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Managing Water in the West

Rio Grande Project Operating Agreement: Supplemental Environmental Assessment

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U.S. Department of the Interior
Bureau of Reclamation

Project Operations: 1916 - 1979

- From Project initiation in 1916 through 1979, Reclamation operated the full Rio Grande Project irrigation system in New Mexico and Texas.
- Reclamation allotted water to project lands by acre, and delivered water from storage to farm gates.

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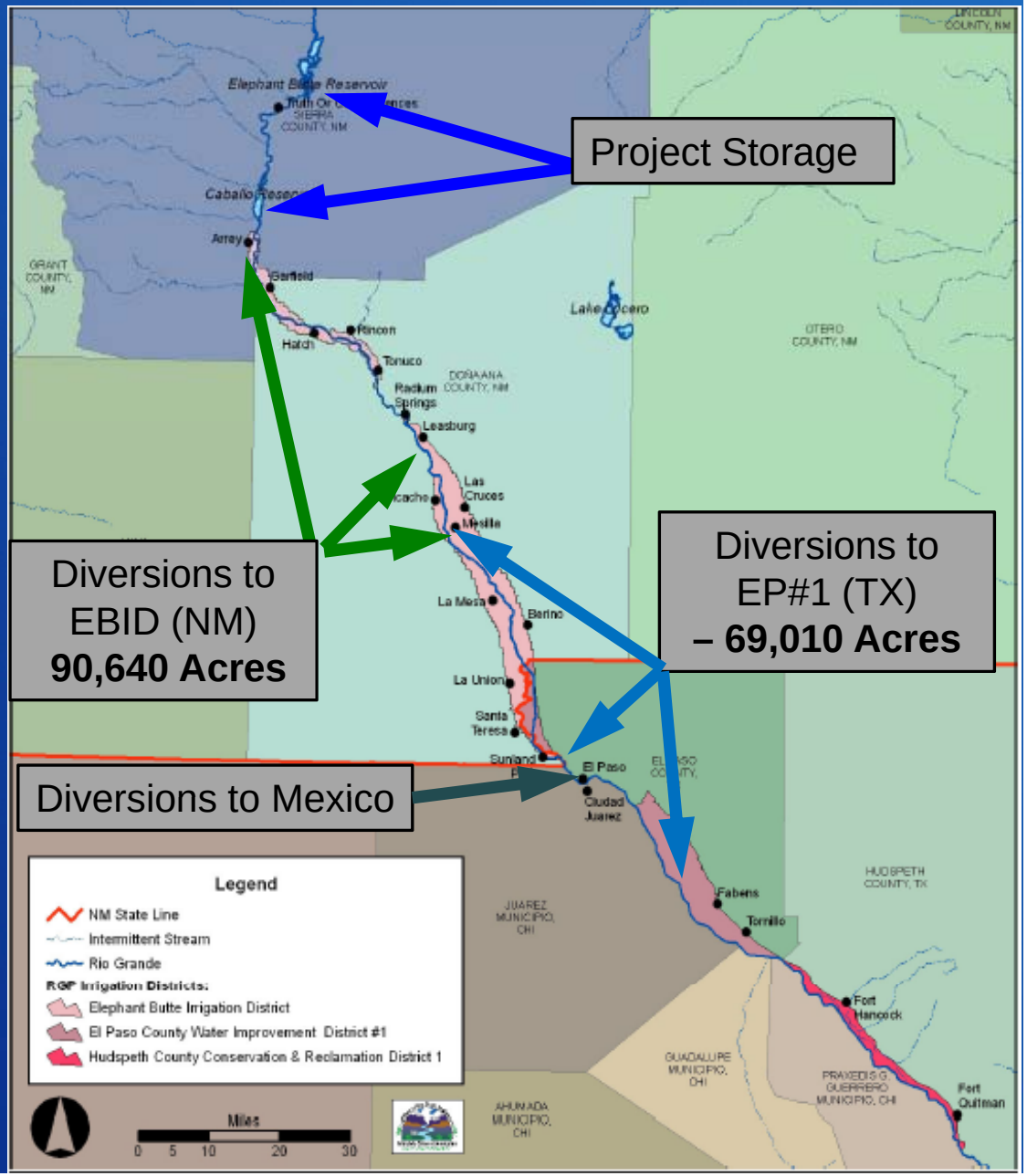
Project Operations: 1980 - 2007

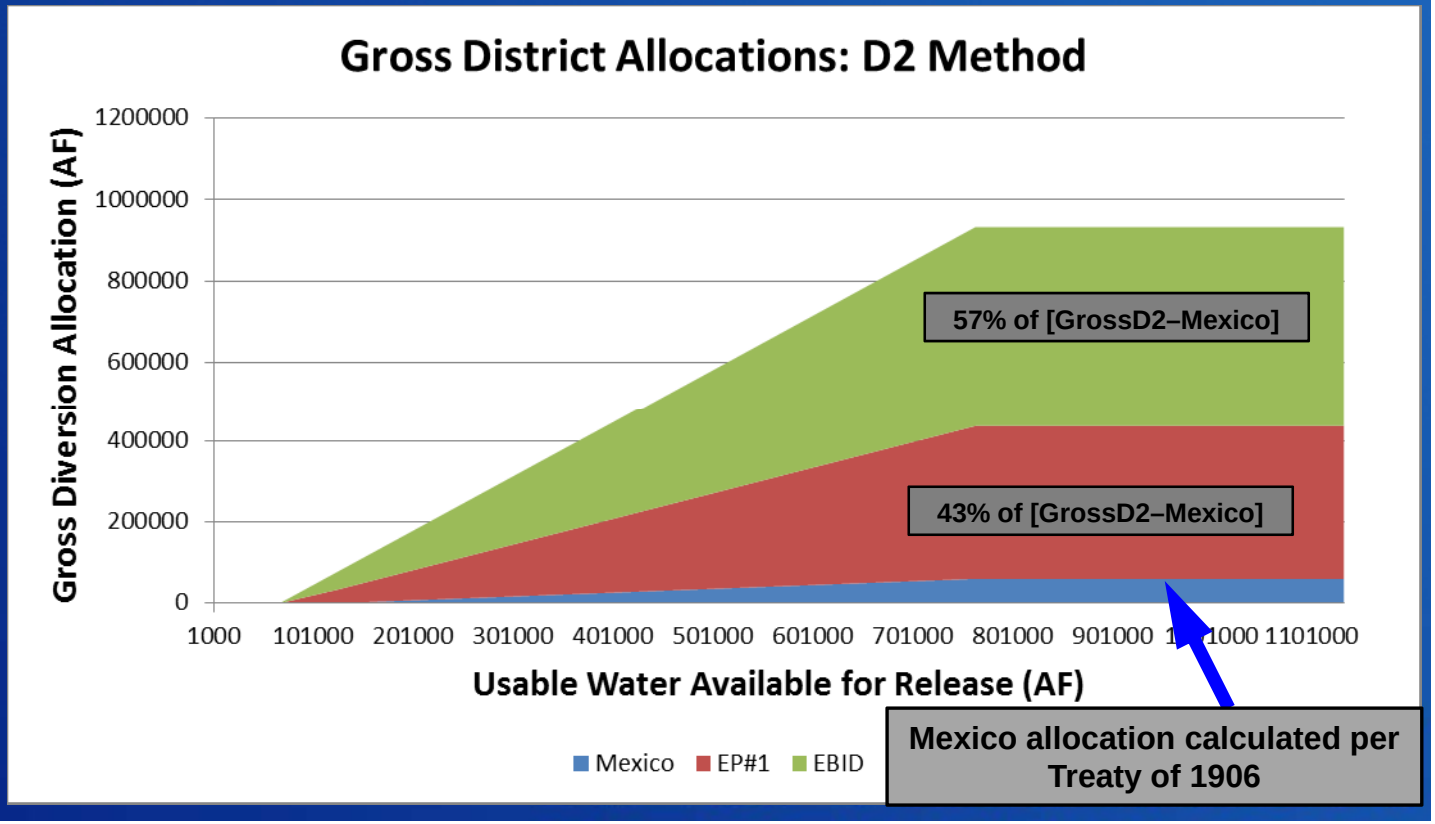
- In 1980, specified operations were transferred from Reclamation to EBID and EPCWID.
- Since 1980, Reclamation has allocated water to districts and Mexico and delivered water to river head gates rather than to project lands.



Project Water Allocations to Irrigation Districts

- Project Allocations to the Districts have been made:
  - in accordance with the proportion of land in each District,
  - taking into account the Project delivery efficiency, as defined by the “D2 curve”.

The “D2 curve” represents the historical relationship between releases from Caballo and total project diversions



Origin of the Operating Agreement

- Reclamation, EBID and EPCWID signed contracts in 1979/1980 that required them to create *a mutually agreeable "detailed operational plan…setting forth procedures for water delivery and accounting."*
- Parties agreed upon operating procedures and in 2008 signed a 50-year Operating Agreement.
- The Operating Agreement resolves decades of litigation, and is in compliance with a legal settlement related to some of the District's concerns.
- Project has been operated according to this agreement since 2008.

Operating Agreement Overview

- As required by the Rio Grande Project contracts with the irrigation districts, the Operating Agreement:
  - Was agreed to by Reclamation and the Districts,
  - Describes how Reclamation allocates Project water to EBID, EPCWID, and Mexico,
  - Is consistent with applicable water rights, state and federal laws, and international treaties.

