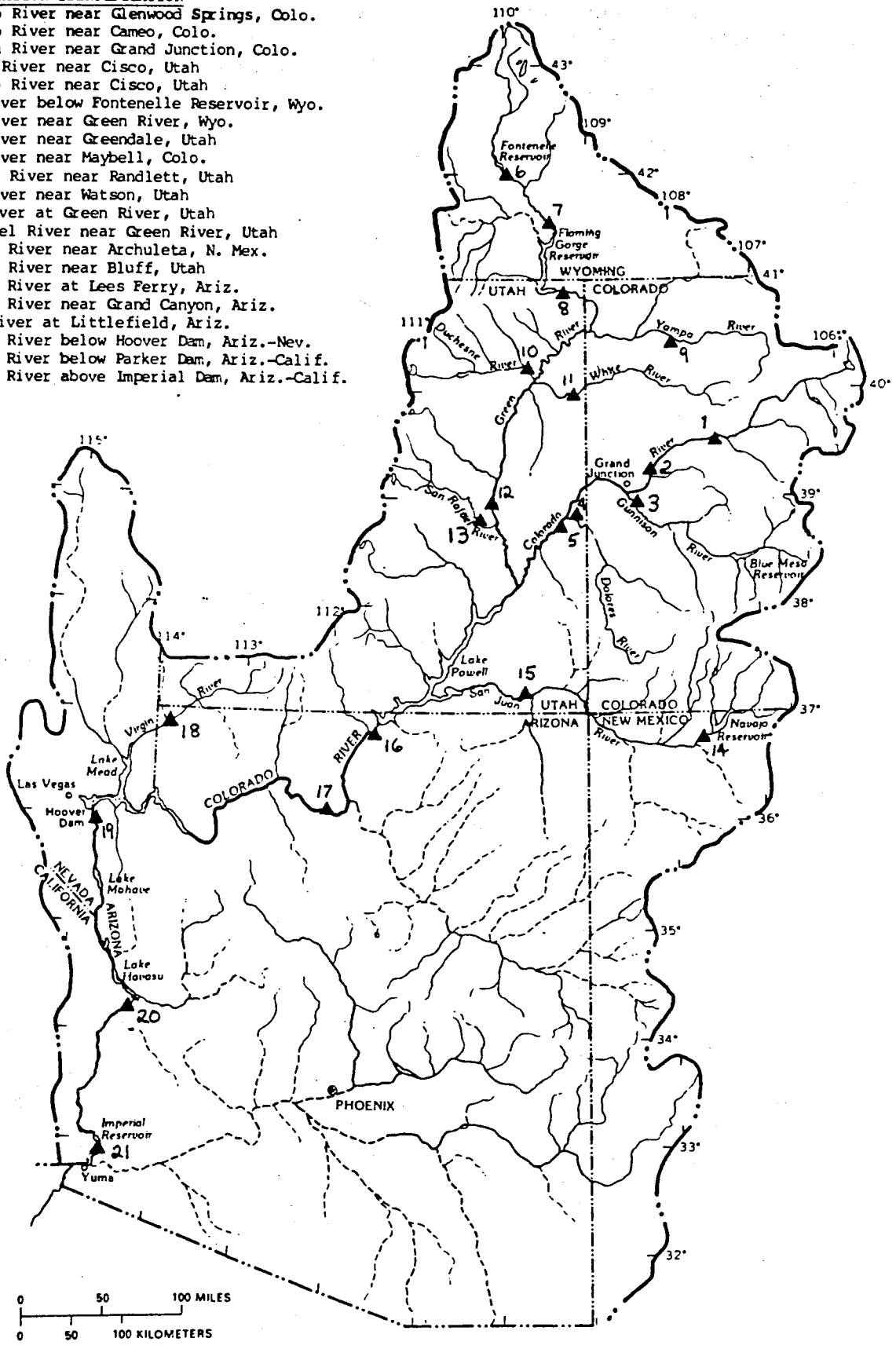
In addition to those stations shown in Figure 8, the USGS maintains monitoring stations that are used to analyze the impacts of individual salinity control projects. Some of the Basin states also maintain monitoring networks. As an example, the Utah Bureau of Water Pollution Control monitors 27 sites in the Colorado River Basin. These sites are sampled bimonthly and samples are analyzed for chemical constituents, nutrients, 5-day biochemical oxygen demand, suspended solids, dissolved solids, and coliform. In addition to routine samples collected at these stations, continuous recordings of temperature and specific conductivity are taken at seven stations in Utah.

Figure 8

MONITORING POINTS

STATION IDENTIFICATION

1. Colorado River near Glenwood Springs, Colo.
2. Colorado River near Cameo, Colo.
3. Gunnison River near Grand Junction, Colo.
4. Dolores River near Cisco, Utah
5. Colorado River near Cisco, Utah
6. Green River below Fontenelle Reservoir, Wyo.
7. Green River near Green River, Wyo.
8. Green River near Greendale, Utah
9. Yampa River near Maybell, Colo.
10. Duchesne River near Randlett, Utah
11. White River near Watson, Utah
12. Green River at Green River, Utah
13. San Rafael River near Green River, Utah
14. San Juan River near Archuleta, N. Mex.
15. San Juan River near Bluff, Utah
16. Colorado River at Lees Ferry, Ariz.
17. Colorado River near Grand Canyon, Ariz.
18. Virgin River at Littlefield, Ariz.
19. Colorado River below Hoover Dam, Ariz.-Nev.
20. Colorado River below Parker Dam, Ariz.-Calif.
21. Colorado River above Imperial Dam, Ariz.-Calif.



Further evaluation by the USGS is needed to assess both the spatial and temporal adequacy of the monitoring system, and to determine whether a greater or lesser frequency of sampling is needed to achieve a desired confidence level.

CHAPTER IV. PLAN OF IMPLEMENTATION FEDERAL PROGRAMS

Introduction

The plan of implementation is designed to maintain the salinity concentration of the river at or below the numeric criteria, principally by reducing the salt contribution to the river from existing sources and minimizing future increases in salt load. The control measures will be selected on the basis of cost-effectiveness, technical feasibility, social and political acceptability, and environmental considerations. Projects will be implemented at a rate commensurate with the expected increase in future Basin water use.

The plan of implementation consists of:

1. Completion of the salinity control units shown in the Table 3, and Figure 9, to the extent that each unit remains cost-effective and technically viable. Should another unit while in the planning phase prove a better alternative, an exchange would be made. Current remaining federal construction costs for Reclamation and USDA activities is approximately $560 million. A significant portion of the program costs will be reimbursed to the federal treasury by the non-federal participants in the program.

2. Implementation of cost-effective salinity control measures by the Bureau of Land Management to reduce salt contribution from public domain lands.

3. Imposition of effluent limitations, principally under the National Pollutant Discharge Elimination System (NPDES) permit program provided for in Section 402 of the Clean Water Act of 1977, on industrial and municipal discharges based on the Forum's 1977 policy on salinity control through NPDES permits.

4. Implementation of the Forum-recommended policy for use of brackish and/or saline waters for industrial purposes.

5. Implementation of the Water Quality Management plans. Individually, the Basin states have developed water quality management plans to conform to the requirements of Section 208 of the Clean Water Act. The water quality management planning process is continuing. After any changes have been appropriately adopted by the states and approved by EPA, those portions of the plan dealing with salinity control will be a part of the implementation plan.

Table 3
Recommended Salinity Control Plan
Implementation Schedule

	Begin Implementation	Projected Date Complete	Tons/yr Removed Jan 1987	Projected Salt Removed Tons/yr
Meeker Dome (USBR)	Complete	1983	48,000	
Grand Valley Stage One (USBR)	Complete	1984	21,900	
BLM well plugging & nonpoint	Complete	1986	7,600	
Las Vegas Wash Pittman (USBR)	Complete	1985	7,000	
Grand Valley (USDA)	1979	2000	33,600	196,400
Paradox Valley (USBR)	1980	1990		180,000
Uinta Basin (USDA)	1980	2003	22,700	75,500
Grand Valley Stage Two (USBR)	1985	2003		113,100
Las Vegas Wash Whitney (USBR)	1986	1988		1,000
Big Sandy River (USDA)	1989	1996		52,900
Dolores Project (McElmo,USBR)	1989	1994		24,500
Lower Gunnison Win Wtr (USBR)	1989	1991		74,000
Lower Gunnison 1 (USDA)	1989	2006		82,100
Moapa Valley (USDA)	1990	1993		19,500
Lower Gunnison 2, Mont. (USDA)	1991	2008		81,700
Lower Gunnison 2, Delta (USDA)	1991	2004		104,700
McElmo Creek (USDA)	1990	1999		38,000
Lower Gunnison 3, (USDA)	1992	1995		12,000
Uinta Basin I (USBR)	1993	2000		25,500
1/Price-San Rafael (Coordinated)	1992	1998		52,300
Lower Virgin River (USBR)	1992	1994		44,100
			140,800	1,177,300 2/

Others under consideration, not included in the plan.

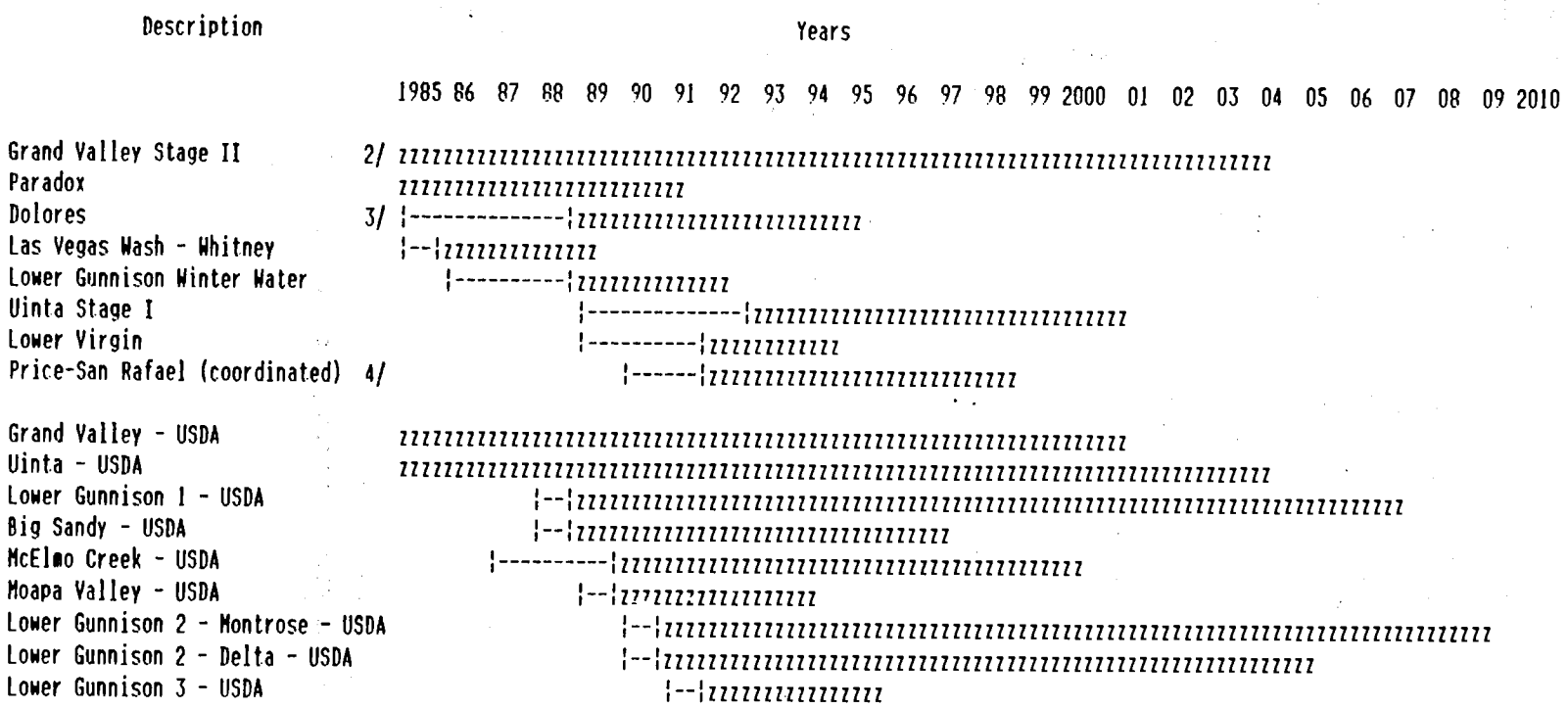
San Juan River (USBR)
Sinbad Valley (USBR)
Mancos Valley (USDA)
Lower Gunnison Stage I Balance (USBR)
Lower Gunnison North Fork (USBR)
Grand Valley II Balance (USBR)
Las Vegas Wash Balance (USBR)
Virgin Valley (USDA)

1/ Not included in USDA implementation plan.
2/ Reduction to maintain the numeric criteria through 2010.

Recommended Plan of Implementation

Bar87-June 4, 1987

$560 million 1/



1/ Information based on 1987 data tables.
2/ I's zzzzzz designate construction activities.
3/ Lines ¦-----¦ designate advance planning activities for Reclamation and technical assistance activities for USDA.
4/ Currently not included in USDA Schedule.

Note: Units not currently in plan:	Reclamation:	USDA:	Deferred:	Completed Units:
*Data not available	Grand Valley II, Ba	Virgin Vall	Dirty Devil River	Meeker Dome
	Lower Gunnison I, B	Mancos Vall	*Palo Verde Irrig. D	Grand Valley Stage I
	*Lower Gunnison North Fork		*Big Sandy	Las Vegas Wash - Pittman
	Las Vegas Wash Stage II		Glenwood-Dotsero Springs	
	*Uinta Stage II			
	*San Juan			
	Sinbad Valley			

Figure 9

Federal Programs

In the authorizing legislation for the Colorado River Storage Project (Public Law 84-485), the San Juan Chama and Navajo Indian Irrigation Projects (Public Law 87-483), and the Fryingpan-Arkansas Project (Public Law 87-590), Congress directed the Secretary of the Interior to study the quality of water of the Colorado River system and to investigate all possible means of improving the quality of such waters. In partial response to this direction, Reclamation has published 13 biennial reports which summarize the existing water quality conditions in the Basin including projections of future conditions.

An additional response to the Congressional direction on Colorado River water quality was the initiation in 1971 of the comprehensive Colorado River Water Quality Improvement Program (CRWQIP). The intent of this program is to investigate the means by which salinity control objectives would be achieved.

By reference to the recommendations of the Seventh Session of the Conference in the Matter of Pollution of the Interstate Waters of the Colorado River and Its Tributaries (1972), Title II of Public Law 93-320 directs the Secretary of the Interior to expedite the investigation, planning, and implementation of the salinity control program defined by the CRWQIP.

Public Law 93-320 also established the program objective of treating salinity as a basinwide problem to be solved in order to maintain salinity concentrations at or below 1972 levels in the lower main stem of the river while the Basin states continue to develop their Compact-apportioned waters. Specifically, the Act authorized the construction, operation, and maintenance of four salinity control projects (Paradox Valley, Grand Valley, Las Vegas Wash, and Crystal Geyser units) and the expeditious completion of planning reports on 12 other projects listed below:

Irrigation Source Control
- Lower Gunnison Basin Unit
- Uinta Basin Unit
- Colorado River Indian Reservation Unit (deferred)
- Palo Verde Irrigation District Unit

Point Source Control
- LaVerkin Springs Unit
- Lower Virgin River Unit
- Glenwood-Dotsero Springs Unit

Diffuse Source Control (non-point source)
- Price River Unit
- San Rafael River Unit
- Dirty Devil River Unit
- McElmo Creek Unit
- Big Sandy River Unit

The Secretary of the Interior, Secretary of Agriculture, and Administrator of the Environmental Protection Agency were directed to cooperate and coordinate their activities to meet the program objectives.

Public Law 98-569 was signed into law on October 30, 1984, and amends Public Law 93-320. This law modifies the original salinity control program by authorizing construction of additional units and by directing the Secretary of Agriculture to establish a major voluntary onfarm cooperative salinity control program. Crystal Geyser was deauthorized by this law because of poor cost effectiveness.

The passage of Public Law 98-569 provides a separate authority for implementing the basinwide USDA Colorado River Salinity Control (CRSC) program. Funds have been appropriated for this program in FY 1987 and with the publication in the Federal Register on May 5, 1987 of the Colorado River Basin Salinity Control Program; Interim Rule (7CFR Part 702) implementation under CRSC can begin. In addition, USDA will continue to use existing program authorities under the Agricultural Conservation Program (ACP) to carry out onfarm activities in the Grand Valley, Colorado and the Uinta Basin, Utah during FY 1987. Training sessions, based on draft operating procedures, have been held for all USDA personnel associated with operational projects under CRSC.

The Bureau of Land Management is involved in studies of nonpoint sources from public domain lands in the basin. BLM's activities include watershed improvements and plugging of flowing saline wells.

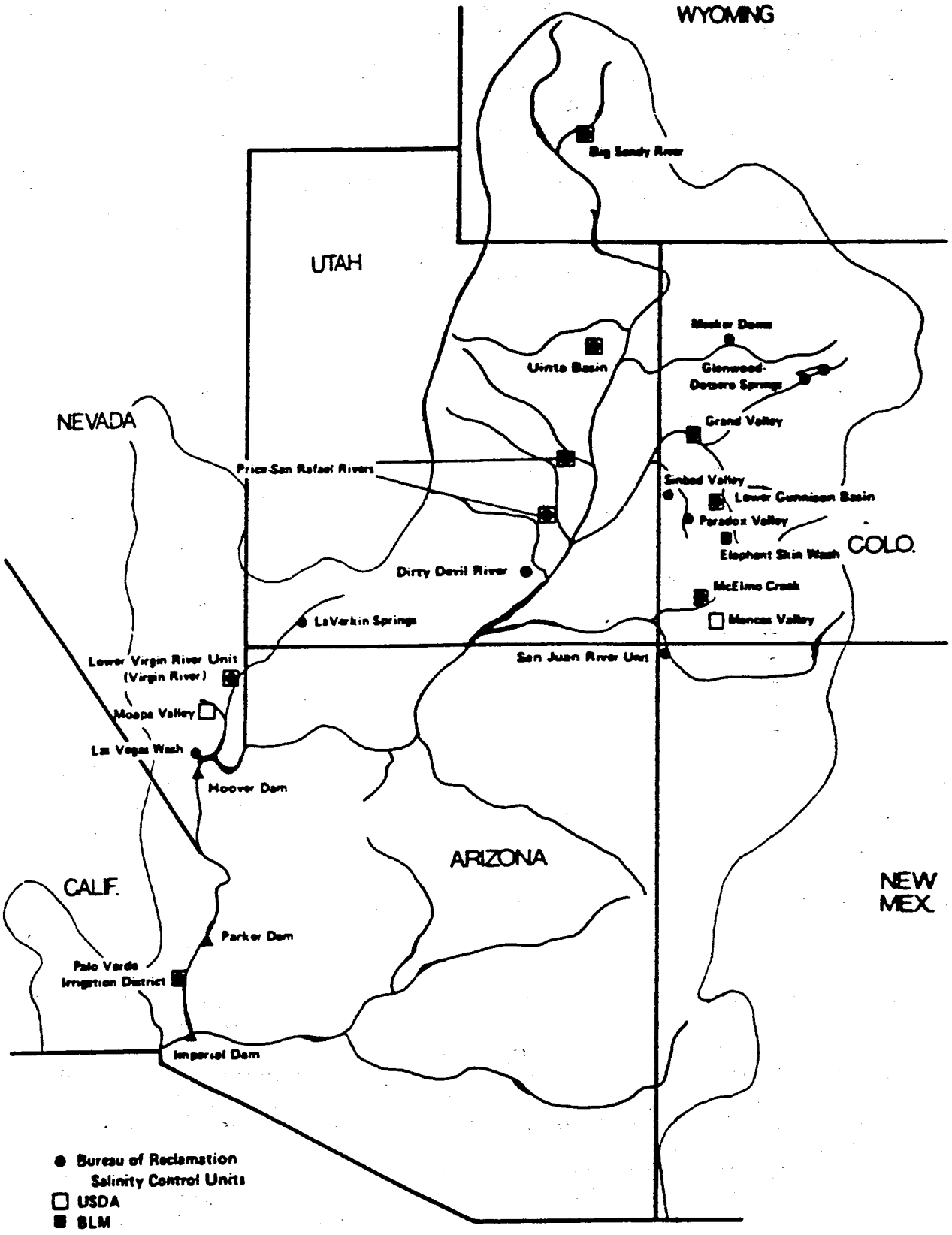
It should be recognized that some of the salinity control units now in the implementation plan may not prove to be cost-effective or implementible, and other projects and/or salinity control measures will have to be substituted in order to maintain the numeric criteria while the Basin states continue to develop their Compact-apportioned waters. At present there are more salinity control measures identified (see Figure 10) than have been included in the recommended plan to meet the salinity objectives for the River.

The onfarm salinity control measures being planned and implemented by the USDA appear to be among the most cost-effective measures for salinity reduction. The Forum is encouraging implementation of these measures as rapidly as possible.

Bureau of Reclamation/Department of Agriculture Units Completed or Under Implementation

Meeker Dome (Reclamation). An oil exploration well known as the Meeker Well was drilled into the localized anticlinal structure known as the Meeker Dome in 1915. This well, located near the bank of the White River 3 miles

Figure 10



LOCATION OF COLORADO RIVER BASIN
SALINITY CONTROL PROJECTS

east of Meeker, Colorado, tapped a supply of warm, salty water (19,000 mg/L) and increased the Colorado River salt load by about 57,000 tons per year. As a result of the well drilling, artesian pressures decreased and many natural springs in the area dried up. In 1968 the Meeker well was plugged by Reclamation, and in a few months other wells and seeps in the area began discharging saline water.

During verification studies, the abandoned Scott, James, and Marland oil wells were cleaned and plugged. After plugging of the three wells, a significant reduction in ground water levels and spring and seep flows occurred, and eventually flows from the springs and seeps ceased. With the plugging of Meeker well, the total salt loading was reduced by 48,000 tons. Cost effectiveness of the reduction of salt load from the three wells is about $14 per ton. A planning report concluding the study was published in July 1985.

Paradox Valley (Reclamation). Paradox Valley, a collapsed salt anticline, is a northwest-southeast trending valley 3 to 5 miles wide in southwestern Colorado. Local ground water comes into contact with the top of the salt formation where it becomes nearly saturated with sodium chloride and surfaces in the Dolores River channel in Paradox Valley. Studies conducted by Reclamation have indicated that the river picks up over 205,000 tons of salt annually from this saline ground water source as it passes through the valley.

The proposal for salinity control involves lowering the freshwater-brine interface below the river channel by ground water pumping. The extracted brine would be injected in deep wells in Paradox Valley. About 180,000 tons of salt would be removed annually by this project.

Construction of the well field began shortly after the Definite Plan Report was issued in January 1979. The well field pump tests confirm that salt pickup by the Dolores River can be significantly reduced by ground water pumping at a rate in the range of 1.0 to 2.0 cubic feet per second (cfs).

The ongoing testing program consists of verification and refinement of controlling brine inflow to the river, design data collection for future facilities, if required, and drilling and testing an injection well. Reclamation is using outside consultants for technical assistance on the deep injection well. An injection well is being constructed and is to be tested over a two-year period to determine characteristics of the disposal formation. Based on these characteristics, the required number and location of additional disposal wells, if needed, will be determined.

The water rights issues have been resolved between the State of Colorado and Reclamation. The Water Court has issued conditional decrees for the ground water wells and an absolute decree for Reclamation's change of water right

and plan of augmentation. The State has also approved pumping and well testing as stipulated in the existing well permits.

Grand Valley Unit (Reclamation and USDA). The Grand Valley Unit in western Mesa County in west-central Colorado includes about 71,000 acres and involves about 200 miles of canals and 500 miles of laterals. Grand Valley contributes an estimated 580,000 tons of salt annually to the Colorado River. Most of the salts are leached from the soil and underlying Mancos Formation by ground water that receives its recharge from canal, lateral, and onfarm seepage.

The Mancos Formation is a thick sequence of gray marine shale varying locally from 4,000 to 5,000 feet thick. Salts present in the shale are mostly calcium sulfate with smaller amounts of sodium chloride, sodium sulfate, and magnesium sulfate. Calcium sulfate (gypsum) is commonly found in crystal form in open joints and fractures in the upper portion of the shale.

Below the soil derived from the shale, the weathered zone of Mancos shale transmits water along open joints, fractures, and bedding planes. Percolating water from irrigation and conveyance system seepage dissolves salts from the weathered shale zone. The excess percolating water and seepage contribute to saline ground water flows that return to the river.

Development of the Grand Valley Unit, by Reclamation, was planned in stages. Stage One, encompassing about 10 percent of the unit area, consisted of concrete lining 6.8 miles of canal, consolidating 34 miles of open laterals into 29 miles of pipe laterals, and installing an automated moss and debris removal structure. This work was completed in April 1983.

To test the effects of Stage One improvements on ground water flows and quality, a hydrologically isolated sub-basin, the Reed Wash study area, was instrumented to monitor surface and ground water inflow and outflow. Salt loading reduction in Stage One from the canal and lateral improvements was determined to be 21,900 tons.

Detailed information on surface and ground water inflow and outflow to other selected sub-basins within the unit were collected and used to develop water and salt budgets. In addition, an intensive drilling and aquifer testing program was conducted in both the areas underlain by cobble deposits and in the weathered Mancos shale areas. The purpose of this program was to determine aquifer characteristics, such as hydraulic conductivity, as well as to identify quality and direction of ground water flow.

The plan for Stage Two, essentially the remainder of Grand Valley, provides for replacing existing open earth laterals with buried pipe and lining three reaches of the Government Highline Canal with membrane liners. The supplement to the Definite Plan Report and Final Environmental Impact Statement was filed with the Environmental Protection Agency on May 23, 1986.

Construction of the west end of the Government Highline Canal began in the fall of 1986, and construction of the west end laterals is scheduled to begin in the fall of 1988. The remaining lateral systems will be implemented in the approximate order of cost effectiveness, with construction to be completed about the year 2005.

To date, USDA's onfarm and off-farm lateral improvements in Stage One and Stage Two of the Grand Valley have been accomplished primarily through the annual practice cost-share provision of the Agricultural Sabilization and Conservation Services (ASCS) ACP program.

The total onfarm pipe and ditch lining installed from 1979 to date includes approximately 163 miles of pipeline and 44 miles of ditch lining. This represents about 31 percent of the total Grand Valley project goal for these practices. The total onfarm average annual salt load reduction is 17,900 tons.

USDA's off-farm lateral improvements, for the period 1980 to date, amount to 40 miles of pipeline and 11 miles of ditch lining. These off-farm lateral improvements account for about 27 percent of USDA's overall goal with an average annual salt load reduction of 15,600 tons.

USDA's total onfarm and off-farm improvements since 1979 amount to a total average annual salt load reduction of 33,600 tons.

Las Vegas Wash (Reclamation). Las Vegas Wash is a natural drainage channel providing the only surface water outlet for the entire Las Vegas Valley. The lower portion is now a perennial stream as a result of waste water effluent and ground water discharges. Flow in the Wash has increased steadily in recent years due primarily to increased sewage discharges resulting from a rapidly growing population. This wastewater carries a salt load of 150,000 tons per year and leaches an additional 80,000 tons of salt per year as the water flows into the Wash.

One alternative salinity control strategy would be to prevent seepage of waste water and minor storm runoff by placing them in a bypass channel running parallel to the Wash for about 4 miles, circumventing salt deposits in the Wash alluvium. The bypass channel has been viewed by some local entities as being in conflict with nutrient and toxics control and plans for a wetlands park. The seepage prevention strategy is being studied in the Pittman Verification Program. Once-through cooling water formerly discharged to the Wash from unlined ditches is now diverted into a pipeline. Several wells in the Pittman area are being used to monitor ground water levels and quality. The curtailment of seepage from the unlined ditches was followed by a drop in ground water levels, which is a good indicator of reduced saline ground water inflow to the Wash. A long term reduction of 7,000 tons per year is expected.

A plan is being developed for a second program to test the development of a ground water detention basin system. Each detention basin would be formed by a peripheral slurry trench/wall. If a detention basin system appears feasible after 2 years monitoring, additional larger basins may be built. The information learned from these programs would then be used to develop a salinity control plan that will have local support.

Uinta Basin (Reclamation and USDA). The Uinta Basin Unit is in northeastern Utah and includes portions of Duchesne and Uintah Counties and contributes about 450,000 tons of salt annually to the Colorado River system. Return flows from 204,000 acres of irrigated land account for much of the salt contribution.

Reclamation Phase I studies showed the only viable alternative in the study area is canal lining. About 56 miles of the total 240 miles of canals and laterals in the Uinta Basin would be lined. Project implementation would reduce the salt load to the Colorado River by an estimated 21,000 to 30,000 tons per year and reduce canal seepage by about 16,800 acre-feet per year, of which about 4,600 acre-feet could be used to reduce irrigation shortages.

A planning report/draft environmental impact statement on the unit was filed with Environmental Protection Agency and released to the public on April 25, 1986. The final document is scheduled to be completed and filed with the EPA in 1987.

In Reclamation's Phase II studies, alternatives which will be evaluated include: 1) a joint Reclamation-Soil Conservation Service (SCS) program of lining canals and laterals in conjunction with onfarm irrigation system improvements, 2) lining canals and laterals not considered under the phase I study, 3) eliminating canals by combining them with other canals which would be lined, 4) eliminating winter water now diverted through canal systems, 5) retiring high salt contributing lands from irrigation, and 6) using saline water for industrial purposes.

In the Uinta Basin, over 80 percent of the USDA's onfarm and supportive off-farm salinity control improvement accomplishments to date have been implemented through the use of Long Term Agreements (LTA's) under the ACP. More than ninety percent of the participants who entered into LTA's have done so through pooling arrangements whereby two or more participants develop mutually beneficial plans. Participants are assisted in implementing a balanced improvement program of structural and management practices that address salinity reduction and wildlife habitat enhancement.

In calendar year 1986, 39 LTA's covering 2,885 acres were developed and 37 individual practices completed. These LTA's and annual practices obligated $1,176,359. During the year, sideroll and center pivot sprinkler

systems were installed to irrigate 1,840 acres, land leveling was completed on 207 acres, and 55 miles of permanent and gated pipelines were installed. Irrigation water management was obtained on 5,972 acres providing for an average annual reduction in deep percolation of 1,744 acre-feet. These accomplishments will provide an average annual salt load reduction to the Colorado River of 3,500 tons.

For the period 1980 to 1986, a total of $11,249,021 was obligated for 424 LTA's and 264 individual practices which included installation of 330 miles of pipelines, land leveling on 1,107 acres, installation of sprinkler systems on approximately 7,500 acres, and irrigation water management on 29,265 acres. Almost 21,000 acre-feet of deep percolation have been eliminated as a result of these accomplishments reducing the salt load contribution by 22,700 tons annually. Approximately 18 percent of the project funds have been obligated, achieving 23 percent of the projected salt load reduction.

Units Ready for Implementation

Lower Gunnison Basin (Reclamation and USDA). The Lower Gunnison Basin Unit, in the Uncompahgre Valley in west-central Colorado, is principally agricultural, and agribusiness is of primary importance to the local economy. An estimated 360,000 tons of salt are picked up in the study area annually and conveyed to the Uncompahgre, Gunnison, and finally, the Colorado River. The salt pickup is a result of deep percolation of applied irrigation water and conveyance system seepage as water passes through the weathered and fractured shale of the Mancos Formation on its way to drains and the Uncompahgre River.

The recommended plan consists of eliminating winter water flows in the irrigation system by replacement through the domestic water delivery system, lining five separate Uncompahgre Project canal and lateral systems east of the Uncompahgre River, and implementation of the USDA onfarm program.

The winter water replacement program would eliminate seepage from canals and laterals during the winter months and allow more efficient livestock watering. The program could reduce annual salt loading by about 80,000 tons. Advance planning on the winter water replacement is expected to be completed in 1987. The advance planning on the canal and lateral lining will be delayed until after more cost-effective measures have been implemented.

The USDA onfarm report outlines an implementation plan, consisting of the full spectrum of onfarm salinity control measures that is compatible with the Reclamation plan. Cost-effective areas in the Lower Gunnison Basin have been identified for high priority implementation.

In the Lower Gunnison Basin, North Fork area (USBR), the primary causes of the salt loading appear to be related to irrigation delivery system seepage and applied irrigation water percolating through the saline soils. A

significant amount of loading from this area appears to be contributed by natural sources due to the large drainage area underlain by Mancos shale soils. In addition, salts are added from abandoned gas and oil exploration wells.

Although studies in the North Fork area are in the early stages, an estimated 480,000 tons of salt per year are believed to be contributed from this area. Preliminary salinity control concepts to be considered include selectively lining canals and laterals and providing piped winter stock water rather than operating canals and laterals year-round. The concept of providing piped winter stock water is similar to the plan developed for Stage I Winter Water of the Uncompahgre area which is ready for construction. Other concepts will be also be considered as the investigation proceeds.

Big Sandy River (Reclamation and USDA). The Big Sandy River begins in the Wind River Mountains of southwestern Wyoming where the salt content of the water is very low. Below Big Sandy Dam, the river is diverted to irrigate lands in the Eden Project. Irrigation seepage into shallow aquifers near the river are the source of saline seeps. These seeps and springs below the Eden Project contribute about 116,000 tons of salt, and tributaries contribute about 48,000 tons of salt annually to the Green River. Studies indicate that the saline water could be intercepted before seeping into the river.

The State of Wyoming has been involved in the study from the beginning and has provided information, guidance, and funding. It has also supported further funding for advance planning studies.

Early Reclamation studies considered the use of saline water for industrial purposes; however, these alternatives did not prove to be viable. Studies of alternatives calling for the lining of some currently unlined canals in the Eden Project area showed that selective canal lining is not cost effective. Reclamation will prepare a Planning Report and conclude all studies at this time.

SCS completed a separate salinity control report in 1986 that recommends converting the existing onfarm gravity irrigation systems to low-head sprinkler irrigation systems. A low pressure sprinkler system alternative is cost effective for the 15,000 irrigated acres. Supplemental, low interest loans for the farmers to cover 30 percent cost sharing from local sources will be needed. The State of Wyoming has a program to provide local farmers with such assistance.

