New Mexico Groundwater Management Perspective on Methods and Challenges

A Consultant's Perspective

Session 31: Groundwater Sustainability Beyond California
Wednesday April 19th, 10 - 11:45 am PT

Gilbert Barth, Ph.D.

S.S. Papadopulos & Associates, Inc.

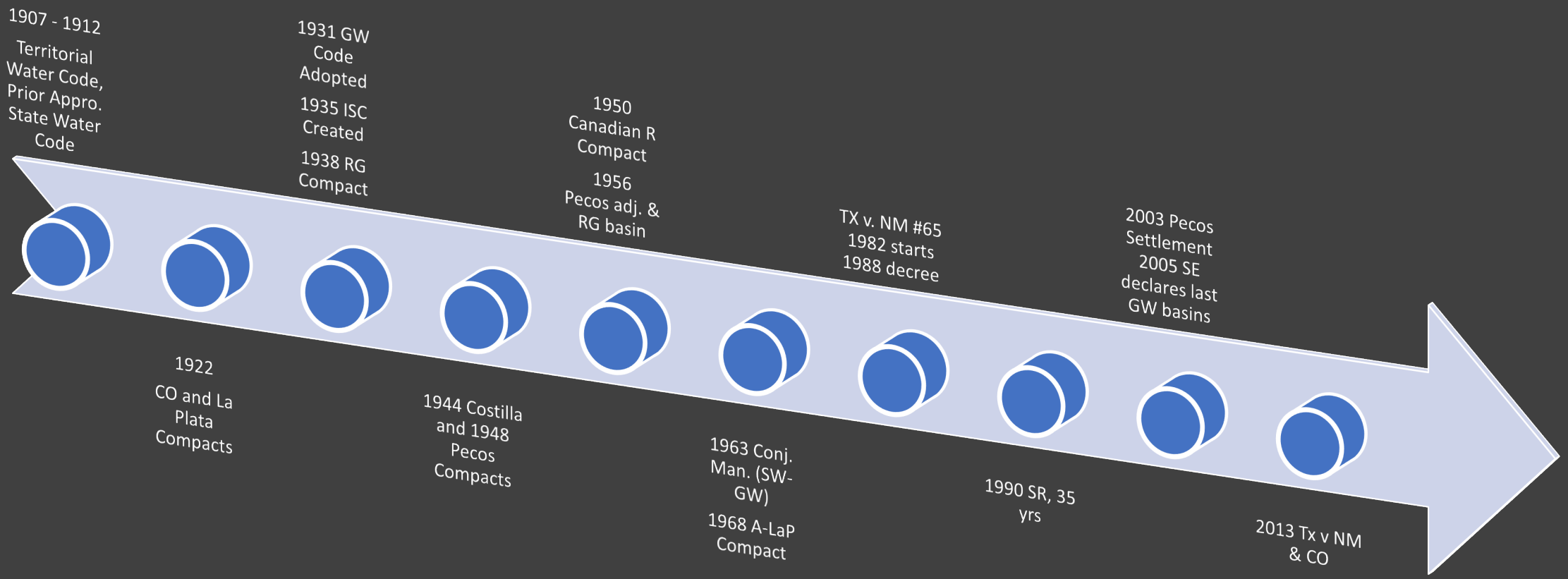
Lessons From New Mexico

- Study the system, understand the physics
- Identify basins
- Establish limits
- Enforce limits
- Manage relationships with neighbors

Outline

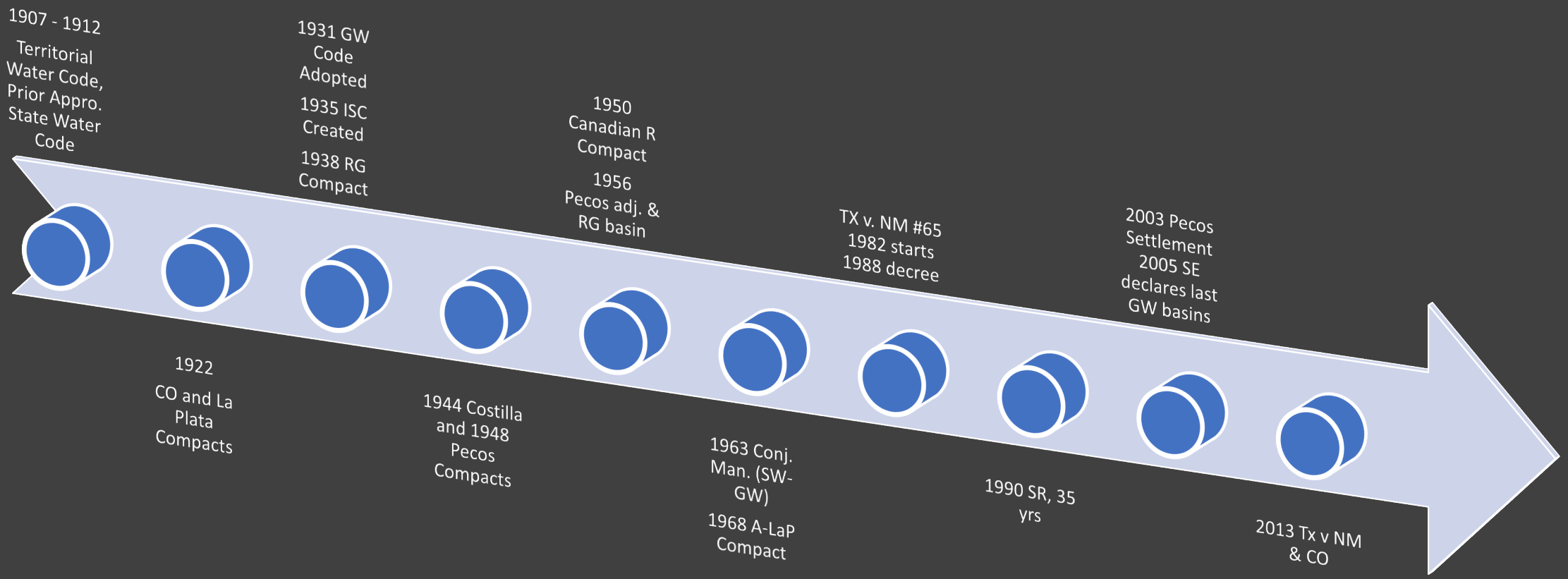
- New Mexico timeline and agencies
- Intrastate water resources
  - Application for water transfer
  - Evaluation of stream depletion
- Interstate water resources
  - Litigation
  - Negotiation

