



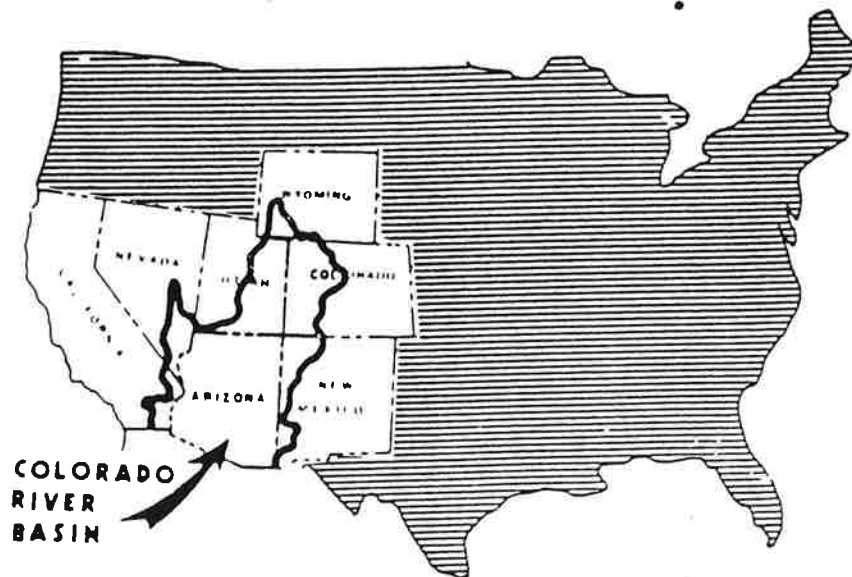
United States
Department of
Agriculture

USDA
Salinity
Control
Coordinating
Committee

1988 Report To Congress

Colorado River Salinity Control Program

(Colorado River Basin Salinity Control Act of 1974,
Pub. L. 93-320, as amended by Pub. L. 98-569,
43 U.S.C. 1571 et seq.)





DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

Honorable George Bush
President of the Senate
Washington, D.C. 20510

April 01 1988

Dear Mr. President:

Enclosed is the Department of Agriculture's (USDA) 1988 Report to Congress on the Colorado River Salinity Control Program. This report is submitted in accordance with Section 202(c)(5) of the Colorado River Basin Salinity Control Act of 1974, as amended by PL 98-569.

The report has been developed through the cooperative efforts of the following agricultural agencies serving on the USDA Salinity Control Coordinating Committee: Agricultural Research Service, Agricultural Stabilization and Conservation Service, Cooperative State Research Service, Extension Service, and Soil Conservation Service.

Sincerely,

A handwritten signature in cursive script that reads "Richard E. Lyng".

RICHARD E. LYN
Secretary

Enclosure

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INTRODUCTION

This United States Department of Agriculture (USDA) 1988 Report to Congress on the Colorado River Salinity Control (CRSC) program was prepared in accordance with provisions of the Colorado River Basin Salinity Control Act of 1974 (the Act), as amended by Pub. L. 98-569, 43 U.S.C. 1571 et seq. The amendments direct the Secretary of Agriculture to establish a voluntary onfarm salinity control program for the Colorado River. Section 202(c)(5), as amended, also directs the Secretary of Agriculture to:

"...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."

This report has been prepared by the USDA Salinity Control Coordinating Committee (SCCC). The committee includes representatives from Agricultural Research Service (ARS), Agricultural Stabilization and Conservation Service (ASCS), Cooperative State Research Service (CSRS), Extension Service (ES), and Soil Conservation Service (SCS). Also participating as ex-officio members are the United States Bureau of Reclamation (USBR) and the Environmental Protection Agency (EPA).

BACKGROUND

The Colorado River Basin encompasses portions of seven States (Arizona, California, Colorado, New Mexico, Nevada, Utah, Wyoming) and Mexico. The river flows over 1,400 miles from its headwaters in Colorado to the Gulf of California. It provides water for over 18 million people and is used to irrigate over 1,700,000 acres in the United States. However, the river carries about 9 million tons of salt annually past Hoover Dam, over half of which is man-induced. This high salt content causes millions of dollars in damages to agriculture and domestic water users in the Lower Basin States. Under the Clean Water Act, the seven Basin States adopted and EPA approved numeric standards for maximum total dissolved solids (TDS) or salinity of 879 milligrams per liter (mg/l) measured at Imperial Dam. This numeric standard is substantially lower than the 960 mg/l salinity levels projected in 2010 without the salinity control program.

