Water Availability in the Southern White River Flow System

and results of the State Engineer's Order 1169 Aquifer Test

Rick Felling

NWRA Annual Conference

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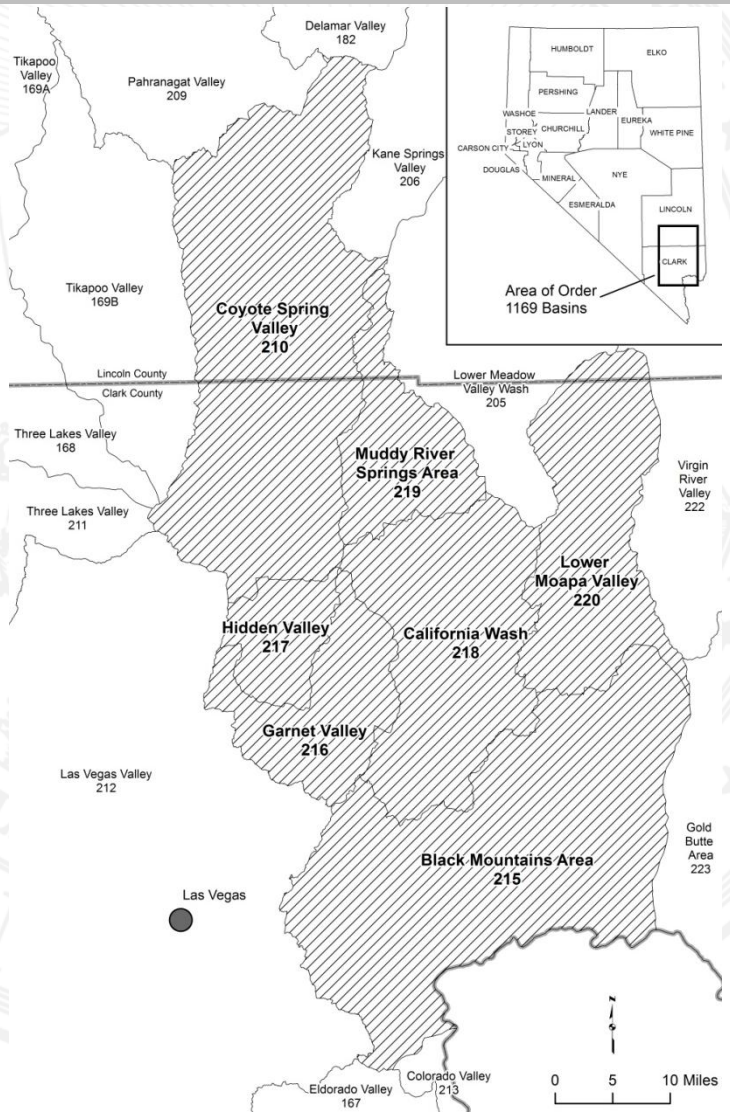
Southern White River Flow System

- Seven Basins considered here
  - Coyote Spring Valley
  - Muddy River Springs Area
  - Lower Moapa Valley
  - Hidden Valley
  - Garnet Valley
  - California Wash
  - Black Mountains Area



Groundwater Available for Appropriation

NRS 533.370(2)

- Unappropriated water at the source of supply
  - Perennial yield
- Conflict with existing rights
  - Surface water
  - Groundwater

Background

- Eakin (Bulletin 33, 1966)
  - Estimated water budget for WRFS
  - Inflow to MRSA 37,000 af
  - Subsurface outflow nil

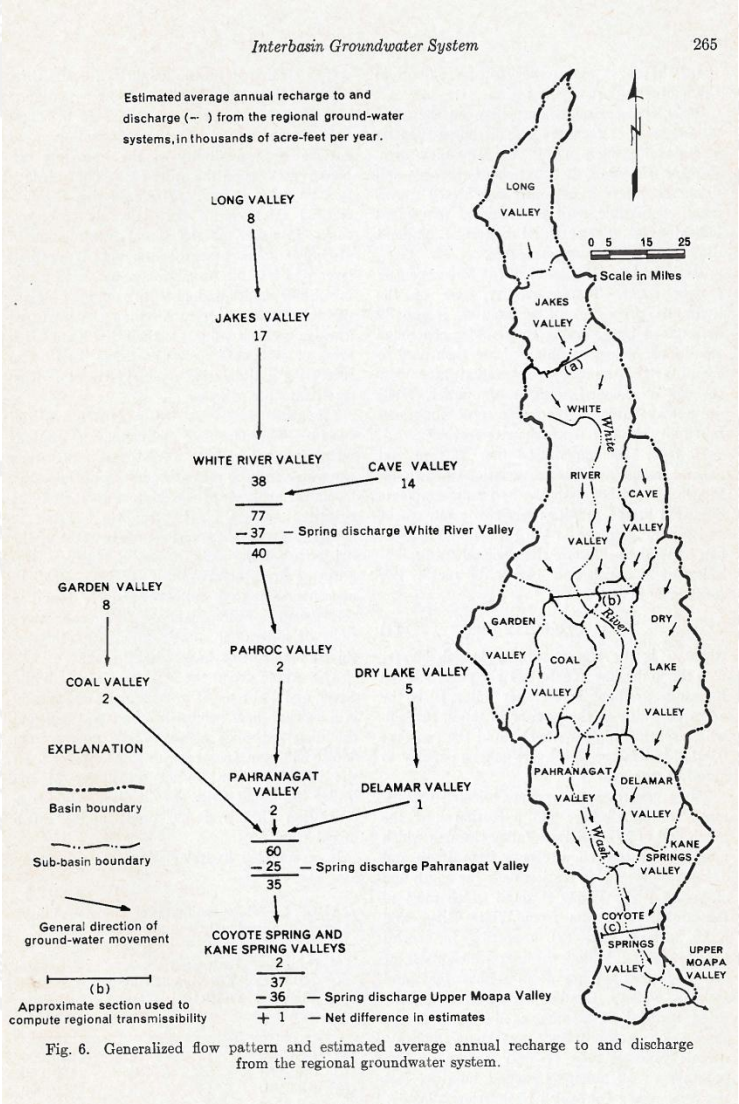
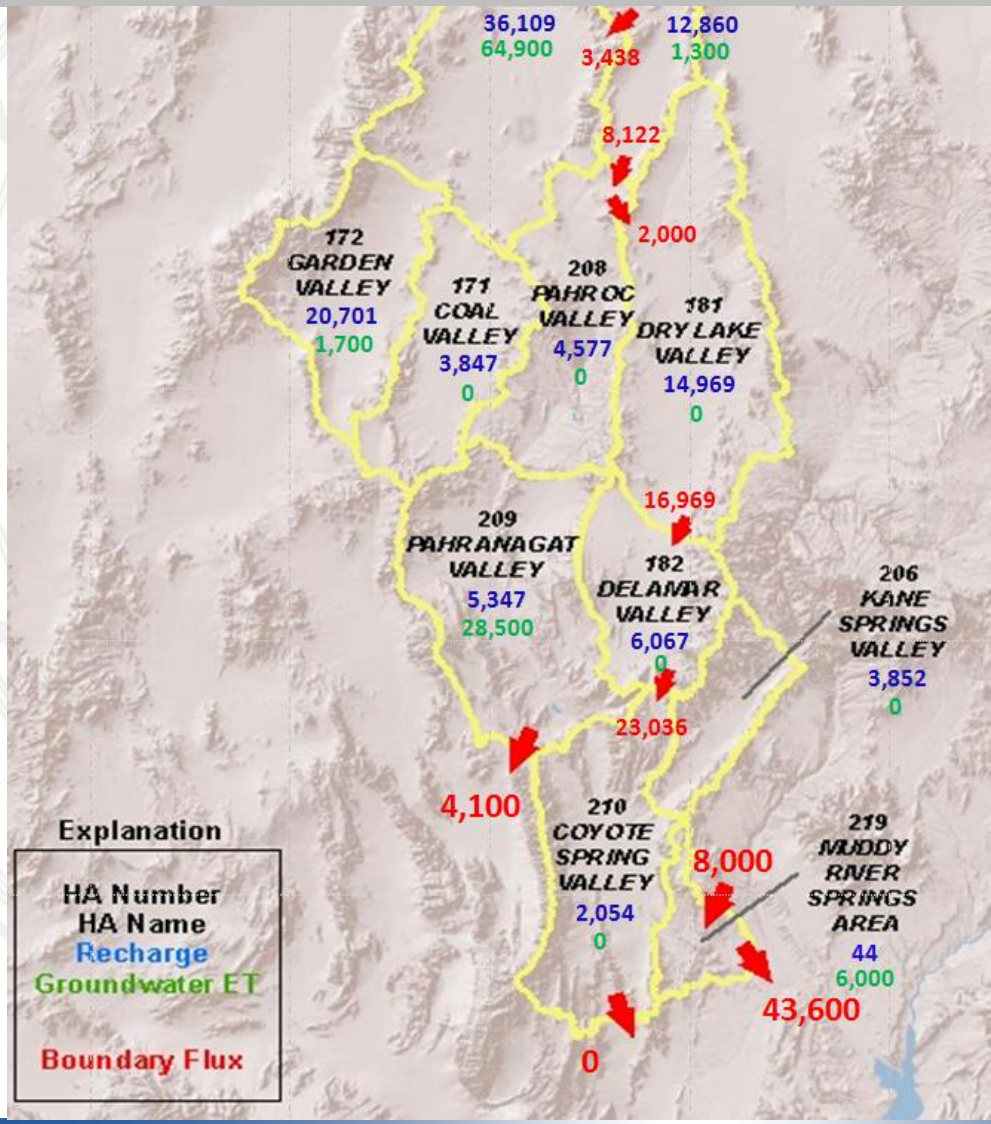


Fig. 6. Generalized flow pattern and estimated average annual recharge to and discharge from the regional groundwater system.

Current Estimated Water Budget

- Total supply 49,000 afa or less
- Includes all seven basins
- Inflow to MRSA 49,000 af
- Subsurface outflow ~10,000 af



Existing Rights (2002)

BASIN	ACRE-FEET ALLOCATED
Coyote Spring Valley	16,300
Muddy River Springs Area	14,800
Lower Moapa Valley	5,800
Hidden Valley*	2,200
Garnet Valley	3,400
California Wash	600
Black Mountains Area	10,200
Total	51,000

Groundwater Available for Appropriation

- Conclusions
  - Existing groundwater rights about equal to total supply
  - Surface water is fully appropriated
  - No additional water available for new appropriations

Groundwater Available for Appropriation

NRS 533.370(2)

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Order 1169 and 1169A

- 390,000 acre-feet of pending applications
- Water budget accepted +/- 30%
- Appropriated water not yet developed
  - Effects of pumping disputed
  - Ability to capture bypass flows disputed

