

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



Outline

Sources of Salt



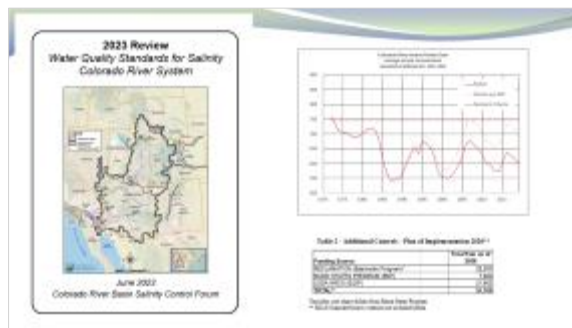
Paradox



Program Genesis



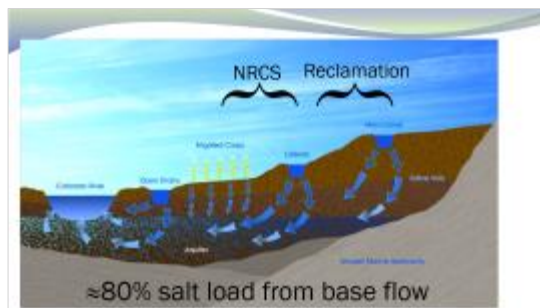
Accomplishments



Salinity Legislation



Implementation



Funding



Geology

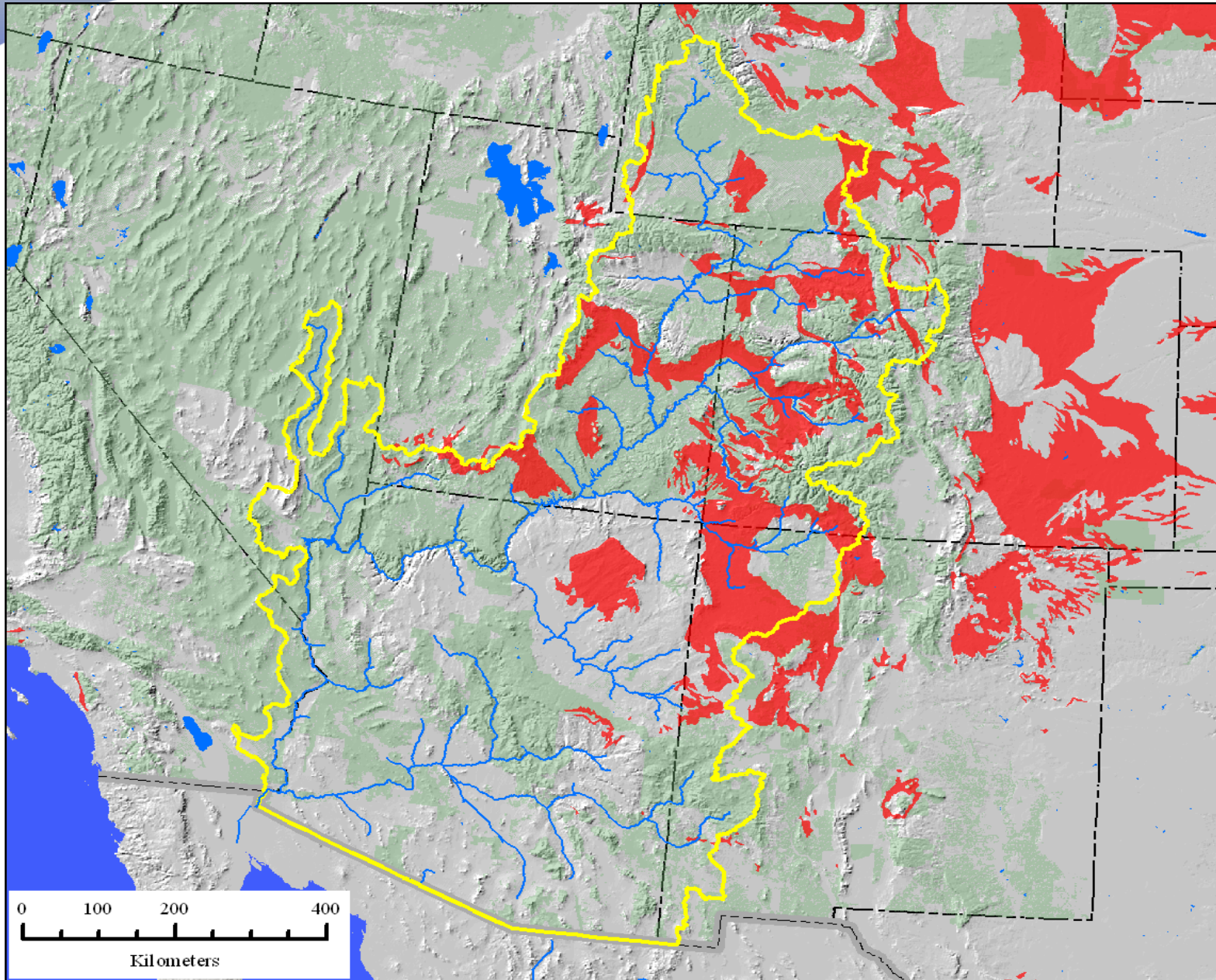
100 mya

1000s ft of
shale



Mancos Shale

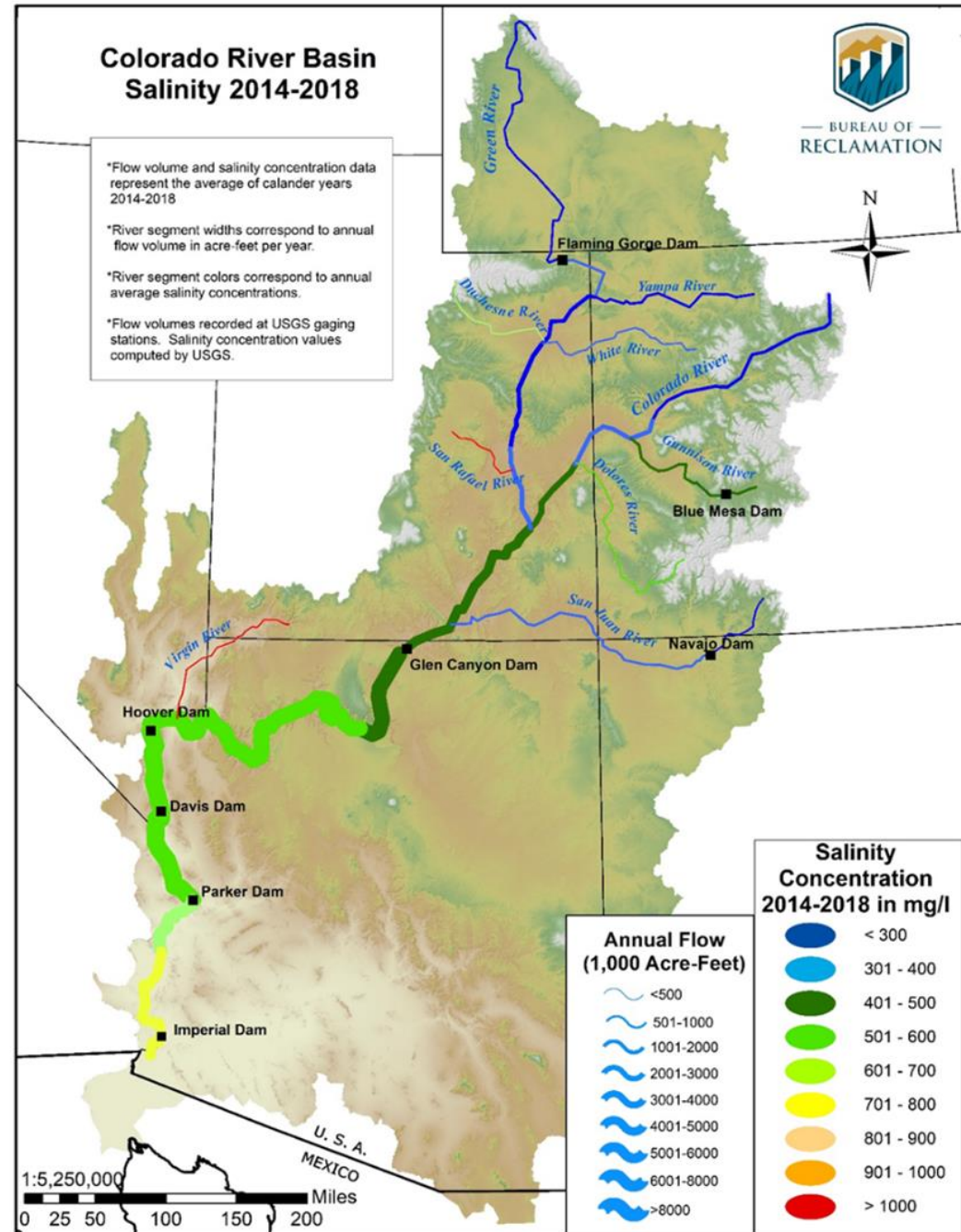




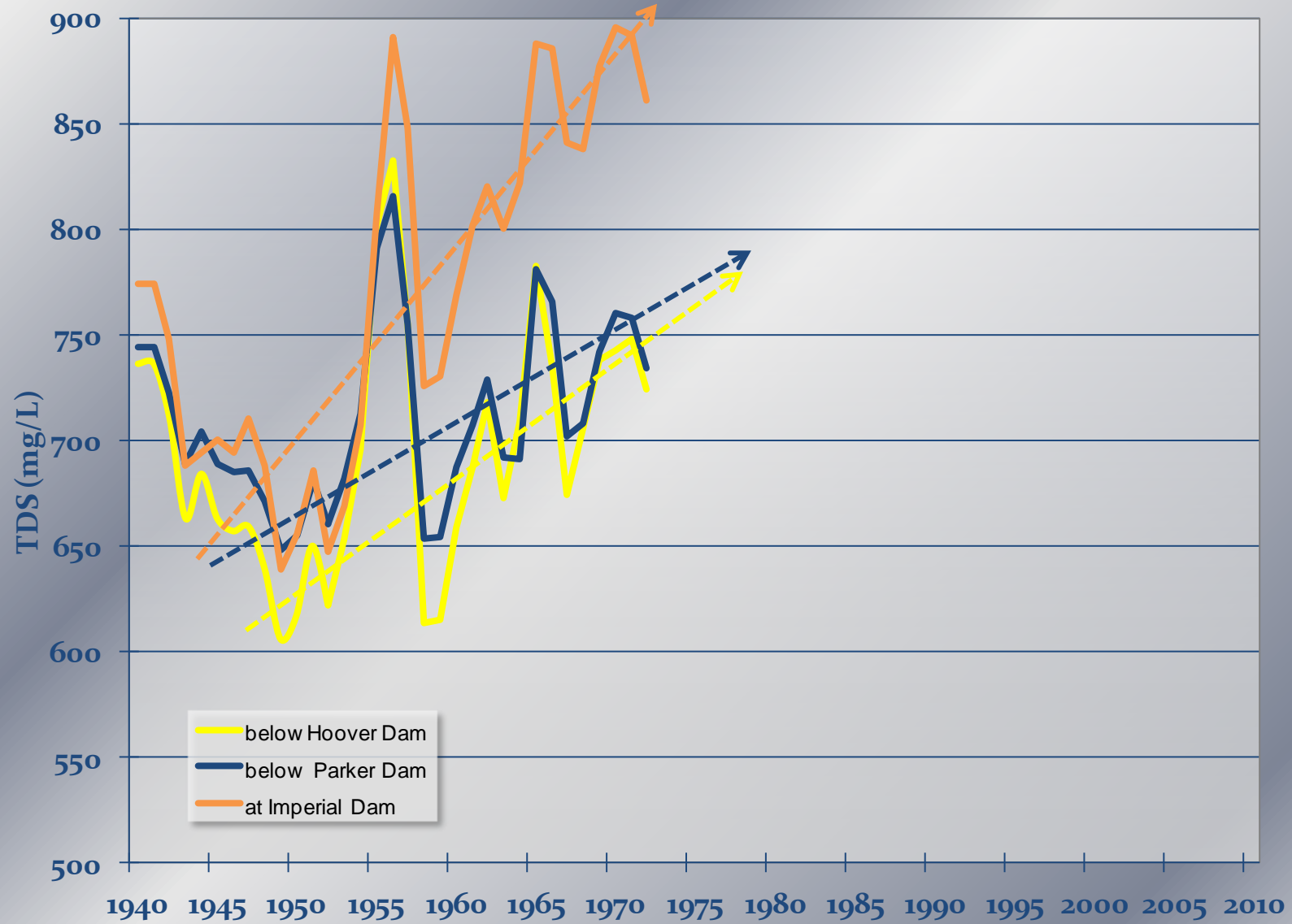
- Pervasive through Upper Basin
- Highly erodible
- Forms valleys
- Loaded with salt

Increases in
salinity

50 mg/L –
800 mg/L



Colorado River Salinity Concentrations at Numeric Criteria Sites



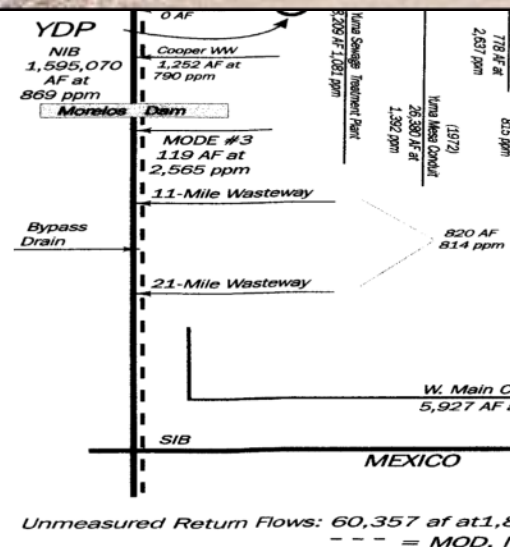
Salinity Control Program History

- Early 1970's
 - Salinity of the Colorado River was rising
 - Significant concerns by Mexico

Program History



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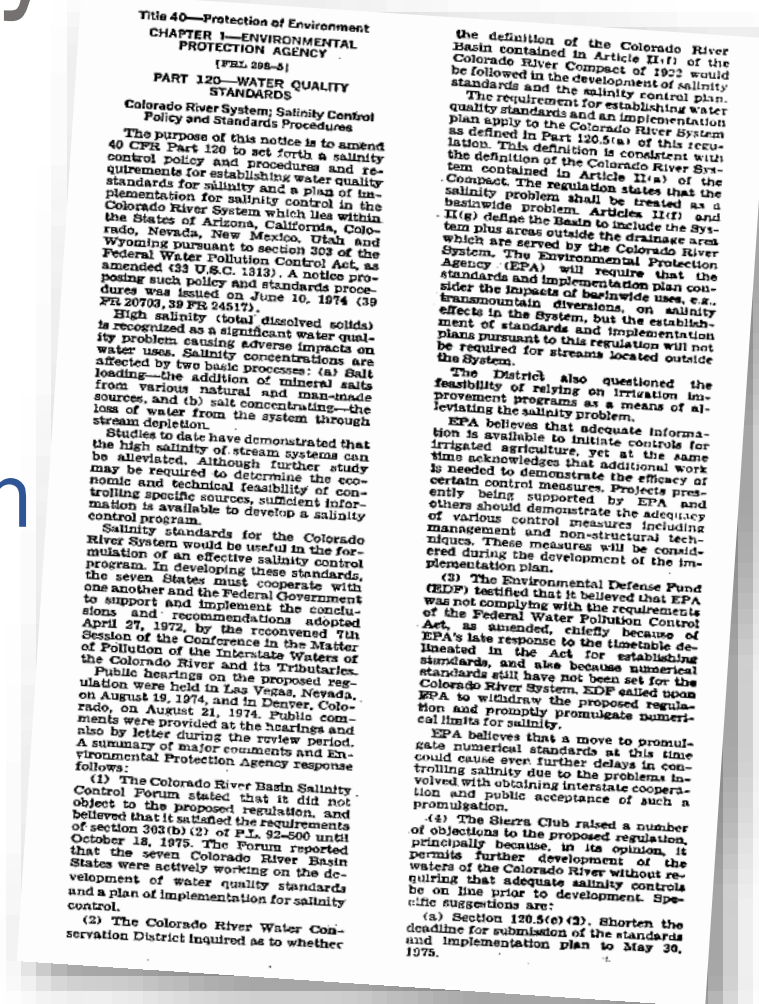
Salinity Control Program History