Title II of the original Colorado River Basin Salinity Control Act of 1974 (Pub. L. 93-320) specifically addresses the salinity problems of the river upstream of Imperial Dam and instructed the Secretaries of Interior and Agriculture to coordinate their activities. It further instructed the Secretary of Agriculture to provide salinity control assistance through using existing programs and authorities available to the Secretary. While the U.S. Department of the Interior (USDI) had special legislation and funding to implement authorized projects, USDA was limited to existing authorities. To work with USDI on a cooperative program, USDA relied on financial assistance from the Agricultural Conservation Program (ACP) available through ASCS and technical support through Conservation Technical Assistance (CTA) funds provided by SCS. Using existing authorities, the Grand Valley (Colorado) onfarm salinity control program was initiated in 1979, followed by the Unita Basin (Utah) salinity control project in 1980.

The use of existing programs and authorities made it possible for USDA to initiate a salinity control program in the Colorado River Basin, even though program limitations created difficulties and inefficiencies in implementing a cost-effective salinity control program. The major problems were the annual cost-share payment limitation of \$3,500 per year and the inability to cost-share with irrigation districts and canal companies for off-farm canal and lateral delivery system improvements. In many cases, the \$3,500 annual payment limitations under ACP would require program participants to borrow money for larger projects or install larger projects in a piece-meal fashion over a number of years. This limitation contributed significantly to inefficient use of cost-share funds and technical assistance staff. The lack of authority to cost-share with irrigation districts or canal companies also restricted the use of off-farm delivery system improvements that would reduce off-farm canal and lateral salt loading problems. It often prevented individual irrigators or groups of irrigators from utilizing the more efficient and cost-effective onfarm gravity-pressure sprinkler systems. Other program limitations include funding and staffing support for salinity control planning studies and for information and education activities. These demands either drew upon limited resources of existing programs or were not provided.

Even though these difficulties and program management problems existed, the ongoing Grand Valley and Unita Basin salinity projects were able to achieve reasonable results. Through 1986, the average annual salt load reductions resulting from these projects were 33,600 tons in the Grand Valley and 22,700 tons in the Unita Basin.

These individual projects are discussed in detail in the previous 1986 and 1987 Joint Evaluation (Reports) of Salinity Control Programs in the Colorado River Basin. The annual evaluation reports are prepared by the USBR Colorado River Water Quality Office and the USDA Salinity Control Coordinating Committee.

Over 1 million tons of salt load reductions are needed each year until the year 2010 to achieve and maintain adopted water quality standards. Coordinated program evaluations by USBR and USDA indicate that a mix of USDA and USBR salinity control projects are needed to achieve this reduction. Figure 1 identifies the mix of USDA and USBR salinity control projects in the Colorado River Basin.

