Colorado River Basin Salinity Control Program Update

Municipal Water District of Orange County October 4, 2023



Don A. Barnett, P.E., P.G.

Colorado River Basin Salinity Control Forum



Improved Water Quality

100 mg/L less salt

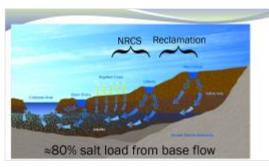




Sources of Salt



Program Genesis



Implementation

Accomplishments

Paradox Valley Unit (PVU)

Paradox

2023 Review Water Quality Standards for Salhity Colorado River System



Funding

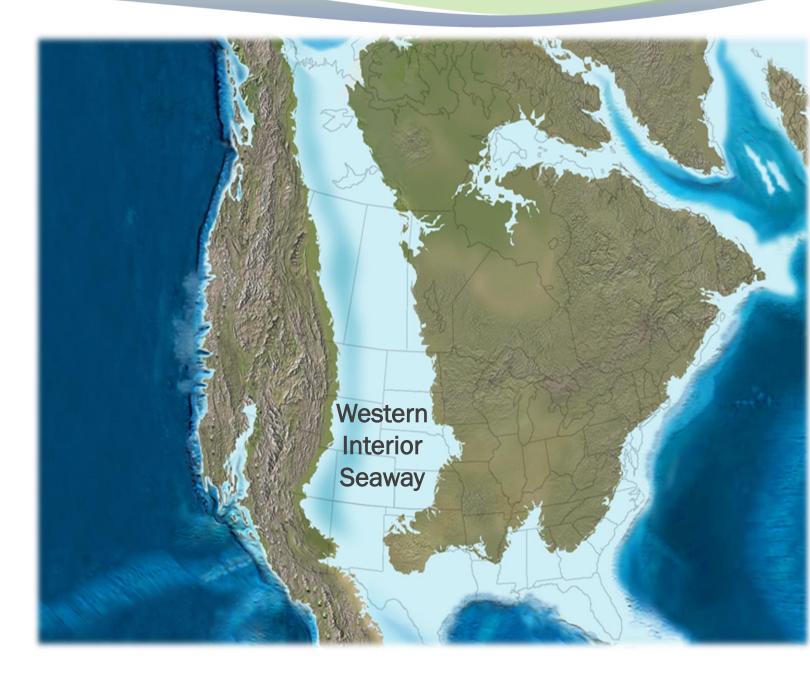


Salinity Legislation

Geology

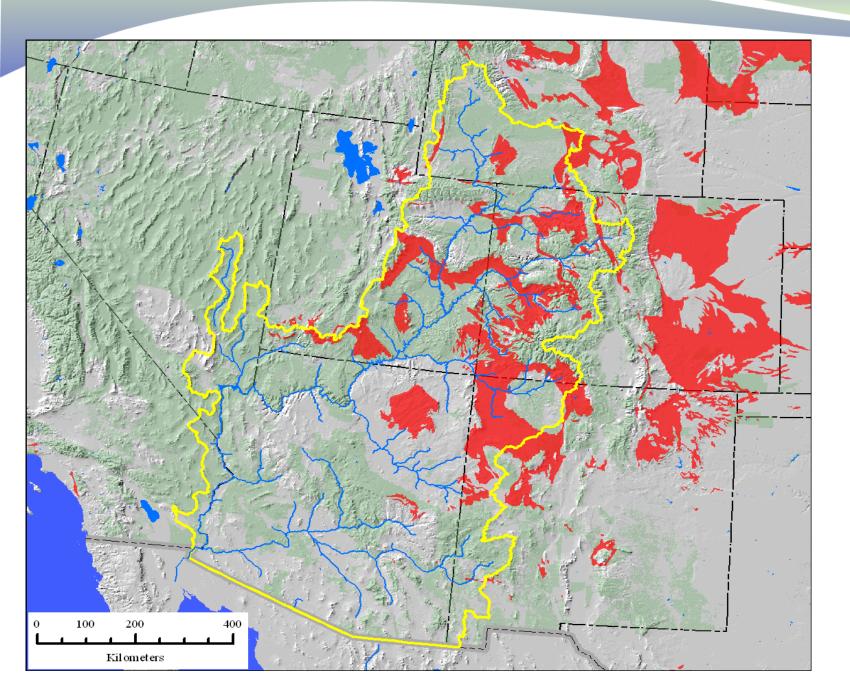
100 mya

1000s ft of shale



Mancos Shale

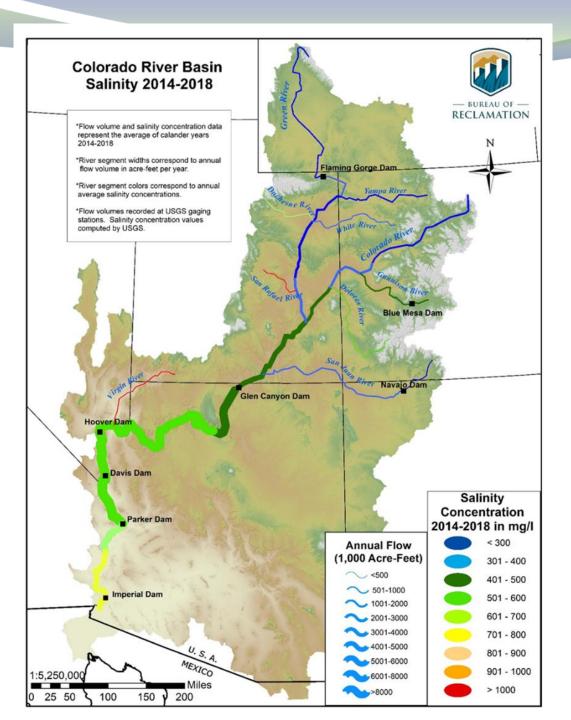


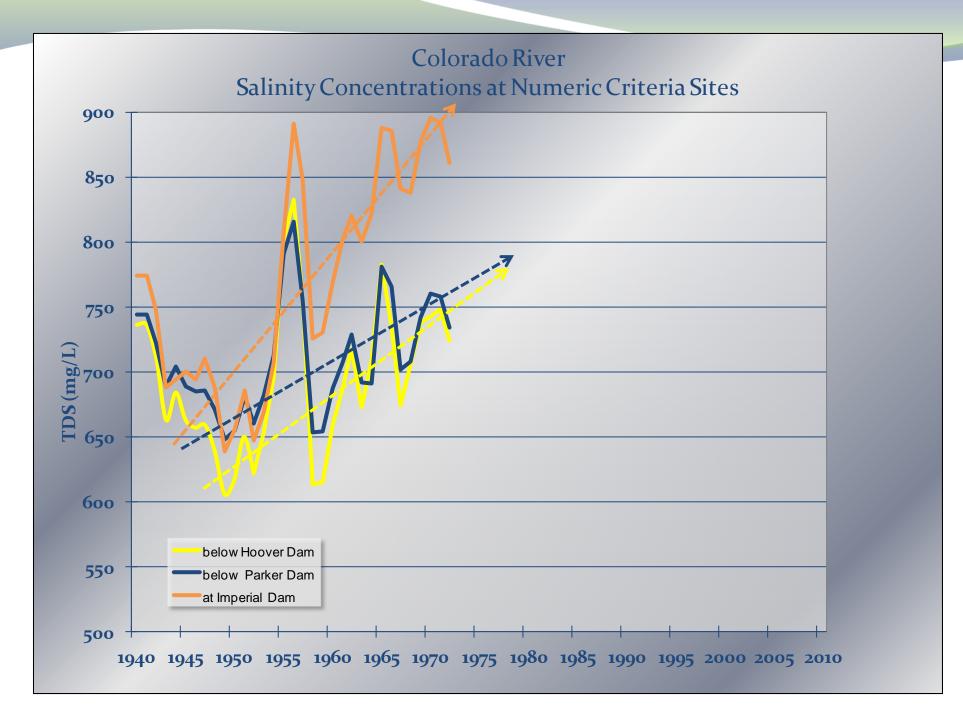


- Pervasive throughUpper Basin
- Highly erodible
- $\,\circ\,$ Forms valleys
- $\,\circ\,$ Loaded with salt

Increases in salinity

50 mg/L – 800 mg/L

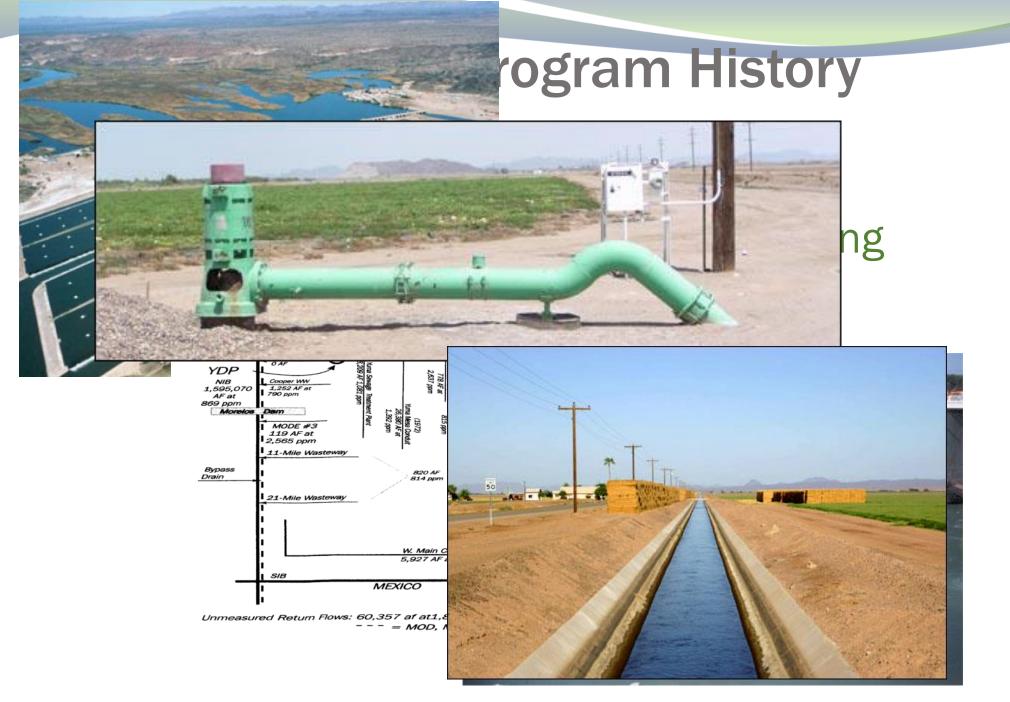




Salinity Control Program History

- Early 1970's
 - Salinity of the Colorado River was rising

Significant concerns by Mexico



Salinity Control Program History

- Early 1970's
 - Salinity of the Colorado River was rising
 - Significant concerns by Mexico
 - 1972 Amendments: Federal Water Pollution Control Act



Salinity Control Program History

- 1973 created the Colorado River Basin Salinity Control Forum (Forum)
- 1974 passed the Colorado River Basin Salinity Control Act (Act)
 - Title I and Title II
- 1975 adopted salinity standards for the Colorado River

Title 40-Protection of Environment CHAPTER I-ENVIRONMENTAL PROTECTION AGENCY [FEL 298-5] PART 120-WATER QUALITY STANDARDS

Colorado River System; Satinity Control Policy and Standards Procedures

Toolicy and Standards Procedures The purpose of this notice is to amend The purpose of this notice is to amend The Part 120 to set forth a salinity outwenned for establishing water quality quivements for establishing water quality extended for establishing water quality plementation for establishing water quality plementation for establishing water quality courses of the stablishing water quality be States of Arizona which less within the States of Arizona which less within the