Order 1169 and 1169A

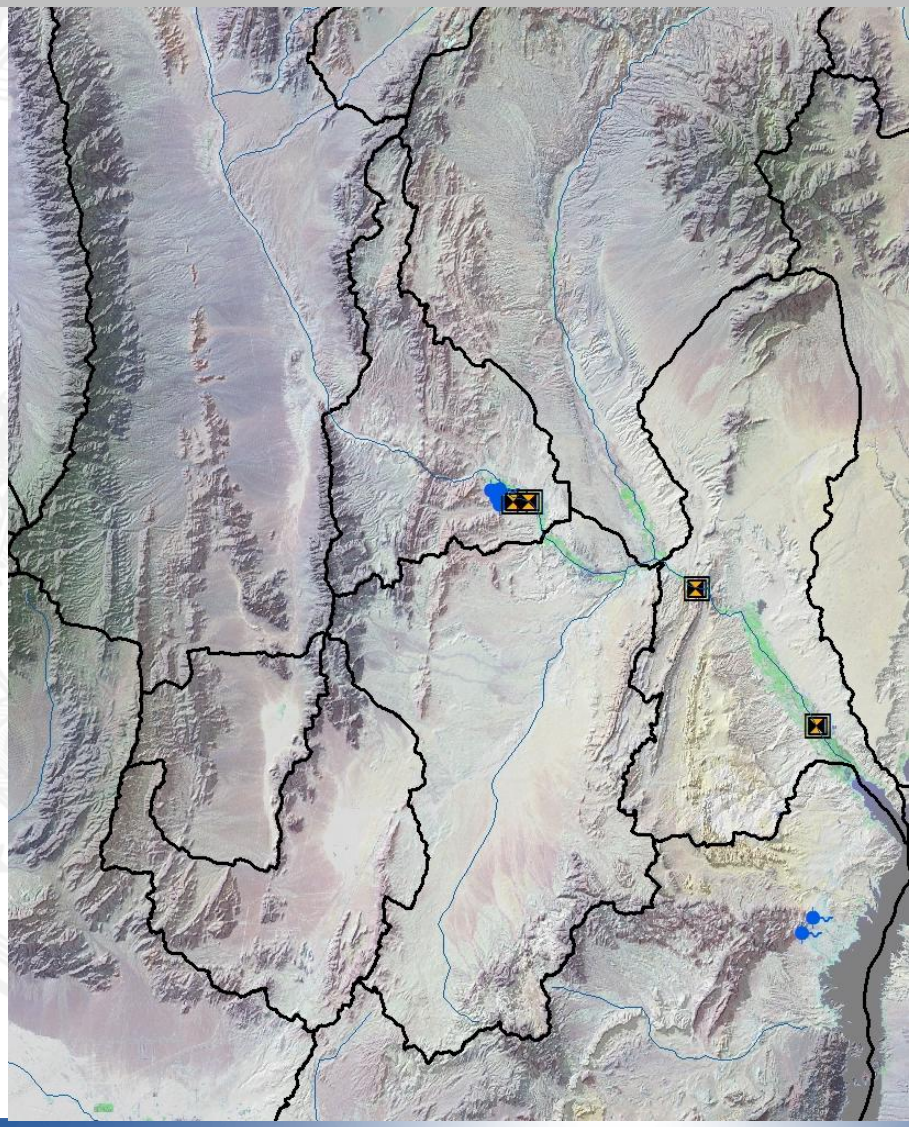
- Five-year test, establish baseline conditions then pump
- Two-year pumping test of 8,000 afa from existing water rights in CSV
- Pumped water to be consumed or otherwise removed from system
- Pumping amount reduced to lesser amount
  - Results will still be adequate to make decision on pending applications
  - Concern that the test itself would cause unacceptable impacts to Moapa dace

Order 1169 and 1169A

- CSV pumping at annual rate of 5,300 afa for 25 ½ months
- Existing pumping maintained (mostly)
- Daily monitoring of wells and springs

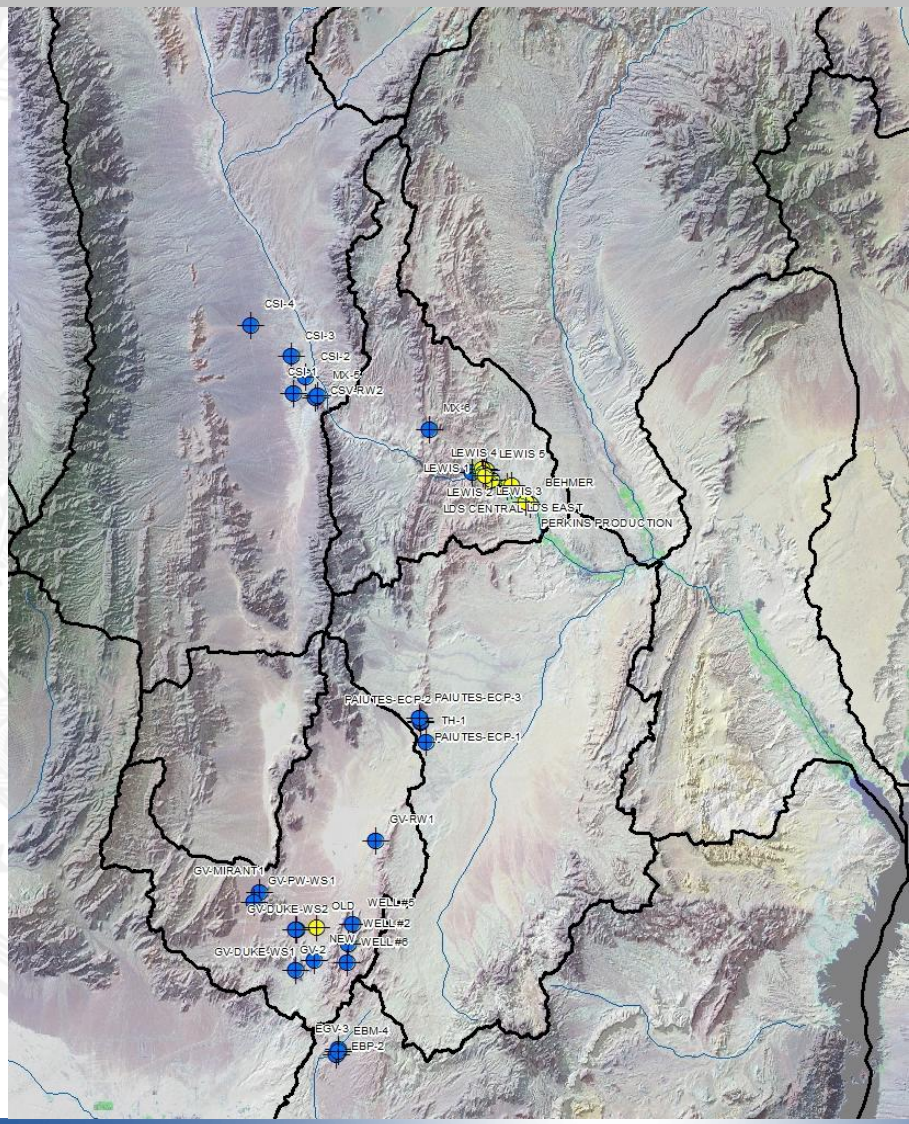
Lower White River Flow System

- **Springs and Stream Gages**
- Pumping Wells
- Monitored Wells



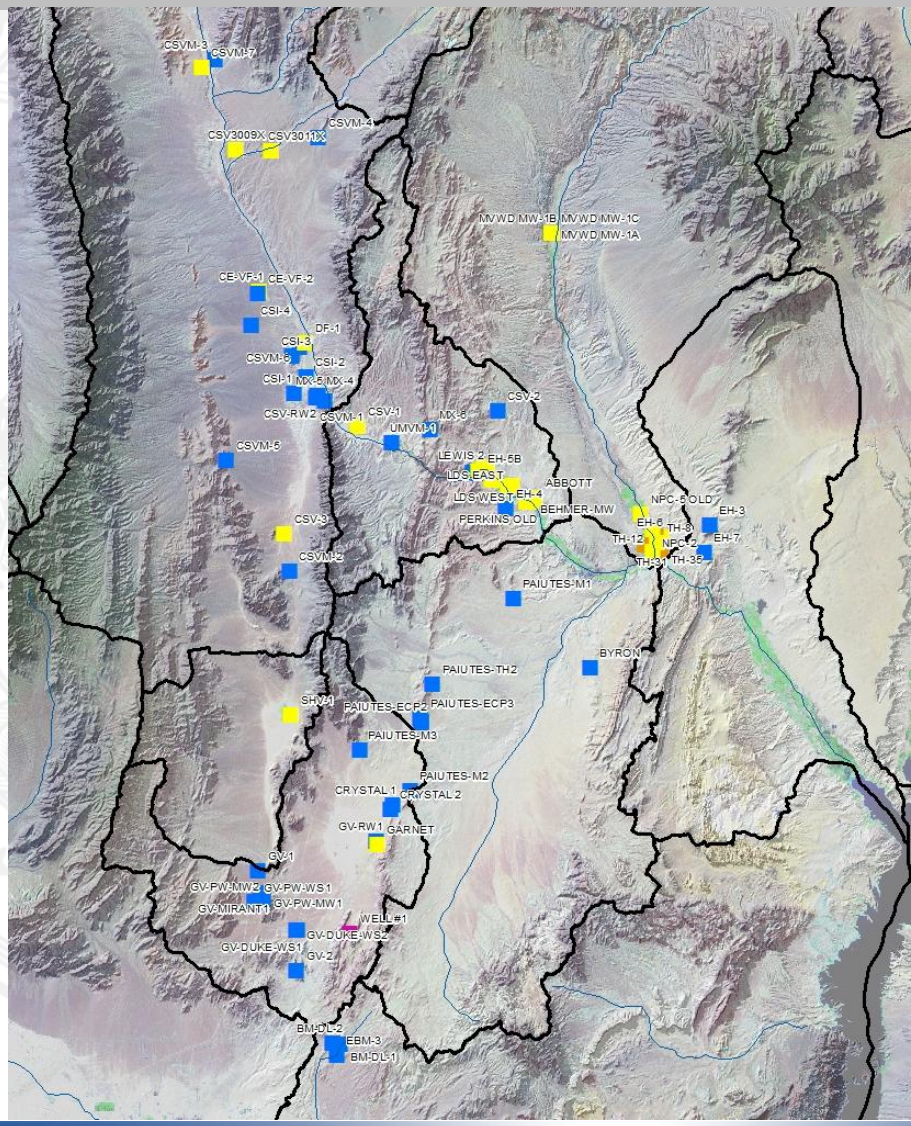
Lower White River Flow System

- Springs and Stream Gages
- **Pumping Wells - 37**
- Monitored Wells



Lower White River Flow System

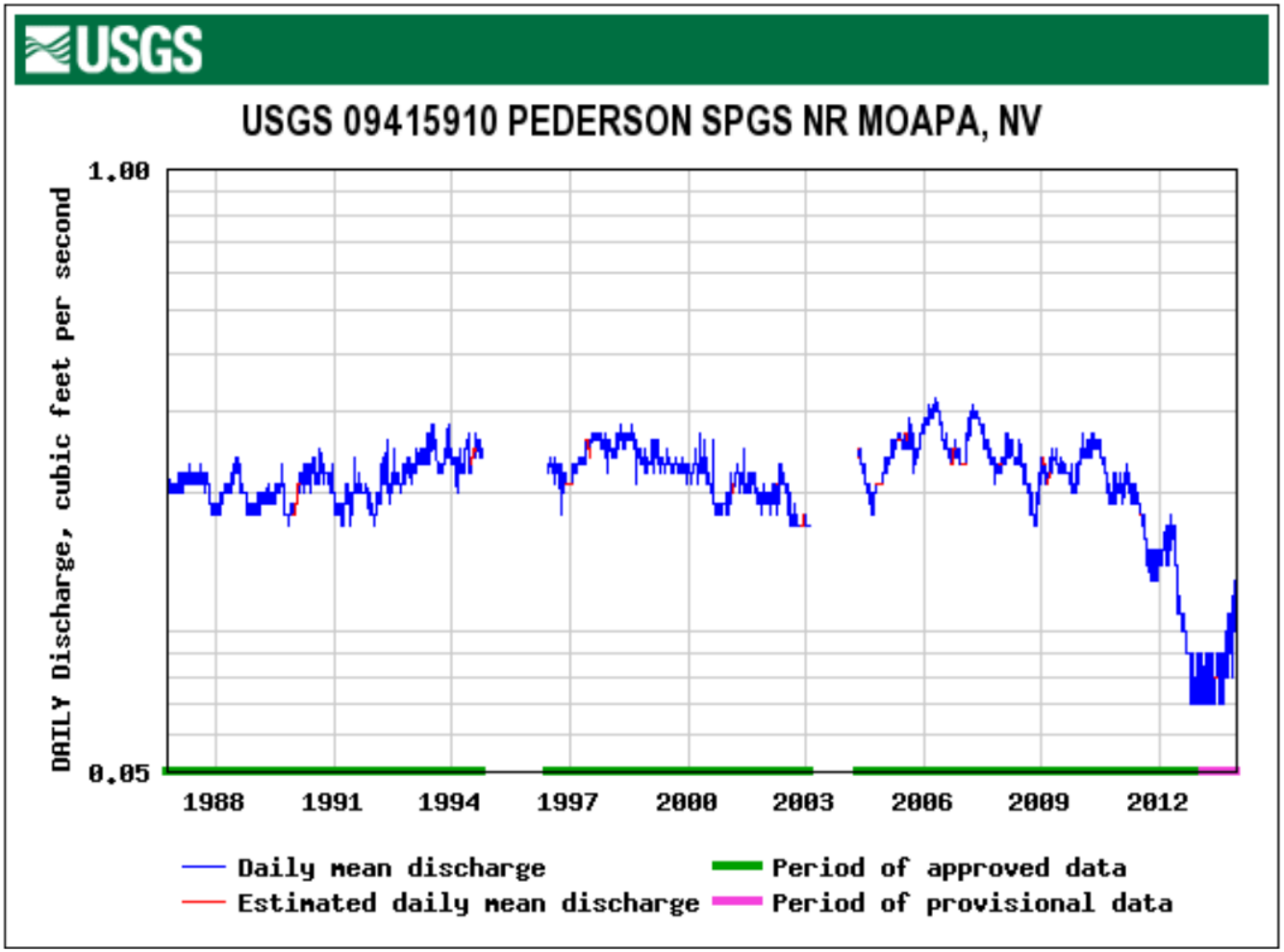
- Springs and Stream Gages
- Pumping Wells
- **Monitored Wells - 81**



