

30-Year Regional Water Plan for the Carson River Watershed

Presented by

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Goals of the 30-Year Plan:

Evaluate Effects Growth and Climate Change will have on Streamflow and Groundwater Trends in the Carson River Watershed

- Evaluate Future Water Demands and Water Supplies by Area
- Utilize the Upper and Middle Carson River Models Developed by the USGS
- Identify Water Supply Sources
- Identify Potential Water Limitations
- Evaluate Groundwater/Surface Water Interaction
- Evaluate Potential Mitigation Strategies

What the 30-Year Regional Water Plan Will Not Do

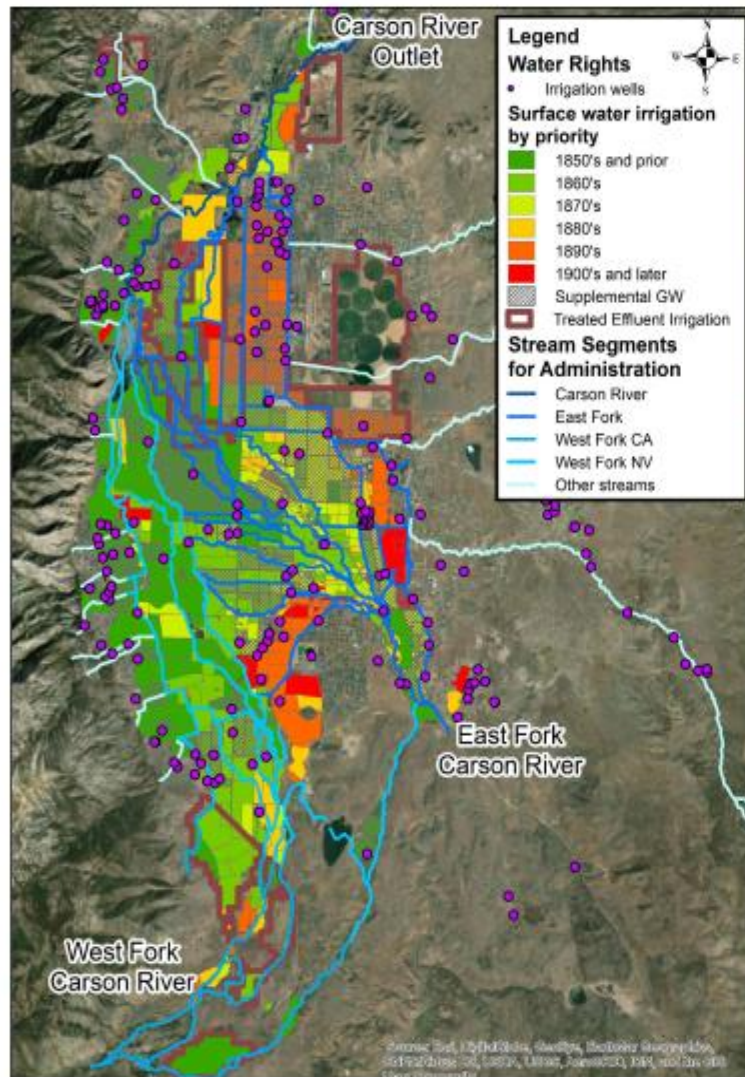
- It **Will Not** take away anyone's water rights
- It **Will Not** propose any changes to the Alpine Decree or Nevada Water Law
- It **Will Not** evaluate any water purveyor's water master plan

30-Year Regional Water Plan Includes:

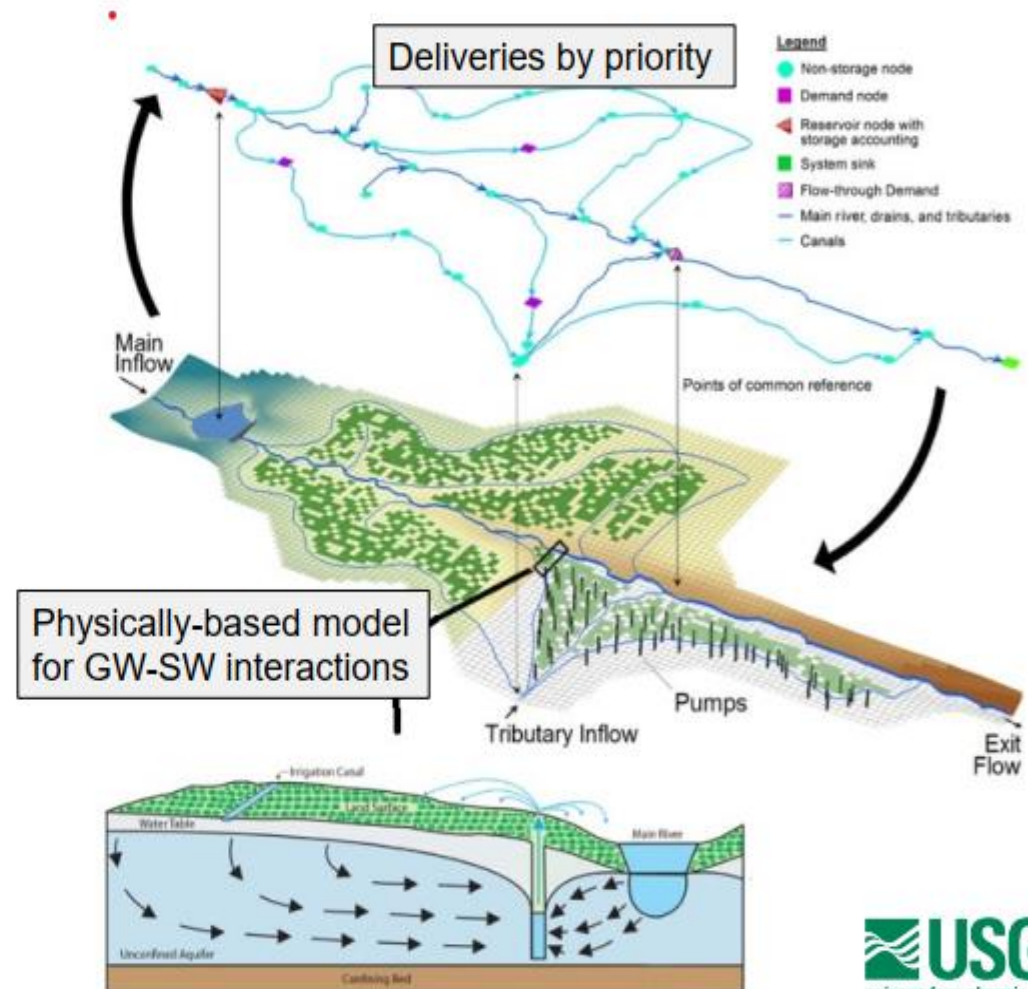
- Working with the USGS to Update the Upper and Middle USGS models
- Working with Lumos to gather future water demands and supplies
- Identify possible water limitations and shortfalls
- Identify possible mitigation alternatives

Not part of the 30-Year Regional Water Plan but is currently being developed is the Carson River Capture model which will identify possible groundwater pumping impacts to surface flow.

Upper Carson River Basin Study by USGS



Alpine Decree – Groundwater integrated modeling framework



Update the 2021 Model with Future Water Demands Funded by Douglas County

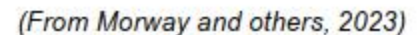
General Approach

- Task 1: Data compilation
- Task 2: Update and possibly recalibrate the Kitlaster and others (2021) model
- Task 3: Run population growth scenarios
- Task 4: Uncertainty analysis



Existing Model

- **Model simulates:**
 - Groundwater/surface-water interaction
 - Crop and phreatophyte evapotranspiration
 - Lake evaporation
 - Mountain-front recharge
 - Recharge from irrigation return flows
 - Groundwater pumping