States of Arizona which less within the States of Arizona which less the water device of the state of the work of the state of the state of the work of the state of the state of the work of the state of the state of the work of the state of the state of the water uses. Salinity Contrast instate on water uses. Salinity corress impacts on water uses. Salinity concentrations are affected by two basic processing and loading.—the addition of mineral Sali loading of the state oncentratings—the tons of and (b) salt concentratings—the load of the state oncentratings—the load of the state oncentratings.—the load of the state oncentratings...the load in the state oncentrating of the states of the states

loss of water from the system through stream depietion. Buildes to date have demonstrated that Buildes to date have demonstrated that the shift of stream systems can be also and the state of the systems of may be recut. Although further study may be recut. Although the solution function is available to submit which and although the solution of a submit of the solution of the solution of the further main an effective salinity control program. The solution of the solution of the solution although the solution of the solution of the solution of the conference in the Master of phone of the conference in the Master of April 27, 1972, by the reconvened fun-dation were held on the proposed reg-ulation were held on the proposed reg-ulation were held on the proposed reg-rado, on August 21, 1974, Priver, Colo-rado, on August 21, 1974, priver, and Enments were provided at the hearings and also by letter during the raview period. A summary of major councents and En-vironmental Protection Agency response

follows: (1) The Colorado River Basin Salinity. Control Forum stated that it did not object to he proposed regulation, and believed that it satisfield the regulations of section 303(b) (2) of PL, 92-500 undit October 18, 1975. The Forum reported October 18, 1975. The Forum reported that the seven Colorado River Basin States were actively working on the development of water quality standards and a plan of implementation for salinity control.