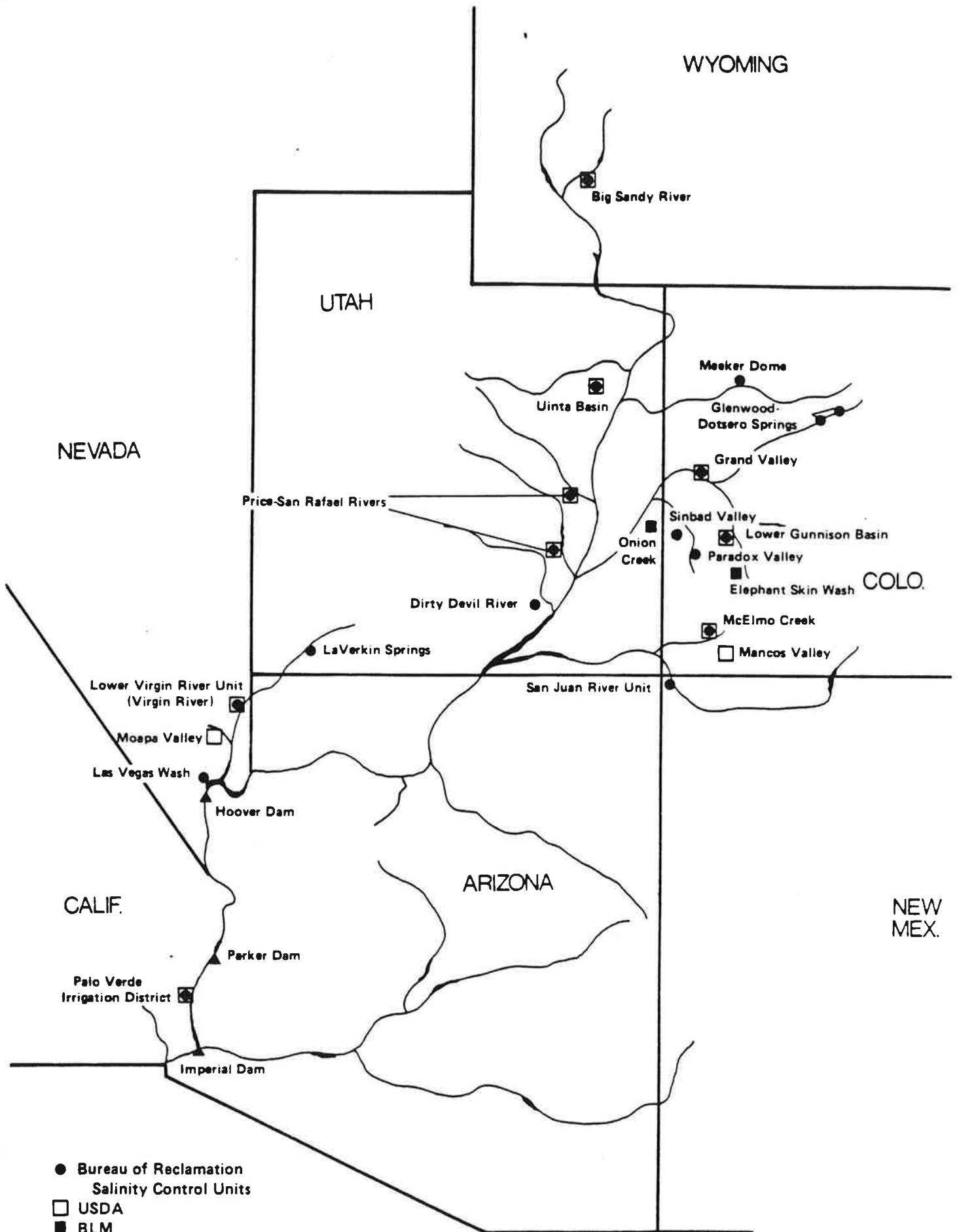


Figure 1. Colorado River Basin salinity control projects.

USDA LEGISLATIVE AUTHORITIES

Public Law 98-569, enacted October 30, 1984, amended the original Colorado River Basin Salinity Control Act of 1974 (Pub. L. 93-320). The amended Act provides for a voluntary USDA onfarm salinity control program which authorizes the Secretary of Agriculture to: (1) identify salt source areas and prepare salinity control reports; (2) provide technical and financial assistance to implement salinity reduction practices consistent with published USDA salinity control reports; (3) provide information and education support, including research and demonstrations, and (4) perform monitoring and evaluation functions.

Several new features to the Act beyond those of traditional conservation programs include the authority to: (1) cost-share with irrigation districts and canal companies; (2) broaden the annual cost-share payment limitation; and (3) provide for voluntary replacement of fish and wildlife values foregone because of program activities.

Under the new program, sufficient flexibility has been provided in USDA regulations and agency operating procedures to allow for separate contracts and financial assistance to landowners and producers for voluntary replacement of fish and wildlife values foregone. The contracts may include measures for the voluntary replacement of wildlife habitat values foregone either separately or with other salinity reduction practices.

Section 205 of the Act provides specific authority for 30 percent repayment or reimbursement of USDA cost-share expenditures for the installation of salinity reduction and voluntary wildlife habitat replacement practices. Reimbursements are made to the U.S. Treasury from hydro-electric power revenues collected for salinity control in the Upper and Lower Colorado River Basins. With a maximum USDA federal cost-share of 70%, 30% of the 70% (or 21%) of salinity control practice costs are borne by the Basin States from power revenues, and 30% of the practice costs are borne by the participant. Therefore, non-Federal sources are paying 51% and the Federal Government 49% of the costs for installing salinity control practices.

PROGRAM GOALS AND OBJECTIVES

The primary objective of the CRSC program is to reduce salinity in the Colorado River a level consistent with established water quality standards while allowing States to continue development of water apportioned to them by various compacts and court decrees. The current Colorado River numeric criteria for salinity is measured as total dissolved solids (TDS) and have been established by the Basin States and approved by EPA. The numeric criteria for salinity are as follows:

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

Historically, the Colorado River carries about 9 million tons of salt in about 10 million acre-feet of flow past Hoover Dam each year. Natural diffuse sources and saline springs provide about one-half of the salt, agricultural irrigation return flows contribute about one-third, and municipal and industrial sources add the remaining salt load.

As the Basin States continue to develop their waters, the Colorado River flows are projected to decrease by 2.7 million acre-feet per year by the year 2010. As flows are reduced, salinity levels are projected to reach about 960 mg/l by 2010. The projected salt load reduction needed to maintain salinity concentrations for TDS at or below the adopted numeric criteria in the lower mainstream of the Colorado River is about 1 million tons per year. Therefore, the program objective is to reduce the average annual salt load by approximately 1 million tons. Figure 2 displays the salinity projection without further controls. These projections are based upon average long-term flows in the river, estimated future water development, and the combined removal of about 141,000 tons of salt per year from existing USDA and USBR salinity control projects in Grand Valley, Unita Basin, Meeker Dome, and Las Vegas Wash. The projected 2010 salinity level in Figure 2 assumes that the level of existing salinity reduction will continue and that no further control will be implemented. Figure 3 shows the salinity level, assuming further controls.