Timeline


1907 - 1912
Territorial Water Code, Prior Appro. State Water Code
1922
CO and La Plata Compacts
1931 GW Code Adopted
1935 ISC Created
1938 RG Compact
1944 Costilla and 1948 Pecos Compacts
1950
Canadian R Compact
1956
Pecos adj. & RG basin
1963 Conj. Man. (SW-GW)
1968 A-LaP Compact
TX v. NM #65
1982 starts
1988 decree
1990 SR, 35 yrs
2003 Pecos Settlement
2005 SE declares last GW basins
2013 Tx v NM & CO

Timeline

- 1906 Fisher (Reports spring flow decreases)
- 1940 Theis (Source of water to wells)
- 1955 Hantush (Step test solution)



New Mexico Agencies

- Office of the State Engineer (OSE)
  - *"The State Engineer has authority over the supervision, measurement, appropriation, and distribution of all surface and groundwater in New Mexico, including streams and rivers that cross state boundaries."*
  - Applications
- Interstate Stream Commission (ISC)
  - The Interstate Stream Commission has broad powers to investigate, protect, conserve, and develop New Mexico's waters including both interstate and intrastate stream systems.
  - Compacts

OSE Example
Water Transfer Application

OSE Example
Water Transfer Application

- District Offices and Hydrology Bureau
- Existing use
  - Location
  - Type
  - Amount (extraction and consumption)
- Proposed use
- Predicted impact
  - Drawdown estimation
  - Depletion estimation
  - Impacts of other wells
  - Conservative Estimation

TECHNICAL MEMORANDUM
OFFICE OF THE STATE ENGINEER
HYDROLOGY BUREAU

DATE: May 23, 2018

TO: Maureen Dolan, Attorney, Administrative Litigation Unit
William Duemling, District 2 Engineering Specialist Supervisor

THROUGH: Ghassan Musharrafieh, Chief, Hydrology Bureau GM

FROM: Eric Keyes, Hydrologist, Hydrology Bureau EJK

SUBJECT: [redacted] and [redacted] Application, C-[redacted], C-[redacted] and C-[redacted] into C-[redacted] and C-[redacted], HU[redacted]

Evaluation Summary

A 10-year transfer to C-[redacted] does not negatively impact the Pecos River during the transfer period but will negatively impact the Pecos River after the transfer period.

A 10-year transfer to C-[redacted] negatively impacts the Pecos River to year 4 of the transfer.

The transfers do not cause significant drawdown at nearby wells.

Evaluation Details

[redacted] and [redacted] have filed an application for a 10-year temporary transfer of water from C-[redacted], C-[redacted] and C-[redacted] into C-[redacted] and C-[redacted]. The locations of the wells are shown in figure 1. The move-to wells are 3 and 22 miles southeast of the move-from wells. The move-to wells are 19 miles apart and will require separate analyses.

The pumping would transfer use from irrigation to commercial.

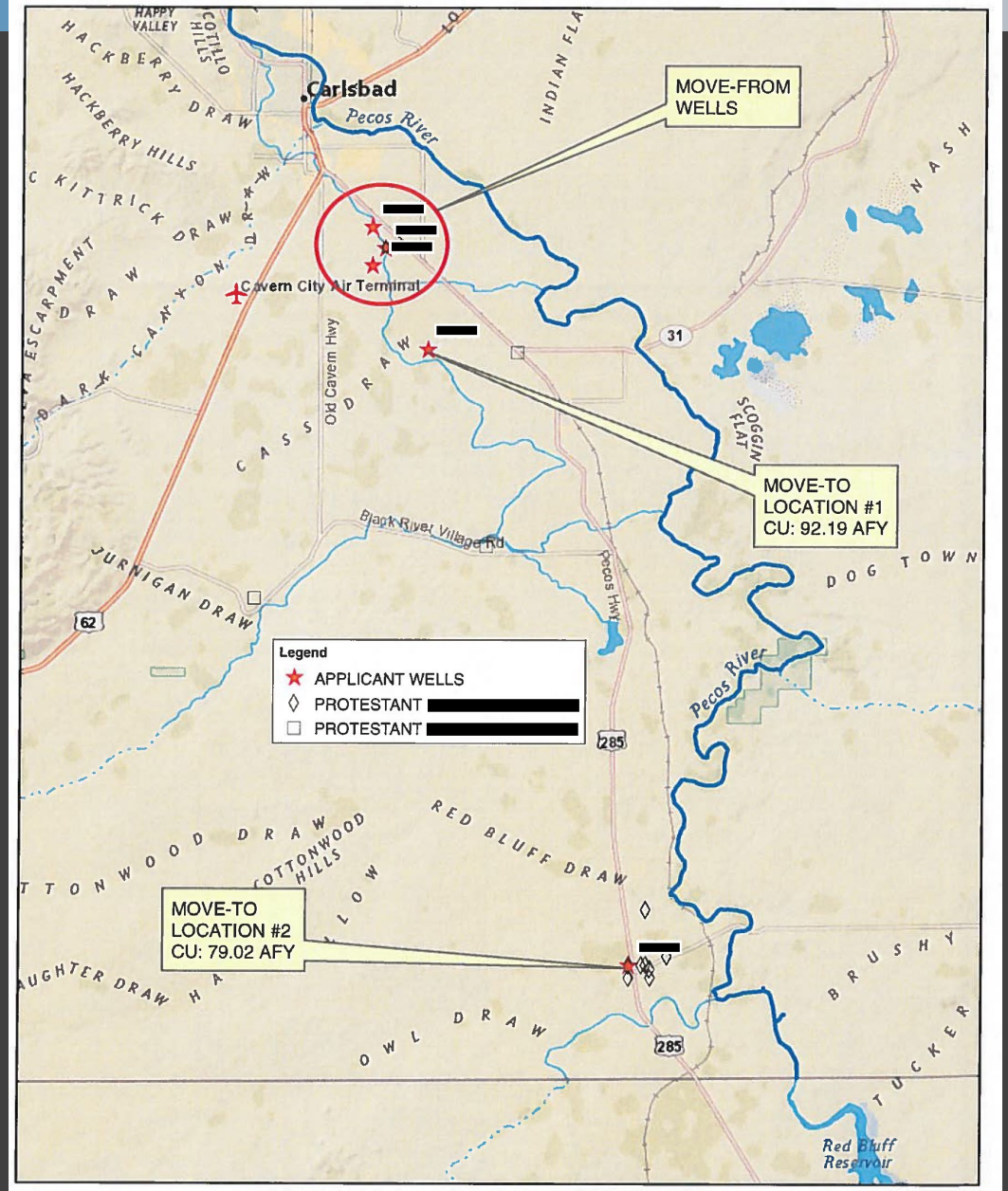
The move-from and the move-to #1 (C-[redacted]) are in the Carlsbad Basin. The Carlsbad Basin is administered with a consumptive irrigation requirement (CIR) of 2.1 acre-feet/acre.