(2) The Colorado River Water Conservation District Inquired as to whether

the definition of the Colorado River Basin contained in Article II(1) of the Colorado Haver Compact of 1922 would be followed in the development of salinity standards and the salinity control plain. The requirement for establishing water quality standards and an impicmentation plan apply to be clorado River System-lation. This definition is consistent with the definition of the Colorado River Sys-tem contained in Article II(a) of the the definition of the Colorado River Sys-tem contained in Article II's) of the Compact. The resultion states that the sailnity problem shall be treated as a besinwide problem. Articles II() and II(s) define the Beain to include the Sys-tem Dius arcss outside the drainage arch tem plus areas outside the drainage area tem plus areas putaide the drainage area which are served by the Celorado River System, The Environmenial Protection Agency (The Environmenial Protection Agency, (The Environmenial Protection attached and implementation plane con-sider the international on available international diverging and available sider the impacts of basinwide uses, e.g., iransmountain diversions, on animity effects in the Bysien, but the establish-ment of standards and implementation plans pursuant to this regulation will not be required for streams located outside

The District also questioned the The District also questioned the feasibility of relying on irritation im-provement programs as a means of al-leviating the salinity problem.

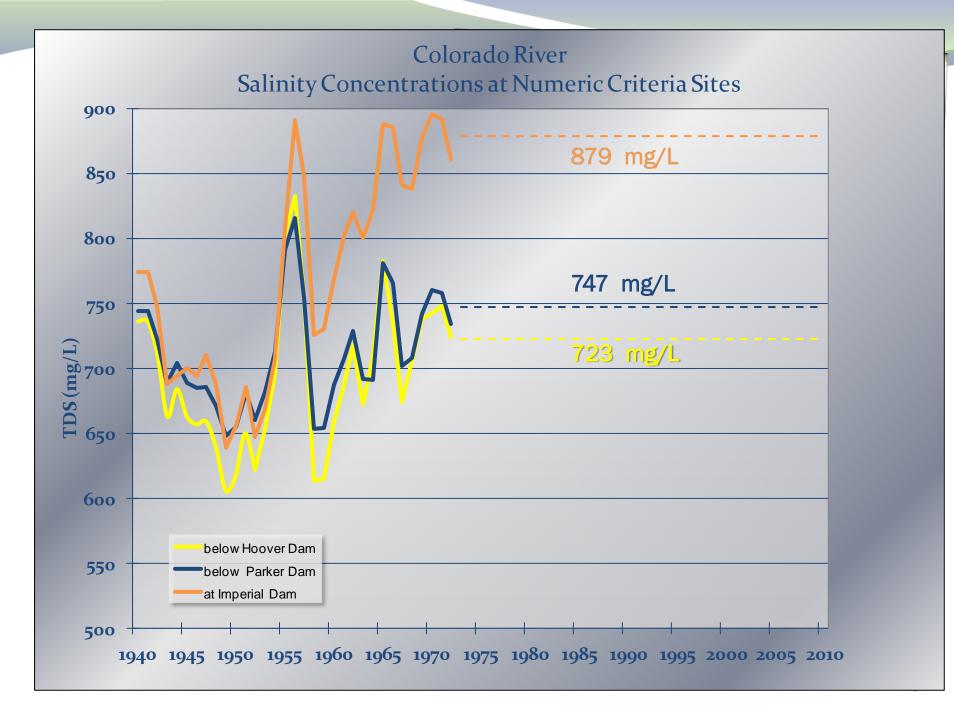
leviating the salitions as a means of al-leviating the sality problem. EFA believes that adequate informa-tion is available unitiate controls for irrigated sericular lutitate controls for sality being supported by formation work entity being supported by formation of others about demonstrate the first pre-clares about demonstrate the first pre-clares about control measures projection of various control measures for an out information of the sality of the sality being information of the sality of the sality being information of the sality of the sality of the information of the sality of the sality of the information of the sality of the sality of the information of the sality of the sality of the information of the sality of the sality of the sality plenear the sality of plementation plan.