Order 1169 and 1169A

- Interpretations of results – not entirely in agreement
- Unprecedented decline in high-altitude springs
- Unprecedented decline in water levels
- No party claimed that additional pumping in the central part of CSV or MRSA could occur without conflict with existing rights or dace habitat
- Argument for existence of southern flow field
- Disagreement over drawdown/water-level decline

Division of Water Resources



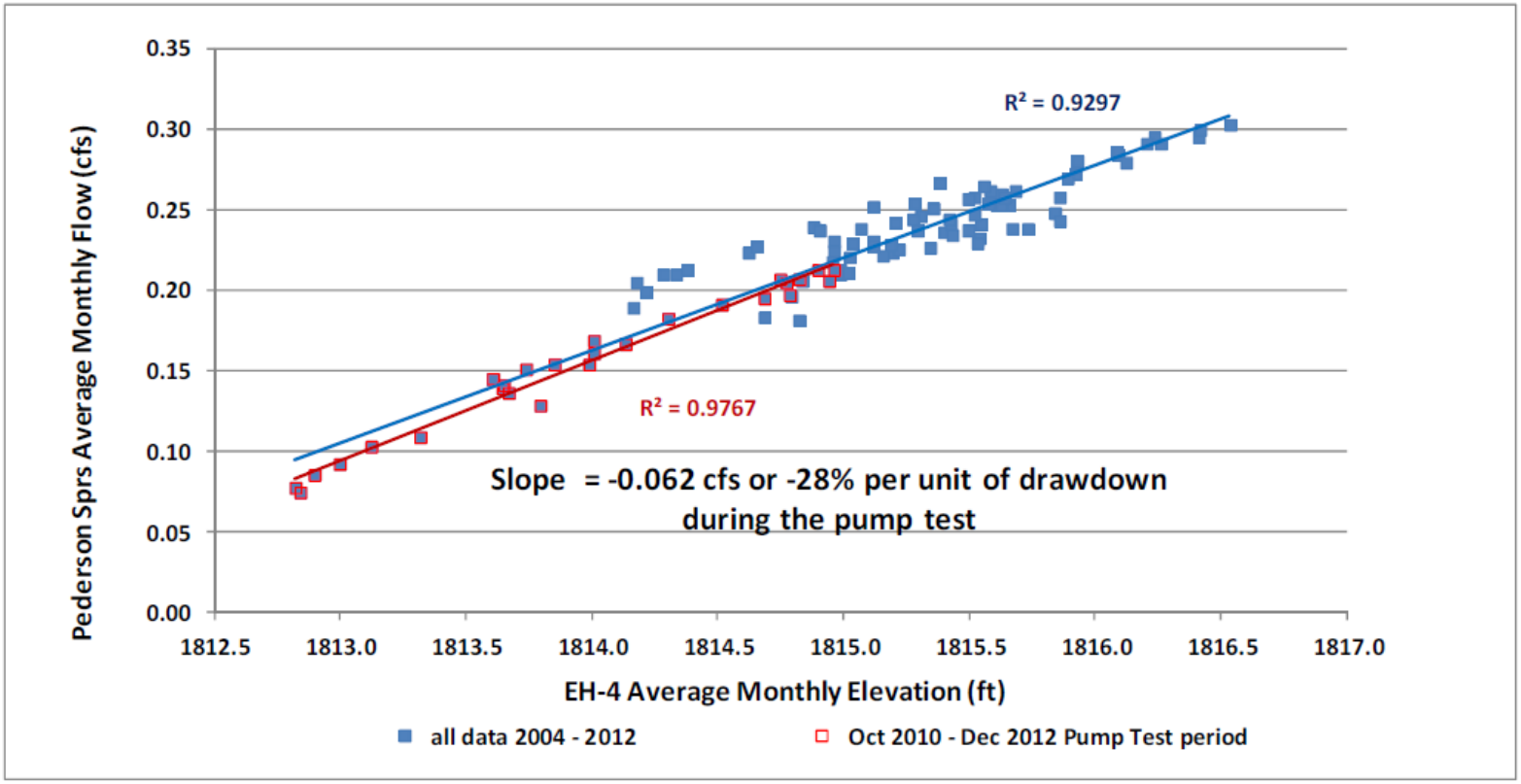
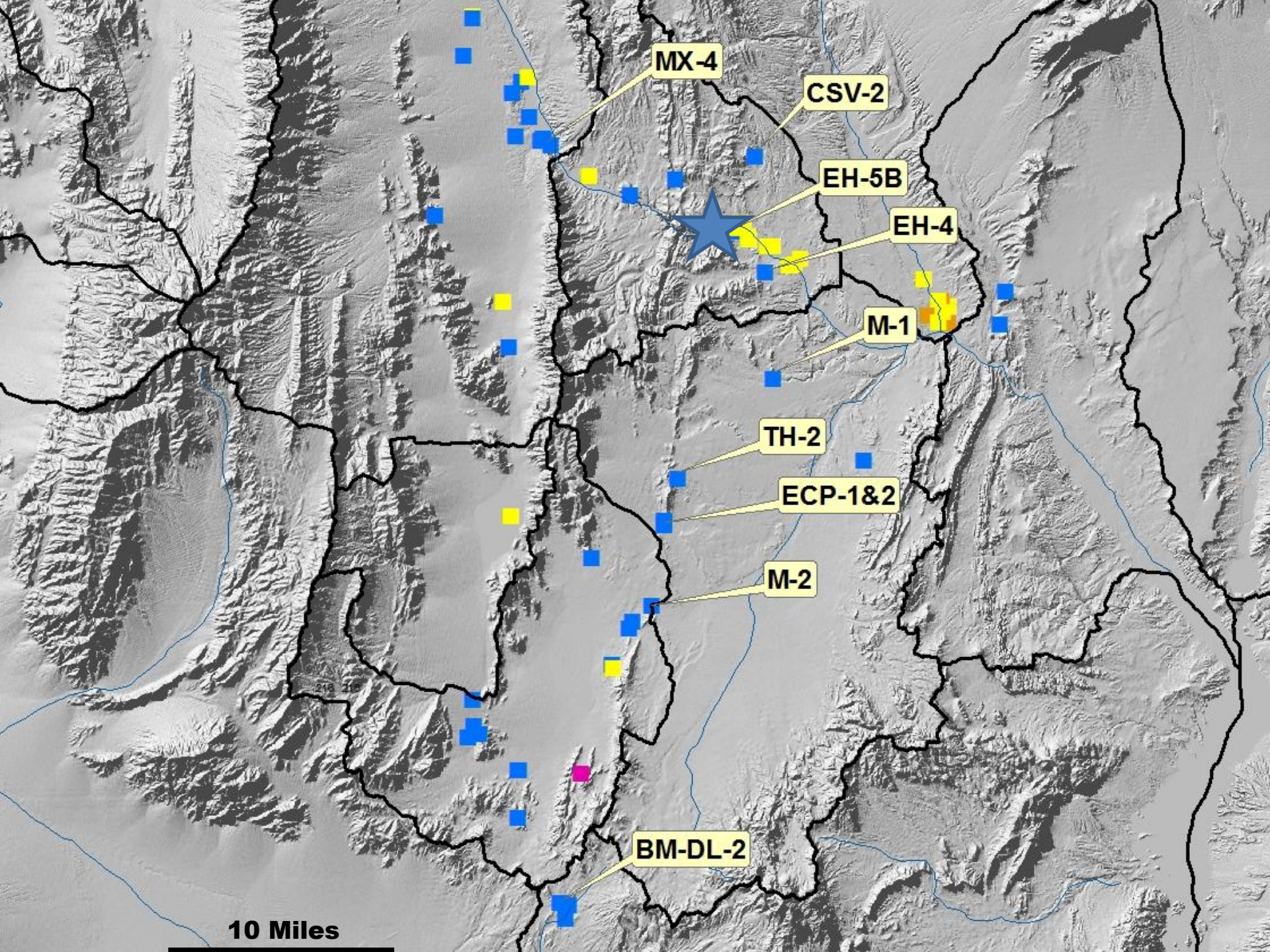