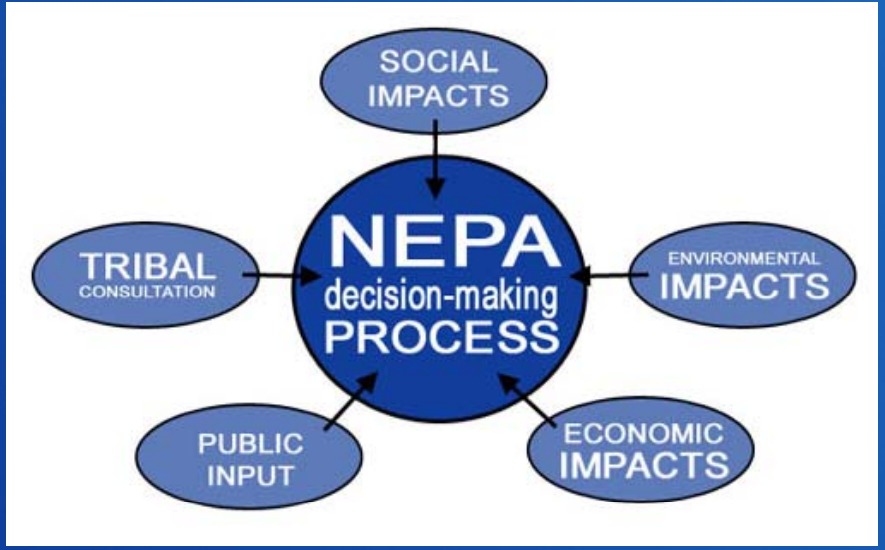
Principles Underlying Operating Agreement

The Operating Agreement:

- Reflects historical operations
- Incorporates two key changes:
  - carryover accounting for any unused portion of the annual diversion allocations to Districts
  - adjustment of annual allocations to Districts to account for changes in Project delivery performance, as characterized by the Project diversion ratio

Compliance with the National Environmental Policy Act

- The National Environmental Policy Act (NEPA) requires evaluation of the impacts of Federal Actions on the human environment.
- Impacts can be evaluated through an Environmental Assessment (less comprehensive study for lower projected impact) or an Environmental Impact Statement (more comprehensive study).



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2007 Environmental Assessment

- In 2007, An Environmental Assessment for implementation of Rio Grande Project Operating Agreement was completed, covering the period 2008-2012.
  - Was in effect prior to initiation of operations under the Operating Agreement, extending through 2012.
  - Reclamation committed to gather data over the first five years of implementation to support future evaluation.

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2013 Supplemental Environmental Assessment: Purpose and Scope

- Evaluates operational data collected during first 5 years of operations under Operating Agreement, 2008 - 2012.
- Projects impacts on human environment for 2013-2015, during which an Environmental Impact Assessment will be prepared.
  - Available data and models are best suited for projection of potential impacts over a limited time frame.
  - In short timeframe, differences in impact between previous operations and future operations is expected to be minimal.
- Alternatives Evaluated:
  - No Action: operations according to procedures used prior to 2008
  - Proposed Action: continued implementation of the 2008 Operating Agreement.

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Supplemental Environmental Assessment: Cooperating Agencies

- The following agencies assisted with the development of the Supplemental Environmental Assessment:
  - International Boundary and Water Commission, United States Section (IBWC)
  - El Paso County Water Improvement District No. 1 (EPCWID)
  - Elephant Butte Irrigation District (EBID)
  - Texas Rio Grande Compact Commission

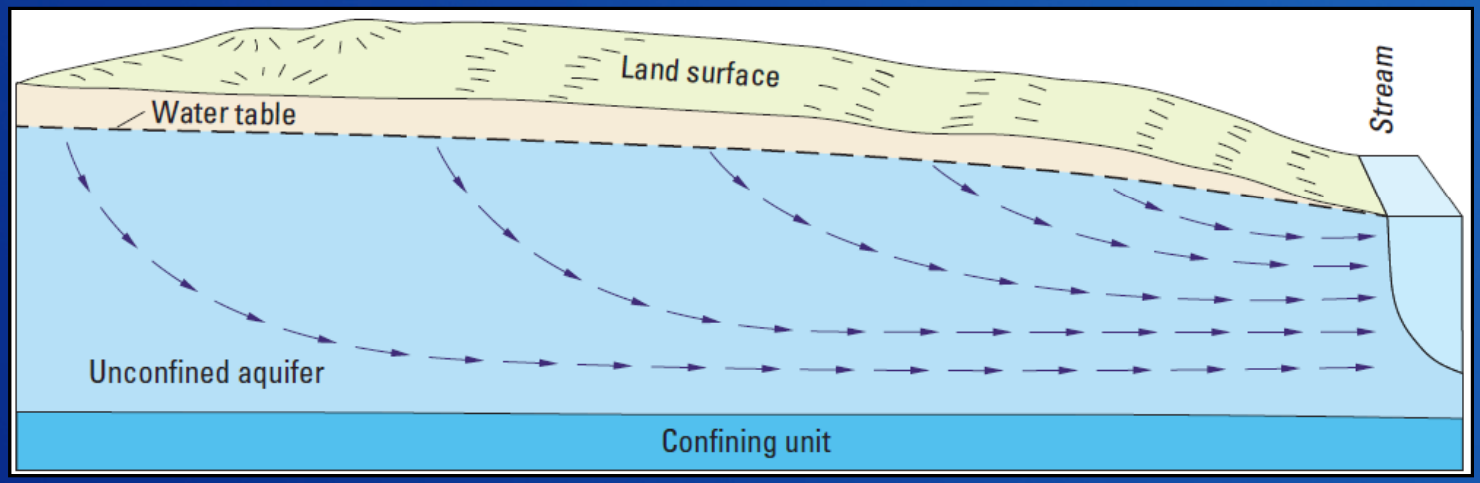
Analyses Performed

- Include effect of Operating Agreement on:
  - Surface-water allocations to the irrigation districts.
  - Groundwater levels, recharge, and incentives for groundwater pumping in the Mesilla Basin.
  - Project delivery efficiency, and
  - Reservoir levels
  - Implications for listed species under the Endangered Species Act
  - Implications for the Rio Grande Compact
  - Water quality

Surface-Water Allocations

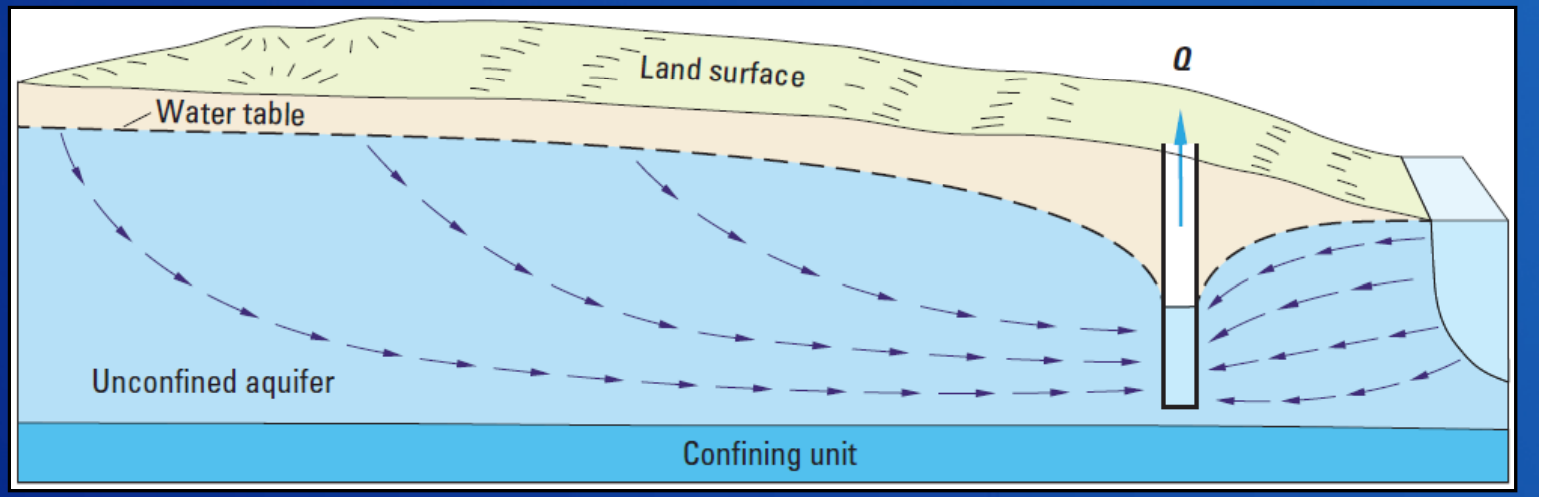
- The Operating Agreement results in changes in allocations between the districts, relative to the prior operations.
- Such changes are consistent with the underlying principles of the Operating Agreement, including:
  - Promotion of water conservation through the carryover provision
  - Mitigation of the potential negative impacts of deviations in project delivery performance which result from groundwater pumping, primarily within the Rincon and Mesilla Basins in New Mexico.