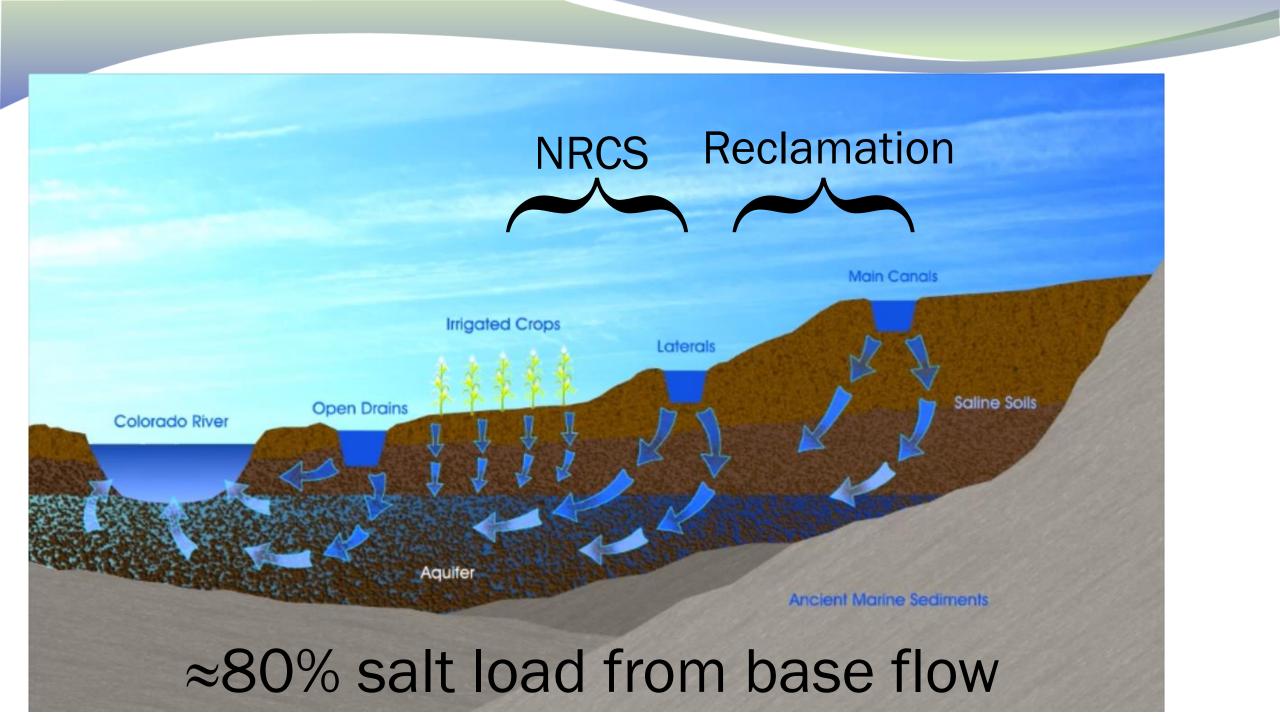
plementation plan, "supplication of the im-(3) The Environmental Defense Fund (EDF) testified that it believed that EPA was not complying with their of the Federal Water of the Federal Water Polnitudirenteries of the Federal Water Polnitudirenteries as unended, chiefly horesized EFA is late response to the timethile de-henside in the Act for establishing standards, and also because numerical standards, and also because numerical standards, and the because numerical standards, and the because numerical tandards, and tandards, and

EPA believes that a move to promul-gate numerical standards at this time could cause even further delays in controlling salinity due to the problems in-volved with obtaining interstate cooperation and public acceptance of such a promulgation.

promugation. (4) The Sierrs Club raised a number of objections to the proposed regulation, principally because, in its ophilon, it permits further development of the waters of the Colorado Fiber without re-guiring that adequate saining controls be on line prior to development. Spe-cific suggestions are presented as a second second colorado and a second second

(a) Section 120.5(c) (3). Shorten the deadline for submission of the standards and implementation plan to May 30.





Salinity Control Program Efforts

- Non-Point Source Activities
 - Lining and piping of canals and ditches (Reclamation)



Salinity Control Program Efforts

- Non-Point Source Activities
 - Lining and piping of canals and ditches (Reclamation)
 - On-farm irrigation efficiency improvements (NRCS)



Salinity Control Program Efforts

- Non-Point Source Activities
 - Lining and piping of canals and ditches (Reclamation)
 - On-farm irrigation efficiency improvements (NRCS)
 - Rangeland improvements (BLM)



Paradox Valley Unit (PVU)

brine



deep injection well

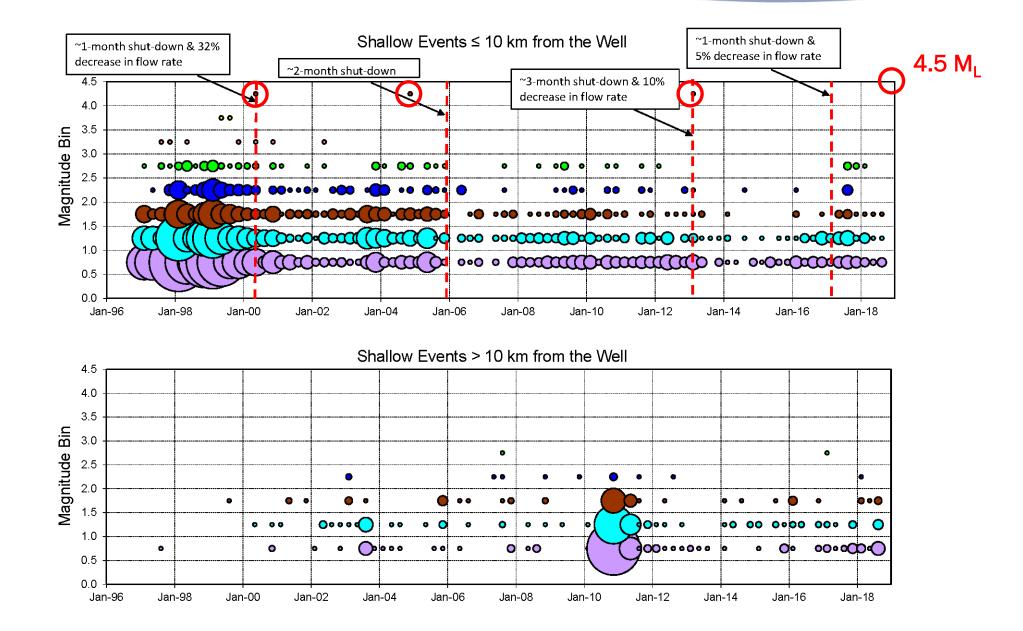


allow collection wells

Contraction of the second states

La Sal Mountains (recharge)





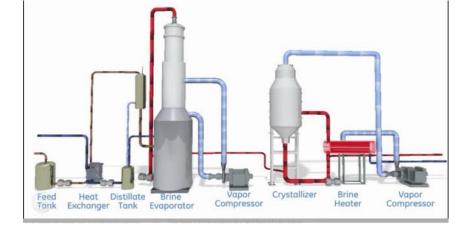
Paradox Valley Unit EIS



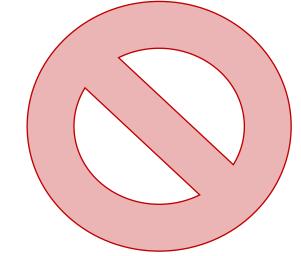
Drill a New Well



Build evaporation ponds



Zero Liquid Discharge (ZLD)