The move-to #2 (C-[redacted]) is in the Delaware Basin. The Delaware Basin is administered with a consumptive irrigation requirement (CIR) of 1.8 acre-feet/acre.

The move-from locations have an irrigation diversion of 131.7 AFY with a consumptive use of 92.19 AFY. The consumptive rate of the right, 92.19 AFY, is to be diverted at move-to #1. The Delaware Basin consumptive portion of the right, 79.02 AFY, is to be diverted at move-to #2.

After 10-years ending on December 31, 2026, pumping reverts back to the licensed points of diversion and places of use.

The application is protested by [redacted] and by [redacted]. There are concerns that the transfer would impair existing water rights and impact flow on the Pecos River. [redacted] has water rights on the C-[redacted] et al wells including the applicant



TEMPORARY 10-YEAR TRANSFER THRU 12/31/2026
DIV: 131.7 AFY, CU: 92.19 AFY ==> 79.02 AFY CU DELAWARE BASIN

N 0 1 2 4 Miles

MAP AREA

FIGURE 1
LOCATION MAP
FOR THE [redacted] SALES APPLICATION
C-[redacted], C-[redacted] & C-[redacted] COMBINED INTO C-[redacted] & C-[redacted]

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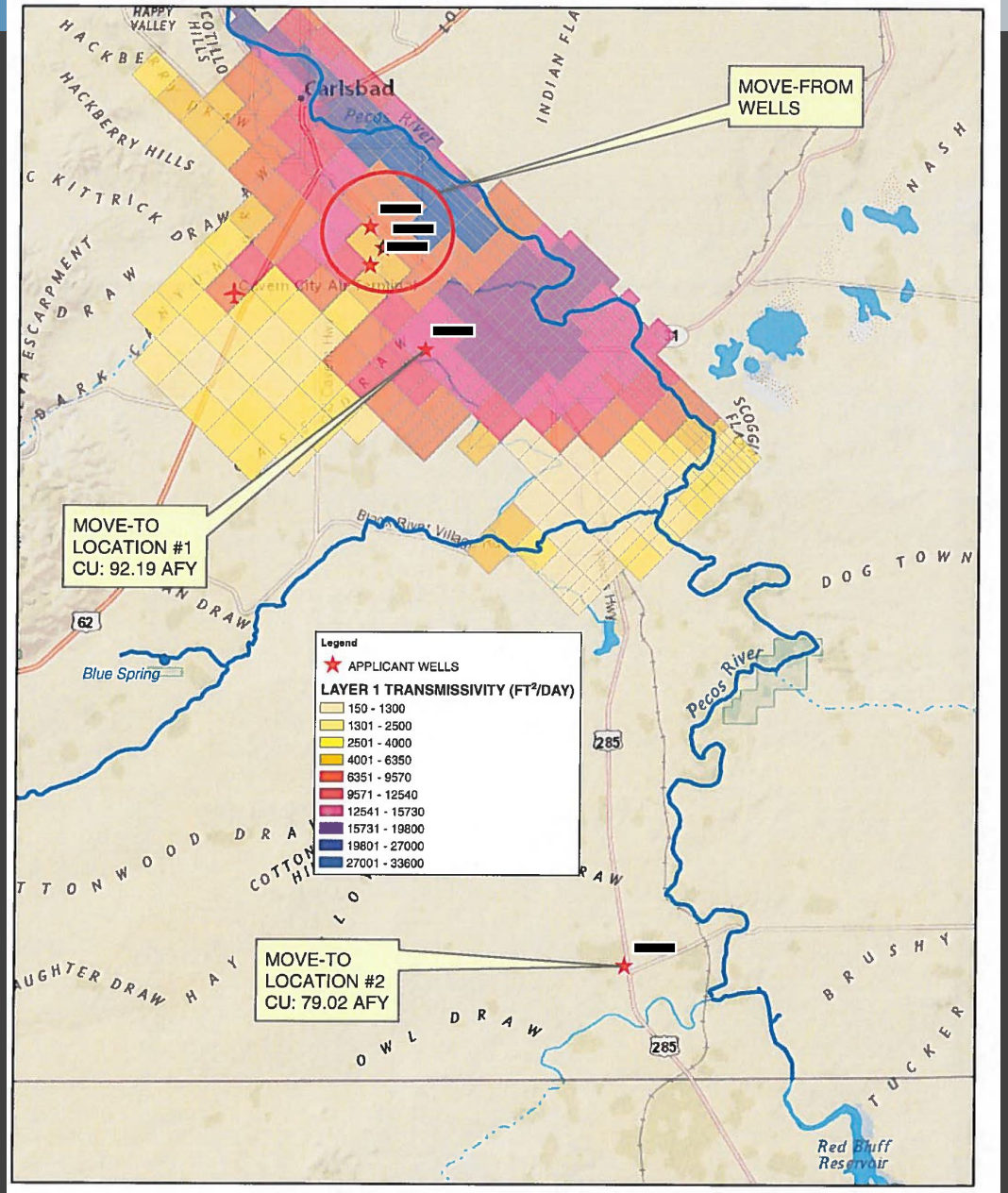