Stream Depletion from Groundwater Pumping



Without ground-water pumping

With ground-water pumping



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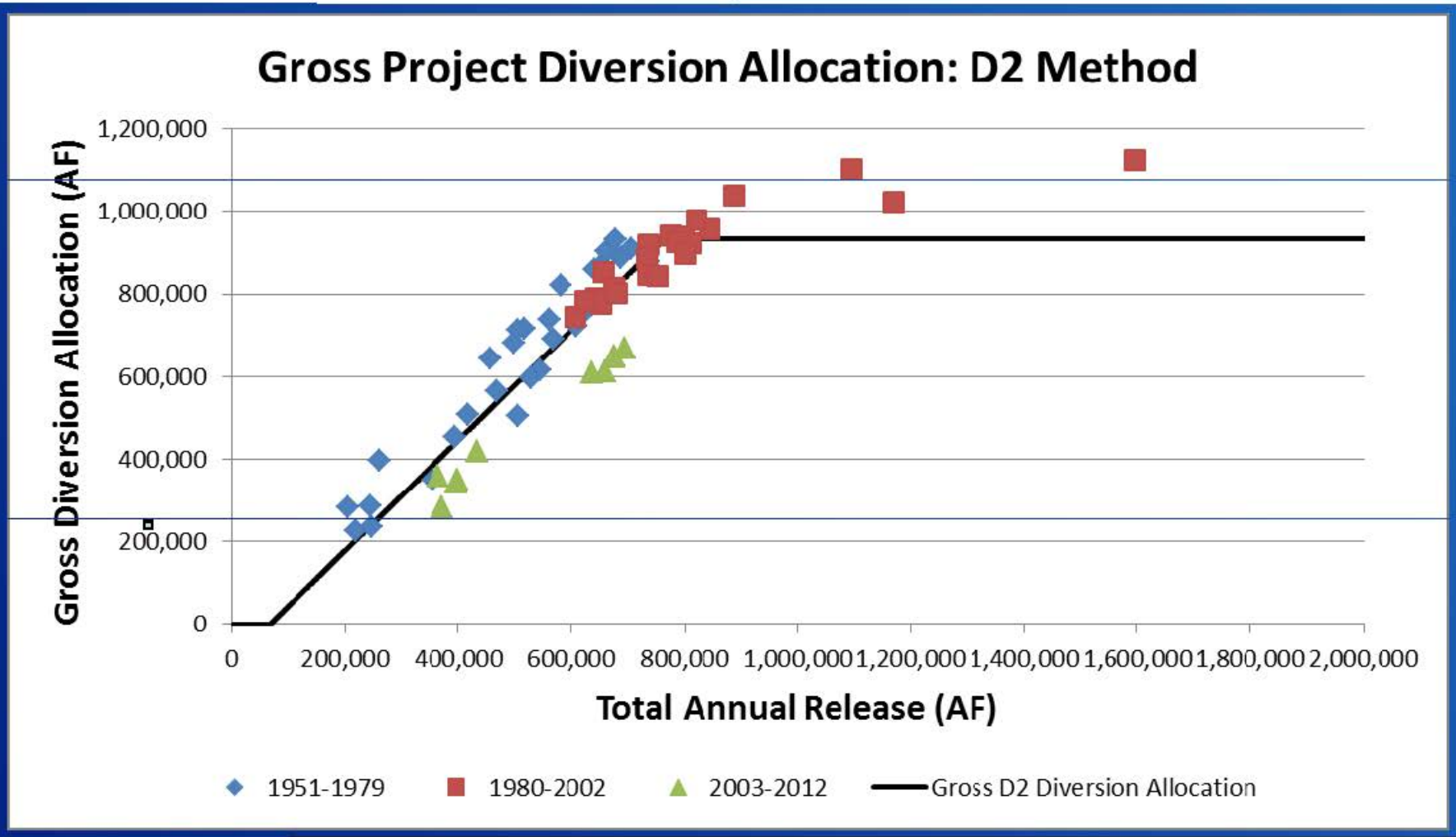
Changes in Project Delivery Performance



$$\text{Diversion Ratio} = \frac{\text{Total Project Diversions}}{\text{Total Project Releases}}$$

Groundwater Levels, Recharge, and Pumping Incentives

- The Operating Agreement
  - maintains groundwater recharge via seepage and deep percolation from the river and irrigation canals.
  - has no direct effect on groundwater use, which is under the authority of the states.
  - Has no significant impact on delivery efficiency, which is primarily caused by groundwater pumping.
  - may affect incentives for groundwater use.

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Reservoir Levels

- Primarily due to the carry-over provision, reservoir levels in Elephant Butte and Caballo are projected to be higher under the Operating Agreement than under the Prior Operations.

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Implications for the Rio Grande Compact

- In the longer term, the Operating Agreement may affect:
  - The timing of Article VII storage restrictions under the Rio Grande Compact,
  - Reservoir evaporation (as a result of changes in storage), and therefore Compact delivery computations for New Mexico.
- Significant impacts on the Compact are unlikely during the period 2013-2015

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Impacts on species listed under the Endangered Species Act

- Changes in reservoir levels in Elephant Butte between 2013 and 2015 are unlikely to negatively impact existing nesting sites for the endangered southwestern willow flycatcher.

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Water Quality

- The Rio Grande below Caballo Dam has been identified as an impaired waterway under section 303(d) of the Clean Water Act.
- The Operating Agreement does not contribute to any additional adverse effect to water quality.
- Paso del Norte Watershed Council is developing a Watershed Based Plan to protect and improve water quality in the lower Rio Grande from Percha Dam downstream to the American Dam.

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Finding of No New Significant Impact 2013-2015

- Continued implementation of the Operating Agreement over the period 2013-2015 will not significantly affect the quality of the human environment.
- Continued implementation of the Operating Agreement over the period 2013-2015 would have no new environmental effects that meet the definition of significance in the Supplemental Environmental Assessment.

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Longer-Term Compliance with the National Environmental Policy Act

- Environmental Impact Statement (EIS) will analyze implementation of OA over its remaining life (through 2050)
  - Assessing potential impacts over a wider variety of hydrologic conditions.
  - Accounting for projected impacts of climate change.
  - Using groundwater modeling to assess groundwater/surface-water interaction, and the impact of groundwater pumping in both states on Project operations.

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2013 Supplemental Environmental Assessment

- Questions?

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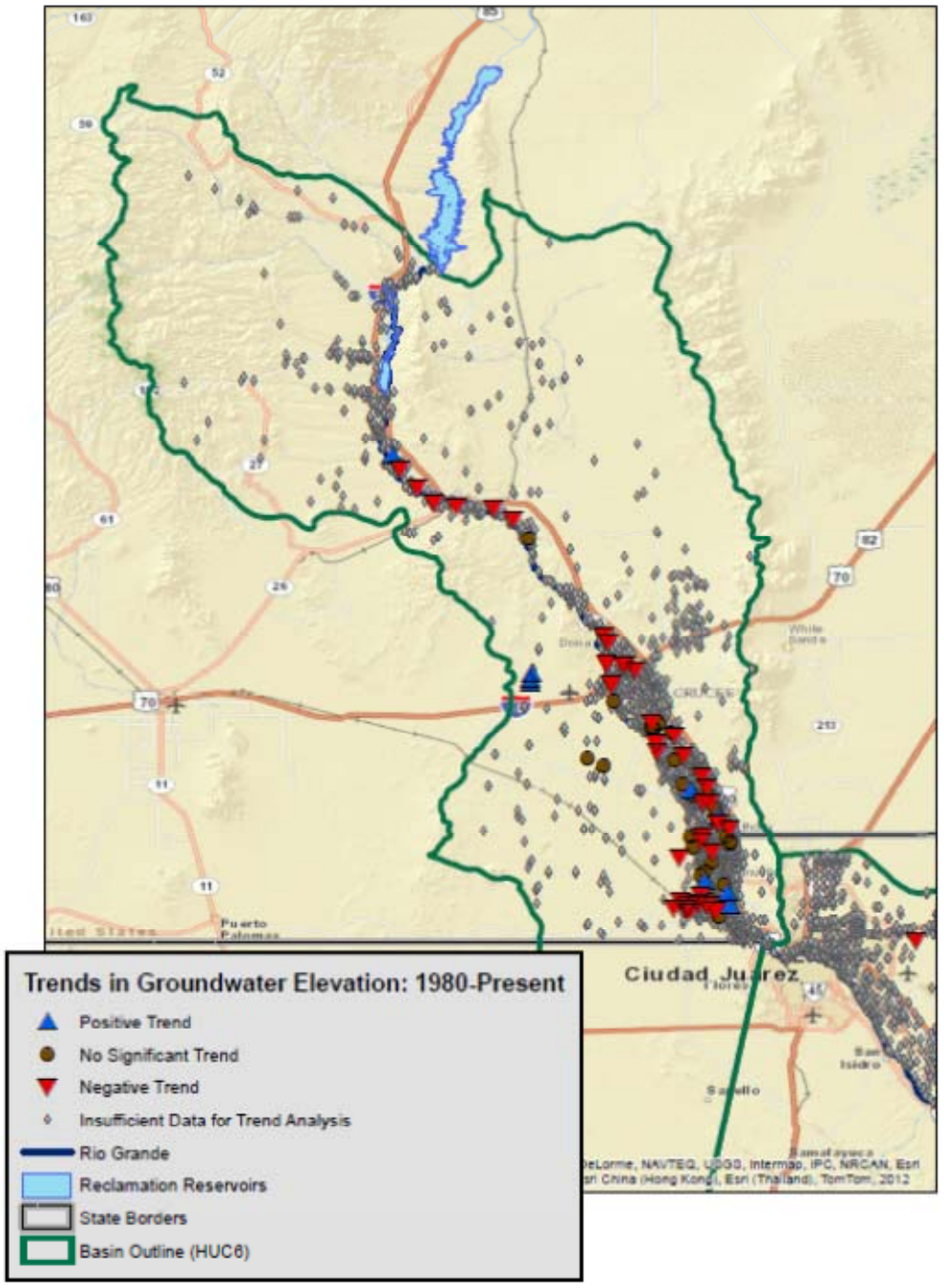
Supplemental Slides