Do nothing – let the project die

PVU DEIS

- FEIS December 2020
- 5 volumes
- 14 appendices
- >2500 pages
- No Action Alternative
- No Record of Decision
- Asked Reclamation to relook (RFI)

Paradox Valley Unit of the Colorado River Basin Salinity Control Program Final Environmental Impact Statement Volume I

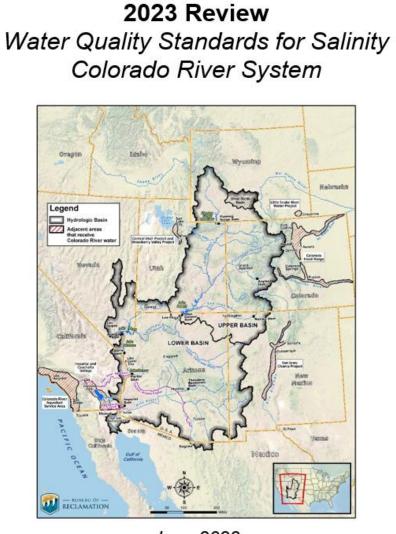




U.S. Department of the Interior Bureau of Reclamation Western Colorado Area Office Interior Region 7: Upper Colorado Basin Grand Junction, Colorado

Estimated lead agency costs for preparing this EIS: \$2,196,000

December 2020



June 2023 Colorado River Basin Salinity Control Forum

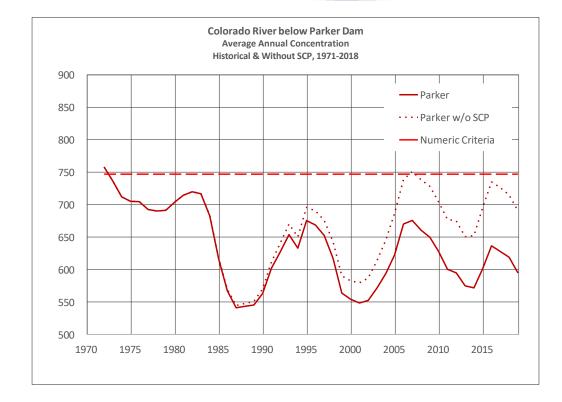


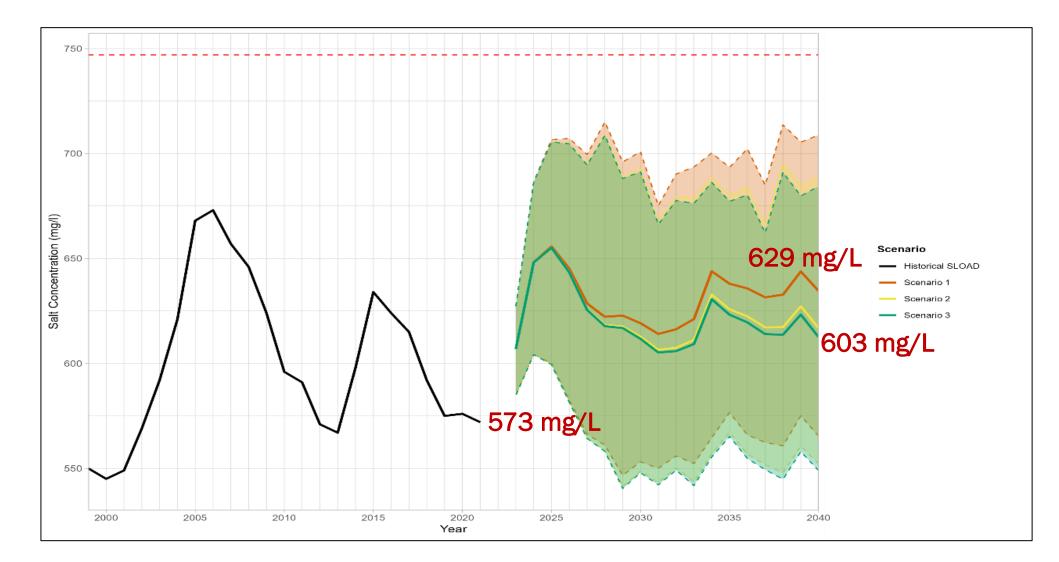
Table 2 - Additional Controls - Plan of Implementation 2026**

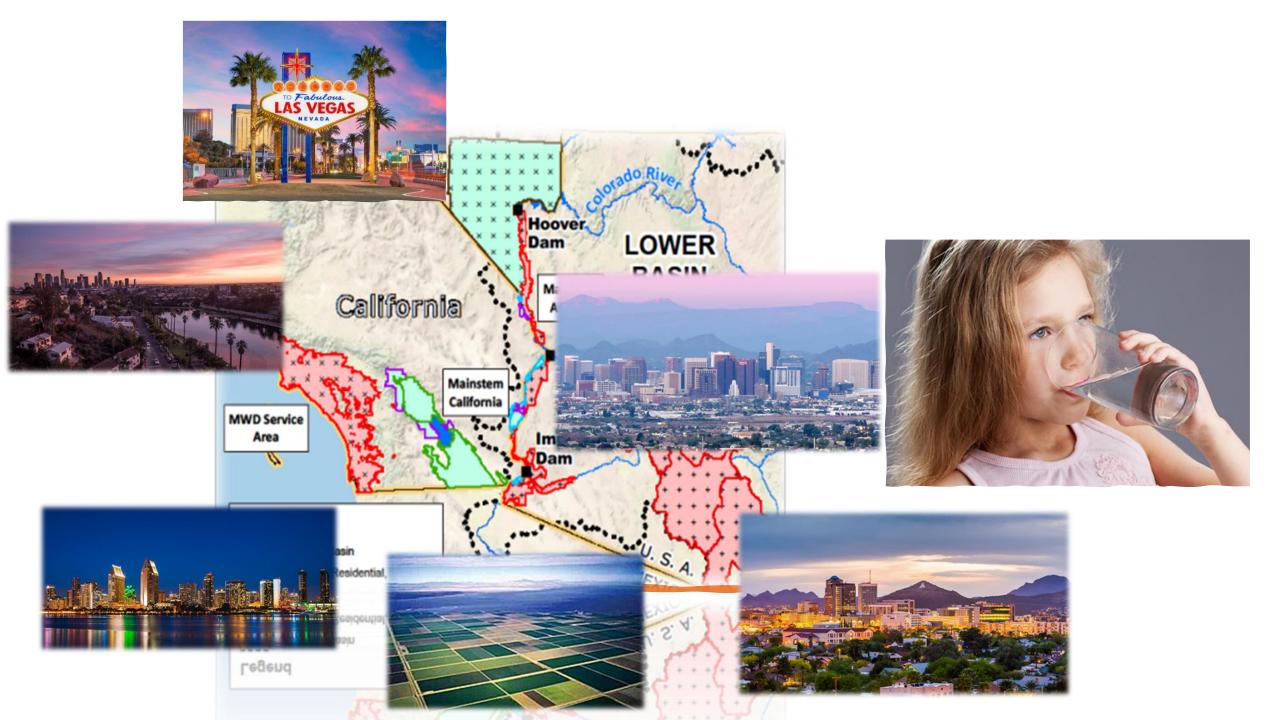
Funding Source	Tons/Year as of 2026
RECLAMATION (Basinwide Program)*	22,200
BASIN STATES PROGRAM (BSP)	7,900
USDA NRCS (EQIP)	21,600
TOTAL**	51,700