Figure 1.24. Monthly flows at Pederson Spring versus monthly carbonate water level elevations in EH-4 for the period May 2004 to Dec 2012.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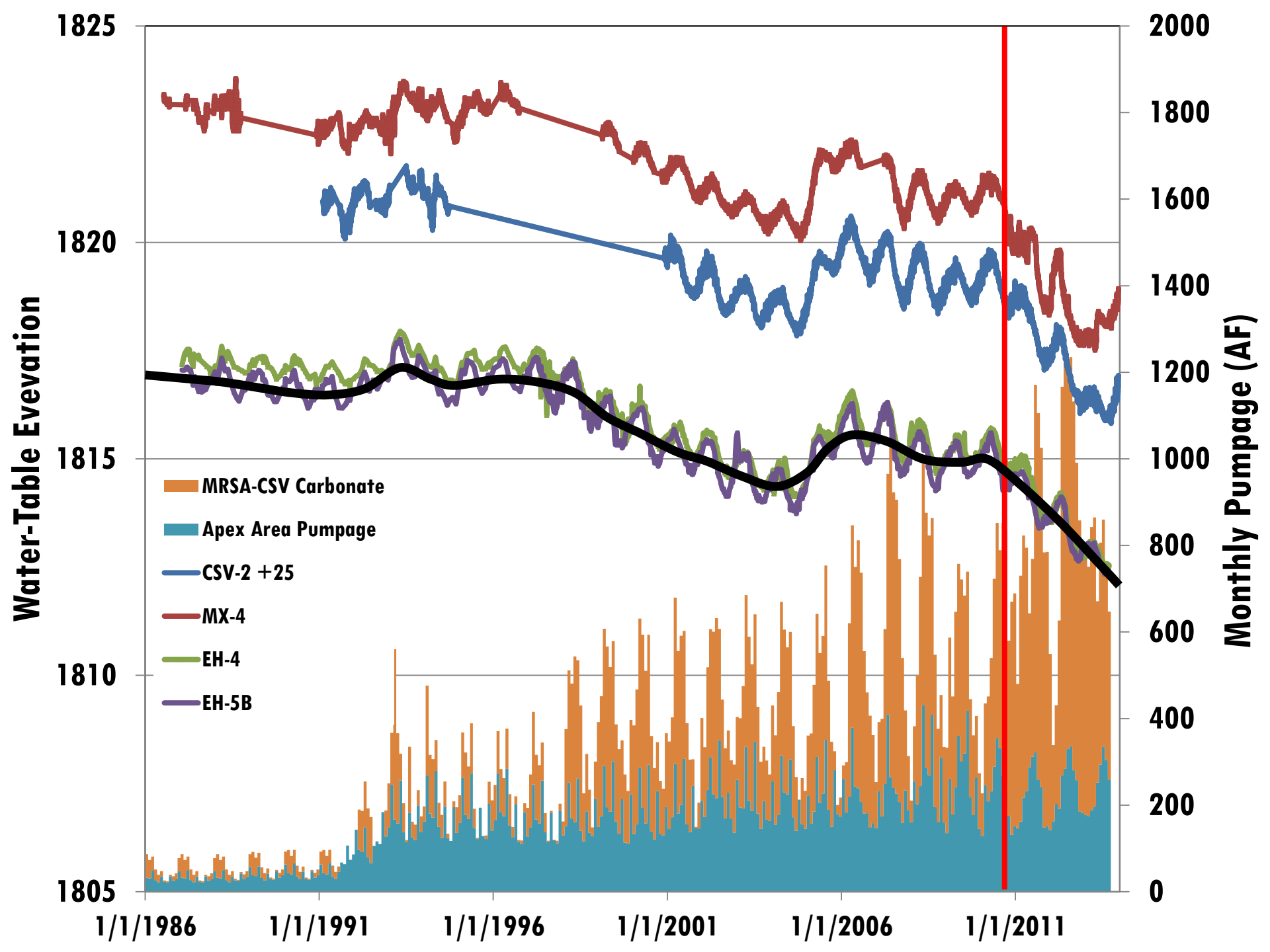
CSV-2
EH-5B
EH-4
M-1
TH-2
ECP-1&2
M-2
BM-DL-2
10 Miles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Water-Table Evevation
Monthly Pumpage (AF)
MRSA-CSV Carbonate
Apex Area Pumpage
CSV-2 +25
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EH-4
