Division 512 Rulemaking

Groundwater Regulation for the Malheur Lake Administrative Basin Rules Advisory Committee

Oregon Water Resources Department

April 2nd, 2025

Welcome, Introductions and Agenda Review

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Ground Rules

- You are here to express your viewpoint.
- Treat others respectfully.
- If online, remain muted when not speaking.
- Use the “raise hand” feature to indicate that you would like to speak.
- If in person, raise your hand to indicate that you would like to speak.
- RAC only participates in RAC meetings, and the Public only participates in comment periods.

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RAC Operating Guidelines

RAC Role

- Attend and participate in meetings at the horseshoe or online.
- Provide input/advice and help the Department consider various perspectives.

Public Role

- Listen only during the presentations and RAC discussions from the audience or online.
- Provide input/advice during the designated comment time.

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RAC Operating Guidelines

Department Role

- Foster meaningful dialog and conversation
- Consider RAC and public feedback.
- Draft final rules

Facilitator Role

- Foster meaningful dialog and conversation by all RAC participants.
- Ensure all parties have a safe space to express their viewpoints in a respectful environment.

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Meeting Agenda

8:00 AM (15 min)	Welcome and introductions
8:15 AM (20 min)	Goal of the Rulemaking
8:35 AM (30 min)	Classification
9:05 AM (40 min)	Approaching the Problem
9:45 AM (60 min)	Fiscal Impacts
10:45 AM (10 min)	Break
10:55 AM (60 min)	Proposed Management Scenario

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Meeting Agenda

11:55 AM (10 min)	Public Comment
12:05 PM (45 min)	Lunch
12:50 PM (80 min)	Draft CGWA Rules
2:15 PM (30 min)	Draft Racial Equity and Statement of Need
2:45 PM (10 min)	Public Comment
2:55 PM (5 min)	Next Steps

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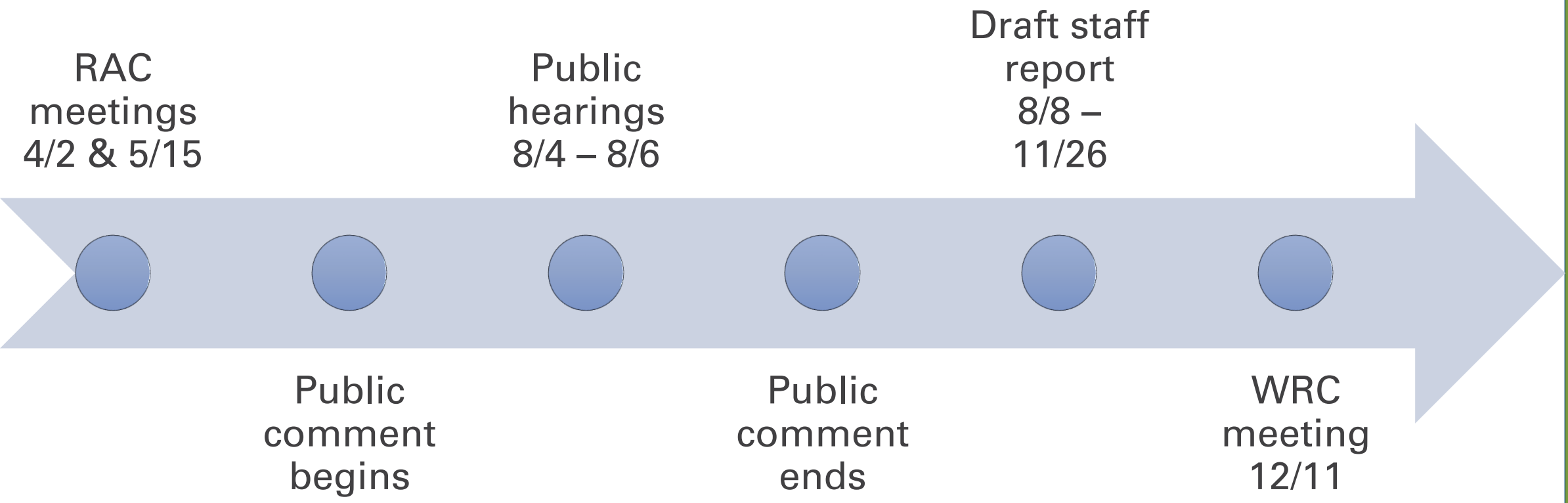
2025 rulemaking schedule



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Goals for Today's Meeting

1. Present OWRD's stated goal for the Division 512 rules
2. Gather input on draft classification rules
3. Review what OWRD learned from different management approaches and feedback received from the RAC
4. Present results of economic analysis for proposed management scenario and gather input for inclusion in fiscal impact statement
5. Gather input on fiscal impact for SWMPA and classification
6. Present OWRD's updated proposed management scenario
7. Gather input on draft CGWA rule language
8. Gather input on racial equity statement and statement of need

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The goal of this rulemaking

Goals of Conversation

- Review the stated goals for this rulemaking

Level of Participation

Inform

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Division 10 Groundwater Report