*Includes cost-share dollars from Basin States Program

** BLM Nonpoint Source controls not included herein

Figure 8 - Projected average annual salinity concentration **below Parker Dam**. The colored solid lines are the mean values, and the shaded cloud area represents the 10th to 90th percentiles of each scenario's annual values. The black line represents the historical observed concentration from the SLOAD program. The red dotted line represents the numeric criteria.

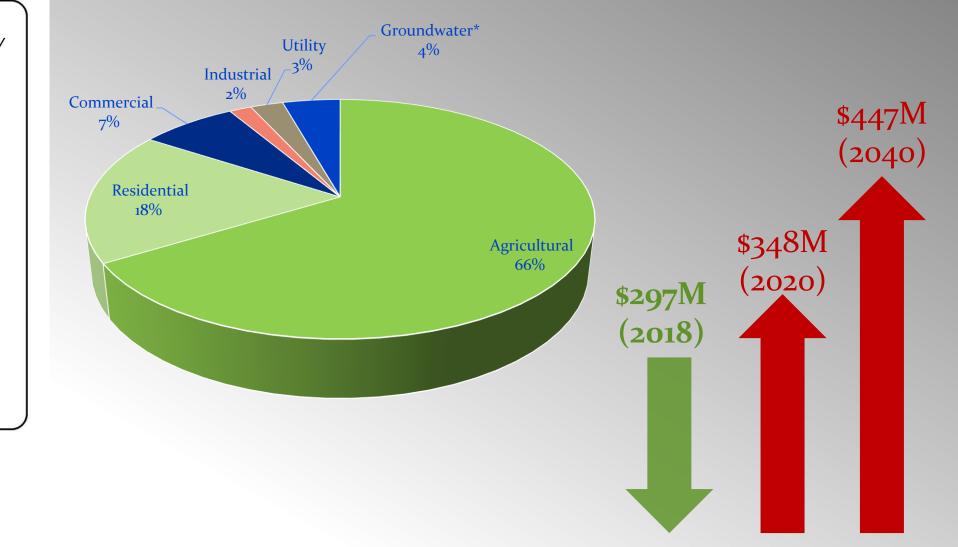




Quantified Annual Salinity Damages

2023 Review Water Quality Standards for Salinity Colorado River System June 2023 Colorado River Basin Salinity Control Forum

> Colorado River Basin SALINITY CONTROL FORUM



Quantified Salinity Damages/Benefits



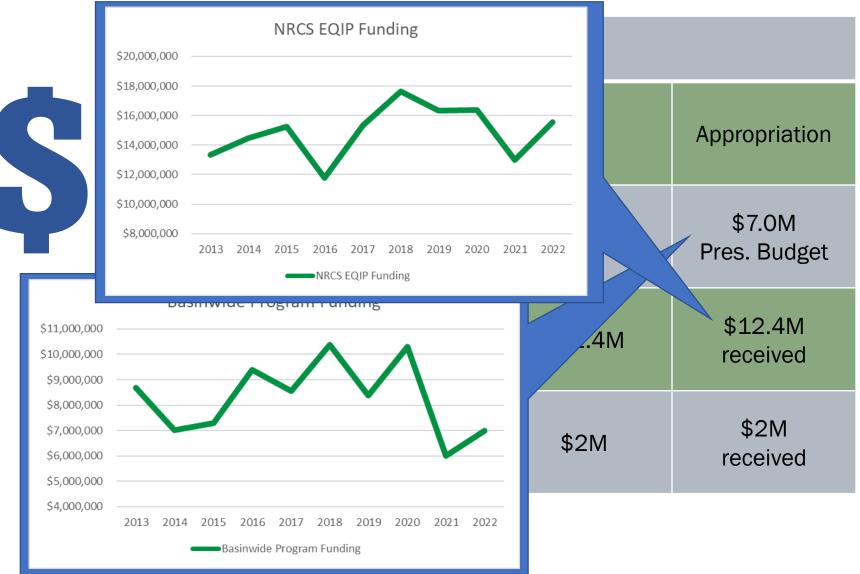


- Reduced leaching
- Greater re-use
- Other?

Program Funding



FY 2022 Program Funding







Appropriation and Cost Share

- "Most" of salt load from federal lands
- Federal Government pays 70% of total costs
- Example: \$10 M Project
 1996 Appropriation \$10 M \$7 M Repayment \$3 M <u>Upfront Cost Share</u>