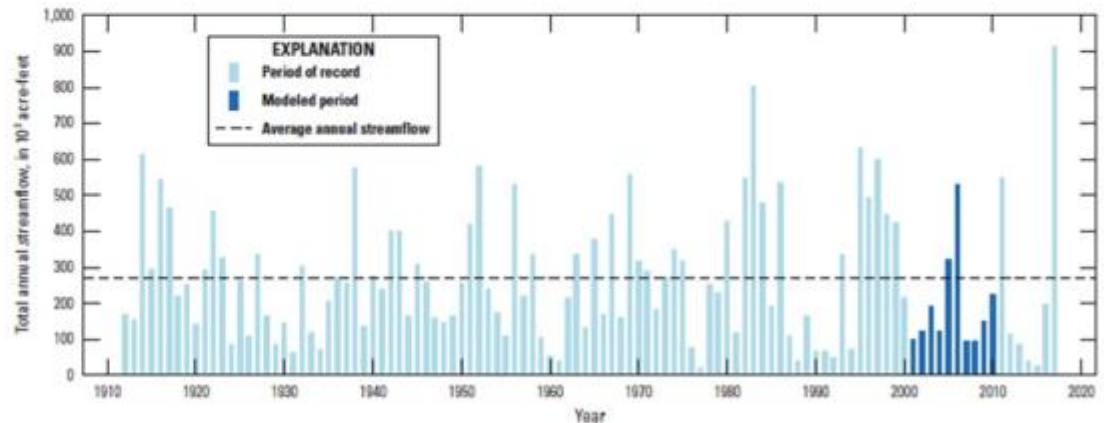


Middle Carson River Basin Model

Model Update

- Update simulation period forward and backward in time to represent conditions from 1980–2020
 - Simulation period consistent with Carson Valley Model
 - Changed stress period length from weeks to months

**Existing model simulation
period: 2000–2010**



(From Morway and others, 2023)

Middle Carson River Basin Model

Funded by CWSD

Approach

Use existing models to evaluate effects of growth and climate change on streamflow trends and water deliveries to Lahontan Reservoir

Task 1: Describe how the Alpine Decree was implemented in the Carson Valley ([Kitlaster and others, 2021](#)) model

Task 2: Update the middle Carson River ([Morway and others, 2023](#)) model to simulate 1980–2020

Task 3: Evaluate impacts of water management scenarios in upper and middle basins on streamflow deliveries to Lahontan Reservoir

Task 4: Evaluate impacts of climate change scenarios in upper and middle basins on streamflow deliveries to Lahontan Reservoir

Task 5: Evaluate how water-use (for example, groundwater pumping or diversions) in the upper Carson River basin is contributing to observed streamflow trends

Task 6: Evaluate how water-use in the middle Carson River basin is contributing to observed streamflow trends

Capture Model

Funded by Churchill County, TCID, and US
Fish and Wildlife

- Hypothetical (potential) capture
- Understanding how pumping affects surface water sources
- Improves management for surface water and groundwater
- Changes in pumping location and/or new wells can be reviewed for capture %
- Tool that can be used consistently by different stakeholders

Where does water come from when pumping a well?

