

Colorado River Basin Salinity Control Program

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Colorado River Basin Salinity Control Forum

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Discussion Outline

- Brief Background/History
- 2011 Review
- Salinity Control Efforts
- Current Programs/Issues
 - Basinwide Program funding
 - 2012 Farm Bill (didn't happen)
 - Paradox Injection Well



The “Greatest”

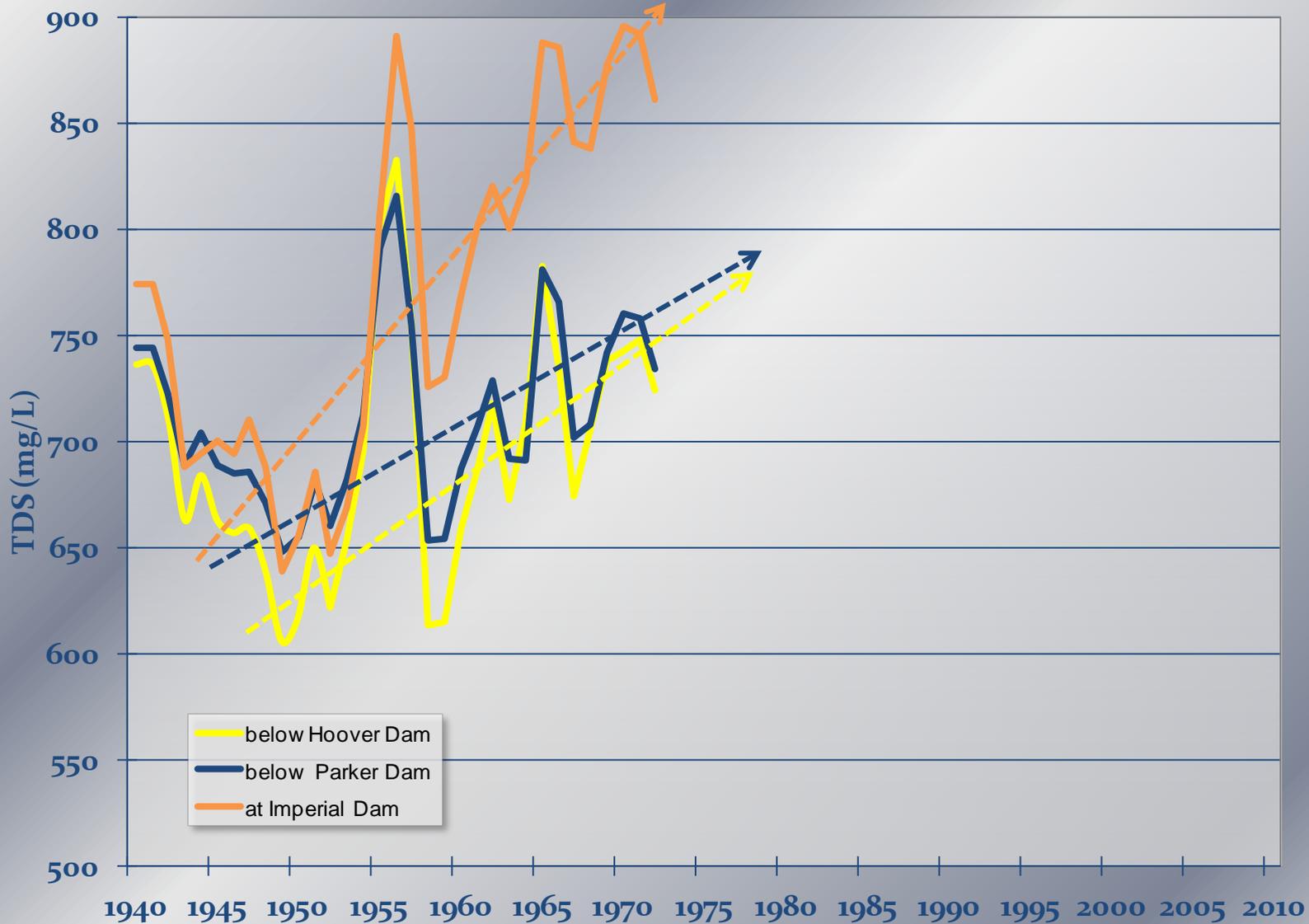
Water Quality Improvement

Facts/Results:

The Colorado River Basin Salinity Control Program...

- reduced the annual salt load by about 1.2M tons
- reduced the concentration at Imperial Dam by 90-100 mg/L (80-90 mg/L below Hoover)
- reduced quantified damages by several hundred million \$/yr
- \$50/ton

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
 - States were concerned about the implications of the Clean Water Act

