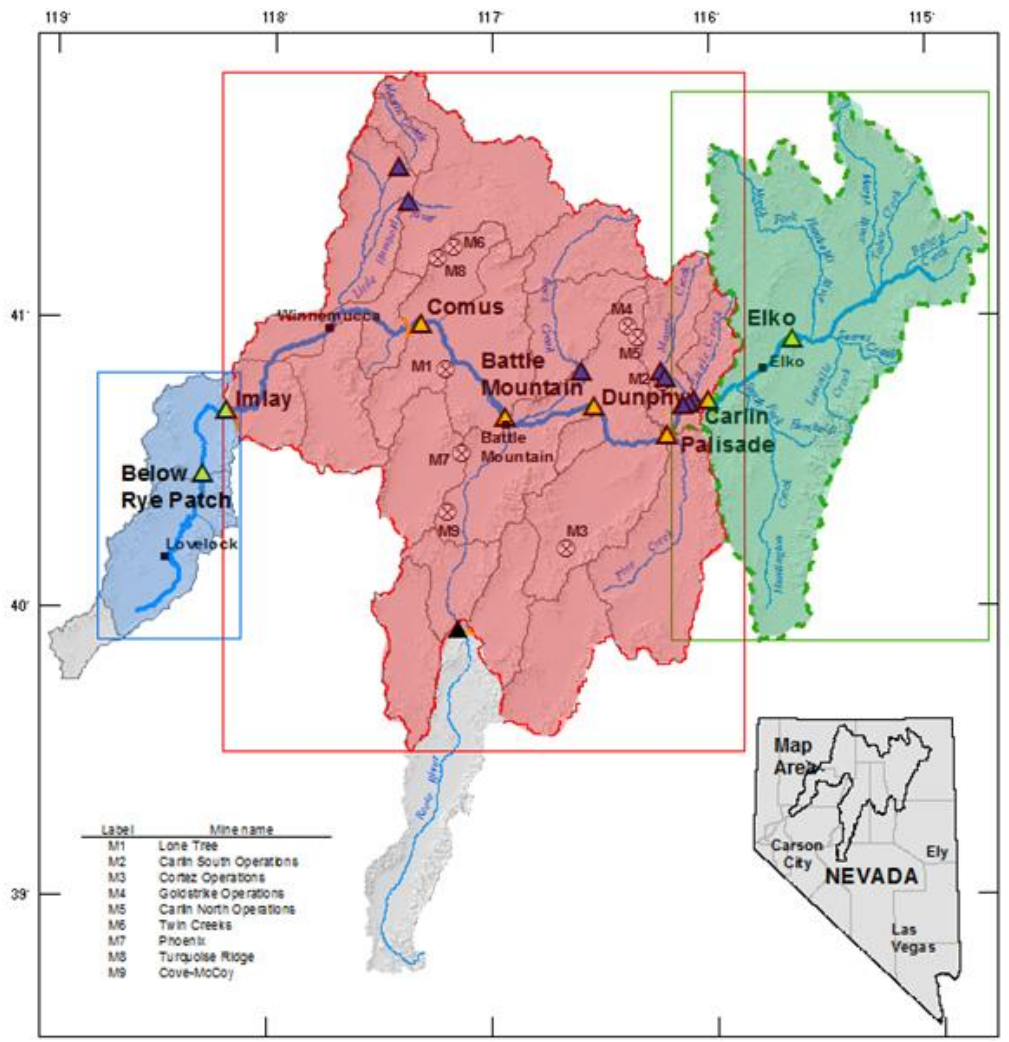


NEVADA DIVISION OF WATER RESOURCES

Nevada Department of CONSERVATION & NATURAL RESOURCES

NDWR Conjunctive Management Update for Humboldt River Region

Public Outreach Sessions:
Elko, Winnemucca, Lovelock

June 10th & 11th, 2025

Presented By:
NDWR Staff: Kelly, Landon, Colton, Adam, Kip

AGENDA

- ❑ Recent Actions, Development and Purpose of a Working Group, and Understanding the NDWR Decision-Making Process-Adam Sullivan, State Engineer
- ❑ The Evidence Behind the Problem and Potential Solutions- Kip Allander, NDWR
- ❑ Groundwater Modeling Update-Kyle Davis and Sarah Peterson, USGS
- ❑ Public Discussion / Q&A – Kelly McGowan, NDWR

Conjunctive Management in the Humboldt Region

- Core Tenets:
  - Optimize beneficial use of water resources, both underground and surface water.
  - Adhere to the Prior Appropriation Doctrine.
  - Measurably reduce existing conflict caused by groundwater pumping to senior decreed rights.
  - Minimize impacts on local and regional economy.
  - Use data-based, building block approach.
  - Citizen participation
- Actions must work within the confines of NV water law and the Humboldt Decree.

History

2013-2014 Downstream reaches of the River go dry for unprecedented duration

2015 Writ petition filed in Pershing County for NDWR to take action

2016 Groundwater models initiated with USGS/DRI

2016-2017 Regulations considered

2018-2022 Annual updates on modeling activity

2021 Order 1329

2022-2023 Upper and Lower groundwater models and ET study published

2023 Public workshops

2024 Current Stakeholder Working Group initiated

Recent Actions to Improve Management and Data, and Reduce Conflict

- Order 1329 upheld confirming SE authority to Conjunctively manage water resources.
- Order 1286 requiring maintenance of diversion structures and measuring devices.
- Gages installed at:
  - Rye Patch Reservoir
  - South Fork Reservoir
  - 3 on Little Humboldt River
- Upcoming Gage installation on Humboldt River at Rose Creek
- Channel efficiency improvements near Iron Point

Humboldt River Stakeholder Working Group and Subgroup meetings

- 4 Humboldt River Stakeholder Working Group meetings (June 25 and October 2, 2024, January 8 and April 11, 2025).
- About 25 people participating
  - Broad representation of perspectives and expertise
  - Small enough to have inclusive conversations
- Constructive discussions: what works for the entire system, keeping an open mind and not just representing your own interests
- Not a requirement, not a public body, not voting on anything, not making any final decisions.

- Materials from those meetings are available here:

PURPOSE OF THE WORKING GROUP

To evaluate and consider proposed strategies for reducing water right conflicts in the Humboldt River region, including solutions beyond the authority of the NDWR.

ACKNOWLEDGMENT: THE HUMBOLDT RIVER STAKEHOLDER WORKING GROUP

Participant	Representing
Zach Woodbury	County 1
Shayla Hudson	County 2
Jim Kerr/Dale Johnson	Municipal Supply/City 1
James Eason	Municipal Supply/City 2
Brigid McHale	Industrial 1
Ed James	Conservancy Rep
Joel Donalson	Mining 1
Steve Skidmore	Mining 2
Kendle Bowler	Irrigation (UG) 1
Sam Routson/Eldon Crawford	Irrigation (UG) 2
Sabrina Tomera Reed	Irrigation (SW) 1

Participant	Representing
Bennie Hodges	Irrigation (SW) 2
Jeff Fontaine	At-Large 1
Doug Busselman	At-Large 2
Laurel Saito	Environmental
Therese Stix/Caitlin Skulan	Legal 1
Sev Carlson	Legal 2
Chris Mahannah	Water Rights 1
Dawn Aragon	Water Rights 2
Jay Dixon	Hydrogeology 1
Dwight Smith	Hydrogeology 2
Michael Taylor/Andrew Ayers	Economics

Humboldt River Stakeholder Working Group and Subgroup meetings

- Discussions incorporated review of data and available science, options to address conflict, and identification of challenges, approaches, and potential solutions.

- Sub-groups formed to explore more thoroughly the concepts of:
  - **Districts – Consideration of the potential applicability of conservancy or groundwater districts**
  - **Economics – Understanding the implications associated with different offsets/mitigation**
  - **Technical – Analyze hydrologic processes and understanding related to conjunctive management**

Materials from HRSWG meetings are available here:

Management ideas being considered/discussed with HRSWG

- No Action
- Curtailment of UG by priority
- Focused curtailment of UG by impact
- Establish Capture Management Zone
- Establish conservancy district
- Special considerations for public water supply
- Consider methods from other Western States
- Use of Decree to offset capture
- Use of pumping reductions or UG relinquishments
- Limit irrigation seasons and duties to that of Decree
- Improved management of Decree
- Managed recharge as offset
- Augmentation plans
- Conservation as offset
- Water right buy back
- Use of private agreements
- Market-based approach
- Nature-based solutions
- Exemptions

PROGRESS SEQUENCING

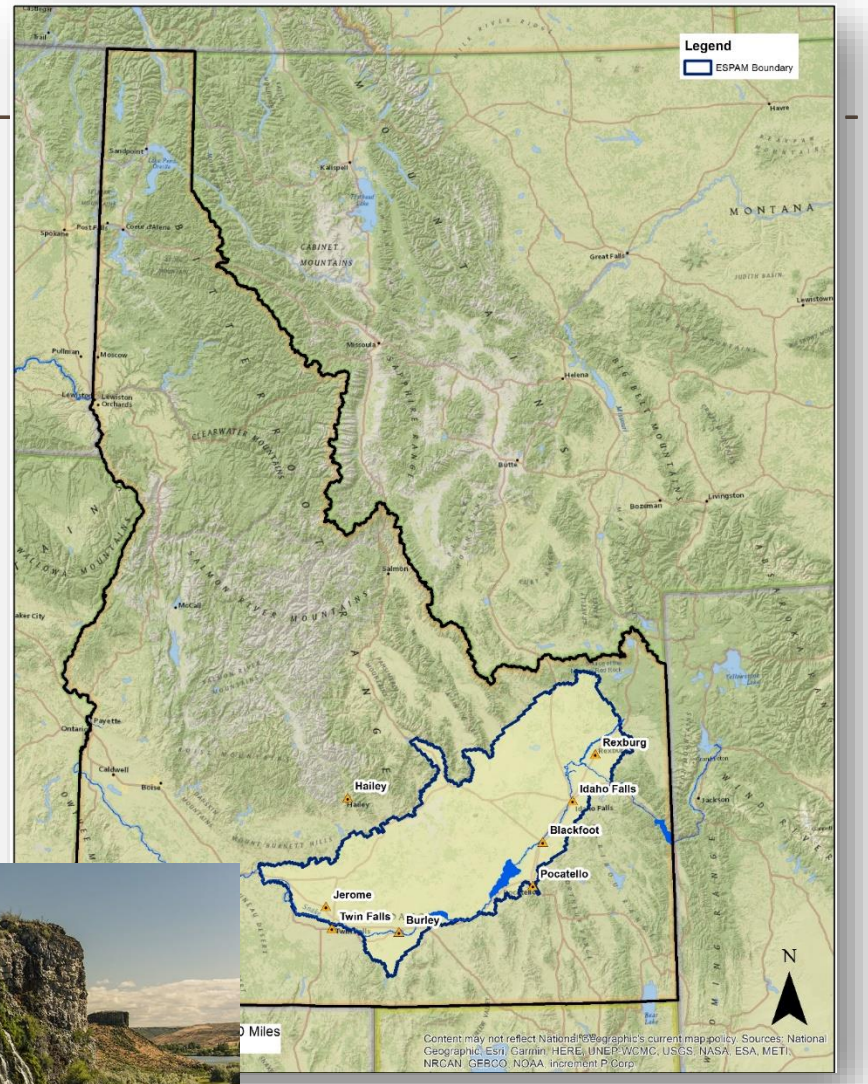
2023-24	2024	2025	2025	2025	2025	2025
Order 1329 in effect Stakeholder presentations: strategies to reduce capture & conflict.	Working Group established &Possible Solutions introduced	Sub-groups established: Offsets, conservancy district, market solutions	Analysis & Solution development	Public outreach	NDWR Preliminary Draft Order	Refine Solutions & Implementation strategy

Planned Draft Curtailment Order

- Curtailment is a last resort because of the harsh impacts, but it is **the** authority in statute to directly address known conflict among water rights.
- Clear pathway to curtailment is needed to incentivize solutions.
- Contents and Objectives.
  - Explanation of the necessity and authority.
  - Sideboards of options and what constitutes resolution of conflict.
  - Timeline for implementing solutions.
  - Curtailment requirements if conflict is not otherwise resolved.
- Draft for open public review: end of 2025.
- Additional public workshops and explanation, with maps and informational tools.
- **Exemptions** under consideration: Domestic wells, small stockwater rights and de minimis use.

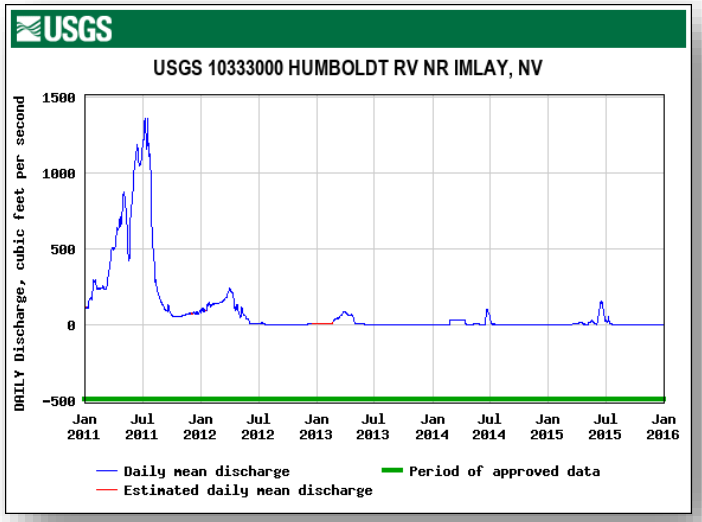
Idaho's experience with Conjunctive Management – Key Takeaways

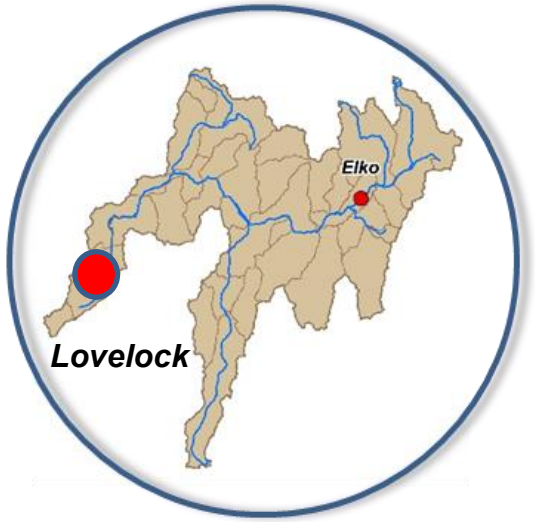
- Strong Legislative support
- Conjunctive Management Rules
- State investment in modeling
- Prior appropriation doctrine rules
- Jr GW arguments of takings, economic harm & is more profitable use failed
- Defendable science/modeling & updates are key
- Benefits from having Districts



THE EVIDENCE DEFINING THE PROBLEM

HUMBOLDT RIVER REGION: THE PROBLEM





IN THE ELEVENTH JUDICIAL DISTRICT COURT OF THE STATE OF NEVADA

IN AND FOR THE COUNTY OF PERSHING

PERSHING COUNTY WATER CONSERVATION DISTRICT,

Petitioner,

v.