A Draft Environmental Impact Statement has been completed and is undergoing interagency review. The final statement is expected to be completed later this year.

McElmo Creek/Dolores Project (Reclamation and USDA). Early studies in the McElmo Creek Basin in southwestern Colorado show that salt loading results from both irrigation and other nonpoint sources, with irrigation being the main contributor.

The total irrigation diversion into the drainage area averages 105,200 acre-feet per year. The average salt load contributed by the Basin is estimated at 119,000 tons per year. Salinity of the irrigation diversion averages 130 mg/L while the outflow from McElmo Creek is about 2,600 mg/L at the Colorado-Utah State line.

Significant public involvement in the salinity control planning program involved proposing several alternatives to reduce salinity. The recommended Reclamation plan to reduce salinity is to line four sections of Montezuma Valley Irrigation Company canals (three on the Lone Pine Lateral and one on the Upper Hermana Lateral) and to install laterals from the proposed Towaoc-Highline Canal (a Dolores Project feature) to serve the Rocky Ford Ditch service area. The Rocky Ford Ditch would then be abandoned and its flows would be combined into the proposed Towaoc-Highline Canal. These portions of the McElmo Creek Unit have been authorized for construction as part of the Dolores Project and will reduce salinity by 24,500 tons annually.

The USDA McElmo Creek Salinity Control report was published in 1983. The recommended plan includes provisions for gravity pressure for sprinkler irrigation for 10,400 acres and pumped pressure for 9,300 acres. In addition, improved surface irrigation systems will be installed on 1,850 acres. The recommended plan includes onfarm improvements on a total of 21,550 acres.

A joint Reclamation - USDA project will permit USDA to increase onfarm gravity pressure sprinkler irrigation by 2,700 acres. Under either alternative, about 270 miles of improved onfarm delivery systems will be needed. The Reclamation and USDA projects are fully compatible, and a fully coordinated effort has been initiated so that the design and implementation of Reclamation's delivery and distribution systems will complement the design and installation of the onfarm systems.

Units in the Planning Phase

Price-San Rafael Rivers (Reclamation and USDA). The Price and San Rafael Rivers, in east-central Utah, are 120 miles southeast of Salt Lake City. These rivers drain into the Colorado River via the Green River. An estimated 430,000 tons of salt annually reach the Colorado River from these two river basins. Of this amount, approximately 60 percent is attributed to non-point sources.

The nonpoint source salt loading contributed to the Colorado River from the Price and San Rafael River Basins occurs principally as a result of the dissolution of soluble salts and irrigation returns to the river system as ground water flow.

SCS and Reclamation are evaluating the potential for a joint and fully coordinated salinity control project which may result in SCS-Reclamation reports for two subareas. Alternatives include placement of laterals in pipe to use gravity pressure for onfarm sprinkler irrigation systems.

Lower Virgin River (Reclamation). This study area is along the Lower Virgin River in northeastern Clark County, Nevada, and northwestern Mohave County, Arizona, and includes natural saline ground water averaging 2,400 to 3,400 mg/l along the Virgin River between the town of Riverside and Lake Mead.

Early studies of this unit did not offer a cost effective means of salinity control. A proposed 1,000 MW powerplant located in the general area may require a water supply of 14,000 acre-feet per year for cooling purposes. In January 1984, Reclamation reinitiated the study to determine if a dual purpose water supply and salinity control project would be feasible. The powerplant is scheduled for startup in 1996.

Moapa Valley (USDA). The project covers a 5,000-acre irrigated area on Muddy River upstream of Lake Mead. The project would include installation of 17 miles of underground piped delivery system, onfarm water management, and salinity control practices. By reducing over irrigation and excessive deep percolation, the average annual salt load is expected to be reduced by 19,500 tons. SCS published its report on Moapa Valley in February 1981.

Other Units Under Consideration, not Currently in Plan

Sinbad Valley (BLM and Reclamation). Sinbad Valley is in western Colorado, south of the town of Gateway. Seeps, which contribute to Salt Creek which drains Sinbad Valley have been identified as a point sources of saline ground water contributing an estimated 5,000 to 8,000 tons per year of salts to the Colorado River system.

The BLM initiated a feasibility study of the interception and disposal of these saline waters during fiscal year 1982 and prepared a report on Sinbad Valley in April 1983. This report idenfified six alternatives and recommended that lead responsibility and funding be assumed by Reclamation.

Before final selection can be made additional information is needed. The additional information includes; discharge and conductivity measurements to define salt loads of high flows, onsite evaporation data to further refine the sizing of evaporation ponds for an evaporation alternative, and data on the abandoned wildcat well, No. 1, Sinbad Unit, for suitability for deep well injection of the collected brines. In addition to the technical issues, questions relating to water rights and compatibility of the project with existing land uses must be resolved.

Mancos Valley (USDA). The report on this 9,200 acre irrigated area along the Mancos River in southwestern Colorado was completed in 1985. The recommended implementation plan includes 3,200 acres of sprinkler systems and other water management/salinity control treatment on about 5,500 total acres. About 17 miles of

canal and lateral lining would combine many old earthen laterals. Total salt load reductions are estimated to be 8,800 tons per year with about 7,700 tons resulting from lateral improvements. This unit has met the prerequisite for construction.

Virgin Valley (USDA). The area consists of about 5,000 acres of irrigated lands in southern Nevada. The plan includes improvements of about 6 miles of off-farm canals and laterals. Deep percolation reduction for the planned actions is estimated to be 19,000 acre-feet per year and salt load reductions would be 37,200 tons per year.

While the Virgin Valley is independent of any Reclamation salinity control project, the downstream impacts on Reclamation's Lower Virgin River Unit are to be evaluated by Reclamation and SCS collectively. Otherwise, this unit has met the prerequisite for construction. The Virgin Valley report was published in March 1982.

San Juan River (Reclamation). San Juan River Unit investigations area includes the entire 23,000 square mile watershed from its headwaters in south-central Colorado to its mouth at Lake Powell. The drainage contributes approximately one million tons of salt annually to the Colorado River Basin. The study area covers many thousands of square miles of natural resource lands as well as agricultural, municipal, and industrial areas which may contribute controllable salt. Most of the natural source of salt is contributed by surface runoff and ground water discharge from the Nacimiento Formation and Mancos shale. Many thousands of acres of vegetation along the streams and washes contribute to salt concentration. Irrigation projects, coal-fired powerplants, surface mining operations, oil and gas fields, and refinery operations also contribute to the river's salinity.

Initial investigations indicate that the Hammond Project, Navajo Indian Irrigation Project (NIIP), and the Hogback Irrigation Project (also a Navajo Indian project) are the principal irrigation sources of salt in the basin, with control on the Hammond Project being cost effective. Investigation will continue on these other areas.

The Hogback Project contributes heavy salt loading but the mechanisms have not yet been identified. Other human caused salt contributions include abandoned gas or oil wells which have developed leaks at the wellhead, coolant discharges from powerplants, and wastewater from a petroleum refinery.

Dirty Devil River (Reclamation). The Dirty Devil River study area, in Emery and Wayne Counties in southern Utah, include the Muddy Creek, the Fremont River, Dirty Devil River, and the tributaries of Muddy Creek, Salt Wash, and South Salt Wash. The drainage contributes

approximately 150,000 tons of salt each year to the Colorado River. Approximately 28 percent of the Muddy Creek salt load, 24,200 tons per year, comes from springs in Hanksville Salt Wash and Emery South Salt Wash.

The recommended plan was to reduce the salinity of the Dirty Devil River and Colorado Rivers by collecting saline spring water in Hanksville Salt Wash and Emery South Salt Wash and disposing of it through deep well injection. Collection would be accomplished by pumping surface and ground water from shallow wells. Using this method of disposal would reduce the salt contribution to the Colorado River by 20,900 tons annually. The only alternative to the recommended plan is no action. The final report will be completed in 1987.

Because State of Utah Water Law may not permit the approval of a water right for well injection, the Forum recommended the study not continue into advanced planning at this time. Reclamation terminated field activities in 1985.

Glenwood-Dotsero Springs (Reclamation). The Glenwood-Dotsero Springs unit is located along the Colorado River in Eagle, Garfield, and Mesa Counties in west-central Colorado. Combined discharges from a number of springs annually contribute approximately 440,000 tons of salt, mostly sodium chloride.

The recommended plan consists of collecting both surface and subsurface salt water at Dotsero, transporting it in a gravity flow pipeline to Glenwood Springs where additional surface and subsurface salt water would be collected and added to the Dotsero salt water. The water would then be piped through a gravity pipeline to evaporation ponds at the Colorado-Utah border.

The current plan is not as cost effective as other units presently included in the plan. For these reasons, and because of unresolved water rights issues, the Forum recommended that studies on this unit be discontinued at this time. A planning report concluding the study was released in April 1986.

LaVerkin Springs (Reclamation). During the past 20 years, this unit, located in south western Utah, has been studied extensively with several reports being produced. The latest, a Preliminary Findings Report, August 1984, recommended the study be discontinued because of poor cost effectiveness.

Palo Verde Irrigation District (Reclamation and USDA). The Palo Verde Irrigation District (PVID) is a privately developed district in Riverside and Imperial Counties, California. Water for irrigation is diverted from the Colorado River at the Palo Verde Diversion Dam and is conveyed through 295 miles of main canals and laterals to serve approximately 91,400 acres of irrigated land

within the district. The irrigation return flows are collected in a 153-mile drainage system and returned to the Colorado River. The return flows are located downstream of many of the diversions impacted by salinity and reduction in salt loading would not have the same level of benefits as an upstream measure.

An analysis based on 1974 operational data indicated that 152,000 tons of salt was the net salt load discharge to the river. The more recently developed southern portion of the district, representing less than 10 percent of the irrigated area, contributes 144,000 of the 152,000 tons annually.

In 1985, SCS and Reclamation formulated a joint staged plan of study. In Phase I, Reclamation undertook a hydrosalinity analysis for the valley to determine the movement of ground water and the location and sources of salt loading. In addition, the study was to identify alternative concepts for salt control in consultation with PVID. SCS, in Stage II, will provide Reclamation with onfarm, onsite evaluations and analyses relative to irrigation efficiencies, reduction in deep percolation from onfarm activities, and the potential for salt reduction through onfarm management.

The current investigation by Reclamation focused on the possible sources of the incremental increase of salt load, apparently coming primarily from the southern end of the valley. This study provided no evidence of saline ground waters rising from deeper aquifers or from sources outside the valley. Ground water table elevations indicate that in the irrigated portion of the valley, the added salt load appears to be resulting primarily from the displacement of saline ground water by the recent application of Colorado River water.

Reclamation will complete Phase I work during 1987 to determine the merit of proceeding with Phase II.

Other Activities

Saline Water Use and Disposal Opportunities (Reclamation). Powerplant Cooling. An early contract study of retrofitting the Jim Bridger Power Plant for the use of saline water found that by using side-stream softeners and disposal ponds, about 8,000 acre-feet per year of Big Sandy River water could be used. Such use translates into a total additional inplant cost of about $70 per ton of salt removed from the Colorado River System. However, when the cost of constructing the collection well system and delivery pipeline were included, the total cost of salt removal more than doubled. Salt reduction costs through the use of saline water on a retrofitted plant are not competitive with other salinity control measures at the present time.

Testing of ion exchange treatment and other equipment to determine the cost effectiveness of using saline water for cooling has been completed at the Etiwanda Power Plant near Ontario, California. The selected hardware was successfully evaluated under actual field conditions to verify technical performance and operation. A parallel study of the economic impacts of the test loop and selected hardware has been completed and a report is available. The economic study is tailored after previous studies completed at Hunter and Jim Bridger powerplants.

The inplant use of brackish water from the Lower Virgin River at the proposed 1000 MW Harry Allen Power Plant near Las Vegas, Nevada, was evaluated by a consultant for Reclamation. The study established that the associated cost compared favorably to the cost of using alternative supplies. The current studies will determine the feasibility of a water supply system from the Lower Virgin River for the proposed power plant.

Solar Ponds. A solar salt gradient pond power system, the first of its kind in the United States, is now operating at a test site near El Paso, Texas.

The system will ultimately produce from saline water both fresh water, by distillation, and electricity from heat captured by the solar ponds. Initial feasibility studies had indicated such ponds might be cost-effective and a small-scale verification test is underway to evaluate the technology.

The first phase of the system has been completed and power generation began in September 1986. The second phase, the water desalting system, will be operational in late 1987. The system employs an .8-acre lined pond to generate up to 100 kilowatts of electrical energy (enough to supply ten homes).

The project is a cooperative effort among the University of Texas - El Paso, El Paso Electric Company, Bruce Foods Corporation, and Reclamation. The test facility is located at Bruce Foods' plant northeast of El Paso.

Aquaculture - International Bio Resources, Inc., and Denver Engineering Corporation completed a contract study based on the concept of the use of a Salt Tolerant Emergent Plant (STEP) process to beneficially use, concentrate, and dispose of saline water. Economics of the STEP process were applied to the Glenwood-Dotsero Springs Unit. Although unit costs under $100 per ton were claimed in the study, technical issues related to production rate, evaporation rate, forage value, etc., could not be confirmed due to lack of field data. In addition, the lack of government funding for continued research, has halted the study.

Economic Update of Salinity Impacts by Reclamation

A preliminary analysis of economic impacts of salinity was originally started in 1974, resulting in a 1980 published report entitled, "Colorado River Salinity - Economic Impacts of Agricultural, Municipal, and Industrial Users" by Messrs. Kleinman and Brown. Since this earlier work, many changes have occurred in water use, treatment, materials, equipment costs, etc., that affect present and future salinity damage levels in the lower basin.

A contract study was initiated in June 1986 to provide an update and better estimate of present and future damages. The evaluation is based on using existing information. The study focuses primarily on the municipal and industrial water use sectors in the Lower Basin. The study contractor, Milliken-Chapman Research Group, Littleton, Colorado, submitted a preliminary report to Reclamation in February 1987. The report, when released, will document available economic data on salinity damages and provide a computer program to assess damages in various water-use sectors under current and assumed future conditions.

Bureau of Land Management

Public Law 98-569 directed the Secretary of the Interior to develop a comprehensive program for minimizing salt contributions from lands administered by the BLM and provide a report on this program to Congress and the Colorado River Basin Salinity Control Advisory Council by July 1, 1987. Development of this program, including implementation actions for the public lands within the seven basin states, has been the primary objective of BLM salinity control efforts since 1984. Salinity control is an ongoing program in BLM, accomplished through the Soil, Water, and Air subactivity, with the objective to minimize salt contributions to the Colorado River while recognizing multiple-use objectives and authorized uses of the public lands. The report to Congress will discuss this ongoing program, outline BLM's implementation actions concerning salinity control, and quantify, classify, and map the saline soils on BLM-administered lands.

BLM has developed a resource management planning process to make basic land-use decisions. BLM's planning process is the principal mechanism by 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.

BLM administers 48 million acres of public lands in the Colorado River Basin above Imperial Dam, 36 percent of the Basin's total area. Approximately 8 million acres of BLM-administered lands in the Basin contain saline soils. Salt concentrations on BLM lands are highest in saline geologic settings, usually marine shales, where annual precipitation averages less than 12 inches.

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 occur from nonpoint sources.

Nonpoint Source Control

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 the watershed 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.

Point Source Control

Many saline water point sources exist on public lands in the form of either wells or springs. Several wells have been plugged, and other 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 public lands. Saline springs will be identified through the 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.

Salinity Control Accomplishments

BLM has identified and implemented salinity control projects beginning 1984. A total of 14 watershed improvement projects with salinity control objectives has been identified in 4 different states. Seven of these watershed improvement projects have been partially implemented. Five flowing saline wells, four in Colorado and one in Wyoming, have been successfully plugged.

The total salt yield reduction resulting from the above BLM salinity control projects is approximately 7,600 tons annually, primarily from well plugging.

Fish and Wildlife Service (FWS)

The responsibilities, set forth in the Endangered Species Act, Fish and Wildlife Coordination Act, Clean Water Act, National Environmental Policy Act and the Migratory Bird Treaty Act, provide for FWS participation in the Colorado River Salinity Control Program. It is mainly through these legislative authorities that the FWS works toward meeting its objective of providing the federal leadership to conserve, protect, and enhance fish and wildlife and their habitat for the continuing benefit of the public.

There is a biological diversity of fish and wildlife resources and a great number of unique species in the Colorado River Basin. This river system has one of the largest lists of threatened and endangered fish and wildlife species in the United States as well as significant other resources, including migratory birds and waterfowl, non-migratory birds, big game, wetlands, riparian lands, and other habitats that support wildlife.

In general FWS activities consist of evaluating salinity control unit proposals and preparing related Fish and Wildlife Coordination Act reports, Planning Aid Memorandums (See Table 4 for status), biological opinions, and commenting on Draft Environmental Impact Statements and biological assessments.

FWS has completed major efforts on ten salinity control units and is currently involved with six additional salinity control units under study in the Colorado River Basin. Of the sixteen salinity control units, thirteen are located within FWS's Region 6, where participating offices include Salt Lake City, Utah, and Grand Junction, Colorado. Region 1 participating offices in Reno, Nevada and Laguna Niguel, California, have jurisdiction over the other three units (Table 4). The Salt Lake City Field Office has been assigned responsibility for overall coordination within the FWS.

Table 4
FWS Involvement in Salinity Control Studies - 1986

Project	Region	Office	Status Fish and Wildlife Coordination Act Report
Paradox Valley	6	Grand Junction, CO	1989
Grand Valley	6	Grand Junction, CO	Completed
Glenwood Dotsero	6	Grand Junction, CO	Completed
McElmo Creek	6	Grand Junction, CO	Completed
Lower Gunnison I	6	Grand Junction, CO	Completed
Lower Gunnison II	6	Grand Junction, CO	1989
Big Sandy	6	Grand Junction, CO	1987
Price-San Rafael	6	Salt Lake City, UT	Completed
Uinta Basin I	6	Salt Lake City, UT	Completed
Uinta Basin II	6	Salt Lake City, UT	1990
Dirty Devil	6	Salt Lake City, UT	Completed
La Verkin Springs	6	Salt Lake City, UT	Work stopped
San Juan	6	Grand Junction, CO	1989
Lower Virgin River	1	Reno, NV	1987
Las Vegas Wash	1	Reno, NV	
Pittman Verification Program			Completed
Ground Water Flow Reduction			1989
Coachella Canal	1	Laguna Niguel, CA	Completed

FWS input to planning salinity control units also is provided through participation in a variety of working/planning meetings with Reclamation, SCS, BLM, state water development agencies, fish and wildlife resource agencies, Indian Tribes, and the public. As required by the Endangered Species Act, lists of threatened or endangered species in salinity control project areas and biological opinions are provided by the FWS.

Geological Survey

The Geological Survey's Water Resources Division provides and analyzes hydrologic information to assess the Nation's water resources. Programs are developed with cooperation and financial support from state, local, and other federal agencies. The programs provide hydrologic and geochemical information for evaluation of surface and ground water systems as well as for management and policy decisions.

To provide information required by the federal, state, and local agencies to address Colorado River water quantity and quality problems, the Water Resources Division operates and maintains a network of about 600 stream gaging stations and 175 water quality stations in the Colorado River Basin. Streamflow and water-quality information from these stations provide input to the hydrologic data base for Reclamation's Colorado River Simulation System.

In addition to collecting hydrologic data, the Water Resources Division conducts specific studies on surface water, ground water, and water quality. During the review period, Division scientists completed a major study of salinity in the Colorado River system. Results of this research include a statistical analysis of streamflow and dissolved solids data for all gaging stations in the Upper Colorado River Basin with more than 5 years of record. Significant long-term trends in dissolved solids concentration and salt load were found associated with reservoir development, mining, salinity control and changing irrigation practices. Salt loading in Las Vegas Wash, Nevada, is also being studied in cooperation with Reclamation. The purpose of this investigation is to determine whether the proposed engineering plan to reduce salt loading to the wash near Henderson is feasible and cost effective.

Environmental Protection Agency

The major Environmental Protection Agency (EPA) programs dealing with salinity control are Water Quality Management Planning, National Pollutant Discharge Elimination System (NPDES) permits and water quality standards. The Water Quality Management Planning and NPDES are largely delegated to the States, and are discussed in other sections of this report. EPA maintains oversight responsibilities for these delegated programs, and has responsibility for approving state adopted revisions to water quality standards. EPA continues to encourage the Basin states to develop and implement the state salinity control strategies.

The Forum and EPA policies encouraging the use of higher TDS water for industrial purposes are being supported primarily through National Environmental Policy Act (NEPA) review responsibilities. EPA also urges the identification of potential salinity impacts resulting from proposed projects, and encourages discussion of mitigation of adverse impacts as required by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508) for implementing NEPA. For example, EPA has commented on potential salinity impacts in reviewing impact statements for grazing and land management, recreational developments, mining, timber harvesting, and water development projects.

The Water Quality control Act of 1987 (PL 100-4) may offer additional opportunities to implement salinity control measures. In particular, the Section 319 program, which addresses nonpoint source pollution control, authorizes funding for implementation of nonpoint source pollution control measures. The states have the lead with the Section 319 program, whee in salinity control needs

must be identified in the State Assessment Report (Section 319 (a)) and also included in the State Management Program (Section 319 (b)) before applying for funding. The states are responsible for identifying their nonpoint source control priorities and submitting them to EPA for review and funding decisions.

CHAPTER V. PLAN OF IMPLEMENTATION STATE PROGRAMS

Important components of the plan of implementation for salinity control are the Basin states' activities associated with the control of total dissolved solids through the NPDES Permit program and the water quality management plans. All states have adopted the 1977 Forum "Policy for Implementation of the Colorado River Basin Salinity Standards through the NPDES Permit Program," and the 1982 policy the "Intercepted Groundwater Policy for Implementation of the Colorado River Salinity Standards Through the NPDES Permit Program." Copies of those policies are presented in Appendix A. A preliminary listing of the NPDES permits in force within the Colorado River Basin are presented in Appendix E. During the period of this review, the status of implementation of the NPDES permits and the water quality management plans in each of the states is as follows.

Arizona

NPDES Permits

Authority for issuing NPDES permits has not been delegated to the state and still resides in the Region IX office of EPA. Arizona is currently operating under an "interim" plan in which the state prepares the permit, solicits public comments and involvement, and forwards the final draft to EPA for approval and issuance.

Arizona, in drafting NPDES permits for industries throughout the Colorado River Basin within the state above Imperial Dam, follows the Forum's policy regarding salinity control. Reuse of treated wastewater is encouraged as a general principle.

Presently three industries (uranium product mines) discharge to tributaries of the Colorado River above Imperial Dam. There are also 31 municipalities or quasi-public permittees in the watersheds of Arizona above Imperial Dam.

The Department of Health Services annually reviews monitoring reports of facilities potentially discharging under NPDES permits. No system is discharging more than one ton per day or 350 tons per year of TDS; and in most cases discharges are to ephemeral tributaries which are remote from the mainstream of the Colorado River.

Water Quality Management Planning

The Northern Arizona Council of Governments is the designated area-wide water quality planning agency for the Colorado River and its tributaries in the northeast and north central parts of the state, while the Western Arizona Council of Governments has similar responsibilities for Mohave, La Paz, and Yuma Counties. Agricultural best management practices and implementation of policy for industrial uses of brackish/saline water offer the best opportunity for salinity control and are consistent with the Forum's plan of implementation for salinity control.

Other Activities

In 1986, the Arizona State Legislature adopted a new Environmental Quality Act (H.B. 2518). The Act establishes a new Department of Environmental Quality on July 1, 1987. The water pollution control staff of the Department will develop state management programs to protect the quality of both surface and ground water. These programs will include point source and nonpoint source permitting and pesticides management.

California

NPDES Permits

The California Regional Water Quality Control Board, Colorado River Basin Region, issues the NPDES permits for navigable waters and waste discharge requirements for non-navigable streams and land discharges within the Colorado River drainage portion of the state. In issuing and reissuing waste discharge requirements the Regional Water Quality Control Board complies with all Forum policies. In addition, the Regional Board has included in the discharge permit requirements for land discharges a prohibition of brine backwash from water softeners into evapo-percolation ponds which overlie ground waters which are in hydraulic continuity with the Colorado River System. Industrial discharges are to be confined in impervious evaporation basins.

Water Quality Management Planning

The Water Quality Control Plan for the combined East and West Colorado River Basin was adopted by the California Regional Water Quality Control Board in November 1984. Following public hearings on the plan, the updated plan was adopted by the Regional Water Quality Control Board and the State Water Resources Control Board, February 1985 and subsequently approved by EPA in September 1985. The salinity control component of the water quality plan is consistent with the Forum's plan of implementation for salinity control. The Regional Water Quality Control Board is working with the Forum and local entities to insure that implementation of the water quality plan is achieved.

Other Activities

A policy establishing priorities for the use of poor quality waters for cooling of inland power plants has been in effect since 1975. The State Water Resources Control Board has included salinity control in the Colorado River among its top priority items.

Colorado

NPDES Permits

Administration of the NPDES permit program was delegated to the Colorado Department of Health, Water Quality Control Commission, by the EPA in May, 1978. The Water Quality Control Commission's regulation for implementation of the Colorado River Salinity Standards reflect all of the Forum policies adopted to date. All new or reissued permits have been brought into compliance with the Water Quality Control Commission's regulation for implementing the Colorado River Salinity Standards through the NPDES permit program.

Presently, there are 301 NPDES permits in the Colorado River Basin portion of the state, 158 are for domestic or municipal facilities and 143 are for industrial facilities. Of this total, there are only 13 major or significant minor industrial permits and 21 major or significant minor municipal permits.

Actions of particular note since the last review include requirements that six major municipal dischargers demonstrate the non-practicability of precluding a greater than 400 milligram per liter incremental increase in salinity in their waste water systems. Analysis of reports to be received from these dischargers will be made and appropriate actions, which may include permit limitations, will be taken.

Additionally, amendments to most industrial permits which lacked salinity monitoring and reporting requirements have been achieved. General permits which are issued for "temporary activities," such as sand and gravel mining, also now contain salinity monitoring and reporting requirements.

Finally, the Colorado Department of Health in cooperation with the Union Carbide Corporation stopped the discharge from the Uravan Uranium Mill in 1985. This was the largest point source discharger in the Colorado River Basin portion of the State.

Water Quality Management Planning

In the Colorado River Basin of Colorado there are four water quality planning regions (9, 10, 11, and 12). Table 5 indicates the counties within each planning region and the status of the Water Quality Management Plans for each region. The State of Colorado has direct responsibility for water quality management planning in regions 9 (San Juan) District 10, and 11 (Colorado West). The Northwest Colorado Council of Governments (COG) has responsibility for water quality planning in its area.

Opportunities for salinity control were identified in the plans for all areas of the basin within Colorado. Critical salt yielding areas were assessed by the USDA, Colorado Soil Conservation Board, and local soil conservation districts. This effort resulted in the development of the Mancos Valley and Lower Gunnison Stage II units which have been added into the salinity program and given appropriate consideration. In addition, the updated plans contain lists of the NPDES permits within each area and stream classifications.

The Northwest Colorado COG is comprised primarily of the high mountain headwaters of the Colorado River and produces little salt loading to the river system. This Water Quality Management Plan directs salinity control efforts towards control of point sources and local control of non-point sources in the form of urban runoff. The Water Quality Management Plan for this region, withdrawn from certification due to litigation, has been revised and updated and is presently being reviewed by the state.

The Region 10 plan covers primarily the Gunnison Basin. Salinity projects in this region include the Lower Gunnison, Paradox Valley and Sinbad Valley units.

Region 9 covers primarily the San Juan Basin portion of Colorado. Salinity projects in this area include McElmo Creek and Mancos Valley.

Region 11 includes the Colorado mainstem below Dotsero, and the lower reaches of the White and Yampa Rivers. The salinity control projects in this region are Grand Valley, Badger Wash, Glenwood-Dotsero and Meeker Dome.

Colorado is endeavoring to fully implement the Section 208 plans as funding allows and will utilize Section 319 funding available to it under the recent amendments to the Clean Water Act when possible to aid in this effort.

Table 5

State of Colorado - Department of Health
Colorado River Basin Water Quality Planning Summary

Planning Region	Counties	Date of Initial 208 Plan	Date of Last Update	Date of Last Governor's Certification	Date of Last EPA Approval
9-San Juan	Archuleta Dolores La Plata Montezuma San Juan	1979	9/84 update currently in progress	11/13/84	12/24/84
10	Delta Gunnison Hinsdale Montrose Ouray San Miguel	1980	9/84 update currently in progress	6/14/85	1/9/86
11-Colorado West COG (Associate Governments of Northwest Colorado)	Garfield Mesa Moffat Rio Blanco	1979	10/86	12/23/80	6/87
12-Northwest Colorado COG	Eagle Grand Jackson Pitkin Routt Summit	1980	2/87		Never approved by EPA

Other Activities

Colorado has continued its support of the basinwide approach to salinity control through its participation in the Colorado River Basin Salinity Control Forum and associated activities. This has included significant efforts on proposed Forum amendments to the Colorado River Basin Salinity Control Act and the Clean Water Act and coordination with local entities having an interest in the legislation.

The State of Colorado has also put significant work into the Grand Valley Salinity Control Unit coordination efforts since installation of facilities began in 1979. The Colorado Water Conservation Board, under a grant from Reclamation, assumed responsibility in 1985 for working with the irrigation water supply entities in the Grand Valley to organize the private individual laterals in the area into legal entities with whom Reclamation could contract for the O&M of the laterals after they are lined or placed in pipe. That effort has now proceeded to the point that Reclamation will begin working directly with the several entities which are considering assuming the ownership of the private laterals which are to be improved.

The Colorado Soil Conservation Board, with support from other state agencies, is continuing its work with the SCS, ASCS, and local soil conservation districts to direct, as appropriate, available federal soil conservation funding programs towards improvement of onfarm irrigation practice. The salinity control benefits of improved practices are one of the reasons for this effort.

The water rights issues have been resolved between the State of Colorado and Reclamation. The Water Court has issued conditional decrees for the ground water wells and an absolute decree for Reclamation's change of water right and plan of augmentation. The State has also approved pumping and well testing as stipulated in the existing well permits.

The state has continued to encourage the industrial use of saline water, particularly by the oil shale and mining industries. All environmental assessments and impact statements concerning oil shale development were reviewed and opportunities for saline water use identified as appropriate.

Nevada

NPDES Permits

EPA has delegated the Nevada Division of Environmental Protection authority to issue NPDES Permits. Basic Management Industries has eliminated industrial wastewater discharges to Las Vegas Wash. The industries now pipe waste water to lined ponds where it evaporates. Two of the companies have been issued permits which allow discharge of cooling water to Las Vegas Wash with a limit of no more than 75 mg/1 TDS increase over the water supply. Another Basic Management Company has been issued a permit which allows discharge of surface storm runoff.

In the past, the Nevada Power Company (Company) discharged brackish cooling water from both the Clark and Sunrise Power Plants into Las Vegas Wash. Permits now prohibit such discharges and the Company treats and recycles water for further cooling before final disposition in lined evaporation ponds. The new recycling process has reduced cooling water requirements by about 75 percent.

The City of Las Vegas and the Clark County Sanitation District (CCSD) Secondary Treatment Plants and the CCSD Advanced Wastewater Treatment Plant are the only municipal dischargers into Las Vegas Wash.

The City of Henderson, acting independently of the other municipalities contributing effluent to the Las Vegas Wash, has changed its secondary plant discharges to rapid infiltration basins and subsequent reuse and has been issued a groundwater discharge permit. This will enable Henderson to discharge excess treated effluent from their new 6.4 MGD aeration treatment plant in an acceptable manner. Treated effluent will be reused on several local projects, including parks, cemeteries, a golf course and a green belt along the Boulder Highway. Nevada is continuing to apply the policies adopted by the Forum.

Water Quality Management Planing

A Section 208 Plan for Clark County was completed by the Clark County Department of Comprehensive Planning in February 1980. It was approved by EPA in October, 1981. The Clark County Commissioners approved an alternative to the plan in August 1985 which involved construction of primary treatment facilities to handle part of the sewage from the City of Las Vegas, North Las Vegas and that from the County service area. The sewage would then be delivered for further treatment to the Advanced Wastewater Treatment Plant.

In December 1985, Clark County, and later the State Division of Environmental Protection, approved optional plans for the City of Las Vegas to enlarge its secondary treatment plant. EPA rejected the proposal because of inconsistencies in the Water Quality Management Plan, and negotiations by the parties are now underway to resolve the issue.

Other Activities

A program has been developed by Clark County Sanitation District No. 1, Las Vegas, and North Las Vegas to coordinate, investigate, and encourage the implementation of management practices resulting in reduction of wastewater salinity. The principal emphasis of this program will be directed toward salinity control to meet the requirements of the NPDES permits issued to Clark County and the City of Las Vegas.

The State is coordinating Reclamation activities with the Nevada Power Company in an effort to use saline water from the Virgin River for cooling the proposed Harry Allen powerplant.

New Mexico

NPDES Permits

Authority for issuing permits has not been delegated to the State, and the program is being administered by EPA, Region VI. EPA is following the Forum policy in the administration of the permit program. In the Colorado River Basin within the state, the following industrial permits have been issued: electric power - 3; coal mines - 7; uranium mines - 4; and gravel plants - 3. In addition, permits have been issued for Navajo Dam including water, sewer, and utility lines and for construction of a hydroelectric power plant at Navajo Dam. Only two of the uranium mines and four of the coal mines are currently operating. All new or renewed discharge permits contain language requiring the permittee to obtain samples in accordance with Forum policy regarding salt discharge. EPA has determined that discharges covered by the uranium mine permits will contribute less than 350 tons of salt per year.

Municipal discharge permits have been issued for three major and two minor sewage treatment plants, one water treatment plant, and 12 small domestic sewage systems, one of which is under an administrative continuation. Forum policy is followed in the issuance of new or reissued permits.

Water Quality Management Planning

Major elements of the State of New Mexico Water Quality Management Plan that have applicability to the Colorado River Basin are sediment control, silviculture, and irrigated agriculture. The New Mexico Water Quality Control Commission is responsible for plan adoption in New Mexico. The initial plan was adopted for two parts in October 1978 and May 1979. The plan has been updated six times since, most recently in 1985. The importance of working cooperatively with the Forum is recognized in the plan.