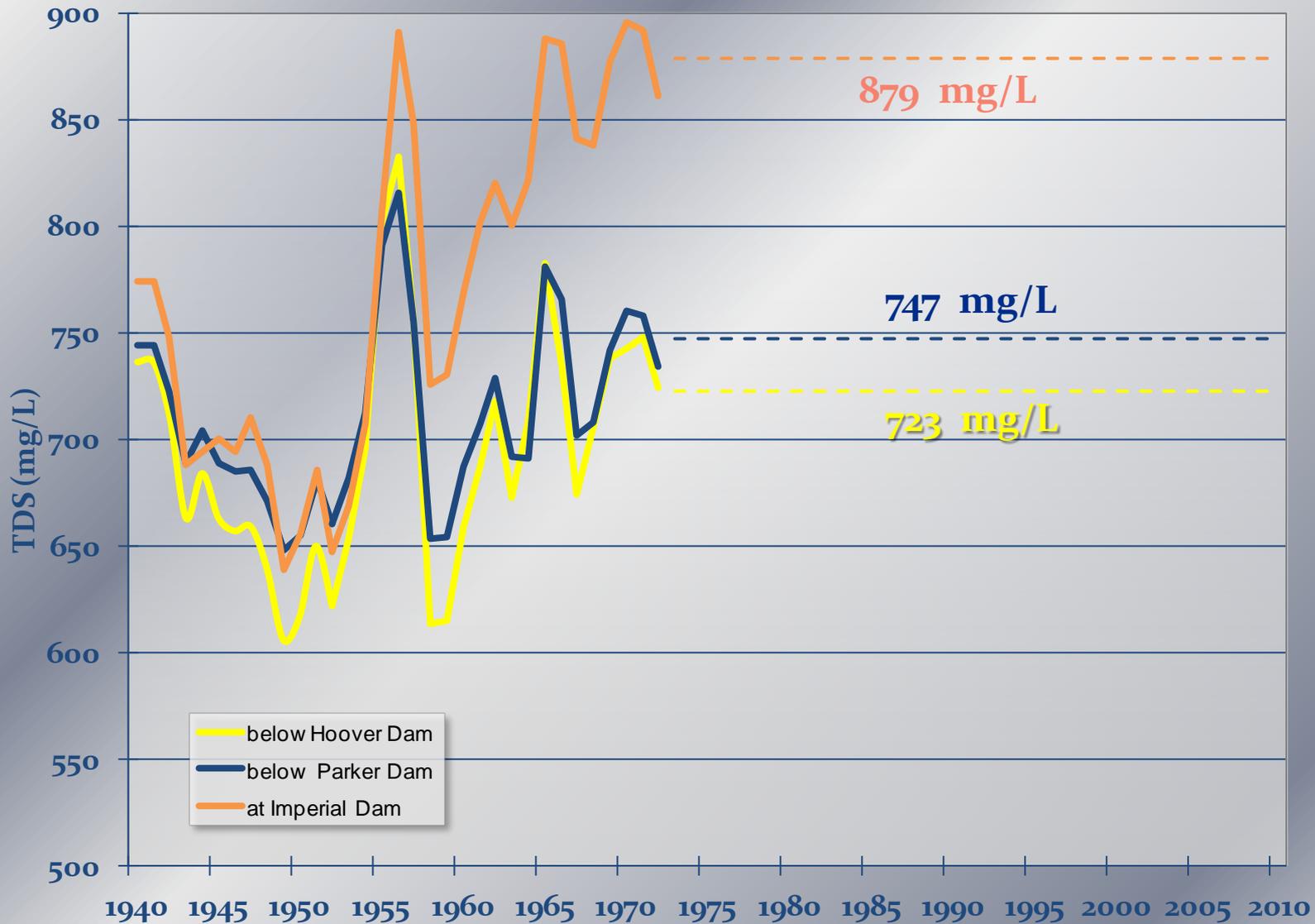


Salinity Control Program History

- 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



2011 Review

- Reviewed the numeric criteria and determined to not change it.
- Identified a Plan of Implementation.

2011 Review Water Quality Standards for Salinity Colorado River System



October 2011
Colorado River Basin Salinity Control Forum

2011 Review

- There are currently measures in place to control 1.2 million tons per year.
- This equates to about 90-100 mg/L lower TDS at Imperial Dam.

2011 Review Water Quality Standards for Salinity Colorado River System



October 2011
Colorado River Basin Salinity Control Forum

2011 Review

- Modeling by Reclamation shows that without additional salinity control the TDS at Imperial will increase on average by **100 mg/L** by 2030.
- The Plan of Implementation is to control an additional **644,000 tons** by 2030 which will reduce this projected increase by about **50 mg/L**.