- Analysis of Historical Groundwater Elevations
- Analysis of first five years of operations under the Operating Agreement
- Projected Conditions through 2015 season

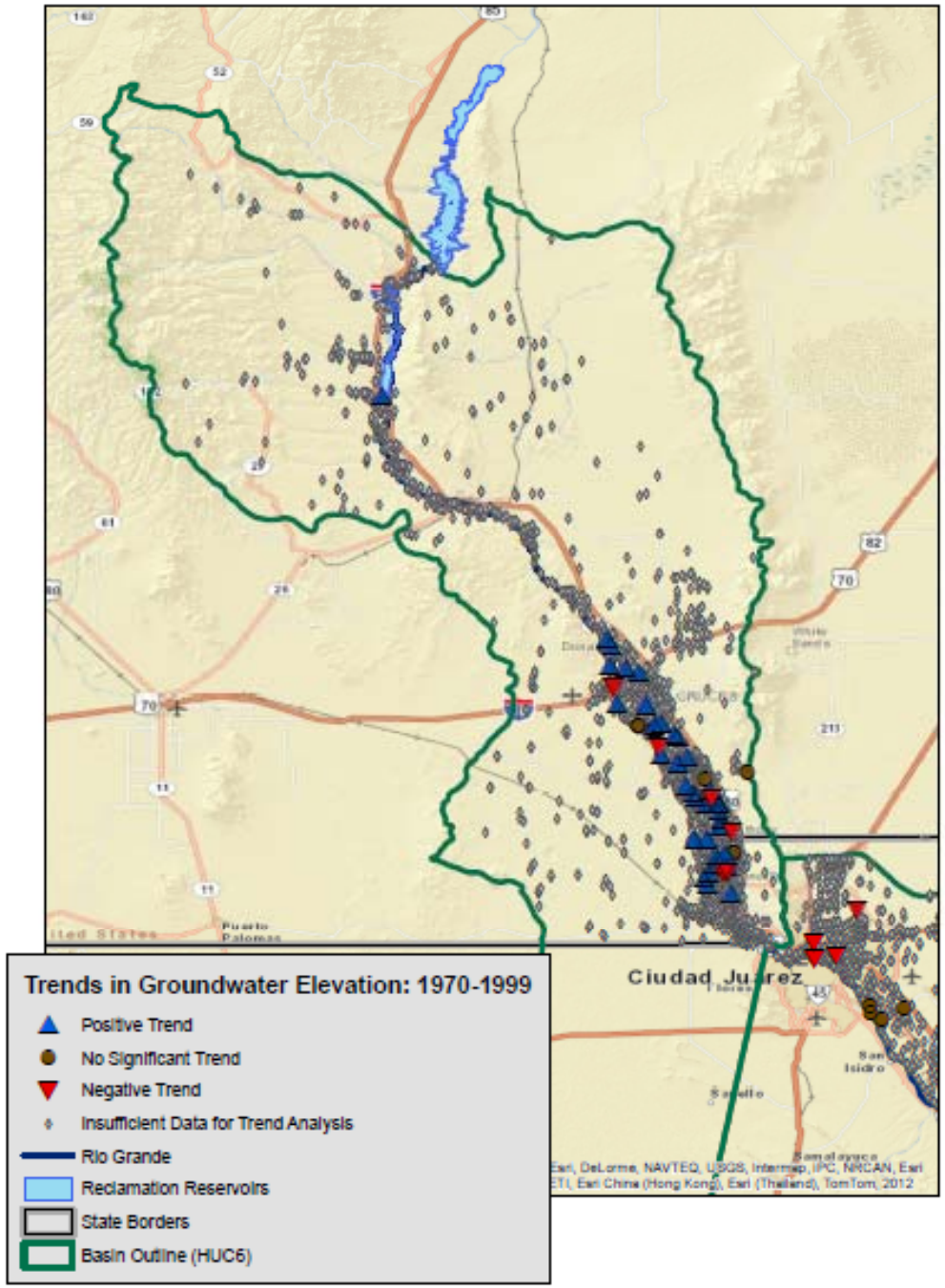
Analysis of Historical Groundwater Elevations:

1980 – Present
Widespread declines



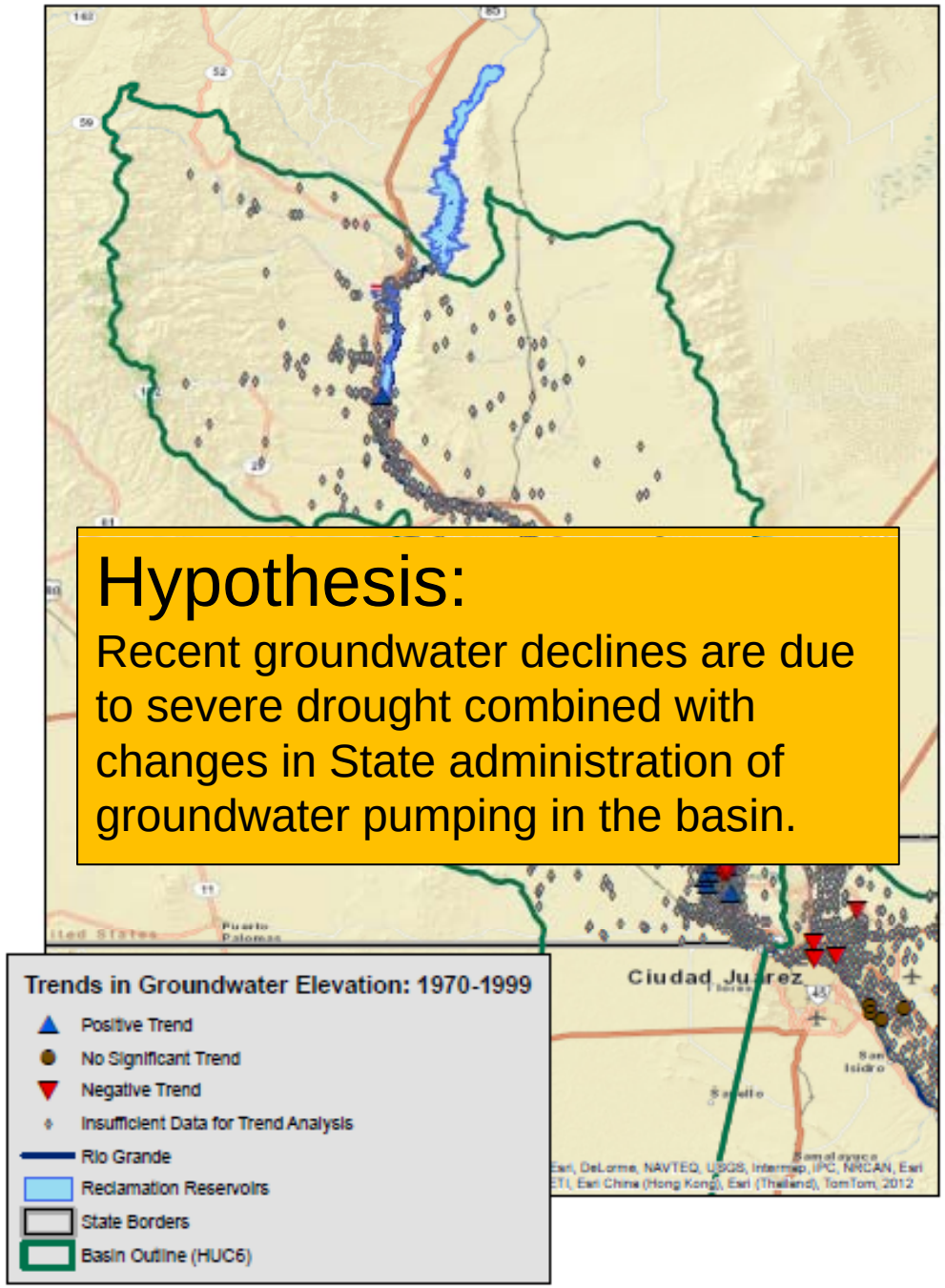
- **Analysis of Historical Groundwater Elevations**

1970 – 1999
No clear trend



- **Analysis of Historical Groundwater Elevations**

Conclusion:
No evidence to suggest long-term groundwater mining.