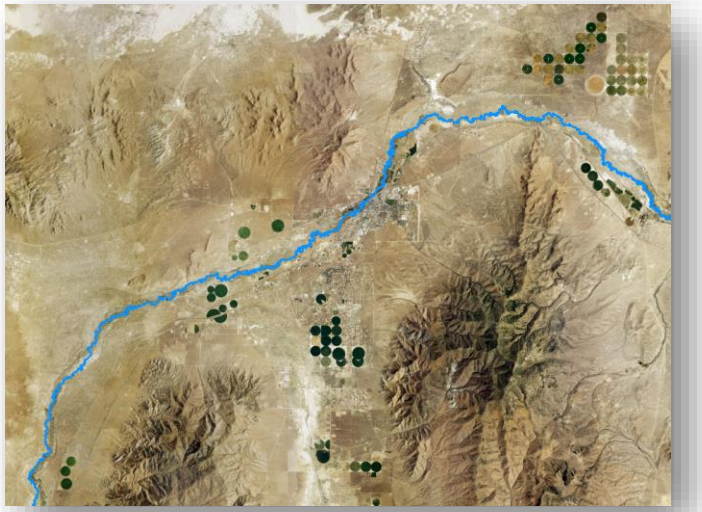
JASON KING, P.E., State Engineer of the State of Nevada, DIVISION OF WATER RESOURCES, DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES,

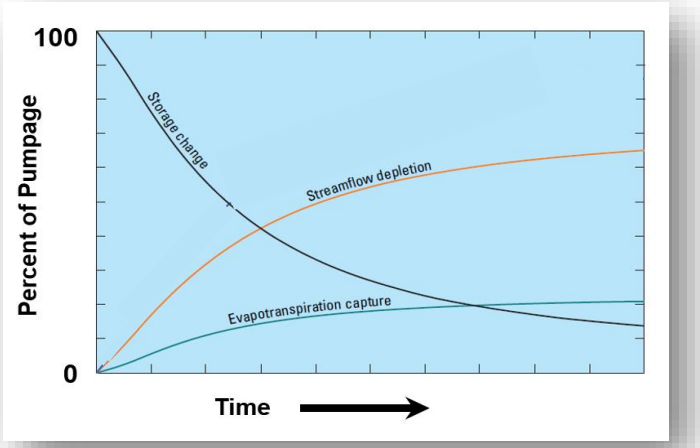
Respondent.

Case No.

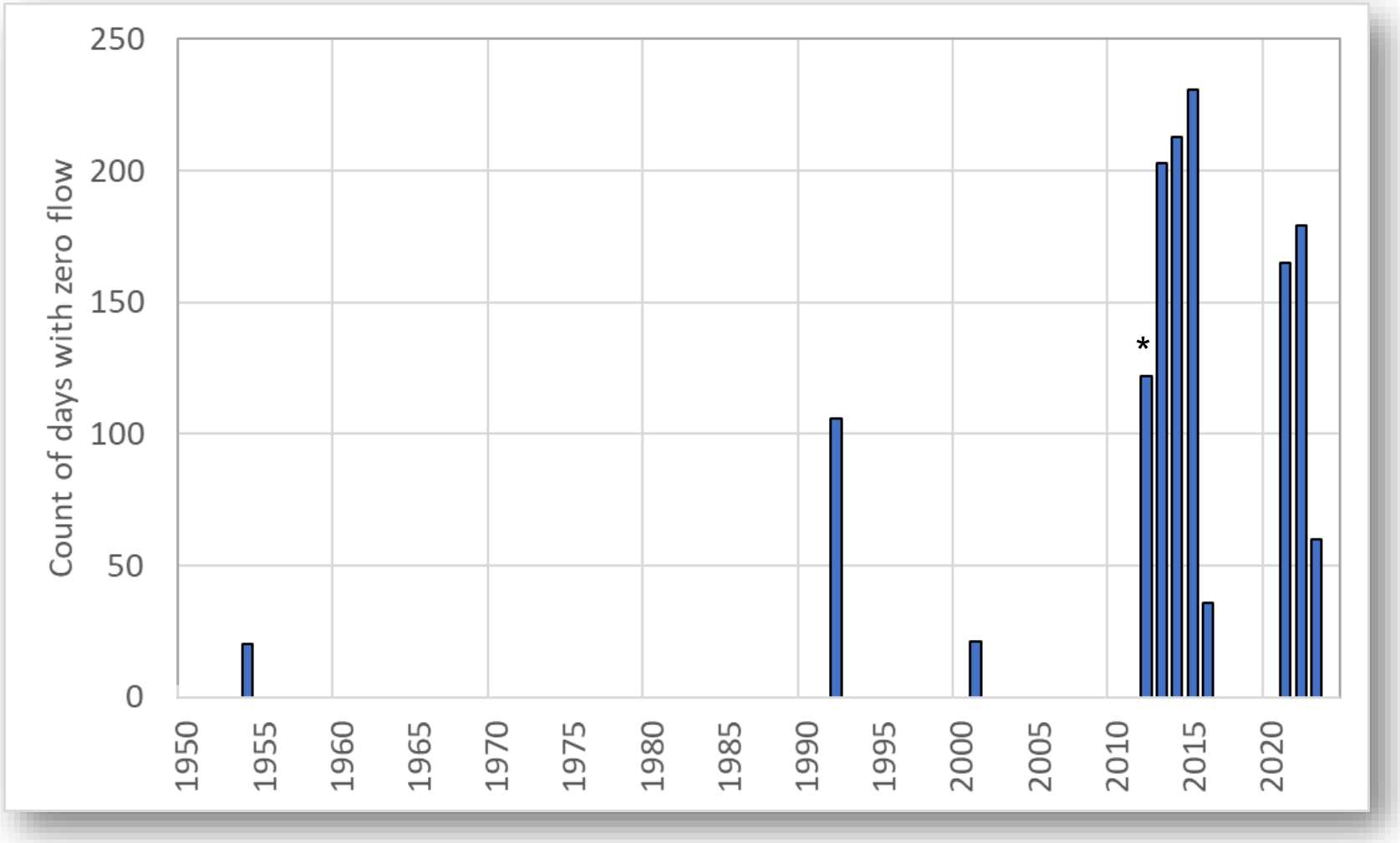
Department No. 01

PETITION FOR WRIT OF MANDAMUS, OR IN THE ALTERNATIVE, WRIT OF PROHIBITION



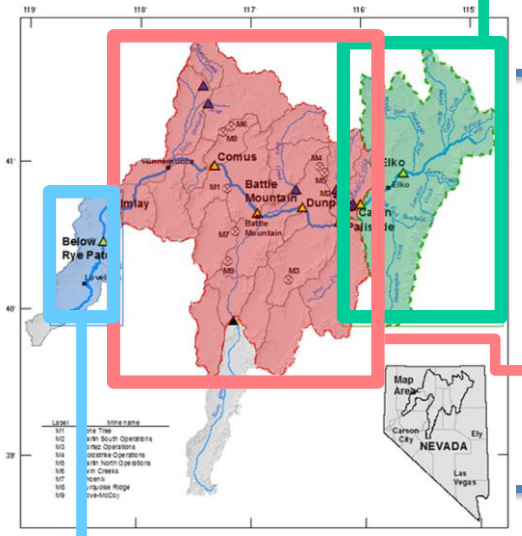


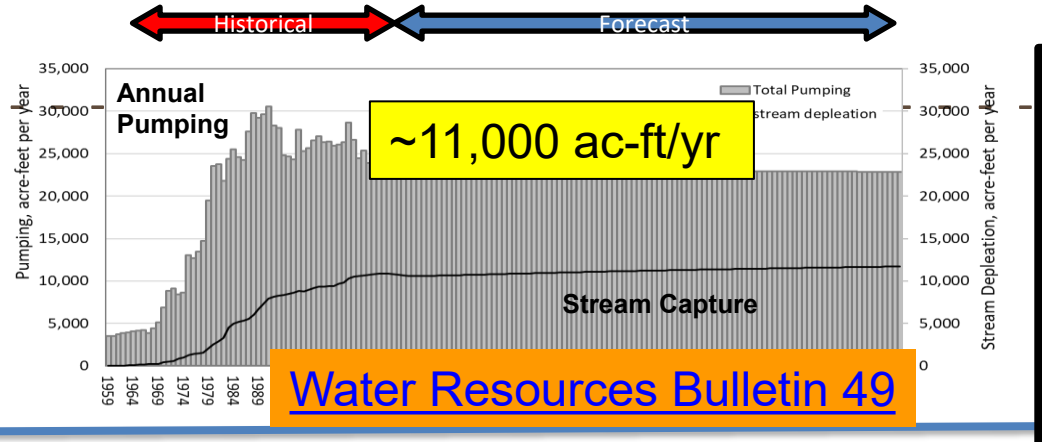
Zero-flow days at Imlay gage since 1946

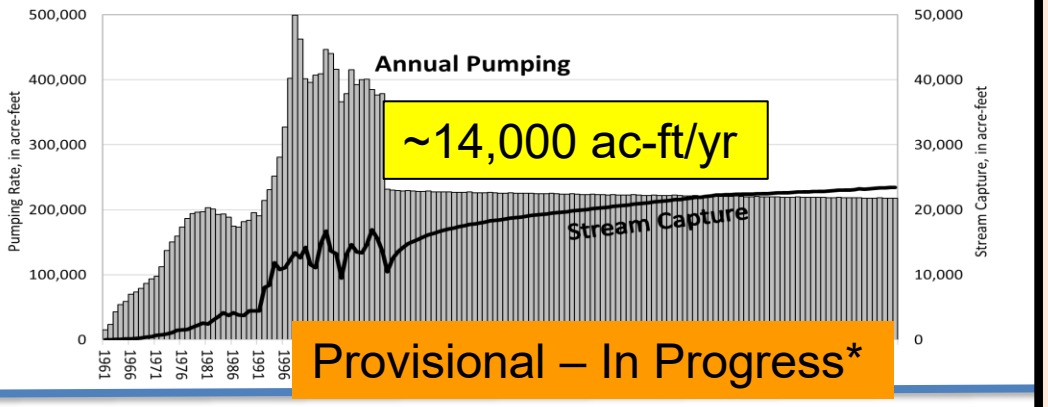


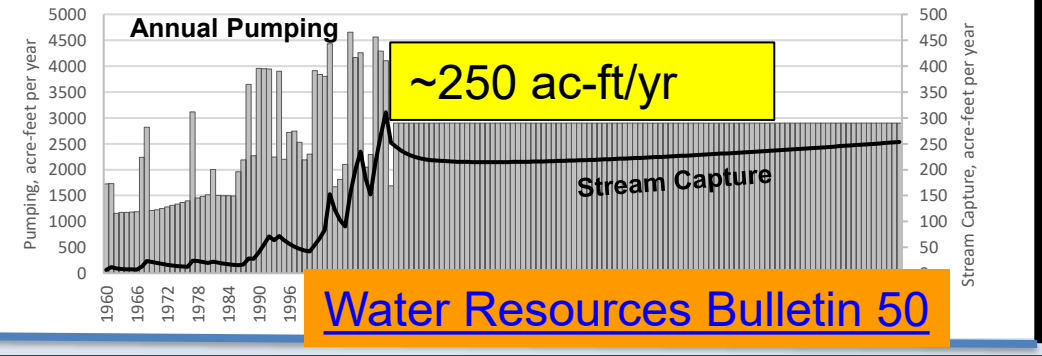
* Landon started working in 2012

Model Estimated Capture Quantity









REGIONWIDE

2015 CAPTURE: 25,000 AFY

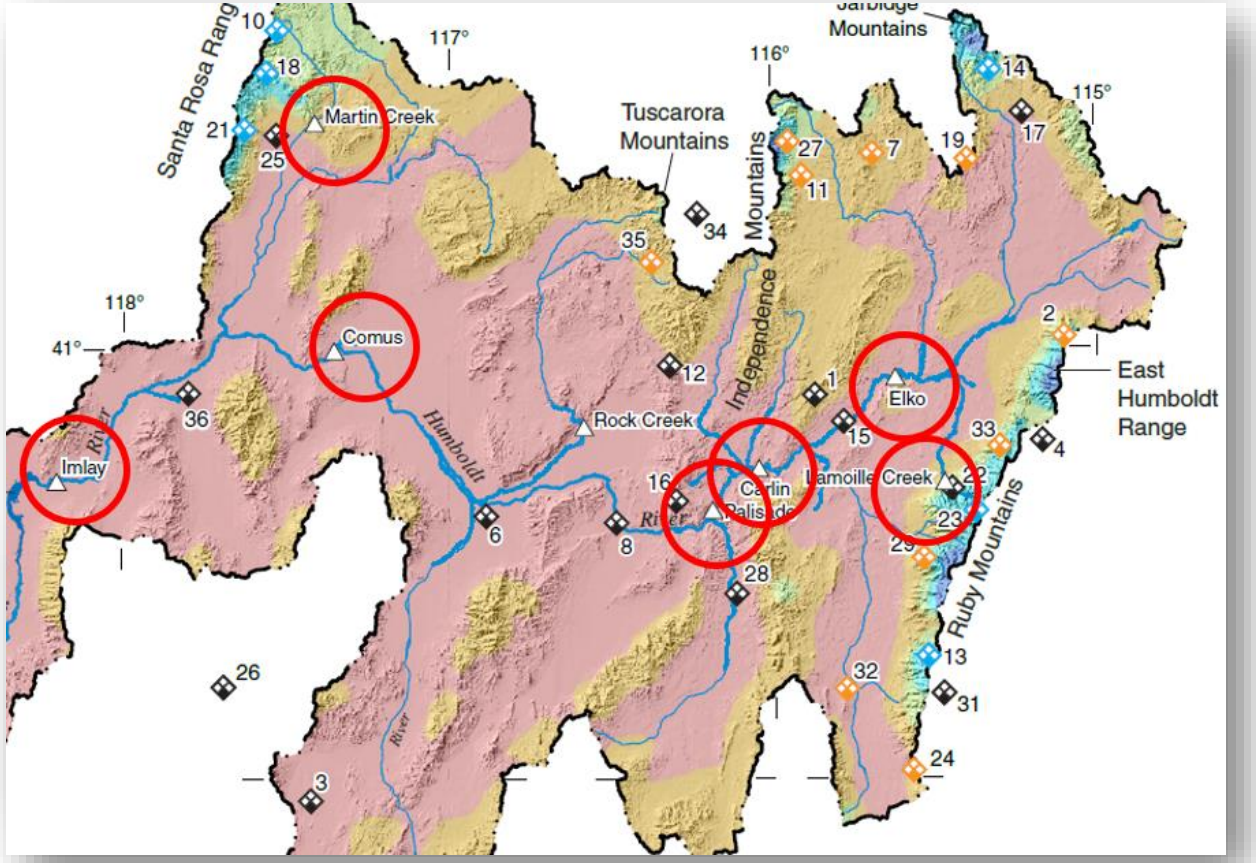
2015 PUMPING: 400,000 AFY

6% PUMPED WATER IS CAPTURE

New Report Released end of 2024 (Prudic's Trends Report)

Trend analysis of gage data between two similar climate periods.