- Groundwater in the Harney Basin occurs within a single groundwater-flow system that includes several distinct, yet hydraulically connected areas distinguished by local geology, location in the basin-wide groundwater flow system, and local rate and magnitude of recharge and discharge.
- 2 statutory criteria have been met:
  - Groundwater levels have declined excessively (>50 ft total decline) and are excessively declining (decline >3ft per year for at least 10 years)
  - The available groundwater supply is being or is about to be overdrawn (pumping > recharge)

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Rulemaking objectives

- Stabilize groundwater levels (target water level trend of no decline)
- Reduce water use basin-wide through straightforward and transparent rules
- Balance negative impacts to:
  - Water users
  - Springs/streams
  - Groundwater dependent ecosystems (GDE) in the form of natural ET
  - Domestic wells
- Minimize impacts to small business and the economy

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Stabilizing water levels

- Ways we are working to achieve the goal through regulatory and voluntary action:
  - Classification – restrict new appropriations in the recharge areas outside the GHVGAC
  - Serious Water Management Problem Area (SWMPA) – require water use measurement and reporting for accountability
  - Critical Groundwater Area (CGWA) – establish the necessary reductions in rule, regulate with orders

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Stabilizing water levels

- Ways we are working to achieve the goal through regulation and voluntary action (continued):
  - Voluntary Agreements – allow users to chart a path for reduction that controls in lieu of orders
  - CREP

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Classification

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Classification rule language

Goals of Conversation

- Gather input around the draft classification rule language

Level of Participation

Consult

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Classification boundary

Rule Language	Rule Language Explainer
(4) The Groundwater Classification Boundary is defined as the Harney Basin within the Malheur Lake Basin and within portions of Grant and Harney Counties, as shown in Exhibit #.	**<u>Classification Boundary</u>** • The classification boundary includes the Harney Basin Groundwater Study Area boundary and portions of Grant County, mainly around Seneca.

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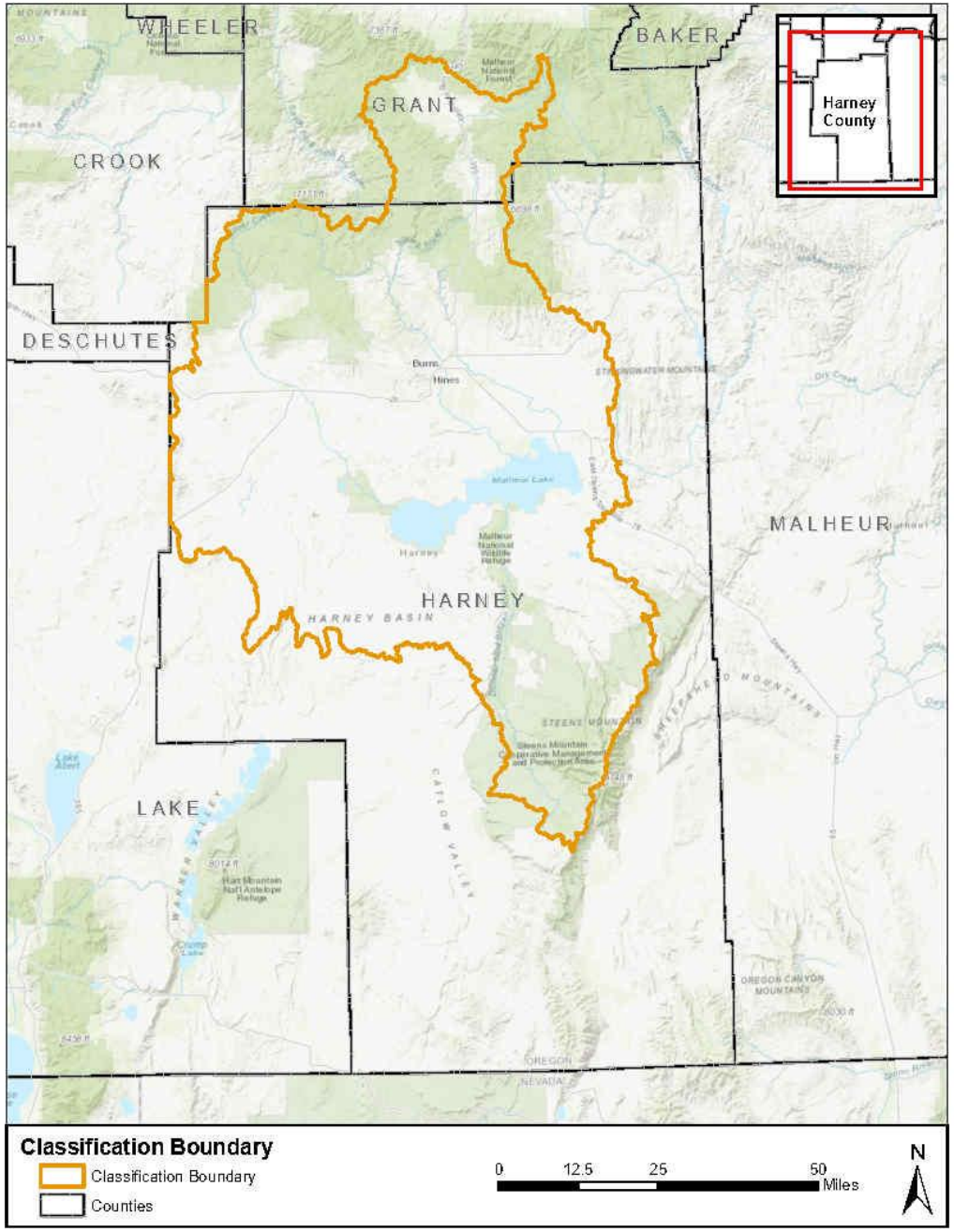
Classification Boundary Map