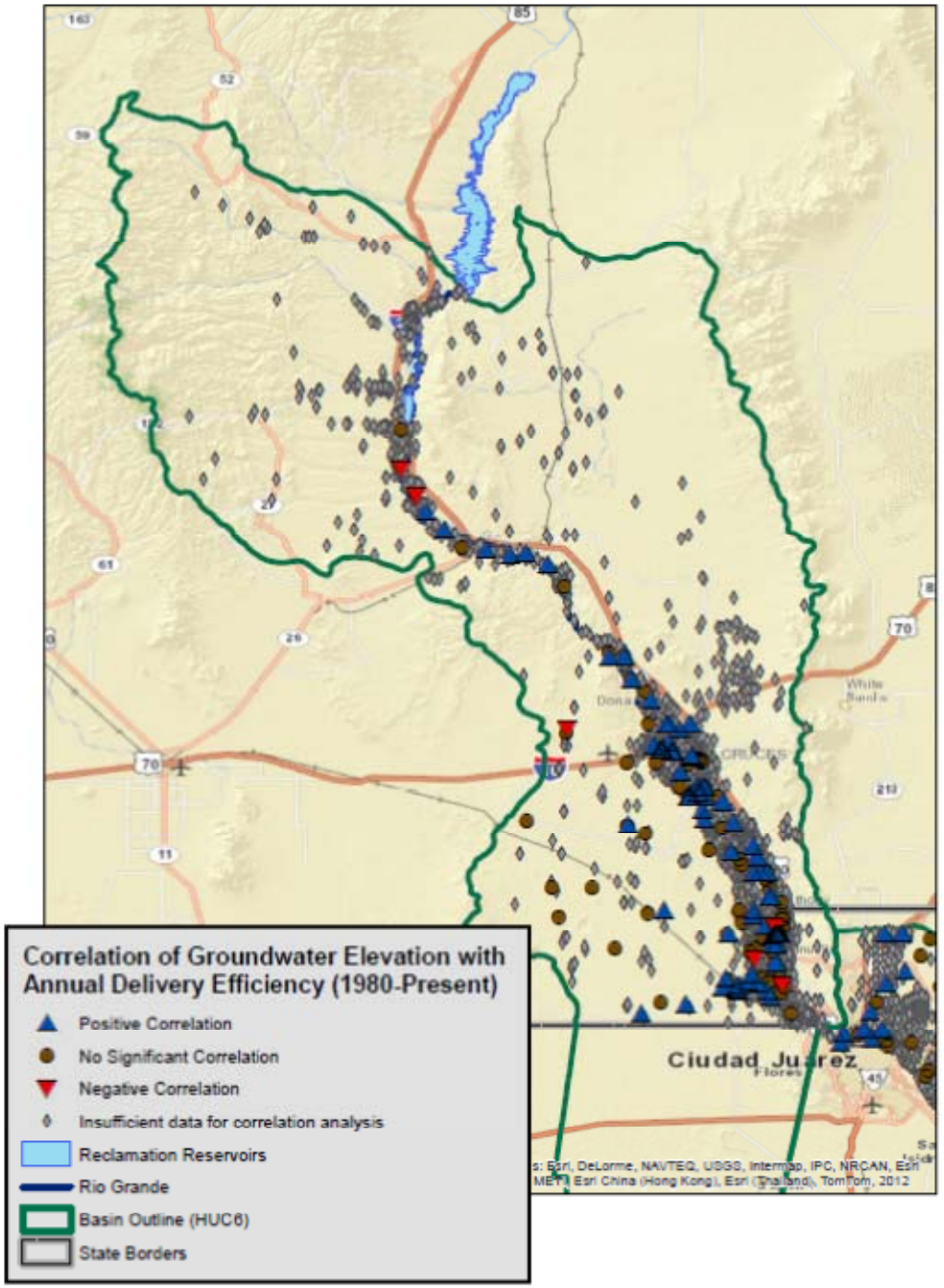


Analysis of Historical Groundwater Data

Is the Project diversion ratio correlated with groundwater elevations?

1980 – Present

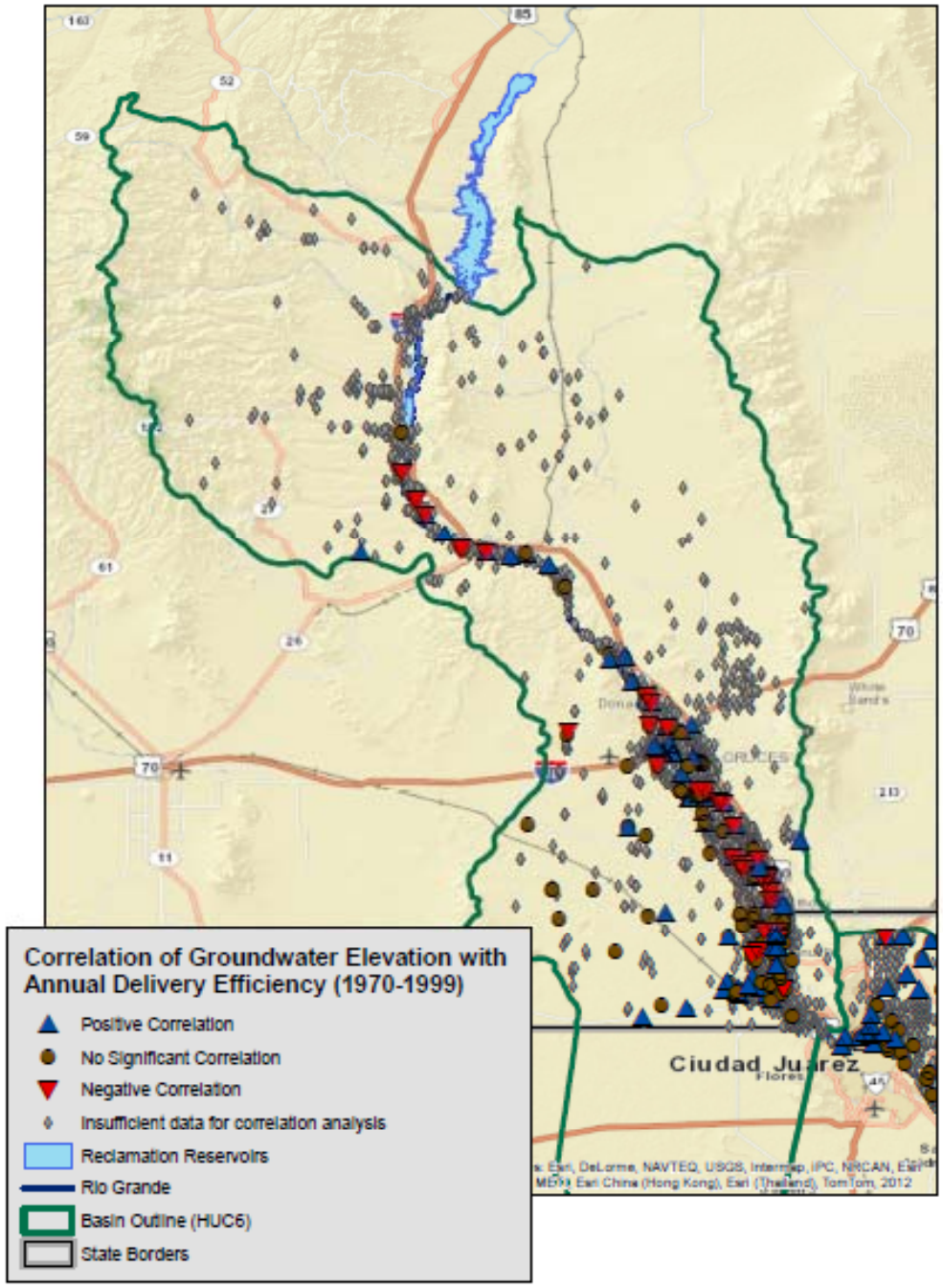
Positive correlation



Analysis of Historical Groundwater Elevations

Is Project conveyance efficiency correlated with groundwater elevations?