- Storage change
- Stream capture
- Groundwater evapotranspiration capture

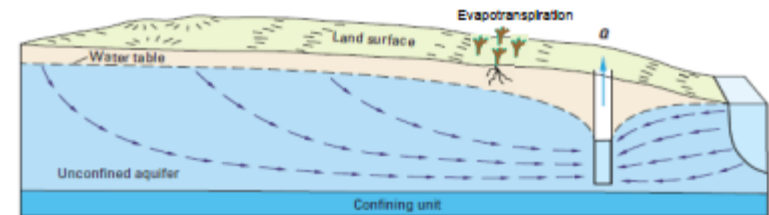
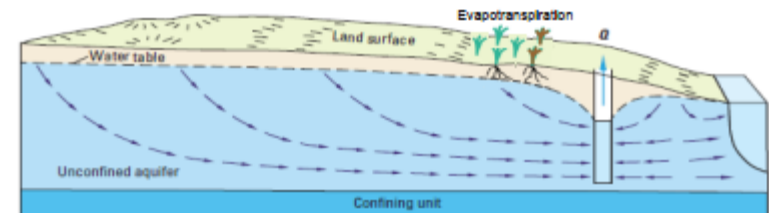
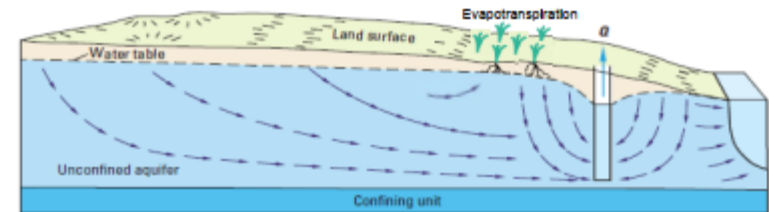
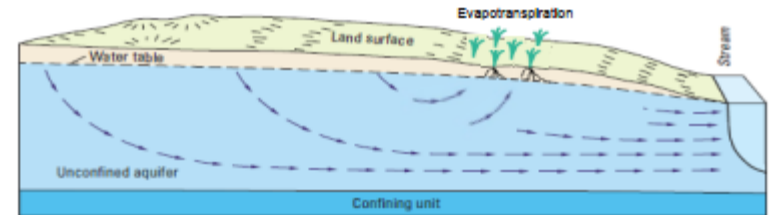
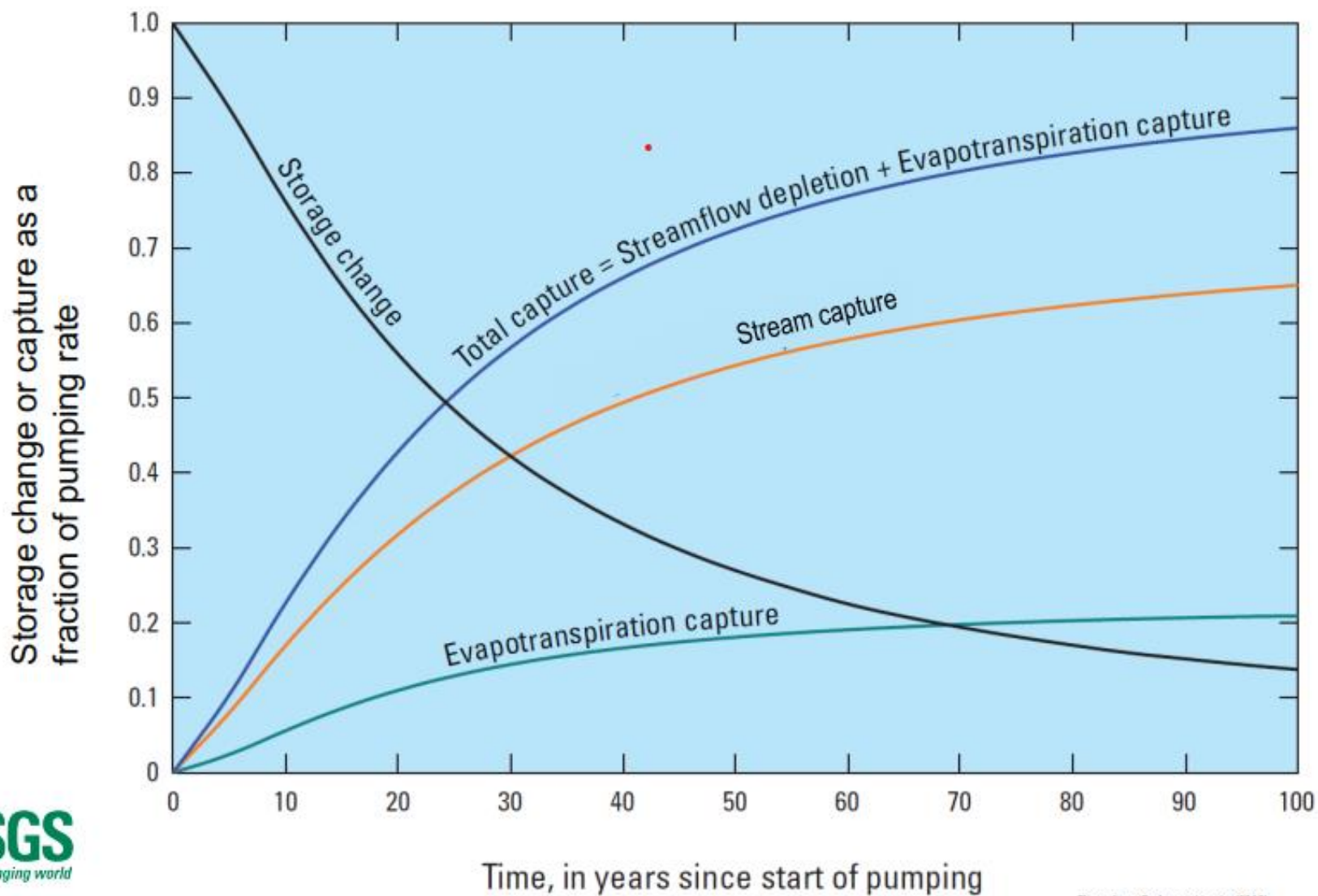
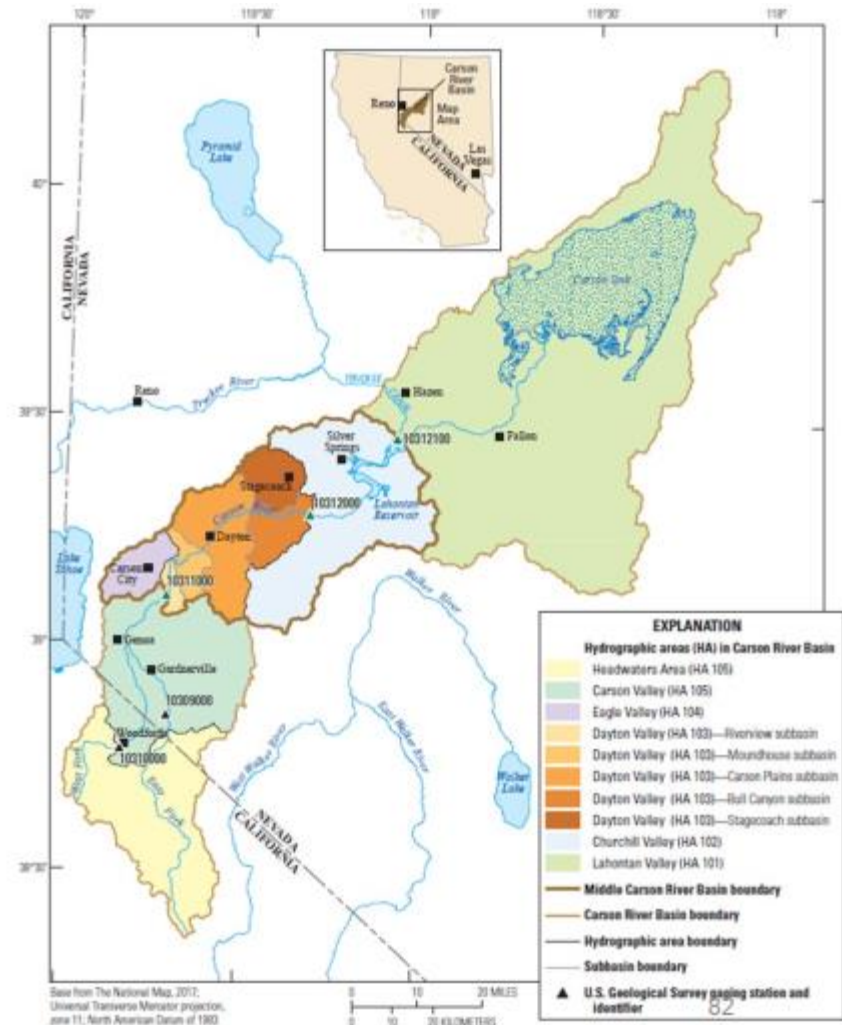