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Section 2

Rule Language	Rule Language Explainer
(2) Groundwater in the Groundwater Classification Boundary defined in OAR 690-512-####(4) is classified for statutorily exempt groundwater uses as specified in ORS 537.545 and nonconsumptive geothermal uses below 250 degrees Fahrenheit.	**Allowed uses within the classification boundary** • Groundwater can only be used for exempt uses within the classification boundary. • Exempt uses are defined in ORS 537.545. • OWRD has the authority to regulate geothermal groundwater uses under 250 degrees Fahrenheit.

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Input

Remaining questions or feedback for the RAC

- Are the rules clear and understandable?
- Is there anything else we need to consider?

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Approaching the Problem

What we've tried, what we've learned, and how we've adjusted.

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Approaching the problem

Goals of Conversation

- Review our initial approach
- Review our modeling approach and what we've learned
- Review feedback we've received

Level of Participation

Inform

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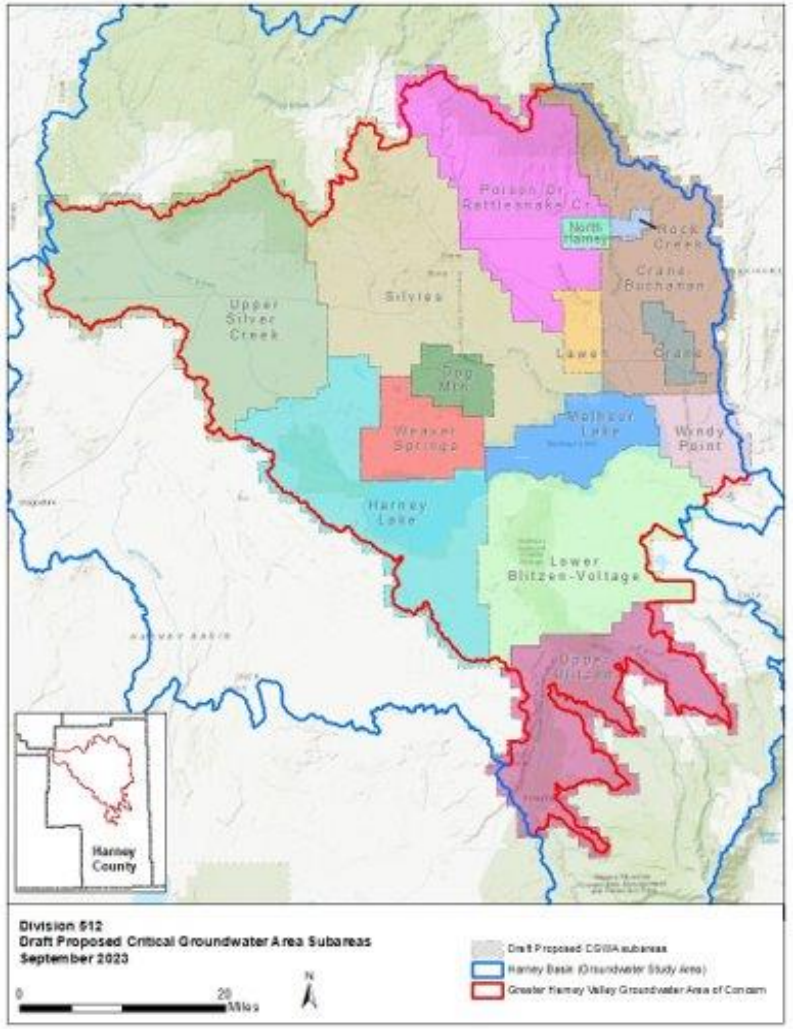
Our First Approach: Targeted Reductions

- Target reductions in the areas of worst decline.
- Implement all curtailments upon completion of contested case
- Subarea delineation criteria – RAC 2
- 15 subareas initially proposed - RAC 3
- Groundwater level trends – RAC 4
- High/Low prioritization - RAC 4
- "Hydrograph approach" to PTW – RAC 5
- Larger subareas discussed – RAC 6



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Measuring progress

- Track groundwater level trends and evaluate the change in each subarea's rate of decline
- Sentinel wells and a minimum groundwater elevation
- Measure total annual pumpage and compare to ET/consumptive use and historic data
- Establish thresholds in lower priority subareas
  - Magnitude of decline
  - Rate of decline
  - Groundwater level elevation

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Feedback we received

- Lower priority subareas may continue to decline
- Need to consider groundwater flow from one subarea to another
- Need space for voluntary agreements (larger subareas)
- Smaller subareas conflict with prior appropriation
- Timeline for reductions was too severe “it took a generation to cause this problem, we should take a generation to fix it”
- Can the model be used to inform PTW when its published?