- **1946 – 1969**
- **2007 – 2020**



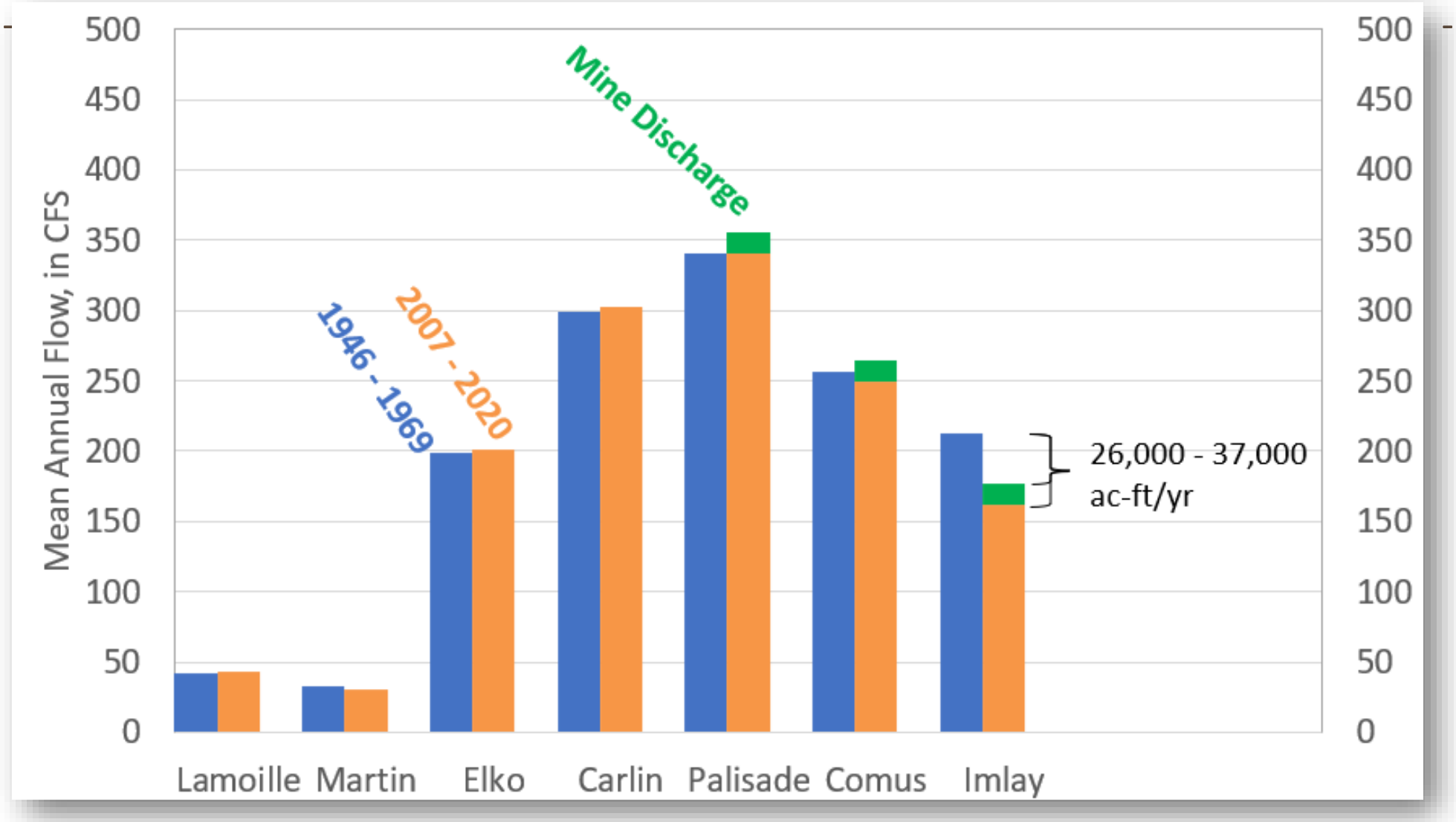
ISSN: 2373-5996
DOI: 10.22542/jnwra/2024/1/3

Trends in flow of the Humboldt River, North-Central Nevada, 1945 to 2020

DAVID E. PRUDIC, 702 Crain Street, Carson City, NV 89703 (davideprudic@gmail.com)

https://doi.org/10.22542/jnwra/2024/1/3

Prudic Trend Summary



Trends upstream of Comus do not appear to be present.

Decreasing trend at Imlay is substantial!

Estimated capture at Imlay based on flow difference ~26,000 – 37,000 AFY.

Is unused decree masking upstream capture impacts?

Above Palisade

Reach/Tributary	Unused Decree (AF)
Main Steam	6,000
South Fork/Dixie Ck	2,669
North Fork	1,908
Mary's River	7,497*
Lamoille	2,139
Smith/Huntington Ck	1,740
Misc. in Elko Co.	342
Pine Valley	303
Total	**22,600**

Below Palisade

Reach/Tributary	Unused Decree (AF)
Main Steam	1,405
Total	**1,405**

Is unused decree masking capture impacts estimated by the Upper Humboldt Model?

Problem Summary

- Magnitude of capture problem is between 25,000 – 45,000 acre-ft/yr.
  - Based on models and trend analysis approaches.
- Groundwater is junior to Surface water.
- Humboldt River rarely serves priority dates junior to 1933 (Rye Patch Storage permit).
- Groundwater pumping capturing flow from the Humboldt River is usually in conflict with the Humboldt Decree.
- Upstream conflict is possibly being masked by unused Decree.

USGS UPDATE ON MIDDLE HUMBOLDT MODEL

Middle Humboldt Capture Model Update

Middle Humboldt Team:

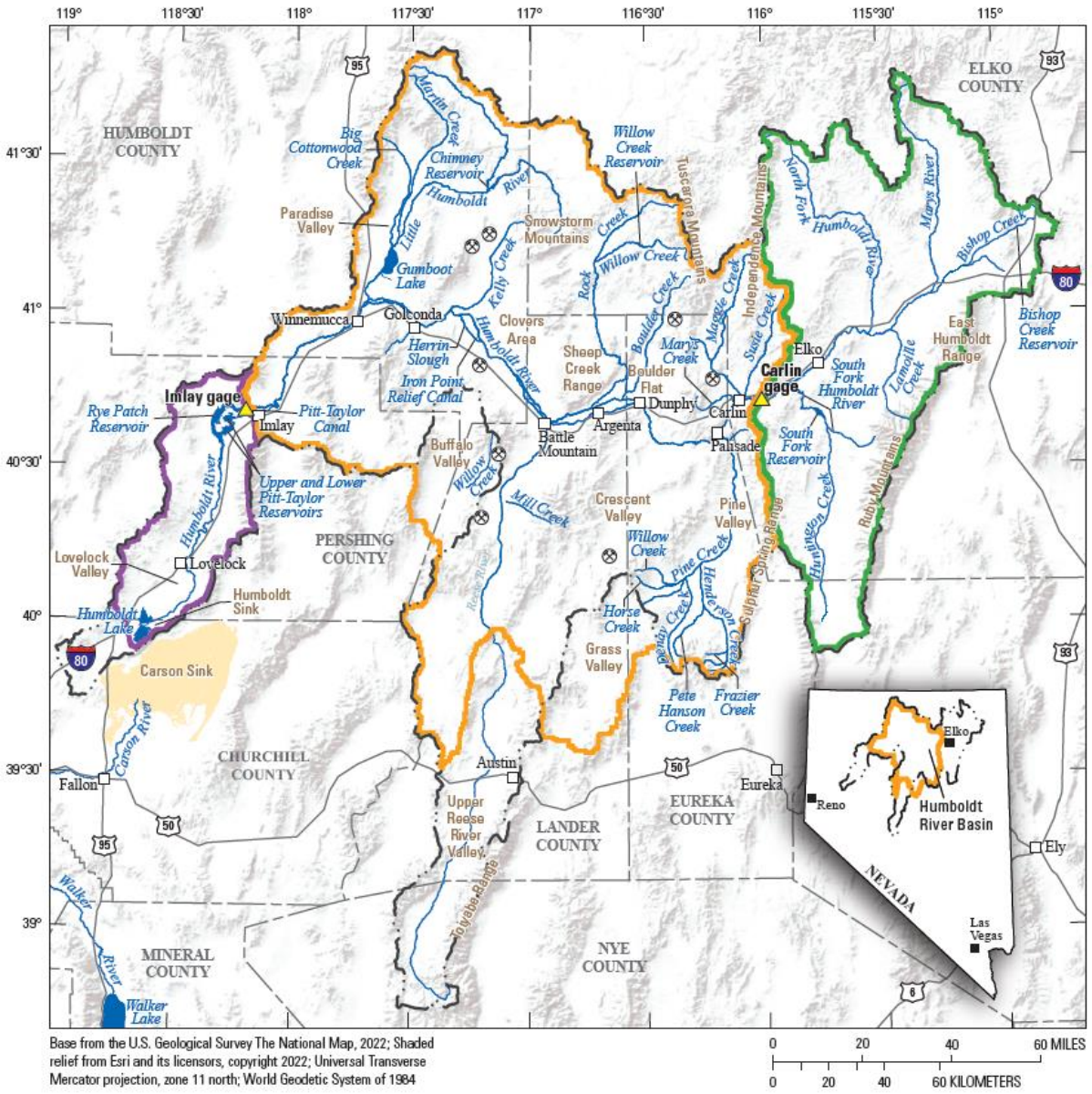
Kyle Davis[1], William Eldridge[2]

[1] USGS, Nevada Water Science Center

[2] USGS, Dakota Water Science Center

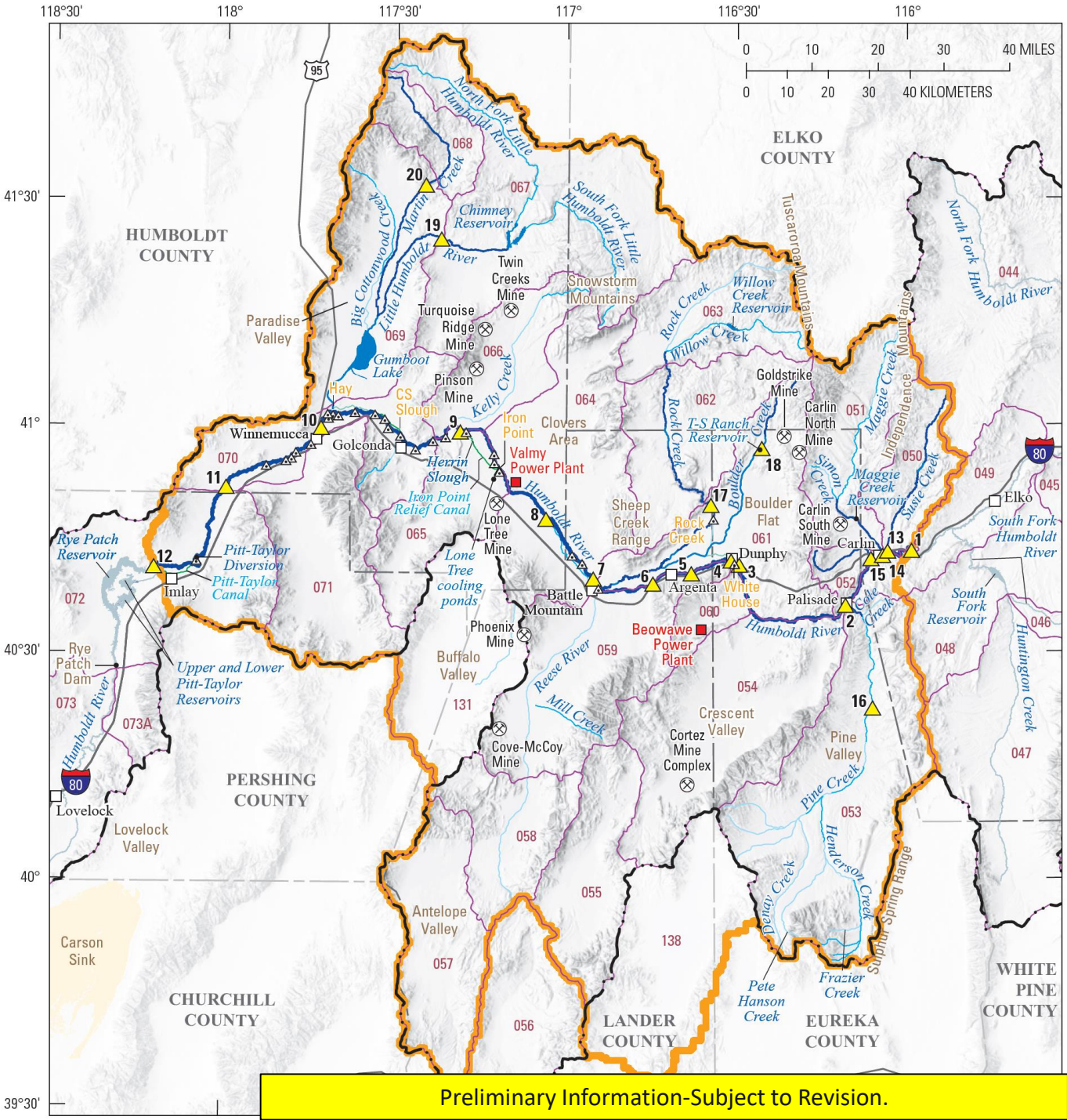
Humboldt Public Outreach Meetings:

June 10–11, 2025



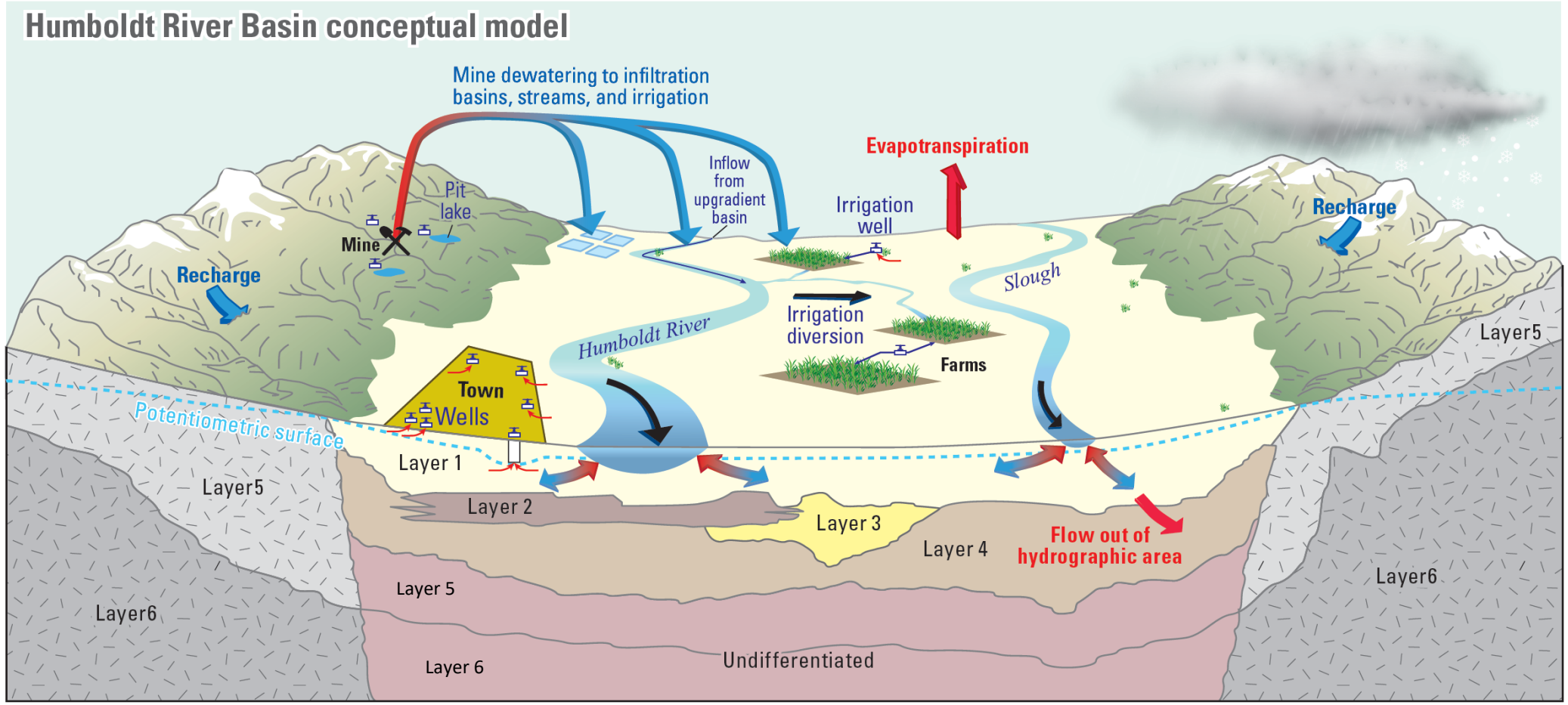
Middle Humboldt Capture Model Update

- Model and report reviews completed
- Results largely unchanged since last update in March 2022
- Review process highlighted some model limitations
- Additional analyses completed based on reviews/comments
  - Paradise Valley (HA 069)
  - Pine Valley (HA 053)
- Report release timeline updated



USGS
science for a changing world

Humboldt River Basin conceptual model



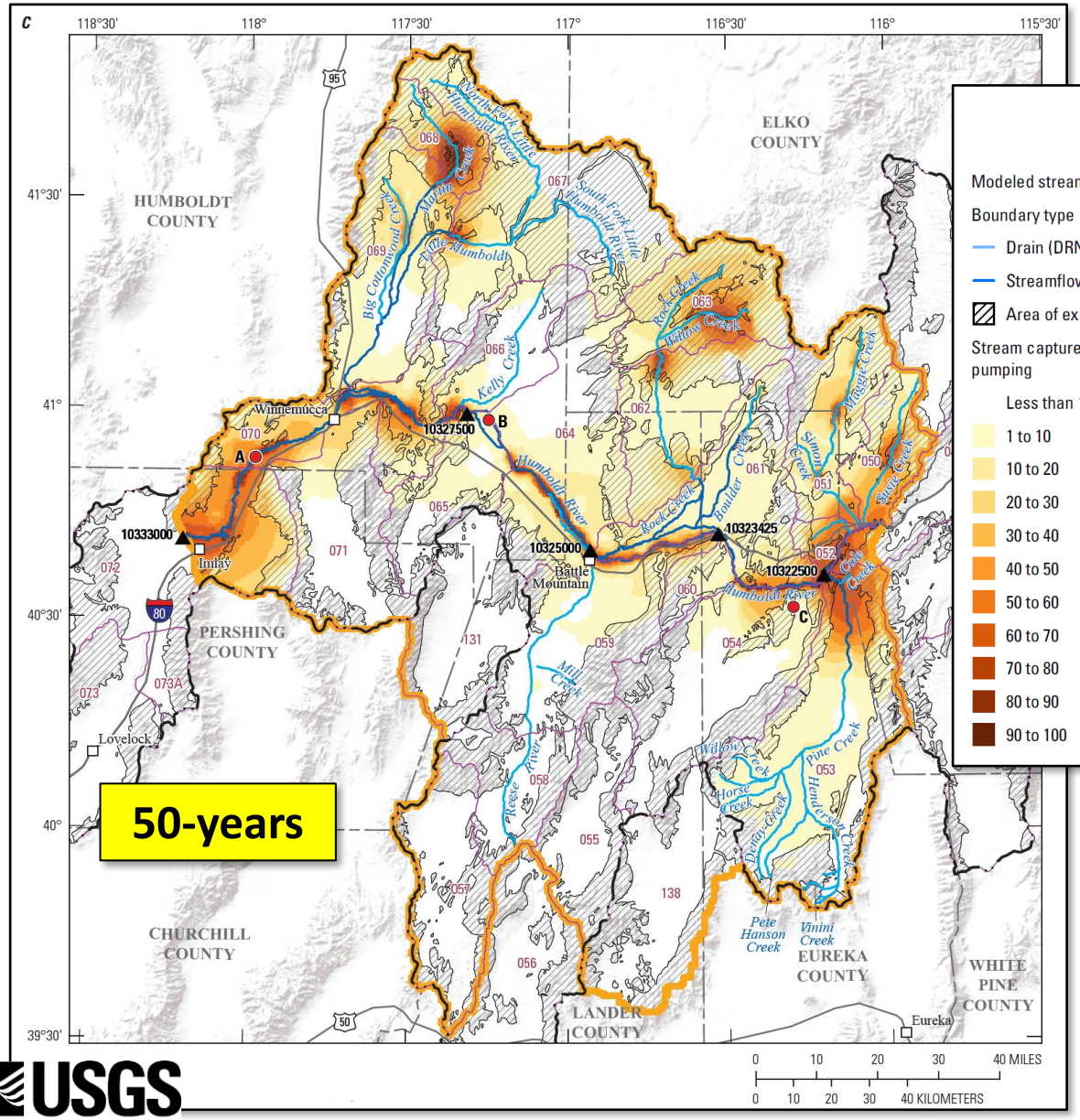
EXPLANATION

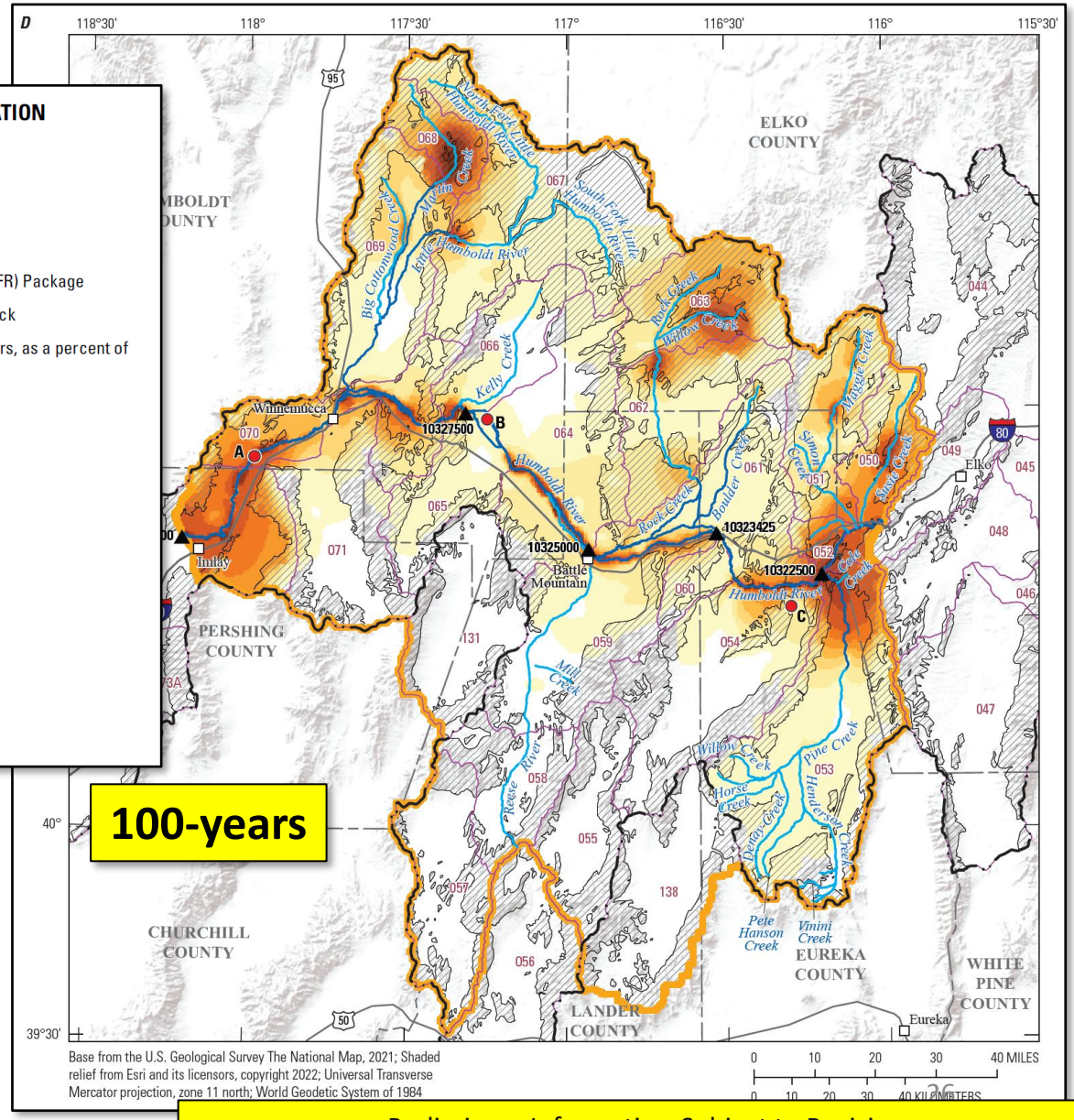
- **Layer 1: Basin fill deposits**—Playa, valley floor, alluvial slope, fluvial deposits (thickness25 to 50 feet)
- **Layer 2: Blue clay**—Blue clay (thickness 10 to 130 feet)
- **Layer 3: Lower basin fill**—Valley floor, fluvial deposits (thickness up to 400 feet)
- **Layer 4: Older basin fill**—Tertiary fine-grain semi-consolidated sediments (thickness up to 1,000 feet)
- **Layer 5: Upper consolidated rock**—Volcanic, clastic sedimentary, carbonate, crystalline, and metamorphic rocks (thickness 1,200 feet)
- **Layer 6: Lower hard consolidated rock**—Volcanic, clastic sedimentary, carbonate, crystalline, and metamorphic rocks (thickness 2,400 feet)
- **Undifferentiated**—Undefined basin fill or consolidated rock
- **Groundwater inflow**
- **Groundwater outflow**
- **Surface water flow direction**

USGS science for a changing world

Preliminary Information-Subject to Revision.

