

NEVADA DIVISION OF
WATER RESOURCES



Nevada Department of
**CONSERVATION &
NATURAL RESOURCES**

Conjunctive Management of Water Resources in Humboldt River Basin

CWSD Board of Directors Meeting

Carson City, Nevada
March 19, 2025

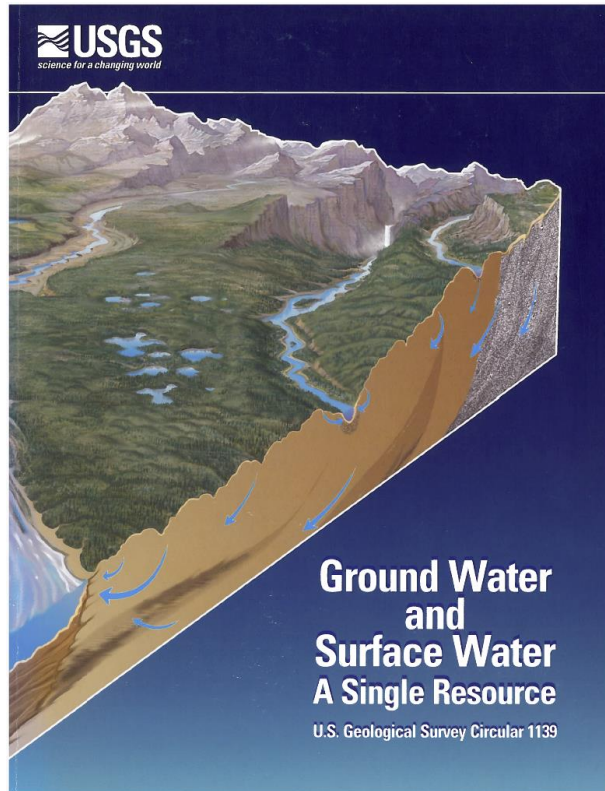
Presented By:
Kip Allander, *Hydrogeologist*

OUTLINE

- Capture Concepts.
- Conjunctive Management efforts in the Humboldt.
- Conjunctive Management is being implemented Statewide.
- The Nevada Water Initiative is proposing investigation of Carson Desert.

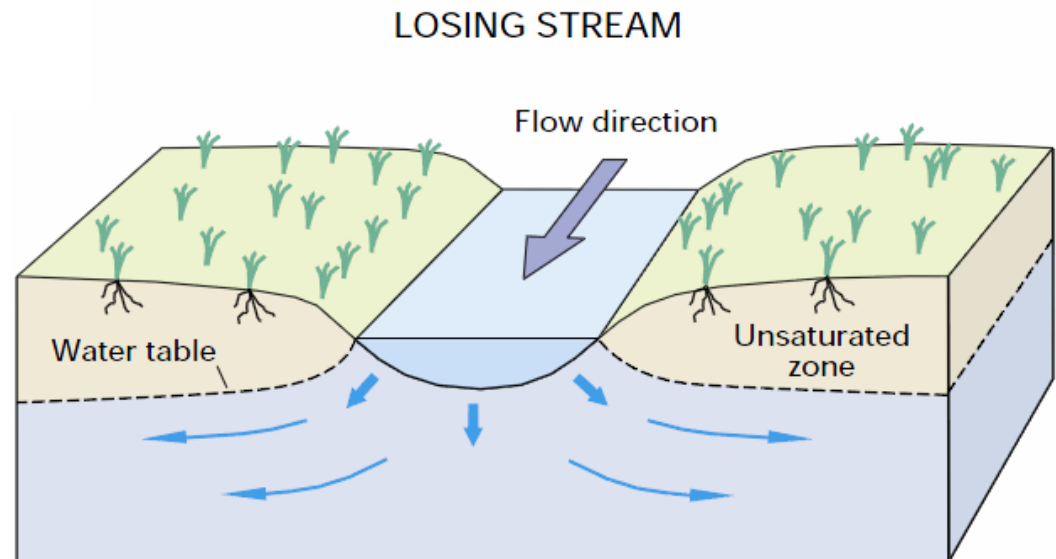
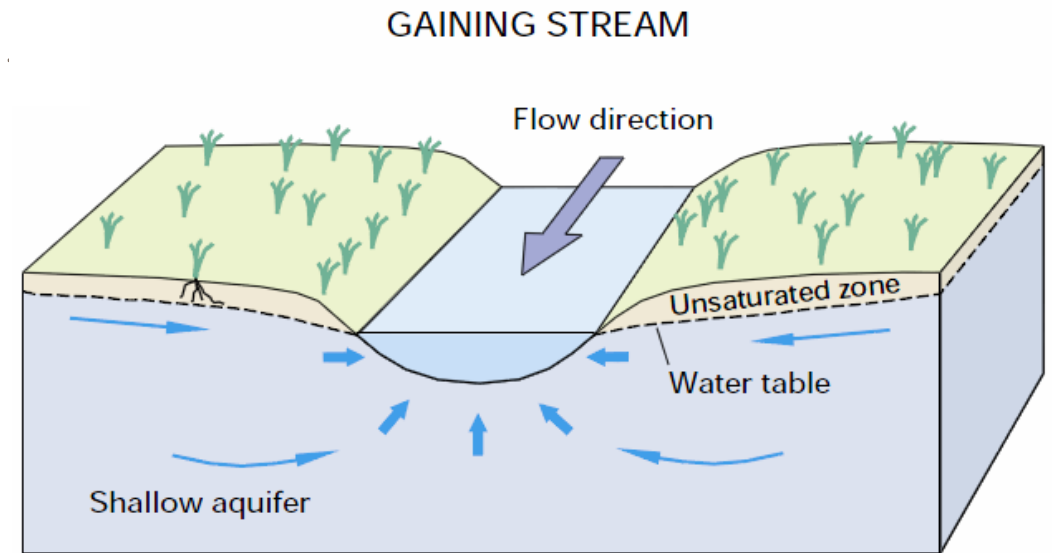
CAPTURE CONCEPTS