The plan covers the entire state except for that portion of the Navajo Reservation lying within the state. Planning within the Reservation is the responsibility of the Navajo Tribe. Much of the Colorado River Basin in New Mexico is within the Reservation.

The State of New Mexico Water Quality Management Plan encourages the voluntary use of best management practices (BMPs) to control or reduce non-point sources of pollution. The plan designates the San Juan River Basin in New Mexico as one of the four priority basins for implementation of BMPs for sediment control.

The 1984 update to the plan included designated management agencies responsible for implementation of the non-point source control programs set forth in the plan. The agencies designated for those portions of New Mexico lying within the Colorado River Basin are:

New Mexico Forestry Division for silviculture;
New Mexico State Highway Department, New Mexico State Park and Recreation Division, and Jicarilla Apache Tribe for rural road construction and maintenance;
New Mexico State Land Office and U.S. Bureau of Land Management for sediment control;
U.S. Forest Service for sediment control, rural road construction and maintenance, and silviculture, and;
U.S. Bureau of Indian Affairs for sediment control, rural road construction and maintenance, silviculture, and irrigated agriculture.

Other Activities

The State of New Mexico through the Forum members, Advisory Council members, and the New Mexico Water Quality Control Commission support the Colorado River Basin Salinity Control Program and are taking all reasonable actions to insure its implementation. State actions include: (1) support of federal legislation including appropriations to implement the program, (2) inclusion of salinity control measures in the Section 208 plans, (3) dissemination of information on salinity sources and control measures to the water users and the public in the Colorado River Basin area of the state, (4) consultation with industries on potential salinity reduction measures, (5) implementation of Forum policy through existing legal and institutional mechanisms, e.g. NPDES Permits, (6) support of funding for the Forum's executive director whose major function is to assist in carrying out the Colorado River salinity program, (7) allocation of state financial and manpower resources to several salinity research efforts, (8) providing matching funds to support the USGS water quality data collection program in the Colorado River Basin portion of the state which is necessary to monitor salinity conditions on the river, and (9) maintaining a continuous water quality planning program whereby new or additional salinity control measures can be addressed. The availability of state funds used in support of items (7) and (8) above, has caused a reduction in those programs for the fiscal year beginning July 1, 1986.

Utah

NPDES Permits

Generally major industrial permits are drafted by the Utah Bureau of Water Pollution Control. The State has the responsibility to review all of the permits for compliance with the Forum policy and to provide water quality certification for all new and renewal permits.

A total of 64 NPDES permits are in effect for specific industrial facilities in the Utah portion of the Colorado River Basin. A general permit for construction dewatering and hydrostatic testing is in effect for some

additional projects. Most of the specific permits are for mining operations which normally have no discharge or discharge intercepted ground water in accordance with Forum policy. No new discharges of process water have been allowed in recent years. Only one industrial permit for a minor facility in the Colorado River Basin has been issued since September 1986.

There are 28 municipal treatment facilities in the Colorado River Basin of Utah. Currently 12 wastewater treatment facilities provide total containment. The two discharge permits scheduled for renewal in 1987 will comply with the Forum policy.

Water Quality Management Planning

The Five County Water Quality Management Plan update was reviewed and certified by the State and approved by EPA in 1986. Water quality management plans for the Uinta Basin, Southeastern Utah, and Wayne County were certified by the State and conditionally approved by EPA in previous years.

Other Activities

The local Soil Conservation Districts (SCD) in Utah are responsible for managing the soil and water resources of the state within their respective boundaries. The districts have been designated by the Governor as management agencies for implementing non-point source pollution control programs for agriculture. Each SCD has a long-range plan which identifies the resource concerns for the district. In the salinity control areas, these plans include methods of implementing projects. The plans are updated annually and technical assistance is provided by the Soil Conservation Service for project implementation.

Utah's Soil Conservation Districts are actively involved in salinity control efforts. Several districts are receiving technical assistance funds from the Soil Conservation Commission and have employed managers to assist in the implementation of irrigation water management and erosion control programs. Utah State University (USU) Extension Service assists the SCDs in these areas with irrigation water management programs. Extension helps provide technical assistance to irrigators on methods to reduce deep percolation by improving irrigation efficiency.

The Utah Department of Agriculture, working with the Soil Conservation Commission and the local SCDs, sponsors a low interest loan program for soil and water conservation projects. This program has provided funds for sprinkler systems and other onfarm measures which result in decreased salinity. The Department also sponsors research at USU aimed at helping farmers conserve water and reduce pollution.

Wyoming

NPDES Permits

The Wyoming Department of Environmental Quality, Water Quality Division, administers the NPDES Program. The Forum "Policy for Implementation of the Colorado River Salinity Standards through the NPDES Permit Program" is utilized to evaluate industrial and municipal dischargers. There are only two significant industrial sources of salinity in the Green River Basin. The Pacific Power and Light Company's Jim Bridger Power Plant permit allows the discharge of 2.4 tons of salt per day with only one ton per day reaching the Green River. This discharge will be eliminated by 1990 when the company places the last of three sulphur dioxide removal units (wet scrubber-air pollution control equipment) on line.

The Utah Power & Light Company Naughton Plant discharges approximately 20 tons of salt per day to a tributary of the Green River. This permit was issued on the basis that it was not "practicable" to implement the Forum policy of no discharge of salt from industrial sources. This decision was based upon a comparison of the costs of removing salt and downstream benefits associated with eliminating the discharge. The current permit expires June 30, 1989, and will be reevaluated for consistency with Forum policy at that time.

A total of 55 NPDES permits have been issued in the Wyoming portion of the Colorado River Basin. Except for the two previously discussed permits, all of these discharges are very small. Fourteen municipal discharge permits serving a total population of 41,000 have been issued. Of this total, 32,000 are in Rock Springs and Green River. The incremental increase in total dissolved solids concentration is 420 mg/l and 400 mg/l, respectively, for Rock Springs and Green River. Of the 12 other municipal discharges, most are in compliance; however, a few exceed the 400 mg/l incremental increase in salinity by a few milligrams per liter. It is not economically feasible to implement a comprehensive municipal salinity control program for these very small salt loads. There are 15 other domestic discharges in the Basin. These are all small facilities that do not exceed the 400 mg/l incremental increase. Twenty-six industrial dischargers also operate in the Basin, all are in compliance with Forum policy.

Water Quality Management Planning

The Water Quality Management Planning Program in Wyoming is under the direction of the Water Quality Division of the Department of Environmental Quality. The Clean Water Report for Southwestern Wyoming addresses water quality in Lincoln, Uinta, and Sweetwater Counties. This report was adopted at the local level, certified by the Governor, and conditionally approved by the EPA on October 9, 1980. The Governor's certification recognizes a

salinity control program for the Green River Basin as a major water quality priority. The report recommends continuation of the Big Sandy River Unit Study, improvement of irrigation efficiencies, and further study of a number of other management alternatives. Salinity control features for the Big Sandy River are being evaluated by the SCS. The SCS has completed their selected plan outlining the onfarm salinity control implementation program. A draft EIS has been prepared. The state strongly encourages and supports the current SCS efforts in the Big Sandy River Unit.

The Statewide Water Quality Management Plan establishes an institutional framework under which planning and implementation activities can proceed in Wyoming. Implementation of much of the program depends on the availability of funds and the acceptance of responsibilities by the designated management agencies. Management agency agreements have been developed and are presently being implemented with the BLM, State Engineer, and the Wyoming Conservation Commission.

Education and Public Involvement

The Basinwide nature of salinity increases the need for effective public education and public involvement programs. Further, implementation of salinity control programs requires a greater awareness of salinity--its sources, impacts, and alternative methods of control. The seven Basin states have and will continue to work with concerned agencies to increase public understanding of salinity and will coordinate this effort with the Forum. The Forum's Annual Progress Reports are a component of this educational effort and are distributed to interested individuals and organizations.

Since irrigation is the principal human-induced source of salinity, a major thrust of the public education/public involvement effort focuses on educating irrigators as to the sources, impacts, and methods of controlling salinity as it relates to irrigation practices. The goal of this effort is to encourage desirable changes in application of technology and management practices. The Basin states work with ongoing efforts (Water Quality Management Programs, SCS, and Cooperative Extension Service) to achieve this goal, and assistance from the Executive Director of the Forum is available. The plan formulation phase of Reclamation, SCS, and BLM salinity control projects is providing an excellent opportunity for public education on Colorado River salinity.

The Forum meetings are open to the public, and all input is considered and acted on as appropriate. The Forum also provides for public involvement in the standards review process. The Forum, as part of the review process, holds public meetings to receive comments on the standards for salinity. As a result of such public input, appropriate changes are made.

As each of the Basin states proceeds with its adoption process, one or more statewide public hearings are held. There is widespread announcement of the Forum and state hearings, and copies of the Forum Review and associated State standards are mailed to interested agencies and groups.

The Forum members participate with their 208 agencies in matters related to salinity and salinity control and will continue to do so as the need arises.

Reclamation publishes in cooperation with USDA, the Forum and other entities, a quarterly newsletter entitled "Salinity Update" which provides current information on Reclamation, USDA, and other activities related to salinity control. In addition, the Forum and the states utilize the newsletter as a means of keeping the public advised of their activities. The newsletter is mailed to over 900 readers.

Forum Activities

The Forum meets about twice a year or as needed to discuss the salinity control program, the efforts of the federal agencies and the states, and the need for additional policy and/or action by the Forum. During the last triennial review effort, the Forum met on May 1, 1984, in Salt Lake City and adopted the preliminary report for 1984. The Forum then held public meetings during the summer, and after receiving comments, prepared a supplemental report dated July, 1984. On October 10, 1984, the Forum met in Jackson, Wyoming, and formally adopted the supplemental report.

During this reporting period, the Forum also met on January 9, 1985, in San Diego, California; June 18, 1985, in Salt Lake City; October 29, 1985, in Phoenix, Arizona; May 23, 1986, in Denver, Colorado; October 28, 1986, in San Diego, California; and February 18, 1987, in Denver, Colorado. In all, since the creation of the Forum in November of 1973, the Forum has held 34 meetings. Recently, the Forum has published a compilation of all of the minutes of the Forum meetings from 1973 through 1985. The Forum held its 35th meeting on May 28, 1987, in Cheyenne, Wyoming, and approved this report for publication.

In addition, the Forum has created a Work Group that holds meetings on a more frequent basis to review technical information that is being generated by the federal agencies, to coordinate the efforts of the seven Basin states, and to report back to the Forum those actions that the Forum may consider.

The Forum has not adopted any formal, new policies since the publication of the 1984 Review. However, the Forum has taken a position on many ongoing issues, such as the need for the appropriation of funds by the Congress (see page 5).

Over the last three years the Forum has been involved with the preparation or review of several reports. Federal agencies have prepared numerous reports in the three-year period. The Work Group and the Forum have had opportunity to review and comment on these reports in draft form. Most notable was the combined federal agency report entitled "1985 Evaluation of Salinity Control Programs" and also the "1986 Joint Evaluation of Salinity Control Programs in the Colorado River Basin." These two reports evaluate progress and set forth the salinity control efforts needed to meet the numeric criteria.

The Basin states, through the Forum, had the opportunity to review and comment on these documents. In addition, the Forum and the Work Group have, over the last three years, assisted the Advisory Council in the preparation of three annual reports. The Forum prepares an annual report and issued the "Seventh Annual Progress Report, Water Quality Standards for Salinity, Colorado River System," December 1985 and the "1986 Annual Progress Report, Water Quality Standards for Salinity, Colorado River System," December 1986. This triennial review will also serve as the annual report for 1987.

The Forum had previously established policies with respect to the issuance of NPDES permits within the Basin. Permits are issued by the individual states, or in the case where authority has not been delegated to the states, by EPA. The Forum concluded that it would be helpful to have a listing of all of the NPDES permits in the Basin, and instructed the Work Group to prepare a comprehensive list. This list is now available and has been included as a part of this report as Appendix E. The listing indicates the name of the permit holder, the type of discharge, the river reach in which the discharge is located, and the amount of salt that is being discharged through the permit. Because the approximate 500 permits identified in the list are being continually reviewed, reissued, and/or terminated and new discharge permits are being filed, this list must be considered as being subject to frequent change.

CHAPTER VI. MEANS OF MAKING PLAN OPERATIONAL

Legislation Needed to Carry Out Programs

The modifications to Public Law 93-320 in 1984 by P.L. 98-569 establish most of the components necessary to effect the plan of implementation as it is now set forth. There are some exceptions. Reclamation's Uinta Stage I Unit in Utah and the Lower Virgin Unit in Nevada, will need construction authorization.

The Price-San Rafael coordinated effort is now being studied by Reclamation and SCS. If it is determined to be cost-effective and feasible, it could use advance planning dollars in FY 89 and construction dollars in FY 92. USDA's portion of the Price-San Rafael Unit will not require formal Congressional action; however, Reclamation's portion of the coordinated plan, if they are to go to construction, will require formal action by the Congress for construction. It is unlikely that USDA will proceed alone with its activities.

Financing Salinity Control Projects

There are many entities and levels of government concerned with the salinity of the Colorado River. However, solutions are possible only in a basinwide context. The federal government is involved in all the major basinwide aspects of the salinity problem, and it is the federal government which entered into Minute No. 242 with Mexico in order to achieve a permanent and definitive solution to the problem of the salinity of the water delivered to Mexico. Additionally, federal lands, including lands held in trust for the Indians, which constitute 75 percent of the basin, are the source of most of the naturally occurring salts in the river. Accordingly, the federal government is the appropriate unit of government to finance the salinity control projects and to be allocated a major share of costs.

In enacting Public Law 93-320, Congress recognized the federal responsibility for the Colorado River as an interstate stream and adopted a cost-sharing formula which provides that 75 percent of the costs of the four Department of Interior salinity control projects authorized by Title II of the Act are nonreimbursable. The remaining 25 percent of the costs are to be repaid from the basin funds of the Upper and Lower Colorado River Basins.

Public Law 93-320 was amended on October 30, 1984, by Public Law 98-569. The Department of Interior construction program was changed by deletion of one of the salinity control units which had been authorized and addition of two new units. The Secretary was also directed to develop a program which would minimize salt contributions from federal lands and authorized advanced planning activities for one unit to start implementation of that program.

The USDA was authorized to establish a voluntary onfarm salinity control program. The work will be accomplished through agreements with non-federal entities which require the land owners to share in the costs on the basis of benefits received. A minimum 30 percent cost-share will be required from the land owner unless the Secretary of Agriculture finds that such cost-sharing requirements would result in a failure to proceed with needed onfarm measures.

Public Law 98-569 provides that costs of operation and maintenance of Reclamation salinity control units will be the responsibility of the land owners, but limited to the costs that would have been incurred absent the project works. Costs of operation and maintenance in excess of that amount, costs of salinity control unit replacements and costs of operation and maintenance of works to replace impacted fish and wildlife values will be a federal cost.

Costs of operation and maintenance of USDA salinity control units including those for works to voluntarily replace fish and wildlife values foregone will be the responsibility of the land owners.

Public Law 93-320 provided that for Reclamation units authorized the basin funds would repay 25 percent of the reimbursable cost without interest over a 50 year period. Pursuant to P.L. 98-659, the same cost-share arrangement continues, for those originally authorized units, except that the 50-year repayment period will be reduced to the lesser of 50-years or that of the estimated life of the unit. For units authorized in 1984, the cost share of all reimbursable costs was increased to 30 percent.

Payment from the two Basin funds is to be allocated by the Secretary of Interior by taking into consideration the benefits to each basin from improved water quality, the causes of salinity, and the availability of revenues in each of the Basin funds. The maximum allocation to the Upper Basin is not to exceed 15 percent of the total costs to be repaid from the two funds with the remainder to be repaid by the Lower Basin fund.

Reimbursable costs allocated to the Upper Basin authorized under Public Law 98-569 shall be repaid from the Upper Basin fund with interest within a 50 year period or the estimated life of the unit, whichever occurs first. Such costs allocated to the Lower Basin shall be repaid without interest during the year when such costs are incurred to the extent funds are available. If such funds are not available, the deficiency shall be repaid with interest as soon as funds become available.

Public Law 98-569 requires that in selecting units to be constructed, in addition to those originally authorized, preference be given to those units or separable portions of units which reduce salinity at the least cost per unit. In programming the work, a least cost investment model has

been developed to evaluate investment levels. The purpose is to minimize cost, meet the salinity reduction requirements and minimize interest payments from the Lower Colorado River Basin Development Fund.

Revenues in the Lower Basin fund are derived from a 2 1/2 mill levy on hydropower generation in the Lower Basin. The plan of implementation presented in this report incorporates a construction schedule that when implemented would have an estimated cost of $560 million. Under this plan, the required salinity reduction can be made to the year 2010, and the Lower Basin fund will be adequate to meet its obligation of repayment if the annual inflation rate does not exceed 3.7 percent.

Responsibility for Accomplishing Salinity Control Measures

The plan of implementation recognizes that the Forum, the several federal agencies, and the Basin states each have specific responsibilities for furthering the salinity control program. Table 5 presents, in summary form, the elements of the plan of implementation, which considers full implementation of all salinity control measures discussed in Chapters IV and V.

The table includes actions to be taken, the time schedule, and the responsible entities.

The Forum will provide overall coordination and a continuing review of salinity changes and program effectiveness. Every 3 years, or more often if necessary, the Forum, in light of existing depletions and salt concentrations, will consider and, where needed and feasible, recommend revisions in the schedule for installing salinity control measures and/or modifications of the numeric criteria. The review will include both federal and non-federal programs.

Appropriate federal agencies will complete planning reports and seek authorization and funding for salinity control in accordance with Title II of Public Law 93-320 and Public Law 98-569. The Basin states will lend their support to requests for authorization and funding.

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for taking action
Meeker Dome Unit (page 28)	Completed plugging of 4 abandoned oil wells. Planning Report concluding the study published. Unit completed.	1983 1985	USBR
Grand Valley Unit (page 31)			
Water Systems Improvement	Initial year of salt removal (Stage I). Unit Completed.	1984	USBR
	Improve canals, laterals (Stage II).	1985-2003	USBR, State of Colorado
	Balance of Stage II.	Under consideration	USBR, State of Colorado
Onfarm Improvements	Initiate onfarm irrigation and related lateral improvements with ACP.	1979-2000	USDA, local participants
	Initial year of salt removal.	1980	
Abandoned Well Plugging (page 43)	Several abandoned oil wells plugged in Wyoming and Colorado.	1975-1980	BLM
Paradox Valley Unit (page 30)	Drill injection well, install surface facilities, and conduct test program.	1987-1989	USBR
	Initial year of salt removal.	1990	

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for taking action
Las Vegas Wash Unit (page 32)			
Pittman Area	Completed construction of Bypass Pipeline.	1985	USBR
Whitney Area	Development of ground-water detention system and 2-year monitoring program.	1986-1988	USBR
	Initial year of salt removal.	1985	
Big Sandy River Unit (page 35)			
Point Source Control	Initiate Planning Report concluding study.	1988	USBR
Onfarm Improvements	Complete Planning Reports and EIS.	1987	USDA
	Initiate onfarm irrigation and related lateral improvements.	1989-1996	USDA, local participants
	Initial year of salt removal.	1990	
Dolores/McElmo Creek Unit (page 35)			
Water Systems Improvement	Combine features of canals and lateral lining with Dolores Project.	1989-1994	USBR, State of Colorado
	Initial year of salt removal.	1990	USBR
Onfarm Improvements	Initiate onfarm irrigation and related lateral improvements.	1990-1999	USDA, local participants
	Initial year of salt removal.	1991	

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for Taking Action
Lower Gunnison Basin Unit (page 34)			
Water Systems Improvement (Uncompahgre Area) Stage I	Construct winter water portion.	1989-1991	USBR, State of Colorado
	Initial year of salt removal.	1990	USBR
Balance of Lower Gunnison Basin (North Fork Area)	Complete Planning Report.	1990	USBR
Water Systems Improvement (State I Balance)	Selective lining.	Under consideration	USBR
Onfarm Improvements (Lower Gunnison 1)	Initiate onfarm and related lateral improvements.	1989-2008	USDA, local participants
(Lower Gunnison 2 - Montrose)			
(Lower Gunnison 2 - Delta)			
(Lower Gunnison 3)			
Moapa Valley (page 37)			
Onfarm Improvements	Initiate onfarm irrigation and related lateral improvements.	1990	USDA, local participants
	Initial year of salt removal.	1991	

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for Taking Action
Uinta Basin Unit 1 (page 33)			
Water Systems Improvement	Construct lining of canals and laterals.	1993-2000	USBR, State of Utah
	Initial year of salt removal.	1994	
Onfarm Improvements	Initiate onfarm and related lateral improvements with ACP.	1980	USDA, local participants
	Initial year of salt removal.	1981	
Price-San Rafael Rivers Unit (page 36)	Draft Coordinated Plan.	1988	USBR/USDA
Water Systems Improvements	Initiate delivery system improvements.	1992	USBR
Onfarm Improvements	Onfarm irrigation and related lateral improvements (coordinated program).	Under Consideration	USDA, State of Utah, local participants
Lower Virgin River Unit (page 37)	Complete plan formulation working document.	1987	USBR
	Use of saline water for cooling-Harry Allen Power Plant.	Under consideration	USBR, State of Nevada

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for Taking Action
Sinbad Valley Unit (page 37) Point Source Control	Completed Planning Report.	1983	BLM
	Study responsiblity shifted to USBR.	1984	USBR
	Additional studies to select and evaluate control plan.	(Under consideration)	USBR
Mancos Valley (page 37) Onfarm Improvements	Initiate onfarm irrigation and related lateral improvements.	(Under consideration)	USDA, local participants
Virgin Valley (page 38) Onfarm Improvements	Initiate onfarm irrigation and related lateral improvements.	(Under consideration)	USDA, local participants
San Juan River Unit (page 38)	Complete advance draft planning report.	1989	USBR
	Potential controls.	(Under consideration)	

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing[2]	Entities Responsible for taking action
Water Quality Management (208) Plans	Develop Water Quality (208) Management Plans.		Certification by the state and approval by EPA.
Arizona (page 48)			
Western Arizona COG	Implementation	On going	Western Arizona COG local agencies, state, EPA.
	Develop nonpoint source controls.	1988	District IV COG, local agencies.
Northern Arizona COG	Implementation	On going	Northern Arizona COG state, local, agencies, EPA
Statewide Plan	Implementation	On going	State, local, agencies, EPA.
California (page 49)			
East and West Colorado River Basin	Plan Update	1985	Calif. Regional Water Quality Control Board, state, local
	EPA approval	1985	
Colorado (page 49)			
Northwest Colorado COG	Plan Update	1986	NW. Colorado COG, state, local agencies, EPA
	State Certification	1979	
	EPA approval.	-	
Region 10	Plan Update	In Progress	Region 10 COG, state, local agencies, USBR, USDA, EPA.
	State Certification	1985	
	EPA approval.	1986	
State Plan Region 9 (San Juan)	Plan Update	In Progress	USBR, USDA, state, local agencies, local farmers, EPA.
	State Certification	1984	
	EPA approval.	1984	
State Plan Region 11 (Colorado West)	Plan Update	1986	USBR, USDA, state, local agencies, local farmers, EPA.
	State Certification	1980	
	EPA approval.	1981	

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity	Major Actions	Timing [2]	Entities Responsible for taking action [1]
Water Quality Management (208) - continued			
Nevada (Page 52)			
Clark County (includes entire drainage area of Colorado River in Nevada)	Conditional state certification.	June 1978	Clark Co. Comm., state, local agencies., EPA.
	Conditional EPA approval.	July 1979	
	Revised 208 Plan completed.	February 1980	
	State certification.	May 1980	
	EPA approval.	October 1981	
	Wastewater reuse and disposal with industrial use.		
	Develop salinity source control strategy for wastewater.		
Statewide	State certification.	November 1978	Nevada Department of Natural Resources, state, EPA.
	Conditional EPA approval.	March 1979	
	Revised 208 plan (draft).	June 1981	
	State certification.	September 1981	
	EPA approval.	October 1981	
	Nevada diffuse source regulations adopted by State Environmental Comm.	October 1980	
New Mexico (Page 54)			
Statewide	Plan Update	1985	State, local agencies, EPA.
	State certification		
	EPA approval.		
	Implement BMP's		State, and Federal agencies, Indian Tribes, and NM Soil and Conservation Districts.
	Develop information and education programs.		
	Reduce nonpoint source. salinity from silviculture.		

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity	Major Actions	Timing [2]	Entities Responsible for taking action [1]
Water Quality Management (208) - continued			
Utah (Pagae 55)			
Southwestern	Implement Plan	On going	Southwestern Utah AOG, state, local agencies, EPA.
Uintah Basin	Implement Plan	On going	Uintah Basin AOG, state, local agencies, EPA. State USDA, Soil Conservation District, local agencies.
Southeastern	Implement Plan	On going	Southeast Utah, AOG, USDA, USBR, BLM, state, local agencies.
Six County Area	Implement Plan	On going	Six County AOG, state, USGS, USDA, local agencies.
Ute Indian Tribe	Develop Plan	—	Ute Indian Tribe.

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity	Major Actions	Timing [2]	Entities Responsible for taking action [1]
Water Quality Management (208) - continued			
Wyoming (Page 57)			
Southwestern	State certification. EPA approval.	March 1980 October 1980	Southwestern Wyoming, Water Quality Association, state, EPA.
	Improvementof irrigation management practices, promote use of saline waters for industrial purposes, point source salinity control.	Further action pending completion of USBR and USDA studies	WYO WQA, USDA, USBR, state, local agencies, local farmers.
Statewide	State certification. EPA approval. Improved Irrigation management practices. Use of saline water for industrial purposes.	March 1980 July 1980	Wyoming Dept. of Environmental Quality State, local agencies, EPA.
Other Activities			
Industrial Water Use (Appendix A)	Encourage and promote the use of saline or brackish water for industrial purposes except where it would be environmentally unsound, economically infeasible, or significantly increase consumptive use.	1980 through 2010	Affected state, USBR, and EPA.
Industrial Discharges (Appendix A)	The objejctive for industrial discharges shall be a no-salt return policy wherever practicable. EPA has endorsed the policy statement of the Forum and each state that has permit issuing authority has adopted the policy. All states are following the Forum policy regarding NPDES permits.	On going	Each state, EPA.

Table 6. - Timing and responsibility for accomplishing the implementation plan

Activity or Source of Salinity[1]	Major Actions	Timing [2]	Entities Responsible for taking action
Other Activities - continued			
Agricultural Discharges	Conduct educational program.	1980 through 2010.	Affected state.
Baseline Values (Page 14)	Review and revise, if necessary baseline salinity values for the specified monitoring points.	1988-89	Forum.
Annual Reports	Prepare annual report on salinity control program effect of other activities having an influence on salinity.	Annually	Forum.
NPDES Permits (Appendix E)	Review effluent limitations on salinity through the NPDES permit program.	Ongoing	Basin states having permit issuing authority. Otherwise EPA.
Standards Review (Page 75)	Reconsider and, where necessary, revise schedule for installing salinity control measures and/or modify the numeric criteria.	1991 or before, at least each 3 years thereafter	Seven states.

1/ Page reference to discussion in report.
2/ Some ongoing programs will continue indefinitely; others will have dates assigned for either completion or significant action after they have progressed further.

Identifying and Evaluating Progress in the Salinity Control Program

Progress in the salinity control program will be monitored and evaluated on a continuing basis. Changes in the plan of implementation will be considered with each 3-year review, or more often as appropriate. Annually, the states, acting through the Forum, will prepare a report which summarizes pertinent results and progress of the salinity control program and the effect of other actions in the Basin having influence on salinity. The report will be transmitted to the EPA and to state water resources and pollution control agencies, and will be made available to others interested in the salinity control program.

Baseline salinity values have been developed for 13 points on the main stem of the Colorado River and major tributaries other than the three main stem locations for which numeric criteria for salinity have been established. The determination of these baseline values, or ranges of values, is based on historic flow and quality data modified to the 1972 level of development. A more complete explanation of the computation of the baseline values and a list of locations is given in the 1981 Review.

Standards Review Procedures

Prior to state action on the review of the numeric criteria and plan of implementation, public review and discussion will be sought through public meetings. The Forum will hold two regional meetings in the Basin to describe the Basinwide nature of the salinity problem and the control program and to solicit views from interested agencies, groups, and individuals.

In accordance with provisions of the Clean Water Act, each of the Basin states plans to review its salinity standards for the Colorado River within its boundaries, and transmit the results of that effort to the EPA in early 1988. It should be noted that there is no recommendation for change in the numeric criteria for salinity at the three lower main stem stations. Action by each state will be accomplished according to the required procedures of each state and the Water Quality Standards Regulation (40 CFR Part 131).

CHAPTER VII. PROVISION FOR REVIEWING AND REVISING STANDARDS

The Forum, in its statement of "Principles and Assumptions for Development of Colorado River Salinity Standards and Implementation Plan," approved by the Forum on September 20, 1974, included Principle 7 as follows:

> "7. The plan of implementation shall be reviewed and modified as appropriate from time to time, but at least once each 3 years. At the same time, the (numeric) standards, as required by Section 303(c) (1) of P.L. 92-500 shall be reviewed for the purpose of modifying and adopting standards consistent with the plan so that the Basin States may continue to develop their compact-apportioned waters while providing the best practicable water quality in the Colorado River Basin."

The Forum took this position because the Colorado River Basin is a large and complex area with many problems. A wide range of research, technical studies, and actions are underway and much knowledge is yet to be gained. Usable procedures for reducing the volume of saline irrigation return flows have been developed and the USDA has initiated its newly authorized voluntary cost-share program with individual farmers, irrigation districts, and canal companies to improve onfarm water management practices and local water delivery systems.

The permanent Work Group keeps current with salinity control efforts and suggests revisions. The Work Group operates under a schedule which enables the states to take action on any potential revision by the required revision date.

APPENDIX A

FORUM POLICIES

Policy for Implementation of Colorado River Salinity Standards Through the NPDES Permit Program
Prepared by
The Colorado River Basin Salinity Control Forum
February 28, 1977

In November 1976, the United States Environmental Protection Agency Regional Administrators notified each of the seven Colorado River Basin states of the approval of the water quality standards for salinity for the Colorado River System as contained in the document entitled "Proposed Water Quality Standards for Salinity Including Numeric Criteria and Plan of Implementation provide for a flow weighted average annual numeric criteria for three stations in the lower main stem of the Colorado River: below Hoover Dam, below Parker Dam, and at Imperial Dam.

The Plan of Implementation is comprised of a number of Federal and non-Federal projects and measures to maintain the flow-weighted average annual salinity in the Lower Colorado River at or below numeric criteria at the three stations as the Upper and Lower Basin states continue to develop their compact-apportioned waters. One of the components of the Plan consists of the placing of effluent limitations, through the National Pollutant Discharge Elimination System (NPDES) permit program, on industrial and municipal discharges.

The purpose of this policy is to provide more detailed guidance in the application of salinity standards developed pursuant to Section 303 and through the NPDES permitting authority in the regulation of municipal and industrial sources. (See Section 402 of the Federal Water Pollution Control Act.) This policy is applicable to discharges that would have an impact, either direct or indirect on the lower main stem of the Colorado River System. The lower main stem is defined as that portion of the main river from Hoover Dam to Imperial Dam.

I. Industrial Sources

The Salinity Standards state that "the objective for discharges shall be a no-salt return policy whenever practicable." This is the policy that shall be followed in issuing NPDES discharge permits for all new industrial sources, and upon the reissuance of permits for all existing industrial sources, except as provided herein. The following addresses those cases where no discharge of salt may be deemed not to be practicable

A. New Construction

1. New construction is defined as any facility from which a discharge may occur, the construction of which is commenced after October 18, 1975. (Date of submittal of water quality standards as required by 40 CFR 120, December 11, 1974.) Appendix A provides guidance on new construction determination.

   a. the permitting authority may permit the discharge of salt upon a satisfactory demonstration by the permittee that it is not practicable to prevent the discharge of all salt from proposed new construction.

   b. The demonstration by the applicant must include information on the following factors relating to the potential discharge:

      (1) Description of the proposed new construction.

      (2) Description of the quantity and salinity of the water supply.

      (3) Description of water rights, including diversions and consumptive use quantities.

      (4) Alternative plans that could reduce or eliminate salt discharge. Alternative plans shall include:

         (a) Description of alternative water supplies including provisions for water reuse, if any.

         (b) Description of quantity and quality of proposed discharge.

         (c) Description of how salts removed from discharges shall be disposed of to prevent such salts from entering surface waters or ground water aquifers.

         (d) Costs of alternative plans in dollars per ton of salt removed.

      (5) Of the alternatives, a statement as to the one plan for reduction of salt discharge that the applicant recommends be adopted.

(6) Such other information pertinent to demonstration of non-practicability as the permitting authority may deem necessary.

c. In determining what permit conditions shall be required, the permit issuing authority shall consider, but not be limited to the following:

(1) The practicability of achieving no discharge of salt.

(2) Where no discharge is determined not to be practicable:

(a) The impact of the total proposed salt discharge of each alternative on the lower main stem in terms of both tons per year and concentration.

(b) Costs per ton of salt removed from the discharge for each plan alternative.

(c) Capability of minimizing salinity discharge.

(3) With regard to both points one and two above, the compatibility of state water laws with either the complete elimination of a salt discharge or any plan for minimizing a salt discharge.

(4) The no-salt discharge requirement may be waived in those cases where the salt load reaching the main stem of the Colorado River is less than one ton per day or 350 tons per year whichever is less. Evaluation will be made on a case-by-case basis.

B. Existing Facilities

1. The permitting authority may permit the discharge of salt upon a satisfactory demonstration by the permittee that it is not practicable to prevent the discharge of all salt from an existing facility.

2. The demonstration by the applicant must include information, in addition to that required under Section I, a, 1, b; the following factors relating to the potential discharge:

(a) Existing tonnage of salt discharged and volume of effluent.

(b) Cost of modifying existing industrial plant to provide for no salt discharge.

(c) Cost of salt minimization.

3. In determining what permit conditions shall be required, the permit issuing authority shall consider the items presented under I, a, 1, c (2), and in addition: the annual costs of plant modification in terms of dollars per ton of salt removed for:

   a) No salt return.
   b) Minimizing salt return.