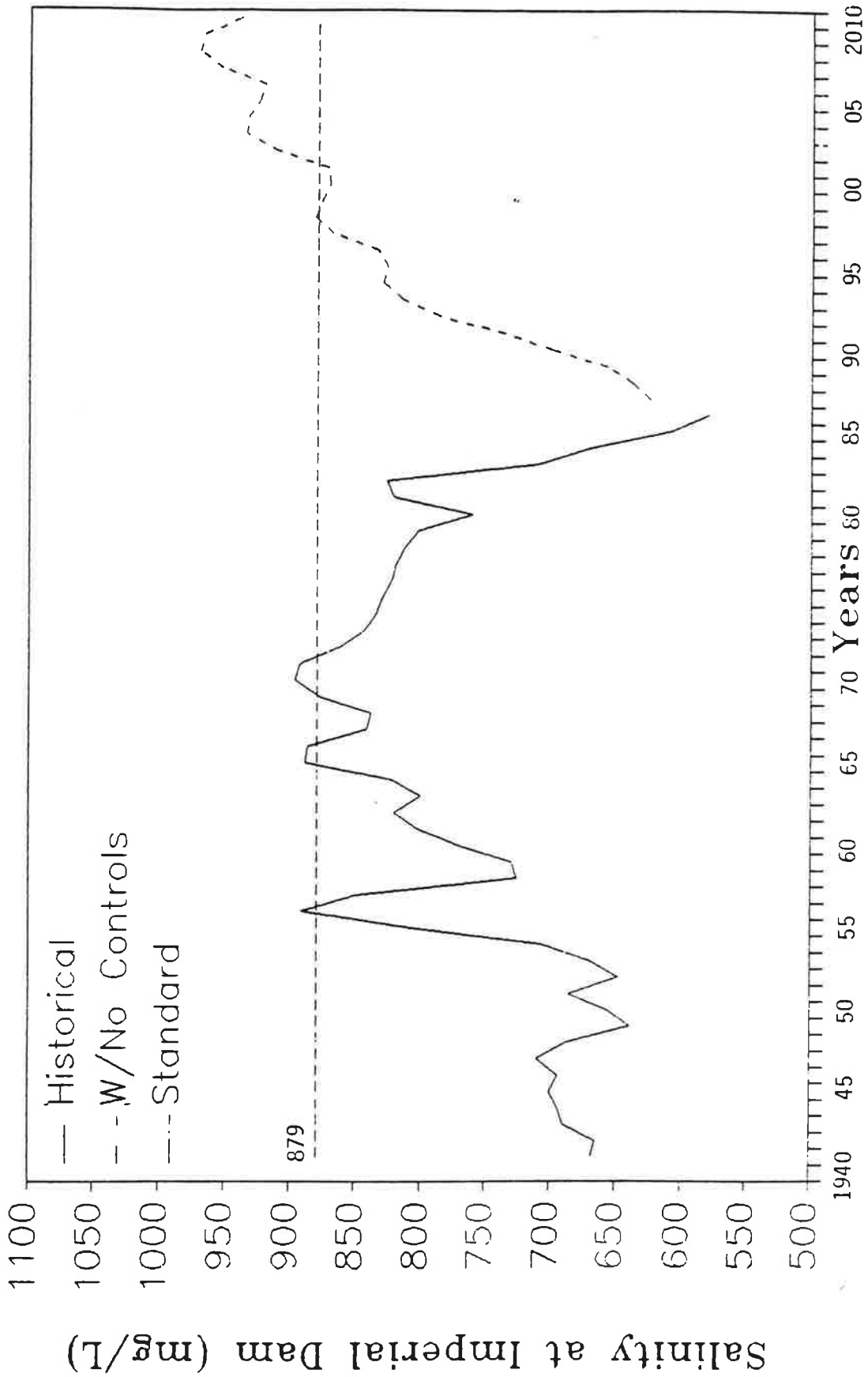
As a part of the USDI and USDA joint evaluation process for the CRSC program, it was determined that a cost-effective mix of both USDA and USDI programs is needed. The salt load reduction goal cannot be achieved by either a USDI or USDA salinity control program alone. In many cases, it is necessary for USDI and USDA projects to be implemented together. The off-farm canal and lateral improvements by USBR are often required before the more cost-effective onfarm improvements can be initiated. The off-farm improvements usually allow individual irrigators to install more efficient and cost-effective gravity pressure sprinkler systems. The USDA and USDI implementation plan to achieve the necessary salt load reduction has an estimated total Federal cost of \$560 million.