GROUNDWATER AND SURFACE WATER ARE A SINGLE RESOURCE

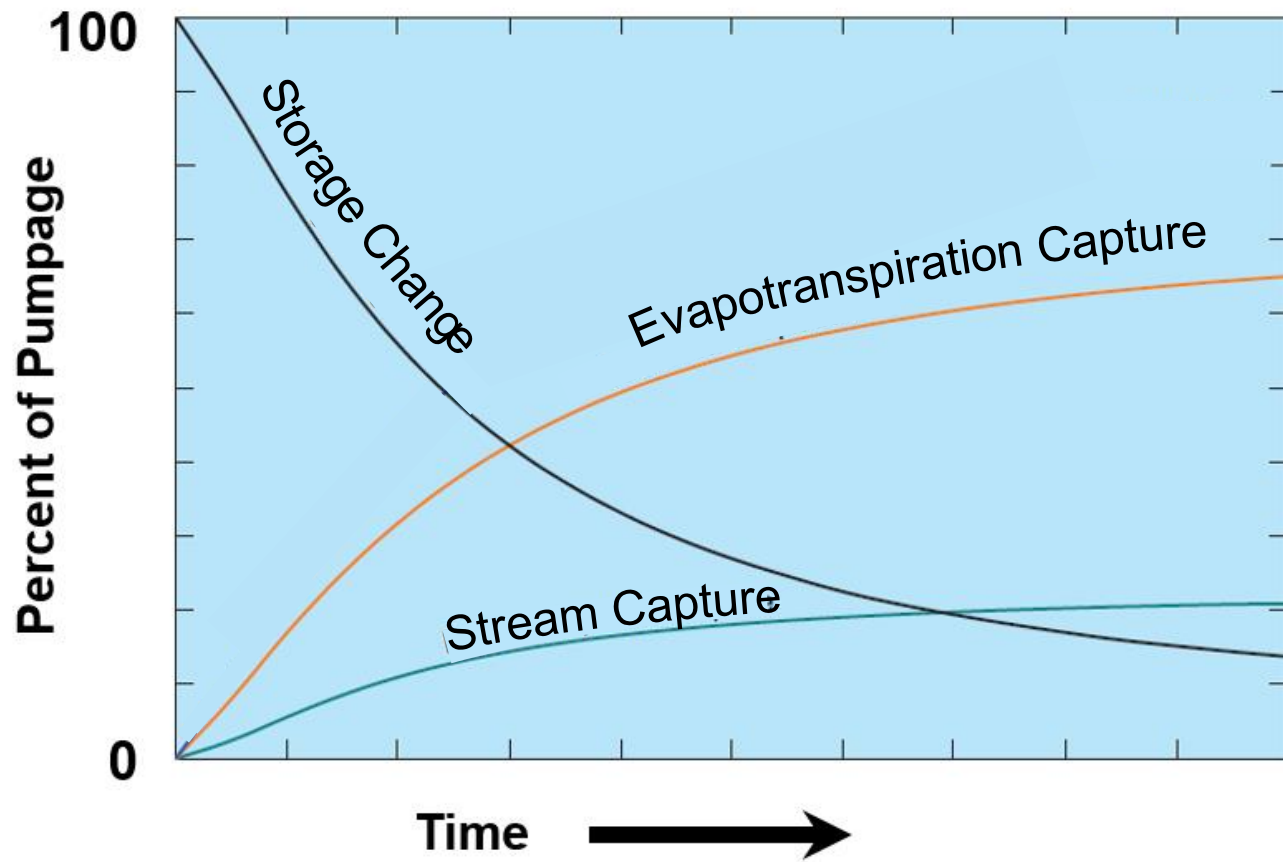


(Winter and others, 1998)

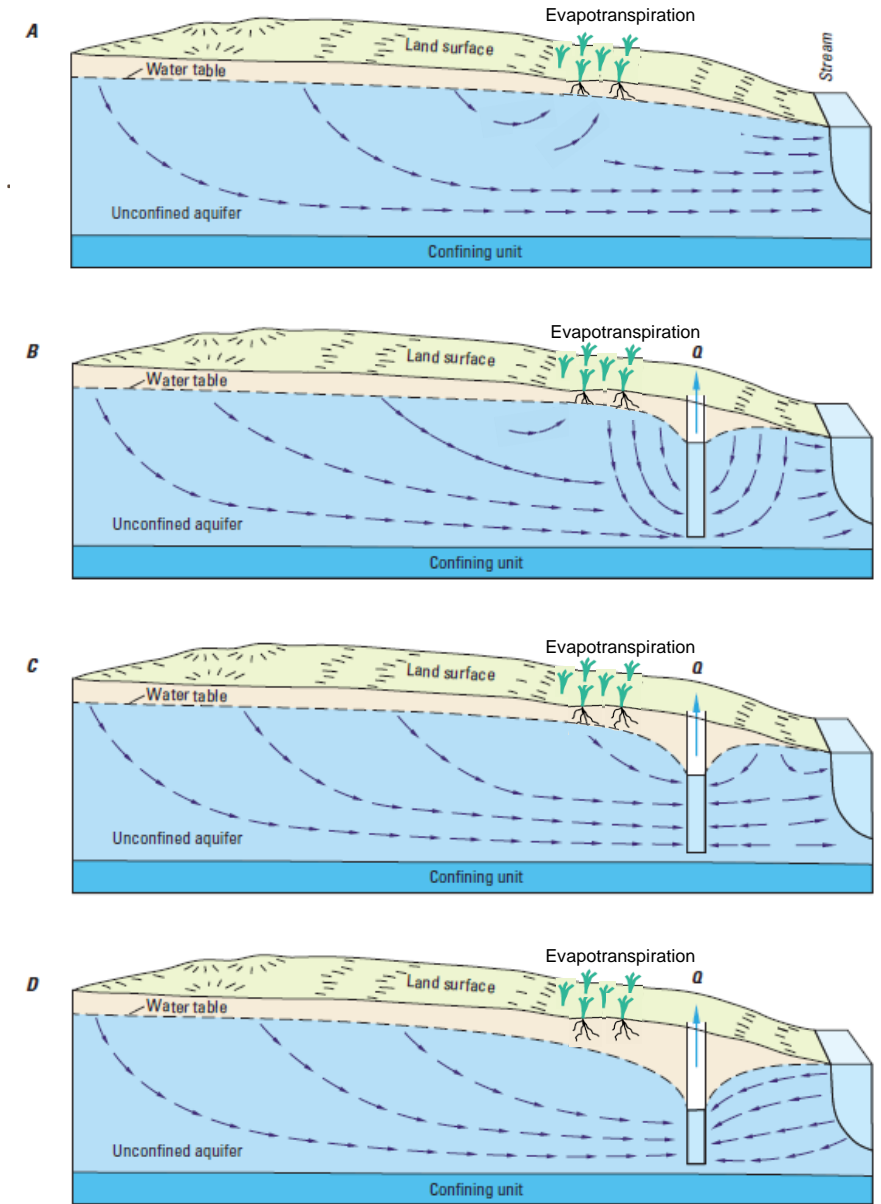
Streams flowing year-round are connected with groundwater.



WHERE DOES THE WATER COME FROM WHEN YOU PUMP A WELL?

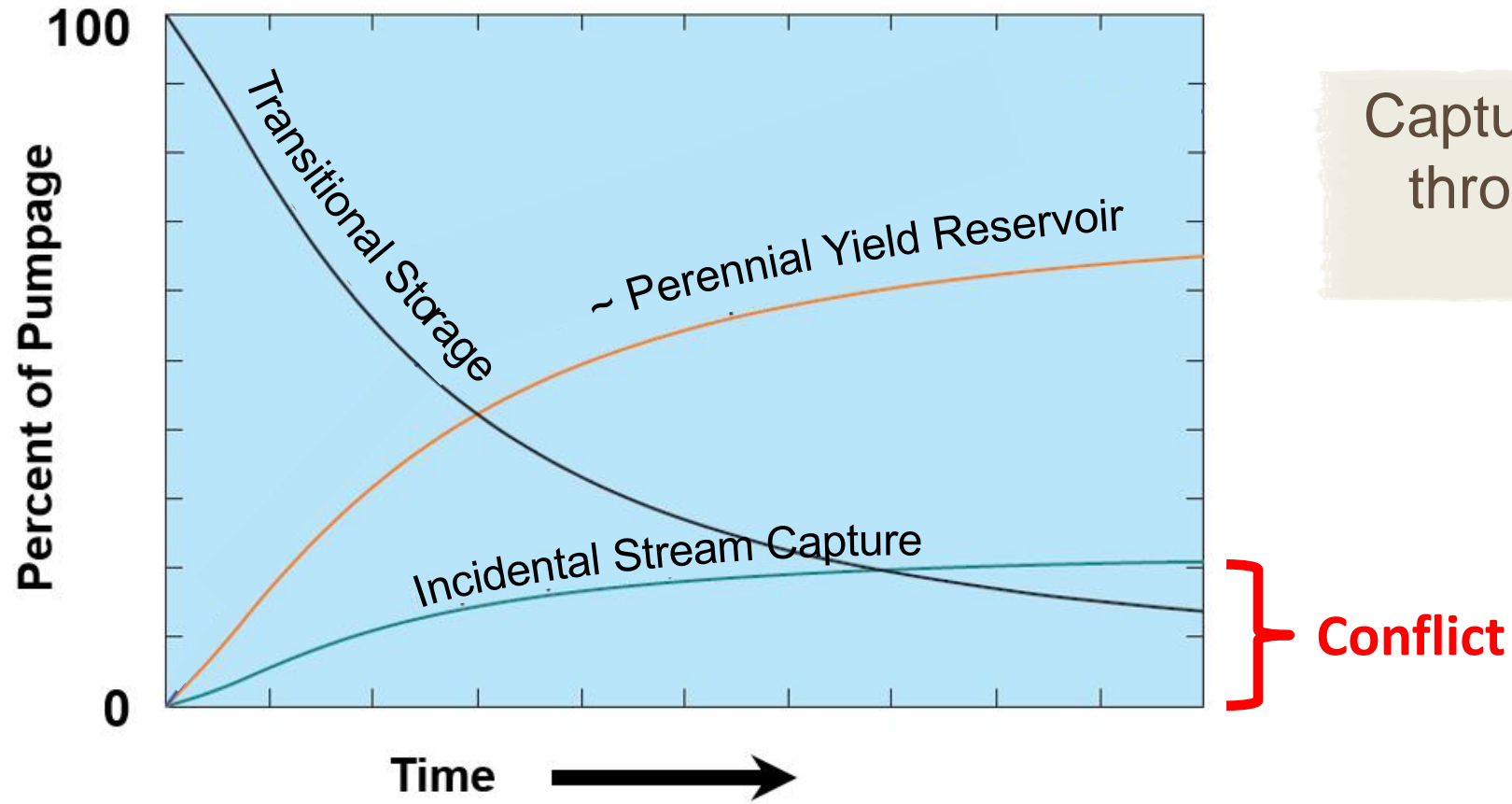


Stream Capture = Streamflow Depletion



(Barlow and Leake, 2012)