4. The no-salt discharge requirement may be waived in those cases where the salt load reaching the main stem of the Colorado River is less than one ton per day or 350 tons per year, whichever is less. Evaluation will be made on a case-by-case basis.

II. Municipal Discharges

The basic policy is that a reasonable increase in salinity shall be established for municipal discharges to any portion of the Colorado River stream system that has an impact on the lower main stem. The incremental increase in salinity shall be 400 mg/l or less, which is considered to be a reasonable incremental increase above the flow weighted average salinity of the intake water supply.

A. The permitting authority may permit a discharge in excess of the 400 mg/l incremental increase at the time of issuance or reissuance of a NPDES discharge permit, upon satisfactory demonstration by the permittee that it is not practicable to attain the 400 mg/l limit.

B. Demonstration by the applicant must include information on the following factors relating to the potential discharge:

1. Description of the municipal entity and facilities.

2. Description of the quantity and salinity of intake water sources.

3. Description of significant salt sources of the municipal wastewater collection system, and identification of entities responsible for each source, if available.

4. Description of water rights, including diversions and consumptive use quantities.

5. Description of the wastewater discharge, covering location, receiving waters, quantity salt load, and salinity.

6. Alternative plans for minimizing salt contribution from the municipal discharge. Alternative plans should include:

   (a) Description of system salt sources and alternative means of control.

   (b) Cost of alternative plans in dollars per ton, of salt removed from discharge.

7. Such other information pertinent to demonstration of non-practicability as the permitting authority may deem necessary.

C. In determining what permit conditions shall be required, the permit issuing authority shall consider the following criteria including, but not limited to:

   1. The practicability of achieving the 400 mg/l incremental increase.

   2. Where the 400 mg/l incremental increase is not determined to be practicable:

      (a) The impact of the proposed salt input of each alternative on the lower main stem in terms of tons per year and concentration.

      (b) Costs per ton of salt removed from discharge of each alternative plan.

      (c) Capability of minimizing the salt discharge.

D. If, in the opinion of the permitting authority, the data base for the municipal waste discharger is inadequate, the permit will contain the requirement that the municipal waste discharger monitor the water supply and the wastewater discharge for salinity. Such monitoring program shall be completed within 2 years and the discharger shall then present the information as specified above.

E. All new and reissued NPDES permits for all municipalities shall require monitoring of the salinity of the intake water supply and the wastewater treatment plant effluent in accordance with the following guidelines:

Treatment Plant Design Capacity	Monitoring Frequency	Type of Sample
<1.0 MGD	Quarterly	Discrete
1.0 - 5.0 MGD	Monthly	Composite
>5.0 - 50.0 MGD	Weekly	Composite
50.0 MGD	Daily	Composite

1. Analysis for salinity may be either as total dissolved solids (TDS) or by electrical conductivity where a satisfactory correlation with TDS has been established. The correlation should be based on a minimum of five different samples.

2. Monitoring of the intake water supply may be at a reduced frequency where the salinity of the water supply is relatively uniform.

APPENDIX A

GUIDANCE ON NEW CONSTRUCTION DETERMINATION

For purposes of determining a new construction, a source should be considered new if by October 18, 1975, there has not been:

(1) Significaht site preparation work such as major clearing or excavation; and/or

(2) Placement, assembly, or installation of unique facilities or equipment at the premises where such facilities or equipment will be used; and/or

(3) Any contractual obligation to purchase unique facilities or equipment. Facilities and equipment shall include only the major items listed below, provided that the value of such items represents a substantial commitment to construct the facility:

(a) structures; or
(b) structural materials; or
(c) machinery; or
(d) process equipment; or
(e) construction equipment.

(4) Contractual obligation with a firm to design, engineer, and erect a completed facility (i.e., a turnkey plant).

Policy for Use of Brackish and/or Saline Waters for Industrial Purposes

by

The Colorado River Basin Salinity Control Forum
September 11, 1980

The States of the Colorado River Basin, the federal Executive Department, and the Congress have all adopted as a policy that the salinity in the lower mainstream of the Colorado River shall be maintained at or below the flow-weighted average values found during 1972 while the Basin states continue to develop their compact-apportioned waters. In order to achieve this policy, all steps which are practical and within the framework of the administration of states' water rights must be taken to reduce the salt load of the river. One such step was the adoption in 1975 by the Forum of a policy regarding effluent limitations for industrial discharges with the objective of no-salt return wherever practicable. Another step was the Forum's adoption in 1977 of the "Policy for Implementation of Colorado River Salinity Standards through NPDES Permit Program." These policies are part of the basinwide plan of implementation for salinity control which has been adopted by the seven Basin states.

The Forum finds that the objective of maintaining 1972 salinity levels would be served by the exercise of all feasible measures including wherever practicable, the use of brackish and/or saline waters for industrial purposes.

The summary and on page 32 of the Forum's 1975 Revision of the Water Quality Standards for Salinity states: "The plan also contemplates the use of saline water for industrial purposes whenever practicable,..." In order to implement this concept and thereby further extend the Forum's basic salinity policies, the Colorado River Basin states support the Water and Power Resources Service appraisal study of saline water collection, pretreatment and potential industrial use.

The Colorado River Basin contains large energy resources, which are in the early stages of development. The WPRS study should investigate the technical and financial feasibility of serving as significant portion of

the water requirements of the energy industry and any other industries by the use of Basin brackish and/or saline waters. The Forum recommends that:

1) The Colorado River Basin states, working with federal agencies, identify, locate and quantify such brackish and/or saline water sources.

2) Information on the availability of these waters be made available to all potential users.

3) Each state encourage and promote the use of such brackish and/or saline waters, except where it would not be environmentally sound or economically feasible or would significantly increase consumptive use of Colorado River System water in the State above that which would otherwise occur.

4) The U.S. Water and Power Resources Service with the assistance of the States encourage and promote the use of brackish return flows from federal irrigation projects in lieu of fresh water sources except where it would not be environmentally sound or economically feasible or would significantly increase consumptive use of Colorado River System water.

5) The U.S. Water and Power Resources Service consider a federal contribution to the cost of industrial use of brackish and/or saline water where cost effective as a joint private-government salinity control measure. Such activities shall not delay the implementation of the salinity control projects identified in Title II of P.L. 93-320.

INTERCEPTED GROUNDWATER* POLICY FOR IMPLEMENTATION OF THE COLORADO RIVER SALINITY STANDARDS THROUGH THE NPDES PERMIT PROGRAM

by

The Colorado River Basin Salinity Control Forum

The States of the Colorado River Basin in 1977 agreed to the "Policy for Implementation of Colorado River Salinity Standards through the NPDES Permit Program" with the objective for industrial discharge being "no-salt return" whenever practicable. That policy required the submittal of information by the applicant on alternatives, water rights, quantity, quality and costs to eliminate or minimize the salt discharge. The information is for use by the NPDES permit issuing agency in evaluating the practicability of achieving no-salt discharge.

There are mines and wells in the Basin which discharge intercepted groundwaters. The factors involved in those situations differ somewhat from those encountered in other industrial dischargees. Continued development will undoubtedly result in additional instances in which permit conditions must deal with intercepted groundwater.

The discharge of intercepted groundwater needs to be evaluated in a manner consistent with the overall objective of "no salt return" whenever practical. The following provides more detailed guidance for those situations where groundwaters are intercepted with resultant changes in groundwater flow regime.

1. The "no-salt" discharge requirement may be waived at the option of the permitting authority in those cases where the discharged salt load reaching the main stem of the Colorado River is less than one ton per day or 350 tons per year whichever is less. Evaluation will be made on a case-by-case basis.

*The term intercepted groundwater means all ground water encountered during mining or other industrial operations.

II. Consideration should be given to the possibility that the groundwater, if not intercepted, normally would reach the Colorado River System in a reasonable time frame. An industry desiring such consideration must provide detailed information including a description of the topography, geology and hydrology. Such information must include direction and rate of groundwater flow, chemical quality and quantity of groundwater, and the location, quality and quantity of surface streams and springs that might be affected. If the information adequately demonstrates that the groundwater to be intercepted normally would reach the river system in a reasonable time frame and would contain approximately the same or greater salt load than if intercepted, and if no significant localized problems would be created, then the permitting agency may waive the "no-salt" discharge requirement.

III. In those situations where the discharge does not meet the criteria in I or II above, the applicant will be required to submit the following information for consideration:

A. Description of the topography, geology and hyorology. Such information must include the location of the development, direction and rate of groundwater flow, chemical quality and quantity of groundwater, and relevant data on surface streams and springs that are or might be affected. This information should be provided for the conditions with and without the project.

B. Alternative plans that could substantially reduce or eliminate salt discharge. Alternative plans must include:

1. Description of water rights, including beneficial uses, diversions and consumptive use quantities.

2. Description of alternative water supplies, including provisions for water reuse, if any.

3. Description ofquantity and quality of proposed discharge.

4. Description of how salts removed from discharges shall be disposed of to prevent their entering surface waters or groundwater aquifers.

5. Technical feasibility of the alternatives.

6. Total construction, operation and maintenance costs and costs in dollars per ton of salt removed from the discharge.

7. Closure plans to ensure termination of any proposed discharge at the end of the economic life of the project.

8. A statement as to the one alternative plan for reduction of salt discharge that the applicant recommends be adopted including an evaluation of the technical, economic and legal practicability of achieving no discharge of salt.

9. Such information as the permitting authority may deem necessary.

IV. In determining whether a "no salt" discharge is practicable, the permit issuing authority shall consider, but not be limited to, the water rights and the technical, economic and legal practicability of achieving no discharge of salt.

V. Where "no-salt" discharge is determined not to be practicable the permitting authority shall, in determining permit conditions, consider:

A. The impact of the total proposed salt discharge of each alternative on the lower mainstem in terms of both tons per year and concentration.

B. Costs per ton of salt removed from the discharge for each plan alternative.

C. The compatibility of state water laws with each alternative.

D. Capability of minimizing salinity discharge.

E. The localized impact of the discharge.

F. Minimization of salt discharges and the preservation of fresh water by using intercepted groundwater for industrial processes, dust control, etc. whenever it is economically feasible and environmentally sound.

APPENDIX B

COLORADO RIVER BASIN SALINITY CONTROL ACT

(AS AMENDED IN 1984)

CHAPTER 32A—COLORADO RIVER BASIN SALINITY CONTROL

SUBCHAPTER I—PROGRAMS DOWNSTREAM FROM IMPERIAL DAM

SUBCHAPTER II—MEASURES UPSTREAM FROM IMPERIAL DAM

SUBCHAPTER I—PROGRAMS DOWNSTREAM FROM IMPERIAL DAM

§ 1571. Water quality improvement

(a) Authority to proceed with program

The Secretary of the Interior, hereinafter referred to as the "Secretary", is authorized and directed to proceed with a program of works of improvement for the enhancement and protection of the quality of water available in the Colorado River for use in the United States and the Republic of Mexico, and to enable the United States to comply with its obligations under the agreement with Mexico of August 30, 1973 (Minute No. 242 of the International Boundary and Water Commission, United States and Mexico), concluded pursuant to the Treaty of February 3, 1944 (TS 994), in accordance with the provisions of this chapter.

(b) Desalting complexes and plants

(1) The Secretary is authorized to construct, operate, and maintain a desalting complex, including (1) a desalting plant to reduce the salinity of drain water from the Wellton-Mohawk division of the Gila project, Arizona (hereinafter referred to as the division), including a pretreatment plant for settling, softening, and filtration of the drain water to be desalted, (2) the necessary appurtenant works including the intake pumping plant system, product waterline, power transmission facilities, and permanent operating facilities, (3) the necessary extension in the United States and Mexico of the existing bypass drain to carry the reject stream from the desalting plant and other drainage waters to the Santa Clara Slough in Mexico, with the part in Mexico subject to arrangements made pursuant to subsection (d) of this section, (4) replacement of the metal flume in the existing main outlet drain extension with a concrete siphon, (5) reduction of the quantity of irrigation return flows through acquisition of lands to reduce the size of the division, and irrigation efficiency improvements to minimize return flows, (6) acquire on behalf of the United States such lands or interest in lands in the Painted Rock Reservoir as may be necessary to operate the project in accordance with the obligations of Minute No. 242, and (7) all associated facilities including roads, railroad spur, and transmission lines.

(2)(A) The desalting plant shall be designed to treat approximately one hundred and twenty-nine million gallons a day of drain water using advanced technology commercially available. The plant shall effect recovery initially of not less than 70 per centum of the drain water as product water, and shall effect reduction of not less than 90 per centum of the dissolved solids in the feed water. The Secretary shall use sources of electric power supply for the desalting complex that will not diminish the supply of power to preference customers from Federal power systems operated by the Secretary.

(B) The Secretary is authorized to use electrical power and energy available from the Navajo Generating Station which is in excess of the Central Arizona Project pumping requirements for the purpose of supplying power and energy requirements of the desalting plant and protective pumping well field constructed pursuant to this subchapter: *Provided*, That revenues credited to the Lower Colorado River Basin Development Fund shall not be diminished below those amounts which would have accrued had the power been marketed at the rate determined by the Secretary of Energy for the sale of power from the Navajo Generating Station to utilities and public entities, as a result of the use of power and energy for the desalting, protective pumping works, and other uses authorized by law, and that power and energy from the Navajo Generating Station shall be used first to meet the pumping requirements of the Central Arizona Project and after those needs have been met, for the desalting and protective pumping facilities constructed pursuant to this subchapter, and finally for other uses: *Provided further*, That prior to obtaining power from the Navajo Generating Station under the authority of this subsection, the Secretary shall complete an analysis of alternative sources of supply, including but not limited to the possibility of developing an agreement with the Republic of

Mexico whereby the United States (or a non-Federal entity) would enter into contractual arrangements with Mexico for a sufficient supply of power to operate the desalting plant, the regulatory pumping fields and appurtenant facilities.

(C) Effective October 1, 1979, and to such extent and in such amounts as are provided in advance in appropriation Acts, the Secretary of the Interior is authorized to purchase supplemental power and energy as required for the purposes of supplying the power and energy requirements of the desalting plant and protective pumping well field.

(c) Replacement water studies

Replacement of the reject stream from the desalting plant, Colorado River waters used for the mitigation of fish and wildlife habitat losses and of any Wellton-Mohawk drainage water bypassed to the Santa Clara Slough to accomplish essential operation except at such times when there exists surplus water of the Colorado River under the terms of the Mexican Water Treaty of 1944, is recognized as a national obligation as provided in section 1512 of this title. Studies to identify feasible measures to provide adequate replacement water shall be completed not later than June 30, 1980. Said studies shall be limited to potential sources within the States of Arizona, California, Colorado, New Mexico, and those portions of Nevada, Utah, and Wyoming which are within the natural drainage basin of the Colorado River. Measures found necessary to replace the reject stream from the desalting plant, Colorado River waters used for the mitigation of fish and wildlife habitat losses and any Wellton-Mohawk drainage bypassed to the Santa Clara Slough to accomplish essential operations may be undertaken independently of the national obligation set forth in section 1512 of this title.

(d) Advancement of funds for that portion of bypass drain within Mexico

The Secretary is hereby authorized to advance funds to the United States section, International Boundary and Water Commission (IBWC), for construction, operation, and maintenance by Mexico pursuant to Minute No. 242 of that portion of the bypass drain within Mexico. Such funds shall be transferred to an appropriate Mexican agency, under arrangements to be concluded by the IBWC providing for the construction, operation, and maintenance of such facility by Mexico.

(e) Desalted water exchange

Any desalted water not needed for the purposes of this subchapter may be exchanged at prices and under terms and conditions satisfactory to the Secretary and the proceeds therefrom shall be deposited in the General Fund of the Treasury. The city of Yuma, Arizona, shall have first right of refusal to any such water.

(f) Return flow reduction

For the purpose of reducing the return flows from the division to one hundred and seventy-five thousand acre-feet or less, annually, the Secretary is authorized to:

(1) Accelerate the cooperative program of Irrigation Management Services with the Wellton-Mohawk Irrigation and Drainage District, hereinafter referred to as the district, for the purpose of improving irrigation efficiency. The district shall bear its share of the cost of such program as determined by the Secretary.

(2) Acquire, by purchase or through eminent domain or exchange, to the extent determined by him to be appropriate, lands or interests in lands to reduce the existing seventy-five thousand developed and undeveloped irrigable acres authorized by the Act of July 30, 1947 (61 Stat. 628), known as the Gila Reauthorization Act [43 U.S.C.A. § 613 et seq.]. The initial reduction in irrigable acreage shall be limited to approximately ten thousand acres. If the Secretary determines that the irrigable acreage of the division must be reduced below sixty-five thousand acres of irrigable lands to carry out the purpose of this section, the Secretary is authorized, with the consent of the district, to acquire additional lands, as may be deemed by him to be appropriate.

(g) Disposal of acquired lands

The Secretary is authorized to dispose of the acquired lands and interests therein on terms and conditions satisfactory to him and meeting the objective of this chapter.

(h) Assistance to water users for installation of system improvements

The Secretary is authorized, either in conjunction with or in lieu of land acquisition, to assist water users in the division in installing system improvements, such as ditch lining, change of field layouts, automatic equipment, sprinkler systems and bubbler systems, as a means of increasing irrigation efficiencies: *Provided, however*, That all costs associated with the improvements authorized herein and allocated to the water users on the basis of benefits received, as determined by the Secretary, shall be reimbursed to the United States in amounts and on terms and conditions satisfactory to the Secretary.

(i) Contract amendment

The Secretary is authorized to amend the contract between the United States and the district dated March 4, 1952, as amended, to provide that—

(1) the portion of the existing repayment obligation owing to the United States allocable to irrigable acreage eliminated from the division for the purposes of this subchapter, as determined by the Secretary, shall be nonreimbursable; and

(2) if deemed appropriate by the Secretary, the district shall be given credit against its outstanding repayment obligation to offset any increase in operation and maintenance assessments per acre which may result from the district's decreased operation and maintenance base, all as determined by the Secretary.

(j) Acquisition of land for storage

The Secretary is authorized to acquire through the Corps of Engineers fee title to, or other necessary interests in, additional lands above the Painted Rock Dam in Arizona that are required for the temporary storage capacity needed to permit operation of the dam and reservoir in times of serious flooding in accordance with the obligations of the United States under Minute No. 242. No funds shall be expended for acquisition of land or interests therein until it is finally determined by a Federal court of competent jurisdiction that the Corps of Engineers presently lacks legal authority to use said lands for this purpose. Nothing contained in this subchapter nor any action taken pursuant to it shall be deemed to be a recognition or admission of any obligation to the owners of such land on the part of the United States or a limitation or deficiency in the rights or powers of the United States with respect to such lands or the operation of the reservoir.

(k) Transfer of funds

To the extent desirable to carry out subsections (f)(1) and (h) of this section, the Secretary may transfer funds to the Secretary of Agriculture as may be required for technical assistance to farmers, conduct of research and demonstrations, and such related investigations as are required to achieve higher on-farm irrigation efficiencies.

(l) Nonreimbursable costs

All cost associated with the desalting complex shall be nonreimbursable except as provided in subsections (f) and (h) of this section.

(Pub.L. 93-320, Title I, § 101, June 24, 1974, 88 Stat. 266, amended Pub.L. 96-336, §§ 1, 2, Sept. 4, 1980, 94 Stat. 1063.)

References in Text. This "chapter", referred to in text, was in the original this "Act", meaning Pub.L. 93-320, which, in addition to enacting this chapter, amended sections 620d(d) and 1543(g) of this title.

The Gila Reauthorization Act, referred to in subsec. (f)(2), is Act July 30, 1947, c. 382, 61 Stat. 628, which is classified to section 613 et seq. of this title.

1980 Amendment. Subsec. (b)(2). Pub.L. 96-336, § 1, designated existing provisions as subpar. (A), deleted at end thereof requirement that all costs associated with the desalting plant be nonreimbursable, and added subpars. (B) and (C).

Subsec. (c). Pub.L. 96-336, § 2, included replacement water studies covering reject stream from the Colorado River waters used for the mitigation of fish and wildlife habitat losses.

Short Title. Section 1 of Pub.L. 93-320 provided: "That this Act [enacting this chapter and amending sections 620d(d) and 1543(g) of this title] may be cited as the 'Colorado River Basin Salinity Control Act'."

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See also Pub.L. 96-336, 1980 U.S.Code Cong. and Adm.News, p. 2830.

Code of Federal Regulations

Wellton-Mohawk irrigation improvement program, see 7 CFR 663.1 et seq.

§ 1572. Canal or canal lining

(a) Authorization of construction

To assist in meeting salinity control objectives of Minute No. 242 during an interim period, the Secretary is authorized to construct a new concrete-lined canal or, to line the presently unlined portion of the Coachella Canal of the Boulder Canyon project, California, from station 2 plus 26 to the beginning of siphon numbered 7, a length of approximately forty-nine miles. The United States shall be entitled to temporary use of a quantity of water, for the purpose of meeting the salinity control objectives of Minute No. 242, during an interim period, equal to the quantity of water conserved by constructing or lining the said canal. The interim period shall commence on completion of construction or lining said canal and shall end the first year that the Secretary delivers main stream Colorado River water to California in an amount less than the sum of the quantities requested by (1) the California agencies under contracts made pursuant to section 617d of this title, and (2) Federal establishments to meet their water rights acquired in California in accordance with the Supreme Court decree in Arizona against California (376 U.S. 340).

(b) Repayment

The charges for total construction shall be repayable without interest in equal annual installments over a period of forty years beginning in the year following completion of construction: *Provided*, That, repayment shall be prorated between the United States and the Coachella Valley County Water District, and the Secretary is authorized to enter into a repayment contract with Coachella Valley County Water District for that purpose. Such contract shall provide that annual repayment installments shall be nonreimbursable during the interim period, defined in subsection (a) of this section and shall provide that after the interim period, said annual repayment installments or portions thereof, shall be paid by Coachella Valley County Water District.

(c) Acquisition of private lands

The Secretary is authorized to acquire by purchase, eminent domain, or exchange private lands or interests therein, as may be determined by him to be appropriate, within the Imperial Irrigation District on the Imperial East Mesa which receive, or which have been granted rights to receive, water from Imperial Irrigation District's capacity in the Coachella Canal. Costs of such acquisitions shall be nonreimbursable and the Secretary shall return such lands to the public domain. The United States shall not acquire any water rights by reason of this land acquisition.

(d) Credit to Imperial Irrigation District against final payments for relinquished capacity in Coachella Canal

The Secretary is authorized to credit Imperial Irrigation District against its final payments for certain outstanding construction charges payable to the United States on account of capacity to be relinquished in the Coachella Canal as a result of the canal lining program, all as determined by the Secretary: *Provided*, That, relinquishment of capacity shall not affect the established basis for allocating operation and maintenance costs of the main All-American Canal to existing contractors.

(e) Transfer of lands to Cocopah Tribe of Indians

The Secretary is authorized and directed to cede the following land to the Cocopah Tribe of Indians, subject to rights-of-way for existing levees, to be held in trust by the United States for the Cocopah Tribe of Indians:

Township 9 south, range 25 west of the Gila and Salt River meridian, Arizona;

Section 25: Lots 18, 19, 20, 21, 22, and 23;

Section 26: Lots 1, 12, 13, 14, and 15;

Section 27: Lot 3; and all accretion to the above described lands.

The Secretary is authorized and directed to construct three bridges, one of which shall be capable of accommodating heavy vehicular traffic, over the portion of the bypass drain which crosses the reservation of the Cocopah Tribe of Indians. The

transfer of lands to the Cocopah Indian Reservation and the construction of bridges across the bypass drain shall constitute full and complete payment to said tribe for the rights-of-way required for construction of the bypass drain and electrical transmission lines for works authorized by this subchapter.

(Pub.L. 93-320, Title I, § 102, June 24, 1974, 88 Stat. 268.)

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327

West's Federal Forms

Eminent domain proceedings, see § 5711 et seq.

§ 1573. Construction and maintenance of well fields; land acquisition; land replacement; nonreimbursable costs

(a) The Secretary is authorized to:

(1) Construct, operate, and maintain, consistent with Minute No. 242, well fields capable of furnishing approximately one hundred and sixty thousand acre-feet of water per year for use in the United States and for delivery to Mexico in satisfaction of the 1944 Mexican Water Treaty.

(2) Acquire by purchase, eminent domain, or exchange, to the extent determined by him to be appropriate, approximately twenty-three thousand five hundred acres of lands or interests therein within approximately five miles of the Mexican border on the Yuma Mesa: *Provided, however*, That any such lands which are presently owned by the State of Arizona may be acquired or exchanged for Federal lands.

(3) Any lands removed from the jurisdiction of the Yuma Mesa Irrigation and Drainage District pursuant to clause (2) of this subsection which were available for use under the Gila Reauthorization Act (61 Stat. 628) [43 U.S.C.A. § 613 et seq.], shall be replaced with like lands within or adjacent to the Yuma Mesa division of the project. In the development of these substituted lands or any other lands within the Gila project, the Secretary may provide for full utilization of the Gila Gravity Main Canal in addition to contracted capacities.

(4) Effective October 1, 1979, and to such extent and in such amounts as are provided in advance in appropriation Acts, enter into contracts under the terms and conditions of the Act of June 17, 1902 (43 U.S.C. 371 et seq.) as amended and supplemented for the delivery of water from said well field to entities within the United States for municipal and industrial or irrigation purposes: *Provided*, That such contracts for municipal and industrial purposes shall contain terms and conditions as substantially provided in section 485h(c)(1) of this title, and that contracts for replacement irrigation water supplies to prevent damage to existing water users on privately developed lands include water charges no greater than if such water users had continued to pump their own wells without the United States lowering the water table and that the acreage limitation and related provisions of the Reclamation Law [43 U.S.C.A. § 371 et seq.] will not be applicable to such privately developed lands: *Provided further*, That no contract shall be entered which will impair the ability of the United States to continue to deliver to Mexico on the land boundary at San Luis and in the Limitrophe Section of the Colorado River downstream from Morelos Dam approximately one hundred and forty thousand acre-feet annually, consistent with the terms contained in Minute No. 242 of the IBWC.

(b) The cost of work provided for in this section, including delivery of water to Mexico, shall be nonreimbursable, except to the extent that the waters furnished are used in the United States.

(Pub.L. 93-320, Title I, § 103, June 24, 1974, 88 Stat. 269, amended Pub.L. 96-336, § 3, Sept. 4, 1980, 94 Stat. 1065.)

References in Text. The Gila Reauthorization Act, referred to in subsec. (a)(3), is Act July 30, 1947, c. 382, 61 Stat. 628, which is classified to section 613 et seq. of this title.

Act June 17, 1902 as amended and supplemented, also known as the Reclamation Law, both referred to in subsec. (a)(4), is Act June 17, 1902, c. 1093, 32 Stat. 388, popularly known as the Reclamation Act, classified generally to chapter 12 (§ 371 et seq.) of this title. For complete classification of Act June 17, 1902, to the Code, see Short Title note set out under section 371 of this title and Tables volume.

1980 Amendment. Subsec. (a)(4): Pub.L. 96-336 added cl. (4).

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code

Cong. and Adm. News, p. 3327. See, also, Pub.L. 96-336, 1980 U.S.Code Cong. and Adm. News, p. 2600.

§ 1574. Modification of projects

The Secretary is authorized to provide for modifications of the projects authorized by this subchapter to the extent he determines appropriate for purposes of meeting the international settlement objective of this subchapter at the lowest overall cost to the United States. No funds for any such modification shall be expended until the expiration of sixty days after the proposed modification has been submitted to the appropriate committees of the Congress, unless the Congress approves an earlier date by concurrent resolution. The Secretary shall notify the Governors of the Colorado River Basin States of such modifications.

(Pub.L. 93-320, Title I, § 104, June 24, 1974, 88 Stat. 270.)

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm. News, p. 3327.

§ 1575. Contract authority

The Secretary is hereby authorized to enter into contracts that he deems necessary to carry out the provisions of this subchapter in advance of the appropriation of funds therefor.

(Pub.L. 93-320, Title I, § 105, June 24, 1974, 88 Stat. 270.)

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm. News, p. 3327.

§ 1575a. Administration and disposition of lands and constructed facilities; revenues credited to general fund of the Treasury

The Secretary is hereby authorized to administer and dispose of lands and interests in lands acquired, and facilities constructed under this subchapter, and revenues received in connection with this authority shall be credited to the general fund of the Treasury.

(Pub.L. 93-320, Title I, § 106, as added Pub.L. 96-336, § 4, Sept. 4, 1980, 94 Stat. 1064.)

Legislative History. For legislative history and purpose of Pub.L. 96-336, see 1980 U.S.Code Cong. and Adm. News, p. 2600.

§ 1576. Interagency cooperation

In carrying out the provisions of this subchapter, the Secretary shall consult and cooperate with the Secretary of State, the Administrator of the Environmental Protection Agency, the Secretary of Agriculture, and other affected Federal, State, and local agencies.

(Pub.L. 93-320, Title I, § 107, formerly § 106, June 24, 1974, 88 Stat. 270, renumbered Pub.L. 96-336, § 4, Sept. 4, 1980, 94 Stat. 1064.)

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm. News, p. 3327.

§ 1577. Existing Federal laws not modified

Nothing in this chapter shall be deemed to modify the National Environmental Policy Act of 1969 [42 U.S.C.A. § 4321 et seq.], the Federal Water Pollution Control Act, as amended [33 U.S.C.A. § 1251 et seq.], or, except as expressly stated herein, the provisions of any other Federal law.

(Pub.L. 93-320, Title I, § 108, formerly § 107, June 24, 1974, 88 Stat. 270, renumbered Pub.L. 96-336, § 4, Sept. 4, 1980, 94 Stat. 1064.)

References in Text. This "chapter", referred to in text, was in the original this "Act", meaning Pub.L. 93-320, which in addition to enacting this chapter, amended sections 620d(d) and 1543(g) of this title.

The National Environmental Policy Act of 1969, referred to in text, is Pub.L. 91-190, Jan. 1, 1970, 83 Stat. 852, which is classified to section 4321 et seq. of Title 42, The Public Health and Welfare.

The Federal Water Pollution Control Act, as amended, referred to in text, is Act June 30, 1948, c. 758, as added Pub.L. 92-500, Oct. 18, 1972, 86 Stat. 816, which is classified to section 1251 et seq. of Title 33, Navigation and Navigable Waters.

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327.

§ 1578. Authorization of appropriations

There is hereby authorized to be appropriated the sum of $356,400,000 for the construction of the works and accomplishment of the purposes authorized in sections 1571, 1572, 1573, and 1579 of this title, of which $3,579,000 is authorized for mitigation of fish and wildlife losses associated with replacement of the Coachella Canal in California, and $6,960,000 is authorized for mitigation of fish and wildlife losses associated with the Desalting Complex Unit and the Protective and Regulatory Pumping Unit in Arizona, based on January 1979, prices plus or minus such amounts as may be justified by reason of ordinary fluctuation in construction costs involved therein, and such sums as may be required to operate and maintain such works and to provide for such modifications as may be made pursuant to section 1574 of this title. In order to provide for the utilization of significant improvements in desalinization technologies which may have been developed since the Bureau's evaluation, the Secretary is directed to evaluate such cost effective improvements and implement such improved designs into the plant operations when the evaluation indicates that cost savings will result: *Provided, however*, That no more than five percent of the amount authorized to be appropriated is used for these purposes. There is further authorized to be appropriated such sums as may be necessary to pay condemnation awards in excess of appraised values and to cover costs required in connection with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 [42 U.S.C.A. § 4601 et seq.].

(Pub.L. 93-320, Title I, § 109, formerly § 108, June 24, 1974, 88 Stat. 270, renumbered and amended Pub.L. 96-336, §§ 4, 5, Sept. 4, 1980, 94 Stat. 1064.)

References in Text. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, referred to in text, is Pub.L. 91-646, Jan. 2, 1971, 84 Stat. 1894, which is classified to section 4601 et seq. of Title 42, The Public Health and Welfare.

1980 Amendment. Pub.L. 96-336, § 5, substituted appropriations authorization of $356,400,000 to carry out sections 1571, 1572, 1573, and 1579 of this title for prior authorizations of $121,500,000 and $34,000,000 for purposes of sections 1571 and 1572, and 1573 of this title, and use of January 1979 for April 1973 price basis, authorized sums of $3,579,000 and $6,960,000 for mitigation of fish and wildlife losses in California and Arizona, and provided for cost savings desalinization plan; operations limited to five percent of appropriations authorization.

Effective Date of 1980 Amendment. Section 5 of Pub.L. 96-336 provided in part that: amendment by Pub.L. 96-336 is effective Oct. 1, 1979.

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 96-336, 1980 U.S.Code Cong. and Adm.News, p. 2600.

§ 1579. Fish and wildlife habitat; mitigation of losses

Effective October 1, 1979, and to such extent and in such amounts as are provided in advance in appropriate[1] Acts, in order to provide measures determined by the Secretary of the Interior to be appropriate to mitigate loss of fish and wildlife habitat associated with other measures taken under this subchapter:

(a) Appropriation of funds; acquisition and disposal of lands; facilities undertakings; funds restriction for non-Federal facilities

The Secretary is authorized to—

(1) acquire lands by purchase, eminent domain, or exchange;

(2) dispose of land, facilities, and equipment;

(3) construct, operate, maintain, and make replacements of facilities:

Provided, however, That no funds will be provided for operation, maintenance, or replacement of non-Federal facilities.

(b) Nonreimbursable costs

All costs authorized by this section are nonreimbursable.

(Pub.L. 95-320, Title I, § 110, as added Pub.L. 96-336, § 6, Sept. 4, 1980, 94 Stat. 1064.)

1 So in original. Probably should be "appropriations".

Legislative History. For legislative history and purpose of Pub.L. 96-336, see 1980 U.S.Code Cong. and Adm. News, p. 2600.

§ 1580. Definitions

As used in this subchapter:

(a) Navajo Generating Station means—

(1) the United States entitlement to a portion of the output of power and energy from the Navajo Generating Station, Page, Arizona, pursuant to United States participation in that generating station;

(2) in the event that said United States entitlement is integrated with other generating facilities, then Navajo Generating Station means that amount of power and energy from the integrated system which is attributable to the United States Navajo entitlement;

(3) when the Navajo Generating Station is replaced at the end of its useful life or an alternative resource is established, then Navajo Generating Station means an amount of power and energy equivalent to the present United States entitlement from Navajo, from the replacement resource.