The USDA implementation schedule would include nine projects and is estimated to achieve the removal of 662,000 tons of salt per year or over 50% of the projected 1,177,000 tons of salt load reduction. The USDA onfarm projects assume about 40% of the total construction cost needed to implement the program. The USDA and USDI combined implementation schedule, assuming sufficient funds are available, is shown in Figure 4.

Salinity Projections

without further controls

September 18, 1987



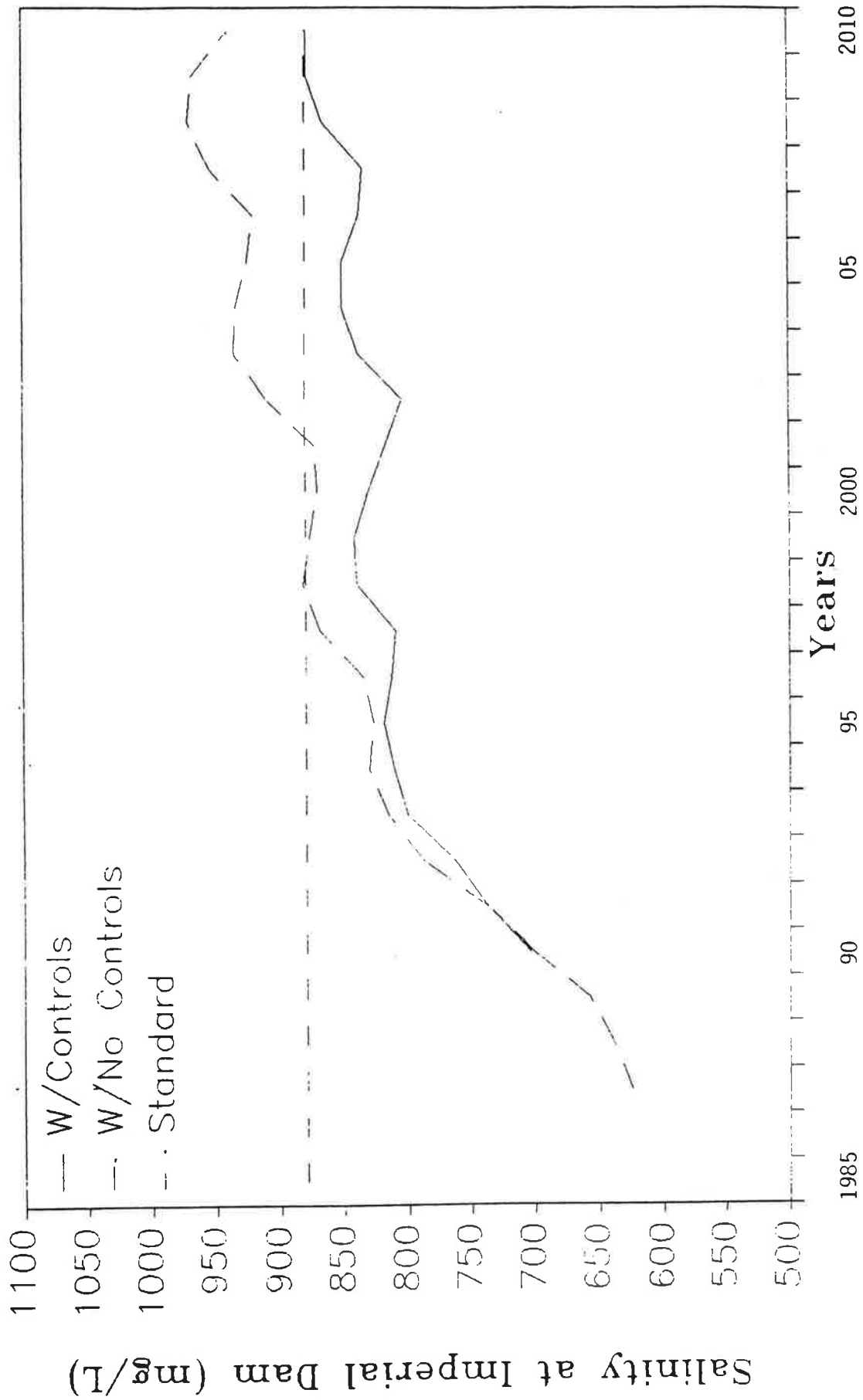
Lotus-CRSStgt
Base10

Figure 2. Salinity projections without further controls.

Salinity Projections

with and without further controls

October 9, 1987



Lotus--CRSStgl
Erose11

Figure 3. Salinity projections with and without further controls.