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

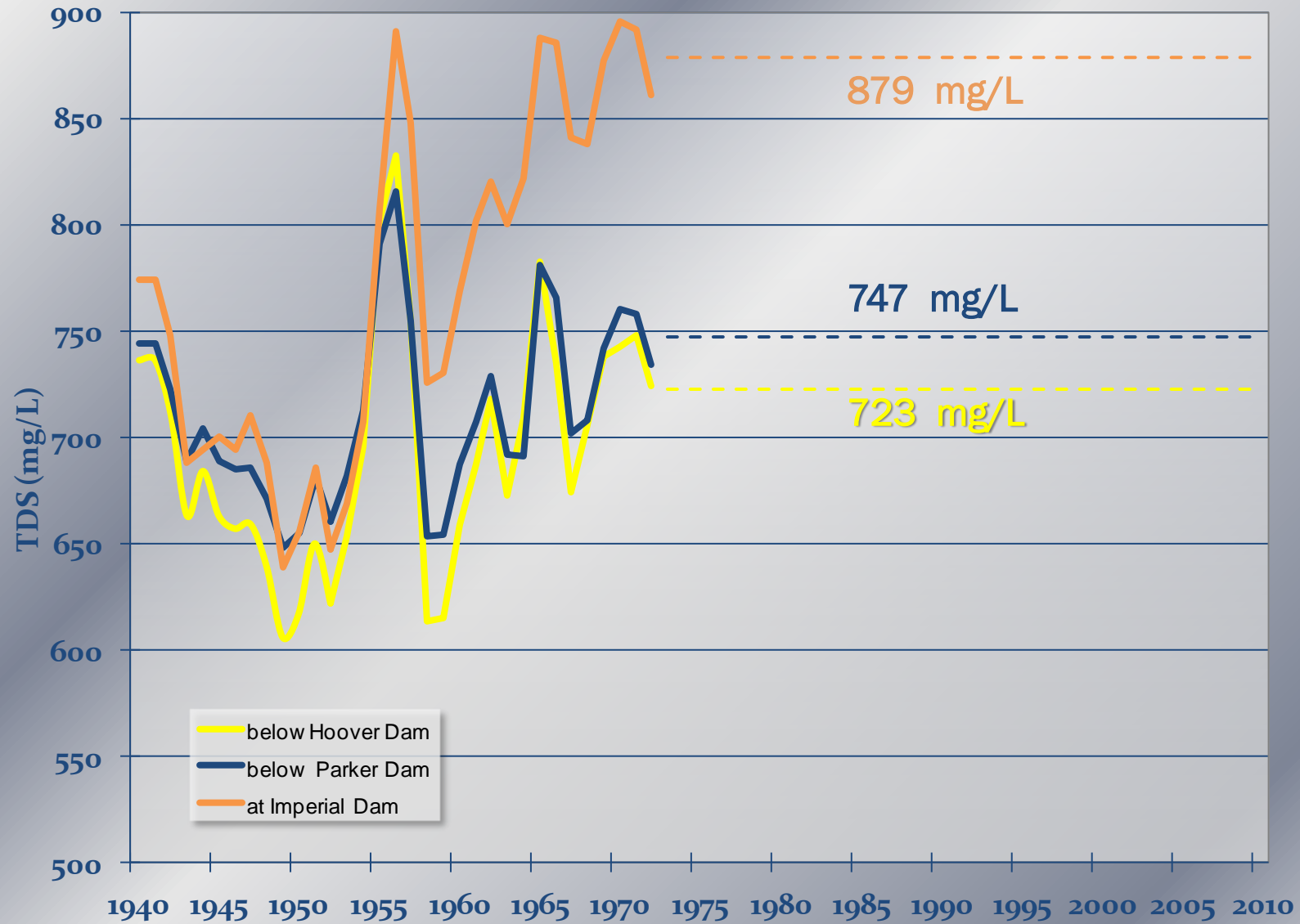


Salinity Control Program History

- 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

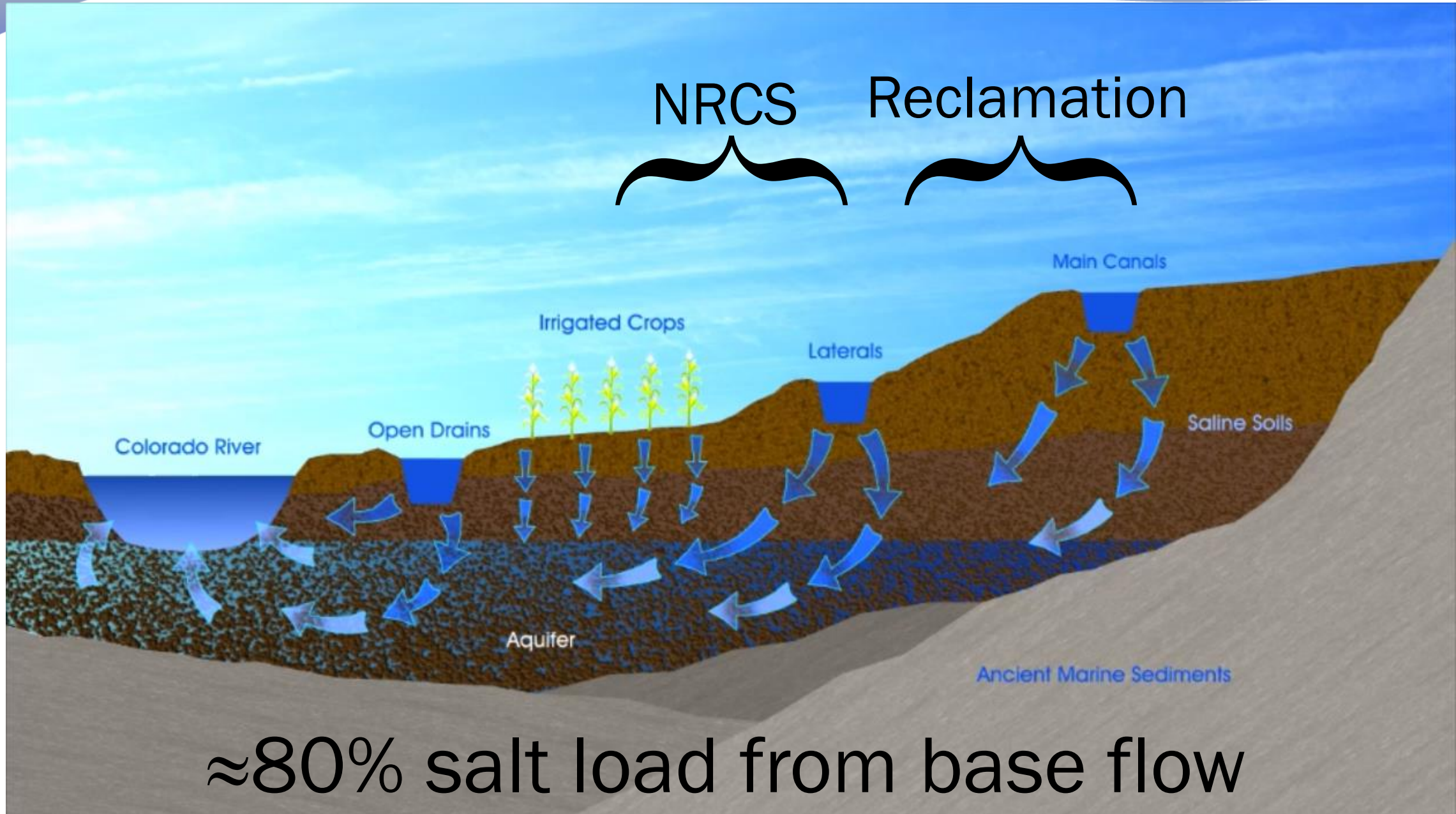


Colorado River Salinity Concentrations at Numeric Criteria Sites



NRCS

Reclamation



≈80% salt load from base flow

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)