(b) All terms used herein that are defined in the Colorado River Compact shall have the meanings therein defined.

(Pub.L. 95-320, Title I, § 111, as added Pub.L. 96-336, § 7, Sept. 4, 1980, 94 Stat. 1065.)

Legislative History. For legislative history and purpose of Pub.L. 96-336, see 1980 U.S.Code Cong. and Adm. News, p. 2600.

SUBCHAPTER II—MEASURES UPSTREAM FROM IMPERIAL DAM

§ 1591. Salinity control policy

(a) Implementation by the Secretary of the Interior

The Secretary of the Interior shall implement the salinity control policy adopted for the Colorado River in the "Conclusions and Recommendations" published in the Proceedings of the Reconvened Seventh Session of the Conference in the Matter of Pollution of the Interstate Waters of the Colorado River and its Tributaries in the States of California, Colorado, Utah, Arizona, Nevada, New Mexico, and Wyoming, held in Denver, Colorado, on April 26-27, 1972, under the authority of section 1160 of Title 33, and approved by the Administrator of the Environmental Protection Agency on June 9, 1972.

(b) Expeditious investigation, planning, and implementation of salinity control program

The Secretary is hereby directed to expedite the investigation, planning and implementation of the salinity control program generally as described in chapter VI of the Secretary's report entitled, "Colorado River Water Quality Improvement Program, February 1972". In determining the relative priority of implementing additional units or new self-contained portions of units authorized by section 1592 of this title, the Secretary or the Secretary of Agriculture, as the case may be, shall give preference to those additional units or new self-contained portions of units which reduce salinity of the Colorado River at the least cost per unit of salinity reduction.

(c) Cooperation with other federal agencies

In conformity with subsection (a) of this section and the authority of the Environmental Protection Agency under Federal laws, the Secretary, the Administrator of the Environmental Protection Agency, and the Secretary of Agriculture are directed

to cooperate and coordinate their activities effectively to carry out the objective of this subchapter.

(Pub L. 93-320, Title II, § 201, June 24, 1974, 88 Stat. 270, amended Pub L. 98-569, § 1, Oct. 30, 1984, 98 Stat. 2983.)

References in Text. Section 1160 of Title 33, referred to in text, has been omitted from the Code in view of the complete revision of the Federal Water Pollution Control Act by Pub L. 92-500, Oct. 18, 1972, 86 Stat. 816. See section 1251 et seq. of Title 33, Navigation and Navigable Waters.

1984 Amendment. Subsec. (b). Pub.L. 98-569 added "In determining the relative priority of implementing additional units or new self-contained portions of units authorized by section 1592 of this title, the Secretary or the Secretary of Agriculture, as the case may be, shall give preference to those additional units or new self-contained portions of units which reduce salinity . . . the Colorado River at the least cost per unit . . . salinity reduction."

Effective Date of 1984 Amendment. Section 6 of Pub.L. 98-569 provided that: "The amendments made by this Act [amending this section and sections 620d, 1543, 1592, 1593, 1595, and 1598 of this title] shall take effect upon enactment of this Act [Oct. 30, 1984]."

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 98-569, 1984 U.S. Code Cong. and Adm. News, p. 4901.

Notes of Decisions

1. **Generally**

Department of the Interior and Bureau of Reclamation did not fail in their duties to develop alternatives to current salinity control programs as required by this section and did not violate section 4332 of Title 42 requiring development and analysis of alternative salinity management measures. Environmental Defense Fund, Inc. v. Costle, 1981, 657 F.2d 275, 211 U.S. App. D.C. 313.

§ 1592. Authorization to construct, operate, and maintain salinity control units

(a) Authority of Secretary

The Secretary is authorized to construct, operate, and maintain the following salinity control units as the initial stage of the Colorado River Basin salinity control program.

(1) The Paradox Valley unit, Montrose County, Colorado, consisting of facilities for collection and disposition of saline ground water of Paradox Valley, including wells, pumps, pipelines, solar evaporation ponds, and all necessary appurtenant and associated works such as roads, fences, dikes, power transmission facilities, and permanent operating facilities, and consisting of measures to replace incidental fish and wildlife values foregone.

(2) The Grand Valley unit, Colorado, consisting of measures and all necessary appurtenant and associated works to reduce the seepage of irrigation water from the irrigated lands of Grand Valley into the ground water and thence into the Colorado River. Measures shall include lining of canals and laterals, replacing canals and laterals with pipe, and the combining of existing canals and laterals into fewer and more efficient facilities implementing other measures to reduce salt contributions from the Grand Valley to the Colorado River, and implementing measures to replace incidental fish and wildlife values foregone. Prior to initiation of construction of the Grand Valley unit, or portion thereof, the Secretary shall enter into contracts through which the non-Federal entities owning, operating and maintaining the water distribution, or portions thereof, systems in Grand Valley, singly or in concert, will assume the obligations, specified in subsection (b)(2) of this section relating to the continued operation and maintenance of the unit's facilities to the end that the maximum reduction of salinity inflow to the Colorado River will be achieved.

(3) The Las Vegas Wash unit, Nevada, consisting of facilities for collection and disposition of saline ground water of Las Vegas Wash, including infiltration galleries, pumps, desalter, pipelines, solar evaporation facilities, and all appurtenant works including but not limited to roads, fences, power transmission facilities, and operating facilities, and consisting of measures to replace incidental fish and wildlife values foregone.

(4) Stage I of the Lower Gunnison Basin unit, Colorado, consisting of measures and all necessary appurtenant and associated works to reduce seepage from canals and laterals in the Uncompahgre Valley, and consisting of measures to replace incidental fish and wildlife values foregone, essentially as described in the feasibility report and final environmental statement dated February 10, 1984. Prior to initia-

tion of construction of stage I of the Lower Gunnison Basin unit, or of a portion of stage I, the Secretary shall enter into contracts through which the non-Federal entities owning, operating, and maintaining the water distribution systems, or portions thereof, in the Uncompahgre Valley, singly or in concert, will assume the obligations specified in subsection (b)(2) of this section relating to the continued operation and maintenance of the unit's facilities.

(5) Portions of the McElmo Creek unit, Colorado, as components of the Dolores participating project, Colorado River Storage project, authorized by Public Law 90–537 and Public Law 84–485, consisting of all measures and all necessary appurtenant and associated works to reduce seepage only from the Towaoc-Highline combined canal, Rocky Ford laterals, Lone Pine lateral, and Upper Hermana lateral, and consisting of measures to replace incidental fish and wildlife values foregone. The Dolores participating project shall have salinity control as a project purpose insofar as these specific facilities are concerned: *Provided*, That the costs of construction and replacement of these specific facilities shall be allocated by the Secretary to salinity control and irrigation only after consultation with the State of Colorado, the Montezuma Valley Irrigation District, Colorado, and the Dolores Water Conservancy District, Colorado: *And provided further*, That such allocation of costs to salinity control will include only the separable and specific costs of these specific facilities and will not include any joint costs of any other facilities of the Dolores participating project. Repayment of costs allocated to salinity control shall be subject to this Act. Repayment of costs allocated to irrigation shall be subject to the Acts which authorized the Dolores participating project, the Reclamation Act of 1902, and Acts amendatory and supplementary thereto. Prior to initiation of construction of these specific facilities, or a portion thereof, the Secretary shall enter into contracts through which the non-Federal entities owning, operating, and maintaining the water distribution systems, or portions thereof, in the Montezuma Valley, singly or in concert, will assume the obligations specified in subsection (b)(2) of this section relating to the continued operation and maintenance of the unit's facilities.

(b) Implementation of authorized units

In implementing the units authorized to be constructed pursuant to subsection (a) of this section, the Secretary shall carry out the following directions:

(1) As reports are completed describing final implementation plans for the unit, or any portion thereof, authorized by paragraph (5) of subsection (a) of this section, and prior to expenditure of funds for related construction activities, the Secretary shall submit such reports to the appropriate committees of the Congress and the governors of the Colorado River Basin States.

(2) Non-Federal entities shall be required by the Secretary to contract for the long-term operation and maintenance of canal and lateral systems constructed pursuant to activities provided for in subsection (a) of this section: *Provided*, That the Secretary shall reimburse such non-Federal entities for the costs of such operation and maintenance to the extent the costs exceed the expenses that would have been incurred by them in the thorough and timely operation and maintenance of their canal and lateral systems absent the construction of a unit, said expenses to be determined by the Secretary after consultation with the involved non-Federal entities. The operation and maintenance for which non-Federal entities shall be responsible shall include such repairing and replacing of a unit's facilities as are associated with normal annual maintenance activities in order to keep such facilities in a condition which will assure maximum reduction of salinity inflow to the Colorado River. These non-Federal entities shall not be responsible, nor incur any costs, for the replacement of a unit's facilities, including measures to replace incidental fish and wildlife values foregone. The term replacement shall be defined for the purposes of this subchapter as a major modification or reconstruction of a completed unit, or portion thereof, which is necessitated, through no fault of the non-Federal entity or entities operating and maintaining a unit, by design or construction inadequacies or by normal limits on the useful life of a facility. The Secretary is authorized to provide continuing technical assistance to non-Federal entities to assure the effective and efficient operation and maintenance of a unit's facilities.

(3) The Secretary may, under authority of this title, and limited to the purposes of this chapter, fund through a grant or contract, for any fiscal year only to such extent or in such amounts as are provided in appropriation Acts, a

non-Federal entity to organize private canal and lateral owners into formal organizations with which the Secretary may enter into a grant or contract to construct, operate, and maintain a unit's facilities.

(4) In implementing the units authorized to be constructed pursuant to paragraphs (1), (2), (3), (4), and (5) of subsection (a) of this section, the Secretary shall comply with procedural and substantive State water laws.

(5) The Secretary may, under authority of this subchapter and limited to the purposes of this chapter, fund through a grant or contract, for any fiscal year only to such extent or in such amounts as are provided in appropriation Acts, a non-Federal entity to operate and maintain measures to replace incidental fish and wildlife values foregone.

(6) In implementing the units authorized to be constructed pursuant to subsection (a) of this section, the Secretary shall implement measures to replace incidental fish and wildlife values foregone concurrently with the implementation of a unit's, or a portion of a unit's, related features.

(c) Voluntary cooperative salinity control program; establishment; improvement of on-farm water management; functions; Secretary; reports; Congressional committees; use of agencies; Commodity Credit Corporation

(1) The Secretary of Agriculture may establish a voluntary cooperative salinity control program with landowners to improve on-farm water management and reduce watershed erosion on non-Federal lands and on lands under the control of the Department of Agriculture for the purpose of assisting in meeting the objectives of this subchapter.

(2) In carrying out such program, the Secretary of Agriculture shall—

(A) identify salt-source areas and determine the salt load resulting from irrigation and watershed management practices;

(B) develop, in consultation with the public and affected governmental interests, plans for implementing measures that will reduce the salt load of the Colorado River by improving on-farm irrigation water management including improvement of related laterals and by improving watershed erosion management practices, such measures to include voluntary replacement of incidental fish and wildlife values foregone;

(C) provide technical and cost-sharing assistance for the voluntary implementation of plans through contracts and agreements with individuals or groups of owners and operators of farms, ranches, and other lands as well as with local governmental and nongovernmental entities such as irrigation districts and canal companies, except that a portion of the costs of implementing such plans shall be shared by the participants on the basis of benefits received and other appropriate factors, as determined by the Secretary of Agriculture, and except that such contracts and agreements shall provide for continuing operation and maintenance of measures installed under this subsection, including measures to replace incidental fish and wildlife values foregone, without additional cost-sharing assistance;

(D) provide continuing technical assistance for irrigation water management as well as monitoring and evaluation of changes in salt contribution to the Colorado River to determine program effectiveness;

(E) carry out related research, demonstration, and education activities; and

(F) in entering into contracts or agreements pursuant to subsection (c)(2)(C) of this title, require a minimum of 30 per centum cost-sharing contribution from individuals or groups of owners and operators of farms, ranches, and other lands as well as from local governmental and nongovernmental entities such as irrigation districts and canal companies, unless the Secretary finds in his discretion that such cost-sharing requirement would result in a failure to proceed with needed on-farm measures.

(3) The measures to be implemented in any particular salt source area shall be described in reports issued by the Secretary of Agriculture. Copies of the reports are to be submitted to—

(A) the committees on Agriculture and Appropriations of the House of Representatives and the committees on Agriculture, Nutrition and Forestry and Appropriations of the Senate;

(B) members of the advisory council established by section 1594(a) of this title; and

(C) the Governor of any State where measures are to be implemented

No funds for implementation of proposed measures undertaken pursuant to this subsection may be expended until the expiration of sixty days after submission of the report of the Secretary of Agriculture.

(4) The Secretary of Agriculture may use existing agencies as well as the services and facilities of the Commodity Credit Corporation to carry out the provisions of this subsection. The Secretary of Agriculture, in addition, may authorize participating agencies to utilize grants or cooperative agreements with conservation districts, local governmental agencies, colleges and universities, or others as appropriate to carry out the activities identified in this subsection. There is hereby authorized to be appropriated annually, to be available until expended, such funds as may be necessary to carry out the provisions of this subsection: *Provided*, That no disbursement shall be made by the Commodity Credit Corporation unless it has received funds to cover the amount thereof from appropriations available for the purpose of carrying out this chapter.

(5) The Secretary of Agriculture shall submit a report to Congress by January 1, 1988, and at each five-year interval thereafter, concerning the operation of the program authorized by this subsection. Such report shall contain an evaluation of the operation of such program and may include recommendations for such additional legislation as may be necessary to solve identified salinity problems in areas designated by the Secretary of Agriculture and may include recommendations to utilize new technology and research related to such problems.

(Pub L. 93–320, Title II, § 202, June 24, 1974, 88 Stat. 271, amended Pub.L. 98–569, § 2, Oct. 30, 1984, 98 Stat. 2933.)

[1] So in original. Directory language of section 2(b)(2) of Pub.L. 98–569 resulted in two periods after "efficient facilities".

References in Text. Public Law 90–537, referred to in subsec. (a)(5), is Pub.L. 90–537, Sept. 30, 1968, 82 Stat. 885, which is classified principally to chapter 32 (section 1501 et seq.) of this title. For complete classification of this Act to the Code, see Short Title set out under section 1501 of this title and Tables.

The Reclamation Act of 1902, referred to in subsec. (a)(5), is Act June 17, 1902, 32 Stat. 388, as amended and supplemented, which is classified generally to this title. For complete classification of this Act to the Code, see Tables.

Public Law 84–485, referred to in subsec. (a)(5), is Pub.L. 84–485, Mar. 11, 1956, 70 Stat. 102, which is classified to chapter 12B (section 620 et seq.) of this title. For complete classification of this Act to the Code, see Tables.

1984 Amendment. Subsec. (a). Pub.L. 98–569, § 2(a) designated existing provisions as subsec. (a).

Subsec. (a)(1). Pub.L. 98–569, § 2(b)(1) added ", and consisting of measures to replace incidental fish and wildlife values foregone" at the end thereof.

Subsec. (a)(2). Pub.L. 98–569, § 2(b)(2) added "replacing canals and laterals with pipe," after "canals and laterals" and added "implementing other measures to reduce salt contributions from the Grand Valley to the Colorado River, and implementing measures to replace incidental fish and wildlife values foregone" after "efficient facilities" in the second sentence.

Pub.L. 98–569, § 2(b)(3) added ", or portions thereof," after "Grand Valley unit", substituted "non-Federal entities" for "agencies" before "owning, operating" added "or portions thereof," after "water distribution systems" and substituted "the obligations specified in subsection (b)(2) of this section" for "all obligations" after "related to the continued operation" in the third sentence.

Pub.L. 98–569, § 2(b)(4) struck out "The Secretary is also authorized to provide, as an element of the Grand Valley unit, for a technical staff to provide information and assistance to water users on means and measures for limiting excess water applications to irrigated lands: *Provided*, That such assistance shall not exceed a period of five years after funds first become available under this subchapter. The Secretary will enter into agreements with the Secretary of Agriculture to develop a unified control plan for the Grand Valley unit. The Secretary of Agriculture is directed to cooperate in the planning and construction of on-farm system measures under programs available to that Department."

Subsec. (a)(3). Pub.L. 98–569, § 2(b)(5) redesignated par. (4) as par. (3). Former par. (3), which related to the Crystal Geyser Unit in Utah, was struck out.

Pub.L. 98–569, § 2(b)(6) substituted ", and consisting of measures to replace incidental fish and wildlife values foregone." for the period at the end thereof.

Subsec. (a)(4). Pub.L. 98–569, § 2(b)(7) added par. (4). Former par. (4) was redesignated par. (3).

Subsec. (a)(5). Pub.L. 98–569, § 2(b)(7) added par. (5).

Subsecs. (b), (c). Pub.L. 98–569, § 2(c) added subsecs. (b) and (c).

Effective Date of 1984 Amendment. Amendment by Pub.L. 98–569, effective Oct. 30, 1984, see section 6 of Pub.L. 98–569, set out as an Effective Date of 1984 Amendment note under section 1591 of this title.

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 98-569, 1984 U.S. Code Cong. and Adm. News, p. 4901.

§ 1593. Planning reports; research and demonstration projects

(a) The Secretary is authorized and directed to—

(1) Expedite completion of the planning reports on the following units, described in the Secretary's report, "Colorado River Water Quality Improvement Program, February 1972":

(i) Irrigation source control:
Lower Gunnison
Uintah Basin
Colorado River Indian Reservation
Palo Verde Irrigation District

(ii) Point source control:
LaVerkin Springs
Littlefield Springs
Glenwood-Dotsero Springs

(iii) Diffuse source control:
Price River
San Rafael River
Dirty Devil River
McElmo Creek
Big Sandy River

(2) Submit each planning report on the units named in paragraph (1) of this subsection promptly to the Colorado River Basin States and to such other parties as the Secretary deems appropriate for their review and comments. After receipt of comments on a unit and careful consideration thereof, the Secretary shall submit each final report with his recommendations, simultaneously, to the President, other concerned Federal departments and agencies, the Congress, and the Colorado River Basin States.

(b) The Secretary is directed—

(1) in the investigation, planning, construction, and implementation of any salinity control unit involving control of salinity from irrigation sources, to cooperate with the Secretary of Agriculture in carrying out research and demonstration projects and in implementing on-the-farm improvements and farm management practices and programs which will further the objective of this subchapter;

(2) to undertake research on additional methods for accomplishing the objective of this subchapter, utilizing to the fullest extent practicable the capabilities and resources of other Federal departments and agencies, interstate institutions, States, and private organizations;

(3) to develop a comprehensive program for minimizing salt contributions to the Colorado River from lands administered by the Bureau of Land Management and submit a report which describes the program and recommended implementation actions to the Congress and to the members of the advisory council established by section 1594(a) of this title by July 1, 1987;

(4) to undertake feasibility investigations of saline water use and disposal opportunities, including measures and all necessary appurtenant and associated works, to demonstrate saline water use technology and to beneficially use and dispose of saline and brackish waters of the Colorado River Basin in joint ventures with current and future industrial water users, using, but not limited to, the concepts generally described in the Bureau of Reclamation Special Report of September 1981, entitled "Saline water use and disposal opportunities"; and

(5) to undertake advance planning activities on the Sinbad Valley Unit, Colorado, as described in the Bureau of Land Management Salinity Status Report, covering the period 1975–1979 and dated February 1980.

(Pub.L. 93-320, Title II, § 203, June 24, 1974, 88 Stat. 271, amended Pub.L. 98-569, § 3, Oct. 30, 1984, 98 Stat. 2937.)

1984 Amendment. Subsec. (b)(3)–(5). Pub.L. 98–569 added par. (3), (4) and (5).

Effective Date of 1984 Amendment. Amendment by Pub.L. 98–569, effective Oct. 30, 1984, see section 6 of Pub.L. 98–569, set out as an Effective Date of 1984 Amendment note under section 1391 of this title.

Legislative History. For legislative history and purpose of Pub.L. 93–320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 98–569, 1984 U.S.Code Cong. and Adm.News, p. 4901.

§ 1594. Colorado River Basin Salinity Control Advisory Council

(a) There is hereby created the Colorado River Basin Salinity Control Advisory Council composed of no more than three members from each State appointed by the Governor of each of the Colorado River Basin States.

(b) The Council shall be advisory only and shall—

(1) act as liaison between both the Secretaries of Interior and Agriculture and the Administrator of the Environmental Protection Agency and the States in accomplishing the purposes of this subchapter,

(2) receive reports from the Secretary on the progress of the salinity control program, and review and comment on said reports; and

(3) recommend to both the Secretary and the Administrator of the Environmental Protection Agency appropriate studies of further projects, techniques, or methods for accomplishing the purposes of this subchapter.

(Pub.L. 93–320, Title II, § 204, June 24, 1974, 88 Stat. 272.)

Legislative History. For legislative history and purpose of Pub.L. 93–320, see 1974 U.S.Code Cong. and Adm.News, p. 3327.

§ 1595. Salinity control units; authority and functions of the Secretary of the Interior

(a) Allocation of costs

The Secretary shall allocate the total costs (excluding costs borne by non-Federal participants pursuant to section 1592(c)(2)(C) of this Title) of the on-farm measures authorized by section 1592(c) of this title, of all measures to replace incidental fish and wildlife values foregone, and of each unit or separable feature thereof authorized by section 1592(a) of this title, as follows:

(1) In recognition of Federal responsibility for the Colorado River as an interstate stream and for international comity with Mexico, Federal ownership of the lands of the Colorado River Basin from which most of the dissolved salts originate and the policy embodied in the Federal Water Pollution Control Act Amendments of 1972 (85 Stat. 816) [33 U.S.C.A. § 1251 et seq.], 75 per centum of the total costs of construction, operation, maintenance, and replacement of each unit or separable feature thereof authorized by section 1592(a)(1), (2), and (3) of this title, including 75 per centum of the total costs of construction, operation, and maintenance of the associated measures to replace incidental fish and wildlife values foregone, 70 per centum of the total costs of construction, operation, maintenance, and replacement of each unit or separable feature thereof authorized by section 1592(a)(4) and (5) of this title, including 70 per centum of the total costs of construction, operation, and maintenance of the associated measures to replace incidental fish and wildlife values foregone, and 70 per centum of the total costs of implementation of the on-farm measures authorized by section 1592(c) of this title, including 70 per centum of the total costs of the associated measures to replace incidental fish and wildlife values foregone shall be nonreimbursable. The total costs remaining after these allocations shall be reimbursable as provided for in paragraphs (2), (3), (4), and (5), of subsection (a) of this section.

(2) The reimbursable portion of the total costs shall be allocated between the Upper Colorado River Basin Fund established by section 5(a) of the Colorado River Storage Project Act (70 Stat. 107) [43 U.S.C.A. § 620d(a)] title and the Lower Colorado River Basin Development Fund established by section 1543(a) of this title after consultation with the Advisory Council created in section 1594(a) of this title and consideration of the following items:

(I) benefits to be derived in each basin from the use of water of improved quality and the use of works for improved water management;

(II) causes of salinity; and

(III) availability of revenues in the Lower Colorado River Basin Development Fund and increased revenues to the Upper Colorado River Basin Fund made available under section 620d(d)(5) of this title: *Provided*, That costs allocated to the Upper Colorado River Basin Fund under this paragraph (2) shall not exceed 15 per centum of the costs allocated to the Upper Colorado River Basin Fund and the Lower Colorado River Basin Development Fund.

(3) Costs of construction and replacement of each unit or separable feature thereof authorized by section 1592(a)(1), (2), and (3) of this title and costs of construction of measures to replace incidental fish and wildlife values foregone, when such measures are a part of the units authorized by section 1592(a)(1), (2), and (3) of this title, allocated to the upper basin and to the lower basin under subsection (a)(2) of this section shall be repaid within a fifty-year period or within a period equal to the estimated life of the unit, separable feature thereof, or replacement, whichever is less, without interest from the date such unit, separable feature, or replacement is determined by the Secretary to be in operation.

(4)(I) Costs of construction and replacement of each unit or separable feature thereof authorized by section 1592(a)(4), and (5) of this title, costs of construction of measures to replace incidental fish and wildlife values foregone, when such measures are a part of the on-farm measures authorized by section 1592(c) of this title or of the units authorized by sections 1592(a)(4) and (5) of this title, and costs of implementation of the on-farm measures authorized by section 1592(c) of this title allocated to the upper basin and to the lower basin under subsection (a)(2) of this section shall be repaid as provided in subparagraphs (ii) and (iii), respectively, of this paragraph.

(II) Costs allocated to the upper basin shall be repaid with interest within a fifty-year period, or within a period equal to the estimated life of the unit, separable feature thereof, replacement, or on-farm measure, whichever is less, from the date such unit, separable feature thereof, replacement or on-farm measure is determined by the Secretary or the Secretary of Agriculture to be in operation.

(III) Costs allocated to the lower basin shall be repaid without interest as such costs are incurred to the extent that money is available from the Lower Colorado River Basin development fund to repay costs allocated to the lower basin. If in any fiscal year the money available from the Lower Colorado River Basin development fund for such repayment is insufficient to repay the costs allocated to the lower basin, as provided in the preceding sentence, the deficiency shall be repaid with interest as soon as money becomes available in the fund for repayment of those costs.

(IV) The interest rates used pursuant to this chapter shall be determined by the Secretary of the Treasury, taking into consideration average market yields on outstanding marketable obligations of the United States with remaining periods to maturity comparable to the reimbursement period during the month preceding October 30, 1984 for costs outstanding at that date, or, in the case of costs incurred subsequent to October 30, 1984, during the month preceding the fiscal year in which the costs are incurred.

(5) Costs of operation and maintenance of each unit or separable feature thereof authorized by section 1592(a) of this title and of measures to replace incidental fish and wildlife values foregone allocated to the upper basin and to the lower basin under subsection (a)(2) of this section shall be repaid without interest in the fiscal year next succeeding the fiscal year in which such costs are incurred. In the event that revenues are not available to repay the portion of operation and maintenance costs allocated to the Upper Colorado River Basin fund and to the Lower Colorado River Basin development fund in the year next succeeding the fiscal year in which such costs are incurred, the deficiency shall be repayed [1] with interest calculated in the same manner as provided in subsection (a)(4)(iv) of this section. Any reimbursement due non-Federal entities pursuant to section 1592(b)(2) of this title shall be repaid without interest in the fiscal year next succeeding the fiscal year in which such operation and maintenance costs are incurred.

(b) Costs payable from the Lower Colorado River Basin Development Fund

Costs of construction, operation, maintenance, and replacement of each unit or separable feature thereof authorized by section 1592(a) of this title, costs of construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and costs of implementation of the on-farm measures authorized by section 1592(c) of this title, allocated for repayment by the lower basin under subsection (a)(2) of this section shall be paid in accordance with section 1543(g)(2) of this title, from the Lower Colorado River Basin Development Fund.

(c) Costs payable from the Upper Colorado River Basin Fund

Costs of construction, operation, maintenance, and replacement of each unit or separable feature thereof authorized by section 1592(c) of this title, costs of construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and costs of implementation of the on-farm measures authorized by section 1592(c) of this title allocated for repayment by the upper basin under subsection (a)(2) of this section shall be paid in accordance with section 620d(d)(5) of this title from the Upper Colorado River Basin Fund within the limit of the funds made available under subsection (d) of this section.

(d) Upward adjustment of rates for electrical energy

The Secretary is authorized to make upward adjustments in rates charged for electrical energy under all contracts administered by the Secretary under the Colorado River Storage Project Act (70 Stat. 105; 43 U.S.C.A. § 620) as soon as practicable and to the extent necessary to cover the costs allocated to the Upper Colorado River Basin Fund under subsection (a)(2) of this section and in conformity with subsection (a)(3), (4) and (5) of this section: *Provided*, That revenues derived from said rate adjustments shall be available solely for the construction, operation, maintenance, and replacement of salinity control units, for the construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and for the implementation of on-farm measures in the Colorado River Basin herein authorized.

(Pub.L. 93-320, Title II, § 205(a), (b)(1), (c), (e), June 24, 1974, 88 Stat. 272-274; amended Pub.L. 98-569, § 4(a)-(f)(1), (g), (i), Oct. 30, 1984, 98 Stat. 2937-3939.)

[1] So in original

References in Text. The Federal Water Pollution Control Act Amendments of 1972, referred to in subsec. (a)(1), is Pub.L. 92-500, Oct. 18, 1972, 86 Stat. 816, which is classified principally to section 1251 et seq. of Title 33, Navigation and Navigable Waters.

The Colorado River Storage Project Act, referred to in subsec. (d), is Act Apr. 11, 1956, c. 203, 70 Stat. 105, which is classified to section 620 et seq. of this title.

Codification. Subsecs. (a), (b), (c), and (d) of this section were, in the original, subsecs. (a), (b)(1), (c), and (e), respectively, of section 205 of Pub.L. 93-320. Subsecs. (b)(2) and (d) of section 205 of Pub.L. 93-320 amended sections 620d and 1543 of this title.

1984 Amendment. Subsec. (a). Pub.L. 98-569, § 4(a) added "(a)" after "section 1592" and added "(excluding costs borne by non-Federal participants pursuant to section 1592(c)(2)(C) of this title) of the on-farm measures authorized by section 1592(c) of this title, of all measures to replace incidental fish and wildlife values foregone, and" after "total costs".

Subsec. (a)(1). Pub.L. 98-569, § 4(b) added "authorized by section 1592(a)(1), (2), and (3) of this title, including 75 per centum of the total costs of construction, operation, and maintenance of the associated measures to replace incidental fish and wildlife values foregone, 70 per centum of the total costs of construction, operation, maintenance, and replacement of each unit or separable feature thereof authorized by section 1592(a)(4) and (5) of this title, including 70 per centum of the total costs of construction, operation, and maintenance of the associated measures to replace incidental fish and wildlife values foregone, and 70 per centum of the total costs of implementation of the on-farm measures authorized by section 1592(c) of this title, including 70 per centum of the total costs of the associated measures to replace incidental fish and wildlife values foregone," after "shall be nonreimbursable" and further added "The total costs remaining after these allocations shall be reimbursable as provided for in paragraphs (2), (3), (4) and (5) subsection (a) of this section" at the end thereof.

Subsec. (a)(2). Pub.L. 98-569, § 4(c), substituted "The reimbursable portion" for "Twenty-five per centum".

Subsec. (a)(3). Pub.L. 98-569, § 4(d) substituted "construction and replacement of each unit" for "construction, operation, maintenance, and replacement of each unit" before "or separable features thereof", added "authorized by section 1592(a)(1), (2), and (3) of this title and costs of construction of measures to replace incidental fish and wildlife values foregone, when such measures are a part of the units authorized by section 1592(a)(1), (2) and (3) of this title" before "allocated", and added "or within a period equal to the estimated life of the unit, separable feature thereof, or replacement, whichever is less," before "without interest".

Subsec. (a)(4), (5). Pub.L. 98–569, § 4(e) added pars. (4) and (5).

Subsec. (b). Pub.L. 98–569, § 4(f)(1) added "authorized by section 1592(a) of this title, costs of construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and costs of implementation of the on-farm measures authorized by section 1592(c) of this title," before "allocated for repayment".

Subsec. (c). Pub.L. 98–569, § 4(g) added "authorized by section 1592(c) of this title, costs of construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and costs of implementation of the on-farm measures authorized by section 1592(c) of this title" before "allocated for".

Subsec. (d). Pub.L. 98–569, § 4(i)(1) struck out "of construction, operation, maintenance, and replacement of units" before "allocated under".

Pub.L. 98–569, § 4(i)(2) added "to the Upper Colorado River Basin Fund" after "allocated".

Pub.L. 98–569, § 4(i)(3) added ", (4) and (5)" before "of this section".

Pub.L. 98–569, § 4(i)(4) added ", for the construction, operation, and maintenance of measures to replace incidental fish and wildlife values foregone, and for the implementation of on-farm measures" after "salinity control units".

Effective Date of 1984 Amendment. Amendment by Pub.L. 98–569, effective Oct. 30, 1984, see section 6 of Pub.L. 98–569, set out as an Effecuve Date of 1984 Amendment note under section 1591 of this title.

Legislative History. For legislative history and purpose of Pub.L. 93–320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 98–569, 1984 U.S. Code Cong. and Adm. News, p. 4901.

§ 1596. Biennial report to President, Congress, and Advisory Council

Commencing on January 1, 1975, and every two years thereafter, the Secretary shall submit, simultaneously, to the President, the Congress, and the Advisory Council created in section 1594(a) of this title, a report on the Colorado River salinity control program authorized by this subchapter covering the progress of investigations, planning, and construction of salinity control units for the previous fiscal year, the effectiveness of such units, anticipated work needed to be accomplished in the future to meet the objectives of this subchapter, with emphasis on the needs during the five years immediately following the date of each report, and any special problems that may be impeding progress in attaining an effective salinity control program. Said report may be included in the biennial report on the quality of water of the Colorado River Basin prepared by the Secretary pursuant to section 620n of this title, section 615ww of this title, and section 616e of this title.

(Pub.L. 93–320, Title II, § 206, June 24, 1974, 88 Stat. 274.)

Legislative History. For legislative history and purpose of Pub.L. 93–320, see 1974 U.S.Code Cong. and Adm.News, p. 3327.

§ 1597. Construction of provisions of subchapter

Except as provided in sections 620d(d)(5), 1543(g)(2), and 1595(b) of this title, with respect to the Colorado River Basin Project Act and the Colorado River Storage Project Act, respectively, nothing in this subchapter shall be construed to alter, amend, repeal, modify, interpret or be in conflict with the provisions of the Colorado River Compact (45 Stat. 1057), the Upper Colorado River Basin Compact (63 Stat. 31), the Water Treaty of 1944 with the United Mexican States (Treaty Series 994; 59 Stat. 1219), the decree entered by the Supreme Court of the United States in Arizona against California and others (376 U.S. 340), the Boulder Canyon Project Act (45 Stat. 1057) [43 U.S.C.A. § 617 et seq.], Boulder Canyon Project Adjustment Act (54 Stat. 774; 43 U.S.C. 618a) [43 U.S.C.A. § 618 et seq.], section 15 of the Colorado River Storage Project Act (70 Stat. 111; 43 U.S.C.A. § 620n), the Colorado River Basin Project Act (82 Stat. 885), section 6 of the Fryingpan-Arkansas Project Act (76 Stat. 398) [43 U.S.C.A. § 616e], section 15 of the Navajo Indian irrigation project and initial stage of the San Juan-Chama Project Act (76 Stat. 102) [43 U.S.C.A. § 615ww], the National Environmental Policy Act of 1969 [42 U.S.C.A. § 4321 et seq.], and the Federal Water Pollution Control Act, as amended [33 U.S.C.A. § 1251 et seq.].