USDA ACTIVITIES AND ACCOMPLISHMENTS

Administration and Management

The initial funding appropriated by Congress for the USDA onfarm CRSC program was \$3.804 million in fiscal year 1987. In addition to these CRSC program funds, \$2.196 million from the ACP were available for use in 1987. These program funds were directed into the ongoing Grand Valley and Unita Basin salinity control projects.

Before actual onfarm contracting and implementation could proceed for the new CRSC program, Federal rules and regulations for administering the program had to be promulgated. An interim rule was published in the Federal Register on May 5, 1987. Under this interim rule, implementation of the new USDA onfarm CRSC program began in July 1987. Current plans call for a final rule to be published in early 1988.

In response to comments on the interim rule concerning fish and wildlife habitat effects of the CRSC program and the replacement of wildlife values, SCS conducted a special biology workshop in September 1987. The purpose of the workshop was to inform and train USDA field personnel on the importance of fish and wildlife habitat value replacement, to explain opportunities and techniques that are available in the new CRSC program, and to illustrate the importance of implementing habitat value replacement as related to monitoring and evaluation activities.

The CRSC program is operating smoothly under the current operating procedures of ASCS and SCS. At this early stage in the new program, USDA agencies see no major problems or obstacles to implementation. USDA has no recommendations for administrative or management changes which would require legislative action.

Technical and Financial Assistance

Consistent with authorities in other similar programs, the responsibilities for technical assistance were delegated by the Secretary of Agriculture to SCS with administrative responsibilities delegated to ASCS.

Although there was a substantial backlog of requests for financial and technical assistance already on file under the existing ACP salinity program, there were many applicants ready to participate in the new CRSC program. Participants for the new CRSC program were either restricted by payment limitations imposed under the ACP or were irrigation districts or canal companies which were ineligible under prior existing programs. As of September 30, 1987, there were 56 CRSC applications for over \$4 million of financial assistance in the Unita Basin and 47 CRSC applications for over \$1.5 million of financial assistance in the Grand Valley unit.

A special "first contract signing" ceremony was held in Roosevelt, Utah by the State of Utah on July 2, 1987. The first nine CRSC contracts were signed at that time by the local CRSC participants, the Unita and Deuschene ASC County Committees, and the Unita Soil Conservation District. Over 70 individuals, representing a cross-section of local, State, and Federal interests,

participated in the program. The first nine contracts will provide onfarm and irrigation delivery system improvements serving 1,528 acres. When all irrigation water management and salinity reduction practices are installed, the salt load reductions in the Colorado River system are estimated to be 1,480 tons per year.

Table 1, Summary of ACP and CRSC program accomplishments, presents a brief overview of activities and accomplishments of both the existing program and the new CRSC program.

As specified in Section 205 of the Act, actual USDA expenditures for financial assistance to install salinity reduction practices under the CRSC program are subject to repayment from Upper and Lower Colorado River Basin funds. With a combined expenditure of \$109,007 for fiscal year 1987, the Lower Colorado River Basin Development Fund reimbursement obligation for 1987 is \$27,797 and the Upper Colorado River Basin Fund reimbursement obligation is \$4,907. The Upper Basin reimbursement is repaid, with interest, to the Federal Treasury over 50 years or over the life of the measures, whichever is less. The life expectancy and repayment period being used for the Grand Valley and Unita Basin is 25 years. ASCS is responsible for reporting annually to the USBR on CRSC program cost-share expenditures that are subject to the reimbursement provisions of the Act.

Section 202(c)(4) of the Act, as amended, authorizes the Secretary of Agriculture to utilize grants and cooperative agreements with conservation districts, local governmental agencies, colleges and universities, and others as appropriate to carry out the activities of the program. Thus far, SCS has entered into cooperative agreements with the Unita Soil Conservation District in Utah and the Mesa Soil Conservation District in Colorado. These cooperative agreements are joint working agreements that complement the technical assistance and monitoring activities of SCS in the Unita Basin and Grand Valley projects. This approach is believed to be an excellent means of program delivery at the local level.

Based upon operating experiences during the first year, the Department sees no need for administrative changes or legislation to provide the technical and financial assistance for the CRSC program.

Planning

The Act authorizes the Secretary of Agriculture to identify salt source areas, to determine salt loading resulting from irrigation and watershed management practices, and to develop plans for implementing measures that reduce salt loading to the Colorado River. The plans are published as USDA salinity control reports for the identified salt-source areas. The plans are developed in coordination with the USBR and in consultation with the public and affected governmental interests.