2011 Review Water Quality Standards for Salinity Colorado River System



October 2011
Colorado River Basin Salinity Control Forum

2011 Review

2011 Review Water Quality Standards for Salinity Colorado River System

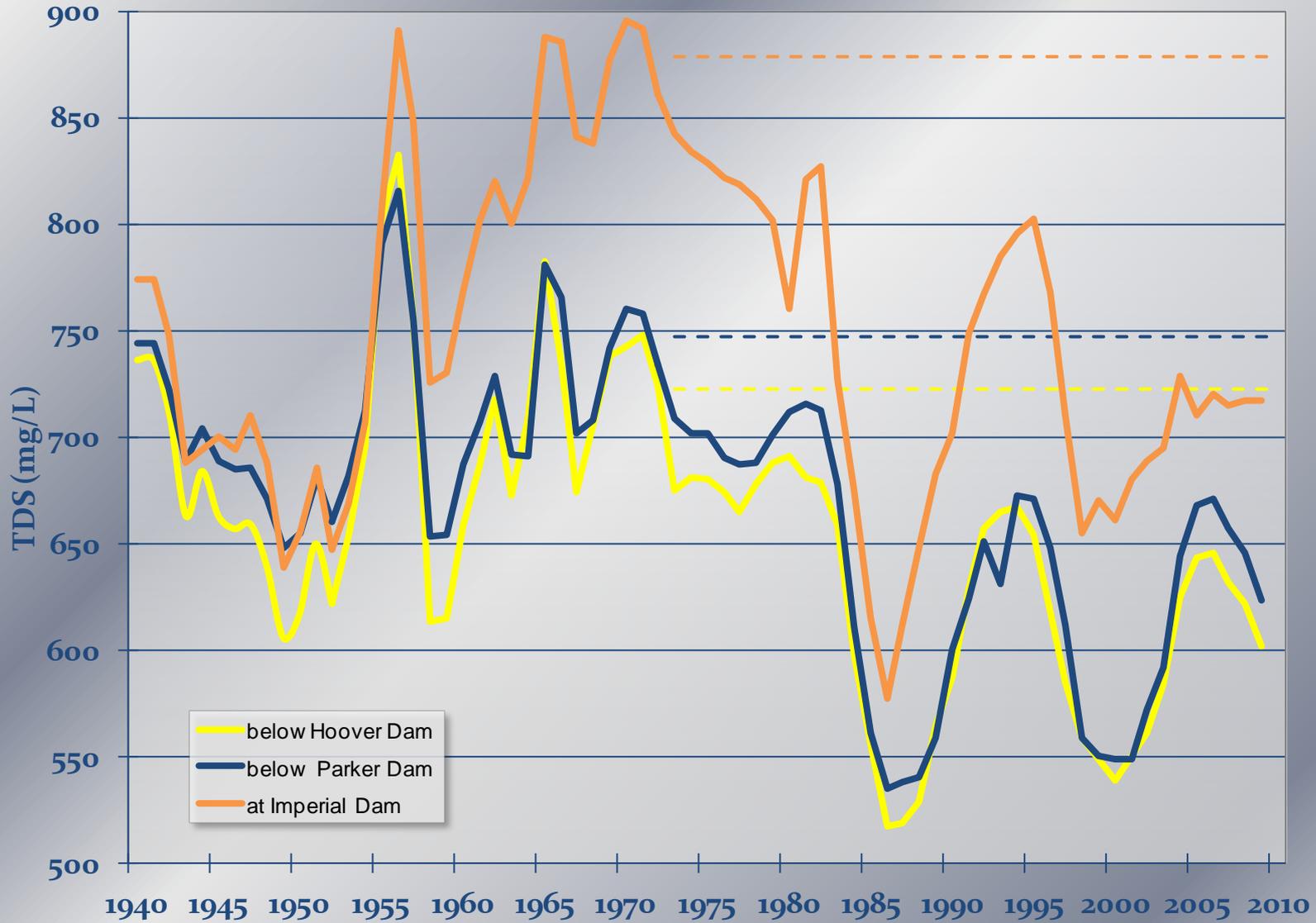
**Table 3
Plan of Implementation**

| Funding Source | | Tons/Year |
|-----------------------------------|---------|----------------|
| RECLAMATION (Basinwide Program) | | 258,000 |
| USDA NRCS (EQIP) | | 186,000 |
| BLM | | 10,000 |
| BASIN STATES PROGRAM (Cost Share) | | 190,000 |
| Basinwide Program | 110,000 | |
| EQIP Related | 80,000 | |
| TOTAL | | 644,000 |