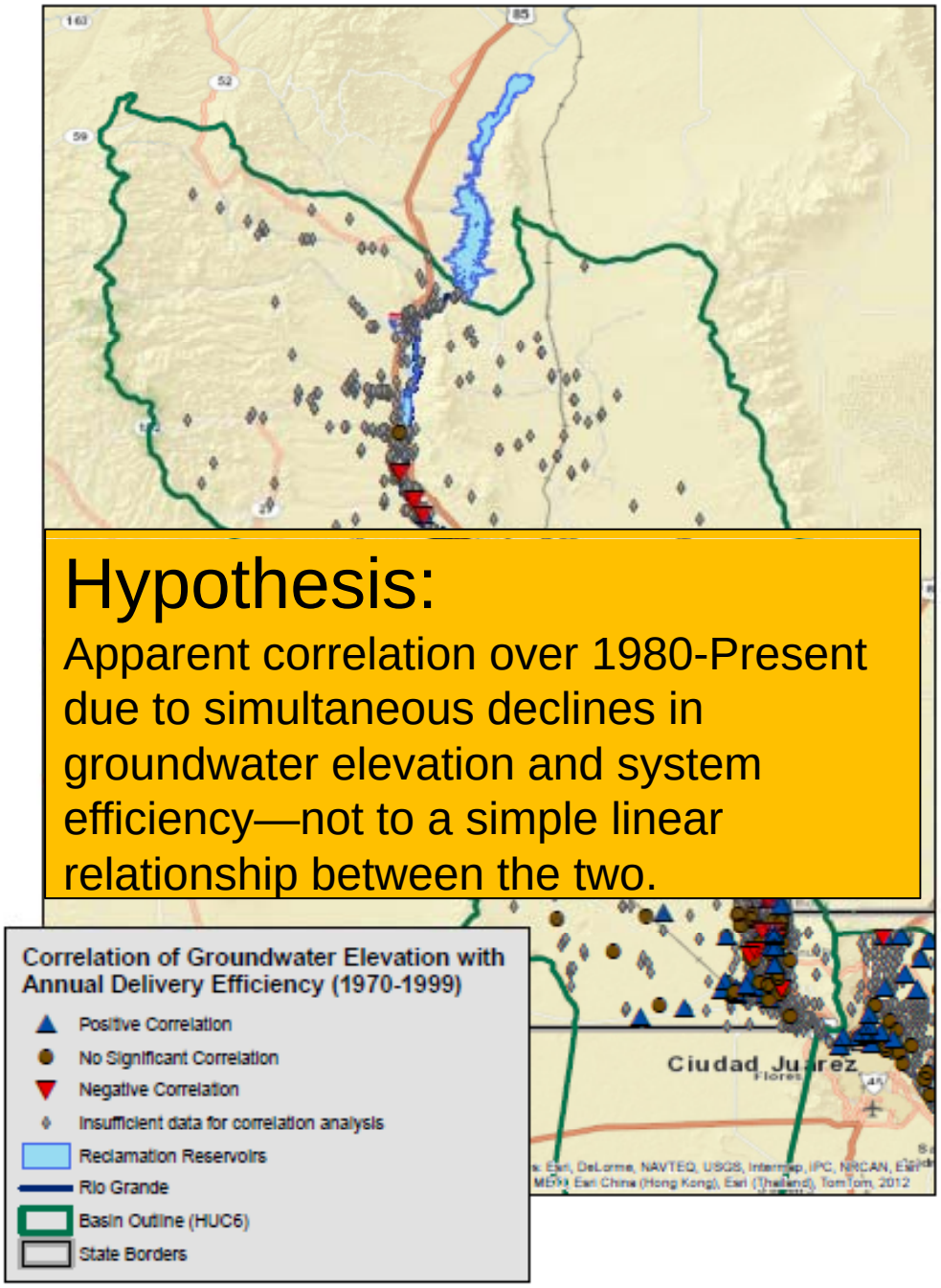
1970 – 1999:
Negative correlation



Analysis of Historical Groundwater Data

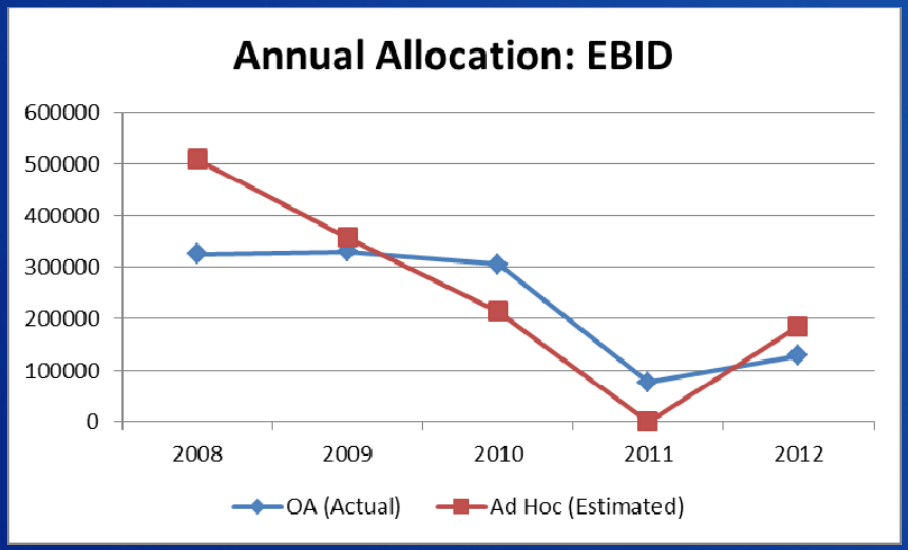
Is Project conveyance efficiency correlated with groundwater elevations?

Conclusion:
No simple (linear) relationship between conveyance efficiency and groundwater elevation

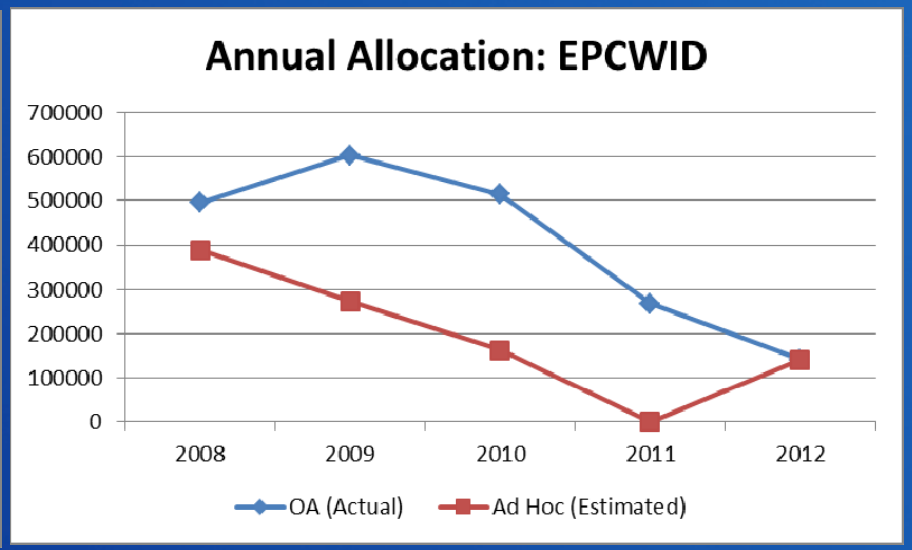


Analysis of First Five Years of Operating Agreement

Effects on Annual Project Allocations to Districts



Average Change: -20,000 AF/y



Average Change: +205,000 AF/y

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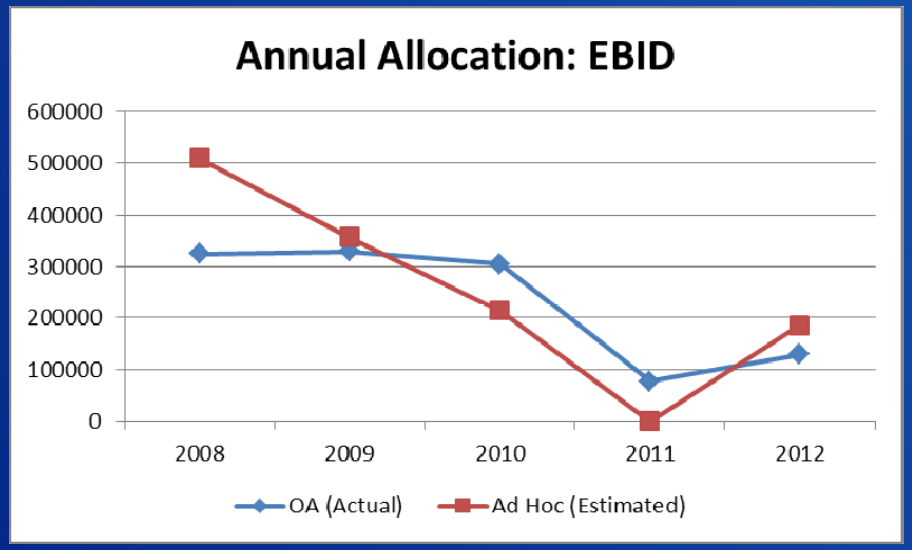
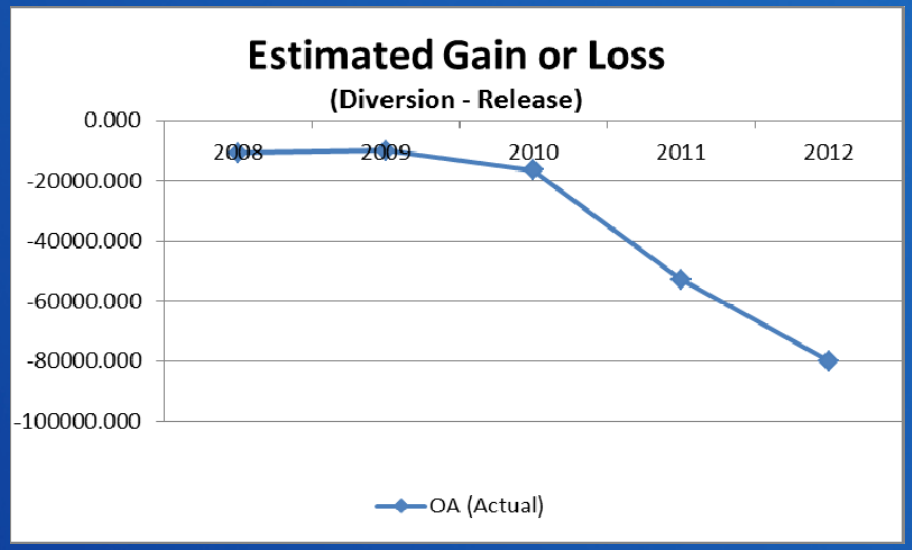
Analysis of First Five Years of Operating Agreement