EH-5B
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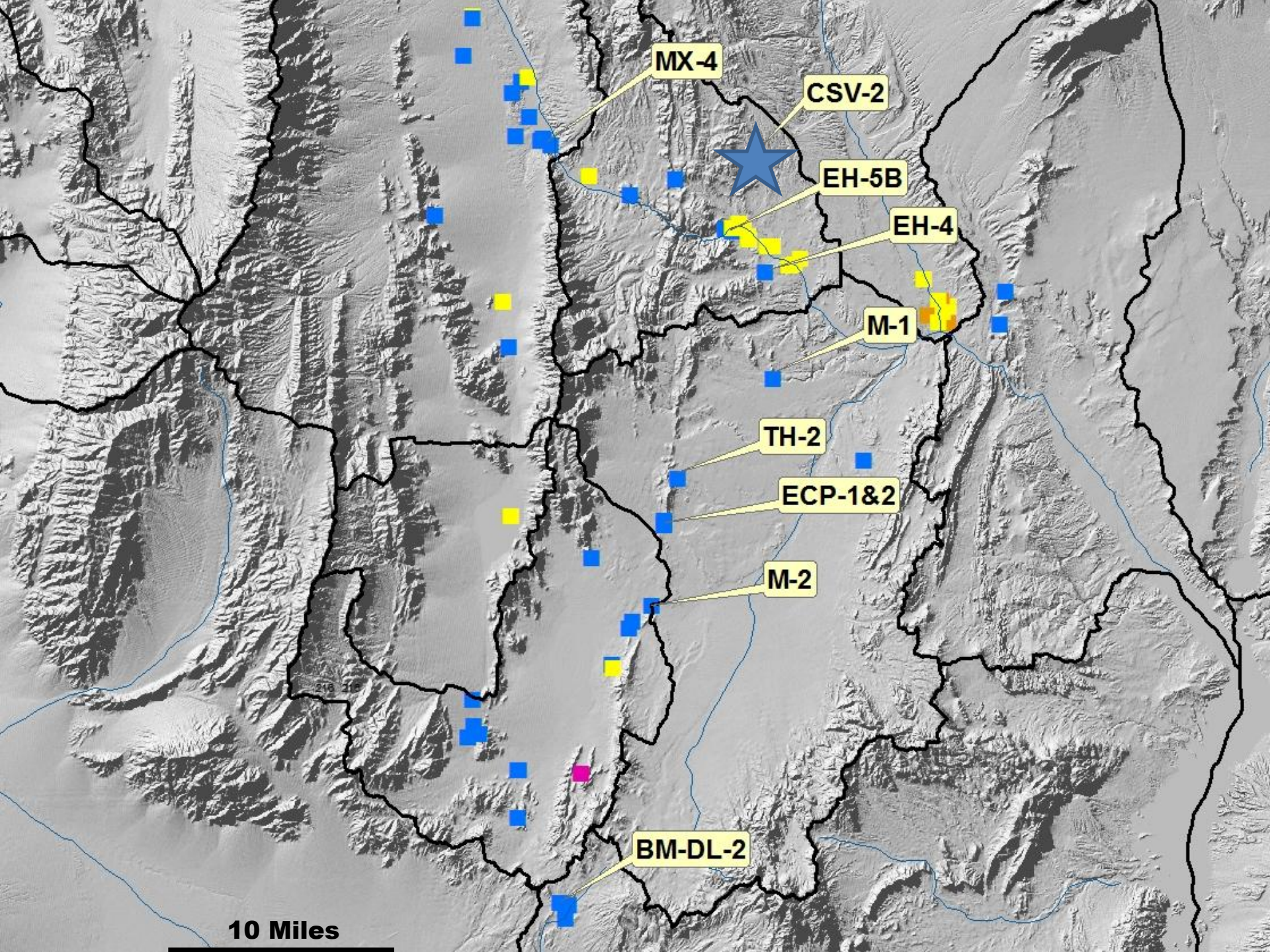
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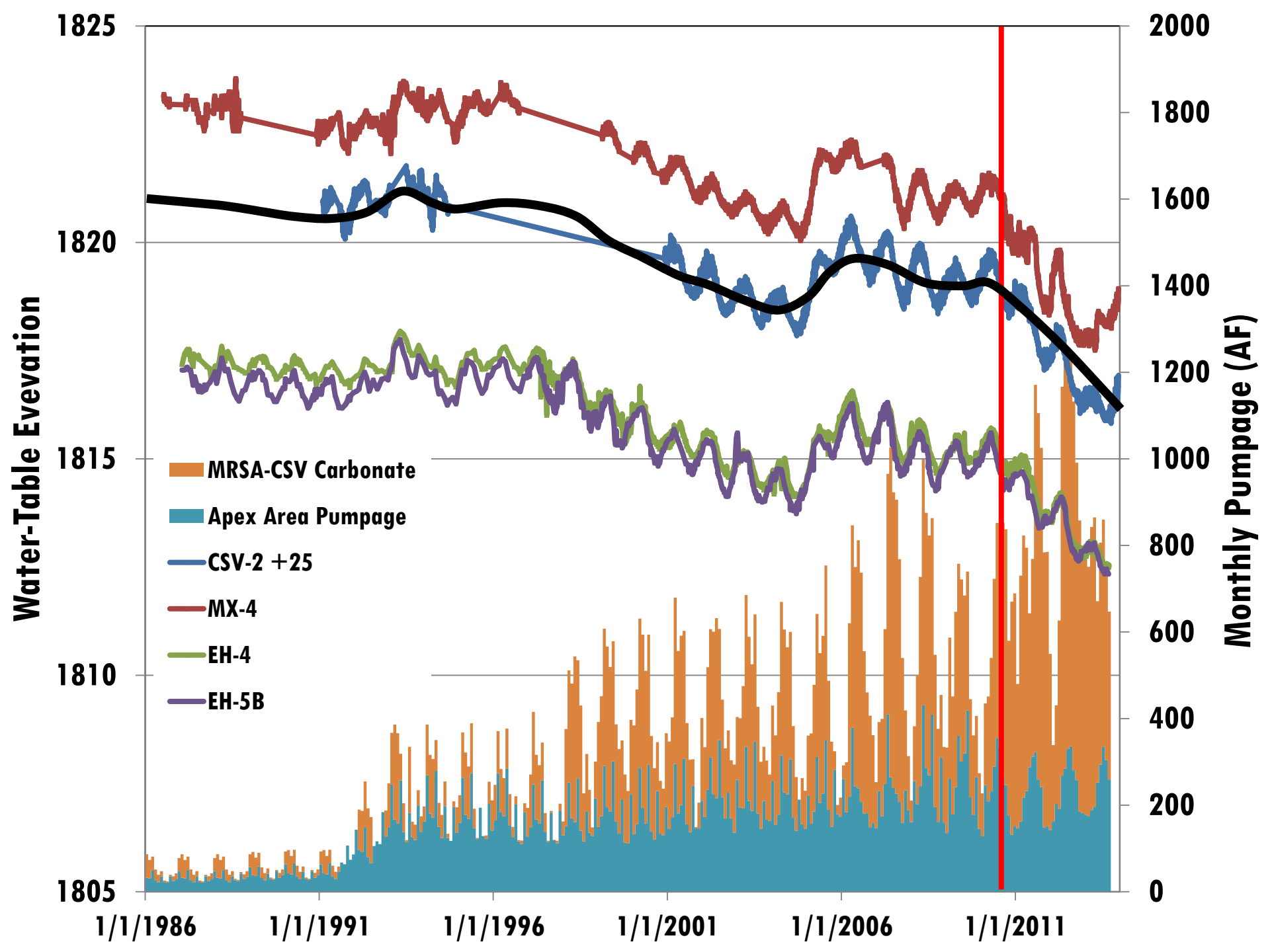
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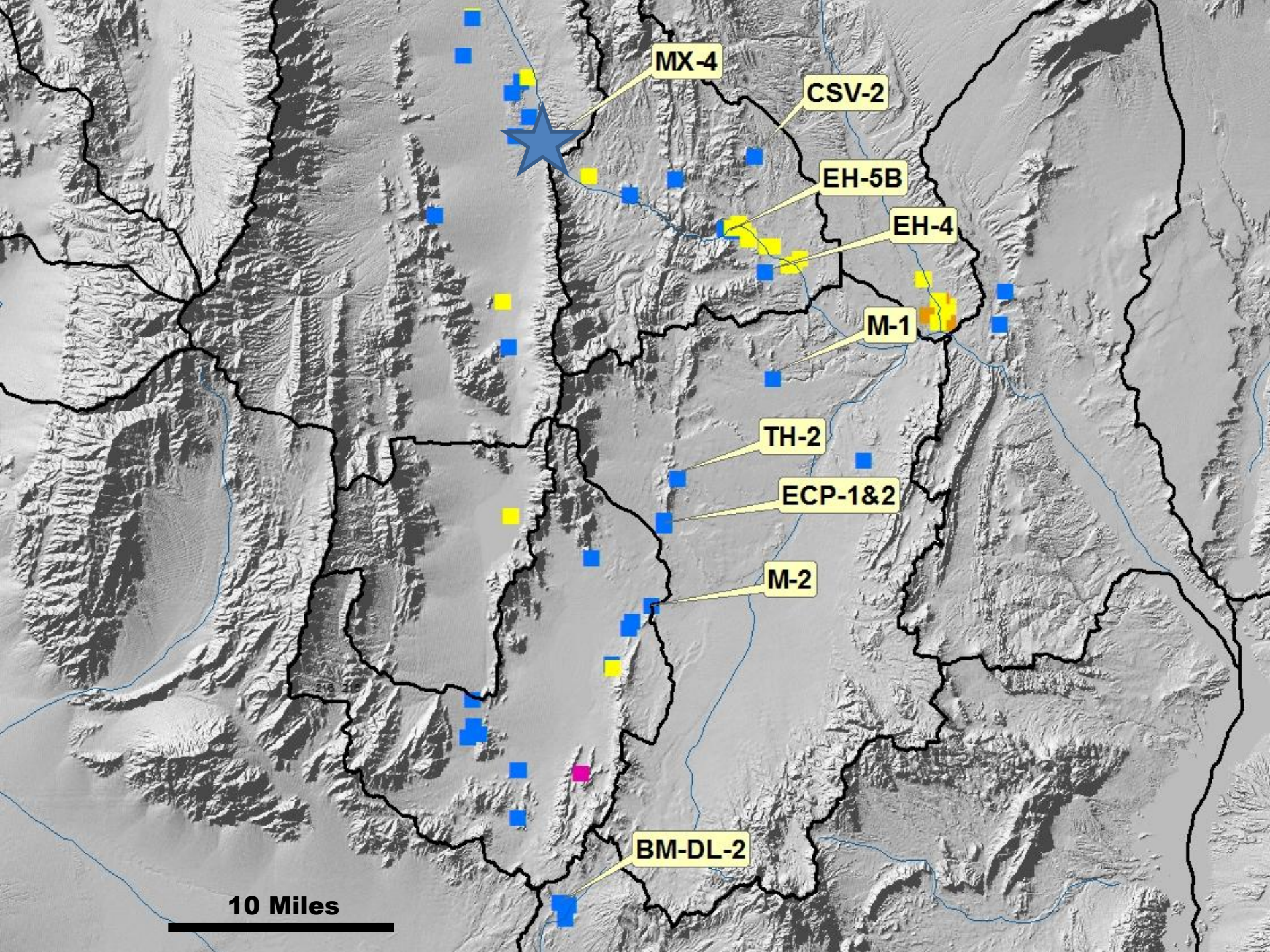
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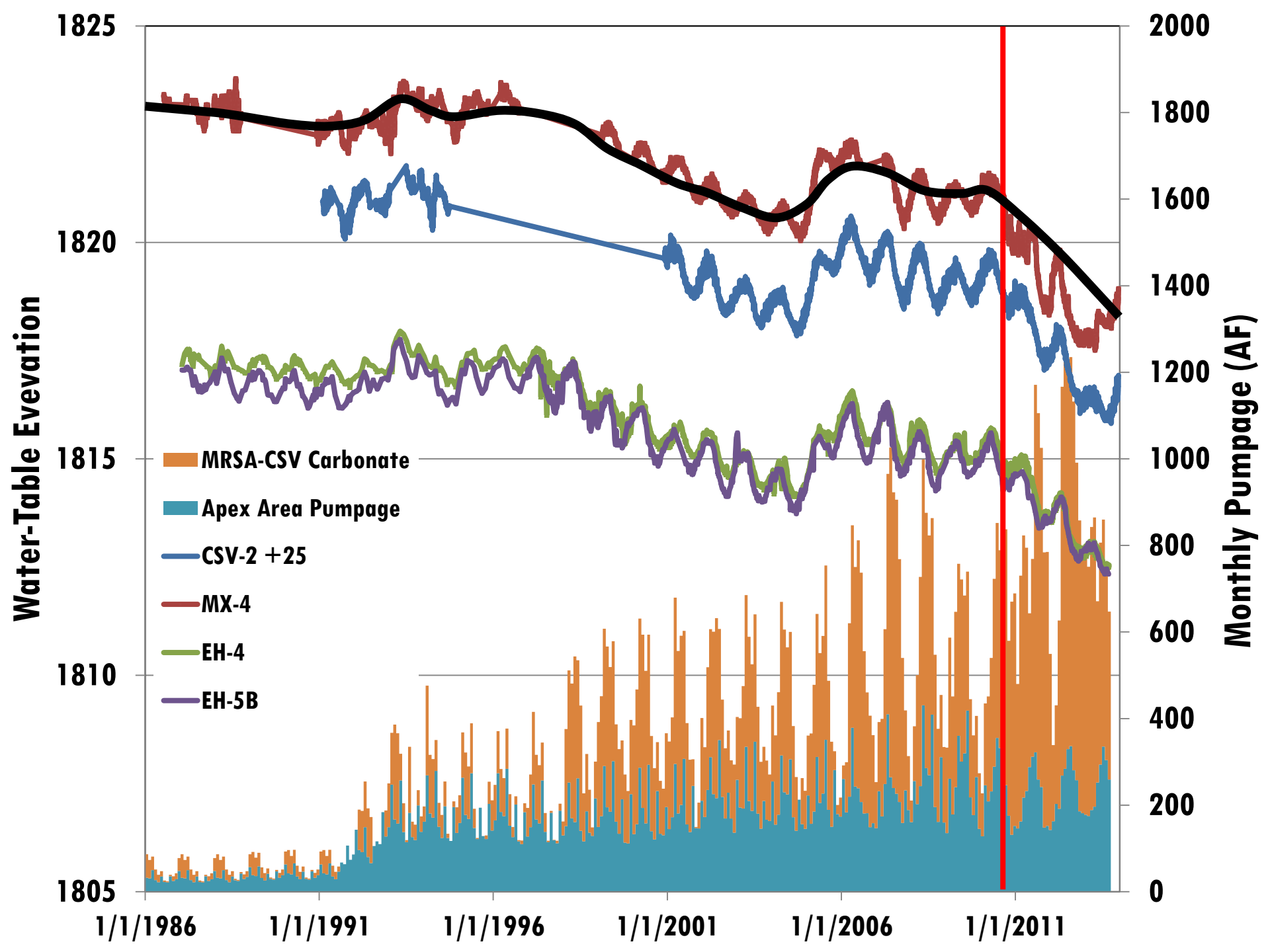
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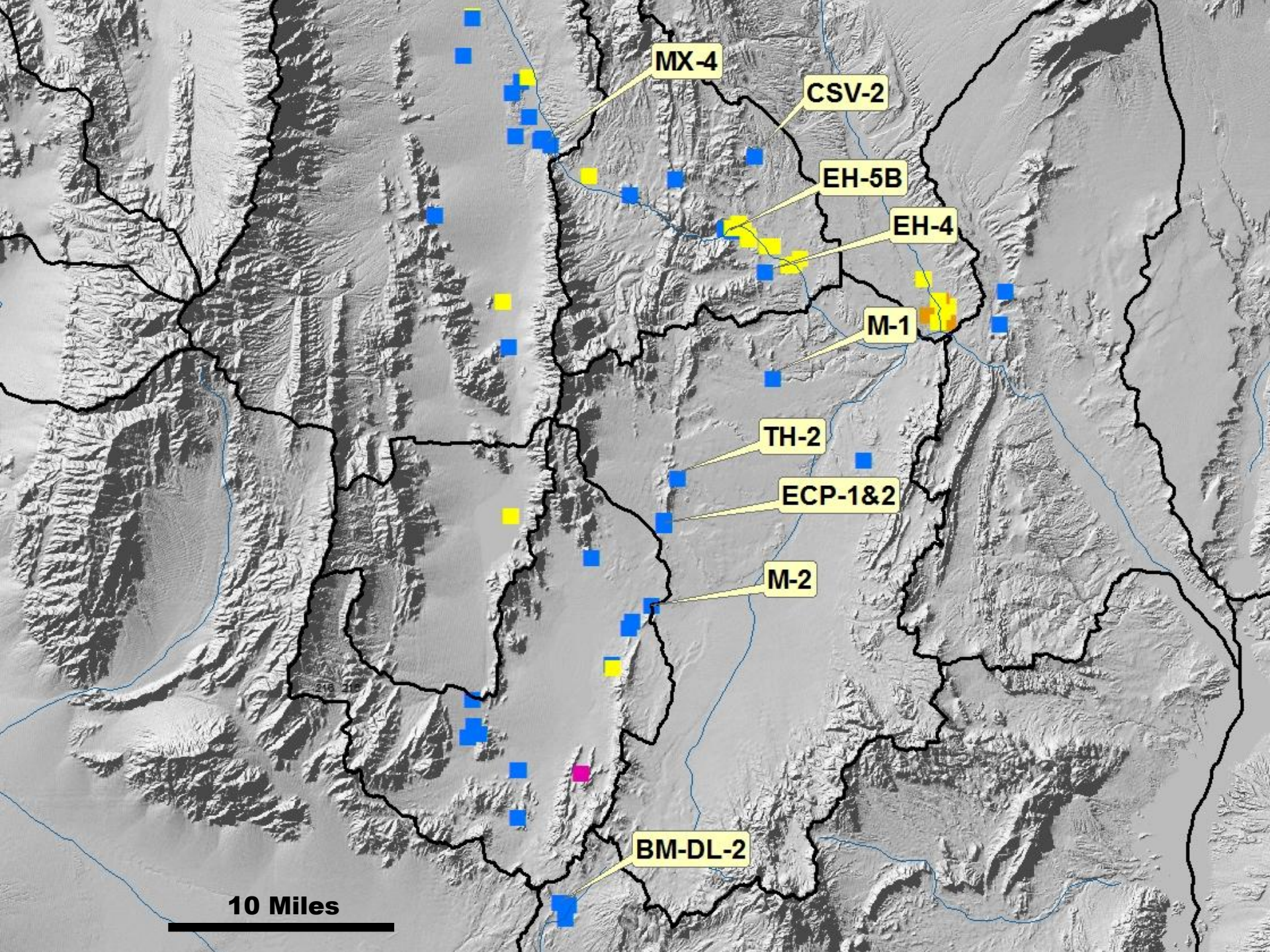