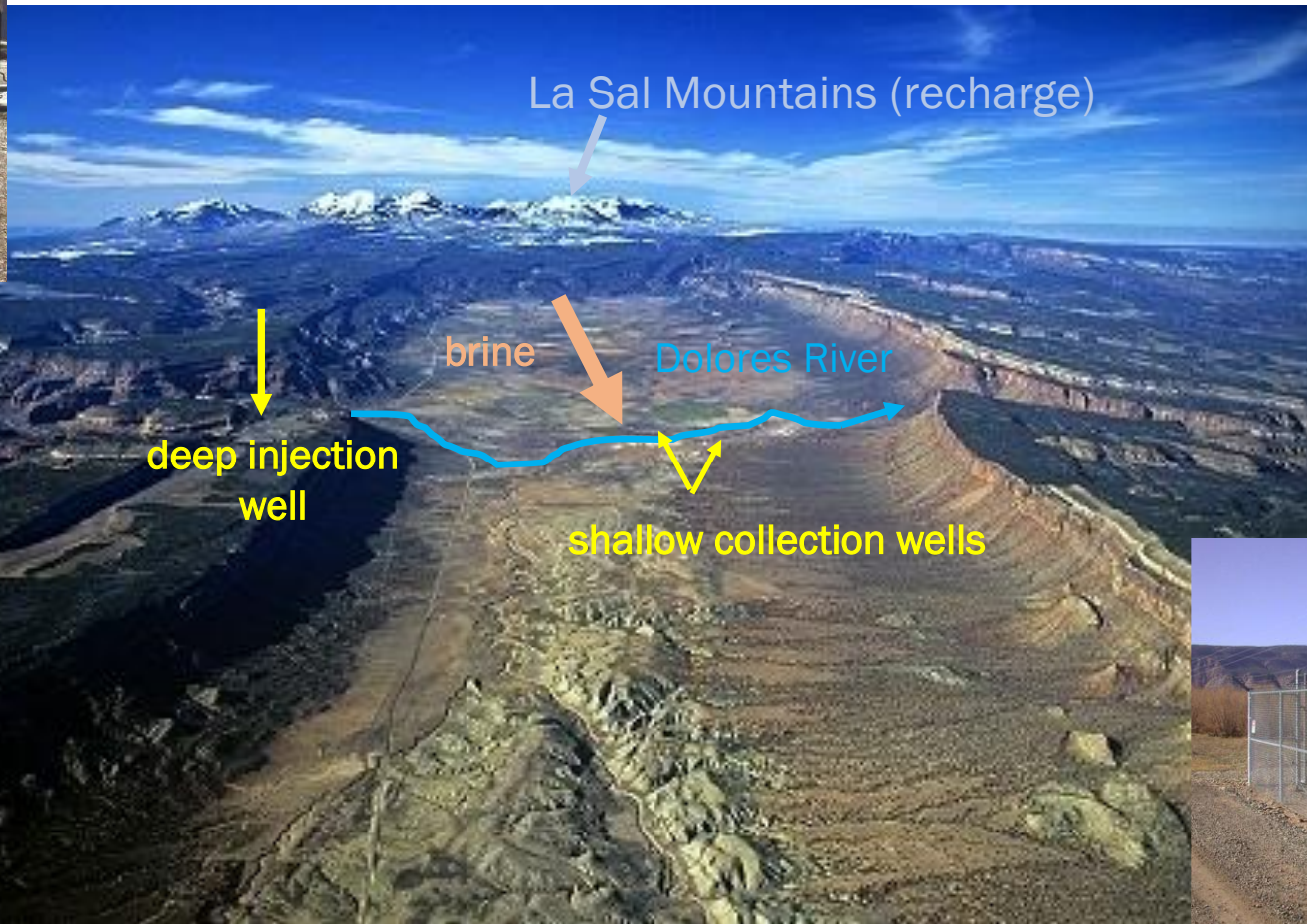


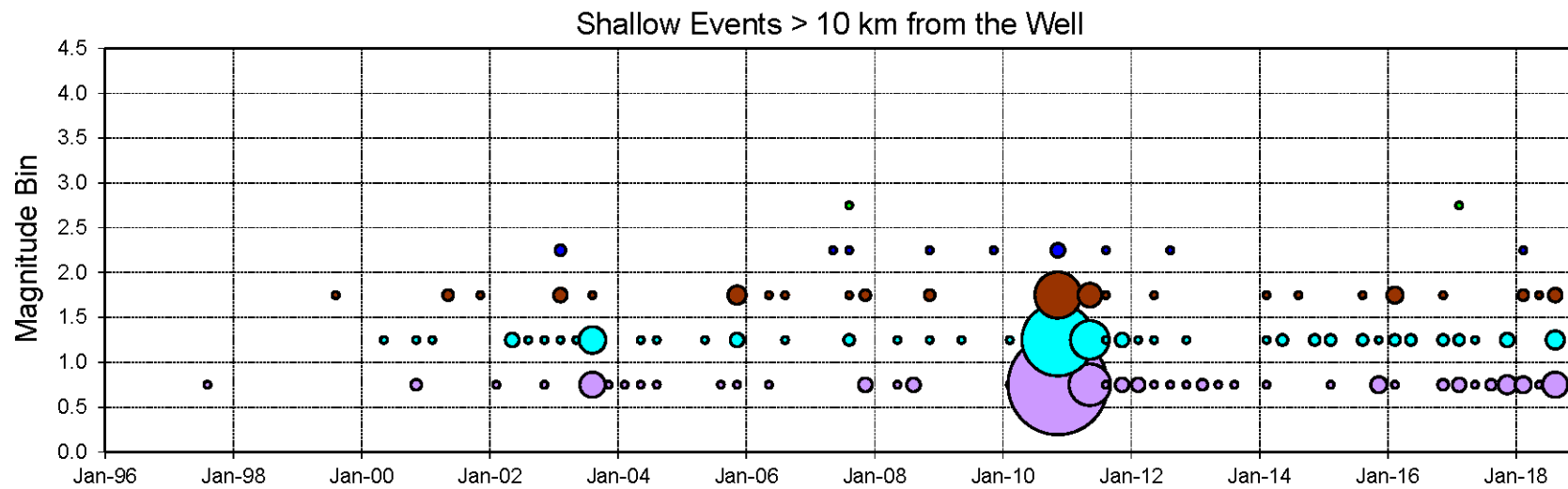
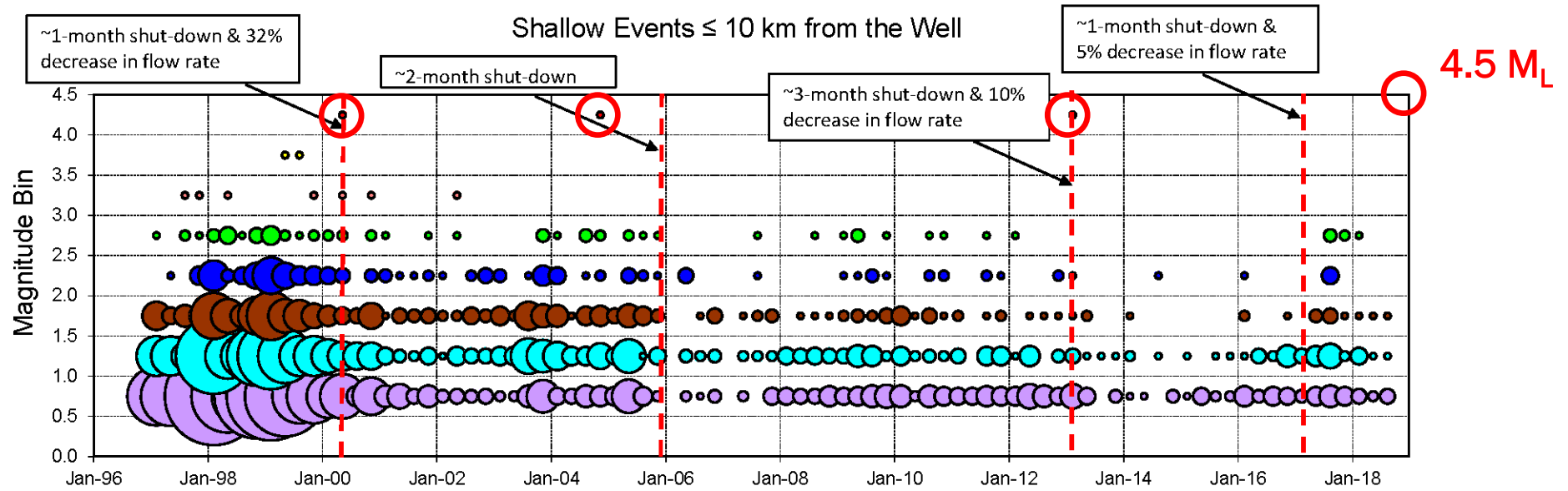
Salinity Control Program Efforts

- 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)