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Learning through modeling

- The Harney Basin Groundwater Model (HBGM) released in early 2024
- Hundreds of staff hours spent building tools and modeling
- Design scenarios and test with the model
- Built software to identify the maximum pumpage and achieve defined goals (stable water levels, spring discharge, etc.)
- Performed sensitivity analyses to isolate and understand variables

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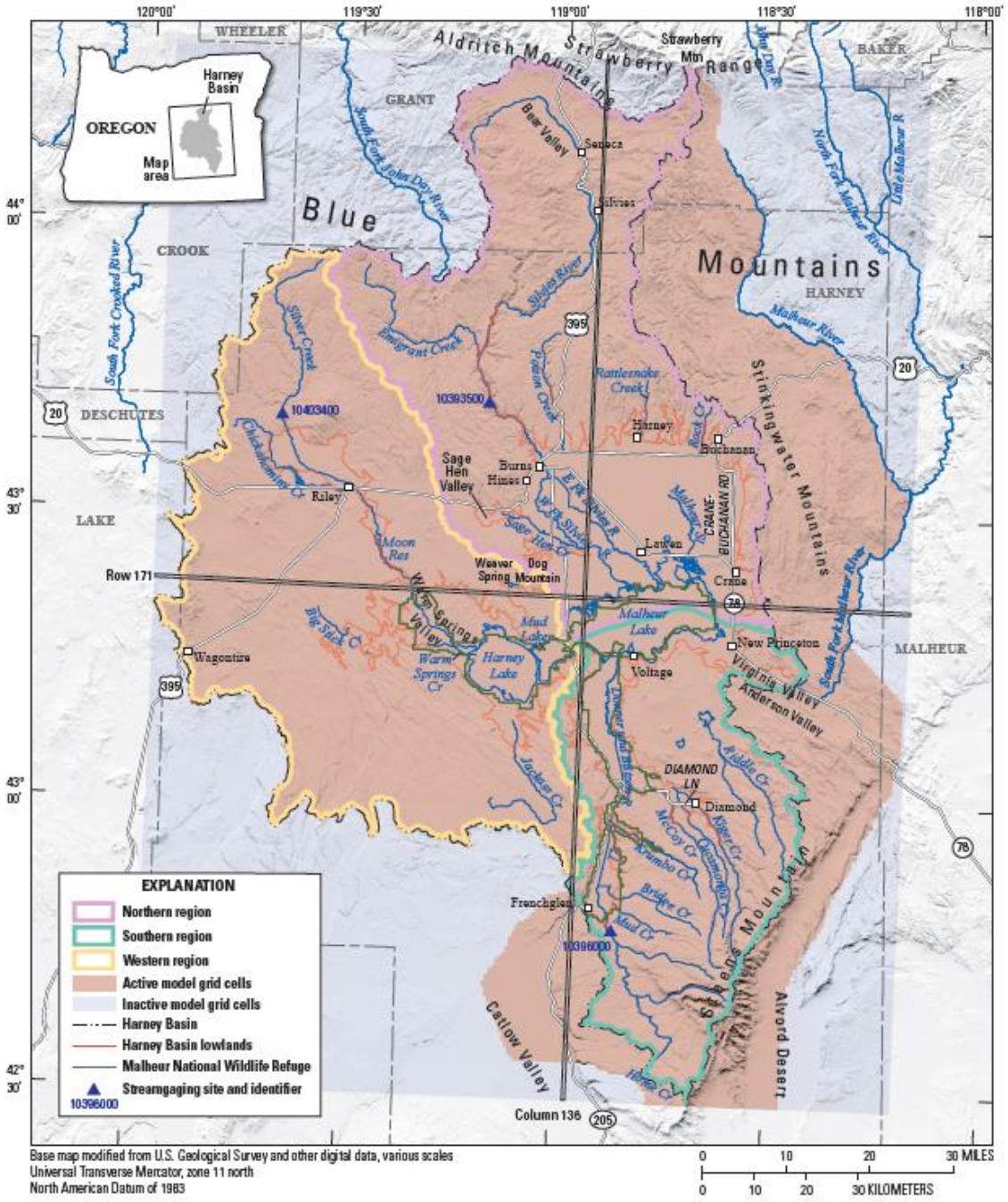
Model grid map



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What we learned: spatial extent

- More subareas means generally larger permissible total withdrawal (PTW) – less curtailment
- Sensitivity runs:
  - Splitting Dog Mountain and Weaver Springs has little impact on overall curtailment
  - Spatial variability of water level rate of change similar between 15 and 6 subareas (about -0.5 - +0.3 ft/yr)

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RAC Feedback

Spatial extent

- 15 subareas may restrict the creation of voluntary agreements and successful market solutions
- One subarea would honor prior appropriation
- Many RAC members support the 7-subarea concept
- 15 subareas allows for targeted curtailment
- There should be a process to adjust subarea boundaries