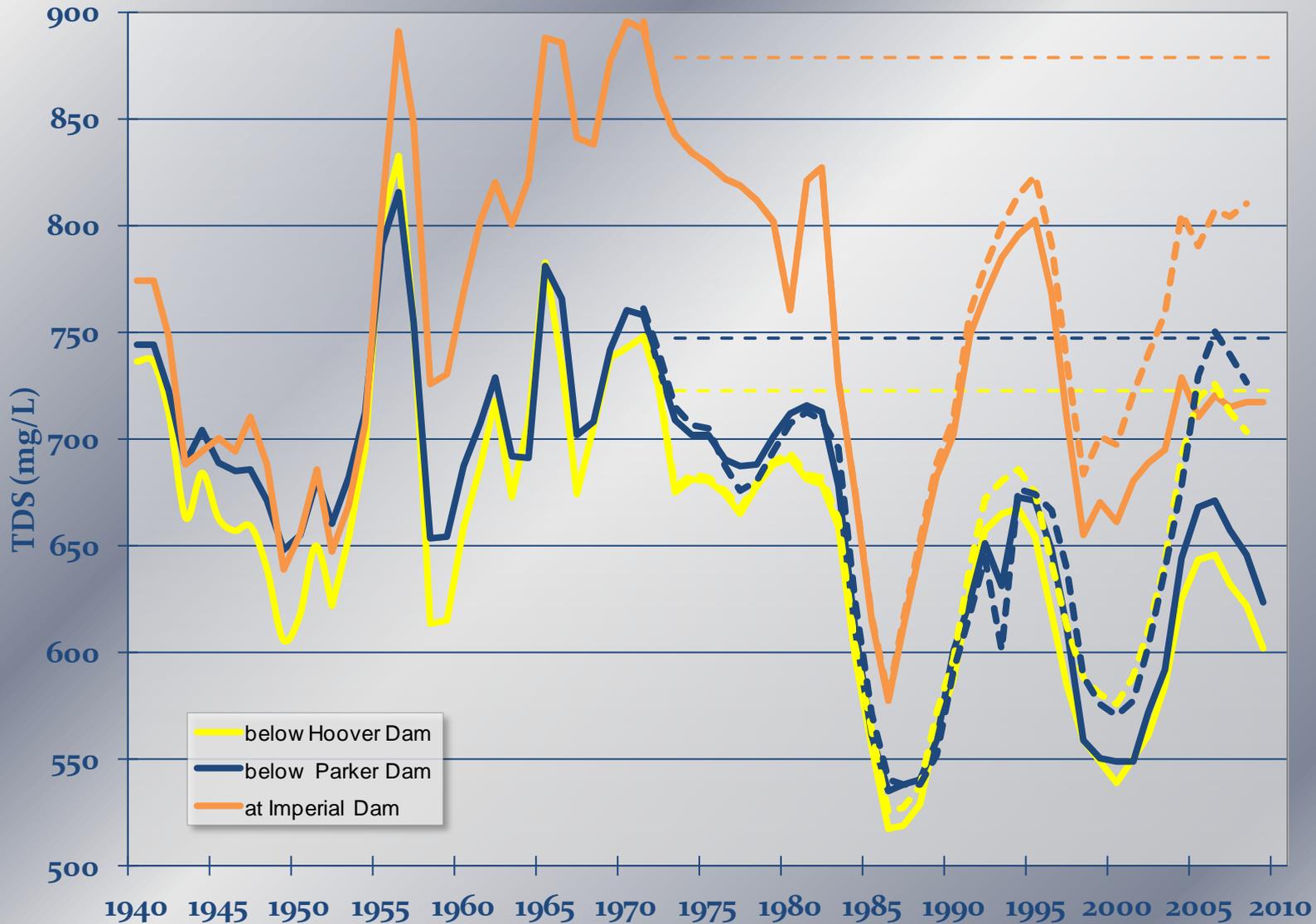


Control Forum

Colorado River Salinity Concentrations at Numeric Criteria Sites

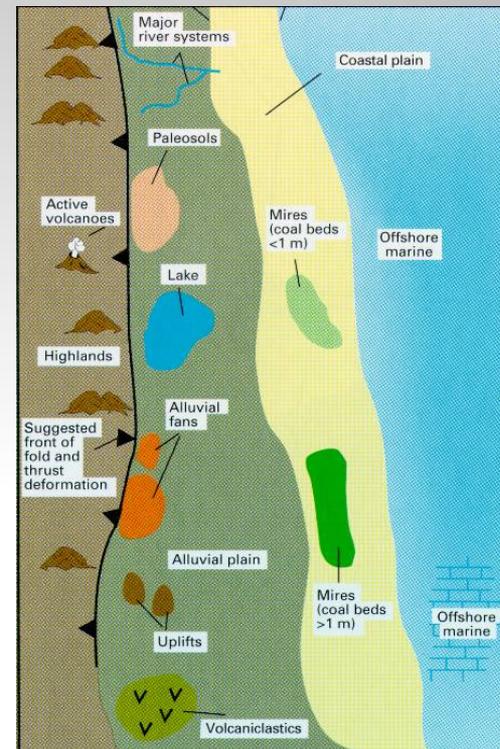
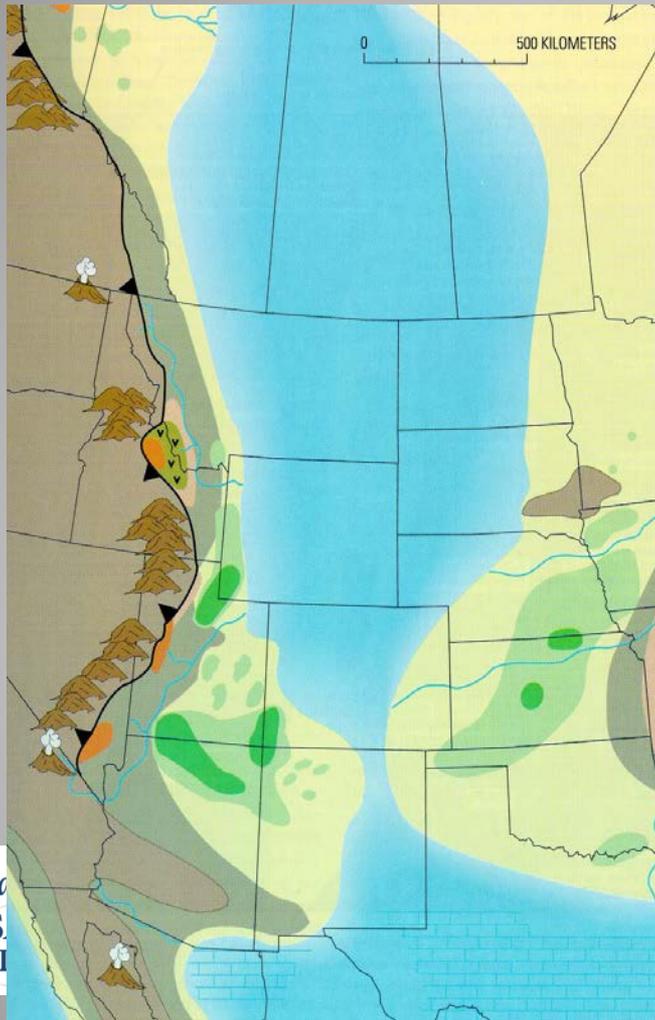