Capture Map – Stream Capture: 50-yr and 100-yr

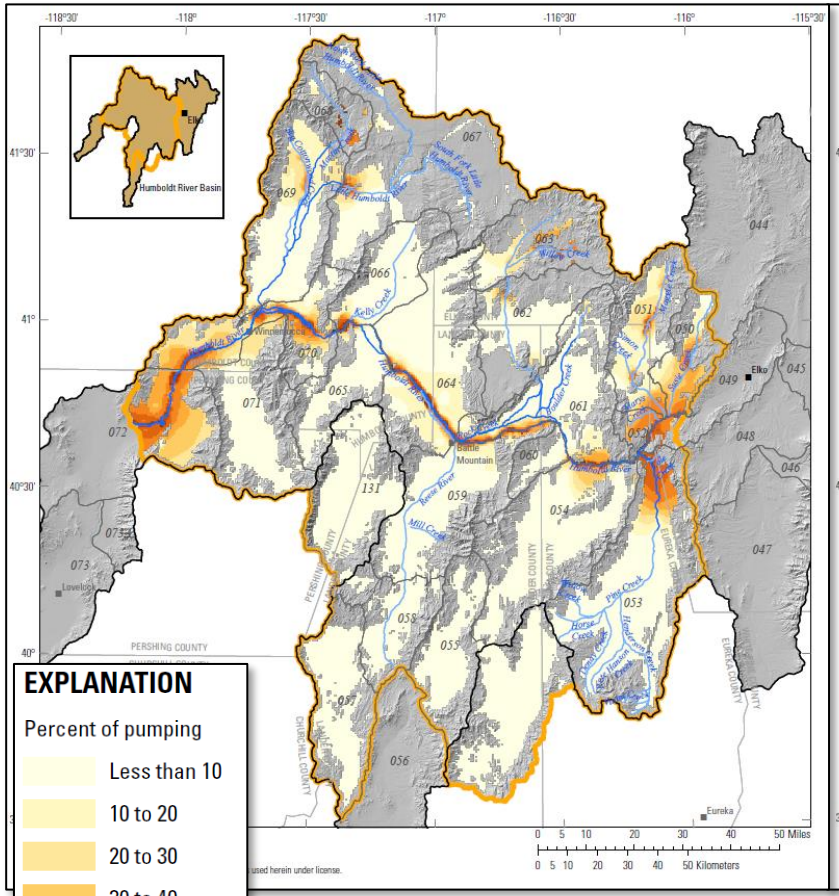




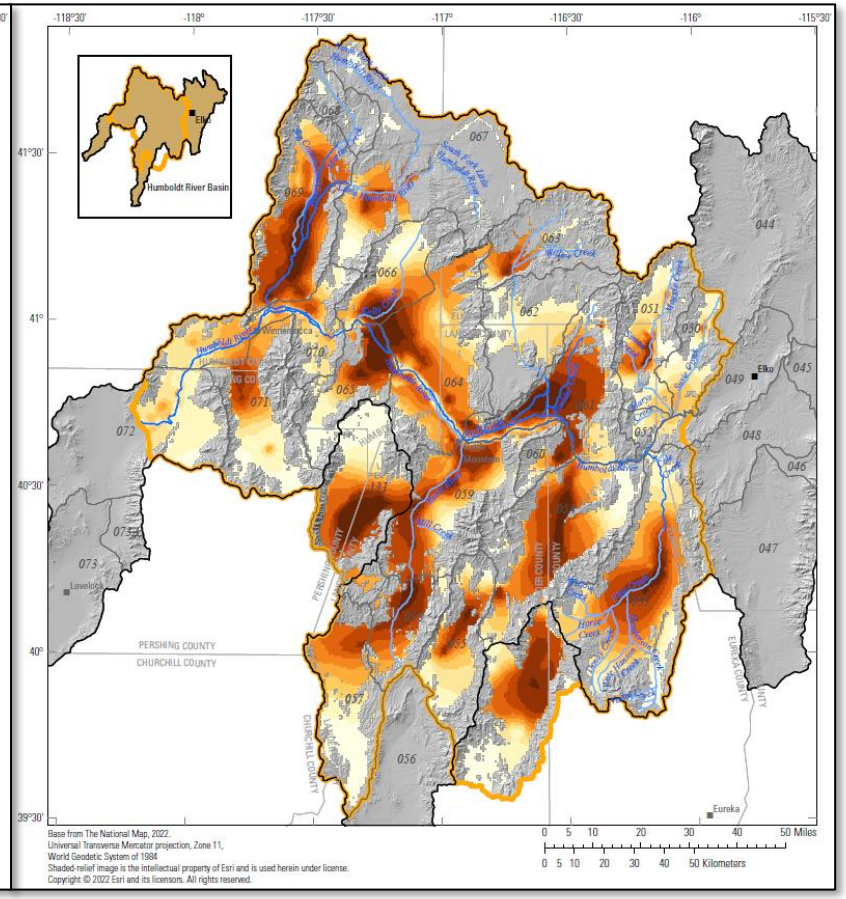
USGS science for a changing world

Preliminary Information-Subject to Revision.

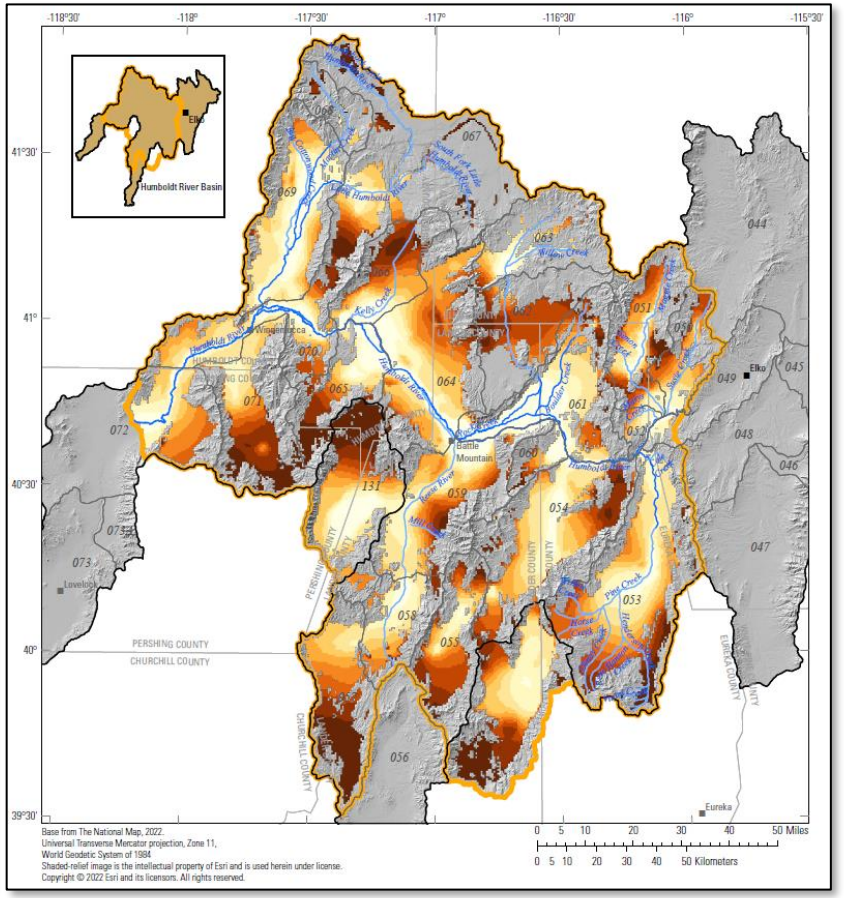
Capture Maps – Stream, ETg, and Storage (50-yr)



Stream



Groundwater evapotranspiration

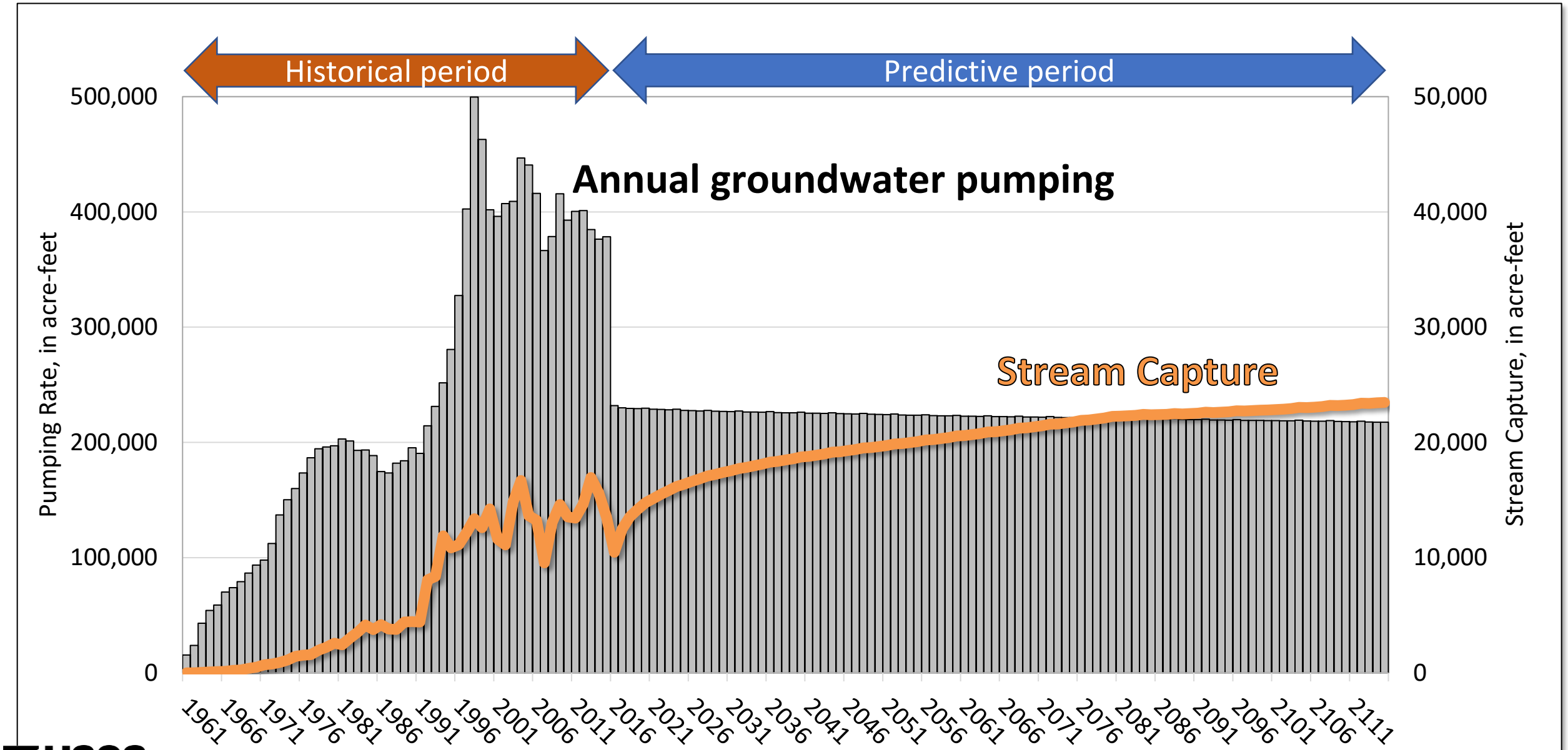


Storage

USGS

Preliminary Information-Subject to Revision.

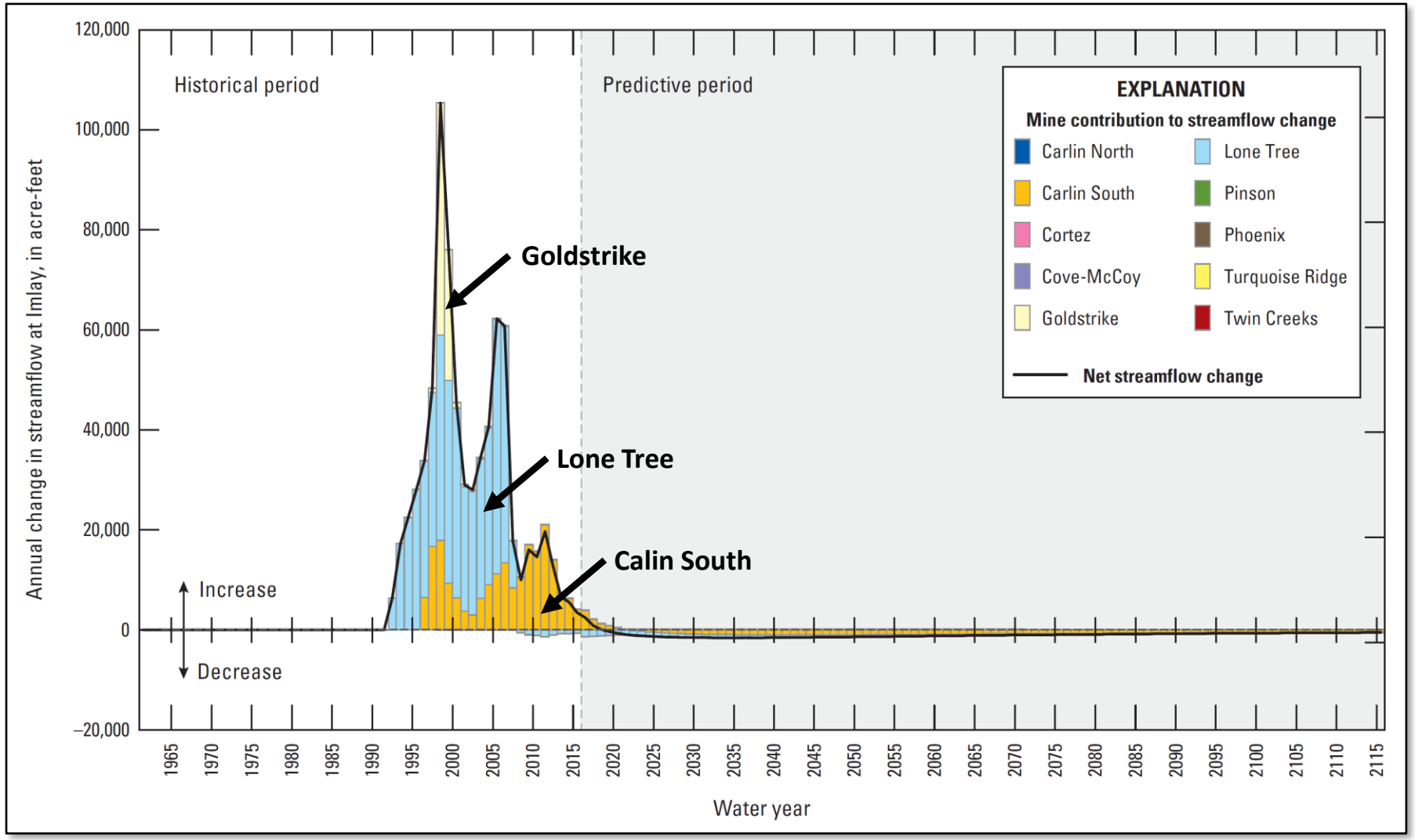
Groundwater Pumping and Stream Capture



USGS science for a changing world

Preliminary Information-Subject to Revision.