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What we learned: success metric

- More stringent success metric means:
  - Higher final water levels
  - Smaller PTW (more curtailment)
- Sensitivity analysis:
  - Spatial variability of water level rate of change when using a median success metric (about -0.5 - +0.3 ft/yr)

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RAC Feedback

Success metric

- Use a well-by-well approach or the mean
- Use the median of measured wells within a subarea
- Use the median of measured wells and include a limit on individual well declines
- Use the 80th percentile and include a limit on individual well declines

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What we learned: timeline to achieve goal

- Shorter timelines to achieve the goal means:
  - Higher final water levels
  - Less impact to springs & streams, natural evapotranspiration (ET), domestic wells
  - Smaller PTW (more curtailment)
  - Less time for adaptive management

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RAC Feedback

Timeline to achieve the goal

- It took a generation to create the problem, we should take a generation to fix it
- 30 years is too long since groundwater levels have been declining for a long time
- Rather than focus on the time to achieve the goal, we should focus on what we can control which is the timeline for implementing curtailment

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What we learned: phased reductions

- Shorter timelines for phasing in reductions means:
  - Higher final water levels
  - Less impact to springs & streams, natural ET, domestic wells
  - Smaller PTW (more curtailment)
  - Less opportunity for adaptive management
  - Temporary recovery events fade before evaluating success
- Sensitivity runs:
  - Frequency of checkpoints for phased curtailment (3, 6, or 9 years) have no impact on final PTW
  - More aggressive timelines in Weaver Springs and Silver Creek provide additional benefit to critical springs
  - Frontloading curtailment reduces basin-wide impacts

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RAC Feedback

Phasing timeline

- 24 years is too long, 6 years would be better
- Weaver Springs should be curtailed differently and on a different timeline; immediate and/or severe curtailment
- Consider fiscal impact and provide an economic adjustment period
- 6-year adaption periods increases certainty for water users

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What we learned: impacts to springs/streams and ET

- Sensitivity runs:
  - Silver Creek is a critical contributor to spring flow
  - Silver Creek, Silvies, and Dog Mountain subareas supply groundwater to the Weaver Springs subarea.
  - Targeting only Weaver Springs for quick and substantial reductions provides limited protection for spring flow

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RAC Feedback

Impacts to springs/streams and ET

- Protecting springs and streams is an element of preserving public welfare, safety, and health
- The highest percentage of springs and streams should be protected by immediate implementation
- The model has some uncertainty (specifically Warm Springs Valley)
- Setting thresholds for protecting springs and streams is not what WRD has proposed as the goal of this process
- Include spring flow as a metric for measuring and adapting

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RAC Feedback

Impacts to domestic wells

- The Department should not allow any more domestic wells to go dry
- ORS 537.525(5) does not allow the Department to elevate economic impacts and delayed curtailment over protecting domestic wells. They must assure "adequate and safe supplies of ground water for human consumption"
- Domestic wells can also go dry because of poor well construction and depth
- Domestic well issues can be mitigated with funding

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Modeling uncertainty

- A model is only as good as the inputs. We have:
  - Limited historic spring discharge measurements
  - Substantial historic water level measurements
- Very confident in calibration to groundwater levels
- Less confident in calibration to spring discharge and natural ET
- A focus on achieving higher stable water levels =>:
  - Fewer dry wells
  - Less spring impacts
  - Less impact to groundwater dependent ecosystems