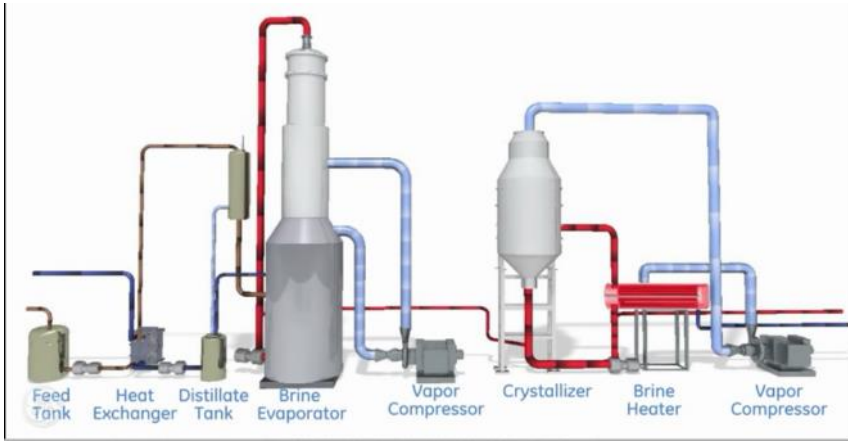
Paradox Valley Unit EIS



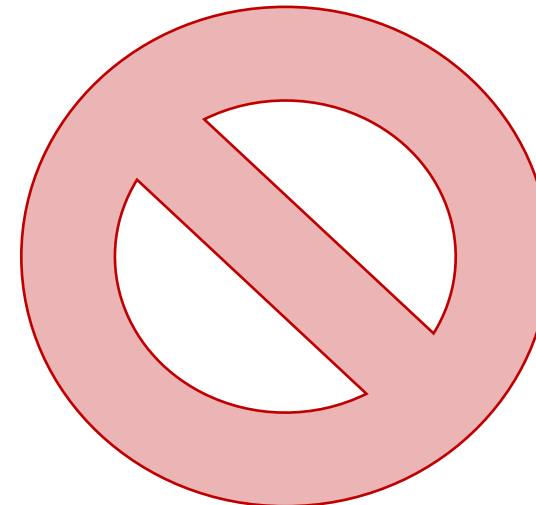
**Drill a
New Well**



**Build
evaporation
ponds**



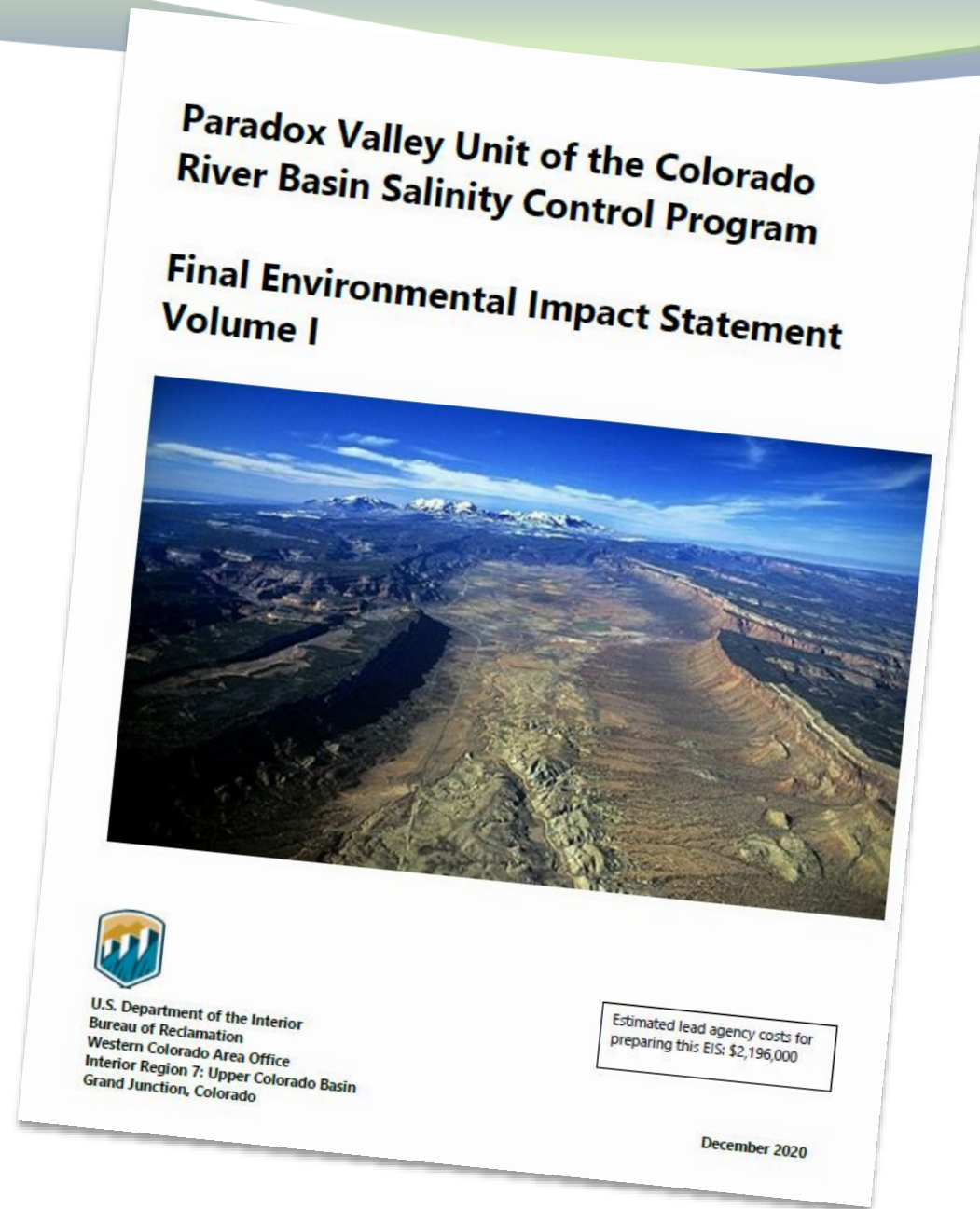
**Zero Liquid
Discharge
(ZLD)**



**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)



2023 Review Water Quality Standards for Salinity Colorado River System



June 2023

Colorado River Basin Salinity Control Forum

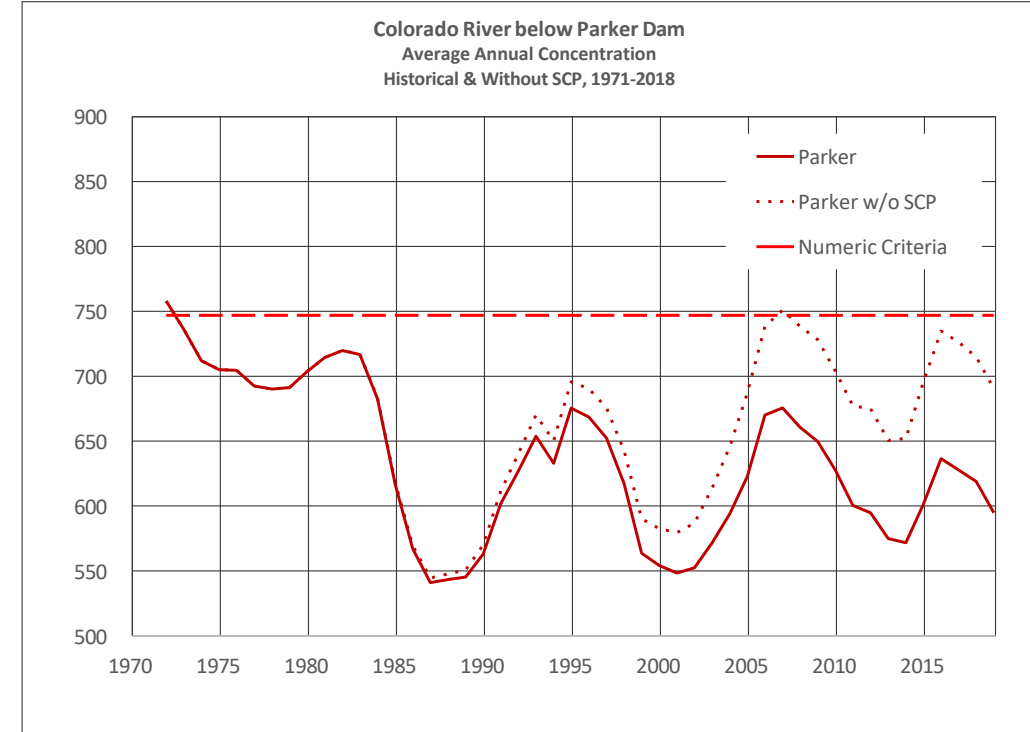


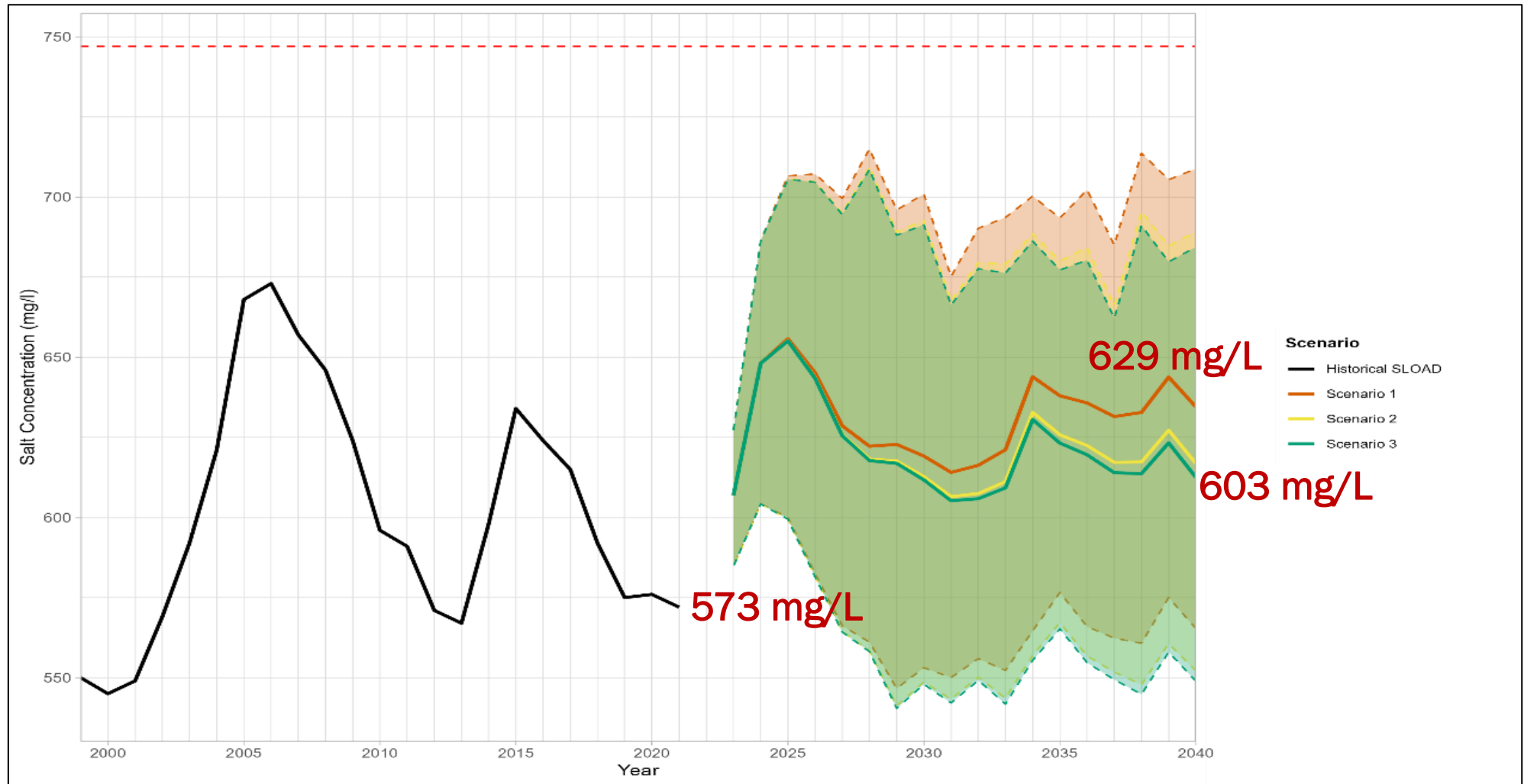
Table 2 - Additional Controls - Plan of Implementation 2026**

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

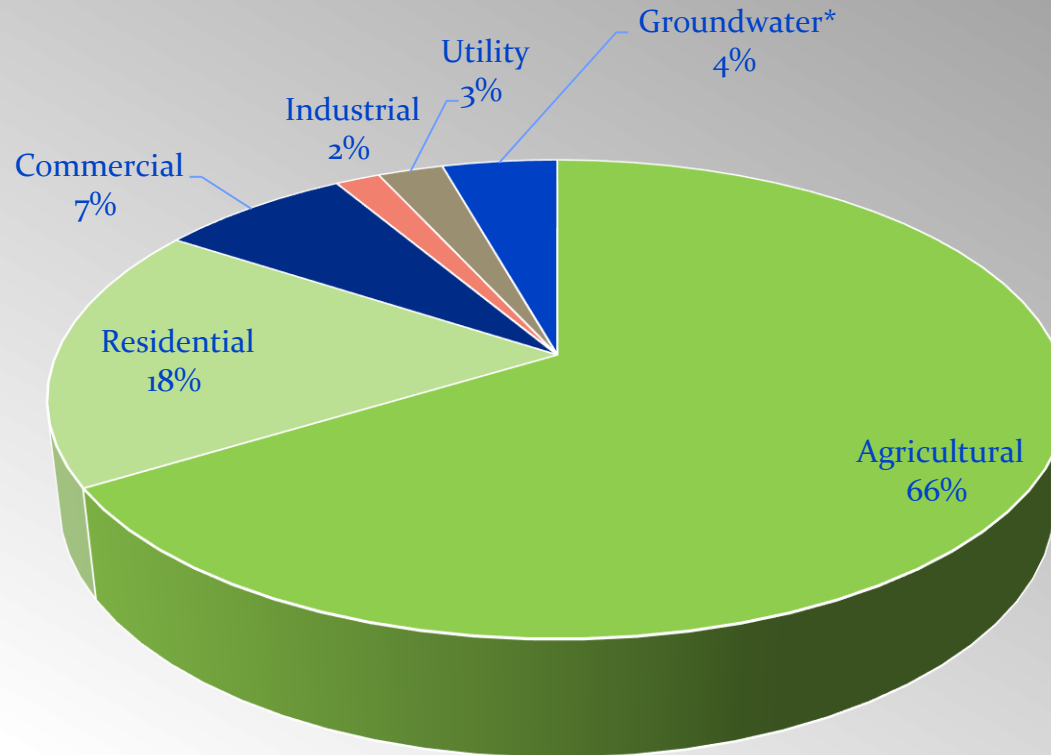
2023 Review

Water Quality Standards for Salinity Colorado River System



June 2023

Colorado River Basin Salinity Control Forum



\$297M
(2018)

\$348M
(2020)

\$447M
(2040)



Quantified Salinity Damages/Benefits

Water
Savings?