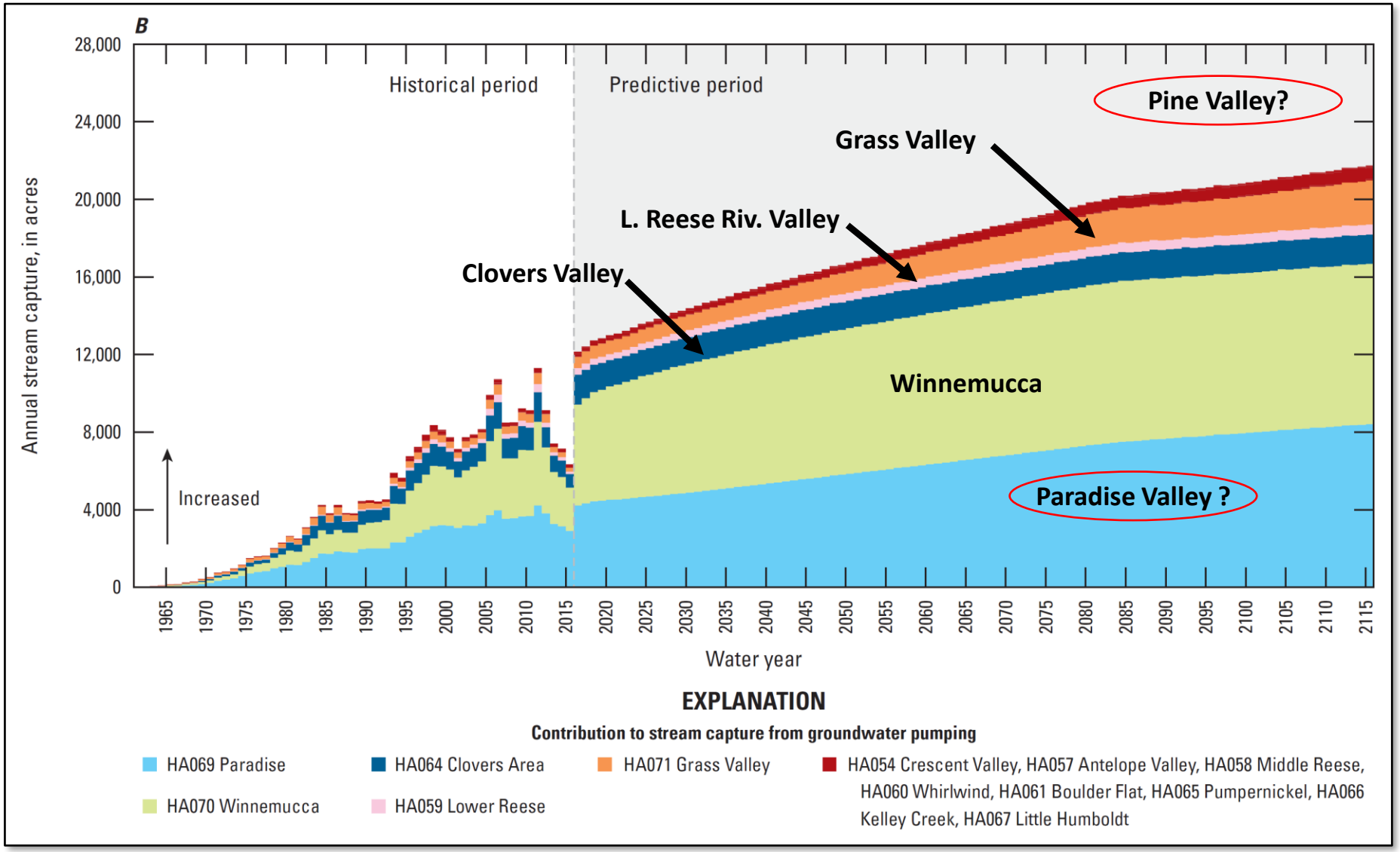
Change in Streamflow at Imlay: Mining Operations



USGS science for a changing world

Preliminary Information-Subject to Revision.

Stream Capture: Non-Mining Pumping

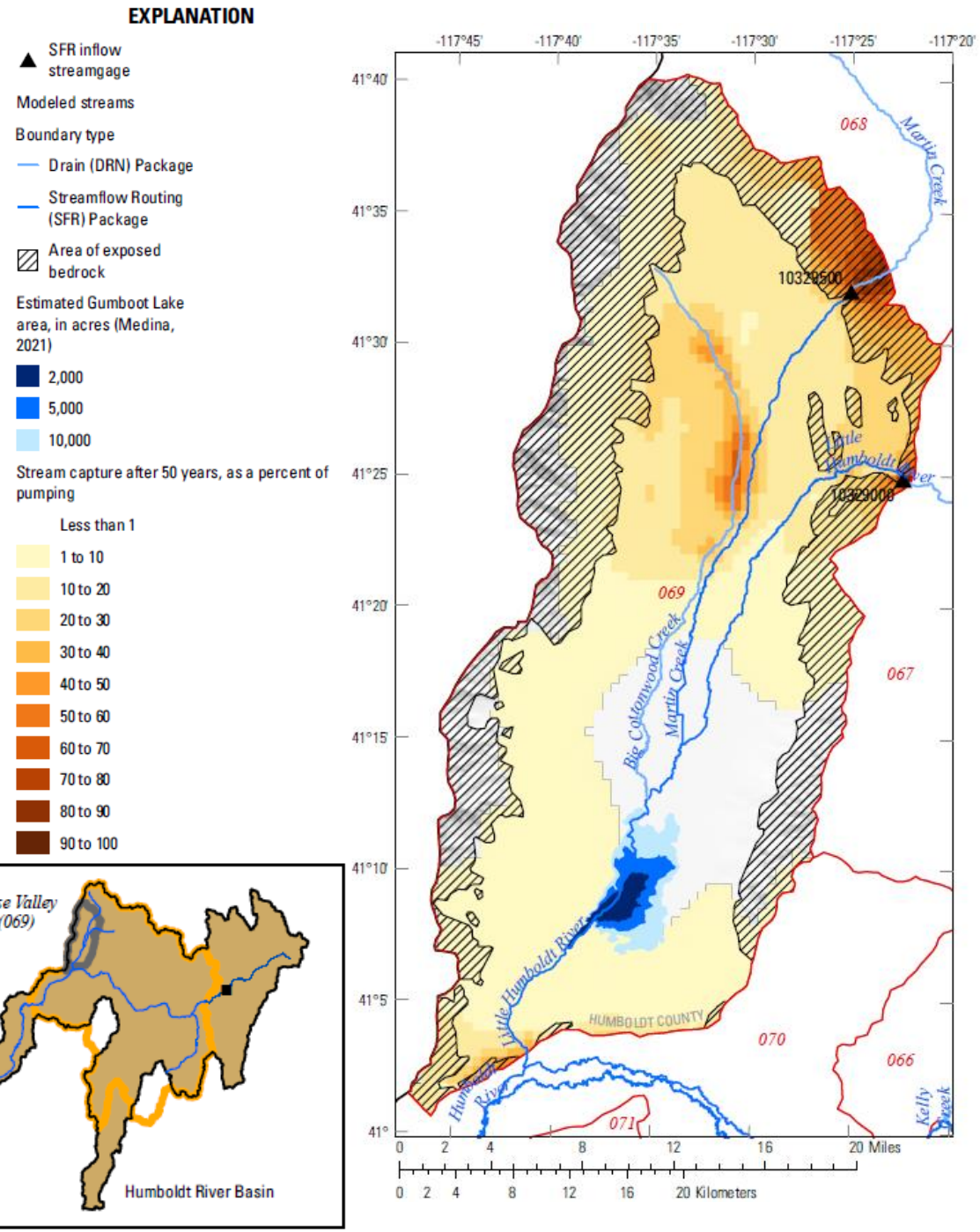


USGS science for a changing world

Preliminary Information-Subject to Revision.

Paradise Valley HA (069)

- Limitations from reviewers:
  - Irrigation return flows too low in some years
  - Little Humboldt River streamflow at confluence with Humboldt River too high
  - Streambed hydraulic conductivity calibrated parameters too low
  - Gumboot Lake formation and through-routing of streamflow
- Effects on model results
  - Inadequate calibration of input properties
  - Possible underestimation of stream capture

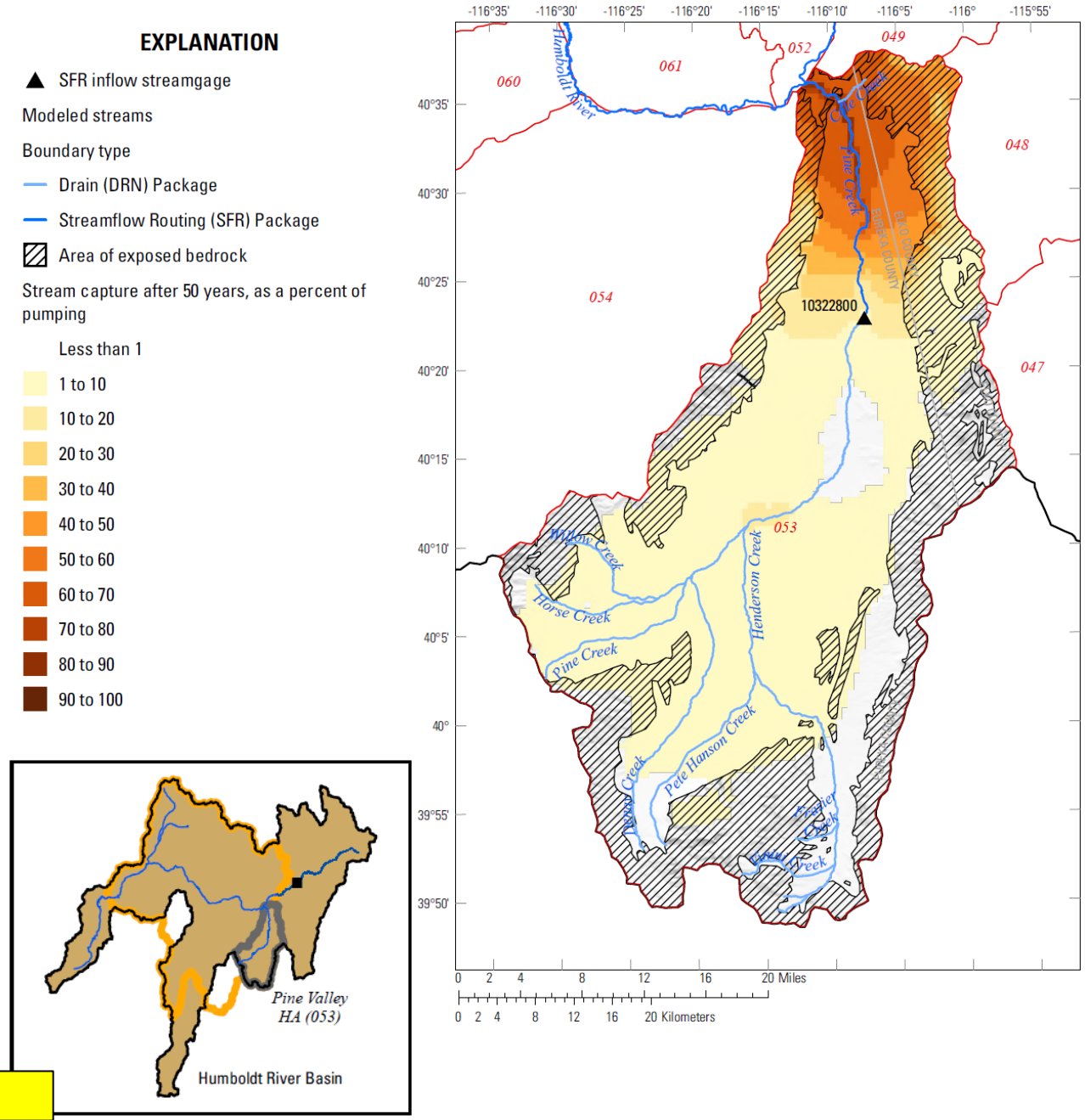


USGS science for a changing world

Preliminary Information-Subject to Revision.

Pine Valley HA (053)

- Limitations from reviewers:
  - No pumping applied in basin (pumping unintentionally excluded during model construction)
  - No surface water diversion below inflow streamgage (10322800; diversions unintentionally excluded during model construction)
- Effects on model results
  - Inadequate calibration of input properties
  - Possible underestimation of stream capture



USGS science for a changing world

Preliminary Information-Subject to Revision.