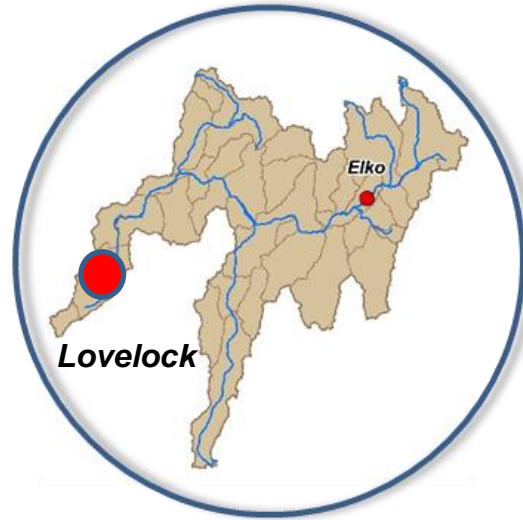
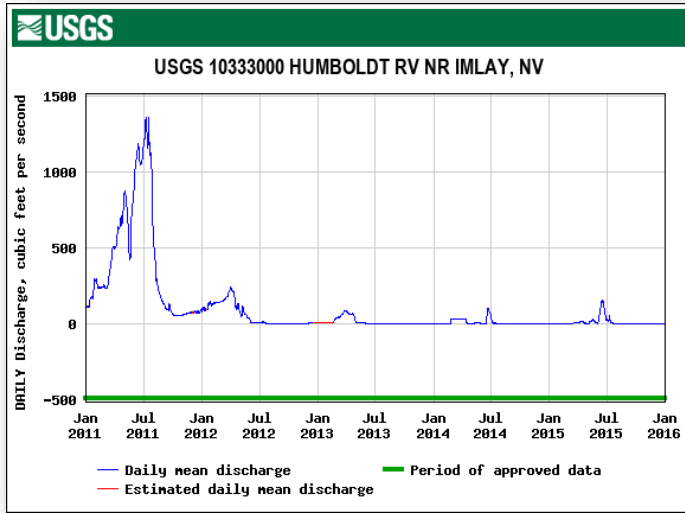
WATER MANAGEMENT PERSPECTIVE



Capture curves conceptualized through water management perspective.

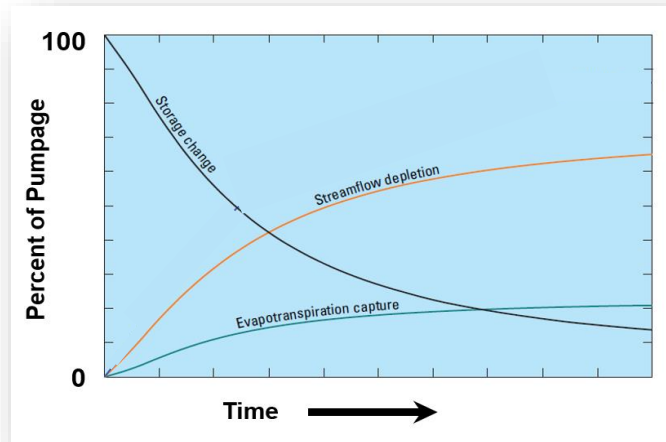
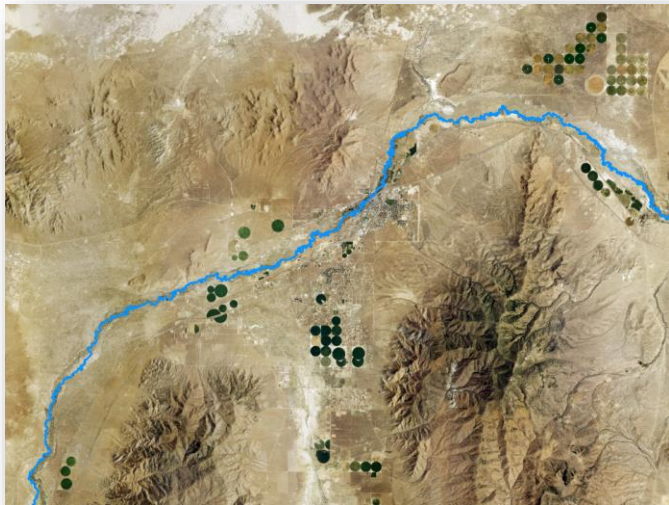
**DEVELOPMENT OF CONJUNCTIVE
MANAGEMENT STRATEGIES IN THE
HUMBOLDT RIVER REGION**

HUMBOLDT RIVER REGION: THE PROBLEM



9 IN THE ELEVENTH JUDICIAL DISTRICT COURT OF THE STATE OF NEVADA
 10 IN AND FOR THE COUNTY OF PERSHING
 11
 12 PERSHING COUNTY WATER CONSERVATION DISTRICT,
 13
 14 Petitioner,
 15 v.
 16 JASON KING, P.E., State Engineer of the State of Nevada, DIVISION OF WATER
 17 RESOURCES, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES,
 18
 19 Respondent.
 20

Case No. Department No. 01
PETITION FOR WRIT OF MANDAMUS, OR IN THE ALTERNATIVE, WRIT OF PROHIBITION



HUMBOLDT REGION CONJUNCTIVE MANAGEMENT TIMELINE - HISTORIC

2012-15

Widespread severe drought strikes the Humboldt Region.

2015

SE recognizes need for Capture Management in the Humboldt.
PCWCD files Writ of Mandamus against SE for not protecting senior water rights.

2016

NDWR initiates 4 capture studies with USGS and DRI.

2016-21

Capture studies ongoing. Fee for Capture Management regulation explored with HRWG.
Effort fails due to Senior's wanting water, not money.

2021

SE Order 1329 – not allowing for increase in capture - is released.

2022-23

3 of 4 Capture studies released as Water Resource Bulletins 48 – 50.

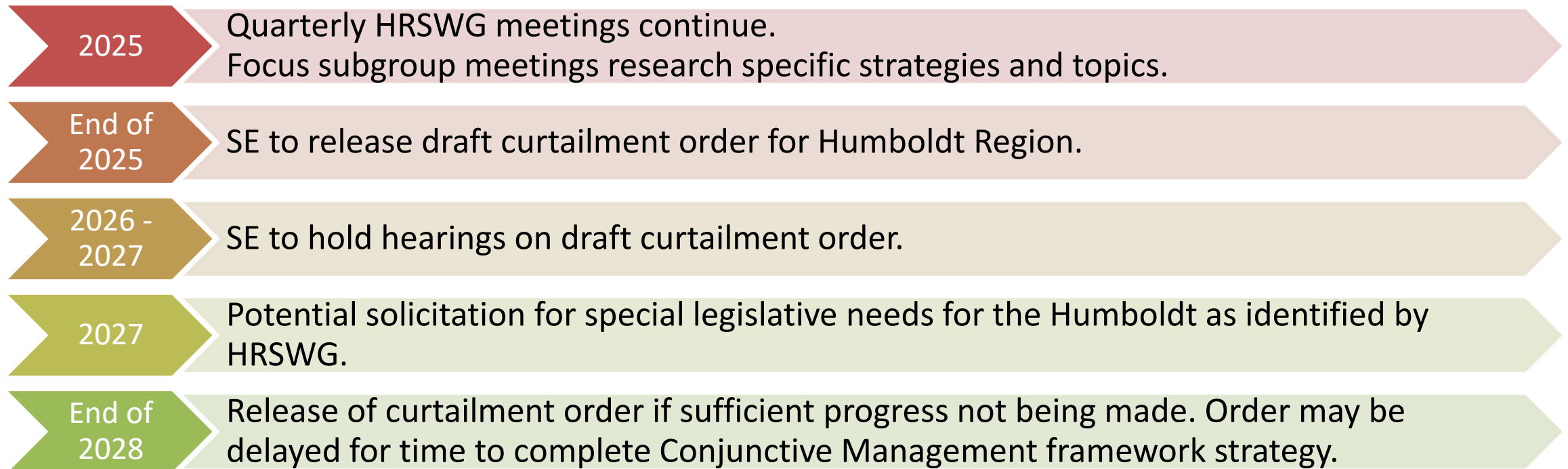
2023

Strategy for developing Conjunctive Management framework announced.
Conjunctive Management ideas solicited.