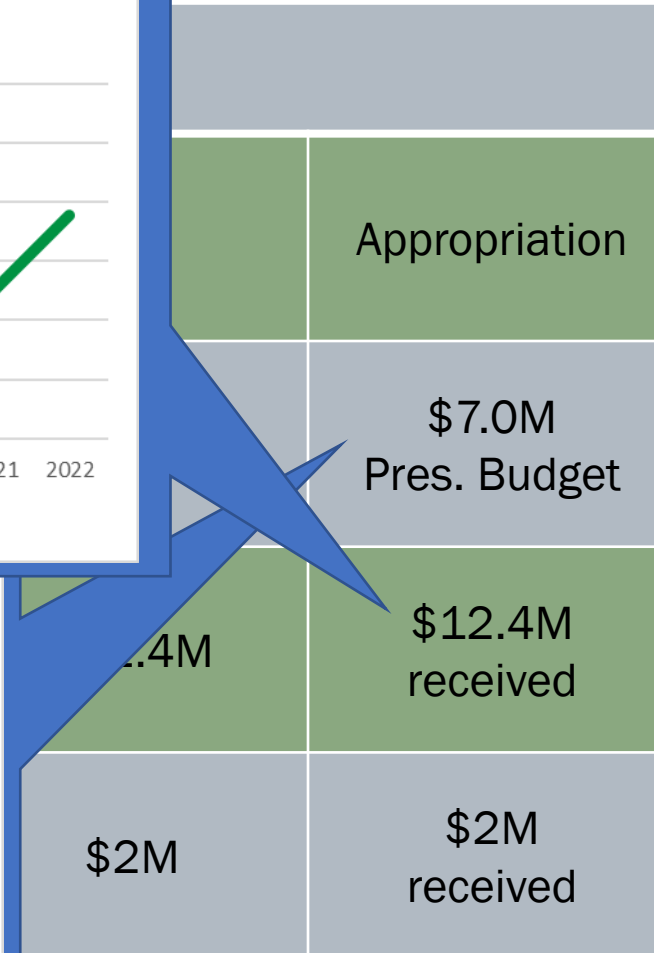
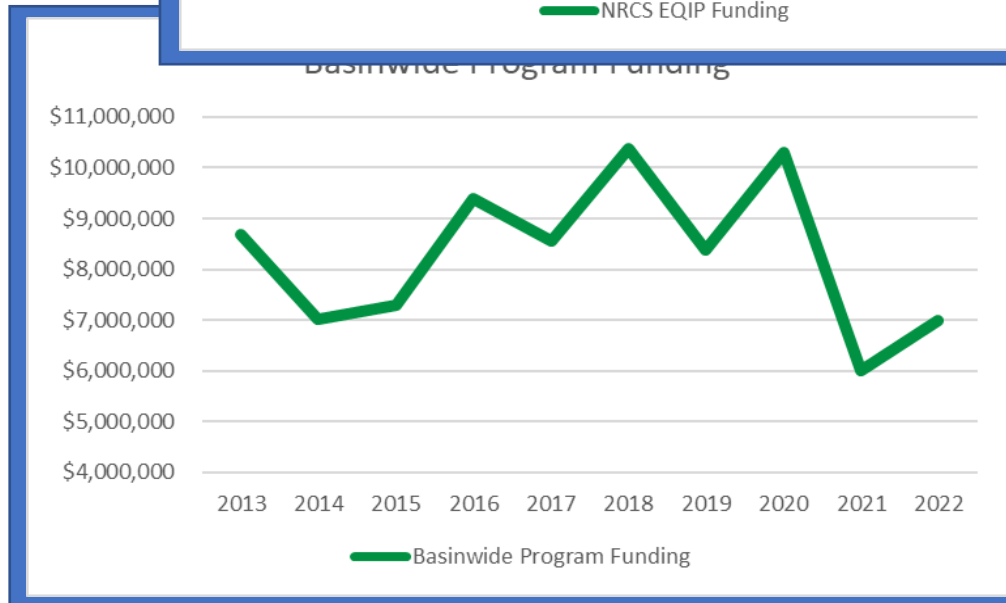
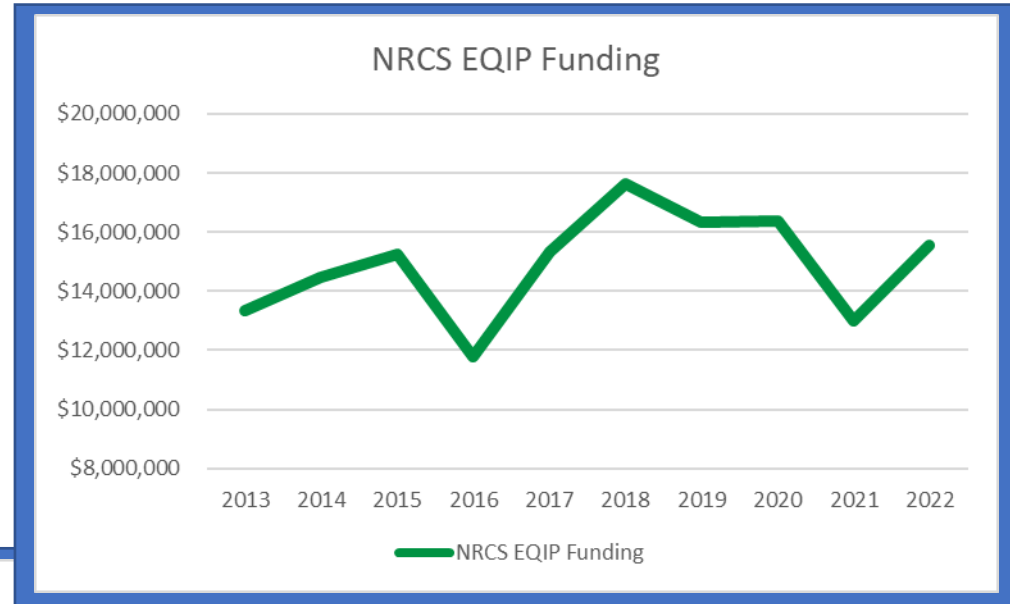


- Reduced leaching
- Greater re-use
- Other?

Program Funding



FY 2022 Program Funding





Appropriation and Cost Share

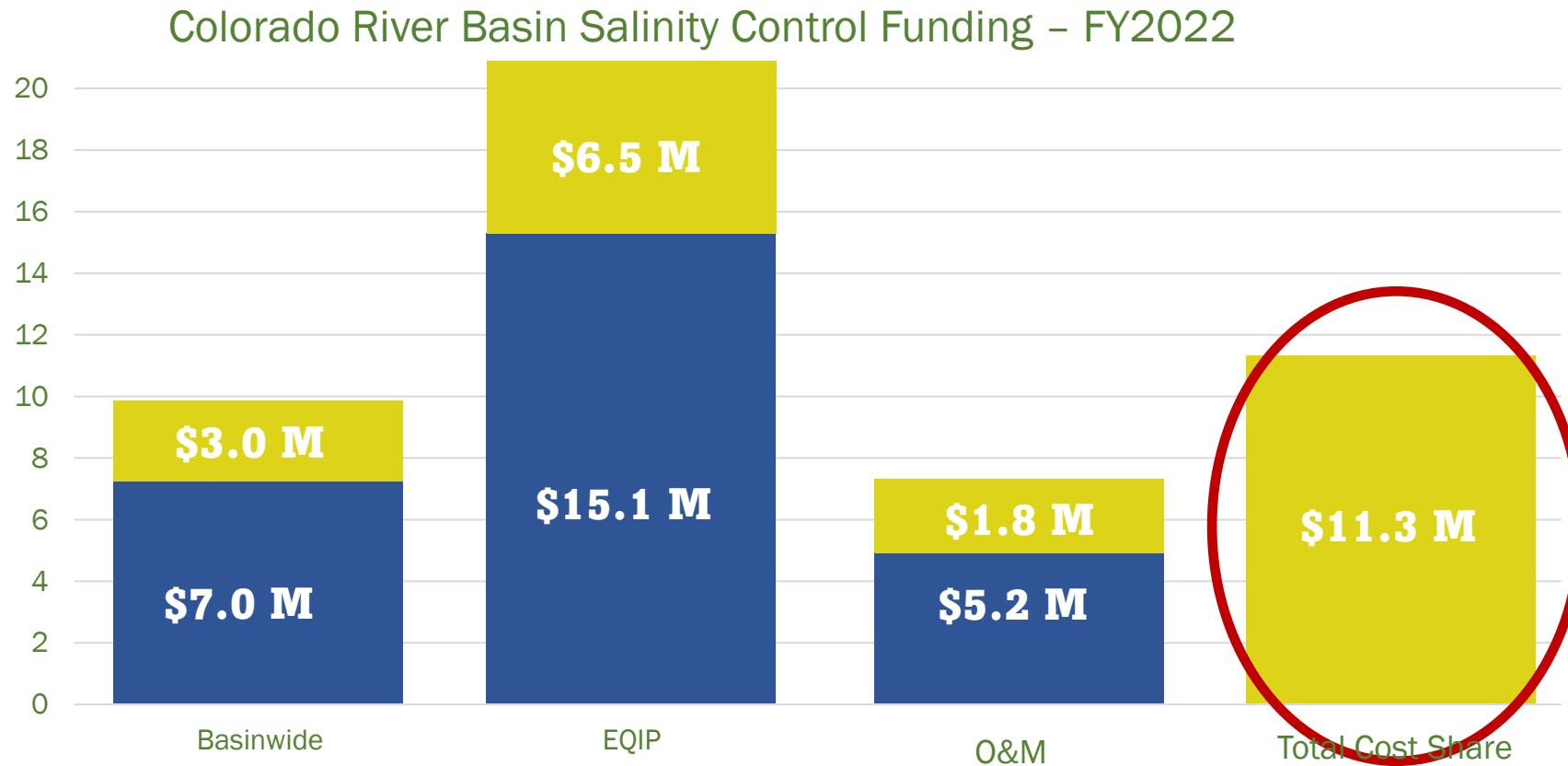
- Reclamation receives an appropriation for full amount
- Builds
- Project sponsor repay Treasury for a portion

Appropriation and Cost Share

- “Most” of salt load from federal lands
- Federal Government pays 70% of total costs
- Example: \$10 M Project