Middle Humboldt Product Status

- Project report and model ready for review: late 2022
- Peer reviews, additional analyses, and reconciliation: 2023
- State reviews, additional analyses, and reconciliation: 2024
- Editorial review/USGS Bureau approval: 2025
- Online Capture Query Tool/Model Data Release available after USGS Bureau approval
- Anticipated product availability to public: late 2025/early 2026

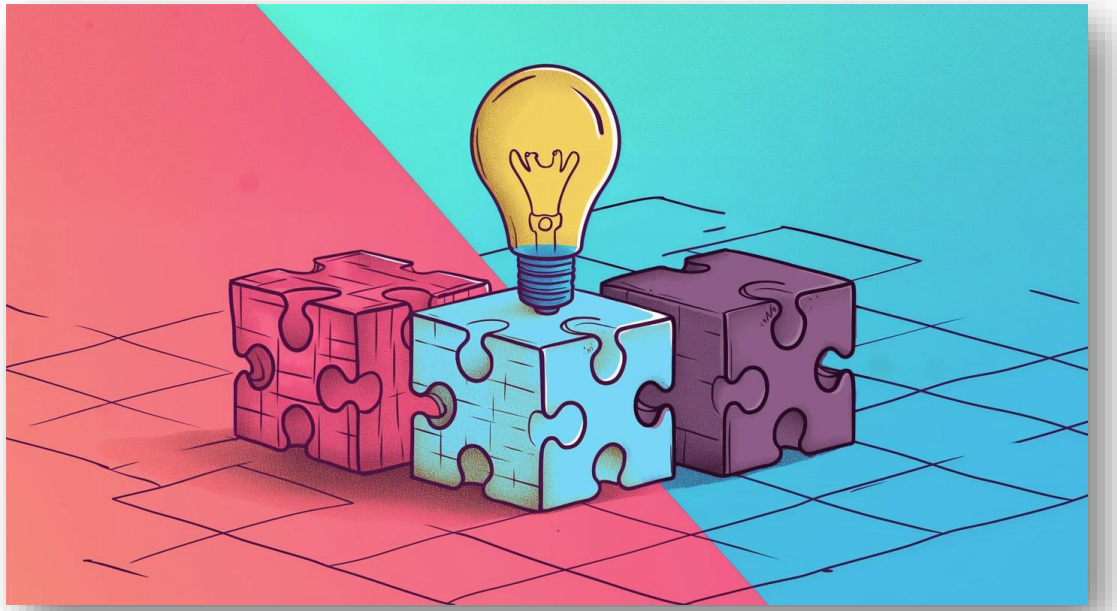
USGS
science for a changing world

Preliminary Information-Subject to Revision.

IDEAS, CONCEPTS, AND TOOLS BEING CONSIDERED

POTENTIAL SOLUTIONS AND TOOLS UNDER DEVELOPMENT

- Developing Offset Strategy
- Water Market for trading Offsets
- Local Management of Offset Vs. State's Role
- Tools:
  - Capture Management Zone Maps - Risk Map
  - Offset Quantification Tool
  - Capture Query Tool



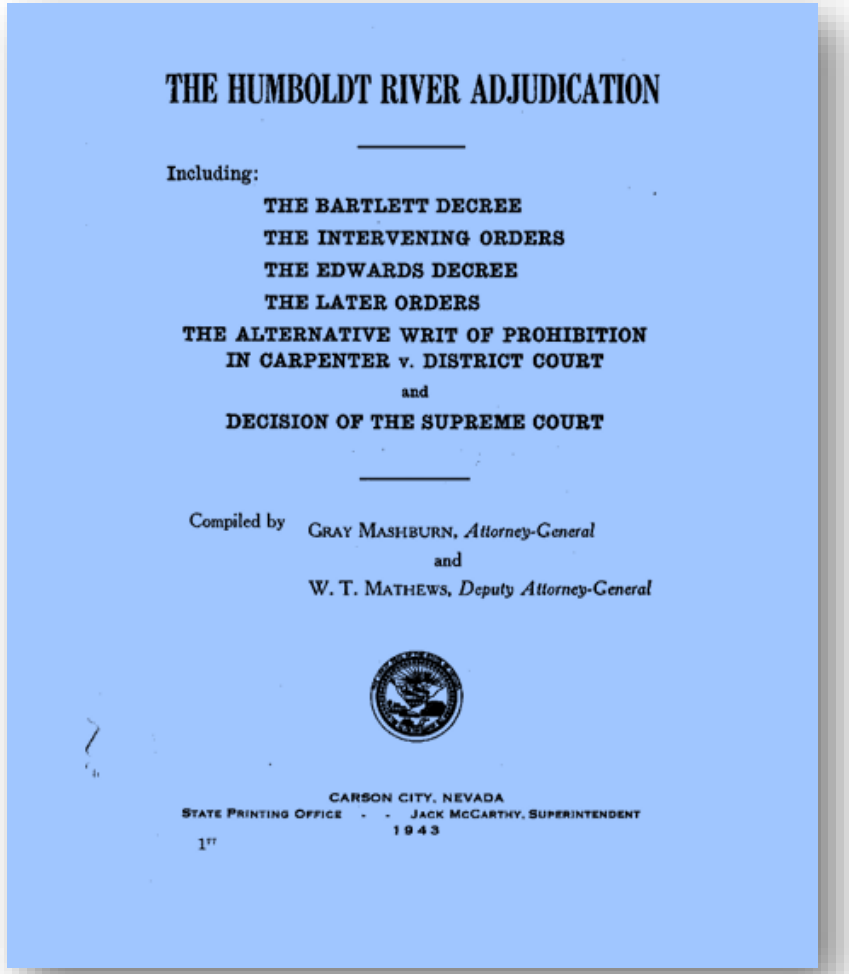
Offsets – Working Definition for the Humboldt

A quantity of water or other form of credit that can be used to 'mitigate' the portion of a junior groundwater right that conflicts with senior surface water rights.

OFFSETS – TYPES UNDER CONSIDERATION

Augmentation of Streamflow

In-Stream replacement using Decree water



THE HUMBOLDT RIVER ADJUDICATION

Including:

THE BARTLETT DECREE
THE INTERVENING ORDERS
THE EDWARDS DECREE
THE LATER ORDERS
THE ALTERNATIVE WRIT OF PROHIBITION IN CARPENTER v. DISTRICT COURT
and
DECISION OF THE SUPREME COURT

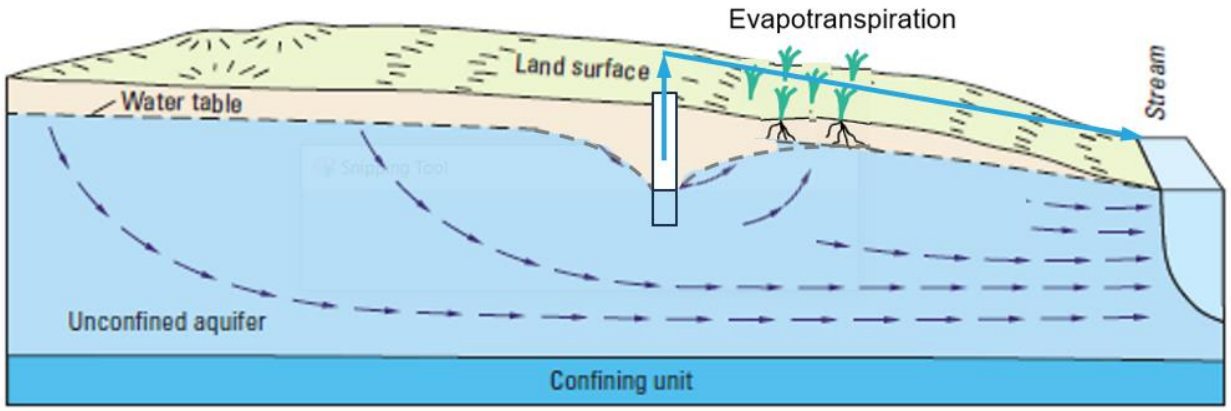
Compiled by GRAY MASHBURN, *Attorney-General*
and
W. T. MATHEWS, *Deputy Attorney-General*

CARSON CITY, NEVADA
STATE PRINTING OFFICE - - JACK McCARTHY, SUPERINTENDENT
1943

Managed Aquifer Recharge (MAR)

Offsets – 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.



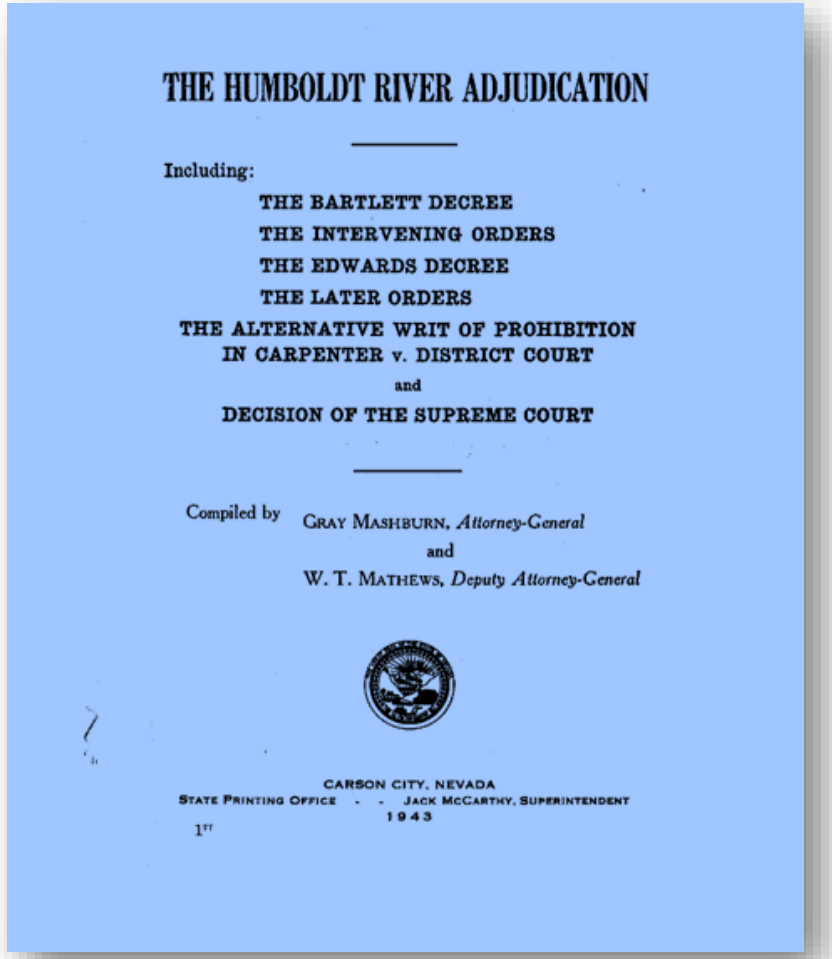
Increasing streamflow through direct addition of water

Mine Discharge to Maggie Creek

Offsets – In-stream offset using Humboldt Decree water

Primary Considerations:
Priority, Duty, Location, Culture Class

- Subject to year-to-year water availability (Wetness factor).
- Still work in progress.
- Some examples of using In-Stream offsets already exist in the Humboldt (Permits 90379 & 92433).



THE HUMBOLDT RIVER ADJUDICATION

Including:

THE BARTLETT DECREE
THE INTERVENING ORDERS
THE EDWARDS DECREE
THE LATER ORDERS
THE ALTERNATIVE WRIT OF PROHIBITION
IN CARPENTER v. DISTRICT COURT
and
DECISION OF THE SUPREME COURT

Compiled by GRAY MASHBURN, *Attorney-General*
and
W. T. MATHEWS, *Deputy Attorney-General*

CARSON CITY, NEVADA
STATE PRINTING OFFICE - - JACK MCCARTHY, SUPERINTENDENT
1943

Offsets – Managed Aquifer Recharge (MAR)

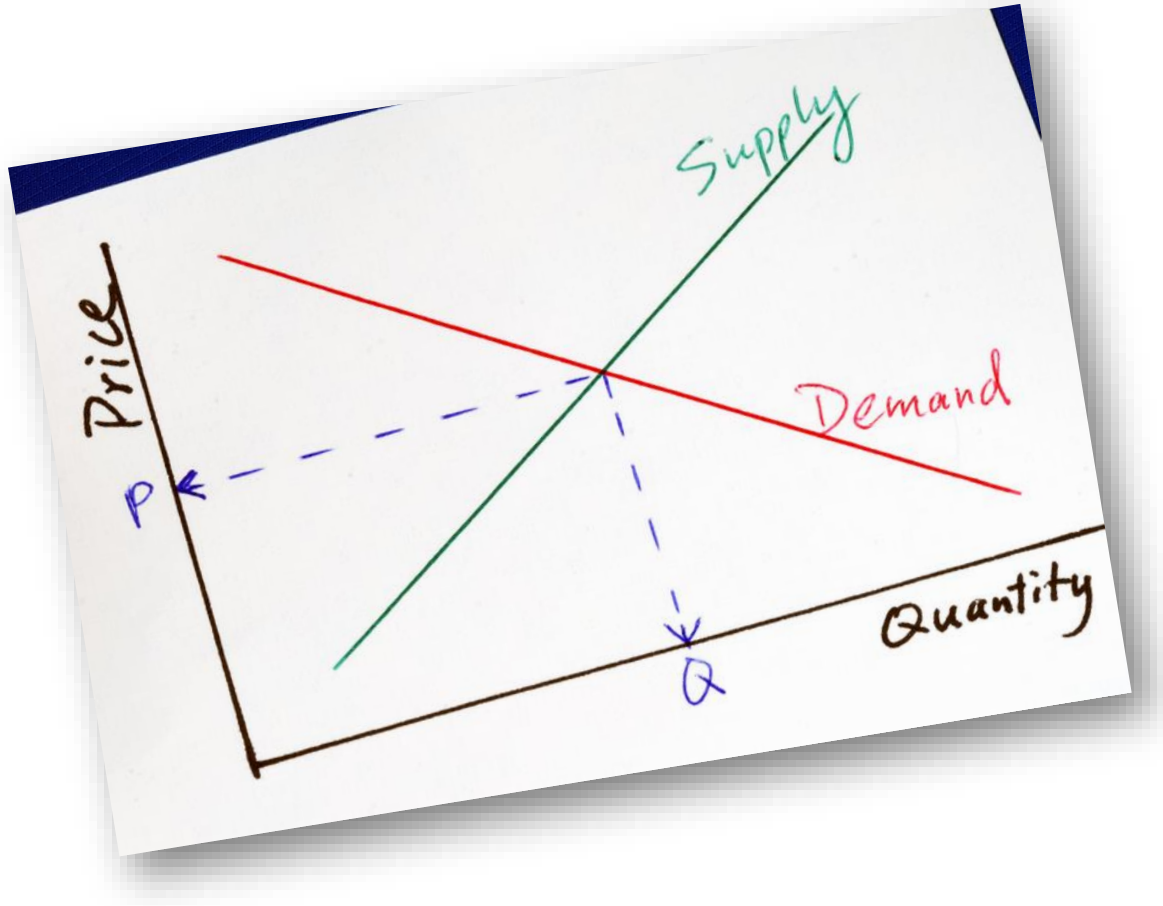
The intentional recharging of aquifers.