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MAP AREA

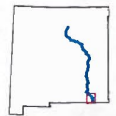

FIGURE 2
MODEL LOCATION

FOR THE [redacted] APPLICATION
C-[redacted], C-[redacted] & C-[redacted] COMBINED INTO C-[redacted] & C-[redacted]

model2.mxd

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FIGURE 3

TOTAL PECOS RIVER IMPACT AND THE MOVE-FROM AND MOVE-TO COMPONENTS

FOR THE [redacted] 10-YEAR TEMPORARY TRANSFER TO MOVE-TO #1, C-[redacted]

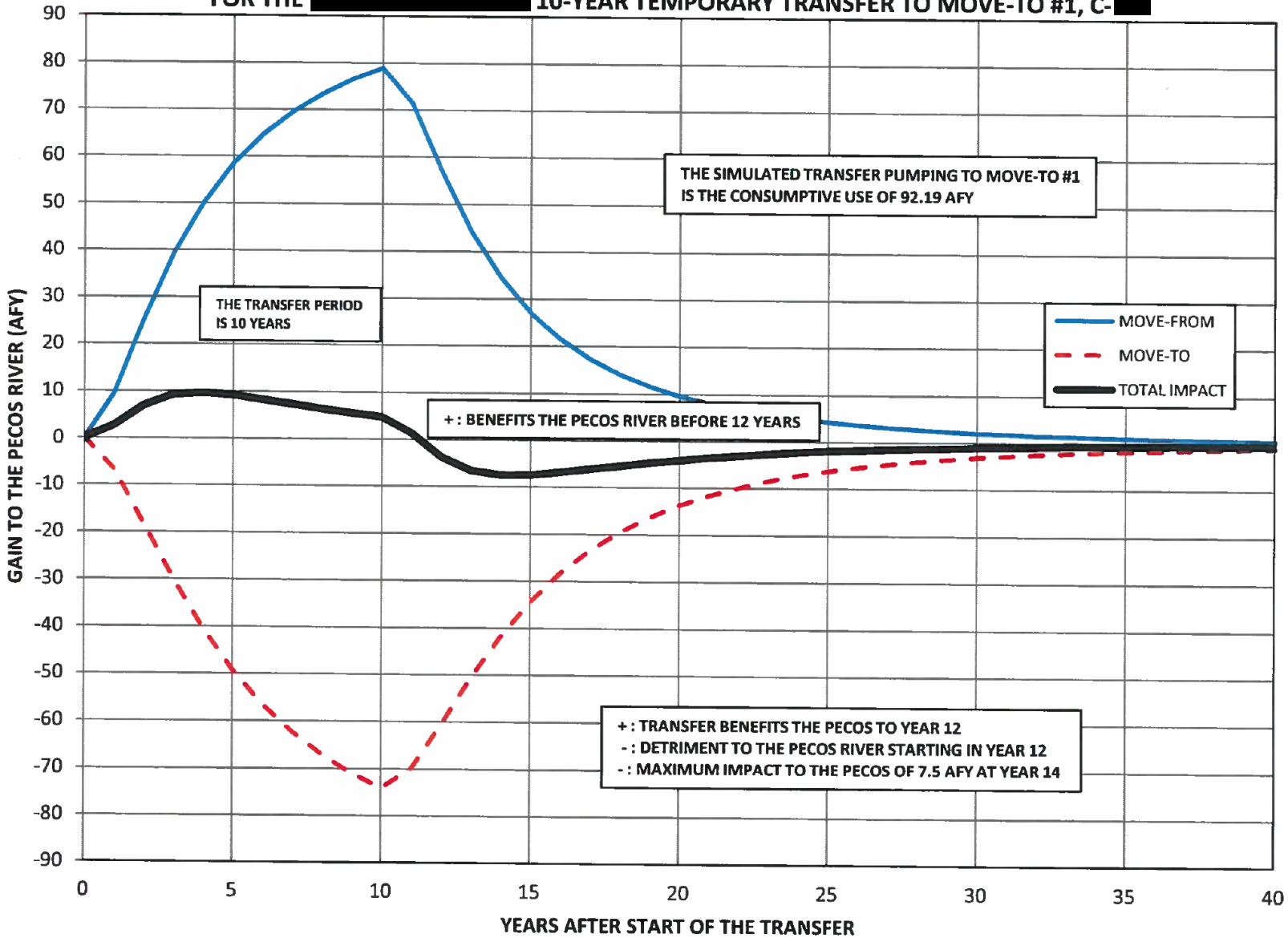
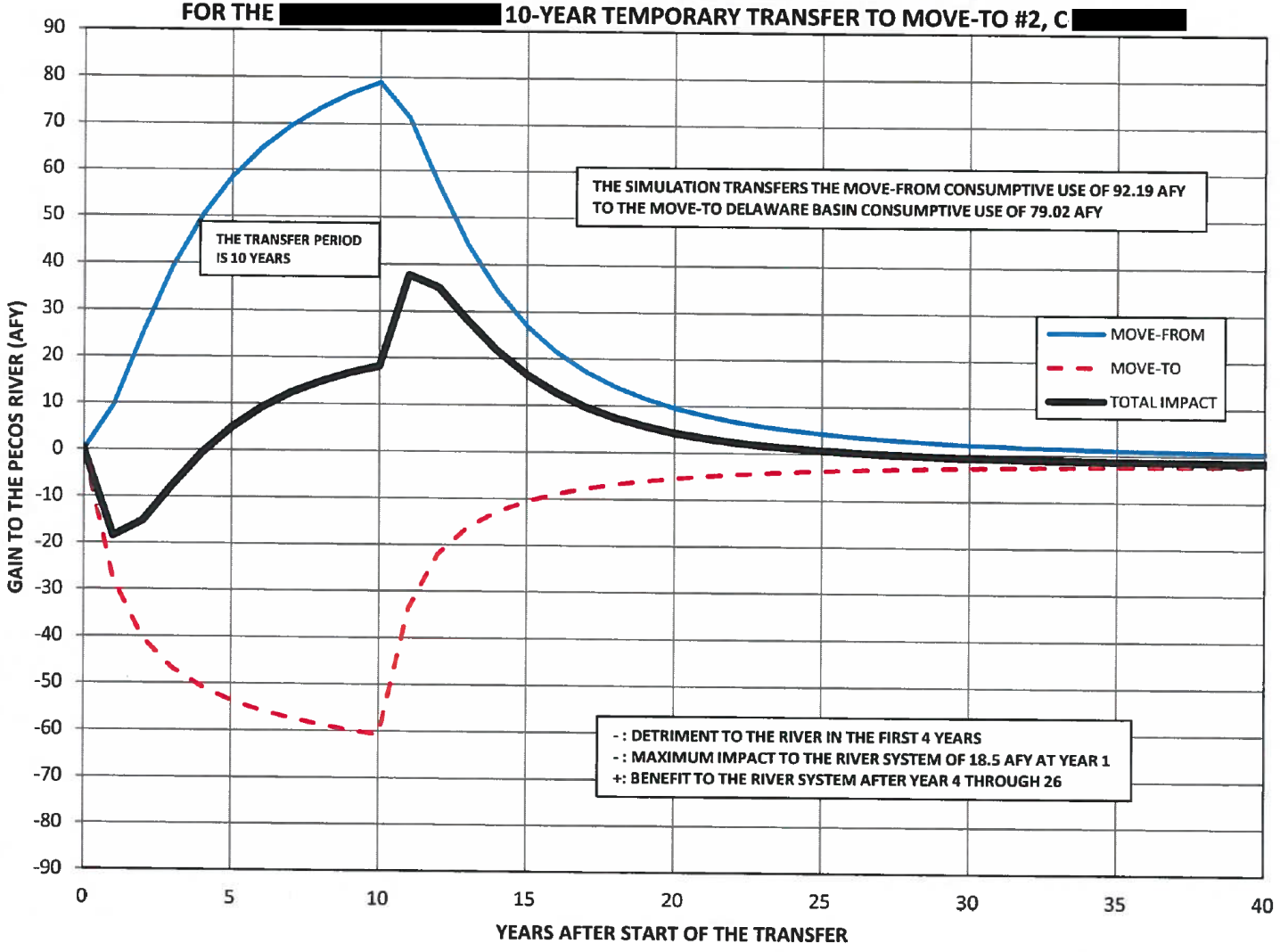
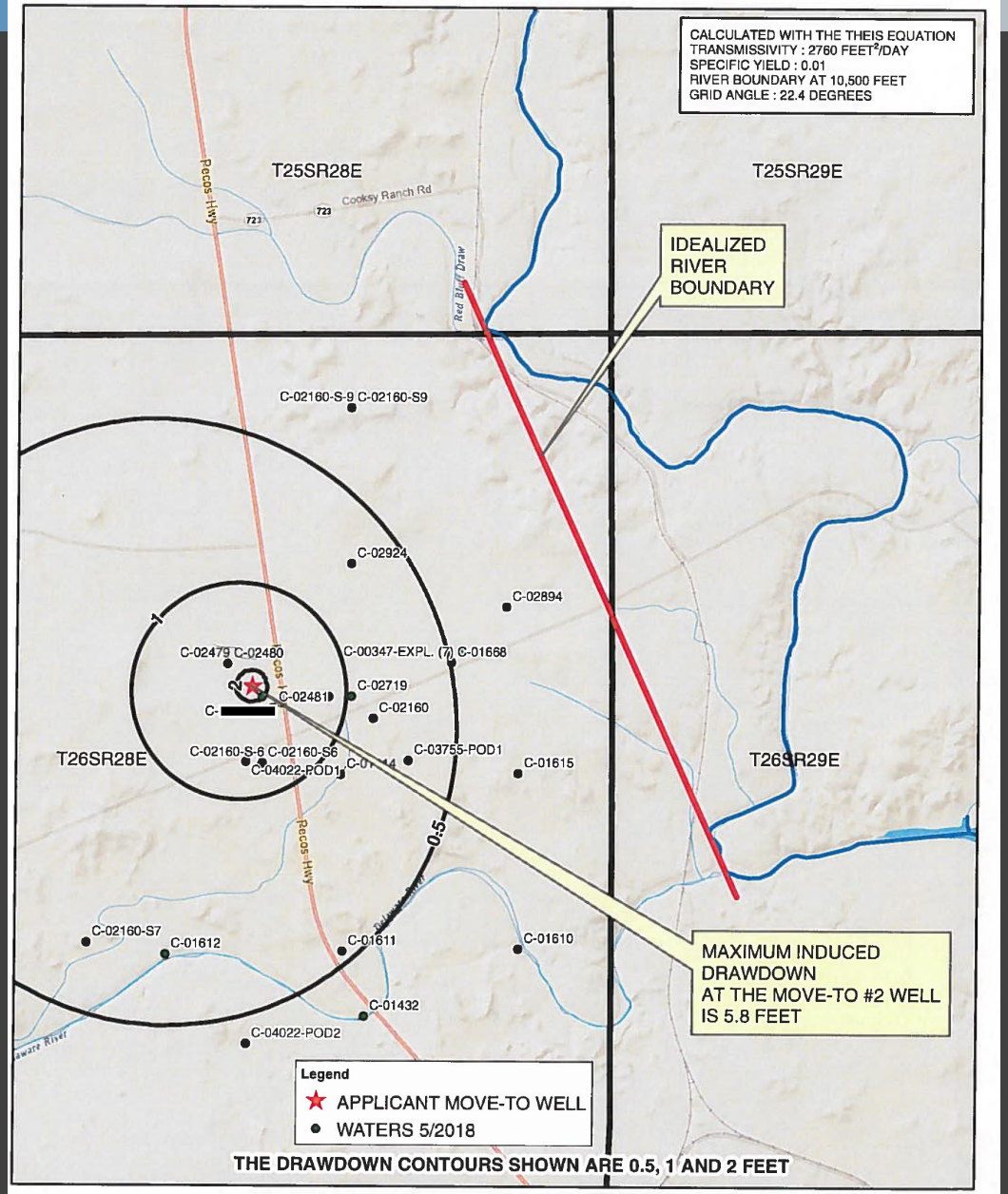