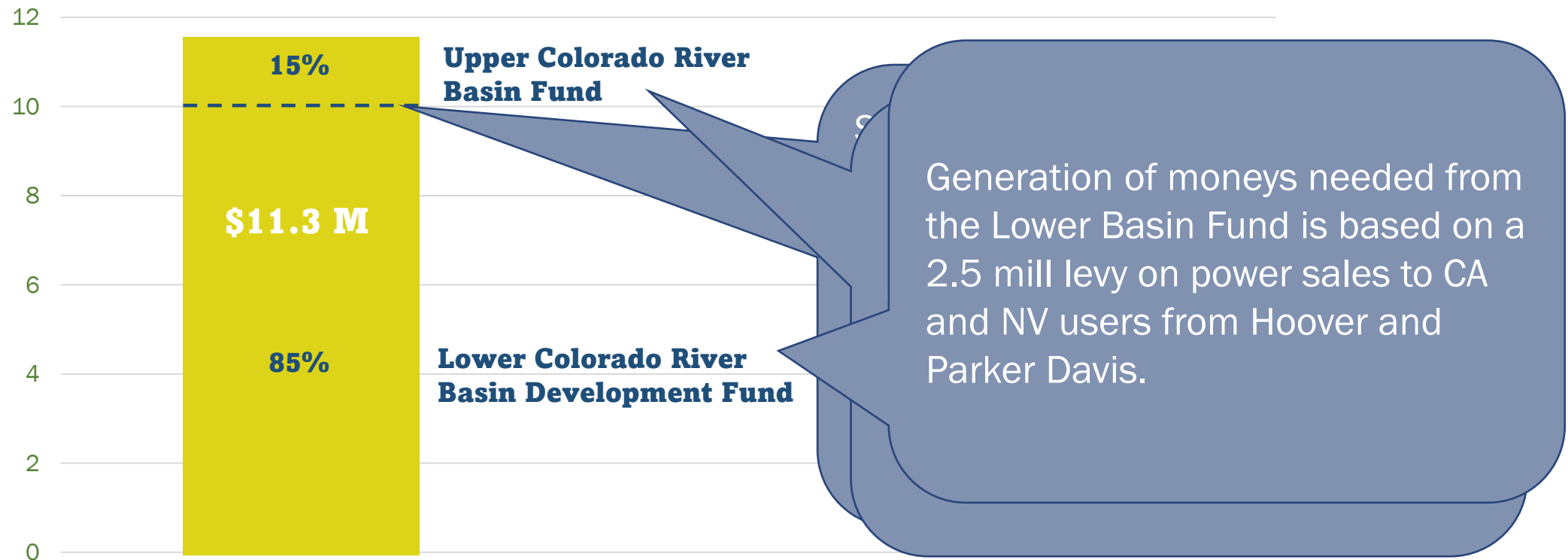
1996 Appropriation ~~\$10 M~~ **\$7 M**
~~Repayment \$3 M~~
Upfront Cost Share