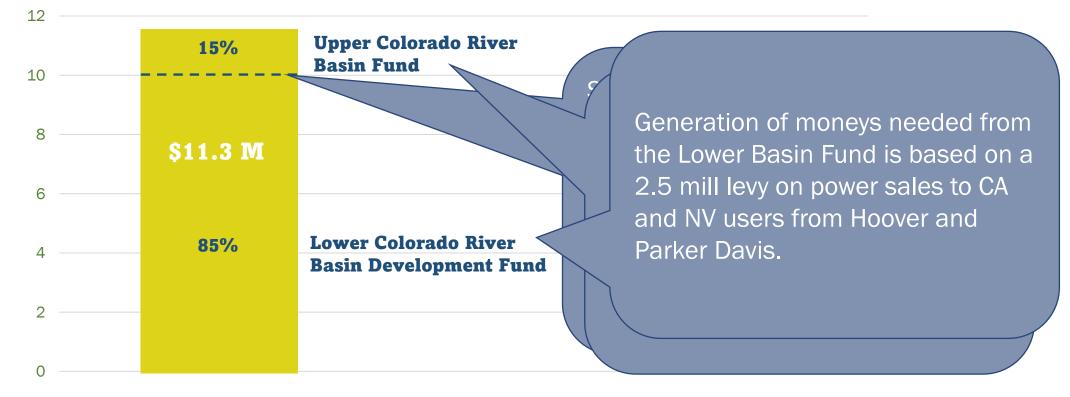
Appropriation and Cost Share

Colorado River Basin Salinity Control Funding – FY2022



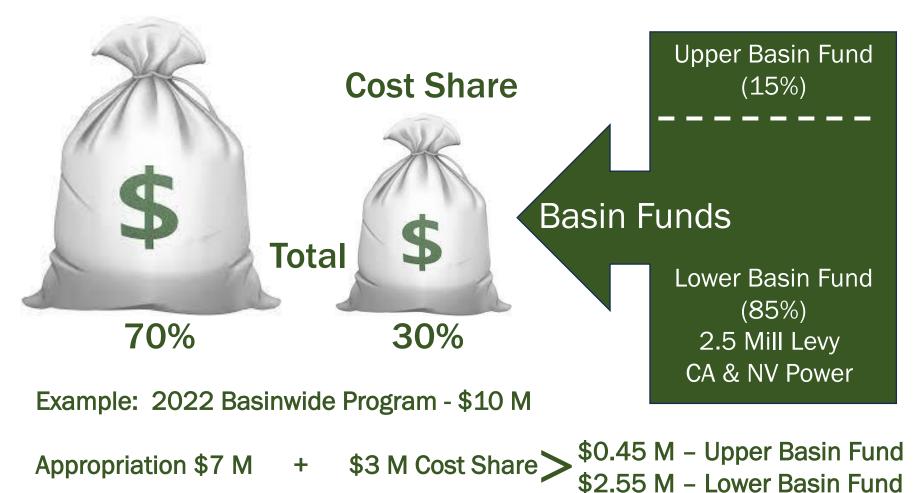
Cost Share

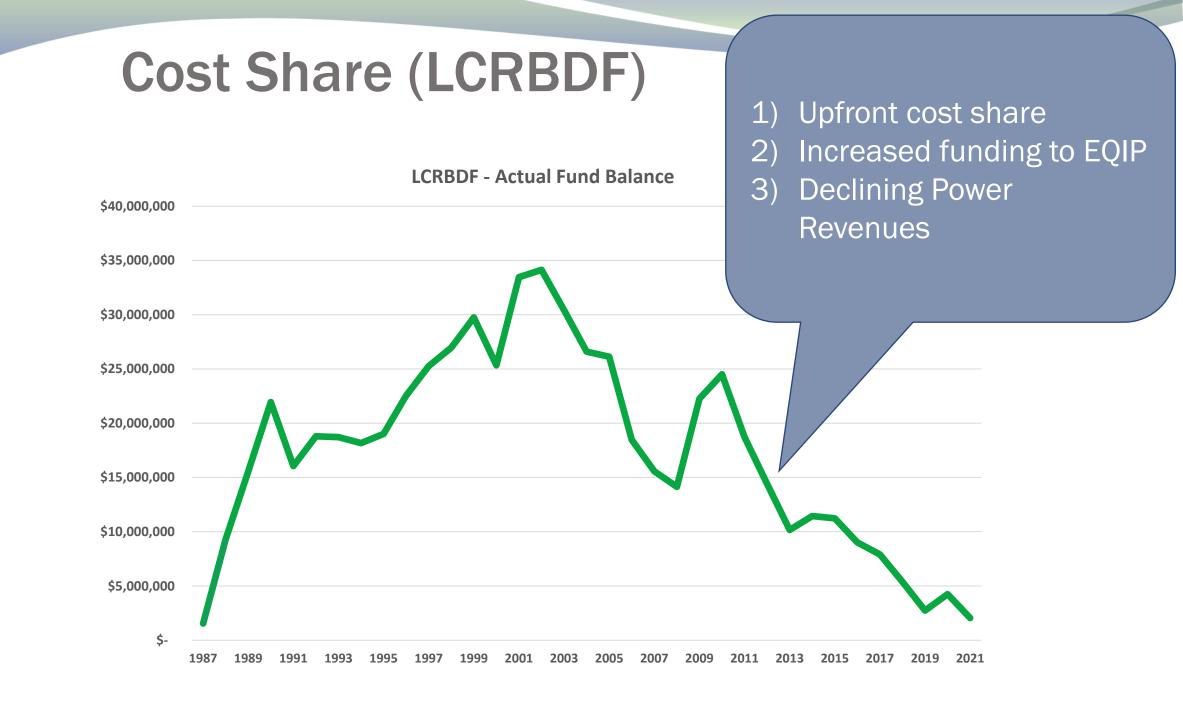
Colorado River Basin Salinity Control Funding