Colorado River Salinity Concentrations at Numeric Criteria Sites



Why is There a Salinity Issue in the Colorado River Basin? It's the Geology

Mid-Cretaceous – Mancos Shale

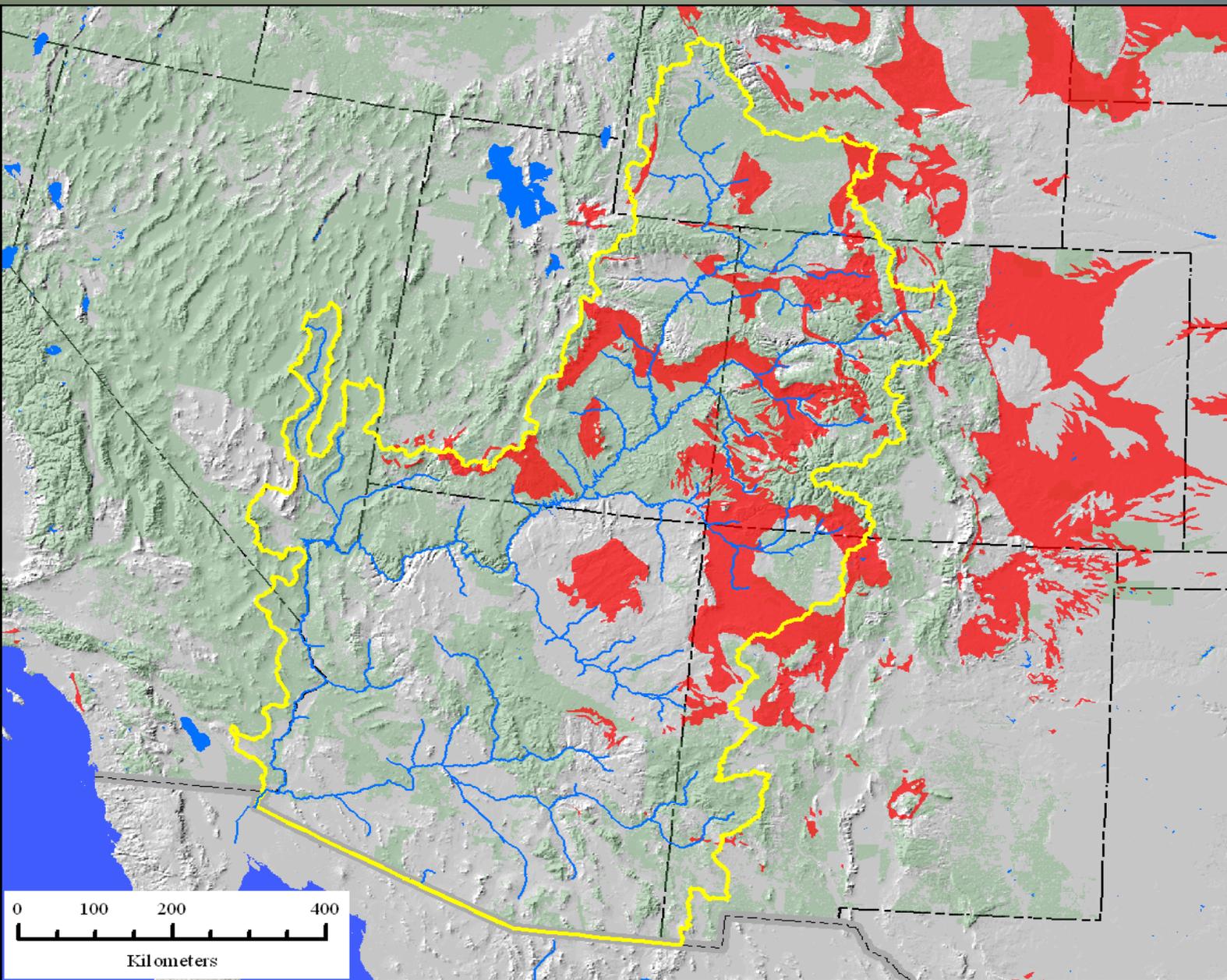


From Roberts and Kirschbaum, 1995





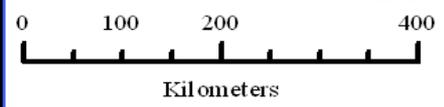
Mancos Shale



Colorado River Basin



Mancos Shale



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)
- Point Source Activities
 - State NPDES administration pursuant to Forum's policies
 - Saline spring disposal (Paradox Valley Unit, Reclamation)
 - Plugging of saline wells (BLM)



Reclamation's Basinwide Program

- Requests proposals through a funding opportunity announcement process
- About \$10M annually (\$7M appropriation, \$3M cost share)
- Average project is \$50-\$60/ton of salinity control



Reclamation's Basinwide Program



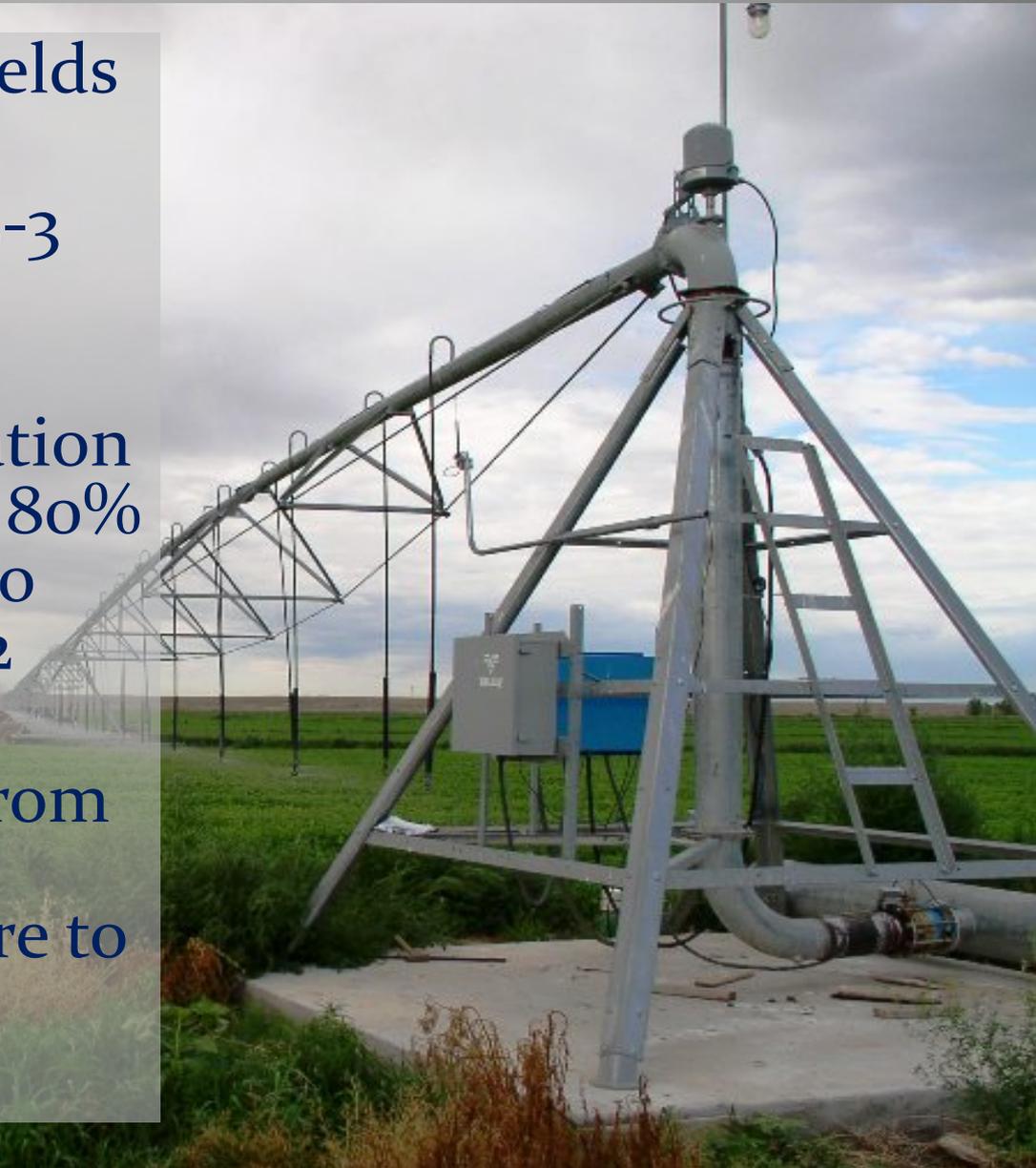
NRCS's EQIP Program (on-farm)