FIGURE 4

TOTAL RIVER IMPACT AND THE MOVE-FROM AND MOVE-TO COMPONENTS

FOR THE [redacted] 10-YEAR TEMPORARY TRANSFER TO MOVE-TO #2, C [redacted]





TEMPORARY 10-YEAR TRANSFER THRU 12/31/2026
DIV: 131.7 AFY, CU: 92.19 AFY ==> 79.02 AFY CU DELAWARE BASIN

FIGURE 5
APPLICANT INDUCED DRAWDOWN
AFTER 10-YEARS AT THE MOVE-TO #2 LOCATION
FOR THE [redacted] SALES APPLICATION
C-[redacted], C-[redacted] & C-[redacted] COMBINED INTO C-[redacted] & C-[redacted]

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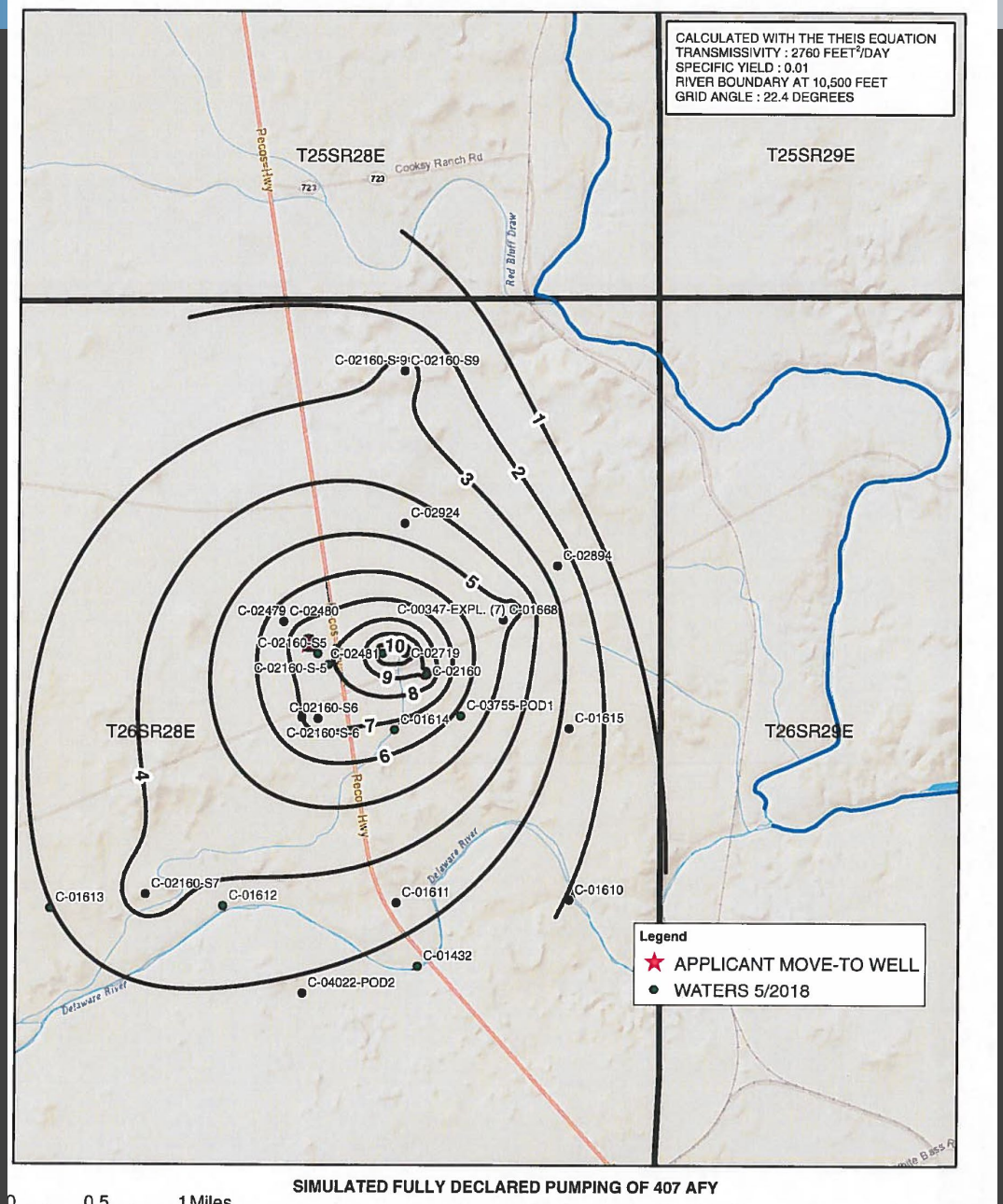

SIMULATED FULLY DECLARED PUMPING OF 407 AFY

FIGURE 6
10-YEAR PROJECTED DRAWDOWN WITH PUMPING OF ALL DECLARATIONS AND WITHOUT APPLICANT PUMPING
FOR THE [redacted] APPLICATION
C-[redacted] C-[redacted] & C-[redacted] COMBINED INTO C-[redacted] & C-[redacted]

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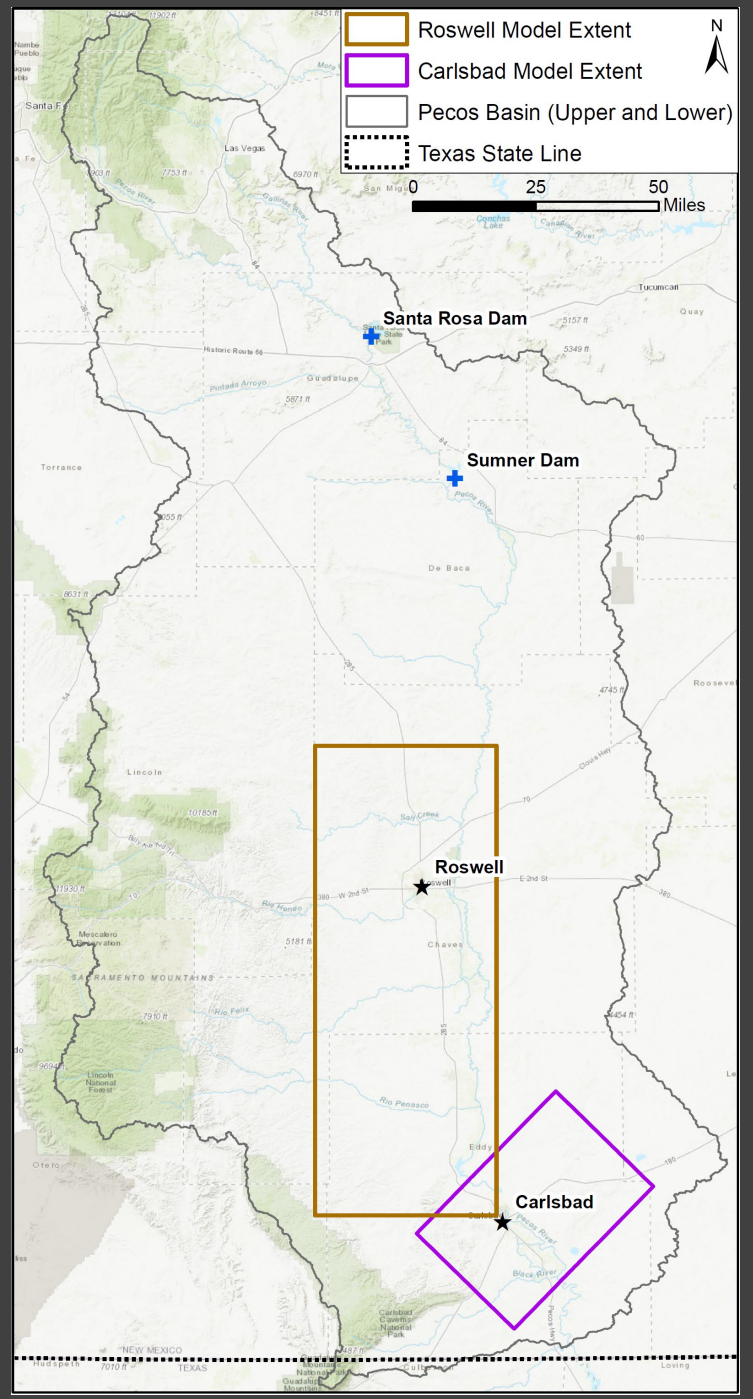
ISC Example
Pecos Basin Management