(Pub.L. 93–320, Title II, § 207, June 24, 1974, 88 Stat. 274.)

References in Text. The Colorado River Basin Project Act, referred to in text, is Pub.L. 90–537, Sept. 30, 1968, 82 Stat. 885, which is classified to section 1501 et seq. of this title.

The Colorado River Storage Project Act, referred to in text, is Act Apr. 11, 1956, c. 203, 70 Stat. 105, which is classified to section 620 et seq. of this title.

The Boulder Canyon Project Act, referred to in text, is Act Dec. 21, 1928, c. 42, 45 Stat. 1057, which is classified to section 617 et seq. of this title.

The Boulder Canyon Project Adjustment Act, referred to in text, is Act July 19, 1940, c. 643, 54 Stat. 774, which is classified to section 618 et seq. of this title.

The Colorado River Basin Project Act, referred to in text, is Pub.L. 90-537, Sept. 30, 1968, 82 Stat. 885, which is classified to section 1501 et seq. of this title.

The National Environmental Policy Act of 1969, referred to in text, is Pub.L. 91-190, Jan. 1, 1970, 83 Stat. 852, which is classified to section 4321 et seq. of Title 42, The Public Health and Welfare.

The Federal Water Pollution Control Act, as amended, referred to in text, is Act June 30, 1948, c. 758, as added Pub.L. 92-500, Oct. 18, 1972, 86 Stat. 816, which is classified to section 1251 et seq. of Title 33, Navigation and Navigable Waters.

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327.

§ 1596. Modification of projects; contract authority; authorization of appropriations

(a) The Secretary is authorized to provide for modifications of the projects authorized by this subchapter as determined to be appropriate for purposes of meeting the objective of this subchapter. No funds for any such modification shall be expended until the expiration of sixty days after the proposed modification has been submitted to appropriate committees of the Congress, except that funds may be expended prior to the expiration of such sixty days in any case in which the Congress approves an earlier date by concurrent resolution. The Governors of the Colorado River Basin States shall be notified of these changes.

(b) The Secretary is hereby authorized to enter into contracts that he deems necessary to carry out the provisions of this subchapter, in advance of the appropriation of funds therefor. There is hereby authorized to be appropriated the sum of $125,100,000 for the construction of the works and for other purposes authorized in section 1592(a) or (b) of this title based on April 1973 prices, plus or minus such amounts as may be justified by reason of ordinary fluctuations in costs involved therein and such sums as may be required to operate and maintain such works. The funds authorized to be appropriated by this section may be used for construction of any or all of the works or portions thereof and for other purposes authorized in subsection (a), including measures as provided for in section 1592 of this title. There is further authorized to be appropriated such sums as may be necessary to pay condemnation awards in excess of appraised values and to cover costs required in connection with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 [42 U.S.C.A. § 4601 et seq.].

(Pub.L. 93-320, Title II, § 206, June 24, 1974, 88 Stat. 274, amended Pub.L. 98-569, § 5, Oct. 30, 1984, 98 Stat. 2939.)

Unconstitutionality of Legislative Veto Provisions

The provisions of section 1254(c)(2) of Title 8, Aliens and Nationality, which authorize a House of Congress, by resolution, to invalidate an action of the Executive Branch, were declared unconstitutional in Immigration and Naturalization Service v. Chadha, 1983, 103 S.Ct. 2764. See similar provisions in subsec. (a) of this section.

References in Text. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, referred to in subsec. (b), is Pub.L. 91-646, Jan. 2, 1971, 84 Stat. 1894, which is classified to section 4601 et seq. of Title 42, The Public Health and Welfare.

1984 Amendment. Subsec. (a). Pub.L. 98-569, § 5(a) struck out "and not then if disapproved by said committees" before ", except that funds may be expended".

Subsec. (b). Pub.L. 98-569, § 5(b)(1) added "(a) or (b)" before "1592".

Pub.L. 98-569, § 5(b)(2) added "The funds authorized to be appropriated by this section may be used for construction of any or all of the works or portions thereof and for other purposes authorized in subsection (a) of this section, including measures as provided for in section 1592(b) of this title."

Effective Date of 1984 Amendment. Amendment by Pub.L. 98-569, effective Oct. 30, 1984, see section 6 of Pub.L. 98-569, set out as an Effective Date of 1984 Amendment note under section 1591 of this title.

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327. See, also, Pub.L. 98-569, 1984 U.S.Code Cong. and Adm.News, p. 4901.

§ 1599. Definitions

As used in this subchapter—

(a) all terms that are defined in the Colorado River Compact shall have the meanings therein defined;

(b) "Colorado River Basin States" means the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming.

(Pub.L. 93-320, Title II, § 209, June 24, 1974, 88 Stat. 275.)

Legislative History. For legislative history and purpose of Pub.L. 93-320, see 1974 U.S.Code Cong. and Adm.News, p. 3327.

APPENDIX C

SELECTED FEDERAL REPORTS ON SALINITY

Selected
Federal Reports on Salinity

Title	Author	Publisher	Date
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APPENDIX D

ESTIMATED FUTURE WATER USE

UPPER BASIN ESTIMATED DEMANDS

DEMAND FUNCTIONS (KAF)

		THERMAL POWER	AGRICULTURE	FISH, WLD + REC	MINERALS	WQIP	M + I	EXPORTS	COAL GAS	OIL SHALE	TOTAL
ARIZONA	TOTAL DEPLETIONS										
	1986	22	16	0	0	0	6	0	0	0	44
	1990	22	16	0	0	0	8	0	0	0	46
	2000	22	16	0	0	0	10	0	0	0	48
	2010	22	16	0	0	0	12	0	0	0	50
COLORADO	TOTAL DEPLETIONS										
	1986	20	1275	5	20	3	19	594	0	0	1936
	1990	21	1309	5	20	4	39	684	0	0	2082
	2000	26	1367	7	22	4	55	739	0	2	2222
	2010	26	1439	7	24	4	120	769	0	8	2397
NEW MEXICO	TOTAL DEPLETIONS										
	1986	43	233	1	3	0	13	110	0	0	403
	1990	100	238	1	3	0	26	110	0	0	478
	2000	100	381	1	3	0	30	110	0	0	625
	2010	84	404	1	3	0	34	110	0	0	636
UTAH	TOTAL DEPLETIONS										
	1986	31	563	8	10	1	7	154	0	0	774
	1990	37	576	8	10	1	8	237	0	0	877
	2000	45	700	8	10	1	10	267	0	7	1048
	2010	49	704	8	10	1	18	267	0	38	1095
WYOMING	TOTAL DEPLETIONS										
	1986	41	275	6	32	0	5	11	0	0	370
	1990	41	285	20	40	0	6	19	0	0	411
	2000	57	308	20	56	0	8	39	19	4	511
	2010	77	313	20	62	0	11	50	50	10	593

UPPER BASIN ESTIMATED DEMANDS

DEMAND FUNCTIONS (KAF)

BASIN	TOTAL DEPLETIONS	THERMAL POWER	AGRICULTURE	FISH, WLD + REC	MINERALS	WQIP	M + I	EXPORTS	COAL GAS	OIL SHALE	TOTAL
	1986	157	2362	20	65	4	50	869	0	0	3527
	1990	221	2424	34	73	5	87	1050	0	0	3894
	2000	250	2772	36	91	5	113	1155	19	13	4454
	2010	258	2876	36	99	5	195	1196	50	56	4771

LOWER BASIN ESTIMATED DEMANDS 1/

DEMAND FUNCTIONS (KAF)

		THERMAL POWER	AGRICULTURE	FISH, WLD + REC	MINERALS	WOIP	M + I	EXPORTS	COAL GAS	OIL SHALE	TOTAL
ARIZONA	TOTAL DEPLETIONS										
	1986	0	1181	67	0	0	580	0	0	0	1828
	1990	0	1179	67	0	0	1554	0	0	0	2800
	2000	0	1192	67	0	0	1541	0	0	0	2800
	2010	0	1201	67	0	0	1532	0	0	0	2800
CALIFORNIA	TOTAL DEPLETIONS										
	1986	0	3812	0	0	0	588	0	0	0	4400
	1990	0	3880	0	0	0	520	0	0	0	4400
	2000	0	3901	0	0	0	499	0	0	0	4400
	2010	0	3901	0	0	0	499	0	0	0	4400
NEVADA	TOTAL DEPLETIONS										
	1986	8	0	0	0	0	107	0	0	0	115
	1990	18	4	0	0	0	156	0	0	0	178
	2000	22	8	0	0	0	220	0	0	0	250
	2010	0	8	0	0	0	242	0	0	0	250
LOWER	TOTAL DEPLETIONS										
	1986	8	4993	67	0	0	1275	0	0	0	6343
	1990	18	5063	67	0	0	2230	0	0	0	7378
	2000	22	5101	67	0	0	2260	0	0	0	7450
	2010	0	5110	67	0	0	2273	0	0	0	7450

1/ Main stem only

APPENDIX E

NPDES PERMITS

LEGEND

NPDES PERMITS
EXPLANATION CODES

COLORADO RIVER BASIN SALINITY CONTROL FORUM

NPDES permits are reviewed under two different criterium under Forum policy: these being municipal l industrial. In order for a permittee to be in compliance under the municipal criterium, the increase concentration between inflow and outflow can not be greater than 400 mg/l. Forum industrial criterium quires that no industrial user discharges more than 1.00 tons/day. Under Forum policy there can be anted exceptions to these limitations by the States. The following gives an explanation of the current atus of the NPDES permits. Because at any given time many of the approximate 600 permits identified in s list are being reviewed, reissued, and/or terminated, and new discharge permits are being filed, this it must be considered as being subject to frequent change.

MUNICIPAL

(M) Municipal user in compliance with Forum policy.

-1) Permit has expired or been revoked. No discharge.

-2) Permittee is not currently discharging.

-3) Measurement of TDS is not currently required, but the state plans to require measurements of both inflow and outflow when the permit is reissued.

-4) Measurements of inflow are not consistent with Forum policy:

(M-4A) Therefore, it is not known whether or not this municipal user is in compliance.

(M-4B) However, since outflow concentration is less than 500 mg/l it is presumed that this permit is not in violation of the <400 mg/l increase.

-5) This permit is in violation of Forum policy in that there is an increase in concentration by >400 mg/l over the source waters.

(M-5A) The state is currently working to bring them into compliance.

-6) This permit is under the supervision of EPA and they report <400 ppm incremental increase in TDS.

-7) Insufficient data to know the status of this permit.

Permit issued to a federal agency or an Indian tribe and the responsibility of EPA.

INDUSTRIAL

(I) Industrial user in compliance with Forum policy.

(I-1) Permit has expired or been revoked. No discharge.

(I-2) Permittee is not currently discharging.

(I-3) Measurement of TDS is not currently required, but the state plans to require measurements of both volume and concentration of outflow when the permit is reissued.

(I-4) Either concentration or volume of outflow are not currently being made as stipulated, thus the permit is in violation of Forum policy. It is not know if the permit is in excess of the <1.00 tons/day requirement.

(I-5) This permit is in violation of Forum policy in that they are discharging >1.00 tons/day of salts.

(I-5A) No provision has been made allowing this violation of Forum policy.

(I-5B) Though discharge is >1.00 tons/day, in keeping with Forum policy the discharger has demonstrated the salt reduction is not practicable and the requirement has been waived.

(I-5C) This permit uses waters for their thermal energy. Only heat is extracted and thus the salt and water which are discharged into the river would have done so naturally. They are covered by the Forums policy on intercepted groundwaters.

(I-5D) This permit is for a fish hatchery and although they are discharging >1.00 tons/day, the use of the water is a one-time pass through use and not >1.00 tons/day of salt is added by the use.

(I-5E) This permit is for the interception and passage of ground waters and thus is excepted under the Forum's policy on ground-water interception.

(I-6) This permit is under the supervision of EPA and they report a discharge of <1.00 tons/day of salt.

(I-7) Insufficient data to know the current status of this permit.

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
AZ0000078	930	AZ PUBLIC SERVICE CO YUCCA POWER	0	0.000	0.00	I-2
AZ0110124	801	BIA DENNE HOTSO BOARDING SCHOOL	0	0.000	0.00	M-1*
AZ0110159	900	BIA DILCON SCHOOL	0	0.000	0.00	M-2*
AZ0110167	900	BIA HUNTERS POINT SCHOOL	___	0.014	0.00	M-6*
AZ0110213	900	BIA LOW MOUNTAIN SCHOOL	___	0.014	0.00	M-6*
AZ0110507	801	BIA LUKACHUKAI	0	0.000	0.00	M-1*
AZ0110043	801	BIA NAZLINI BOARDING SCHOOL	___	0.013	0.00	M-5*
AZ0110175	900	BIA PINE SPRINGS SCHOOL	0	0.045	0.00	M-2*
AZ0110132	900	BIA ROCKY RIDGE	0	0.000	0.00	M-1*
AZ0110183	900	BIA SEBA DALKAI	0	0.000	0.00	M-2*
AZ0110094	801	BIA TEEC NOS POS SCHOOL	___	0.080	0.00	M-6*
AZ0110191	900	BIA TOYEI SCHOOL	0	0.000	0.00	M-2*
AZ0110116	700	BIA UPPER KAIBITO	0	0.000	0.00	M-1*
AZ0021610	900	CAMERON TRADING POST	2500	0.010	0.10	I
AZ0021822	801	CHINLE PUBLIC SCHOOL	0	0.000	0.00	M-1*
AZ0021024	920	CITIZENS UTILITIES	1280	0.088	0.47	M-4A
AZ0022462	940	COLORADO RIVER INDIAN TRIBE WTP	___	_.___	0.00	M-7*
AZ0021415	940	COLORADO RIVER WTJV	1099	0.348	1.60	M-4A
AZ0022268	930	CYPRUS BAGDAD COPPER DIV	0	0.000	0.00	I-2
AZ0022144	900	ENERGY FUELS NUCLEAR HACK CANYON	0	0.000	0.00	I-2
AZ0022322	900	ENERGY FUELS NUCLEAR KANAB	0	0.000	0.00	I-2
AZ0022225	900	ENERGY FUELS NUCLEAR PIGEON	0	0.000	0.00	I-2
AZ0022454	900	FAIRFIELD SUNRISE VILLAGE	0	0.000	0.00	I-2
AZ0020427	900	FLAGSTAFF, CITY OF	344	3.830	5.50	M-4B
AZ0022152	900	GRAND CANYON NAT. PK.	___	_.___	0.00	I-7
AZ0022527	940	HEADGATE ROCK DAM	___	_.___	0.00	I-7*
AZ0020257	900	HOLBROOK, TOWN OF	835	0.367	1.28	M-4A
AZ0022098	940	LE PERA SCHOOL - PARKER SCHOOL DIST #27	814	0.004	0.01	M-4A
AZ0020265	801	NTUA CHINLE	617	0.168	0.43	M-4A
AZ0020281	801	NTUA KAYENTA	887	0.090	0.33	M-4A
AZ0021920	801	NTUA MANY FARMS	552	0.047	0.11	M-4A
AZ0020290	900	NTUA TUBA CITY	359	0.200	0.30	M-4B
AZ0021555	900	NTUA WINDOW ROCK	730	0.888	2.71	M-4A
AZ0022284	940	PARKER, TOWN OF	___	_.___	0.00	M-7
AZ0022179	900	PEABODY COAL CO.	0	0.000	0.00	I-2
AZ0020991	920	RIVER QUEEN RESORT	0	0.000	0.00	I-2
AZ0020125	900	SNOWFLAKE, TOWN OF	___	_.___	0.00	M-7
AZ0000132	920	U.S.F.W. WILLOW	36	8.400	1.26	I-5A
AZ0110302	900	US FOREST SERVICE APPACHE	0	0.000	0.00	I-2
AZ0110426	900	US NAT'L PARK SER. GRAND CANYON	460	0.080	0.15	I
AZ0110249	920	WATER & POWER RES SERV DAVIS	710	0.027	0.08	I
AZ0020648	940	WHITEWING AGRICULTURE	___	_.___	0.00	I-7
AZ0020346	900	WILLIAMS, CITY OF	___	0.141	0.00	M-3
AZ0021512	900	WINSLOW, CITY OF	0	0.000	0.00	M-2
CA0104205	920	NEEDLES, CITY OF	1231	0.960	4.93	M

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
COG500141	100	ALPINE ROCK CO.	0	0.000	0.00	I-5E
CO0035394	190	AMAX - MT EMMONS	890	0.520	1.93	I-5B
CO0000248	100	AMAX INC. - CLIMAX MOLYBDENUM	0	0.000	0.00	I
CO0032522	---	AMAX INC. - HENDERSON	0	0.000	0.00	I
CO0039993	801	AMERIGAS, INC., CO2 DIVISION	1400	0.032	0.19	I
CO0040444	220	AMOCO PRODUCTION-HOTCHKISS RCH	3112	0.007	0.09	I
CO0029793	310	ANACONDA MINERALS COMPANY	1020	1.400	10.02	I-5A
CO0039683	510	ANDRIKOPOULOS, A G	4910	0.021	0.43	I
CO0033090	801	ANIMAS AGGREGATES INC	0	0.000	0.00	I-1
CO0037320	220	ANTELOPE HILLS HOA	___	_.___	0.00	M-3
CO0031364	100	ASPEN BASALT KOA CAMPGROUND	361	0.011	0.02	M
CO0026387	100	ASPEN METRO SAN DIST	625	1.570	4.09	M
CO0022721	100	ASPEN VILLAGE	310	0.020	0.03	M
CO0040665	190	ATLAS PRECIOUS METALS, INC-CART	489	1.100	2.24	I-2
CO0037117	---	AXIAL BASIN RANCH COMPANY	___	_.___	0.00	I-2
CO0021491	100	BASALT SANITATION DISTRICT	___	0.235	0.00	I-3
CO0038989	100	BATTLEMENT MESA, INC WTP	0	0.000	0.00	I-2
CO0039063	100	BATTLEMENT MESA, INC.	693	0.728	2.11	M
CO0039276	801	BAYFIELD SAN DIST-GEM VILLAGE	600	0.014	0.04	M
CO0020273	801	BAYFIELD SANITARY DIST	475	0.153	0.30	M
CO0036943	220	BEAR COAL COMPANY INC BEAR MIN	0	0.000	0.00	I-2
CO0031003	500	BEAR POLE RANCH	72	0.008	0.00	M
CO0000051	---	BHP PETROLEUM	1778	0.908	6.74	I-5B
CO0033553	220	BLUE RIBBON MINE	1530	0.013	0.08	I
CO0037532	220	BLUE RIDGE ESTATES SUBDIVISION	0	0.000	0.00	M-2
CO0038253	100	BLUE RIVER WTR DIST-PEAK 7 WTP	220	0.012	0.01	I
COG500150	300	BOUNDS & SONS, INC.-BOUNDS PIT	0	0.000	0.00	I-2
CO0036072	100	BRAMWELL-WENDALL	___	_.___	0.00	M-2
CO0021539	100	BRECKENRIDGE SANITATION DISTRICT	260	2.862	3.11	M
CO0031020	100	BRECKENRIDGE WTP	0	1.640	0.00	I-2
CO0040517	801	BUFFALO BOY MINING CO, INC	0	0.000	0.00	I-2
COG500096	801	BURNETT CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0026751	100	CARBONDALE SANITATION DISTRICT	360	0.210	0.32	M
CO0033634	100	CARBONDALE-TOWN OF	0	0.040	0.00	M-2
CO0033634	801	CASCADE VILLAGE WTP	1265	0.023	0.12	I
CO0040592	220	CASIAS-LOVATO SUBDIVISION	0	0.000	0.00	M-1
CO0033961	510	CATHEDRAL BLUFFS SHALE OIL CO	1400	0.500	2.92	I-5B
CO0031984	220	CEDAREDGE, TOWN OF	400	0.070	0.12	M
CO0039381	220	CEDAREDGE, TOWN OF - WTP	88	1.300	0.48	I
CO0036081	801	CHIMNEY ROCK COAL-MARTINEZ MIN	0	0.000	0.00	I-2
CO0038474	300	CLEARCREEK DEVELOPMENT SEMI-WORKS	___	_.___	0.00	I-1
CO0033791	300	CLIFTON SANITATION DISTRICT	820	0.475	1.63	M
CO0033260	300	CLIFTON SANITATION DISTRICT #1	1720	0.330	2.37	M
CO0041076	---	COCA COLA BOTTLING COMPANY	480	0.001	0.00	I
CO0040487	100	COLLBRAN, TOWN OF WWTP	718	0.130	0.39	M
CO0021563	300	COLLBRAN- TOWN OF	1230	0.158	0.81	M-1
CO0032905	100	COLO DIV HWY-DEBEQUE	0	0.000	0.00	I-2
CO0030872	100	COLO DIV HWY-WILMOR LAKE REST	825	0.090	0.31	M
CO0000272	190	COLO DIV WILDLIFE - PITKIN TROUT	281	5.550	6.51	I-5D
CO0000299	190	COLO DIV WILDLIFE - ROARING JUDY	250	20.300	21.18	I-5D
CO0000329	100	COLO DIV WILDLIFE - CRYSTAL RIVER	426	6.200	11.02	I-5D

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
CO0000353	100	COLO DIV WILDLIFE - FINGER ROCK	994	5.990	24.85	I-5D
CO0026352	100	COLO DIV WILDLIFE - RIFLE FALLS	438	21.100	38.57	I-5D
CO0000281	801	COLO DIV WILDLIFE - DURANGO FISH HATCHERY	284	2.590	3.07	I-5D
CO0040771	100	COLO STATE-DEPT CORR-RIFLE CTR	___	_.___	0.00	M
CO0000043	220	COLO UTE ELEC ASSOC - JIM BULLOCK	0	0.000	0.00	I-2
CO0000523	500	COLO UTE ELEC ASSOC - HAYDEN PL	420	0.030	0.05	I
CO0000540	310	COLO UTE ELEC ASSOC - NUCLA STATION	0	0.000	0.00	I-2
CO0033685	220	COLO WESTMORELAND INC - IRISH FA	438	0.067	0.12	I
CO0032832	500	COLO-WYO COAL CO	1800	0.058	0.44	I
CO0027154	500	COLORADO YAMPA COAL COMPANY	3600	0.700	10.52	I-5B
CO0036021	500	COLORADO YAMPA COAL COMPANY	0	0.000	0.00	I-5E
CO0033537	300	COORS PORCELAIN CO GRAND JUNCTION	660	0.979	2.70	I
CO0021598	100	COPPER MOUNTAIN SANITATION DISTRICT	___	0.182	0.00	M-4
CO0027383	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0032344	100	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0033863	220	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-1
CO0039209	100	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039403	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039411	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039420	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039438	300	CORN CONSTRUCTION COMPANY	___	_.___	0.00	I-5E
CO0039454	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039462	300	CORN CONSTRUCTION COMPANY	___	_.___	0.00	I-5E
CO0039466	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0039471	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-1
CO0039489	300	CORN CONSTRUCTION COMPANY	0	0.000	0.00	I-2
CO0020125	801	CORTEZ SANITATION DISTRICT - NORTH	1114	0.200	0.93	M-5A
CO0027545	801	CORTEZ SANITATION DISTRICT	917	0.200	0.77	M-5A
CO0027880	801	CORTEZ SANITATION DISTRICT - SOUTH	653	0.390	1.06	M-5A
CO0036251	310	COTTER CORP - J D-9 MINE	3600	0.009	0.14	I
CO0023663	---	COUNTRY MEADOWN MOBILE ESTATES	282	0.023	0.03	M
CO0040037	500	CRAIG, CITY OF WWTP	976	1.010	4.11	M-5A
CO0037729	220	CRAWFORD SEWER TREATMENT PLANT	392	0.017	0.03	M
CO0031836	190	CRESTED BUTTE SOUTH METRO DISTRICT	341	0.013	0.02	M
CO0020443	190	CRESTED BUTTE, TOWN OF	184	0.700	0.54	M
CO0027171	190	CRESTED BUTTE WATER & SANITATION DISTRICT	247	0.966	1.00	M
CO0038563	801	CUMBERLAND MINES LTD	0	0.000	0.00	I-1
CO0023418	100	DEBEQUE, TOWN OF	1025	0.024	0.10	M
CO0032735	220	DELTA -MONTROSE VOCATIONAL-TECH	710	0.001	0.00	M
CO0020036	220	DELTA, CITY OF	0	0.000	0.00	M-2
CO0039641	220	DELTA, CITY OF	1560	1.190	7.75	M-5
COG050130	220	DELTA SAND & GRAVEL CO - PIT N	0	0.000	0.00	I-1
COG050136	220	DELTA SAND & GRAVEL CO - PIT N	___	_.___	0.00	I-1
CO0000418	100	DILLION, CITY OF	78	0.015	0.00	M
CO0020001	801	DOLORES, TOWN OF	0	0.000	0.00	M-1
CO0040509	801	DOLORES, TOWN OF	320	0.150	0.20	M
CO0036609	300	DORCHESTER COAL COMPANY - FRUITA MINE	0	0.000	0.00	I-2
CO0036960	300	DORCHESTER COAL COMPANY	0	0.000	0.00	I-1
CO0033901	190	DOS RIOS DIV OF GUNNISON COUNTY	439	0.117	0.21	M-1
CO0023434	310	DOVE CREEK SANITATION DISTRICT	1160	0.051	0.25	M-4A
CO0024082	801	DURANGO, CITY OF	100	2.020	0.84	M

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
CO0031658	801	DURANGO SKI CORP	0	0.000	0.00	M-1
CO0036226	801	DURRANGO WEST METROPOLITAN DIST	1332	0.044	0.24	M-4A
CO0021059	100	EAGLE SANITATION DISTRICT	680	0.086	0.24	M
CO0039501	100	EAGLE, TOWN OF	0	0.000	0.00	I-2
CO0040720	190	EAST RIVER REGIONAL SD-WWTP	250	0.044	0.05	M
CO0040380	100	EASTSIDE COAL CO., INC	0	0.000	0.00	I-2
CO0040266	801	EDGEMONT RANCH WW RECLAM FAC	0	0.000	0.00	M-2
CO0041220	---	EL ROCKO MOBILE HOME PARK	0	0.000	0.00	M-2
COG500106	300	ELAM CONSTRUCTION - 19 ROAD PIT	0	0.000	0.00	I-5E
COG500107	300	ELAM CONSTRUCTION - 29 ROAD	0	0.000	0.00	I-5E
COG500108	300	ELAM CONSTRUCTION - BOUNDS	0	0.000	0.00	I-2
COG500130	300	ELAM CONSTRUCTION - GRIFFIN PIT	0	0.000	0.00	I-5E
CO0033812	300	ELAM CONSTRUCTION - PETERSON	0	0.000	0.00	I-1
CO0033014	220	ELK MEADOWS ESTATES	0	0.000	0.00	M-1
CO0039021	500	EMPIRE ENERGY CORP LOADOUT	0	0.000	0.00	I-2
CO0034142	500	EMPIRE ENERGY CORP WISE HILL	675	0.007	0.02	I
CO0036048	500	ENERGY FUELS COAL, INC	0	0.000	0.00	I-2
CO0000051	500	ENERGY RESERVES GROUP	1600	0.700	4.67	I-5B
CO0038229	100	EVERIST L G - LOVE GRAVEL PIT	145	0.750	0.45	I
CO0037524	510	EXXON COAL RESOURCES USA, INC	0	0.000	0.00	I-1
CO0038270	100	EXXON COMPANY - COLONY SHALE OIL PRO	560	0.200	0.47	I
CO0026981	220	FEDERAL RESOURCES (CAMP BIRD MINE)	1103	2.170	9.99	I-5A
CO0040967	190	FILOHA MEADOWS HEALTH EDUCATION	0	0.000	0.00	M-2
CO0031445	801	FIVE BRANCHES CAMPGROUND	0	0.000	0.00	M-3
CO0031496	801	FLORIDA MESA ELEMENTARY SCHOOL	0	0.001	0.00	M-3
CO0028827	801	FOREST GROVES ESTATES	675	0.003	0.01	M
CO0020966	100	FRASER SANITARY DISTRICT	188	0.420	0.33	M-1
CO0040142	100	FRASER SANITATION DISTRICT	236	0.790	0.78	M
COG500114	100	FREI, ALBERT & SONS, SILT PIT	0	0.300	0.00	I-5E
CO0020451	100	FRISCO SANITARY DISTRICT	352	0.684	1.00	M
CO0037907	100	FRISCO, TOWN OF WTP	50	0.005	0.00	M-2
CO0020257	100	FRUITA, TOWN OF	336	0.420	0.59	M-2
CO0040916	100	GARFIELD COAL SALES, INC	0	0.000	0.00	I-1
CO0070014	---	GARFIELD COUNTY UNA BRIDGE	___	_.___	0.00	1-2
CO0000078	300	GARY WESTERN COMPANY	0	0.000	0.00	I-2
CO0037460	220	GAYNO INC - MOUNTAIN TOP MINE	0	0.000	0.00	I-2
CO0036340	500	GENERAL ELECTRIC HOLDING - CRAIG MINE	___	_.___	0.00	I-1
CO0000141	100	GLENWOOD HOT SPRINGS LODGE	16075	1.900	127.45	I-5C
CO0020516	100	GLENWOOD SPRINGS, CITY OF	536	0.840	1.88	M
CO0035386	100	GLENWOOD SPRINGS, CITY OF	90	0.042	0.02	M
CO0380164	100	GOLD FIELD MINING CORP	0	0.000	0.00	I-1
CO0023108	801	GOLDEN WEST PARK	0	0.000	0.00	M-1
CO0020699	100	GRANBY SANITATION DISTRICT	288	0.600	0.72	M
CO0032964	100	GRAND CO WATER & SANITATION DIST	164	0.690	0.47	M
CO0033740	100	GRAND CO WATER & SANITATION DIST	___	0.020	0.00	M-3
CO0040053	300	GRAND JUNCTION, CITY OF - PERSIGO	1097	5.600	25.64	M-5A
CO0027715	220	GRAND JUNCTION WATER TP	0	0.000	0.00	I-2
CO0036935	220	GRAND MESA COAL COMPANY	1820	0.027	0.21	I
CO0037991	100	GRAND VALLEY PIT, GRAND RIVER CONSTRUCTION	0	0.000	0.00	I-1
CO0031640	801	GRANDVIEW MOTEL & PINON ACRES	0	0.000	0.00	M-2
CO0033502	---	GRANITE CONSTRUCTION COMPANY	0	0.000	0.00	I-2

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
CO0036781	801	GREAT GUENNEL GOLD MINING CO L	0	0.000	0.00	I-2
CO0041530	220	GUNNISON, CITY OF	391	3.000	4.89	M
CO0030996	100	GYPSUM SANITATION	766	0.047	0.15	M-5
CO0038860	100	H LAZY F MOBILE HOME PARK	720	0.022	0.07	M
CO0038164	500	H-G COAL CO - HAYDEN GULCH MINE	1245	0.011	0.06	I
CO0036447	500	H-G COAL CO - HAYDEN GULCH MINE	450	0.050	0.09	I
CO0020486	500	HAYDEN, TOWN OF	381	0.420	0.67	M-1
CO0040959	500	HAYDEN, TOWN OF	42	0.120	0.02	M-4B
CO0040452	801	HERMOSA SEWAGE LAGOONS	840	0.069	0.24	M-4A
CO0021326	801	HI-Z MINING CORP	0	0.000	0.00	I-1
CO0036315	---	HOLLY PLAZA DEVELOPMENT (KINGS VIEW EST)	460	0.005	0.01	M
CO0032841	220	HORIZONS NURSING HOME INC	440	0.008	0.01	M
CO0024350	100	HOT SULPHUR SPRINGS, TOWN OF	340	0.050	0.07	M
CO0021415	220	HOTCHKISS SANITARY DISTRICT	1170	0.100	0.49	M
CO0034363	300	ICS INCORPORATED	0	0.000	0.00	M-2
CO0026956	310	IDARADO MINING	___	_.___	0.00	I-7
CO0022853	801	IGNACIO SANITARY DISTRICT	540	0.390	0.88	M-4A
CO0040410	510	INDUSTRIAL RESOURCES, INC (IRI)	0	0.000	0.00	I-2
CO0040754	510	IRI NAHCOLITE 3-HOLE EXPLOR PG	0	0.000	0.00	I-2
CO0033723	300	JOHNSON, PAUL W (MOBILE CITY)	___	0.032	0.00	M-3
CO0022748	801	JUNCTION CREEK TRAILER PARK	600	0.004	0.01	I-1
CO0000132	---	KAISER COAL - SOMERSET MINE	0	0.000	0.00	I-2
CO0037214	---	KAISER STEEL - CHIMMEY ROCK	___	_.___	0.00	I-7
COG500067	100	KENT, F J CORPORATION - GRAVEL	0	0.000	0.00	I-2
CO0035777	100	KESTREL II PARTNERSHIP	2168_	0.010	0.09	M
CO0023876	100	KEYSTONE ARAPAHOE LTD. PARTNER	370	0.009	0.01	M
CO0027995	100	KEYSTONE INTERNATIONAL - SUMMIT HOUSE	0	0.000	0.00	M-2
COG500118	300	KIEWIT WESTERN CO	0	0.000	0.00	I-2
CO0036315	300	KINGS VIEW ESTATES HOLLY PLAZA DEVELOPMENT	___	_.___	0.00	M-7
CO0021637	100	KREMMLING SANITATION DISTRICT	0	0.000	0.00	M-2
CO0020371	200	LAKE CITY AREA WATER & SANITATION DISTRICT	0	0.160	0.00	M-1
CO0040673	200	LAKE CITY AREA WATER & SANITATION DISTRICT	160	0.170	0.11	M-4B
CO0029777	310	LAST DOLLAR PLANNED UNIT	323	0.002	0.00	M-4B
COG500083	---	LATHAM, THOMAS & GINGER	___	_.___	0.00	I-5E
CO0040134	100	LAZIER - SILLS JT VT - CANYON CREEK	0	0.000	0.00	M-2
CO0020303	100	LAZY GLEN INC	350	0.012	0.02	M
CO0032492	801	LEE MOBILE HOME PARK	480	0.004	0.01	M
CO0029904	801	LIGHTNER CREEK MOBILE HOME PARK	0	0.000	0.00	M-2
CO0026468	801	LIGHTNER CREEK SAFARI CAMP	926	0.007	0.03	M
CO0041395	---	LOBATO, FIDEL - BLUE FLAME COAL	___	_.___	0.00	I-7
CO0041408	---	LOMA LINDA SANITATION DISTRICT	___	_.___	0.00	M-7
CO0034193	---	LOUISIANA - PACIFIC CORPORATION	1400	0.066	0.39	I
CO0021687	801	MANCOS, TOWN OF	290	0.167	0.20	M
CO0039225	---	MARQUETTE MINERALS, INC	0	0.000	0.00	I-2
CO0022781	510	MEEKER SANITATION DISTRICT	606	0.160	0.40	M
CO0029203	190	MERIDIAN LAKE, INC.	0	0.000	0.00	M-7
CO0027456	510	MESA CO - GATEWAY SCHOOL	0	0.000	0.00	M-2
COG500071	---	MESA CO ROAD DEPARTMENT	0	0.000	0.00	I-2
CO0023485	300	MESA SKI CORPORATION	335	0.028	0.04	M
CO0032727	300	MESA WATER & SANITATION DISTRICT	1100	0.036	0.17	M-4A
CO0029611	100	METROPOLITAN MORTGAGE, BULLERT CORP.	160	0.009	0.01	I