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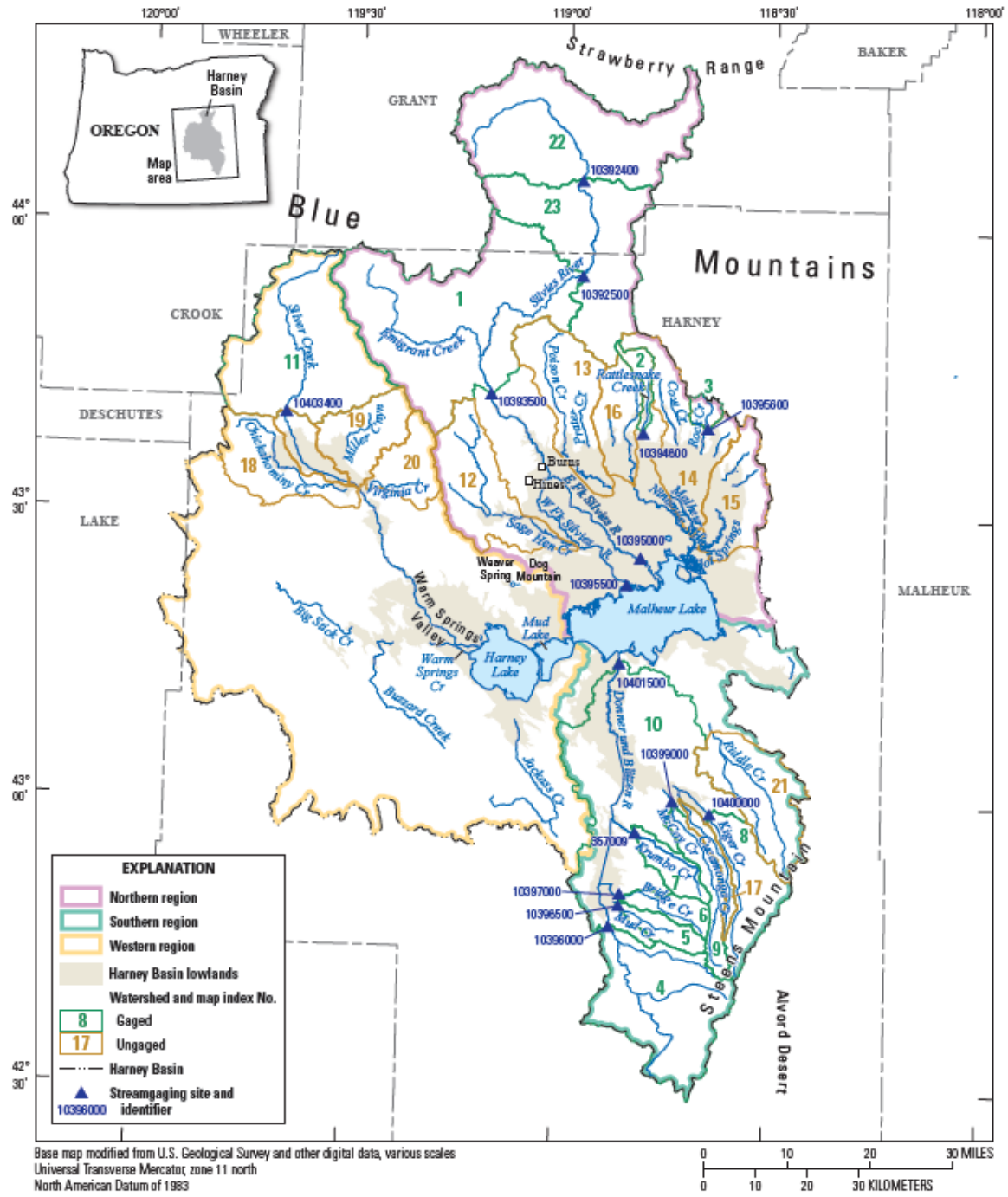
Map of natural discharge calibration



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Fiscal Impact

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Fiscal Impact

Goals of Conversation

- Review economic analysis by ECOnorthwest
- Gather feedback on the analysis for the CGWA fiscal impact statement
- Gather input on SWMPA and classification fiscal impact statement

Level of Participation

Consult

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ECONorthwest Results

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Harney County Economic and Fiscal Impacts

Presentation to the RAC

April 2nd, 2025

ECO northwest

Overview of ECOnorthwest's Work

- ECO looked at the impact of proposed groundwater reductions on:
  - Crop production (particularly alfalfa)
  - Livestock production
  - Ecosystem services provided by local springs and streams
  - Small business (e.g., supply chain sectors) associated with agriculture
  - Other small businesses (e.g., local consumption) in Harney County
  - Local government tax revenues
- OWRD looked at the fiscal impacts on domestic well users

Methods

- Interviewed local farmers, ag businesses, local government agencies, wildlife managers, and other stakeholders to inform our analyses
- Used available data/information on agricultural production, ecosystem services, and local government tax information.
- Used IMPLAN to estimate economic contributions of agriculture to Harney County's economy
  - ECO used IMPLAN data from 2023 (most recent year available).
  - IMPLAN is a static model, results of analysis would look the same regardless of the timeframe used.

Addressing Feedback from Jan. 22nd RAC

- Alfalfa/Hay Price Variation
  - Used 5-year average of prices, inflated to $2024
- Livestock Production
  - Included average of livestock sales reported in 2017 & 2022 USDA Census of Agriculture
  - Reduce sales value in proportion with reduction in alfalfa production as a modeling assumption.
- Ecosystem Services
  - Included more discussion of outdoor recreation impacts
- Economic Analysis
  - Based on OWRD's proposed management scenario that intends to achieve groundwater stability after 30 years.

Analytical Assumptions

- Proposed groundwater reduction (**33.6%**) scenario for **seven subareas** provided by **OWRD** on March 5th.
  - Baseline groundwater pumping based on 2018 conditions and groundwater pumping after 30-year phase-in of management scenario
- **Baseline (e.g., 2023)** – Period before curtailment begins
  - Establish baseline:
    - Agricultural Production (crops and livestock)
    - Economic Impacts in Harney County
    - Fiscal Impacts
    - Ecosystem Services (qualitative analysis)
- **Curtailment – End of 30 years (e.g., 2053)**, after curtailment period ends.
  - Measure change in three baseline impact categories with quantitative data
  - Present results across 6-year phase-in periods
  - Assumed full implementation of curtailment