2024

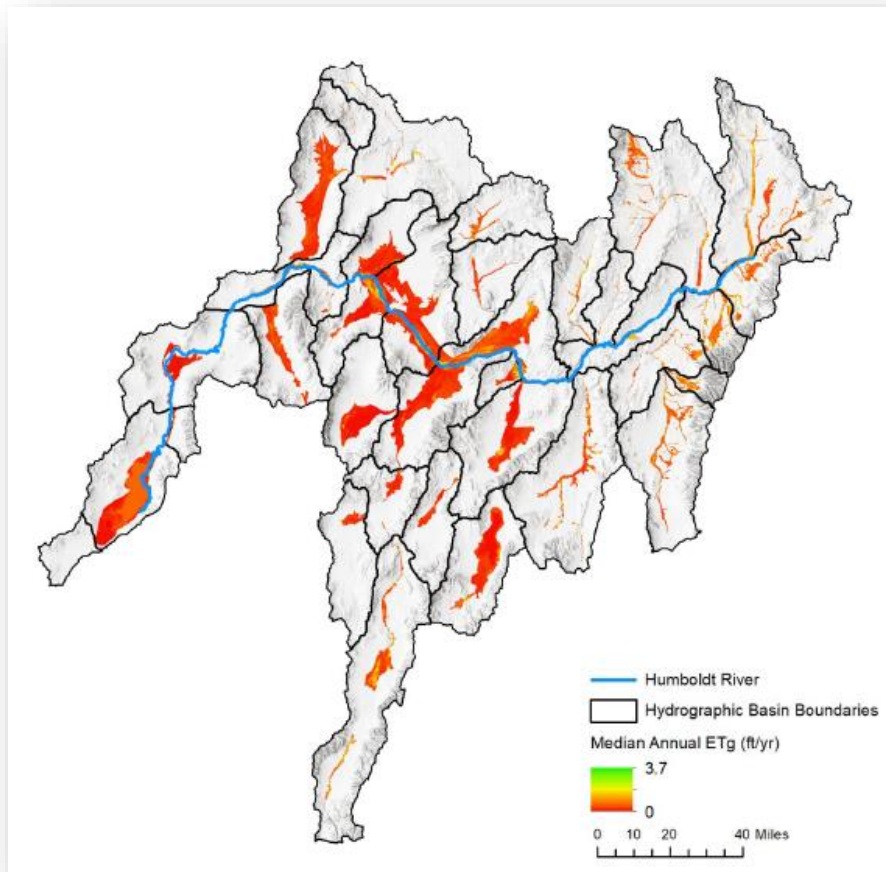
HRSWG formed and begins meeting regularly.

HUMBOLDT REGION CONJUNCTIVE MANAGEMENT TIMELINE - FUTURE



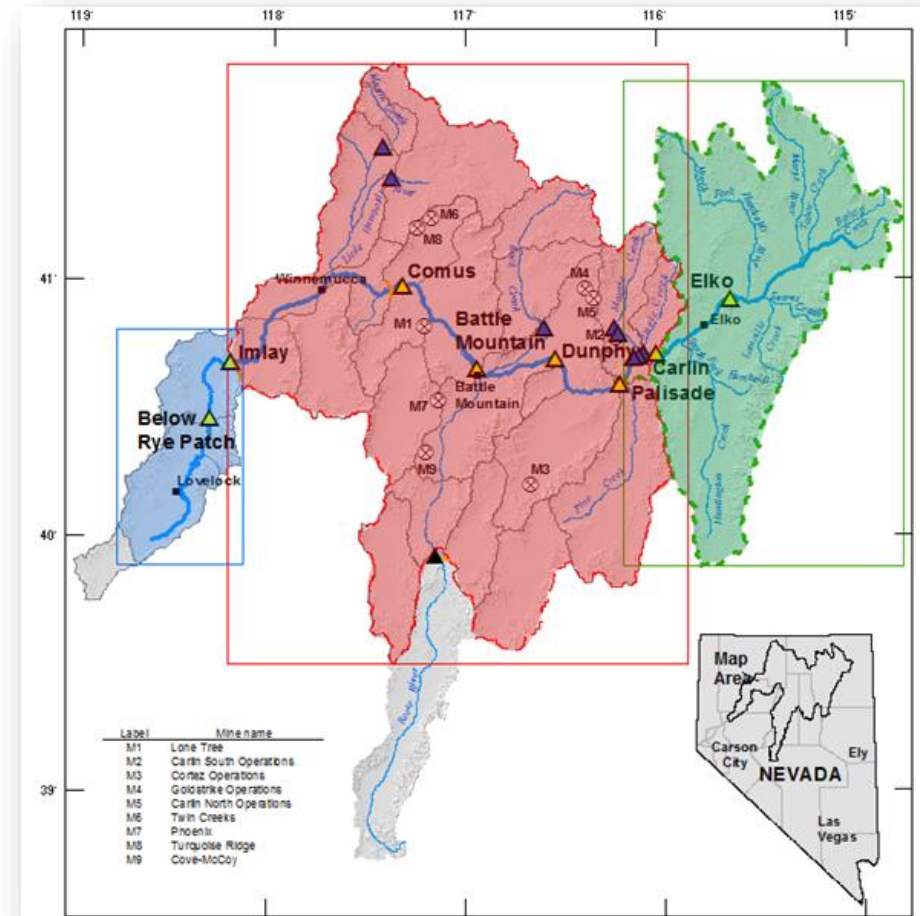
HUMBOLDT RIVER BASIN CAPTURE STUDY COMPONENTS

Regional Evapotranspiration Study



([Huntington and others, 2022](#))