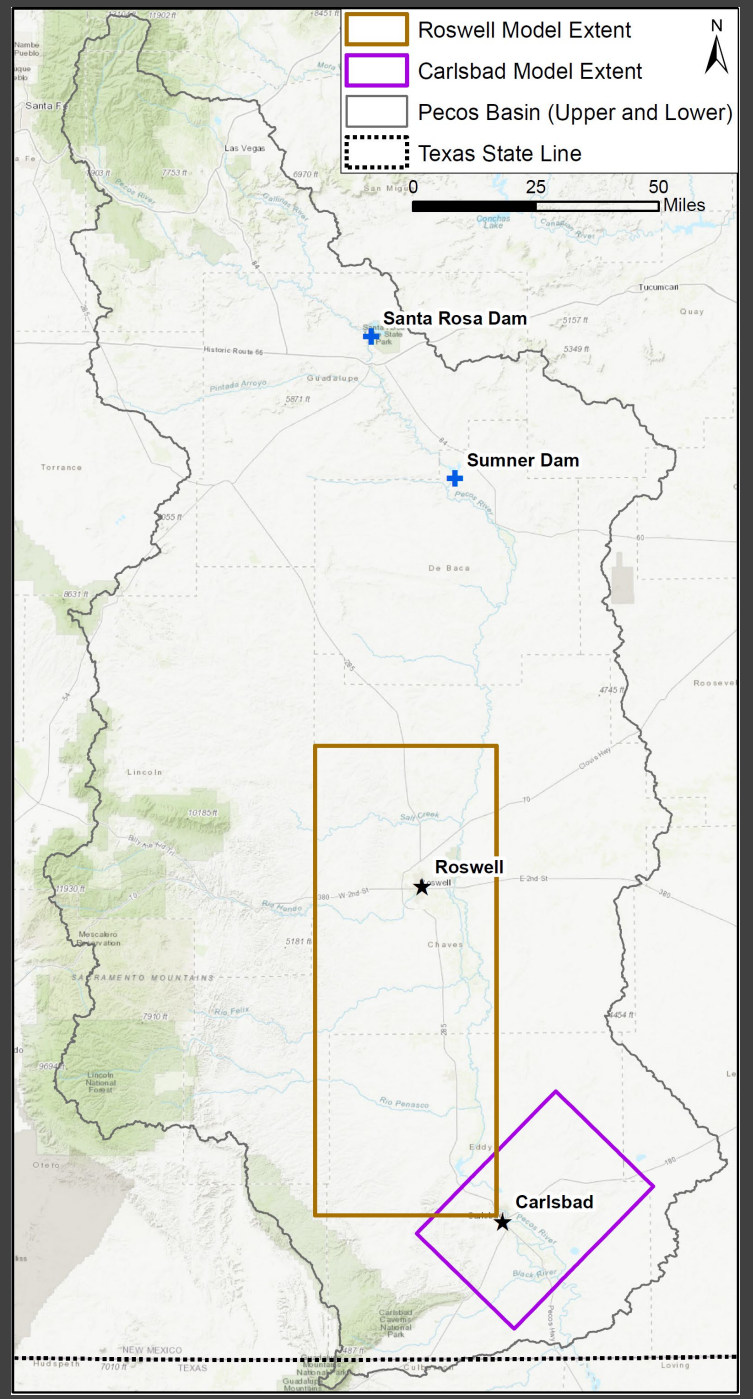
Pecos Basin

- Inter and Intrastate Issues
- NM to TX
  - Pecos Headwaters
  - Roswell Underground Water Basin
  - Carlsbad Area
  - State line



Intra and Interstate

- 1931: Roswell Underground Water Basin declared (NMOSE)
  - Groundwater regulated
  - Water right adjudication (1956-1966), retire ~12,000 “illegal” acres
  - 3 acre-feet per acre.
- 1932: Pecos Valley Artesian Conservancy District (PVACD), to “conserve the waters.”
  - Plugged more than 1,500 wells
  - Ditch-lining and land-leveling projects
  - Purchased/retired > 7,000 acres of irrigation rights.
- 1938 Roswell alluvium extraction (29,000 acres)
- 1940’s Carlsbad alluvium
- Texas irrigation from Pecos (1914 -)
  - 1971 Texas v. New Mexico: NM shortfall (314,000 acre-feet), paid $14 million
- “It has taken more than a century for large-scale water use in the Pecos Basin to mature, so that it is more or less in equilibrium with the supply and with obligations to Texas. ”
  - Shomaker (2003)
  - But there is more…



Historical, But Still Going On….