Figure from: Barlow and Leake (2012).



General Approach

- Extend current models back to pre-groundwater development conditions (1960)
- Analyze capture
 - Historical and predictive capture
 - Capture maps, results displayed with a capture query tool



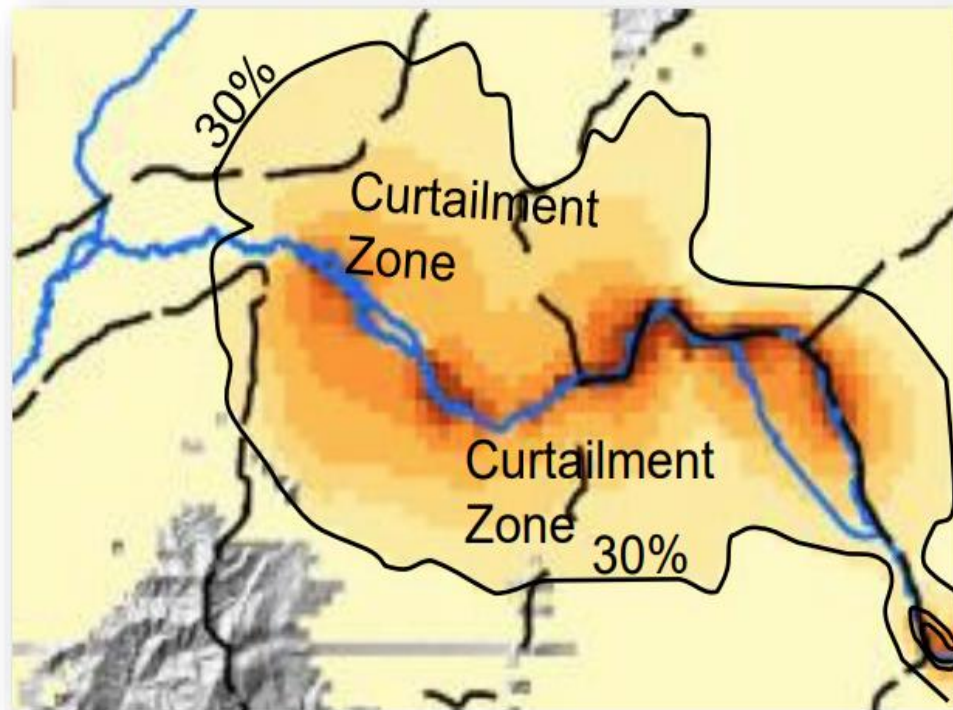
Establishing Capture Management Zone and Humboldt River Conservancy District for the Humboldt River Region - NDWR