Conjunctive supply available to groundwater pumpers in the Mesilla Basin, especially in New Mexico





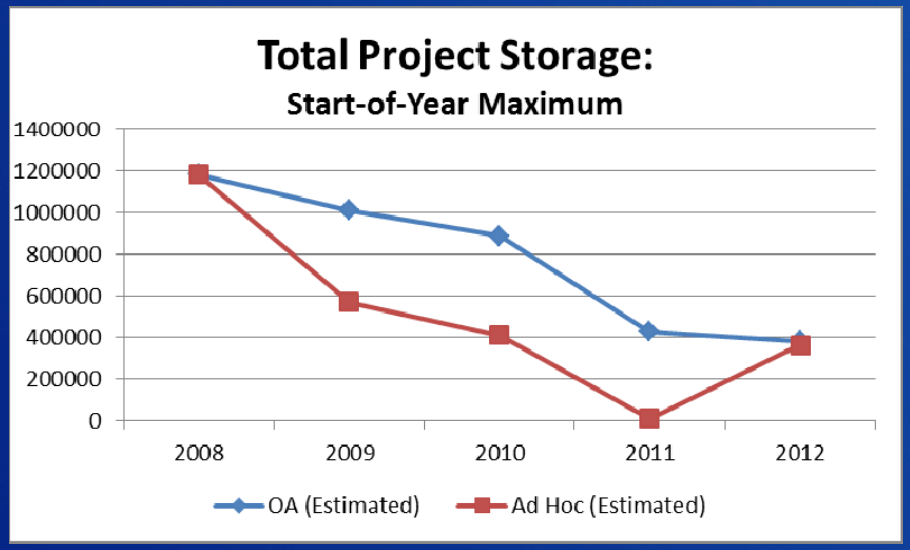
Average Change: -20,000 AF/y

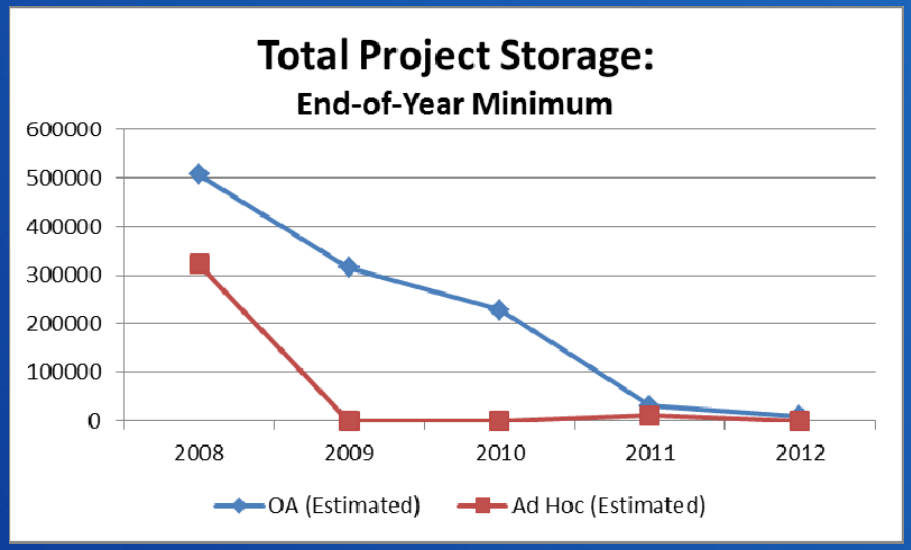
Average Loss of surface-water to groundwater: -65,500 AF/y

Recent study commissioned by IBWC estimates 26 AF/day loss due to evaporation from the Rio Grande when there is water in the channel. This amounts to approximately 5,000 AF/y in evaporative loss. The remaining loss occurs as seepage. Previous studies suggest that a large fraction of seepage losses ultimately contribute to shallow groundwater supplies. Our analysis therefore suggests that the OA does not adversely affect total conjuctive supply available in NM.

• Analysis of First Five Years of Operating Agreement

Effects on Total Project Storage





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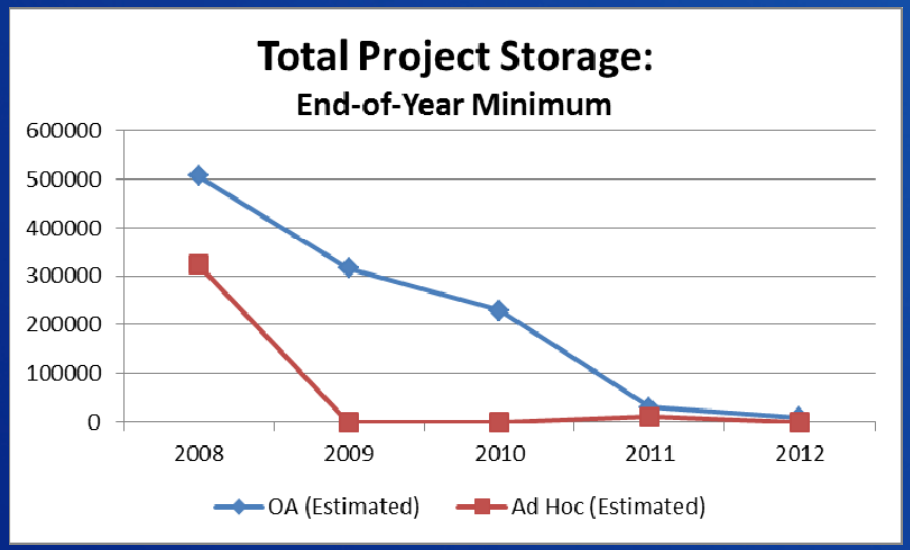
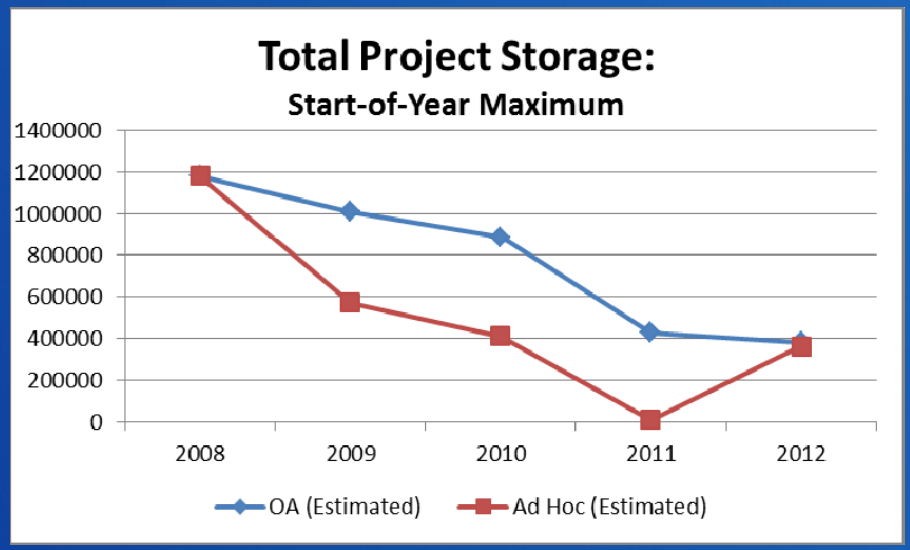
• Analysis of First Five Years of Operating Agreement