3 Capture Models



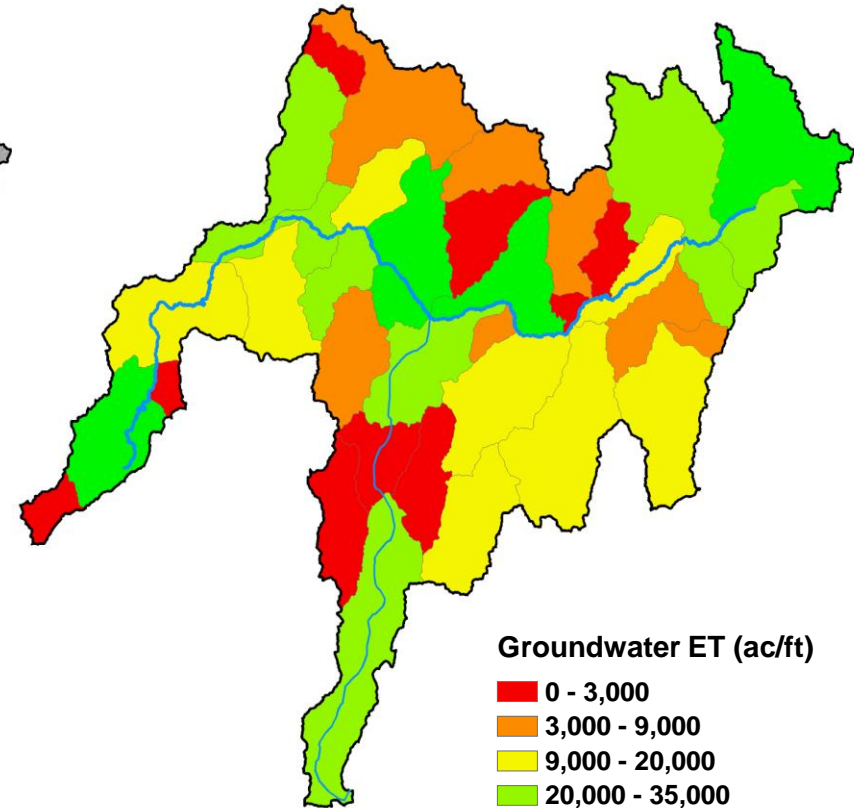
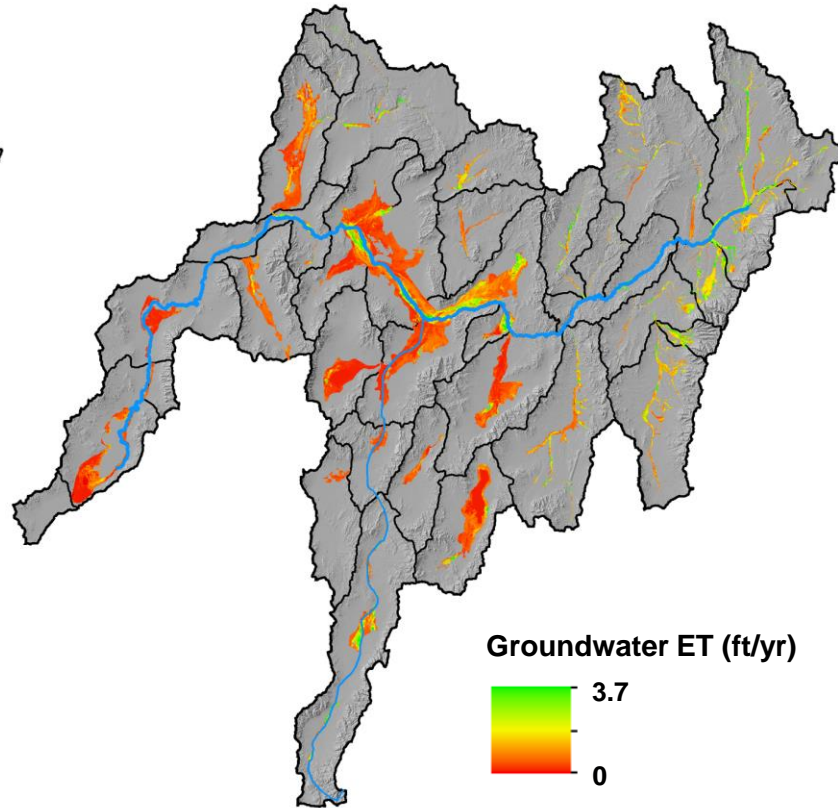
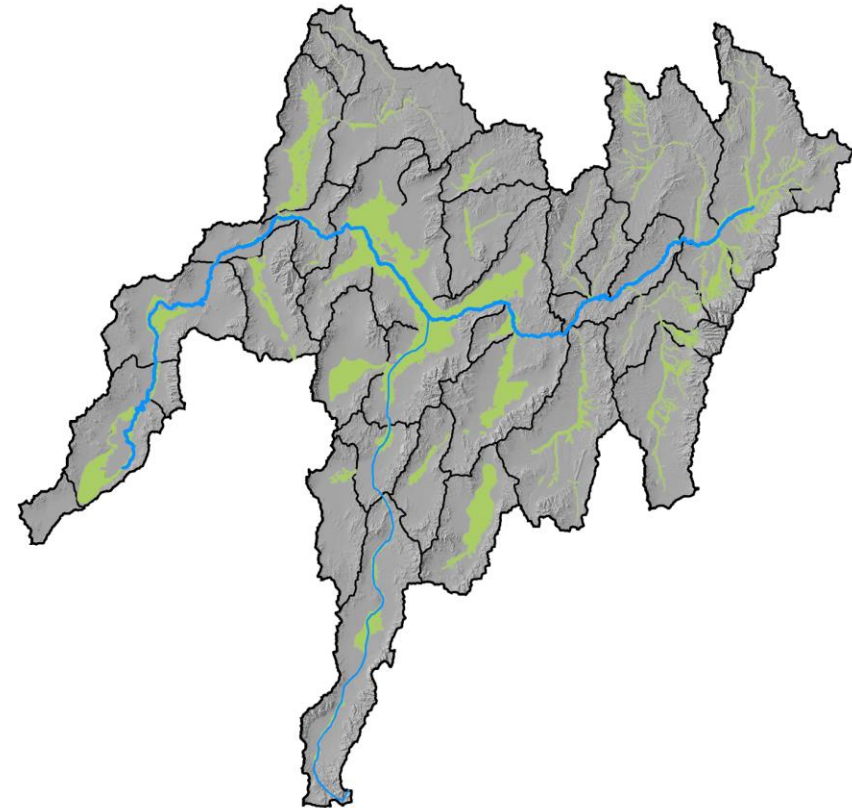
*** Middle model results are provisional and subject to change***

EVAPOTRANSPIRATION DISCHARGE

Potential areas of GW discharge

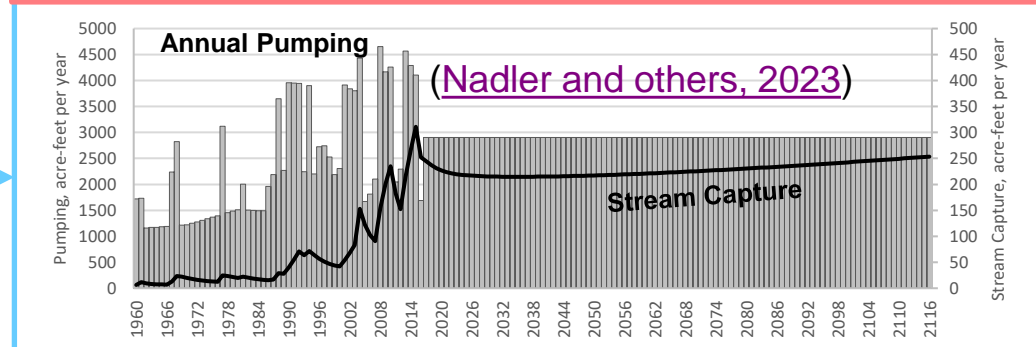
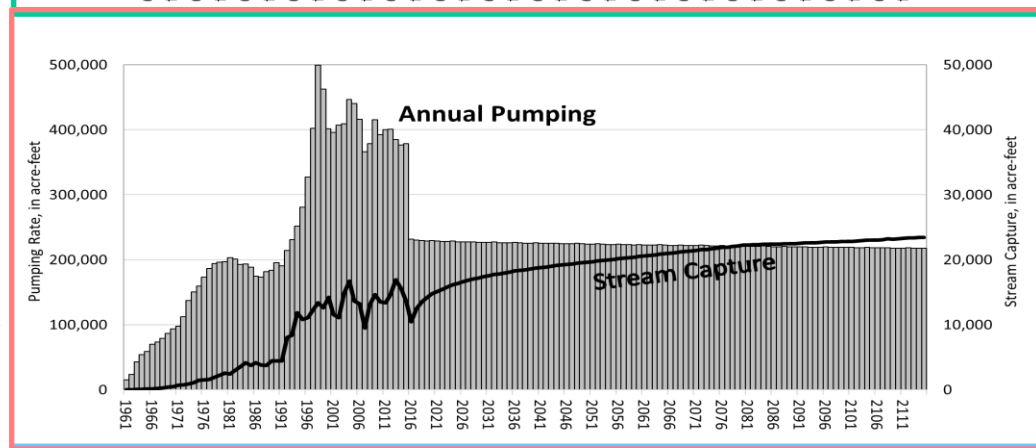
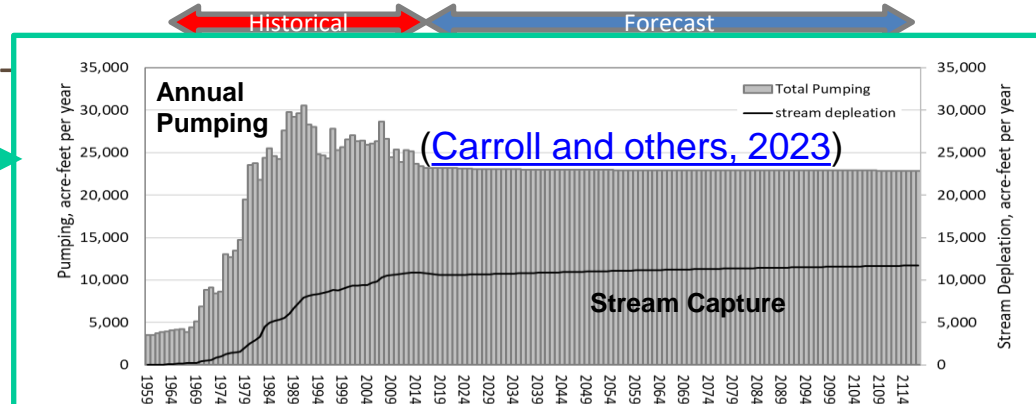
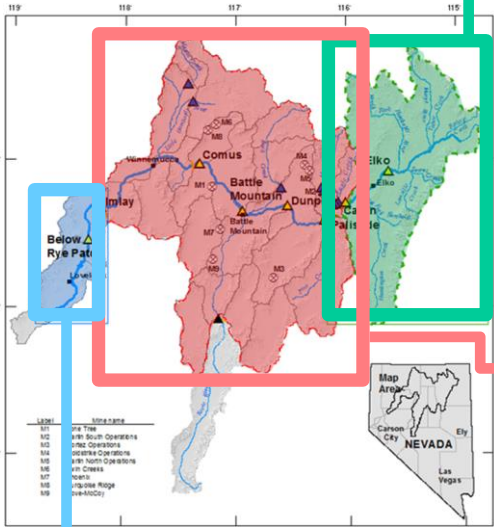
Groundwater ET