Assumptions for Agricultural Analysis

- Used 2018 parcel data from Dr. Bill Jaeger's HEM model
  - Updated crop yields from interviews with eight farmers
  - Used 5-year (2019-2023) crop price average in $2024
- Matched parcel data with groundwater modeling output
- Calculated number of irrigated acres based on the groundwater availability options to estimate change in agricultural production.
  - **DO NOT** model changes in yields or water-application to fields
  - Simplifying assumption of constant yields and water application
    - i.e., its possible farmers could find a different crop, crop rotation, or apply less water and get less yield, but that is difficult to know or assume
- Included average of livestock sales reported in 2017 & 2022 USDA Census of Agriculture for Harney County

Harney County Livestock Production

- To estimate livestock production value in Harney County, used average of livestock sales from USDA 2017 & 2022 Census of Agriculture for Harney County.
  - Baseline Value in $2024: **~$65 million**
- To estimate value after curtailment, apply similar reduction in crop value to livestock value (**simplifying assumption**).
  - Curtailment Value in $2024: **~$42.5 million**

Agricultural Results (Crop + Livestock) - Baseline

Subarea Name	Groundwater Pumped (AF)	Irrigated Acres	Avg. Yield (ton/acre)	Total Revenue
Northeast-Crane	52,156	19,166	5.6	$23,463,793
Silvies	22,810	8,193	6.0	$10,715,224
Silver Creek	21,012	7,173	5.8	$9,178,460
Weaver Springs	19,246	6,633	5.0	$7,267,336
Lower Blitzen - Voltage	13,121	4,962	5.2	$5,501,485
Dog Mountain	4,504	1,853	5.0	$2,032,149
Upper Blitzen	69	23	6.1	$30,913
Alfalfa	**132,919**	**48,003**		**$58,189,361**
Livestock				**$64,830,693**
Total Annual Agricultural Value				**$123,020,054**

Agricultural Results (Crop + Livestock) - Curtailment

Subarea Name	Groundwater Pumped (AF)	Groundwater Curtailed (AF)	Irrigated Acres	Irrigated Acres Curtailed	Avg. Yield (ton/acre)	Total Revenue	Revenue Lost
Northeast-Crane	34,809	17,347	12,850	6,316	5.6	$15,733,840	-$7,729,952
Silvies	19,830	2,980	7,049	1,144	6.0	$9,248,028	-$1,467,196
Silver Creek	15,533	5,479	5,384	1,788	5.8	$6,899,295	-$2,279,165
Lower Blitzen - Voltage	8,002	5,119	2,745	2,217	5.2	$3,084,431	-$2,417,054
Weaver Springs	4,769	14,477	2,254	4,379	5.0	$2,482,020	-$4,785,316
Dog Mountain	4,093	411	1,718	135	5.0	$1,885,925	-$146,225
Upper Blitzen	69	0	23	-	6.1	$30,913	$0
Alfalfa	**87,105**	**45,814**	**32,024**	**15,979**		**$39,364,453**	**-$18,824,908**
Livestock						**$42,464,104**	**-$22,366,589**
Total Annual Agricultural Value (End of 30 Years)						**$81,828,556**	**-$41,191,497**
Annualized Loss (Every 6 Years over 30 Year Period)							**-$8,238,299**

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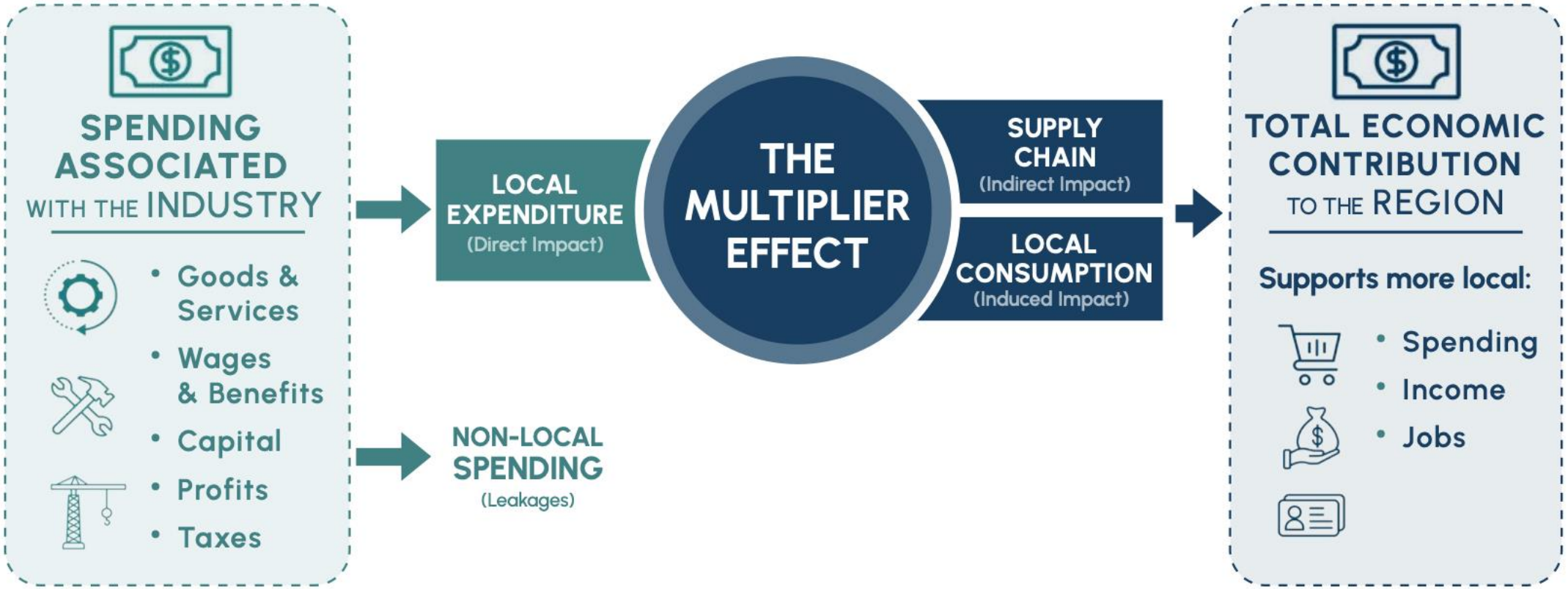
Economic Contributions through IMPLAN