Rapid Infiltration Basins (RIBS)

Direct Injection using Wells

Water Market for Offsets – Overview of Concept

- Ability to buy or sell 'Offsets' in a water market.
- Offsets could be purchased to mitigate capture conflict.
- Offsets could be developed and sold to supply the market.
- Economic viability of water market being evaluated by UNR economists.
- Requires some type of organization to manage the market.



Water Market for Offsets – Challenges

- Offsets need to be of consistent value throughout system to provide for more robust market.
- No entity or organization in place to manage offsets or a market.
- Requires buy in from community and formation of organization to manage.

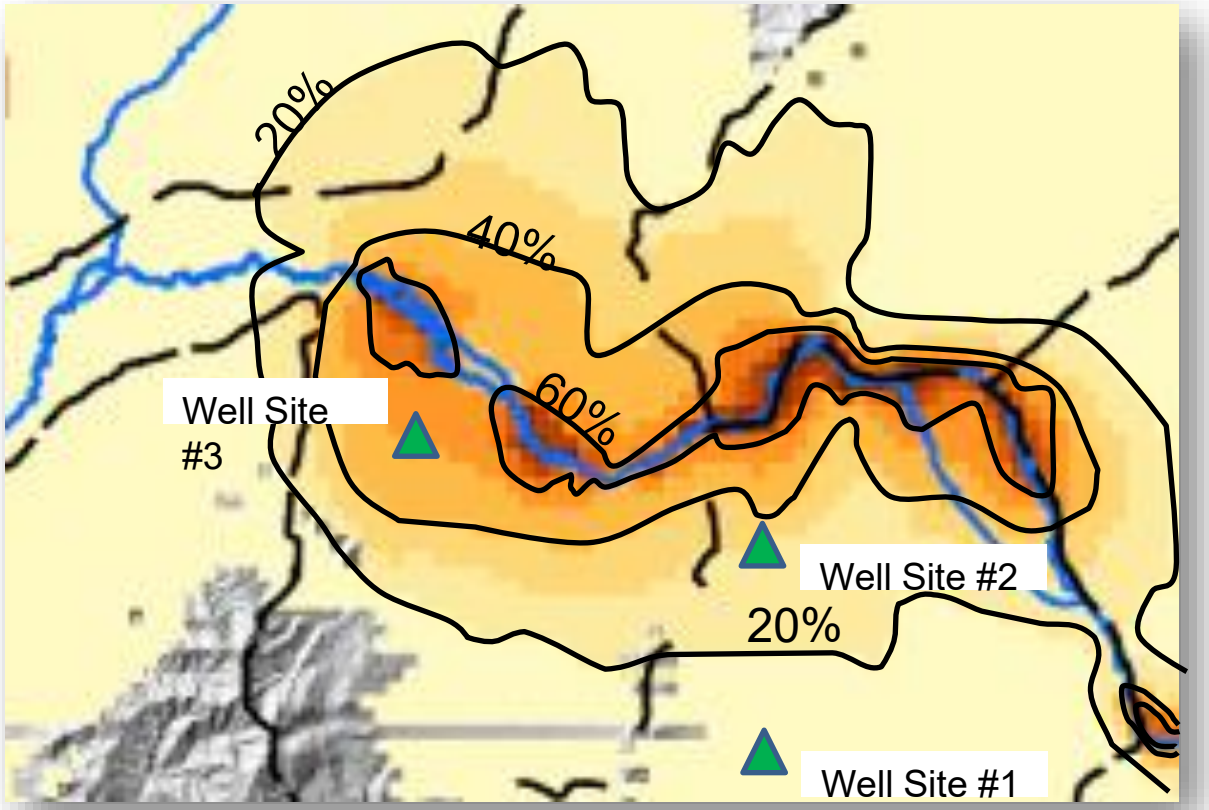
Local Management of Offsets and Water Market

- Outside the authority of the State Engineer.
- Ideally would be 'locally' governed.
- Could acquire and hold water rights (permitted and decreed).
- Obtain grants.
- Lead conservation efforts to create offsets.
- Would require assessments.
- Existing NRS limits Nevada to Conservancy or conservation districts.
- GW districts (like Idaho) would require special legislation.
- Carson Water Subconservancy District is a good example.

https://www.cwsd.org/

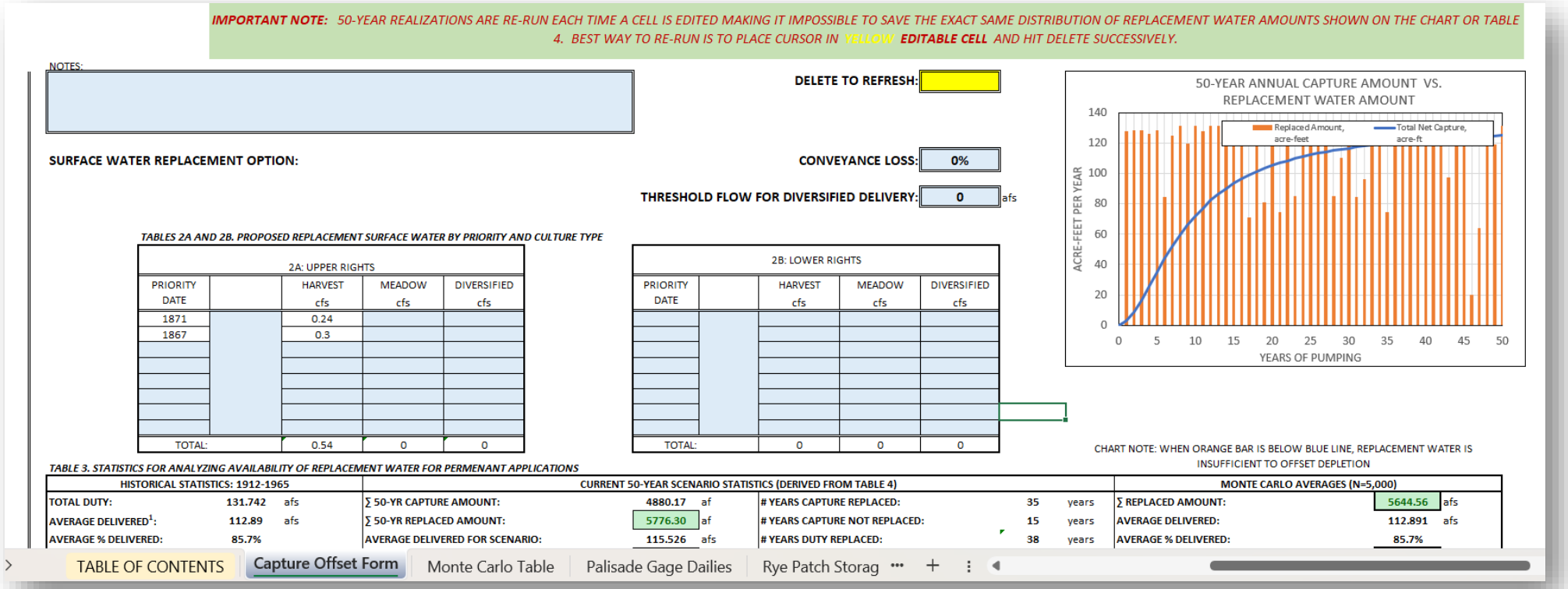
Tools to support conjunctive management – Capture Management Zone Risk Maps

- Formerly referred to as capture maps.
- Indicates areas subject to capture management and curtailment.
- Also relative magnitude of capture liability (percentage of pumping that results in capture).
- Data currently available for Upper and Lower Humboldt basins.



Tools to support conjunctive management – Offset Quantification Tool

- Tool that computes relative value of offsets (Wetness).
- Still being developed as we continue to research and explore offset concepts.



IMPORTANT NOTE: *50-YEAR REALIZATIONS ARE RE-RUN EACH TIME A CELL IS EDITED MAKING IT IMPOSSIBLE TO SAVE THE EXACT SAME DISTRIBUTION OF REPLACEMENT WATER AMOUNTS SHOWN ON THE CHART OR TABLE 4. BEST WAY TO RE-RUN IS TO PLACE CURSOR IN YELLOW* ***EDITABLE CELL*** *AND HIT DELETE SUCCESSIVELY.*

NOTES:

DELETE TO REFRESH:

SURFACE WATER REPLACEMENT OPTION:

CONVEYANCE LOSS: 0%

THRESHOLD FLOW FOR DIVERSIFIED DELIVERY: 0 afs

TABLES 2A AND 2B. PROPOSED REPLACEMENT SURFACE WATER BY PRIORITY AND CULTURE TYPE

2A: UPPER RIGHTS

PRIORITY DATE		HARVEST cfs	MEADOW cfs	DIVERSIFIED cfs
1871		0.24		
1867		0.3		
TOTAL:		0.54	0	0

2B: LOWER RIGHTS

PRIORITY DATE		HARVEST cfs	MEADOW cfs	DIVERSIFIED cfs
TOTAL:		0	0	0

CHART NOTE: WHEN ORANGE BAR IS BELOW BLUE LINE, REPLACEMENT WATER IS INSUFFICIENT TO OFFSET DEPLETION

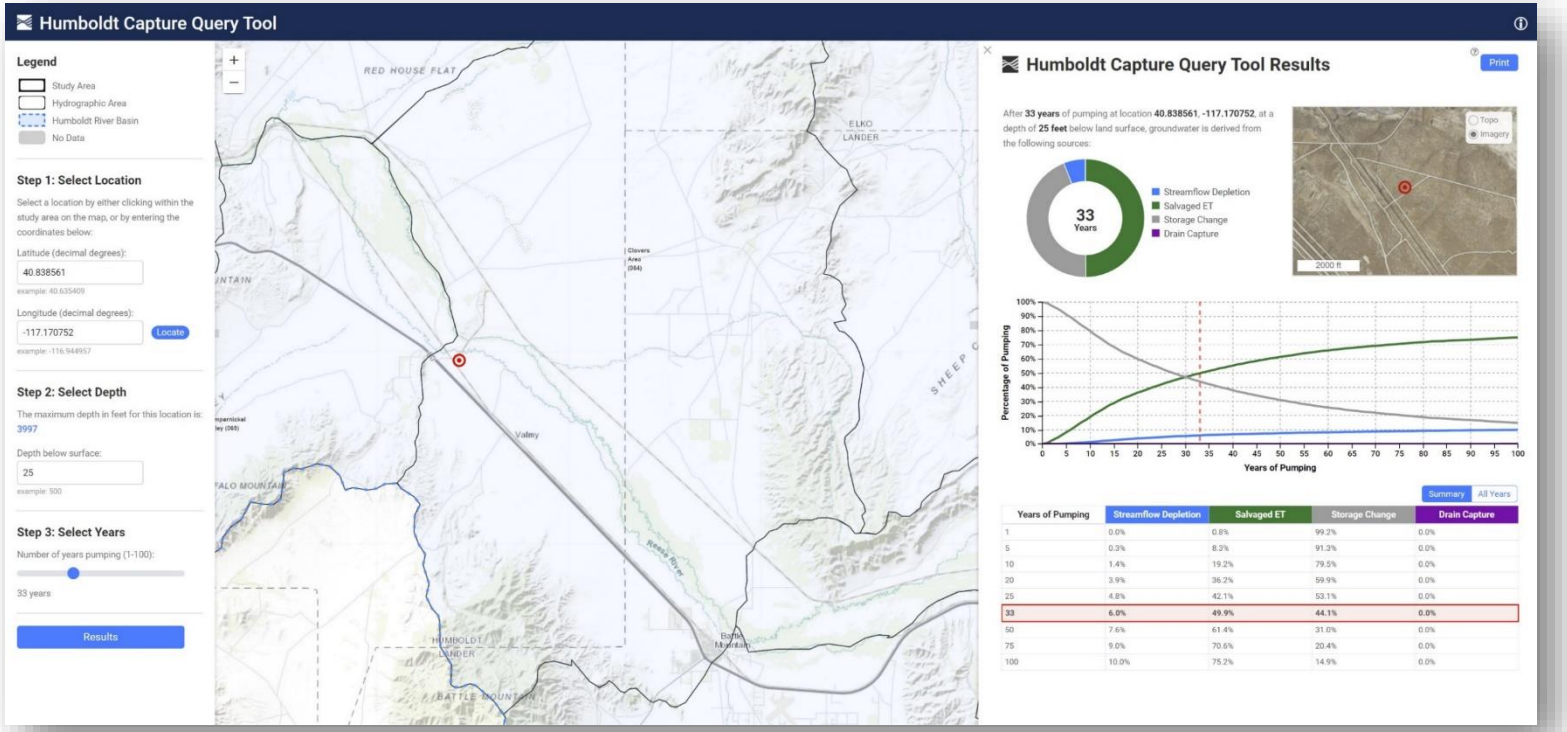
TABLE 3. STATISTICS FOR ANALYZING AVAILABILITY OF REPLACEMENT WATER FOR PERMENANT APPLICATIONS

HISTORICAL STATISTICS: 1912-1965			CURRENT 50-YEAR SCENARIO STATISTICS (DERIVED FROM TABLE 4)					MONTE CARLO AVERAGES (N=5,000)	
TOTAL DUTY:	131.742	afs	∑ 50-YR CAPTURE AMOUNT:	4880.17	af	# YEARS CAPTURE REPLACED:	35 years	∑ REPLACED AMOUNT:	5644.56 afs
AVERAGE DELIVERED[1]:	112.89	afs	∑ 50-YR REPLACED AMOUNT:	5776.30	af	# YEARS CAPTURE NOT REPLACED:	15 years	AVERAGE DELIVERED:	112.891 afs
AVERAGE % DELIVERED:	85.7%		AVERAGE DELIVERED FOR SCENARIO:	115.526	afs	# YEARS DUTY REPLACED:	38 years	AVERAGE % DELIVERED:	85.7%

TABLE OF CONTENTS | Capture Offset Form | Monte Carlo Table | Palisade Gage Dailies | Rye Patch Storag

Tools to support conjunctive management – Capture Query Tool

- Web based tool to determine capture liability based on location of water rights.
- Already planned and developed.
- Waiting release from USGS.



Questions?

Closing & Comments

Public Comments can be provided from Humboldt River Region web page here or email:

Ndwrpubliccomments@water.nv.gov