Salted field in the
lowlands of the
Unita Basin



NRCS's EQIP Program (on-farm)

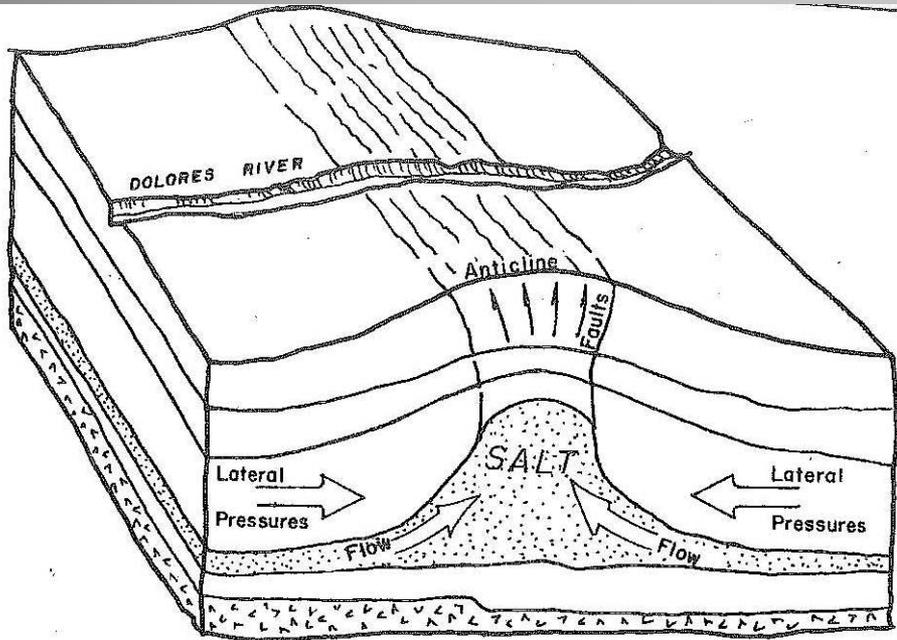
- Had lots of salted up fields in lowlands
- Alfalfa yield averaged 2-3 tons/ac
- Now yield up to 5-7 tons/ac, changed irrigation efficiency from 20% to 80% and reduced salt load to the Colorado River by 2 tons/ac treated
- Profitability changed from break-even to a couple hundred dollars per acre to \$500 to \$600/ac