Appropriation and Cost Share



Cost Share

Colorado River Basin Salinity Control Funding



Salinity-Cost Share Requirements

Appropriation



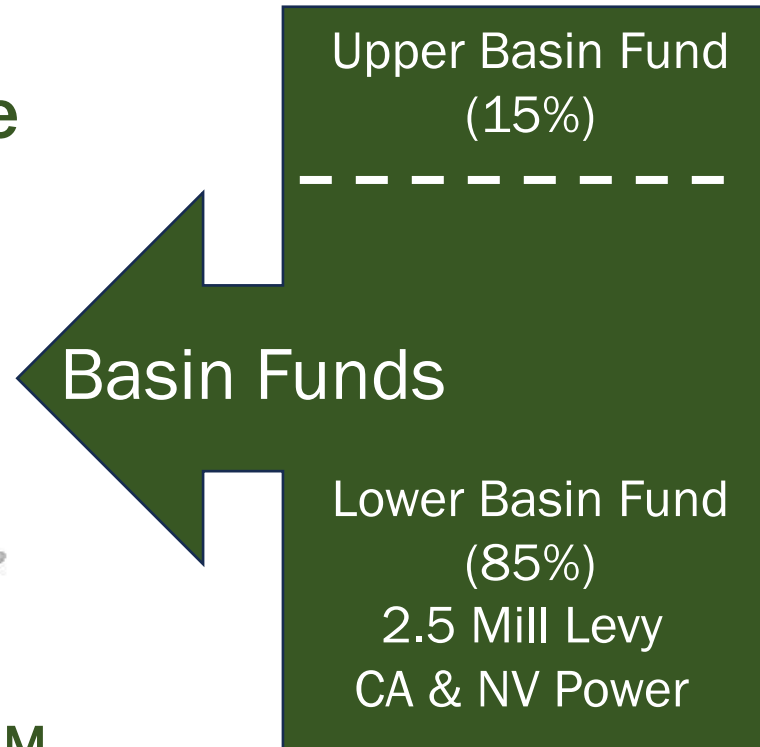
70%

Cost Share



30%

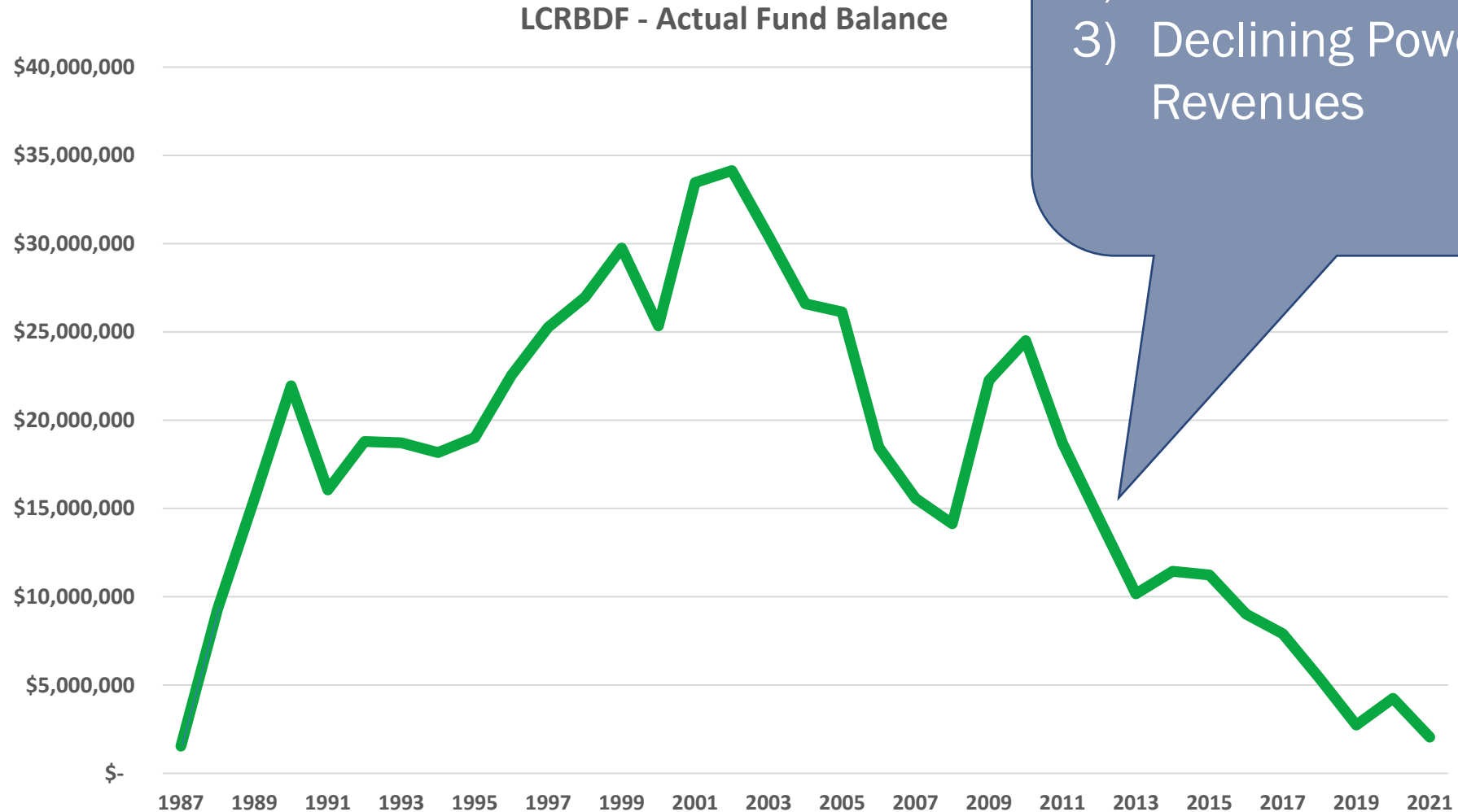
Total



Example: 2022 Basinwide Program - \$10 M

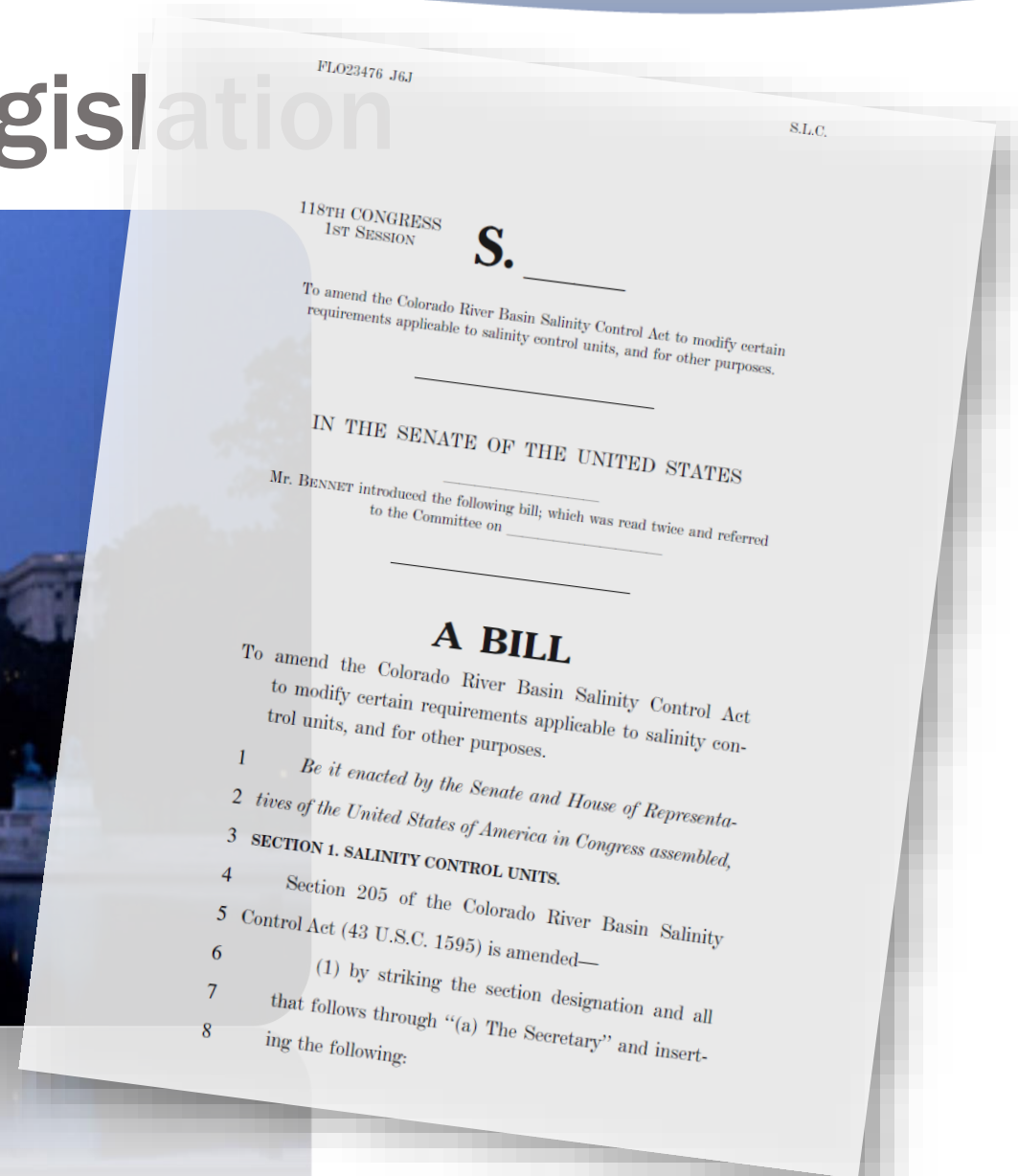
Appropriation \$7 M + \$3 M Cost Share > \$0.45 M – Upper Basin Fund
\$2.55 M – Lower Basin Fund

Cost Share (LCRBDF)

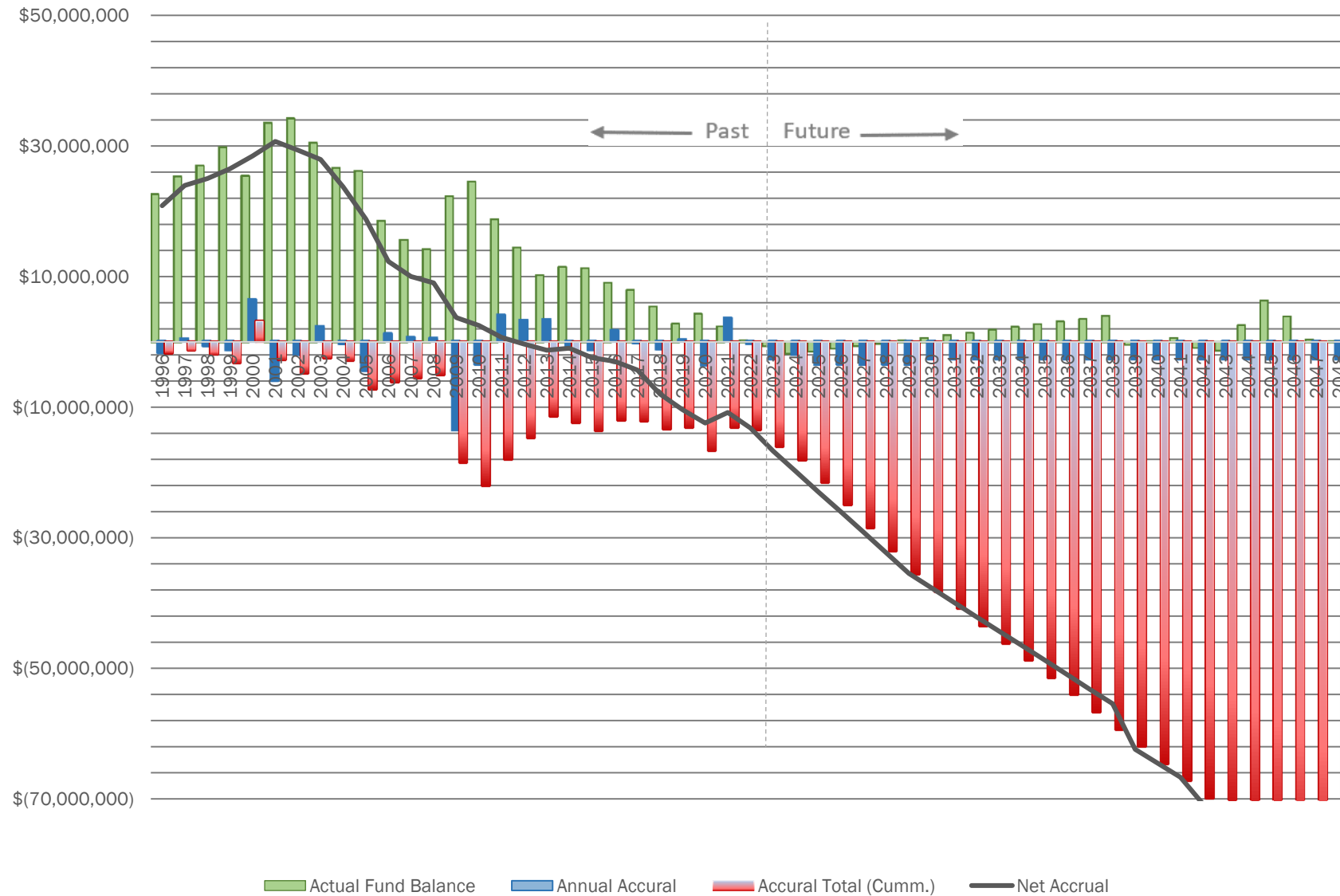


- 1) Upfront cost share
- 2) Increased funding to EQIP
- 3) Declining Power Revenues

Cost Share Legislation



Lower Colorado River Basin Development Fund Balances



and sections 620d, 1543, 1592, 1593, 1595, and 1598 of this title) shall not affect upon enactment of this Act [Oct. 30, 1984]."

§ 1592. Authority for the construction, operation, and maintenance of salinity control units and salinity 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 Paradox Valley, including, but not limited to, collection, treatment, 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 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 saline water from the Las Vegas Wash, including, but not limited to, collection, treatment, and permanent 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

202(a)(4) - Lower Gunnison

¹ So in original.

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.

(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 (49 U.S.C. 1501 et seq.), are hereby designated as components of the project only from the Towaoc-Highline combined canal, Rocky Ford laterals, Lone Pine lateral, and Upper Hermosa 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 75 per centum of the total costs of construction, operation, 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, and 70 per centum of the total costs of implementation 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:

202(a)(5) - McElmo

202(a)(6) - Basinwide

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.

(6) A basinwide salinity control program shall be authorized by the Secretary, acting through the Reclamation, shall may carry out the project directly, or may make grants, commitments for grants, or advances of funds to non-Federal entities under such terms and conditions as the Secretary 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, erosion of public and private land, or other sources that the Secretary considers appropriate. Such program shall provide for the mitigation of the effects of salinity on the riparian resources of the Colorado River. The Secretary shall, in carrying out this program, shall be reimbursed as provided for in paragraphs (2), (3), (4), and (5),¹ of this section 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-