Before enactment of the new CRSC program authority, the salinity control planning studies and investigations were carried out by SCS through existing authorities of Section 6 of Pub. L. 98-566, 16 U.S.C. 1006, under special river basin study funds. In addition to the Grand Valley and Unita Basin reports, other USDA salinity control reports have been published for: Moapa Valley and Virgin Valley in Nevada; Lower Gunnison, McElmo Creek, and Mancos Valley in Colorado; and the Little Colorado River and Colorado River Indian Reservation in Arizona. No recommended plans or salinity reduction benefits were identified for the Arizona studies.

During fiscal year 1987, SCS was involved with salinity control planning in the Big Sandy River (Wyoming) and the Price-San Rafael Rivers (Utah). For the Big Sandy unit, SCS developed a recommended plan which includes low-pressure, pumped sprinkler irrigation system improvements on about 15,000 acres, which is about 85% of the irrigated acres in the project area. Because of potential fish and wildlife habitat effects and consequences of the salinity control project, SCS prepared a draft environmental impact statement (EIS) according to the National Environmental Policy Act. Through consultation with the EPA, representatives of USDI agencies, and the State of Wyoming, a final EIS was prepared and published. After a record of decision has been rendered by the SCS State Conservationist in Wyoming, implementation of the Big Sandy project may proceed.

A coordinated planning effort with the USBR on the Price-San Rafael River in Utah has been underway for over 2 years. The goal of this effort is to provide a more cost-effective salinity control project which utilizes the USBR off-farm canal and lateral improvements with the USDA onfarm gravity-pressure sprinkler irrigation systems.

Coordinated planning is also underway on the Dolores-McElmo Creek project in Colorado. The USBR is now proceeding with the previously authorized Dolores River irrigation development project and the recently authorized salinity control efforts in the McElmo Creek area. SCS has assigned additional technical staff to assist in the coordinated design of off-farm irrigation improvements to ensure compatibility with future onfarm irrigation improvements provided through the CRSC program.

Addressing environmental issues and concerns, along with earlier coordination with USBR activities is critical to a cost-effective program. The program goal is to make more efficient use of Federal and non-Federal funds in an environmentally acceptable manner.

USDA does not foresee any additional administrative or legislative needs regarding these activities.

Monitoring and Evaluation

Responsibilities for monitoring and evaluating USDA onfarm activities have been assigned to SCS. For the Unita Basin and Grand Valley projects, special monitoring and evaluation (M&E) plans were developed in 1982 and initial M&E field activities began in 1983. The major objectives of the M&E efforts are to:

1. Evaluate the effectiveness of salinity reduction practices and quantify salt load reduction accomplishments by project;
2. Evaluate and quantify the environmental effects on fish and wildlife habitat values; and,
3. Measure the onfarm economic aspects of implementing irrigation water management and salinity reduction practices.

SCS established a CRSC monitoring and evaluation team in 1987 to reassess earlier M&E plans, to make appropriate adjustments in existing M&E efforts, and to develop and initiate new M&E plans for those salinity control projects scheduled for early implementation under the new CRSC program.

The SCS/USBR Technical Policy Coordination Committee developed a joint "Monitoring and Evaluation Interim Guide" for use by State, project, and field personnel as a technical reference in the development of project M&E plans.

The current legislation and existing authorities are sufficient for monitoring and evaluation of the CRSC program.

Research, Demonstration, and Education

Research and demonstration activities are carried out by the ARS and CSRS through the land grant colleges and State agricultural experiment stations. While research and demonstrations are specifically authorized by amendments to the Act, the existing ARS and CSRS research activities also serve needs of the CRSC program.

The ARS research activities include development of soil salinity monitoring instruments (California), reuse and disposal of saline irrigation drainage waters on salt tolerant crops (California), computerization of canal delivery systems and canal flow control schemes (Arizona), level basin systems (Colorado, Arizona), cable-gation irrigation systems (Utah, Idaho), and the use of remote sensing to determine "real time" crop coefficients for more effective irrigation scheduling (Arizona).

Salinity research studies conducted through the State universities include the reuse of waste-waters at a coal-fired power plant in Utah and irrigation drainage studies in the Lower Colorado and Gila River Valleys in Arizona.

Extension education and information responsibilities have been assigned to the ES and are provided through the Cooperative Extension Service (CES) at the State level. In the early years of the Grand Valley and Unita Basin salinity control projects, the State CES provided support and assistance through existing staffs and limited State-level funding.

For Grand Valley, an irrigation water management extension specialist was funded through a cooperative agreement with USBR. The specialist worked with USBR personnel and local irrigators to coordinate planning activities for USBR's off-farm canal and lateral improvement program in Grand Valley.

With the new CRSC program and funding for extension education activities, ES State offices are becoming more actively involved in local salinity control coordinating committees and in educational activities such as producing newsletters and providing tours at project levels. USDA believes extension education needs of the CRSC program can be adequately addressed with current legislative authority.