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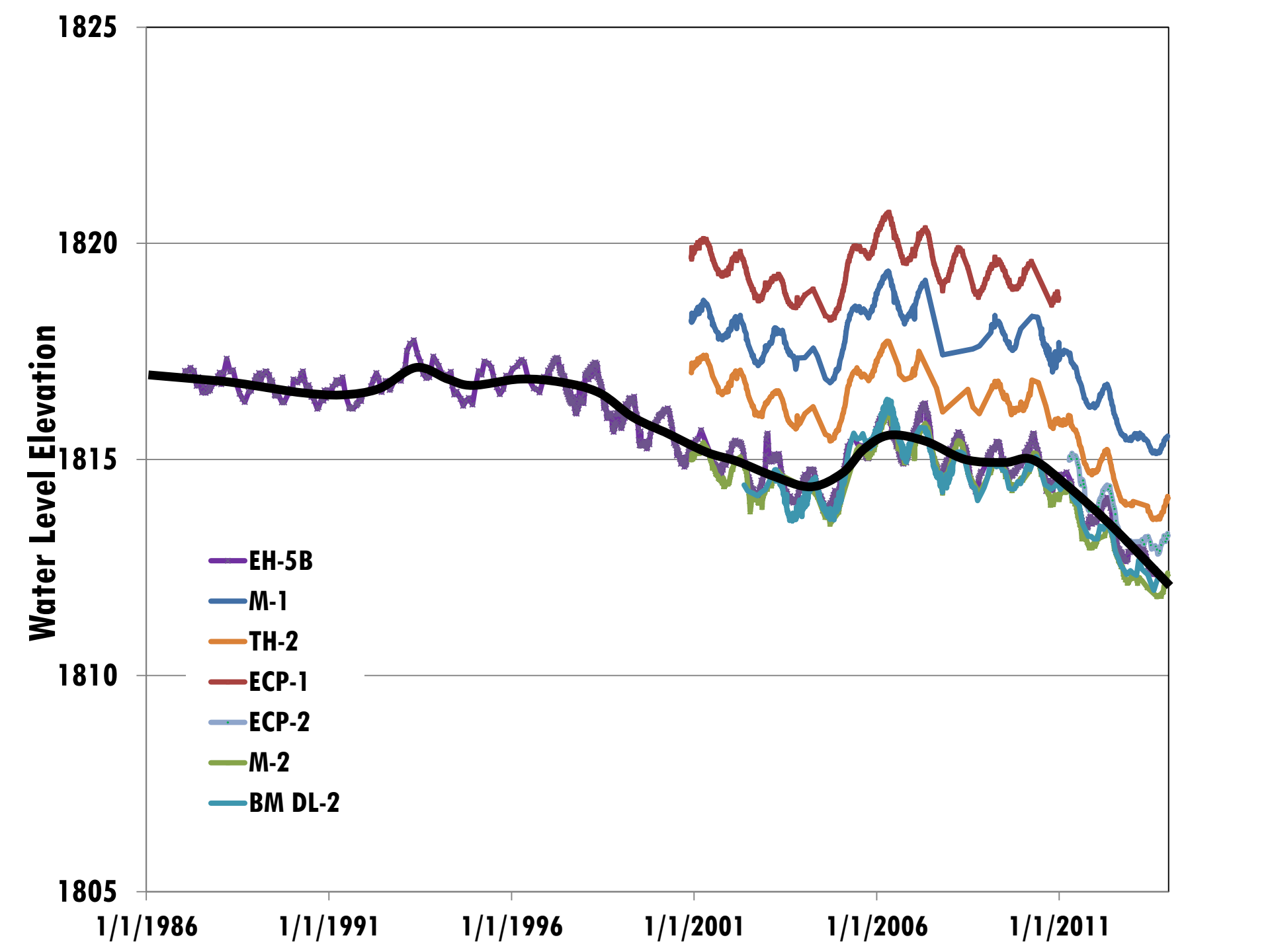
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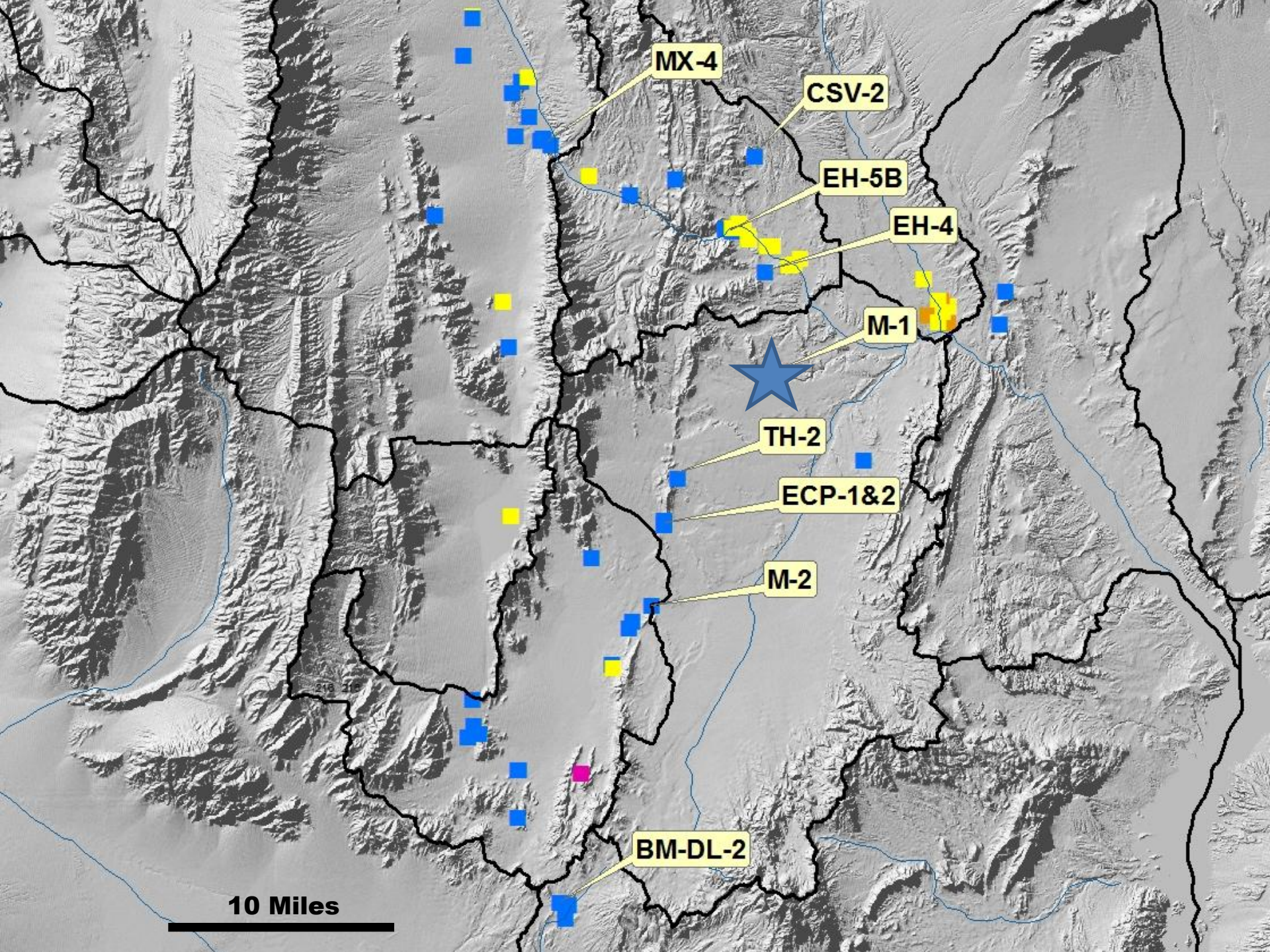
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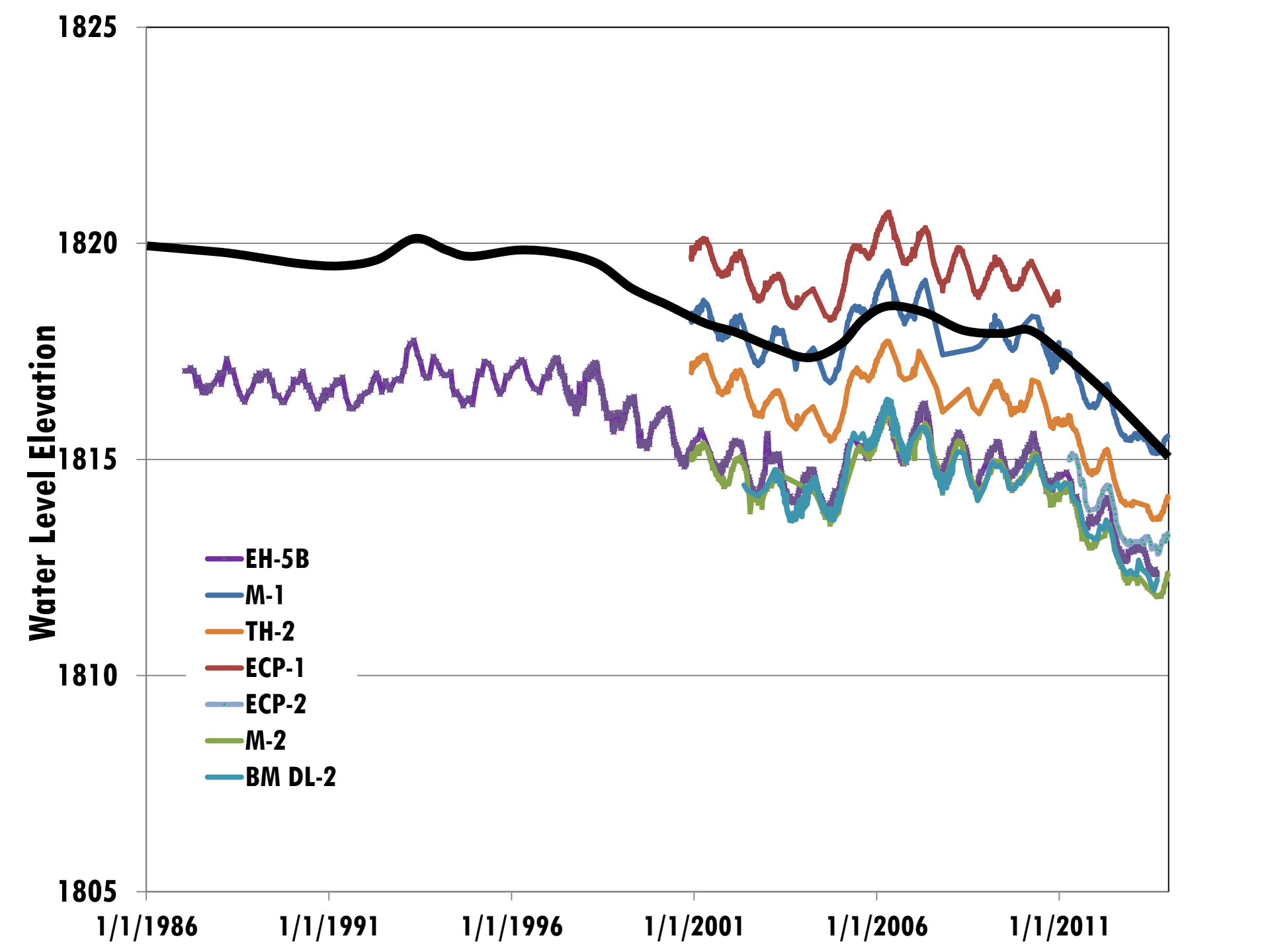
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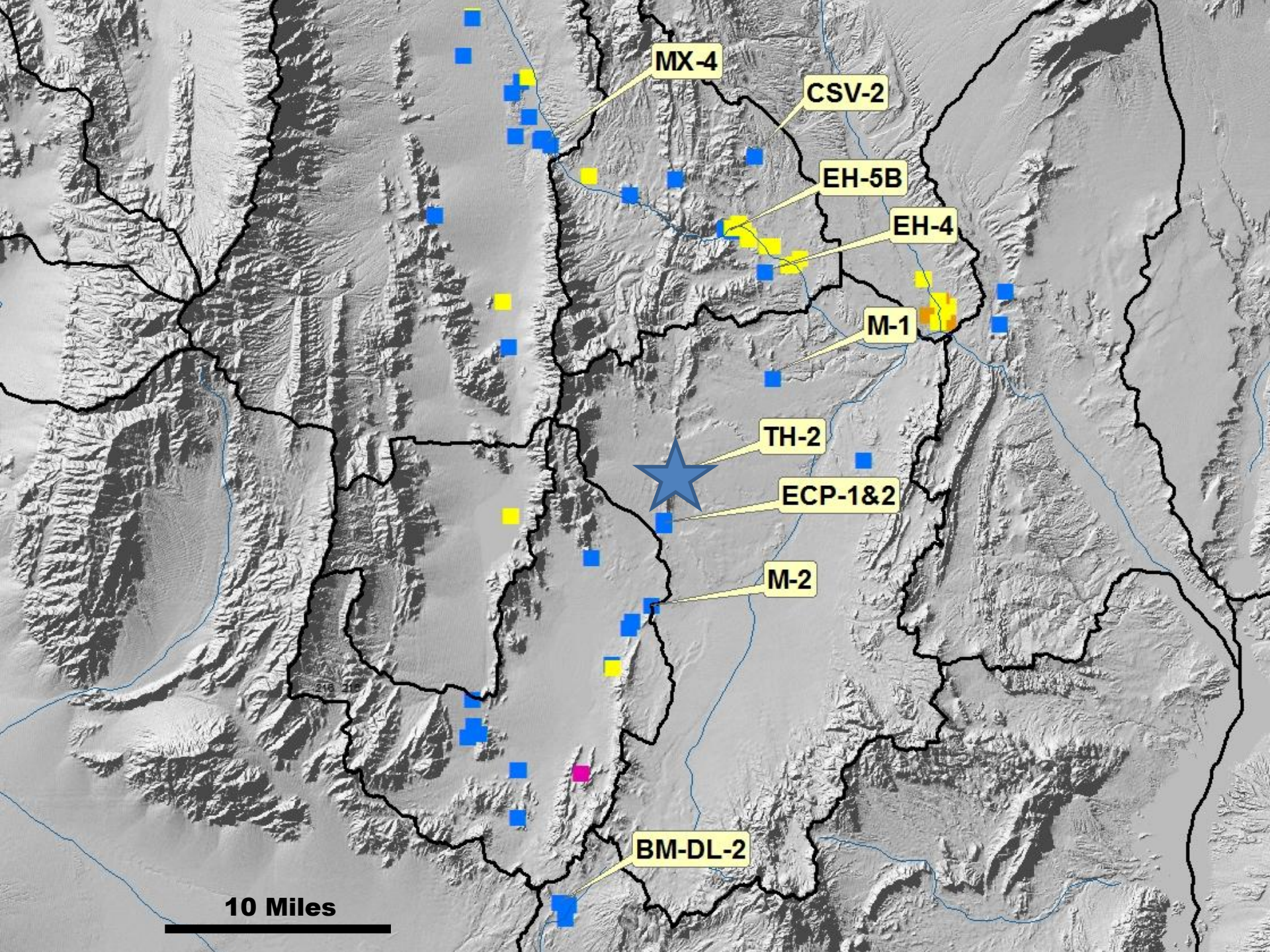
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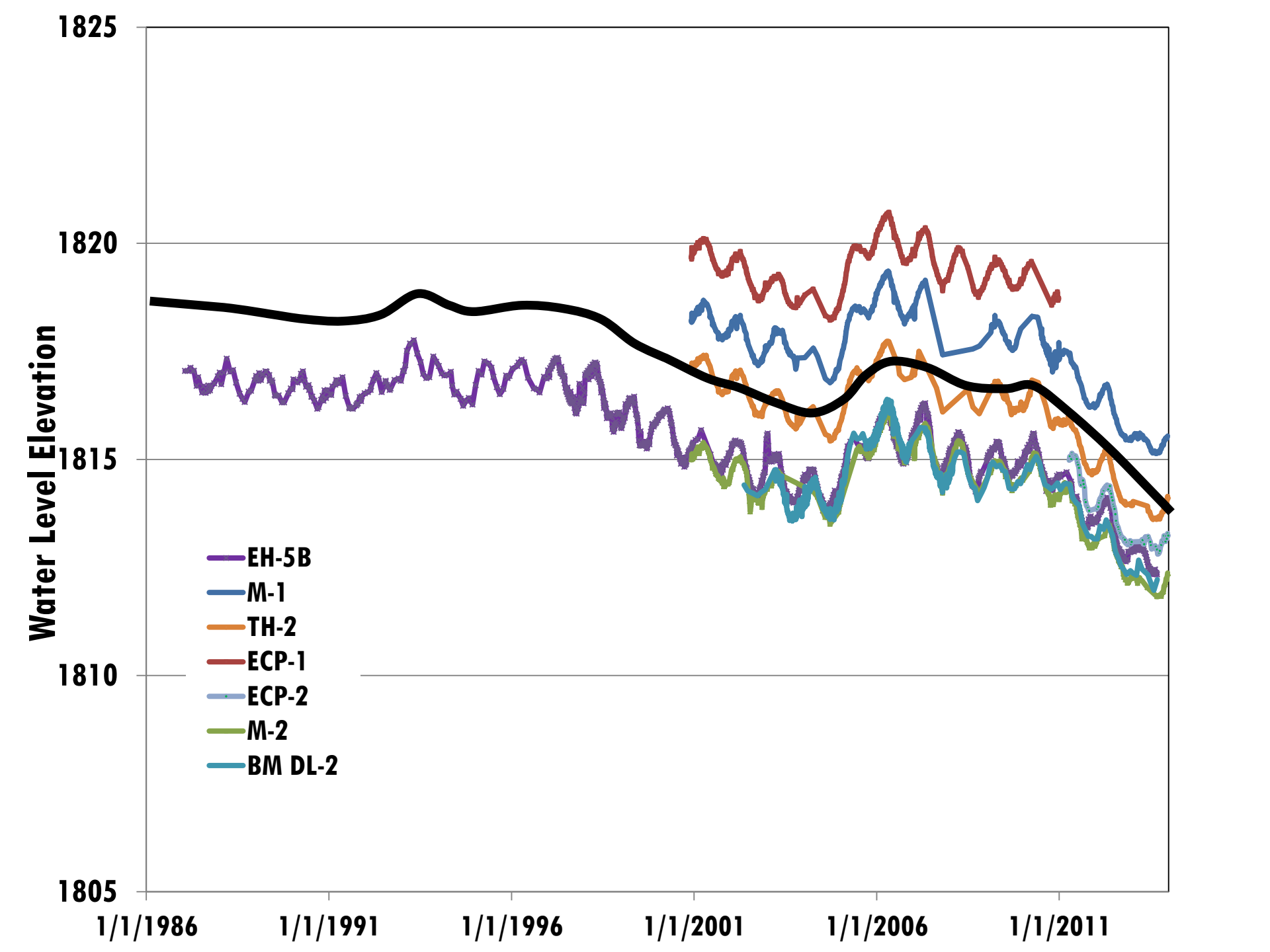