Groundwater ET



[\(Huntington and others, 2022\)](#)

CAPTURE QUANTITY: HISTORICAL AND FORECASTED CAPTURE AMOUNTS



REGION WIDE

2015 Capture:
25,000 AFY

2015 Pumping:
400,000 AFY

6% Pumped water is
capture

Middle model results are provisional and subject to change

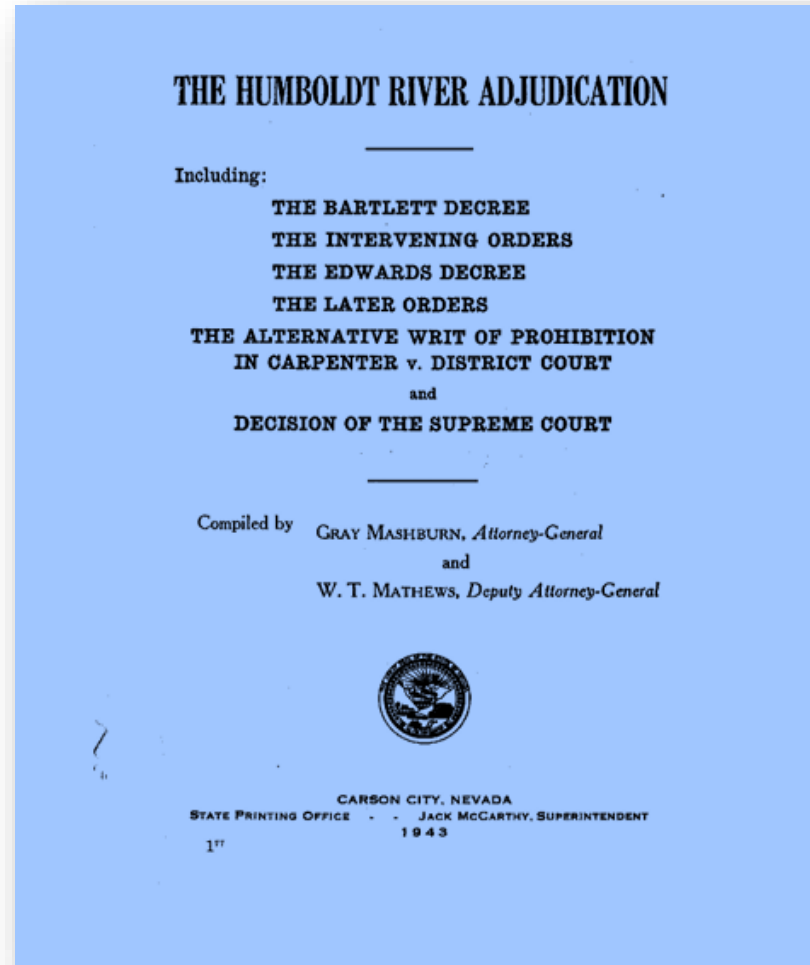
OFFSETS BEING CONSIDERED UNDER CONJUNCTIVE MANAGEMENT FRAMEWORK

OFFSET TYPES UNDER CONSIDERATION



Augmentation of
Streamflow

In-Stream replacement
using Decree water

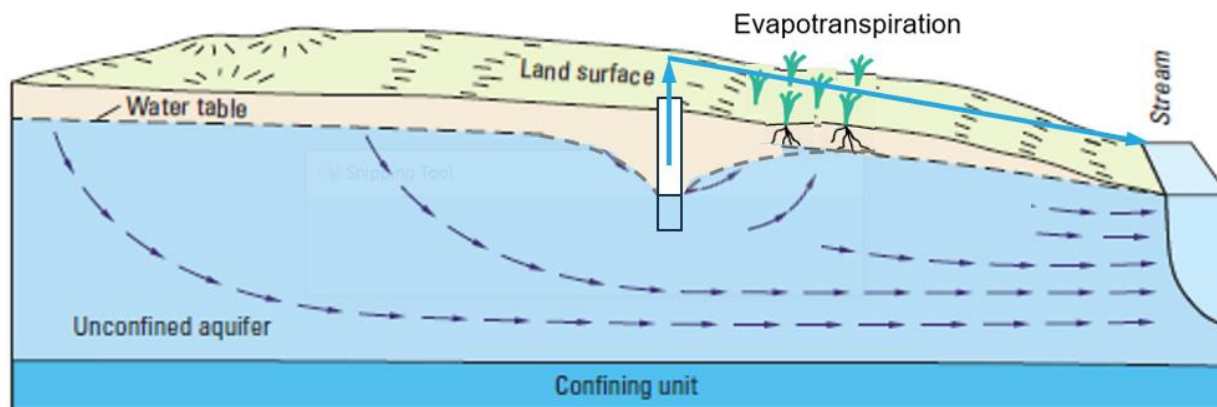


Managed Aquifer
Recharge (MAR)



AUGMENTATION OF STREAMFLOW

- Direct discharge to stream or tributary.
- Source:
 - Groundwater with low to no stream capture.
 - Reservoirs.
 - Imported from other surface water/streams.
 - Wastewater discharge.



Increasing streamflow through direct addition of water

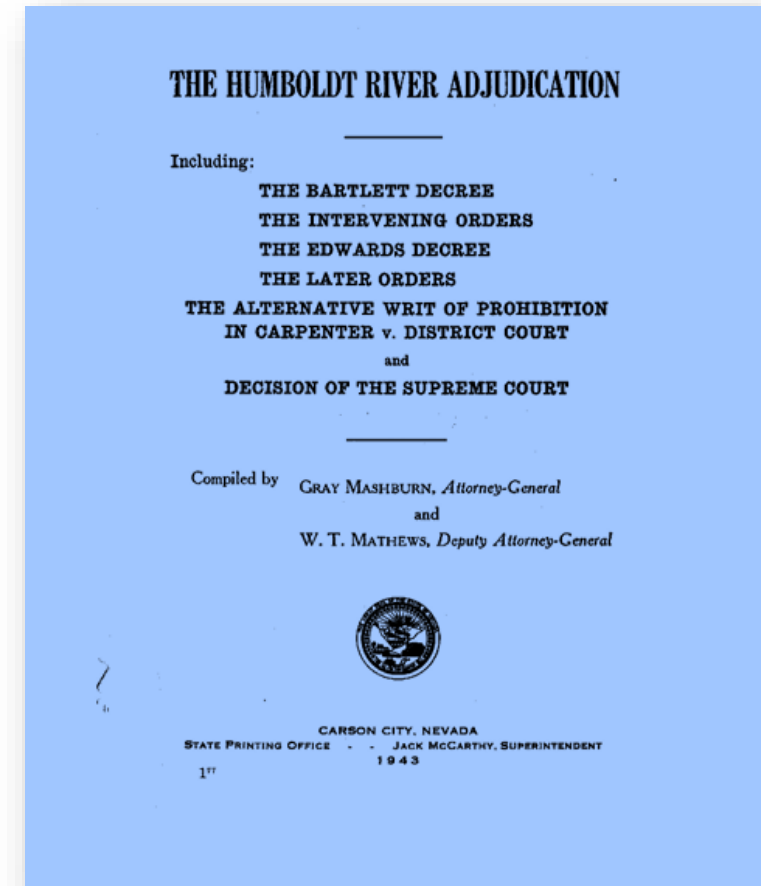
Mine Discharge to Maggie Creek



IN-STREAM OFFSET USING HUMBOLDT DECREE WATER

Primary Considerations: Priority, Duty, Location, Culture Class

- Subject to year-to-year water availability (wetness factor).
- Complex conversion calculation.
- Very difficult to move from upstream to downstream due to inherent losses in the system.
- Can move from downstream to upstream relatively easily.
- Can use tributary stream decree to offset main stem impacts.
- Cannot use main stem decree to offset tributary impacts.