202(c) - EQIP

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

(a) Allocation of costs

The Secretary shall allocate the total costs (excluding costs borne by non-Federal participants) 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 (86 Stat. 816) [33 U.S.C. 1251 et seq.], 75 per

centum of the total costs of construction, operation, 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

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 non-reimbursable. 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%	\$530,000
Las Vegas Wash	1592(a)(3)	75%	75%	75%	75%	\$420,000
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%	\$280,000
EQIP	1592(c)		70%			
						<u>\$3,110,000</u>
						\$4,340,000

Revised Act

4 “(a) ALLOCATION OF COSTS.—The Secretary”;

5 (2) by striking paragraph (1) and inserting the
6 following:

7 “(1) NONREIMBURSABLE COSTS; REIMBURS-
8 ABLE COSTS.—

9 “(A) NONREIMBURSABLE COSTS.—

10 “(i) IN GENERAL.—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

21 “(I) 75 percent of the total costs
22 of construction and replacement of
23 each unit or separable feature of a
24 unit authorized by section 202(a)(1),
25 including 90 percent of—

1 “(aa) the costs of operation
2 and maintenance of each unit or
3 separable feature of a unit au-
4 thorized by that section; and

5 “(bb) the total costs of con-
6 struction, operation, and mainte-
7 nance of the associated measures
8 to replace incidental fish and
9 wildlife values foregone.

Paradox

Revised Act

15 “(ii) SPECIAL RULE FOR NONREIM-
16 BURSABLE COSTS FOR FISCAL YEARS 2024
17 AND 2025.—Notwithstanding clause (i), for
18 each of fiscal years 2024 and 2025, the
19 following shall be nonreimbursable:

20 “(I) 75 percent of all costs de-
21 scribed in clause (i)(I).

22 “(II) 75 percent of all costs de-
23 scribed in clause (i)(II).

24 “(III) 70 percent of all costs de-
25 scribed in clause (i)(V).

1 “(IV) The percentages of all
2 costs described in subclauses (III),
3 (IV), and (VI) of clause (i).

Paradox

Grand Valley

McElmo

Las Vegas Wash
Lower Gunnison
Basinwide
EQIP