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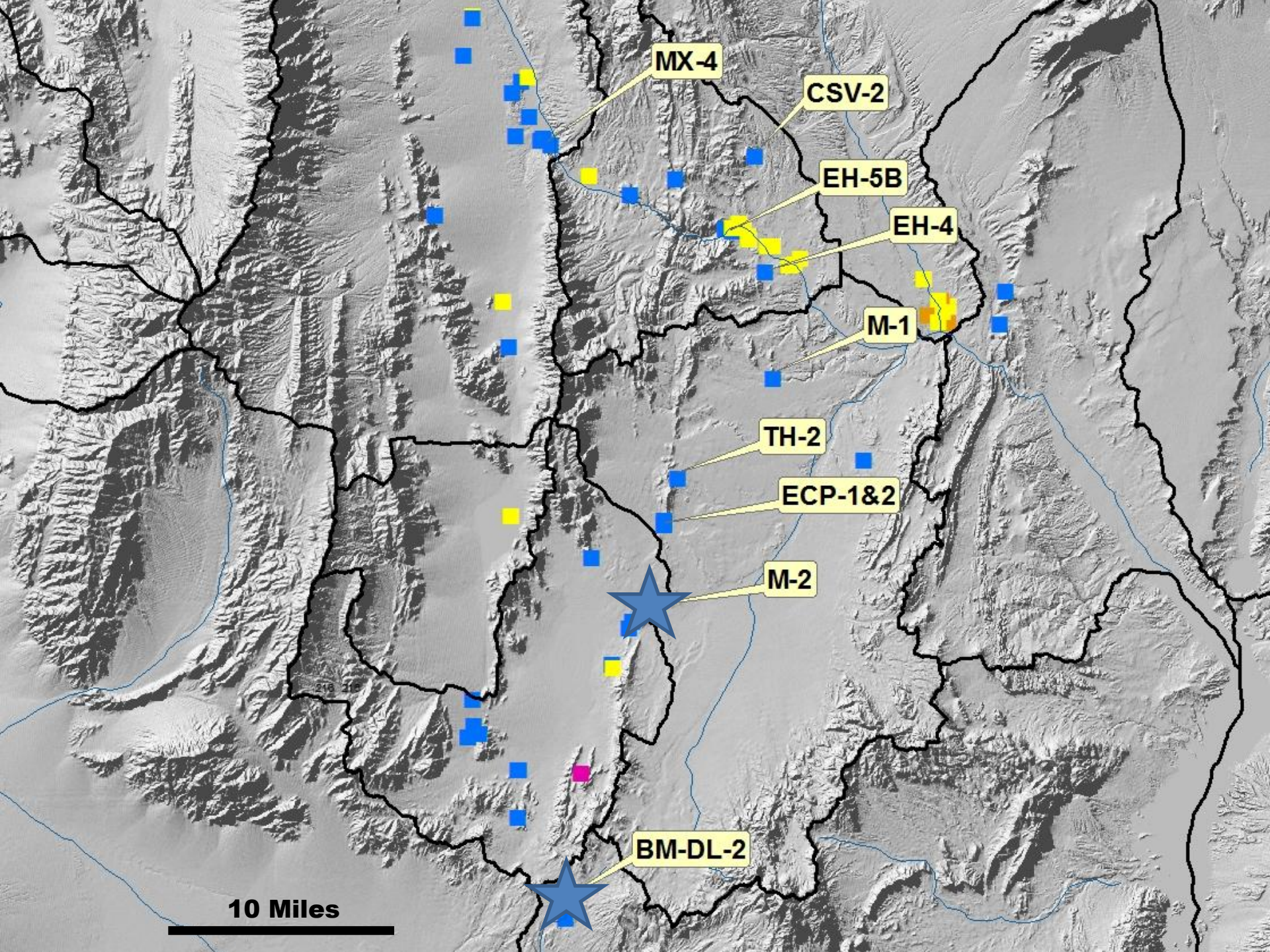
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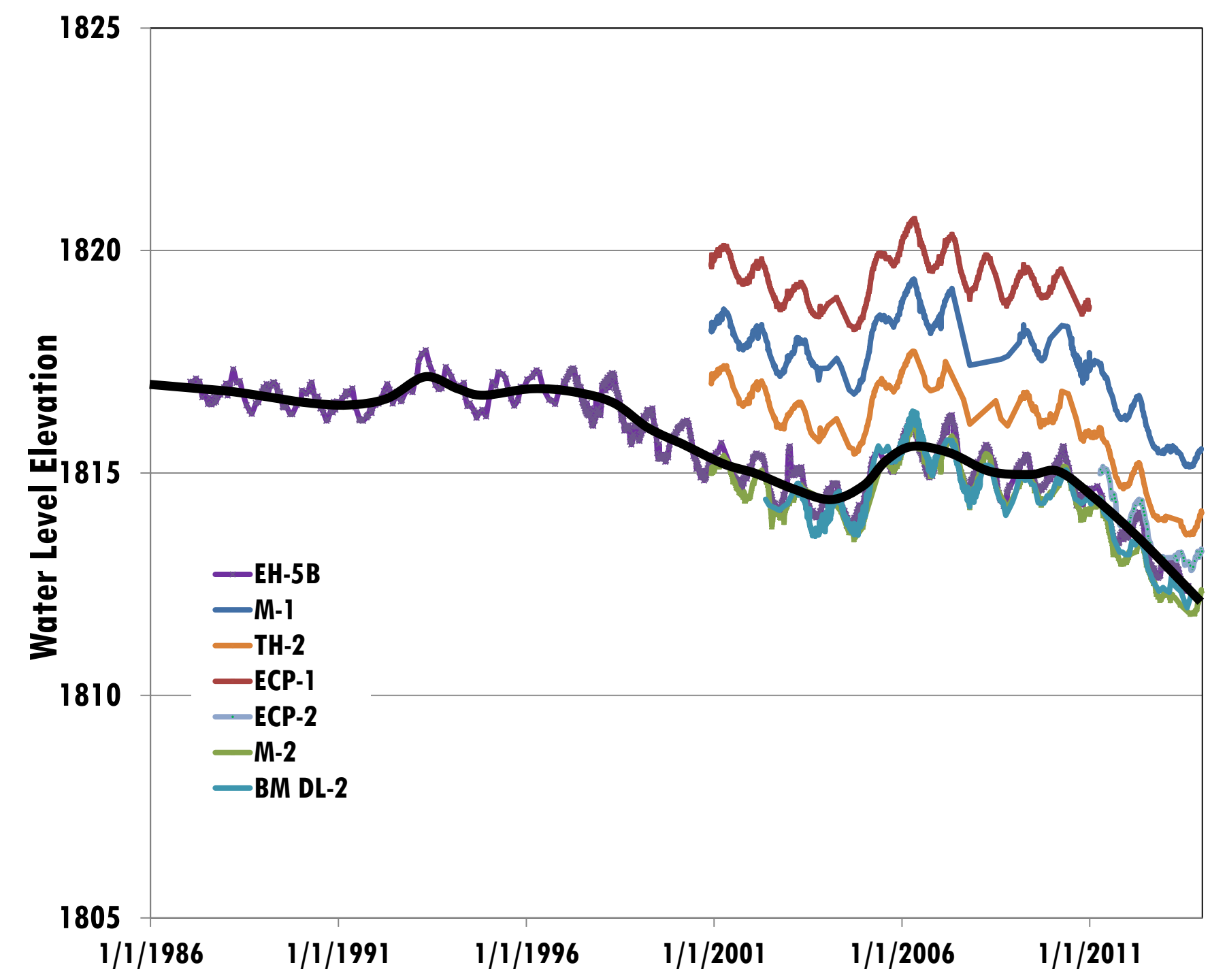
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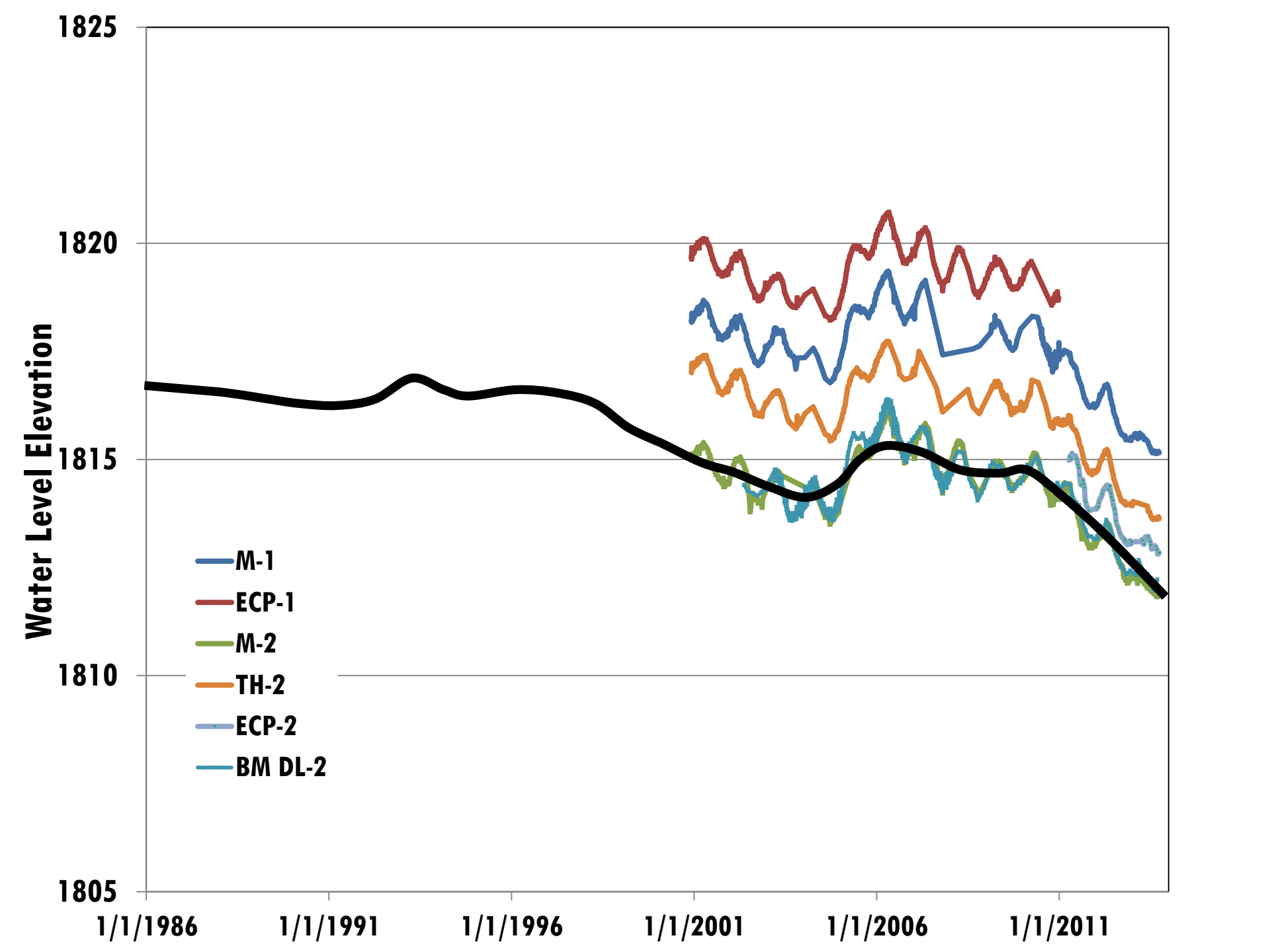
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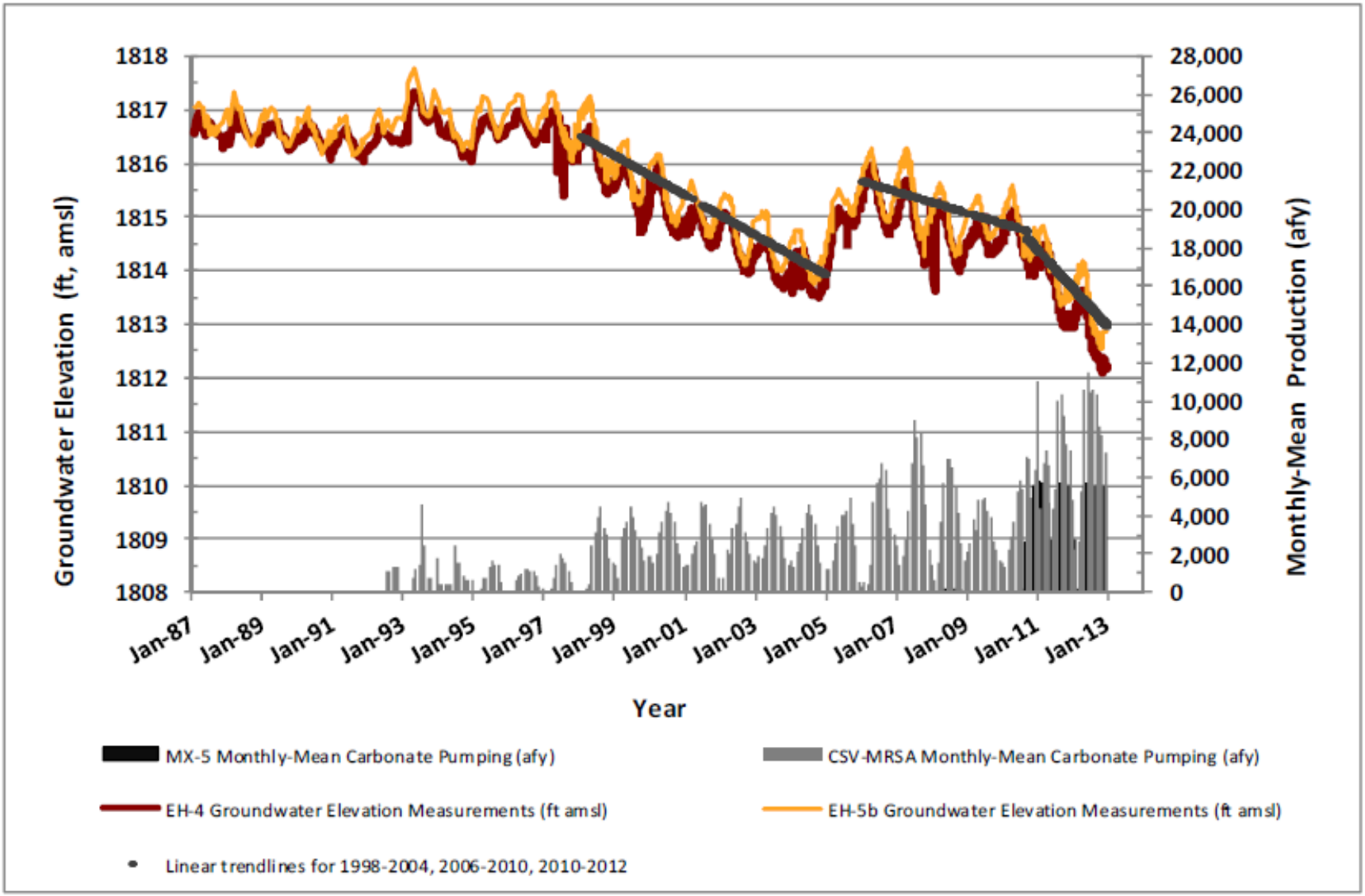
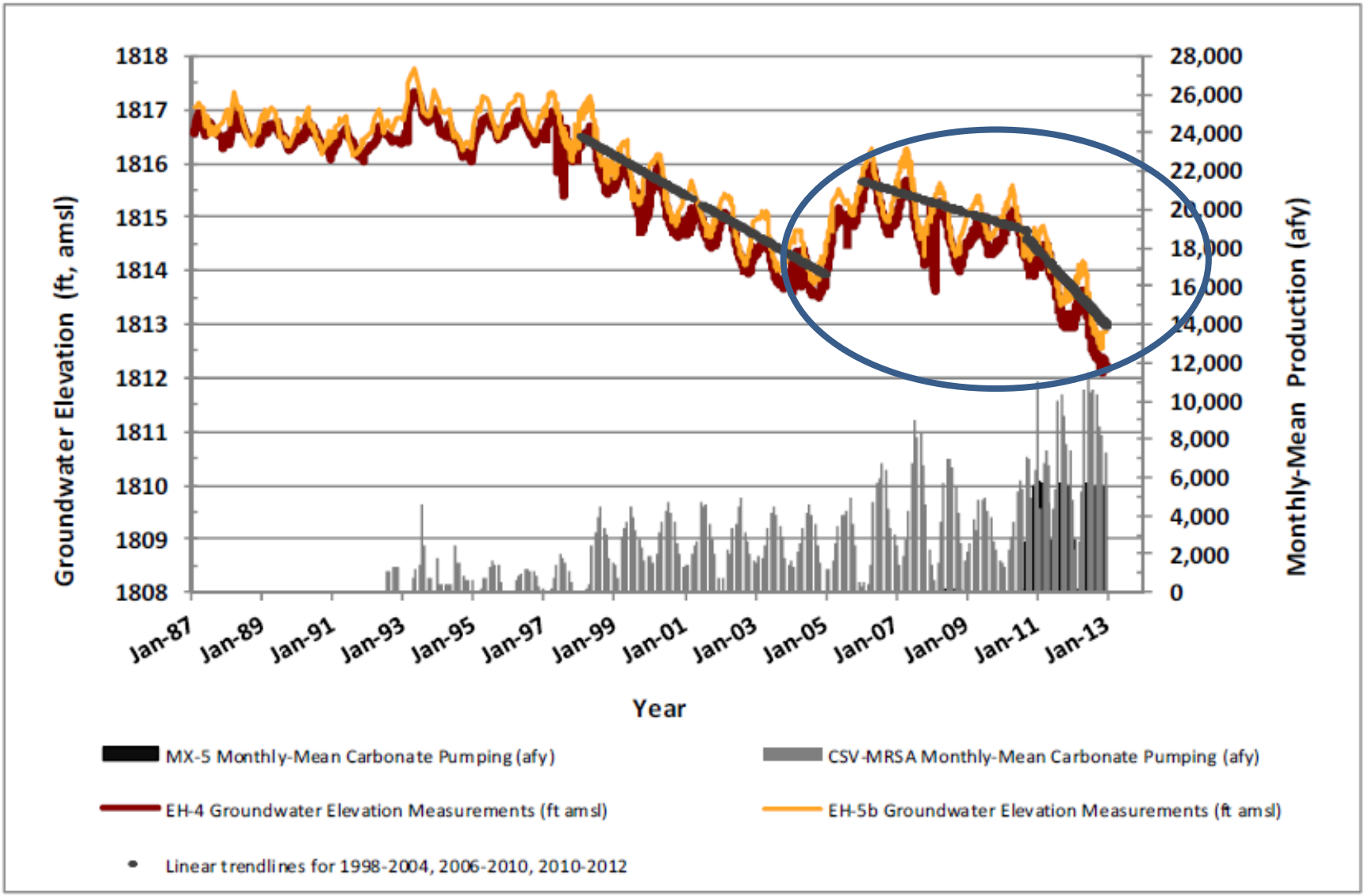