CURTAILMENT ZONE

- Define Curtailment Zone for areas with substantial conflict
 - For example: 30% or 50% of pumping sourcing from stream capture.
- All non-exempted pumping curtailed unless capture is offset.
- Offsets can be from Decree rights, artificial storage credits, water trading, and ???.
- Offsets must be of sufficient quantity and reliability (wetness) to offset capture.

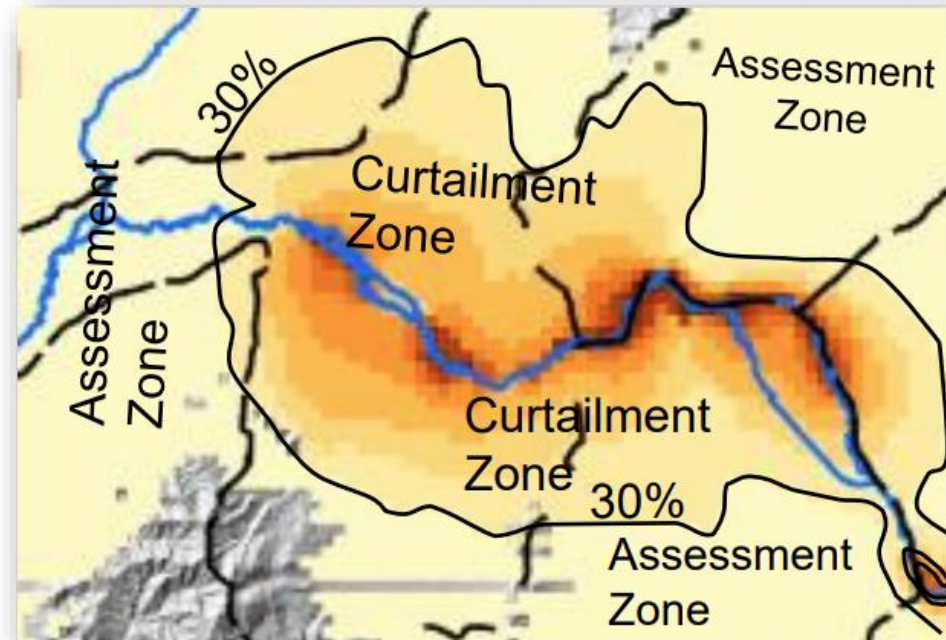
Hypothetical example for a 30% capture curtailment zone modified from:

http://www.water.nv.gov/HumboldtRiver/2023_HumboldtOutreach.pdf



ASSESSMENT* ZONE

- Area outside of Curtailment zone within CMZ.
- Assessments based on value of 'surface' irrigation water conflicted.
- Assessments prorated by time in conflict.
- UG water rights only in priority when Decree and Storage rights are fully served (or will be).



* - Not groundwater assessments by NDWR.

HUMBOLDT RIVER CONSERVANCY DISTRICT ([NRS 541](#))

Establishment of the District

- Establish a local District
- Governed by locally elected board members.
- Boundaries defined by CMZ.
- Levy base assessments on GW and SW users within CMZ.
 - Funds staff and facilities.
- Levy capture assessments for UG rights within assessment zone.
- Would require petition from counties, court action, or legislative action to stand up a Conservancy District.

HUMBOLDT RIVER CONSERVANCY DISTRICT

Mission/Activities of the District

- Manage the CMZ.
- Apply for/manage grants and other funding sources.
- Use capture assessments and other funds to purchase, retire, and/or resell water rights:
 - To reduce conflict from capture impacts.
 - To make Decree offset available for UG rights.
- Undertake river restoration or enhancement projects.
- Manage/Maintain water markets and water trading to offset impacts or incentivize conservation.



Questions and Thank You!