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

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NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
CO0000396	100	MID CONTINENT RESOURCES, INC BA	880	0.055	0.20	I
CO0039136	100	MID CONTINENT RESOURCES, INC	0	0.000	0.00	I-2
CO0040495	100	MID-VALLEY METROPOLITAN DISTRICT	0	0.000	0.00	M-3
COG500079	100	MIDDLE PARK CONCRETE, CERTIFIED REDI-MIX	0	0.000	0.00	I-2
CO0000035	100	MILLER ENTERPRISES - EAGLE MINE	0	0.000	0.00	I-2
CO0039705	500	MILNER SEWAGE TREATMENT FACILITY	370	0.015	0.02	M
COG500119	100	MOBILE PREMIX COMPANY - RIFLE PIT	0	0.000	0.00	I-1
COG500120	500	MOBILE PREMIX COMPANY	0	0.000	0.00	I-1
COG500087	300	MOBILE PREMIX COMPANY - LOESCH PIT	0	0.000	0.00	I-2
CO0037621	500	MOFFAT COUNTY IMPROV - MAYBELL	625	0.006	0.02	M
CO0039624	220	MONTROSE, CITY OF STP	978	1.130	4.61	M
CO0039322	220	MONTROSE CO SCHOOL BOARD - OAK GROVE	0	0.002	0.00	M-3
CO0000124	220	MONTROSE CONCRETE COMPANY	0	0.000	0.00	I-1
CO0029301	300	MONUMENT MEADOWS PROPERTY OWNER ASSOC.	0	0.000	0.00	M-1
CO0022969	220	MORRISON CREEK METROPOLITAN WA	300	0.038	0.05	M
CO0040703	500	MT WERNER WATER & SANITATION-FISH CREEK	0	0.000	0.00	I-2
CO0031551	801	NARROW GAUGE MOBILE HOME PARK	860	0.006	0.02	M-4A
CO0036561	801	NATIONAL KING COAL INC - KING CO	0	0.000	0.00	I-2
CO0024007	310	NATURITA, TOWN OF	628	0.017	0.04	M
CO0020192	100	NEW CASTLE, TOWN OF	485	0.089	0.18	M-1
CO0040479	100	NEW CASTLE, TOWN OF WWTP	466	0.087	0.17	M
COG500089	100	NICHOLS BEN J - CALDWELL PIT	0	0.000	0.00	I-2
CO0038601	100	NIELSON INC - ORTIZ GRAVEL	0	0.000	0.00	I-1
CO0037168	190	NORTH ELK MEADOWS WWTP	815	0.001	0.00	M
CO0034096	220	NORTH FORK CONCRETE PRODUCTS	0	0.000	0.00	I-2
CO0031895	510	NORTH PARK MOBILE HOME PARK	0	0.000	0.00	M-2
CO0037177	500	NORTHERN COAL CO CRAIG LOADOUT	0	0.000	0.00	I-1
CO0036293	510	NORTHERN COAL CO-RIENAU #2	0	0.000	0.00	I-2
CO0037354	510	NORTHERN COAL COMPANY	0	0.000	0.00	I-2
CO0037931	510	NORTHERN COAL COMPANY	0	0.000	0.00	I-2
CO0036439	510	NORTHERN COAL COMPANY - NORTHERN	918	0.043	0.16	I
CO0039667	510	NORTHWEST PIPELINE CORPORATION	0	0.000	0.00	I-2
CO0032191	310	NORWOOD SANITATION DISTRICT	532	0.049	0.11	M
CO0020591	310	NUCLA SANITARY DISTRICT	215	0.320	0.29	M-4B
CO0037605	---	O C COAL MINE	0	0.000	0.00	I-2
CO0021393	500	OAK CREEK, TOWN OF	360	0.310	0.47	M-4B
CO0040908	500	OAK CREEK, TOWN OF WTP	___	_.___	0.00	I
CO0029947	100	OCCIDENTAL OIL SHALE - LOGAN WASH	1910	0.020	0.16	I
CO0020907	220	OLATHE, CITY OF	2390	0.190	1.90	M-5A
CO0028860	100	OURAY RANCH ASSOC. LTD.	0	0.000	0.00	M-2
CO0020087	220	OURAY SANITARY DIST	719	0.130	0.39	M
CO0036790	801	P & G MINING COMPANY, INC	342	0.120	0.17	I
CO0039586	801	P & G MINING COMPANY, INC.	592	0.190	0.47	I
CO0034193	300	PABCO INSULATION DIVISION	200	0.102	0.09	I-1
CO0031755	801	PAGOSA AREA WATER & SANITATION DIST	800	0.525	1.75	M-5A
CO0038032	801	PAGOSA AREA WATER & SANITATION DIST	1040	0.026	0.11	M-5A
CO0043432	---	PAGOSA AREA WATER & SANITATION DIST	___	_.___	0.00	I-7
CO0039659	801	PAGOSA PROPANE / TOVREA OIL	0	0.000	0.00	M-2
CO0022845	801	PAGOSA SPRINGS SAN DISTRICT	1060	0.400	1.77	M-5A
CO0039764	300	PALISADE, TOWN OF - SEWAGE LAGOON	380	0.200	0.32	M
CO0040100	300	PALISADE, TOWN OF WTP	180	0.001	0.00	I

NPDES PERMITS

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NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
CO0037583	801	PANDORO MINING COMPANY - ANGLO	0	0.000	0.00	I-1
CO0022713	300	PANORAMA IMPROVEMENT DISTRICT	429	0.067	0.12	M-4B
CO0021709	220	PAONIA, TOWN OF	1760	0.280	2.06	M
CO0000213	310	PEABODY COAL CO - NUCLA MINE	3920	0.052	0.85	I
CO0000221	500	PEABODY COAL CO - SENECA MINE	1243	0.097	0.50	I
CO0037656	500	PEABODY COAL CO - MESA GRAVEL	___	_.___	0.00	I-5E
CO0041033	---	PEERLESS RESOURCES, INC	180	0.025	0.02	I
CO0032638	500	PITTSBURG & MIDWAY COAL MINING	2580	0.500	5.38	I-5B
CO0027537	801	PONDEROSA KOA	620	0.008	0.02	M
CO0027146	300	POWDERHORN COAL COMPANY	1402	0.800	4.68	I-5A
CO0036617	300	POWDERHORN COAL COMPANY	0	0.000	0.00	I-2
CO0000027	300	PUBLIC SERVICE COMPANY - CAMEO STATION	2115	50.160	442.71	I-5B
CO0038610	801	PUEBLO COAL	1060	0.032	0.14	I
CO0040878	801	PURGATORY METRO DISTRICT WWTP	___	_.___	0.00	M-7
CO0020176	801	PURGATORY SANITARY DISTRICT	1230	0.080	0.41	M
CO0031887	100	QUANDARY BRECKENRIDGE CONDOMINIUM	___	_.___	0.00	M-1
CO0035807	220	QUINN COAL COMPANY	0	0.000	0.00	I-2
CO0039802	310	RADO REEF RESOURCES, EMMA MINE	920	0.072	0.28	I
CO0028525	100	RANCH AT ROARING FORK	631	0.031	0.08	M
CO0036366	801	RANCH WASTEWATER TREATMENT PLANT	___	0.014	0.00	M-3
CO0026972	510	RANGELY SANITATION DISTRICT	816	0.468	1.59	M
CO0000108	310	RAPHOLZ SILVER, INC - SILVER BELL	0	0.000	0.00	I-2
CO0021385	100	REDCLIFF SANITARY DISTRICT	230	0.245	0.24	M
CO0039551	100	REDSTONE 21-9 GEOTHERMAL WELL	22500	0.700	65.72	I-5C
CO0041564	---	REDSTONE CORPORTATION	___	_.___	0.00	M-7
CO0023922	100	REDSTONE WATER & SANITATION DISTRICT	330	0.034	0.05	M
CO0031402	801	RICKHOFF, LEO	0	0.000	0.00	M-2
CO0029106	220	RIDGWAY, TOWN OF	424	0.012	0.02	M
CO0020117	100	RIFLE, CITY OF	1110	0.714	3.31	M-1
CO0040738	100	RIFLE, CITY OF WWTP	1138	0.448	2.13	M
CO0030970	100	RIFLE VILLAGE SOUTH METRO DISTRICT	0	0.000	0.00	M-2
CO0034045	510	RIO BLANCO OIL SHALE PROJECT	0	0.000	0.00	I-2
CO0035947	190	RIVER BEND WASTEWATER TREATMENT	0	0.000	0.00	M-2
COG050071	300	ROAD DEPT - CO OF MESA - CONNECTED	0	0.000	0.00	I-2
CO0035653	500	ROCKCASTLE CO - GRASSY CREEK COAL MINE	0	0.000	0.00	I-2
CO0032590	500	ROUTT CO. FOR PHIPPSBURG COMMUNITY	611	0.042	0.11	M
CO0036277	801	SACKETT MINING CO SHALAKO MINE	0	0.000	0.00	I-1
CO0038342	100	SALT CREEK MINING COMPANY	3260	0.042	0.57	I
CO0040827	---	SALT CREEK MINING COMPANY	0	0.000	0.00	I-2
CO0032573	801	SAN JUAN AREA VOC-TECH SCHOOL	___	_.___	0.00	M-1
CO0031461	801	SAN JUAN RIVER RESORT INC	300	0.029	0.04	M
COG500093	220	SCHNEIDERS READY MIX CO	0	0.000	0.00	I-2
CO0041181	---	SCHOOL DISTRICT 9-R	___	_.___	0.00	I-7
CO0040860	310	SECURITY SAVINGS AND LOAN	0	0.000	0.00	M-2
CO0036978	801	SIERRA VERDE ESTATES	0	0.000	0.00	M-2
CO0029181	100	SILT, TOWN OF	811	0.234	0.79	M
CO0026867	220	SILVER SPRINGS TROUT FARM	564	1.000	2.35	I-5D
CO0020826	100	SILVERTHORNE - DILLON JT SW	350	1.463	2.14	M
CO0020311	801	SILVERTON, TOWN OF	350	0.650	0.95	M
CO0029599	100	SNOWMASS COAL CO - THOMPSON CREEK M	983	0.196	0.80	I
CO0037567	100	SNOWMASS COAL CO - UNIT TR	0	0.000	0.00	I-2

NPDES PERMITS

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CO0023086	100	SNOWMASS WATER & SANITATION	216	0.530	0.48	M
CO0036544	100	SNOWMASS WATER TREATMENT PLANT	93	0.010	0.00	I
CO0031810	100	SOPRIS VILLAGE JOINT VENTURE	0	0.000	0.00	M-2
CO0022632	---	SOUTH BLUE RIVER SANITATION	342	0.005	0.01	M
CO0041262	---	SOUTH DURANGO SANITATION DISTRICT	___	_.___	0.00	M-7
CO0037001	220	SPRING CREEK ESTATES LAGOON	___	_.___	0.00	M-7
CO0038075	510	STAGECOACH SANITATION INC	712	0.001	0.00	M
CO0032280	500	STEAMBOAT HEALTH & RECREATION	628	0.072	0.19	M-4A
CO0035556	500	STEAMBOAT LAKE SANITATION DISTRICT	200	0.021	0.02	M
CO0020834	500	STEAMBOAT SPRINGS, TOWN OF	224	3.964	3.71	M
CO0040894	100	STORM KING MINES - COAL RIDGE 1	0	0.000	0.00	I-2
CO0037508	310	SUCC BIDD - OHBAYASHI - DOLORES TN	0	0.000	0.00	I-1
CO0029955	100	SUMMIT COUNTY - SNAKE RIVER	328	0.552	0.76	M
CO0036030	500	SUN COAL COMPANY INC - MEADOWS N	0	0.000	0.00	I-2
CO0036668	500	SUNLAND MINING CORP APEX #2 MI	0	0.000	0.00	I-2
CO0038598	100	SUNLIGHT SKI AREA & REC COMPLEX	282	0.302	0.36	M
CO0027529	801	SUNNYSIDE GOLD - AMERICAN	986	2.240	9.22	I-5A
CO0000426	801	SUNNYSIDE GOLD - MAYFLOWER	253	0.855	0.90	I
CO0036056	801	SUNNYSIDE GOLD - TERRY TUNNEL	0	0.000	0.00	I-2
CO0041355	---	SWANS NEST UTILITY COMPANY	___	0.070	0.00	M-2
CO0035815	100	TALBOT ENTERPRISES	1330	0.044	0.24	I
CO0035939	801	TAMARRON WASTEWATER PLANT	1375	0.170	0.98	M
CO0027472	310	TELLURIDE SKI AREA	320	0.009	0.01	M
CO0020869	310	TELLURIDE, TOWN OF	295	0.275	0.34	M-4B
CO0039527	310	TELLURIDE, TOWN OF WTP	133	0.066	0.04	I
COG500004	---	TERRA CONSTRUCTION COMPANY	___	_.___	0.00	I-7
CO0039756	220	TERROR CREEK CO - PACIFIC BASIN	0	0.000	0.00	I-2
CO0037681	100	THREE LAKES WATER & SANITATION - WILLOW	344	0.350	0.50	M
CO0037699	100	THREE LAKES WATER & SANITATION-SUN VALLEY	208	0.002	0.00	M
CO0041165	---	THREE RIVERS RESORT, INC	___	_.___	0.00	M-7
CO0037672	190	TIMBERLINE MINING INC	0	0.000	0.00	I-1
CO0040550	---	TORO DE PLATA, INC	0	0.730	0.00	I
CO0032115	500	TRAPPER MINING INC	1400	0.050	0.29	I
CO0036684	500	TWENTYMILE COAL CO	3440	0.049	0.70	I
CO0041009	801	TXO PRODUCTION CORP	0	_.___	0.00	I-1
CO0000515	310	UMETCO MINERALS CORP - URAVAN WWTP	13400	0.000	0.00	I-2
CO0020648	310	UMETCO MINERALS CORP - URAVAN	0	0.000	0.00	M-1
CO0039101	220	UNCOMPAHGRE VISTA SUBDIV WWT	0	0.000	0.00	M-1
CO0039918	100	UNION OIL CO - PARACHUTE CREEK	0	0.000	0.00	I-2
CO0038121	100	UNION OIL TEMP CAMP	0	0.000	0.00	M-2
COG500047	---	UNITED COMPANIES OF MESA	5126	0.036	0.77	I
COG500020	300	UNITED SAND & GRAVEL COMPANY	5280	0.032	0.71	I
COG500142	300	UNITED SAND & GRAVEL COMPANY	0	0.000	0.00	I-2
CO0024431	100	UPPER EAGLE VALLEY SANITATION	700	0.300	0.88	M-4A
CO0037311	100	UPPER EAGLE VALLEY SANITATION	330	2.041	2.81	M-4B
CO0000132	220	US STEEL CORP - SOMERSET	3765	0.600	9.43	I-5B
CO0027511	300	USBOR - COLLBRAN JOB CORPS	___	0.000	0.00	M-1*
CO0021725	100	USBOR - GREEN MTN GOVT CAMP	___	_.___	0.00	I-7*
CO0021741	100	USBOR - GREEN MTN POWER PLANT	___	_.___	0.00	M-7*
CO0021351	220	USBOR - MORROW POINT DAM	___	_.___	0.00	I-7*
CO0034398	801	USDI-NPS-MESA VERDE NAT'L PARK	___	0.028	0.00	M-7*

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CO0000086	220	USFWS - HOTCHKISS NFH	___	6.490	0.00	I-7*
CO0022578	220	USFWS - HOTCHKISS NFH STP	0	0.000	0.00	I-2*
CO0000205	300	UTE WATER CONSERVATION DISTRICT - WA	159	0.631	0.42	I
CO0030465	100	VAIL ASSOCIATES INC	1040	0.013	0.06	M
CO0021369	100	VAIL SANITARY DISTRICT	300	2.100	2.63	M-4B
COG500010	190	VALCO INC - GUNNISON CONCRETE	0	0.000	0.00	I-2
CO0031437	801	VALLECITO RESORT	510	0.001	0.00	M
CO0027197	100	VALLEY OF THE BLUE WWTP	210	0.002	0.00	M-1
CO0037702	801	VISTA VERDE VILLAGE	0	0.000	0.00	I-2
CO0037206	220	WALKER MINING & MILLING INC	0	0.000	0.00	I-2
CO0038776	220	WEST ELK COAL COMPANY (WECC)	780	0.069	0.22	I
CO0024317	100	WEST GLENWOOD SPRINGS SANITATION DISTRICT	396	0.299	0.49	M
CO0030499	220	WEST MONTROSE SANITATION DISTRICT	1800	0.130	0.98	M
CO0038024	510	WESTERN FUELS UTAH INC - DESERAD	7077	0.100	2.95	I-5
CO0033146	220	WESTERN SLOPE CARBON	854	0.095	0.34	I
CO0031062	500	WHITEMAN SCHOOL	197	0.008	0.01	M
COG500122	220	WHITEWATER BLDG - 29 ROAD	0	0.000	0.00	I-2
COG500123	220	WHITEWATER BLDG - DYKE ROAD	0	0.000	0.00	I-2
COG500127	220	WHITEWATER BLDG - HWY 141	___	_.___	0.00	I-7
COG500062	---	WILLIAMS FORK COMPANY	2392	1.340	13.38	I-5E
CO0026051	100	WINTER PARK WATER & SANITATION	300	0.180	0.23	M
CO0035319	801	WOLF CREEK VILLAGE MOBILE HOME	0	0.000	0.00	M-2
CO0028762	220	WOODGATE SUBDIVISION	2300	0.006	0.06	M
CO0030635	500	YAMPA, TOWN OF	192	0.058	0.05	M
CO0023442	100	YMCA SNOW MTN RANCH	0	0.000	0.00	M-2
NM0027995	801	ARCO MATERIALS INC.	___	1.080	0.00	I-3
NM0000019	801	ARIZONA PUBLIC SERVICE CO. - FOUR CORNER	630	12.090	31.78	I-5B
NM0020168	801	AZTEC WASTEWATER TREATMENT PLANT	___	0.430	0.00	M-7
NM0028142	801	BLOOMFIELD SCHOOLS WASTEWATER TREATMENT	0	_.___	0.00	I-7
NM0020770	801	BLOOMFIELD WASTEWATER TREATMENT PLANT	713	0.603	1.79	M-4A
NM0029538	900	CARBON COAL (CARBON #2 MINE)	0	0.000	0.00	I-2
NM0029251	801	CARBON COAL (MENTMORE MINE)	0	0.000	0.00	I-2
NM0028584	801	CONSOLIDATION COAL CO.	0	0.000	0.00	I-2
NM0029599	801	FARMINGTON ELEC. UTILITIES, NAVAJO DAM	0	0.000	0.00	I-2
NM0029572	801	FARMINGTON MUNICIPAL OPERATIONS CENTER	0	0.000	0.00	I-5E
NM0000043	801	FARMINGTON POWER PLANT (ANIMAS)	0	3.900	0.00	I-6
NM0028258	801	FARMINGTON SAND AND GRAVEL	0	0.000	0.00	I-2
NM0020583	801	FARMINGTON WASTEWATER TREATMENT PLANT	828	3.400	11.75	M-6
NM0000051	801	FARMINGTON WATER TREATMENT PLANT	0	0.220	0.00	I-3
NM0029025	801	FOUTZ AND FOUTZ INVESTMENT, INC.	___	_.___	0.00	I-7
NM0020672	900	GALLUP WASTEWATER TREATMENT PLANT	___	2.500	0.00	M-7
NM0027774	900	INDIAN HILLS MHP	___	_.___	0.00	M-7
NM0020621	801	INDIAN LAND - NTUA (SHIPROCK WWTP)	578	0.570	1.37	M-4A*
NM0029505	801	LA PLATA MINE	0	0.000	0.00	I-2
NM0028878	801	NAVAJO DAM WATER POWER RES., USDIBOR	0	0.000	0.00	I-2*
NM0020630	900	NTUA CROWNPOINT WASTEWATER TREATMENT	___	0.200	0.67	M-7*
NM0020613	900	NTUA NAVAJO WASTEWATER TREATMENT PLANT	___	0.120	0.39	M-7*
NM0028274	900	PHILLIPS URANIUM CORPORATION	0	0.000	0.00	I-2
NM0028606	801	PUBLIC SERVICE CO OF NM - SAN JUAN	0	0.000	0.00	I-2
NM0020524	900	QUIVIRA MINING COMPANY - CHURCH ROCK	___	0.000	0.00	I-5B

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
NM0023396	900	RAMAH WASTEWATER TREATMENT PLANT	0	0.290	0.00	M-3
NM0000027	801	SAN JUAN GRAVEL PRODUCTS CO.	---	0.200	0.00	I-3
NM0029475	801	SUNBELT MINING CO., INC.	0	0.000	0.00	I-2
NM0028550	900	UNITED NUCLEAR CORPORATION CHURCH ROCK	0	0.000	0.00	I-2
NM0020401	900	UNITED NUCLEAR CORPORATION NE CHURCH ROCK	0	0.000	0.00	I-2
NM0020869	801	USDIBIA, CRYSTAL BOARDING SCHOOL	0	0.000	0.00	M-2*
NM0021016	801	USDIBIA, LAKE VALLEY BOARDING SCHOOL	0	0.000	0.00	M-1*
NM0020800	801	USDIBIA, NENAHNEZAD BOARDING SCHOOL	---	0.000	0.00	M-1*
NM0020991	801	USDIBIA, PUEBLO PINTADO BOARDING SCHOOL	0	0.000	0.00	M-1*
NM0020818	801	USDIBIA, SANOSTEE BOARDING SCHOOL	---	0.000	0.00	M-1*
NM0020982	801	USDIBIA, STANDING ROCK BOARDING SCHOOL	0	0.000	0.00	M-1*
NM0028193	801	UTAH INTERNATIONAL INC.	0	0.000	0.00	I-2
NM0028746	801	WESTERN COAL - SAN JUAN MINE	0	0.000	0.00	I-2
NV0021261	910	CLARK COUNTY SD #1	1420	38.790	229.86	M-4A
NV0000078	910	KERR - MCGEE CHEMICAL	652	0.200	0.54	I
NV0020133	910	LAS VEGAS, CITY OF	931	33.270	129.26	M-4A
NV0020192	910	NV DEPT FISH & GAME	577	3.600	8.67	I-5D
NV0020923	910	STAUFFER CHEMICAL CO	0	0.000	0.00	I-2
NV0000060	910	TITANIUM METALS	624	4.900	12.76	I-5A
UT0021091	610	ALTAMONT, CITY OF	0	0.000	0.00	M-2
UT0000167	510	AMERICAN GILSONITE CO	2453	0.162	1.66	I-5E
UT0024112	600	AMOCO MINERALS CO - SUNNYSIDE TRIAL	0	0.000	0.00	I-1
UT0024147	600	ANDALEX	---	---	0.00	I-2
UT0023507	600	ANDALEX - PINNACLE COAL MINE	2050	0.072	0.62	I
UT0024180	610	ASAMERA OIL - HANSEN #1	0	0.000	0.00	I-2
UT0020028	411	ASHLEY VALLEY SEWER BOARD	0	0.000	0.00	M-2
UT0020133	802	ATLANTIC RICHFIELD CO-ENGLISH	1060	0.130	0.58	I
UT0023922	300	ATLAS MINERALS RIM MINE	369	0.001	0.00	I
UT0023906	710	ATLAS MINERALS SNOW PROBE MINE	0	0.000	0.00	I-2
UT0023914	300	ATLAS MINERALS VELVET MINE	520	0.186	0.40	I
UT0023124	710	BEAVER CREEK COAL - GORDON CREEK	435	0.007	0.01	I
UT0023116	710	BEAVER CREEK COAL - HUNTINGTON	0	0.000	0.00	I-2
UT0023060	600	BEAVER CREEK COAL - GORDON 3 & 6	0	0.000	0.00	I-2
UT0023949	600	BEAVER CREEK COAL COMPANY	0	0.000	0.00	I-2
UT0024139	300	BIG HORN OIL, INC.	0	0.000	0.00	I-2
UT0023647	600	BLAZON NO 1 MINE	0	0.000	0.00	I-1
UT0020451	510	BONANZA, CITY OF	0	0.000	0.00	M-2
UT0023761	600	C & W MINE # 1	0	0.000	0.00	I-2
UT0023663	710	CASTLE VALLEY SPECIAL SERVICE	---	0.650	0.00	M
UT0022489	700	CHAPPELL'S CHEESE COMPANY	0	0.000	0.00	I-2
UT0000230	411	CHEVRON RESOURCES COMPANY	0	0.000	0.00	I-2
UT0022411	600	CLEAR CREEK UTILITIES, INC.	0	0.000	0.00	M-2
UT0023612	710	CO-OP MINING COMPANY	0	0.000	0.00	I-2
UT0023671	710	COAL SEARCH CORPORATION - KNIGHT COAL MINE	0	0.000	0.00	I-2
UT0023540	600	COASTAL STATES ENERGY CO-UTAH	500	0.350	0.73	I-5E
UT0024040	700	CONSOLIDATED COAL - EMERY PLANT	0	0.000	0.00	I-2
UT0022624	700	CONSOLIDATED COAL CO. - SURFACE MINE	0	0.000	0.00	I-2
UT0022616	700	CONSOLIDATED COAL CO-UNDERGROUND	3564	0.310	4.61	I-5E
UT0020095	610	DUCHESNE CITY CORP	952	0.200	0.79	M-4A

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
UT0024279	600	E CARBON CITY - SUNNYSIDE CWTP	0	0.000	0.00	M-2
UT0000124	411	ENERGY RESERVES GP	1329	1.081	6.00	I-5E
UT0000035	411	EQUITY OIL CO	1360	1.400	7.95	I-5E
UT0020052	710	FERRON, CITY OF	1072	0.200	0.89	M
UT0023876	600	FIRST WESTERN COAL CO- ALETHA #1	0	0.000	0.00	I-2
UT0024368	710	GENWAL COAL CO, INC-CRANDALL	600	_.___	0.00	I
UT0020958	600	GREEN RIVER, CITY OF	0	0.000	0.00	M-2
UT0000787	600	GREEN RIVER, CITY OF	0	0.000	0.00	M-5A
UT0022748	600	HIAWATHA	0	0.000	0.00	M-2
UT0021792	411	HOLLANDSWORTH & TRAVIS	1940	0.105	0.85	I-5E
UT0021296	710	HUNTINGTON, CITY OF	3000	0.220	2.75	M-4A
UT0024015	411	INTERMOUNTAIN CONCRETE	1644	0.100	0.69	I
UT0024376	600	KAISER - WELLINGTON	0	0.000	0.00	I-2
UT0022942	600	KAISER STEEL CORP - SUNNYSIDE	1420	1.200	7.11	I-5E
UT0022926	600	KAISER STEEL CORP-UNITED STATES STEEL CORP	0	0.000	0.00	I-2
UT0020401	900	KANAB CITY CORP	0	0.000	0.00	M
UT0021377	600	KENILWORTH UTILITIES CO	0	0.000	0.00	M-2
UT0021768	411	LACY-R INC	1544	0.345	2.22	I-5E
UT0020443	411	MANILA, TOWN OF	2800	0.143	1.67	M-4A
UT0023396	300	MINERALS EVALUATION & INVEST	0	0.000	0.00	I-2
UT0020419	300	MOAB, CITY OF	530	0.700	1.55	M
UT0023108	300	MOAB READY-MIX CO	0	0.000	0.00	I-1
UT0021997	802	MONTICELLO CITY (WATER TREATMENT PLANT)	0	0.000	0.00	M-1
UT0023001	610	NEOLA TOWN WATER & SEWER ASSOC.	650	0.020	0.05	M-5A
UT0024287	610	NORTH FORK SIPHON - SUCCESSFUL BIDDER	___	_.___	0.00	I-7
UT0024163	510	PARAHO-UTE OIL SHALE FACILITY	0	0.000	0.00	I
UT0022527	610	PENNZOIL	0	0.000	0.00	I-2
UT0023736	600	PLATEAU MINING COMPANY	837	0.144	0.50	I-5E
UT0024341	600	PLEASANT VALLEY COAL - KINNEY #2	0	0.000	0.00	I-1
UT0000183	411	PRECISION ENGINEERING, INC	1996	0.067	0.56	I
UT0023086	600	PRICE RIVER COAL COMPANY	2400	0.015	0.15	I
UT0021814	600	PRICE RIVER WATER IMP DIST	1178	2.640	12.98	M
UT0024295	710	RILDA CANYON MINE - WEST APPA	0	0.000	0.00	I-1
UT0000311	802	RIO ALGOM CORP - LISBON MINE	7003	0.400	11.69	I-5E
UT0024228	510	SEEP RIDGE SHALE OIL COMPANY	0	0.000	0.00	I-2
UT0023680	600	SOLDIER CREEK COAL CO	860	0.297	1.07	I-5E
UT0023701	710	SOLDIER CREEK COAL CO HIDDEN VALLEY	0	0.000	0.00	I-2
UT0023817	600	SOLDIER CREEK COAL COMPANY	0	0.000	0.00	I-2
UT0022918	700	SOUTHERN UTAH FUEL	580	1.200	2.90	I-5E
UT0021776	905	ST GEORGE, CITY OF	1366	2.960	16.87	M
UT0024031	600	SUNCO ENERGY DEVELOPMENT CO	0	0.000	0.00	I-2
UT0000761	300	TEXASGULF, INCORPORATED, MOAB POTASH OPERAT	0	0.000	0.00	I-2
UT0024104	510	TOSCO DEVELOPMENT CORP - SAND WASH PROJECT	0	0.000	0.00	I-2
UT0023728	710	TRAIL MOUNTAIN COAL CO	0	0.000	0.00	I-2
UT0023370	900	TROPIC TOWN	0	0.000	0.00	M-2
UT0024171	411	TXO PROD CORP - ASPHALT CREEK FED 1	0	0.000	0.00	I-2
UT0023841	610	TYGER CONSTRUCTION CO, INC-UPPER STILLWATER	___	0.640	0.00	I-7
UT0023931	600	UCO, INC - SCOFIELD MINE	0	0.000	0.00	I-2
UT0023990	600	UCO, INCORPORATED	0	0.000	0.00	I-2
UT0023787	411	UNDERGROUND CONSTRUCT CO-TYZACK PUMPING	0	0.000	0.00	I-1
UT0023094	600	UNITED STATES FUEL CO	742	0.007	0.02	I-5E

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
UT0021121	411	USBOR - DUTCH JOHN COMMUNITY	0	0.000	0.00	I-2
UT0020338	411	USBOR - FLAMING GORGE DAM	800	0.060	0.20	I
UT0024252	610	USBOR - SOLDIER CREEK DAM	___	_.___	0.00	I-7
UT0023035	610	USBOR - STILLWATER	0	0.000	0.00	I-1
UT0024023	610	USBOR UPPER STILLWATER DAM/TUN	___	_.___	0.00	I-7
UT0000213	411	USFWS - JONES HOLE NFH	250	21.600	22.53	I-5D
UT0022811	700	UTAH DIV OF WILDLIFE - J PERRY EAGON	120	11.600	5.81	I-5D
UT0000256	700	UTAH DIV OF WILDLIFE - LOA	200	8.650	7.22	I-5D
UT0000191	610	UTAH DIV OF WILDLIFE - WHITEROCK	300	5.500	6.89	I-5D
UT0022896	710	UTAH POWER & LIGHT CO (WILBERG MINE)	1300	0.080	0.43	I
UT0023426	710	UTAH POWER & LIGHT (HUNTER)	0	0.000	0.00	I-2
UT0023591	710	UTAH POWER & LIGHT CO (DES BEE DOVE MINE)	7000	0.007	0.20	I
UT0000094	600	UTAH POWER & LIGHT CO (CARBON)	1200	0.300	1.50	I-5B
UT0023604	710	UTAH POWER AND LIGHT CO (DEER CREEK)	0	0.000	0.00	I
UT0022985	600	VALLEY CAMP OF UTAH INC	510	0.144	0.31	I-5E
UT0020184	900	WASHINGTON CITY	0	0.000	0.00	M-2
UT0023515	710	WESTERN STATES MINERALS CORP	0	0.000	0.00	I-2
UT0024121	610	WHITE RIVER DAM - SUCCESSFUL BIDDER	0	_.___	0.00	I-2
UT0024261	510	WHITE RIVER SHALE OIL CORP	0	0.000	0.00	I-2
WY0026671	401	AMERICAN FAMILY INN	616	0.010	0.03	M
WY0033448	411	AMOCO SKULL POINT	0	0.000	0.00	I-2
WY0023523	500	ANDOVER MINERALS	50	0.500	0.10	I
WY0022128	401	B & R INC	704	0.050	0.15	M
WY0022888	500	BAGGS, TOWN OF	750	0.080	0.25	M
WY0020133	500	BIG PINEY, TOWN OF	724	0.500	1.51	M
WY0030261	401	BLACK BUTTE COAL COMPANY	0	0.000	0.00	I-2
WY0030350	401	BRIDGER COAL COMPANY	0	0.000	0.00	I-2
WY0033111	411	CHEVRON SLURRY PUMP STATION	832	0.014	0.05	I
WY0031411	500	CHEYENNE, CITY OF - BD PUB UTIL	0	0.000	0.00	I-2
WY0023132	411	CHURCH & DWIGHT CO INC	1500	0.006	0.04	I
WY0032727	401	COLO INTERSTATE GAS CO - TABLE	1240	0.021	0.11	M
WY0030406	401	CUMBERLAND COAL	0	0.000	0.00	I-2
WY0021938	500	DIXON, TOWN OF	750	0.010	0.03	M
WY0032085	401	ELF AQUATAIN	352	0.005	0.01	M
WY0032450	401	EXXON	0	0.000	0.00	I-2
WY0032409	401	EXXON	0	0.000	0.00	M-1
WY0032549	401	EXXON CO - BIG PINEY MANCAMP	660	0.050	0.14	M-1
WY0032701	401	EXXON CORP - LABARGE PROJ	0	0.000	0.00	I-2
WY0032689	401	EXXON CORP - LABARGE PROJ	0	0.000	0.00	I-2
WY0031763	401	FMC	0	0.000	0.00	I-2
WY0027626	401	FMC WYOMING CORPORATION	0	0.000	0.00	I-2
WY0030881	401	FOOTHILLS SUBDIVISION	0	0.000	0.00	M-2
WY0022071	411	FORT BRIDGER	588	0.250	0.61	M
WY0022373	411	GRANGER, TOWN OF	0	0.000	0.00	M-2
WY0020443	401	GREEN RIVER, CITY OF	870	0.500	1.82	M
WY0033553	411	HAGENSTEIN GRAVEL	0	0.000	0.00	I-2
WY0020320	411	KEMMERER, TOWN OF	720	1.000	3.00	M
WY0000116	411	KEMMERER, TOWN OF WTP	388	0.035	0.06	I
WY0022080	411	LA BARGE, TOWN OF	976	0.080	0.33	M
WY0030473	401	LAKE VIVA NAUGHTON MARINA	900	0.001	0.00	M