MANAGED AQUIFER RECHARGE (MAR)

The intentional recharging of aquifers.

Rapid Infiltration Basins (RIBS)



Direct Injection using Wells



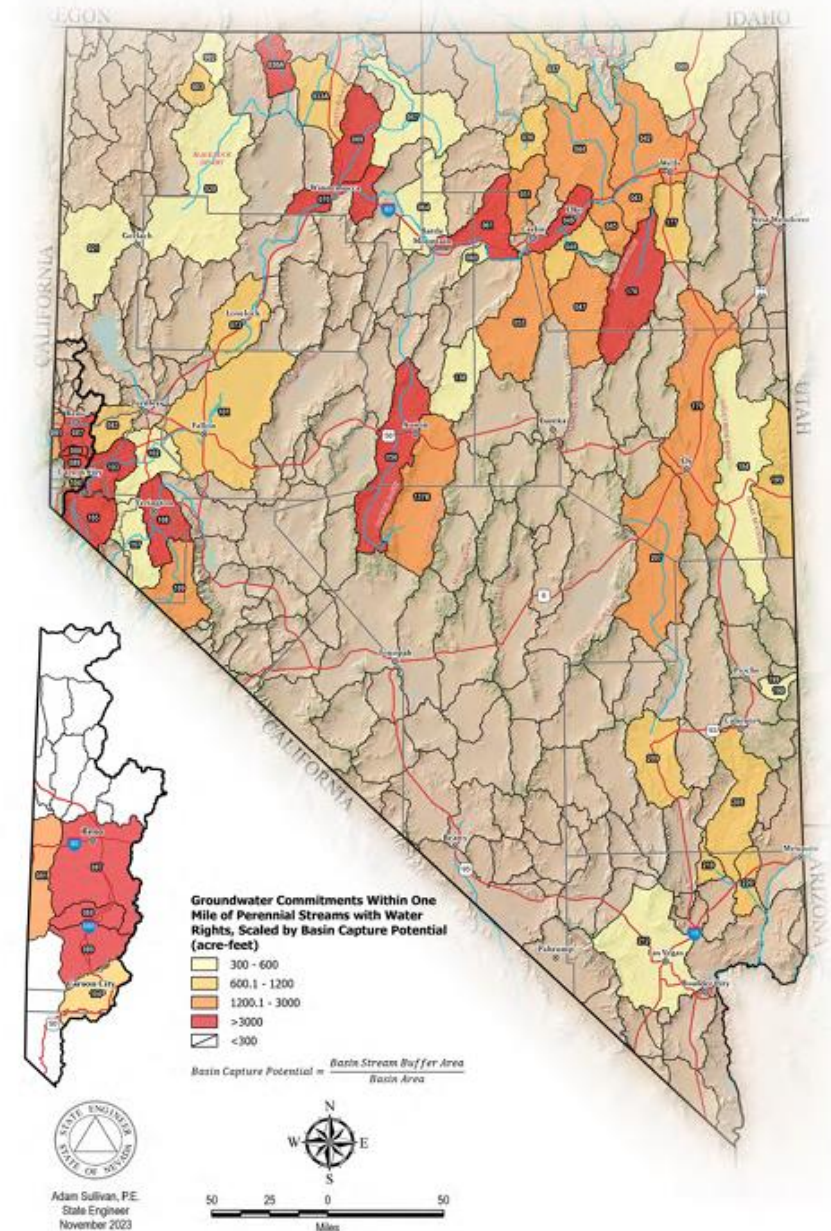
**CONJUNCTIVE MANAGEMENT IS BEING
IMPLEMENTED STATEWIDE**

ALL NEW APPLICATIONS SUBJECT TO CONJUNCTIVE MANAGEMENT CONSIDERATIONS

- Similar to Humboldt Region.
- Not allowing for increase in capture conflict.
- All applications are evaluated for capture and/or drawdown impacts.