Figure 1.2. Groundwater elevations in carbonate monitoring wells EH-4 and EH-5b in the MRSA and monthly-mean production rates in the carbonate-rock aquifer at production well MX-5 and in the combined CSV and MRSA area from 1987 to 2012. Linear trendlines are shown for 1998-2004, 2006-2010, and 2010-2012.



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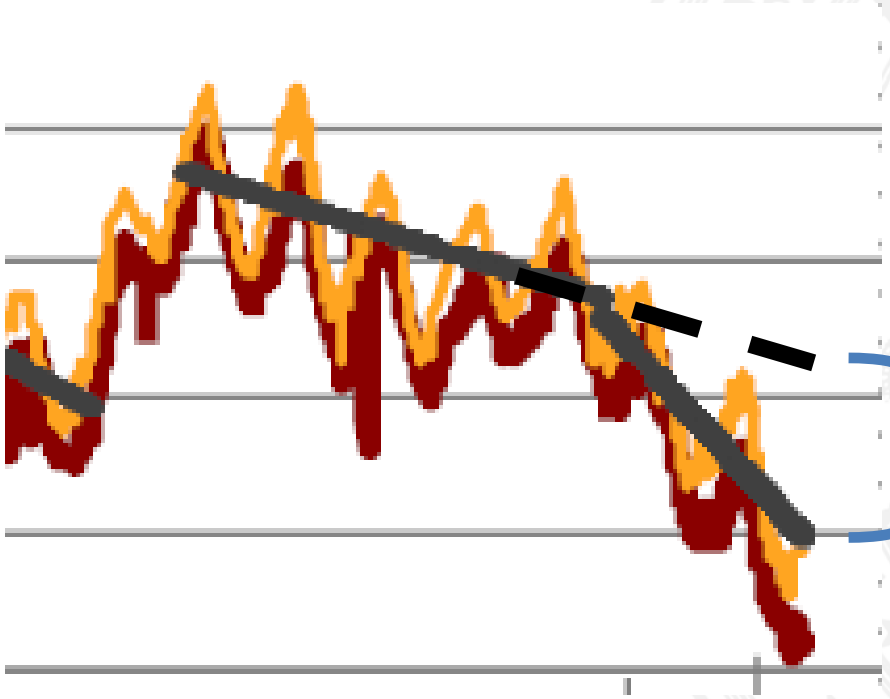

- Water-level decline due to MX-5 pumping
- Similar hydrographs in wells throughout the area

Conclusions - Rulings

- Hydrogeology well understood at basin scale
- Water budget not appreciably changed
- Pumping has immediate and widespread effects
- No additional groundwater is available
- All pending applications in 7 basins denied
- Development of existing rights may eventually conflict with senior rights and/or habitat of Moapa dace

Questions?

Mission Statement

The mission of the Nevada Division of Water Resources is to conserve, protect, manage and enhance the State's water resources for Nevada's citizens through the appropriation and reallocation of the public waters.