- 1949 Interstate Pecos River Compact
- River Master's Manual (amended decree, 1988)
- 2014: Tropical storm, heavy rainfall
  - NM holds water at TX request
  - TX later requests NM compensate for evaporation…

Syllabus

NOTE: Where it is feasible, a syllabus (headnote) will be released, as is being done in connection with this case, at the time the opinion is issued. The syllabus constitutes no part of the opinion of the Court but has been prepared by the Reporter of Decisions for the convenience of the reader. See *United States* v. *Detroit Timber & Lumber Co.*, 200 U. S. 321, 337.

SUPREME COURT OF THE UNITED STATES

Syllabus

TEXAS *v.* NEW MEXICO

ON MOTION FOR REVIEW OF THE RIVER MASTER'S FINAL DETERMINATION

No. 65, Orig. Argued October 5, 2020—Decided December 14, 2020

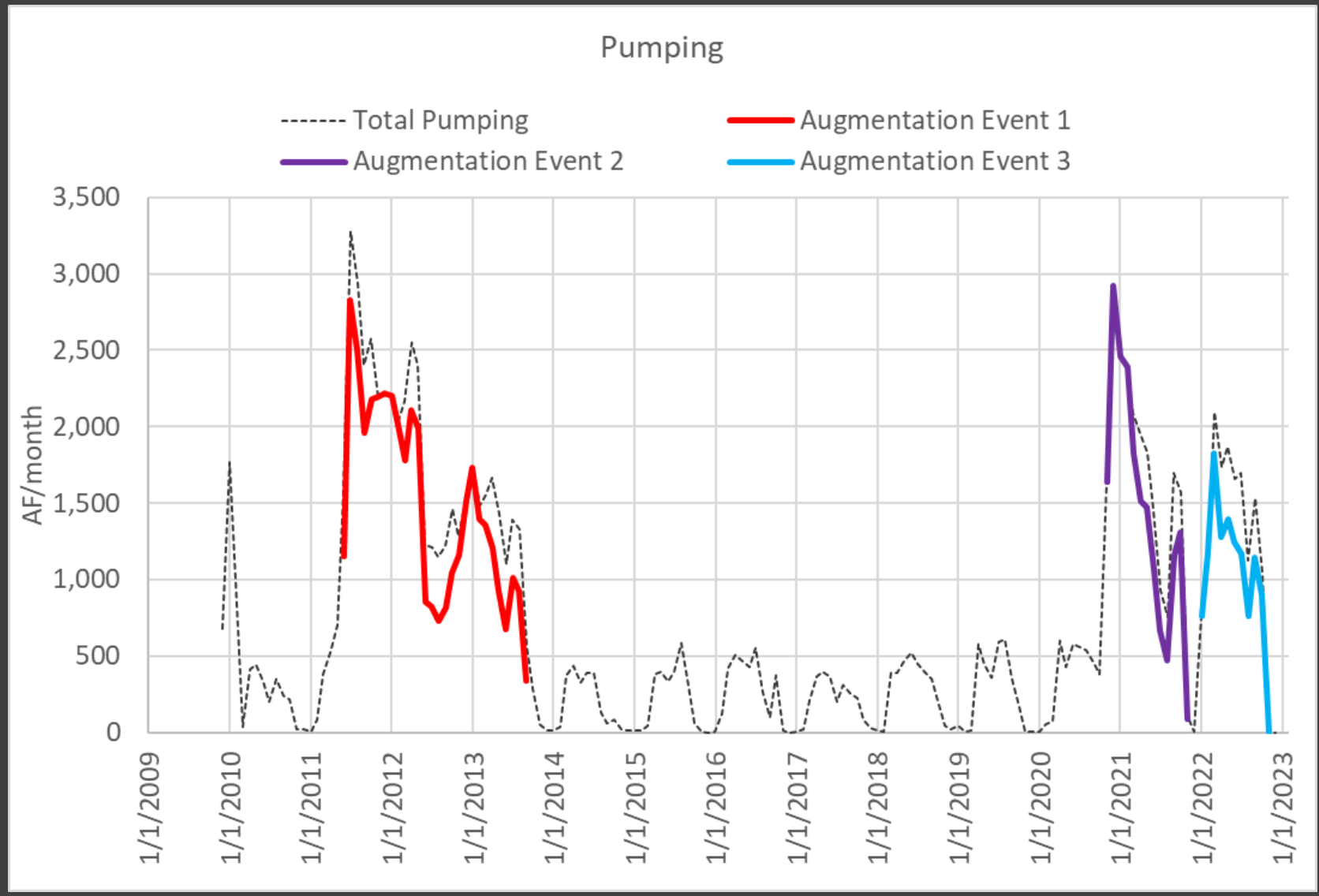
The 1949 interstate Pecos River Compact provides for equitable apportionment of the use of the Pecos River's water by New Mexico and Texas. In a 1988 amended decree in this case, the Court appointed a River Master to annually calculate New Mexico's obligations to Texas under the Compact. See *Texas* v. *New Mexico,* 485 U. S. 388. The Court also adopted the River Master's Manual, which elaborates on how to make the necessary calculations to determine whether New Mexico is complying with its obligations under the Compact. As relevant, §C.5 of the Manual provides that when water is stored "at the request of Texas" in a facility in New Mexico, then New Mexico's delivery obligation "will be reduced by the amount of reservoir losses attributable to its storage."

In 2014, a tropical storm caused heavy rainfall in the Pecos River Basin. To prevent flooding, Texas's Pecos River Commissioner requested that some of the River's water be stored in New Mexico. New Mexico's Commissioner agreed. Several months later, the water was released. But critically for purposes of this dispute, a significant amount of water evaporated while the water was held in New Mexico.

For years thereafter, the States sought to reach an agreement on how the evaporated water should be accounted for under the Compact. To permit those negotiations to continue, the River Master outlined a procedure in 2015 that called for the future resolution of the issue. Neither State objected. When negotiations eventually broke down, however, New Mexico filed a motion with the River Master that sought delivery credit for the evaporated water. As relevant here, the River Master ruled in New Mexico's favor, rejecting Texas's argument that the motion was untimely and concluding that the evaporated water was water stored "at the request of Texas" under §C.5 of the River

ISC in Action

- Settlement dictates augmentation during “low” supply
- NMISC pumps artesian aquifer to increase water at Brantley



Lessons

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- Identify basins
- Establish limits
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- Manage relationships

Questions?