Salinity-Cost Share Requirements

Appropriation



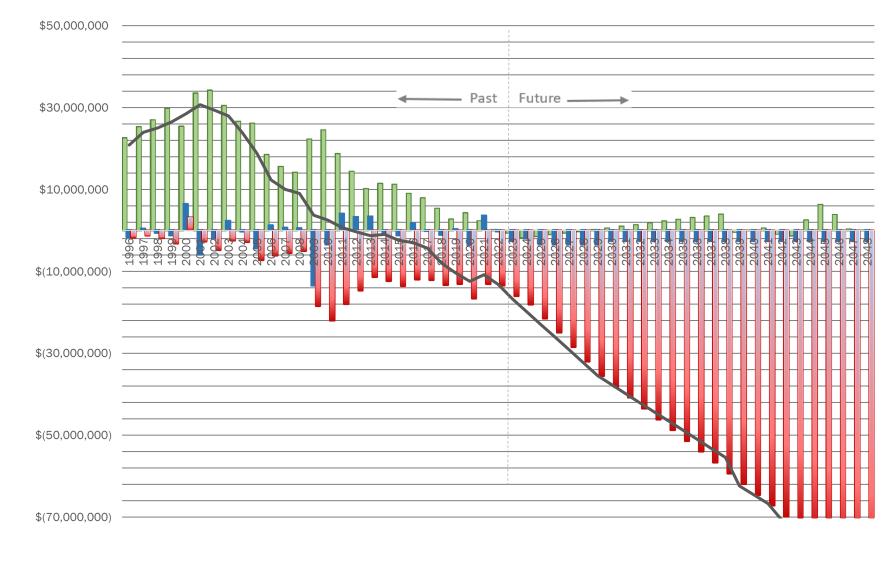


Cost Share Legislation



¹¹⁸ TH CONGRESS IST SESSION S.	
To amend the Colorado River Basin Salinity Control Act to modify certain requirements applicable to salinity control units, and for other purposes.	
IN THE SENATE OF THE UNITED STATES Mr. BENNET introduced the following bill; which was read twice and referred to the Committee on	
A Dra	
To amend the Colorado River Basin Salinity Control Act to modify certain requirements applicable to salinity control units, and for other purposes. 1 Be it enacted by a	
1 Be it enacted by the Senate and House of Representa- 2 tives of the United States of America in Congress assembled, 3 SECTION 1. SALINITY CONTROL UNITS.	
5 Control Act (43 U.S.C. 1595) is one of the Solution of the Solution Solut	
that follows through "(a) m	
ing the following:	

S.L.C.



Lower Colorado River Basin Development Fund Balances



control programs

(a) Authority of Secretary

The Secretary is authorized to construct, operate, and maintain the following salinity control units and salinity control programs 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 Para-

ď .nd 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 into

Grand Valley fa

to the Colorado River, and implementing measures to replace incidental fish and wildlife values foregone.,1 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 systems, or portions thereof, 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



(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 18-



§1592

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

(excluding costs borne by non-Federal partici-

pants) of the on-farm measures authorized by

section 1592(c) of this title, of all measures to re-

total costs

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specified in subsection (b)(2) of this section relating to the continued operation and maintenance of the unit's facilities.

retary shall enter into contracts through which the on-Feder I entities owning, operating a d

TITLE 43—PUBLIC LANDS

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(5) Portions of the McElmo Creek unit, Colorado, as components of the Dolores participating project, Colorado River Storage project, author-

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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 nese 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 salin control will include

rectly, or may make grants, commitments for

grants, or advances of funds to non-Federal enti-

ties under such terms and conditions as the Sec-

retary may require. Such program shall consist

of cost-effective measures and associated works

to reduce salinity from saline springs, leaking

wells, irrigation sources, industrial sources, ero-

sion of public and private land, or other sources

that the Secretary considers appropriate. Such

concerning the program established under this

paragraph to the appropriate committees of Congress. The Secretary may not expend funds

for any implementation measure under the pro-

place 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 (86 Stat. 816) [33 U.S.C. 1251 et seq.], 75 per

cific costs of these si Centum total costs of construction, operude any joint cos the Dolores p replacement of each costs allocated to sa ject to this chapter cated to irrigation s separable feature thereof authorized by unit or which authorized 202(a)(6 section 1592(a)(of this title, includand (3)per centum of the total costs of construcing thereof, in the Mont on, operation, and maintenance of the associconcert, will assume subsection (b)(2) continued operation measures to replace incidental fish and unit's facilities. A basinwide sal the Secretary, actin values foregone, 70 per centum of the Reclamation, shall Ite may carry out the pu

> 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)¹ of subsection (a) of this section²

Proposed Fix

Name	UNIT	CONSTRUCTION	OPERATIONS & MAINTENANCE	REPLACEMENT	WILDLIFE
Paradox	1592(a)(1)	75%	75%	75%	75%
Grand Valley	1592(a)(2)	75%	75%	75%	75%
Las Vegas Wash	1592(a)(3)	75%	75%	75%	75%
Lower Gunnison	1592(a)(4)	70%	70%	70%	70%
McElmo/Dolores	1592(a)(5)	70%	70%	70%	70%
Basinwide	1592(a)(6)	70%	70%	70%	70%
EQIP	1592(c)		70%		

<u>\$3,110,000</u> **\$4,340,000**

4	"(a) Allocation of <u>Costs.—</u> The Secretary";			
5	(2) by striking paragraph (1) and inserting the			
6	following:			
7	"(1) Nonreimbursable costs; reimburs-			
8	ABLE <u>COSTS.</u>			
9	"(A) <u>Nonreimbursable costs</u> .—			
10	"(i) <u>IN GENERAL</u> .—In recognition of			
11	Federal responsibility for the Colorado			
12	River as an interstate stream and for			
13	international comity with Mexico, Federal			
14	ownership of the land of the Colorado			
15	River Basin from which most of the dis-			
16	solved salts originate, and the policy estab-			
17	lished in the Federal Water Pollution Con-			
18	trol Act (33 U.S.C. 1251 et seq.) and ex-			
19	cept as provided in clause (ii), the fol-			
20	lowing shall be nonreimbursable:			

Revised Act

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"(I) 75 percent of the total costs of construction and replacement of each unit or separable feature of a unit authorized by section 202(a)(1), including 90 percent of—

> "(aa) the costs of operation and maintenance of each unit or separable feature of a unit authorized by that section; and "(bb) the total costs of construction, operation, and maintenance of the associated measures to replace incidental fish and wildlife values <u>foregone</u>.

Paradox

	"(ii <u>) Special</u> rule for nonreim-
	BURSABLE COSTS FOR FISCAL YEARS 2024
	AND <u>2025.—</u> Notwithstanding clause (i), for
	each of <mark>fiscal years 2024 and 202</mark> 5, the
	following shall be nonreimbursable:
Paradox	"(I) 75 percent of all costs de-
	scribed in clause (i)(I).
Grand Valle	"(II) <mark>75 percent of all costs de-</mark>
	scribed in clause (i)(II).
McElmo	"(III) <mark>70 percent o</mark> f all costs de-
	scribed in clause (i)(V).
	"(IV) The percentages of all
Las Vegas V	costs described in subclauses (III),
Lower Guni	(IV), and (VI) of clause (i).
Racinwide	

Revised Act

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EQIP