Table 1. Summary of ACP and CRSC Program Accomplishments

ACP & CRSC
Cumulative Accomplishments
as of
September 30, 1987

<u>ACTIVITY</u>		<u>Unita Basin</u>	<u>Grand Valley</u>
<u>CONTRACTING</u>			
ACP - LTA's <u>1/</u>	No.	473	38 <u>2/</u>
Active LTA	No.	183	10
CRSC Contracts (1987)	No.	12	3
<u>FINANCIAL ASSISTANCE</u>			
ACP (LTA's and Annuals)	\$	11,512,190	9,402,837
CRSC Obligation (1987)	\$	648,237	172,000
CRSC Paid (1987) (subject to repayment)	\$	82,113	26,894
<u>LAND TREATMENT (ACP & CRSC Combined)</u>			
Pipeline (onfarm)	Ft	1,647,000	1,284,270 <u>3/</u>
Pipeline (off-farm)	Ft	50,600	285,340 <u>3/</u>
Sprinkler systems	No./Acre	354/31,700	30/522
Surface systems	No./Acre	118/10,600	870/12,760
Land Leveling	Acre	1,370	2,815
Irr. Water Mgt.	Acre	34,950	3,430
<u>LAND TREATMENT RESULTS (ACP & CRSC)</u>			
Deep Percolation Reduction	Acre-Ft/Yr	21,830	9,160
Salt Load Reduction	Tons/Yr	25,307	35,160

1/ Long Term Agreements

2/ Excludes approximately 3,200 annual referrals

3/ Includes concrete ditch lining

PROGRAM COORDINATION

Interdepartmental

As a result of Pub. L 93-320, coordination between USDI and USDA was established through a Departmental Memorandum of Understanding signed in November 1974. This Memorandum of Understanding was extended to 1986 and subsequently revised in August 1986, following the 1984 amendments to the Act. Both USDI and USDA have designated salinity control liaison officers to coordinate respective programs.

A working Memorandum of Agreement between USBR, ASCS, and SCS, was initiated in 1974, and subsequently revised in August 1986 to be consistent with the new CRSC program authorities for USDA.

Departmental

The CRSC program coordination is conducted by the agency administrators of ARS, ASCS, CSRS, ES, and SCS. The agencies have established a USDA Salinity Control Coordinating Committee (SCCC), which has responsibility for carrying out the day-to-day coordination functions of the program. SCCC provides the forum for determining the administration and program management functions for respective USDA agencies and makes recommendations to USBR and EPA on policy matters, funding levels, and implementation priorities. Both USBR and the EPA have ex-officio members participating on the SCCC. The USDA salinity control liaison officer, the Director of the Land Treatment Program Division, SCS, is chairperson of this committee.

To enhance coordination efforts between USDA and USBR, SCS established a CRSC Basin Coordinator position in 1985. The Basin Coordinator is located at USBR in the Colorado River Water Quality Office in Denver, Colorado. The Basin Coordinator provides additional guidance and assistance to the USDA agencies in the Basin while coordinating basin-wide activities within the States. Experience to date has demonstrated the importance of the Basin Coordinator in resolving many of day-to-day technical and program coordination difficulties with USBR.

Basin States

Coordination with representatives of the Colorado River Basin States improves the administration and management of the CRSC programs. Since the seven basin States are primary users of Colorado River water, they have a vested interest in both the quality and quantity of water in the river. The basin States supported the original Act and were instrumental in the subsequent amendments in 1984. The Act established a Colorado River Basin Salinity Control (CRBSC) Advisory Council composed of representatives from the basin States. The Advisory Council receives annual reports from all Federal agencies on their salinity control related activities. The Advisory Council also presents an annual report, which includes program recommendations, to the Secretaries of the Interior and Agriculture and the Administrator of EPA.

The CRBSC Forum is a related organization composed of water resources and water quality representatives appointed by the governor of the respective States. The Forum was established in 1972 as a result of amendments to the

Clean Water Act and serves as an interstate water quality coordination mechanism. The Forum is concerned with establishment of Colorado River water quality standards, especially those concerning TDS. The Forum is also concerned with implementation plans and schedules for controlling salt loadings and whether the numeric water quality criteria will be met or maintained as future development occurs in the basin.

USDA reports annually to both groups and has ASCS and SCS representatives participating with the Forum Work Group. This work group is the technical arm of the Forum and also functions as a technical review or study team for the Advisory Council.

Given current structure and institutional relationships in the CRSC program, USDA believes the present mechanism for consultation and coordination with all Federal and non-Federal interests is adequate. No additional authority or legislation is needed to continue the effective coordination already established.