NPDES PERMITS

COLORADO RIVER BASIN SALINITY CONTROL FORUM

JUNE, 1987

NPDES #	REACH	NAME	CONCENTRATION MG/L	FLOW RATE MGD	SALT LOAD TONS/DAY	EXPLANATION CODE
WY0020117	411	LYMAN, TOWN OF	686	0.320	0.92	M
WY0021997	401	MARBLETON	700	0.150	0.44	M
WY0022896	411	MOUNTAIN VIEW	546	0.150	0.34	M
WY0026841	411	OPAL LTD	1704	0.010	0.07	M
WY0031615	401	PACIFIC POWER & LIGHT (BRIDGER)	5000	0.100	2.09	I-5B
WY0000027	401	PACIFIC POWER & LIGHT (GREEN RIVER WTP)	0	0.000	0.00	I-2
WY0020656	401	PINEDALE, TOWN OF	100	1.000	0.42	M
WY0000051	411	PITTSBURG AND MIDWAY COAL MINE	0	0.000	0.00	I-2
WY0028886	401	PROSPECT POINT COAL	0	0.000	0.00	I-2
WY0032956	411	RECOSOL	0	0.000	0.00	I-2
WY0021814	401	RMT PROPERTIES, INC	0	0.000	0.00	M-2
WY0022357	401	ROCK SPRINGS, CITY OF	760	2.000	6.34	M
WY0021806	401	SOUTH SUPERIOR	0	0.000	0.00	M-2
WY0024546	500	SUGAR CREEK RESOURCES	3500	0.002	0.03	I
WY0000043	401	UNION PACIFIC RR - GREEN RIVER	1500	0.030	0.19	I
WY0020311	411	UTAH POWER & LIGHT CO (NAUGHTON)	820	5.730	19.61	I-5B
WY0026093	401	VOLCIC MOBILE HOME PARK	0	0.000	0.00	M-2
WY0024457	401	WESTERN HILLS TRAILER COURT	684	0.040	0.11	M
WY0023825	401	WINTON COAL CO	0	0.000	0.00	I-2
WY0023809	401	W-K MOBILE HOME PARK	0	0.000	0.00	M-2
WY0000094	401	WYO. FISH AND GAME - BOULDER	___	_.___	0.00	I-5D
WY0000086	401	WYO. FISH AND GAME - DANIEL	___	_.___	0.00	I-5D
WY0023124	401	WYOMING RANGE M.H.P.	0	0.000	0.00	M-2
WY0030252	401	ZANETTI PETE, PURPLE SAGE SUBDIVISION	0	0.000	0.00	M-2

SUPPLEMENT TO

1987 REVIEW

SUPPLEMENTAL REPORT ON THE 1987 REVIEW

WATER QUALITY STANDARDS FOR SALINITY

COLORADO RIVER SYSTEM

August 1987

August 1987

Supplemental Report on the 1987 Review

WATER QUALITY STANDARDS FOR SALINITY COLORADO RIVER SYSTEM

Prepared by
Colorado River Basin Salinity Control Forum

COLORADO RIVER BASIN SALINITY CONTROL FORUM
MEMBERS

ARIZONA

C. Laurence Linser, Deputy Director
Department of Water Resources
Dr. Ronald L. Miller, Manager
Department of Health Services
Stewart Udall, Attorney at Law,
Central Arizona Water Conservation District

CALIFORNIA

Myron B. Holburt, Assistant General Manager
The Metropolitan Water District
of Southern California
Walter G. Pettit, Deputy Executive Director
State Water Resources Control Board
Dennis B. Underwood, Executive Director
Colorado River Board of California

COLORADO

J. William McDonald, Director
Colorado Water Conservation Board
David Robbins, Attorney at Law
Gary Broetzman, Assistant to the Director
Office of Health and Environmental Protection

NEVADA

Jack L. Stonehocker, Director
Colorado River Commission of Nevada
Lewis H. Dodgion, Administrator
Division of Environmental Protection
Roland D. Westergard, Director
Department of Conservation and Natural Resources

NEW MEXICO

Stephen E. Reynolds, State Engineer

UTAH

D. Larry Anderson, Director
Division of Water Resources
Calvin K. Sudweeks, Director
Bureau of Water Pollution Control
Division of Environmental Health

WYOMING

Gordon W. Fassett, State Engineer
William L. Garland, Administrator
Department of Environmental Quality
Dan S. Budd, Commissioner
Interstate Streams

Jack A. Barnett, Executive Director
Colorado River Basin Salinity Control Forum
106 W. 500 South, Suite 101
Bountiful, Utah 84010

CONTENTS

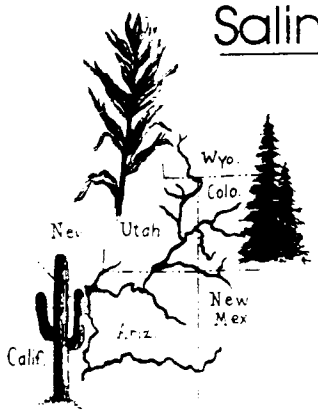
TRANSMITTAL LETTERS

The Federal Water Pollution Control Act requires that at least once every three years the states of the Colorado River Basin review water quality standards relating to the salinity of the waters of the Colorado River. The states collectively initiate this review under the auspices of the Colorado River Basin Salinity Control Forum and prepare a proposed report and, after holding public meetings, prepare a supplemental report.

Upon the Forum's adoption of these two reports, they are transmitted to the individual states for their own independent action. The following is an example copy of the transmittal letter to the Governor of the State of Arizona. Following this letter is a listing of the governors in each of the other six Colorado River Basin states who will receive an identical letter.

Colorado River Basin

Salinity Control Forum



Honorable Evan Meacham
Governor of Arizona
Statehouse
Phoenix, Arizona 85007

Dear Governor Meacham:

Enclosed is a copy of the Proposed Report on the 1987 Review - Water Quality Standards for Salinity, Colorado River System, approved on May 28, 1987, by the seven-state Colorado River Basin Salinity Control Forum.

Subsequent to the May approval, two regional public meetings were held to provide an opportunity for those who desired to present comments or suggestions on the proposed report. The meetings were held on July 20, 1987, in Vernal, Utah, and on July 22, 1987, in Las Vegas, Nevada.

Also enclosed is a copy of a supplemental report which includes modifications to the report based on comments and suggestions received. The attached supplement was approved by the Forum on August 21, 1987. The report and the supplement constitute the 1987 review of the Water Quality Standards for Salinity of the Colorado River System.

106 West 500 South, Suite 101
Bountiful, Utah 84010
(801) 292-4663

Section 303(c)(1) of the Clean Water Act requires:

> The Governor of a State or the State Water pollution control agency of such State shall from time to time (but at least once each three year period beginning with the date of enactment of the Federal Water Pollution Control Act Amendments of 1972) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Results of such review shall be made available to the Administrator.

The enclosed report and its supplement recommends no change in the numeric criteria for salinity, but reflects some changes in the plan of implementation previously adopted by the Forum. The Forum urges that each state's water quality control agency adopt the 1987 Review as appropriate, thus preserving the basin-wide approach to salinity control developed by the basin states over the last decade. The Forum urges that your state take prompt action in adopting this review.

Sincerely,

David Robbins

Chairman

Enclosure

cc: Arizona Forum Members

Identical transmittal letter sent to each of the following:

Honorable George Deukmejian
Governor of California
State Capitol
Sacramento, California 95814

Honorable Roy Romer
Governor of Colorado
State Capitol
Denver, Colorado 80203

Honorable Richard Bryan
Governor of Nevada
State Capitol
Carson City, Nevada 89701

Honorable Garrey Carruthers
Governor of New Mexico
State Capitol
Santa Fe, New Mexico 87501

Honorable Norman H. Bangerter
Governor of Utah
State Capitol
Salt Lake City, Utah 84114

Honorable Mike Sullivan
Governor of Wyoming
State Capitol
Cheyenne, Wyoming 82002

STATEMENTS, COMMENTS, AND FORUM RESPONSE

INTRODUCTION

The Supplemental Report on the 1987 Review - Water Quality Standards for Salinity, Colorado River System, contains statements and comments received by the Forum and the Forum's response to one statement (page 10). Statements and comments were received at public meetings held in Vernal, Utah, on July 20, 1987, and in Las Vegas, Nevada, on July 22, 1987. Written comments received by July 24, 1987, were also accepted. The supplement also includes the correction of typographical errors. All comments or statements received are presented.

Clark County
Sanitation District
E. JAMES GANS
DIRECTOR
5857 E. FLAMINGO ROAD
LAS VEGAS, NEVADA 89122
(702) 458-1180

July 14, 1987

Mr. Jack L. Stonehocker
Colorado River Commission of Nevada
1515 East Tropicana Avenue
Las Vegas, Nevada 89109

PROPOSED REPORT ON THE 1987 REVIEW OF WATER QUALITY STANDARDS FOR SALINITY

Thank you for your letter dated July 2, 1987 forwarding a copy of the "Proposed Report on the 1987 Review of Water Quality Standards for Salinity-Colorado River System" and advising us of the public meeting to receive comments. As you probably realize, the District has been interested in and closely following the forum's deliberations since the mid 1970's as it was apparent we would be impacted by its recommendations.

We have reviewed the subject report from our perspective as a municipal discharger to the Colorado River. We continue to acknowledge and support the Colorado River Basin Salinity Control Forum's general goals to control, and where cost effective and technically viable, reduce salinity in the drainage. As you are aware, District NPDES permits already contain references to salinity limitations, public education programs, and require a summary report for the entire Las Vegas Valley, which we provide to the state each year.

We have one specific report content comment and a strong general concern that we hope the forum will consider. Our specific comment relates to page E-11 of the report. The data for the Clark County Sanitation District (no longer designated "No. 1") is obviously from several years ago (1983 or 1984). In addition, we are designated as not measuring our inflow consistent with Forum policy. We are unsure of where or how we are failing to comply and request a clarification of this designation.

Our concern with the subject report and the Forum's 1977 policy toward dischargers is with what we view as a dramatic and unwarranted emphasis on control of municipal and industrial dischargers. The Forum's own report indicates that the combined discharges of all municipal and industrial facilities are only one percent of the Colorado Basin salinity sources (page 6). A quick review of Appendix E, which summarizes all NPDES salinity contributions, indicates that roughly 36 percent of these discharges are municipal in nature, further reducing the municipal impact on salinity to less than 1% overall.

While we recognize that it is certainly easier to account for and regulate man-made point sources of salinity, the data clearly indicate that the combined impact of all these sources is negligible.

In consideration of the above, it is our opinion that the present Forum policy and 1987 report recommendations supporting imposition of a 400 mg/l incremental increase limitation on municipal dischargers is unwarranted and will provide no measureable improvement in overall water quality. It also places a significant liability on municipal dischargers with regard to potential violations of a standard which, to our knowledge, has little or no data supporting it.

Another aspect of the present basin-wide incremental increase standard that we find inequitable is the apparent lack of consideration for higher increases caused by higher raw water salinity. For example, municipal water supplies with high levels of dissolved salts will result in a higher consumer use of detergents, chelating agents and water softeners, which increase the salt load to a municipal wastewater treatment plant. We recognize that the 1977 Forum policy does provide for a waiver of the 400 mg/l incremental increase, but it also places the burden upon the municipal discharger to prepare costly alternative control and economic analyses to justify the waiver.

We conclude the Forum's present policy and recommendations are unreasonable for several reasons. First, the apparent lack of data supporting the 400 mg/l standard. Second, the lack of justification of any standard for municipal dischargers due to their negligible contribution to salinity. And third, the potentially significant economic

impacts on municipal dischargers to identify, monitor and control inputs to their sewer systems, to provide desalinization facilities, and/or to bear NPDES permit violation fines.

We, therefore, respectfully request that the Forum review and revise its policy regarding municipal dischargers, taking into consideration the issues raised above, with special emphasis on the costs versus benefits of specific municipal discharge salinity limitations.

Please be assured that the Clark County Sanitation District is concerned about minimizing salinity impacts to the Colorado River and supports a program in which control measures are justified by sound technical analysis, and costs and responsibilities for salinity reduction are proportionate to the source impact on basin salinity.

My staff and I are available if you should wish to discuss our comments further. We thank you for the opportunity to review the Forum's report.

E. James Gans

E. JAMES GANS
Director

EJG:DAS:ab

cc: Richard Holmes, Clark County Comprehensive Planning
Lewis Dodgion, Department of Environmental Protection
Roland Westergard, Dept. of Conservation & Natural Resources

FORUM RESPONSE

The Clark County Sanitation District (District) in its written and oral comments suggested that the Forum policy on municipal discharges is unreasonable. A portion of their concern centered on the validity of the 400 mg/l incremental increase. Although implementation of Forum policies, including the one on municipal discharges, is a part of the 1987 Plan of Implementation for salinity control, any suggestion for change in policy must be addressed through the Forum. This can be accomplished through the Forum representatives from Nevada.

The District contends that the municipal discharge impacts on salinity are insignificant; therefore, regulation of these salinity discharges is unnecessary. Central to the solution of the salinity problem in the Colorado River, however, is the premise that no salt contribution can be ignored. The Forum fully believes that any and all sources of salinity, no matter how small, need to be addressed.

The Clark County Sanitation District predicts significant economic impacts on municipal discharges in complying with the municipal discharge policy. Forum policy provides a mechanism for obtaining a waiver from the 400 mg/l incremental increase upon satisfactory demonstration that meeting the policy is not practicable.

It should also be noted that further clarification as to the District's permit designation is made in the "Corrections" section of this supplement at the bottom of page 27. The Forum notes and appreciates the District's testimony which supports the overall salinity control program.

ADDITIONAL STATEMENTS

A number of agencies submitted statements supporting the report and made no recommendations for change. The agencies are: Imperial Irrigation District, Palo Verde Irrigation District, The Metropolitan Water District of Southern California, Los Angeles Department of Water and Power, Colorado River Board of California, Bureau of Reclamation, Utah Bureau of Water Pollution Control, Utah Board of Water Resources, and Uintah Water Conservation District.

JUL 11 1987

IMPERIAL IRRIGATION DISTRICT

OPERATING HEADQUARTERS • P. O. BOX 937 • IMPERIAL, CALIFORNIA 92251

IIDGM

July 7, 1987

Mr. Jack A. Barnett, Executive Director
Colorado River Basin Salinity Control Forum
106 West 500 South, Suite 101
Bountiful, UT 84010

Dear Mr. Barnett:

The Imperial Irrigation District has reviewed the recommendations set forth in the "Proposed Report on the 1987 Review, Water Quality Standards for Salinity, Colorado River System," prepared by the Colorado River Basin Salinity Control Forum. The District, one of the major beneficiaries of Colorado River salinity control, concurs with the recommendation for no change in the numeric Colorado River salinity standards at this time, and with the recommended updated schedule of implementation of salinity control measures to maintain the standards.

The salinity control projects defined in the plan of implementation have been deemed cost effective and necessary to maintain the numeric Colorado River salinity standards and should be implemented in accordance with the schedule set forth in the report. In this regard, the expedient completion of construction of Paradox Valley and Grand Valley salinity control units should occur as recommended.

The District appreciates the opportunity to review and comment on the report.

Yours truly,

for Steve Glocklin

CHARLES L. SHREVES
General Manager

14SALINITY

JUL 13 1987

PALO VERDE IRRIGATION DISTRICT

180 WEST 14TH AVENUE – BLYTHE, CALIFORNIA 92225

TELEPHONE (619) 922-3144

July 9, 1987

Mr. Jack A. Barnett
Executive Director
Colorado River Basin
Salinity Control Forum
106 West 500 South Suite 101
Bountiful UT 84010

Dear Mr. Barnett:

The Palo Verde Irrigation District concurs with the findings and recommendations contained in the "Proposed Report on the 1987 Review, Water Quality Standards for Salinity, Colorado River System" which was prepared by the Colorado River Basin Salinity Control Forum. The District appreciates having the opportunity to review and comment on the report and would like to commend the Forum for its efforts to control river salinity.

Very truly yours,

GM Davisson

Gerald M. Davisson
Manager

GMD/elc

JUL 1 3 1987

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

[illegible] General Manager

July 7, 1987

Mr. Jack A. Barnett
Executive Director
Colorado River Basin Salinity
Control Forum
106 West 500 South, Suite 101
Bountiful, Utah 84010

Dear Mr. Barnett:

1987 Review of Water Quality
Standards for Salinity, Colorado River System

We have reviewed the "Proposed Report on the 1987 Review, Water Quality Standards for Salinity, Colorado River System" prepared by the Colorado River Basin Salinity Control Forum. Metropolitan wishes to commend the Forum for its continued efforts to control river salinity, a long-standing interstate and international problem. The breadth of the Forum's efforts in maintaining interstate cooperation and support of the program, and its overall coordination and ongoing monitoring of salinity changes and program effectiveness, are particularly noteworthy.

Metropolitan fully supports the report's recommendations for no change in the Colorado River numeric salinity standards and for updating the plan of implementation to maintain these standards. We were especially pleased with the recommendation for early and expedient implementation of the Department of Agriculture's recently authorized Colorado River Basin on-farm salinity control program. The on-farm salinity control measures have proven to be one of the most cost-effective means for controlling salinity. We urge the adoption of the 1987 review report by each of the concerned states.

Metropolitan appreciates the opportunity to review and comment on the Forum's 1987 report.

Very truly yours,

Myron B. Holburt
Assistant General Manager

JVD:rk

cc: Mr. Dennis B. Underwood
Colorado River Board of California

Department of Water and Power the City of Los Angeles

TOM BRADLEY
Mayor

Commission
RICK J. CARUSO, *President*
JACK W. LEENEY, *Vice President*
ANGEL M. ECHEVARRIA
CAROL WHEELER
WALTER A. ZELMAN
JUDITH K. DAVISON, *Secretary*

PAUL H. LANE, *General Manager and Chief Engineer*
NORMAN E. NICHOLS, *Assistant General Manager - Power*
DUANE L. GEORGESON, *Assistant General Manager - Water*
DANIEL W. WATERS, *Assistant General Manager - External Affairs*
NORMAN J. POWERS, *Chief Financial Officer*

July 17, 1987

Mr. Jack A. Barnett, Executive Director
Colorado River Basin Salinity
Control Forum
106 West 500 South, Suite 101
Bountiful, Utah 84010

Dear Mr. Barnett:

Proposed Report on the 1987 Review
Water Quality Standards for Salinity
Colorado River System

This is in response to the June 30, 1987 invitation by the California members of the Colorado River Basin Salinity Control Forum to make comments and suggestions on the above titled report. We are in general agreement with all points covered in the report and fully support its recommendations.

Of particular importance are the recommendations to expedite completion of two salinity control units, the Paradox Valley and Grand Valley Units, as well as the implementation of the recently authorized Department of Agriculture's Colorado River Basin on-farm salinity control program. We are also in overall agreement with the recommended schedule of implementation of the salinity control projects described in the plan. We believe these salinity control measures are essential to the program for maintaining the numeric standards for Colorado River Salinity and for preserving the quality of Colorado River water available to the City of Los Angeles.

We appreciate the opportunity to review and comment upon the report.

Sincerely,

Paul H Lane /GSH

PAUL H. LANE
General Manager and Chief Engineer

111 North Hope Street, Los Angeles, California ☐ *Mailing address:* Box 111, Los Angeles 90051
Telephone: (213) 481-4211 *Cable address:* DEWAPOLA

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, Governor

COLORADO RIVER BOARD OF CALIFORNIA
107 SOUTH BROADWAY, ROOM 8103
LOS ANGELES, CALIFORNIA 90012
(213) 620-4480

R E S O L U T I O N

OF

COLORADO RIVER BOARD OF CALIFORNIA

in support of the

1987 Review, Water Quality Standards for Salinity, Colorado River System

WHEREAS, the salinity of the Colorado River is of great concern to the nearly fourteen million people in California who rely on the river in full or in part to meet their domestic, municipal, and industrial water needs and to those who rely on the river to farm over 650,000 acres of irrigated lands; and

WHEREAS, water quality standards for salinity, including numeric salinity criteria and a plan of implementation to maintain the standards, were established by the seven-state Colorado River Basin Salinity Control Forum in 1975, adopted by the seven Basin states, and approved by the Environmental Protection Agency as a basinwide approach to controlling salinity of the Colorado River; and

WHEREAS, Section 303 of the federal Clean Water Act requires that the water quality standards be reviewed from time to time, but at least once during each three-year period; and

WHEREAS, pursuant to Section 303 of the Clean Water Act, reviews of the Colorado River water quality standards for salinity were conducted in 1978, 1981, and 1984, wherein it was found that the 1975 numeric salinity criteria were still appropriate and wherein the plan of implementation was reviewed and modified to accommodate changes; and

WHEREAS, the proposed Colorado River Basin Salinity Control Forum's 1987 review of the water quality standards for salinity recommends that no changes be made to the 1975 numeric salinity criteria but that the plan of implementation be modified to reflect changes since 1984; and

WHEREAS, there is no reason to believe that the numeric salinity criteria will be exceeded during the next three-year review period;

NOW, THEREFORE, BE IT RESOLVED that the Colorado River Board of California fully supports the Colorado River Basin Salinity Control Forum's "Proposed Report on the 1987 Review, Water Quality Standards for Salinity, Colorado River System"; and

BE IT FURTHER RESOLVED that the Colorado River Board of California urges each of the Colorado River Basin states to adopt the 1987 review report as their water quality standards for Colorado River salinity.

Unanimously adopted on July 15, 1987.

Project and Lower Gunnison Basin Unit, and feasibility studies leading to possible authorization and construction of seven additional salinity control units. In recent years, feasibility investigations under the Colorado River Water Quality Improvement Program have been continuing essentially on schedule. All of these activities are described in the Forum's Proposed 1987 Review.

Grand Valley Stage One and Meeker Dome Units in Colorado are complete and not shown in the plan of implementation. Four other unit studies are complete with no further action planned at this time. Should the cost-effectiveness of any unit currently in the plan of implementation change, or should an action fail to remove from the river system the amount of salt expected, one or more of the deferred units may again be examined.

In summary, we believe the Proposed 1987 Review - Water Quality Standards for Salinity, Colorado River System, which confirms the numeric criteria and updates the plan of implementation for salinity control, is an excellent review of the established standards. We concur in the adequacy of the numeric criteria for the next 3 years and in the plan of implementation. We look forward to continued close cooperation with the Forum, the Basin States, and Federal agencies in implementing the salinity control program.

State of California)
) ss.
County of Los Angeles)

I, DENNIS B. UNDERWOOD, Executive Secretary of the Colorado River Board of California, do hereby certify that the foregoing is a true copy of a resolution adopted by said Board at a Regular Meeting thereof, duly convened and held in Los Angeles, California on the fifteenth day of July 1987, at which a quorum of said Board was present and acting throughout.

Dated this 15th day of July 1987.

DENNIS B. UNDERWOOD
Executive Director

United States Department of the Interior

BUREAU OF RECLAMATION
WASHINGTON, D.C. 20240

IN REPLY
REFER TO:

Statement on behalf of
C. Dale Duvall, Commissioner,
Bureau of Reclamation
for presentation before the public meeting
relating to the Proposed 1987 Review
Water Quality Standards for Salinity in
the Colorado River System
Vernal, Utah, July 20, 1987, and
Las Vegas, Nevada, July 22, 1987

Colorado River salinity standards are of special importance to the Department of the Interior and the Bureau of Reclamation. We are charged with planning and constructing many of the principal physical components and coordinating the plan of implementation to maintain the adopted standards for the Colorado River system. Thus, the standards have a direct bearing on Reclamation's particular share of responsibilities associated with development and management of the water resources of the Colorado River Basin.

The Bureau of Reclamation endorsed the salinity standards proposed by the Colorado River Basin Salinity Control Forum, adopted by the Basin States, and approved by the Environmental Protection Agency in 1975. We have been continuously kept informed of the progress of the Forum during the current review of the water quality standards. We appreciate having had the opportunity to work with the Forum in this endeavor.

We believe the Forum's approach of considering the total basin as a single operating entity is the most logical and workable method to meet the overall objective of maintaining salinity levels in the lower main stem at or below 1972 levels, while water resource development continues throughout the Basin. Our analyses support the Forum's conclusion that salinity levels at the three numeric criteria stations will not exceed the 1975 criteria (i.e., 1972 salinity levels) or the proposed 1987 criteria during the next 3 years. In the long term, the salinity projections appear reasonable for the assumptions made.

Reclamation activities associated with the plan of implementation for meeting Colorado River salinity standards include the construction of three authorized projects, advance planning on the authorized Dolores

Norman H. Bangerter
Governor

Suzanne Dandoy, M.D., M.P.H.
Executive Director

STATEMENT BY
CALVIN K. SUDWEEKS

ON
1987 REVIEW
WATER QUALITY STANDARDS FOR SALINITY
COLORADO RIVER SYSTEM

JULY 20, 1987

I am Calvin K. Sudweeks, and currently serve as the Director of the Bureau of Water Pollution Control, Division of Environmental Health, Utah Department of Health.

As one of the two Forum members representing Utah, and as the Executive Secretary of the Utah Water Pollution Control Committee, I wish to indicate support of the 1987 Review as printed, and as being considered at this public meeting. This Review, along with the "Supplement" that will be generated as a result of this meeting and the meeting scheduled for Las Vegas on July 22, 1987, will be included as part of the total Water Quality Standards update proposals which will be discussed at formal public hearings and considered for adoption by the Utah Water Pollution Control Committee for application in Utah. These actions are planned to occur during this calendar year, possibly as early as September.

I appreciate the comments made by Mr. Irvin A. Haws and can indicate Utah Water Pollution Control Committee concurrence with his statement.

3203y

Kenneth L. Alkema, Director • Division of Environmental Health

288 North 1460 West • P.O. Box 16690 • Salt Lake City, Utah 84116-0690 • (801) 538-6121

Remarks of

IRVIN A. HAWS

on

1987 Review
Water Quality Standards for Salinity
Colorado River System

July 20, 1987

My name is Irvin A. Haws, and I am a member of the Utah Board of Water Resources. The Board is responsible for establishing water policy for the State of Utah, and gives general policy direction to the Division of Water Resources. The Board also approves technical and financial assistance for water-related projects. (Many of these projects have been constructed here in the Uinta Basin, and a number of these were designed to improve irrigation efficiency.)

The Board of Water Resources has consistantly supported State of Utah participation in the Colorado River Basin Salinity Control Forum since its formulation in 1973. Lynn Thatcher, past Director of the Utah Division of Environmental Health, was the first Forum chairman, serving in that capacity until 1976. Dan Lawrence, past Director of the Division of Water Resources, was a charter member of the Forum, and was the Forum chairman from 1977 until 1980. Both Lynn Thatcher and Dan Lawrence were instrumental in developing the first "Water Quality Standards for Salinity - Colorado River System" in 1975.

As some of you may remember, these salinity standards (often referred to as the 'Forum Report') were developed in response to provisions of the Clean Water Act. Further, the bases for the formation of the Colorado River Basin Salinity Control Forum were that: (1) salinity in the Colorado River Basin was a basinwide problem, and (2) this problem could best be addressed by the states acting collectively through an interstate organization. Although Utah water users are not benefited directly by decreases in mainstem Colorado River salinity, we feel that the maintenance of interstate comity and avoidance of litigation will in the long-run more than balance the program costs to Utah.

The 1987 Review, which is the subject of this meeting, does not propose changes in the salinity standards, nor does it depart in substance from the thrust of the original 1975 Forum Report. The Utah Forum and Work Group representatives participated extensively in the preparation of this 1987 Review, and their endorsement should be interpreted as the position of their respective agencies, and by extension, the State of Utah. (The 1987 Review will be acted on officially by the Utah Water Pollution Control Committee after a public hearing in accordance with administrative requirements.)

From a personal perspective as a resident of the Uinta Basin, I have seen first-hand the value of one of the salinity control projects included in the plan of implementation -- the USDA Uintah Basin Unit. Farmers and ranchers in this area have signed up for and implemented on-farm salinity control practices -- such as canal lining and sprinkler installation --

because they can see the value in terms of increased crop production and reduced labor costs by better water control. At the same time, hydrologic analysis indicates that implementation of these practices is reducing the salt inflow to the Colorado River System. This type of project, where everybody benefits and the costs are shared equitably by federal, state, and local interests, is one of those rare "win-win" propositions.

Concluding, the Utah Board of Water Resources has supported in the past and continues to support the Colorado River Basin salinity control program. The Board feels that the 1987 Review, which includes an updated plan of implementation for this program, represents a necessary and desirable step in the successful completion of that program. The Board endorses the adoption of the 1987 Review in its present form.

JUL 2 2 1987

Uintah Water Conservancy District

"Steinaker Dam"

78 West 3325 North
Vernal, Utah 84078
Phone 789-1651

"Red Fleet Dam"

July 21, 1987

Mr. Jack A. Barnett
Colorado River Basin Salinity Control Forum
106 West 500 South, Suite 101
Bountiful, UT 84010

Dear Jack:

Enclosed is a written statement, expressing the Uintah Water Conservancy District's position regarding your 1987 Review as presented in Vernal, Utah on July 20, 1987.

Best wishes to you and the forum members for future success in your very important assignment.

Sincerely,

Dave Rasmussen

Dave Rasmussen
Manager

vj

Enclosure

STATEMENT

The Uintah Water Conservancy District wholeheartedly supports and endorses the Proposed Report on the 1987 Review, Water Quality Standards for Salinity Colorado River System.

The program, sponsored by the U.S.D.A. in the Uinta Basin beginning in 1980, has already produced amazing results not only in salt reduction, but also in increased production of crops on lands irrigated with improved systems.

Uintah Water Conservancy District relys on the original program as well as the 1987 expanded program as a means of implementing our long-range Water Conservation Plan. For many years we have recognized the need to up-grade old existing canals and laterals as a means of conserving water and reducing drainage problems in high seepage areas. Due to the economy of agriculture, water users have been unable to provide funding to take care of a rehabilitation program. Water users attempted to apply enough water during April, May and June (high run off months) to satisfy the total growing season. This practice compounded the seepage and drainage problems and did not help crop production.

The Colorado River Salinity Control program has provided Water Users a rehabilitation program that is affordable and effective and will no doubt provide many benefits to the area's population as well as reduce the salt load in the Colorado River, the primary purpose of the program.

The Forum is to be congratulated on a job well done in preparing and presenting the 1987 Review as presented July 20, 1987 at Vernal, Utah.

Thank you.

Dave Rasmussen, Manager

UINTAH WATER CONSERVANCY DISTRICT

CORRECTIONS

The following typographical errors have been noted in the Proposed Report on the 1987 Review - Water Quality Standards For Salinity, Colorado River System. They are as follows:

Page 5, fifth paragraph, fifth sentence. The sentence should read as follows; "The Basin states are actively engaged in an effort to convince the Congress that inclusion of $6 million should again be made available for this program for FY 1988."

Page 17, Figure 7. The numeric criteria at Imperial Dam is 879 mg/l rather than 750 mg/l as indicated.

Page 51, Table 5, Planning Region No. 11. The date of the last EPA approval is 2/6/87 rather than 6/87 as shown.

Page 52, Other activities, fourth paragraph, first sentence. The sentence should read; "The water rights issues on the Paradox Valley Unit have been resolved between the State of Colorado and Reclamation."

Appendix E, Page E-1, bottom of left column. It has been observed by some reviewers that an "*" should be the key in the legend preceding the statement, "Permit issued to a federal agency or an Indian tribe and the responsibility of EPA." It should be noted by readers that indeed an "*" does precede this statement but it is often overlooked because it is obscured by the binding.

Appendix E, Page E-11, Permit Numbers NV 0021261 and NV 0020133. These two permits, issued by the Nevada Division of Environmental Protection (the permitting authority for the state), show that

the Clark County Sanitation District and the City of Las Vegas are in compliance with Forum policy. The data for these two permits within the State of Nevada, as shown on page E-11, are out of date and are under review by the Nevada constituents. Also, it should be noted that the Clark County Sanitation District is no longer designated "#1".