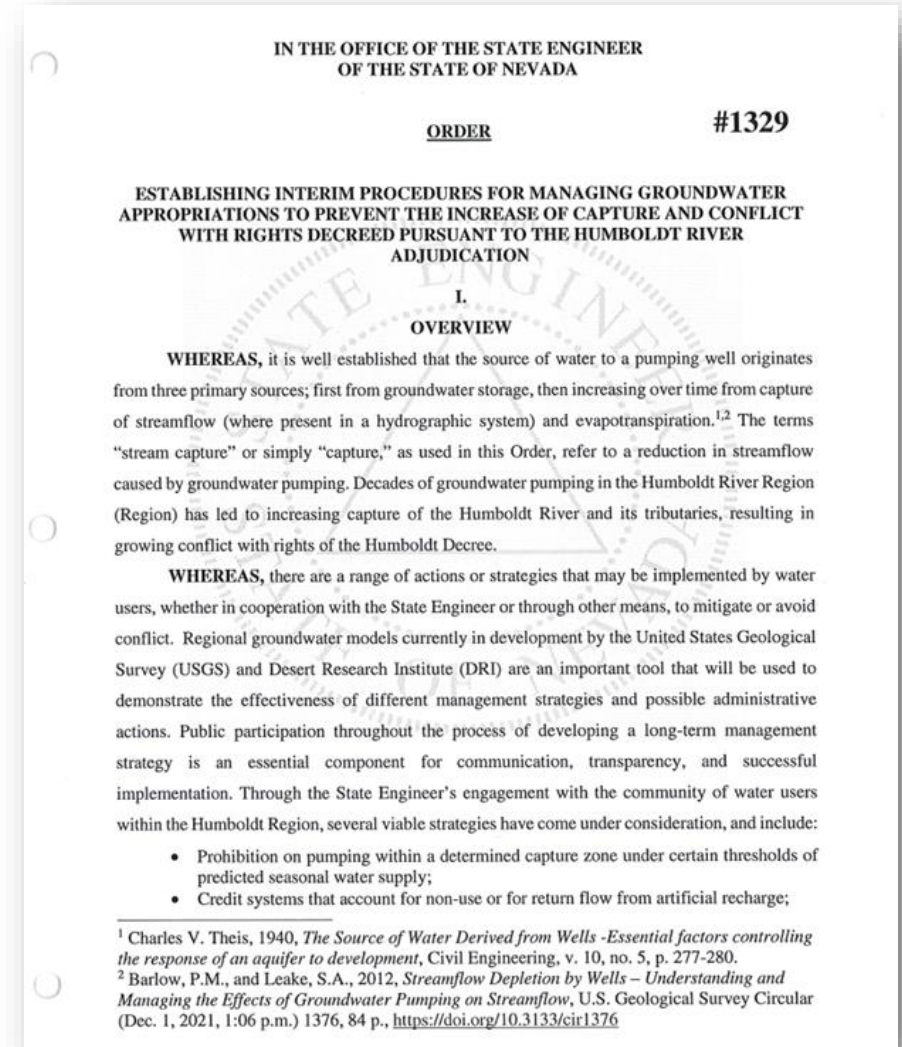
POTENTIAL CAPTURE OF SURFACE WATER RIGHTS BY GROUNDWATER PUMPING

NEVADA DIVISION OF WATER RESOURCES - 2023 BASIN STATUS ASSESSMENT



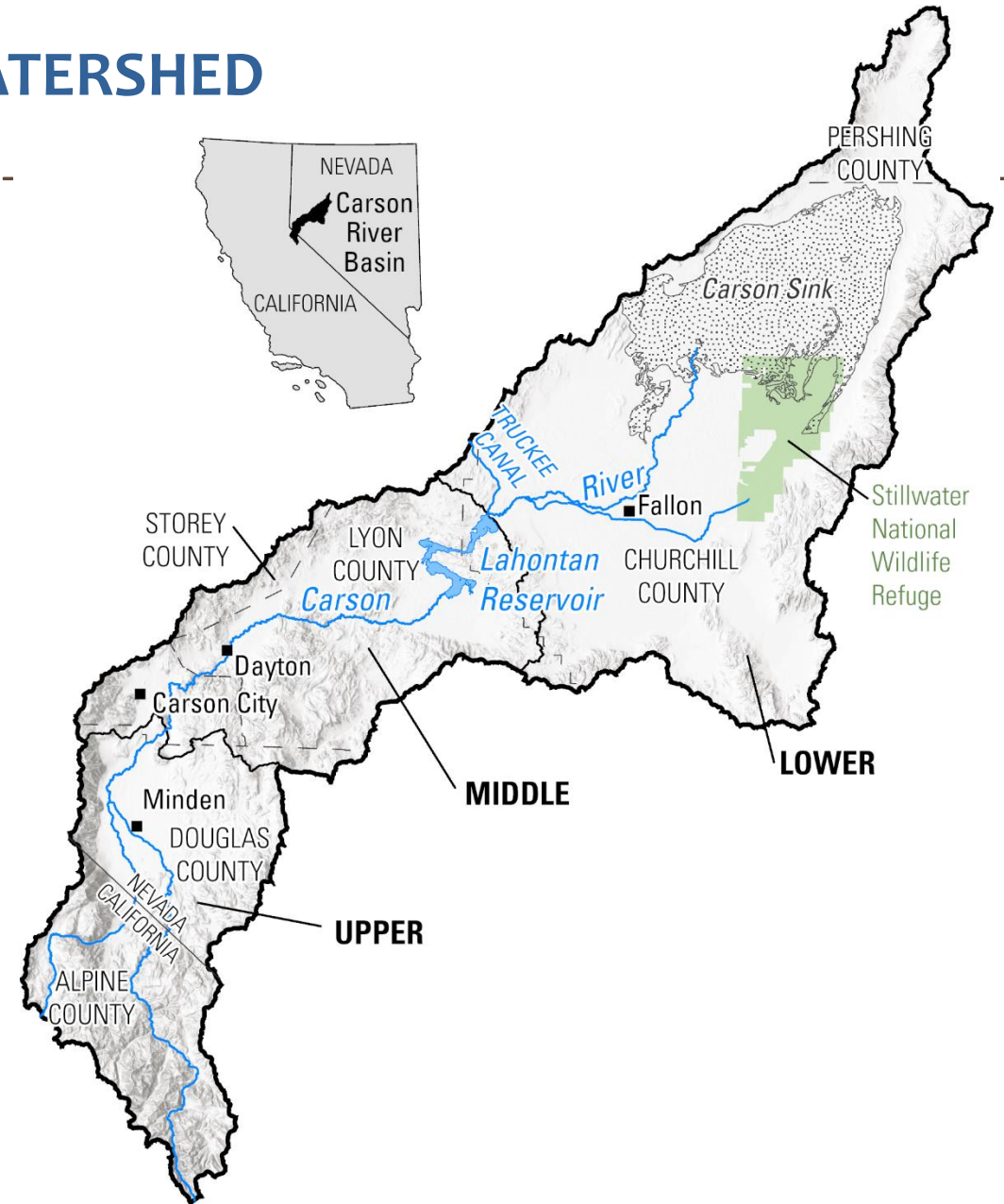
CAPTURE CONFLICT CRITERIA – CAPTURE EVALUATED OVER 50-YEAR PERIOD

- Exemption Criteria:
 - <5 AFY capture after 50 yrs of pumping – exempt.
 - <10% capture after 50 yrs of pumping – exempt.
 - otherwise, Offset is required.
- Successful Offset Criteria:
 - Cumulative offset:** equal or exceed cumulative volume of capture within 50 years.
 - 80 percent rule:** equal or exceed annual capture in 40 out of 50 years (80 percent of the time).



IMPLICATIONS TO THE CARSON RIVER WATERSHED

- Difficult to move underground rights closer to Carson River or tributaries.
- Could require relinquishment of additional duty.
- Or dedication of offsets.





NWMI

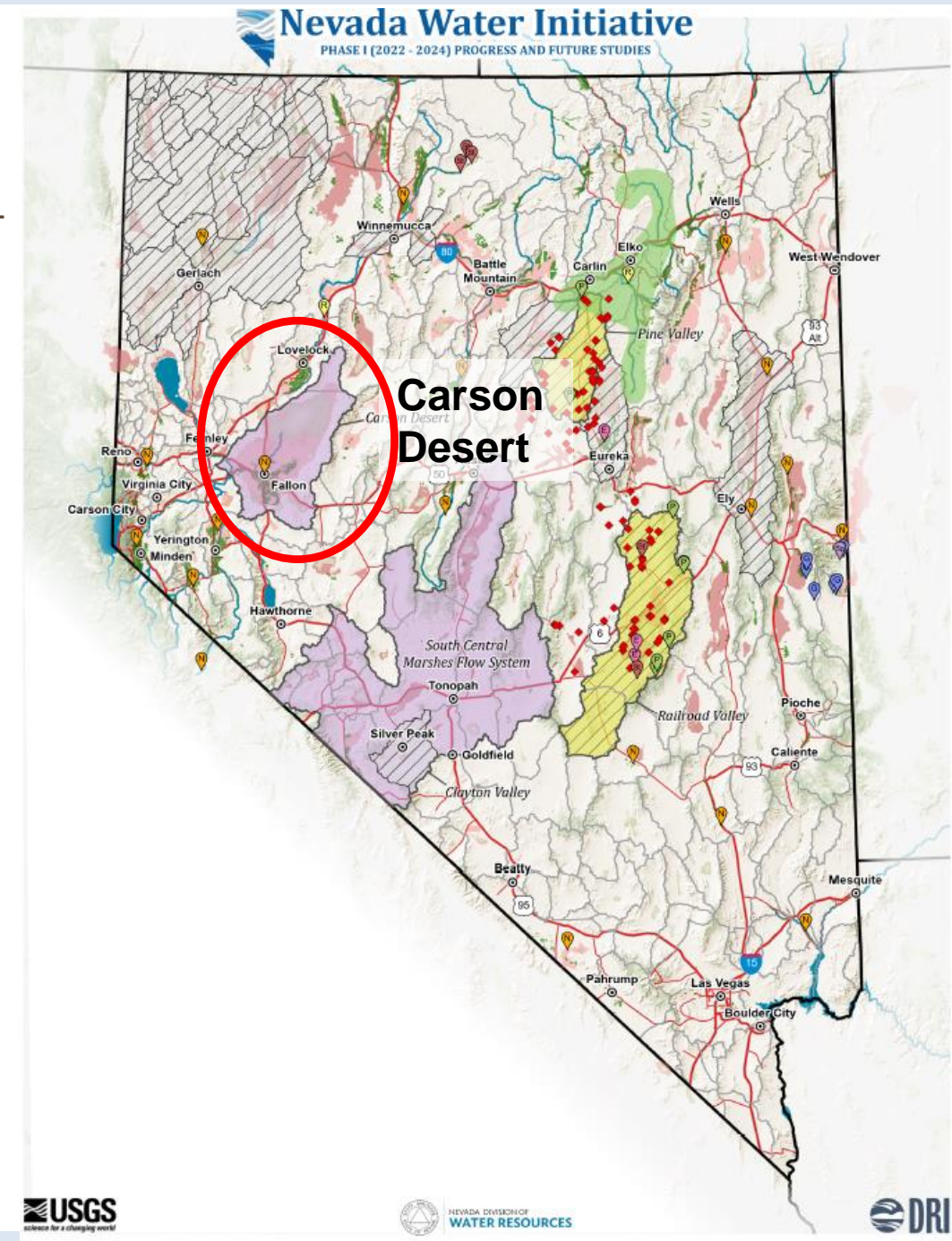
Nevada Water Initiative

The bridge to Nevada's water security

WHAT'S NEXT FOR NWI CARSON DESERT (FALLON AREA)

Proposed study of the Carson Desert

- Economic growth is currently constrained by outdated estimate of water availability.
- Advances in water treatment technology makes more water available.
- Recent work suggests there may be many times as much water available.
- Responsible development needed to protect:
 - Existing water rights and water quality
 - Migratory bird habitat
 - Basalt freshwater aquifer
 - Indigenous cultural resources



Questions?



Contact

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