Effects of carry-over provision on project storage



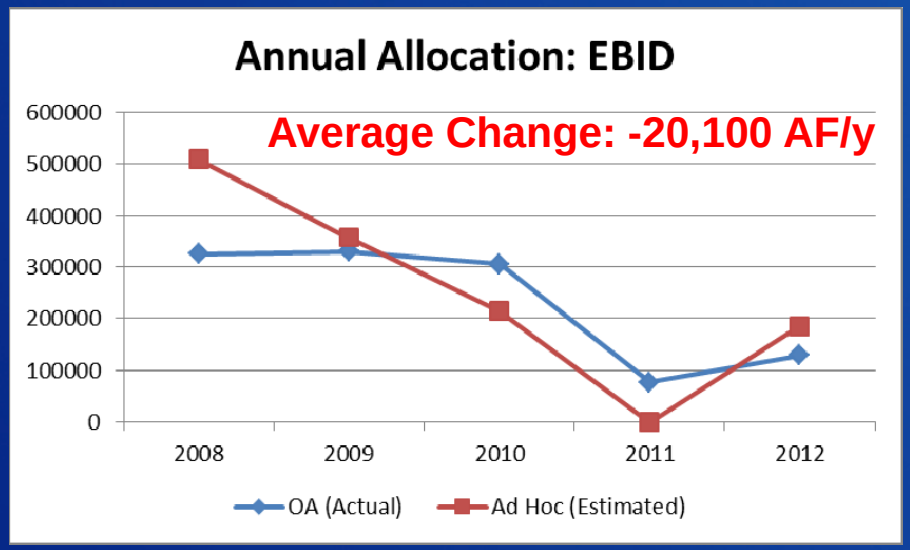


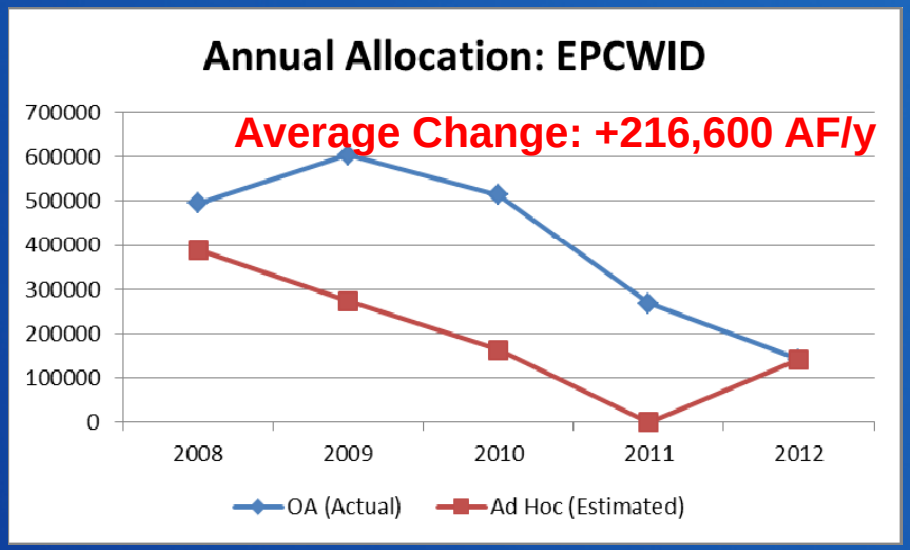
EBID generally uses full allocation…

- Under D2 operations, EBID uses full allocation each year and EP#1 loses a portion of its unused allocation to EBID the following year. This ultimately results in full depletion of the Project storage.
- Under the OA, EBID does not receive a portion of EP#1's unused allocation, thus more water remains in Project storage.

Analysis of First Five Years of Operating Agreement

Changes in Total Annual Allocation, including Carry-over





EP#1 does not use full allocation

Change in allocation due to carry-over of unused allocation balance

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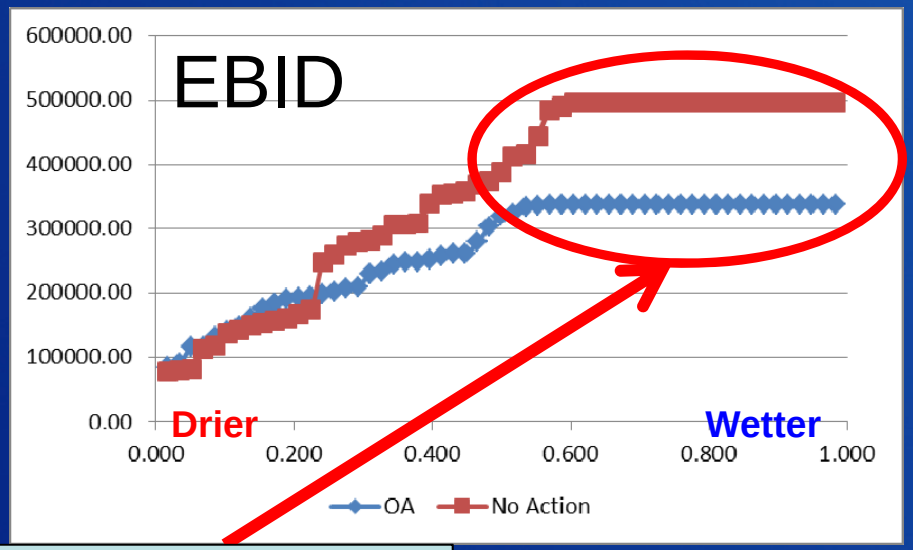
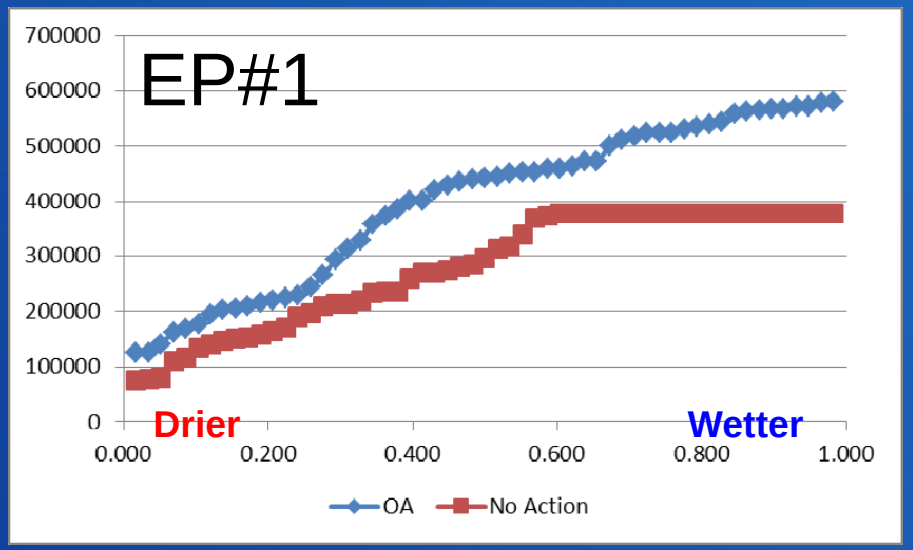
Projected conditions through 2015 season

Non-Exceedence Curves: Project Allocations 2015





Difference is largest under wet conditions, when carryover from EP#1 and diversion ratio adjustment are greatest

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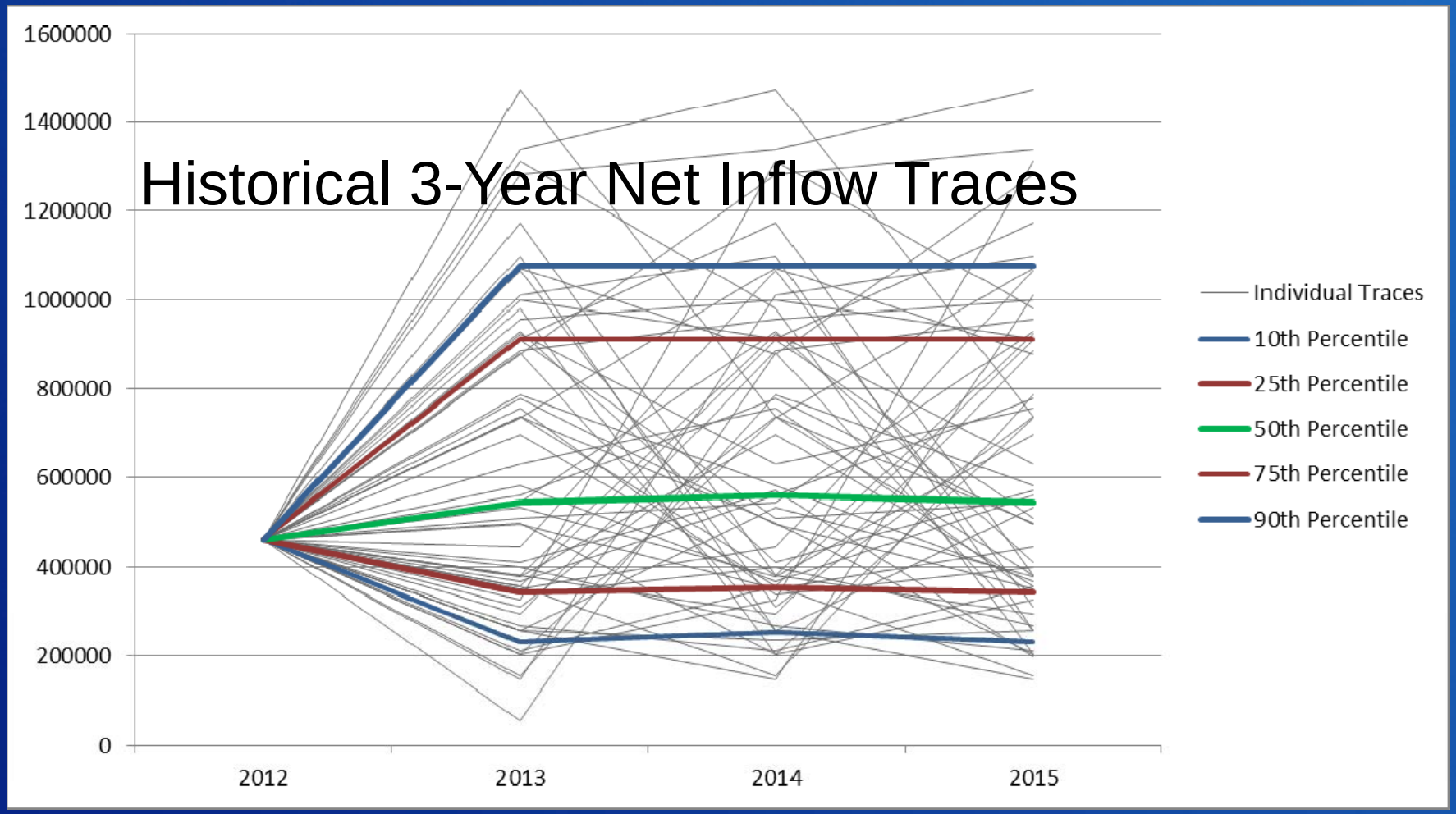
Projected conditions through 2015 season

Resampling of historical inflow traces



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