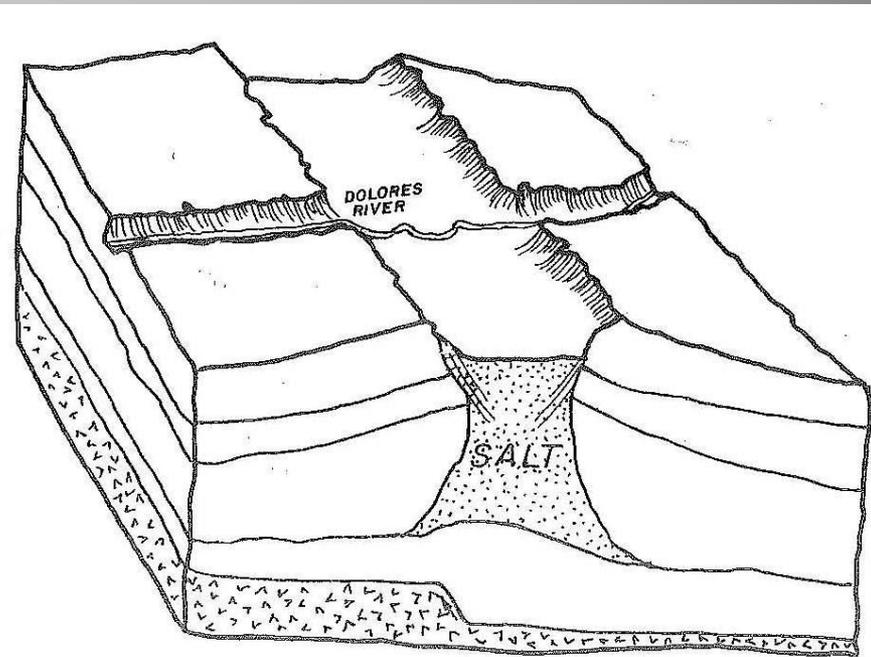
Paradox Valley Unit



Paradox Valley

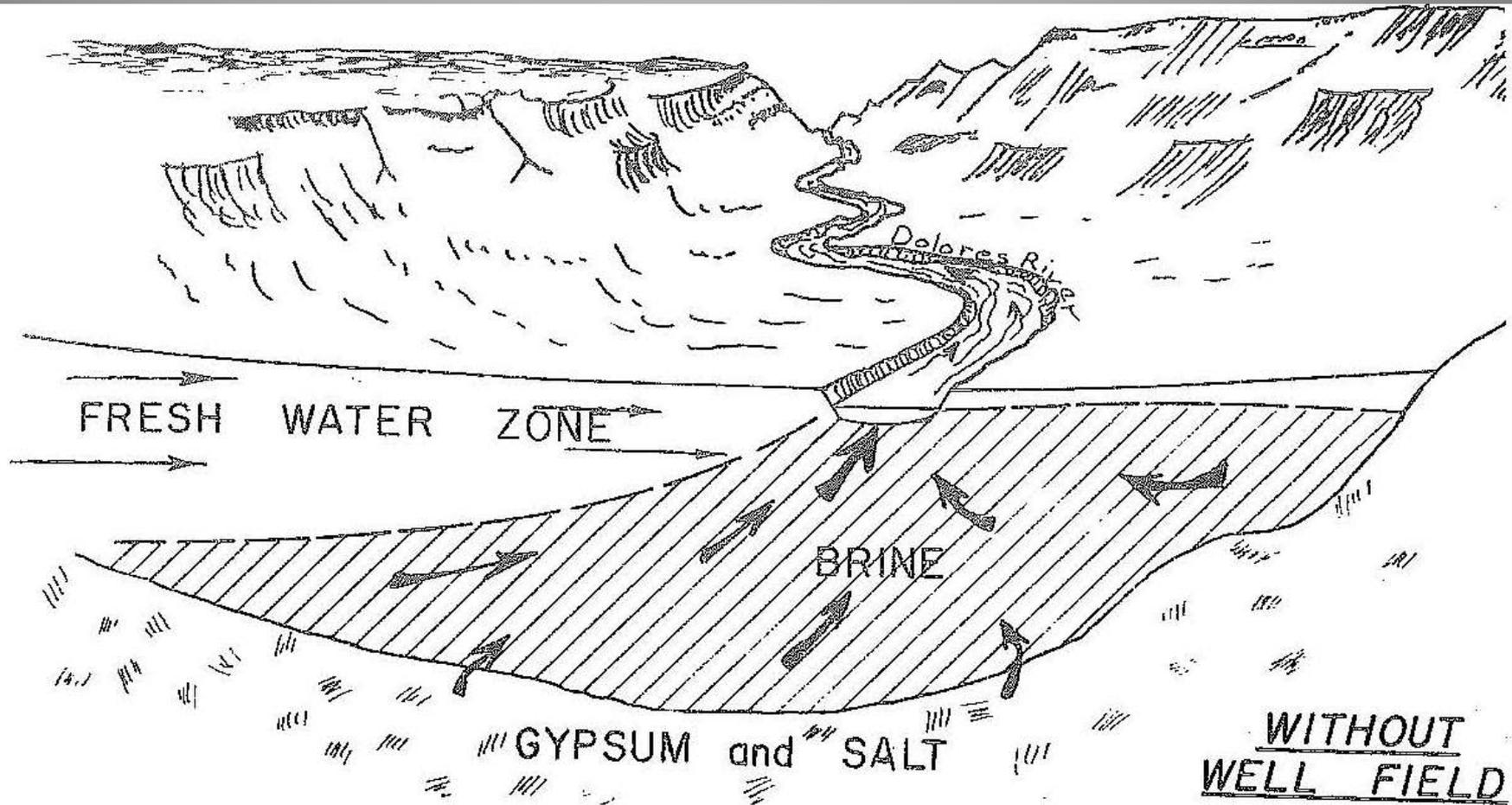


EARLY STAGE

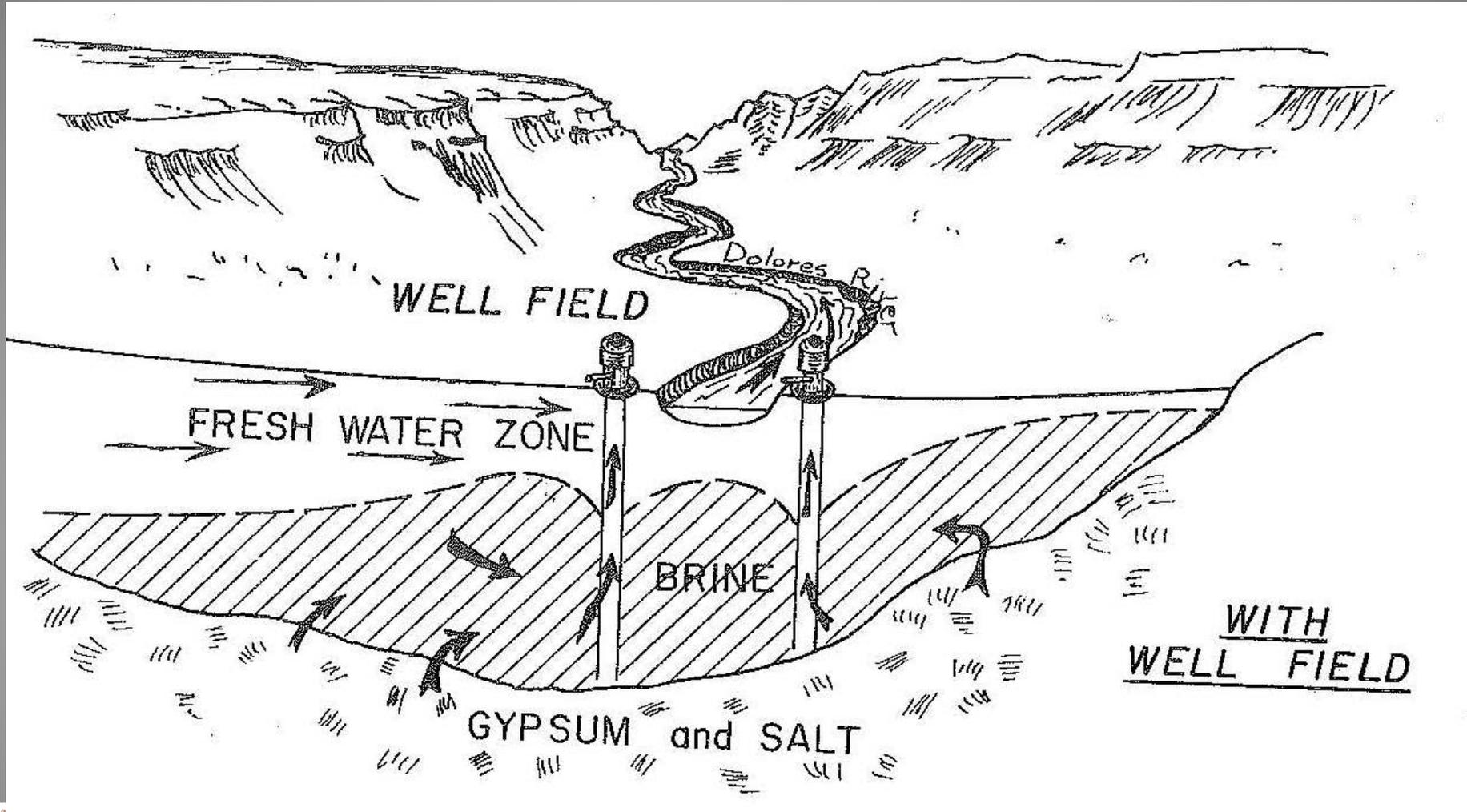


PRESENT STAGE

How Does the Salt Brine get into the Dolores River?



How is the Salt Brine Intercepted?

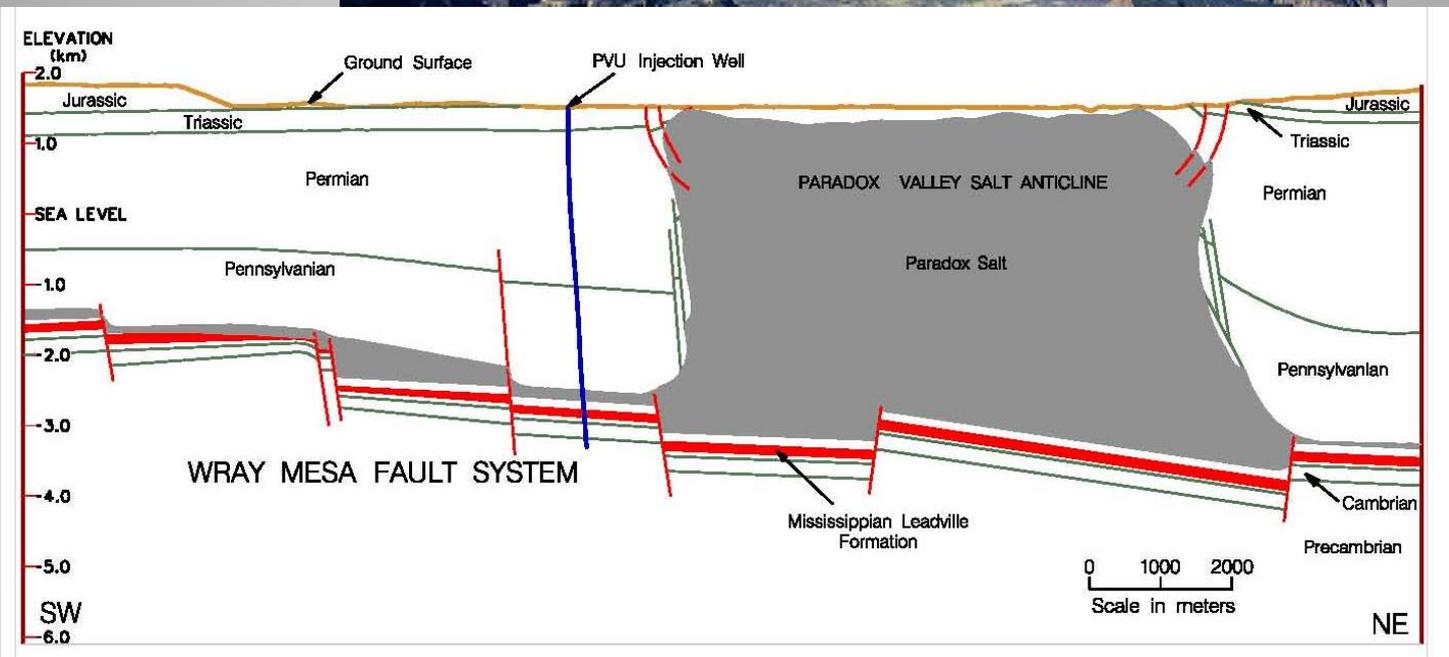


Collection Well



- 9 Wells
- 40-70 ft deep
- 30-120 gal/min

PVU Injection Well



Vertical cross section roughly perpendicular to Paradox Valley, looking to the northwest. Based on figure from Harr and Bramkamp (1988)

Paradox Valley Unit

- Reclamation project
- Operational since 1996
- Intercepts 250,000 ppm brine before it discharges to the Dolores River
- Disposes of >100,000 tons of salt annually
- Disposal is with a 16,000 deep injection well
- Required injection pressure is increasing



Summary

- Have put measures in place that reduce the salt load by 1.2 M tons per year or a concentration of 90-100 mg/L at Imperial Dam (about 80 mg/L at Hoover)
- However, salinity levels are projected to increase by 100 mg/L by 2030 without continuation of the program
- In order to offset that increase by 50 mg/L we need greater funding under Reclamation's Basinwide Program and continuation of NRCS's EQIP with current funding levels.
- Current issues for the Forum are:
 - 1) funding under Reclamation's Basinwide Program,
 - 2) the future of the Farm Bill, and
 - 3) an alternative to the existing Paradox Valley Unit injection well



Questions?