Direct spending of agricultural production supports income and employment in businesses that supply the inputs (***indirect***), and businesses people spend their wages (***induced***).



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IMPLAN Results – Baseline (2023)

- Annual agricultural output of livestock and alfalfa supports approximately 670 direct jobs, 240 indirect jobs, and 110 induced jobs.
- For every $1 spent directly by agriculture, $0.51 is generated in additional economic activity in Harney County.
- For every acre-foot of groundwater pumped by agriculture, an estimated $1,400 of economic activity is generated.
  - $926 of direct output
  - $356 of indirect output
  - $119 of induced output

Impact	Employment	Labor Income	Output
1 - Direct	670	$35,890,000	$123,020,000
2 - Indirect	240	$10,460,000	$47,300,000
3 - Induced	110	$4,360,000	$15,790,000
	1020	$50,710,000	$186,110,000

IMPLAN Results – Curtailment (2053)

- Every 6 years during the curtailment period, an estimated 64 jobs will be lost.
  - 40 – direct jobs
  - 16 – indirect jobs
  - 8 – induced jobs
- Every 6 years during the curtailment period, an estimated $12 million in economic output will be lost.
  - $8 million – direct
  - $3 million – indirect
  - $1 million – induced
- At the end of the 30-year period, annual economic output in Harney will be reduced to $125 million from $186 million in the baseline.
  - Assuming nothing changes in Harney County over the 30-year period.

***Losses every six-year period**

Impact	Employment	Labor Income	Output
1 - Direct	-40	-$2,580,000	-$8,220,000
2 - Indirect	-16	-$600,000	-$2,820,000
3 - Induced	-8	-$300,000	-$1,080,000
	-64	-$3,480,000	-$12,120,000

***Annual production at the end of 30 years**

Impact	Employment	Labor Income	Output
1 - Direct	470	$22,910,000	$81,830,000
2 - Indirect	160	$7,460,000	$33,230,000
3 - Induced	70	$2,840,000	$10,280,000
	700	$33,210,000	$125,340,000

ECOnorthwest

Other Industries Affected by Agricultural Production

- **Indirect (e.g., supply chain) Industries Affected**
  - Other farming industries
  - Financial services (e.g., banking/lending)
  - Veterinary Services
  - Insurance
  - Real estate related to agriculture
  - Fuel Suppliers
- **Induced (e.g., local consumption) Industries Affected**
  - Individual, family, and community services
  - Retail (e.g., grocery stores, merchandise, automotive, etc.)
  - Restaurants (fast food and full-service)
  - Automotive Repair
  - Real Estate

Fiscal Impacts – Property Tax Revenues

- Assumptions:
  - Informed by changes in irrigated acreage from Ag Analysis
  - All parcels start at Land Class 2 (Irrigated) in Baseline
  - Parcels that are fully curtailed, move to Land Class 5 (non-irrigated)
  - Used average tax rates for potentially impacted taxing districts
    - Broken out across General Fund, Hospital, and Local School Districts.
  - Used average specially assessed value (SAV)by Land Class to calculate assessed value for parcels.
  - Looked at total property tax revenue collected by the County (which is then distributed out to other districts like the hospital, schools, etc.)

Results – Property Tax Revenues

- Approximately **25% of parcels** modeled move to Land Class 5 at the end of 30 years. This leads to a:
  - $12.3 million reduction in taxable assessed value
  - $146,000 reduction in annual property tax revenue **(~1.3% decrease in County Revenues from FY24-25**).
    - ~$55,000 reduction in annual revenues to General Fund
    - ~$24,000 reduction in annual revenues to Hospitals
    - ~$66,000 reduction in annual revenues to Local School Districts
- These results assume that tax rates and specially assessed values (SAV) do not change over 30-year curtailment period.

Results – Ecosystem Services

- Springs are important, especially the Double O Springs that support baseflow to the most productive parts of the Refuge.
- Groundwater management is likely to sustain outdoor recreational opportunities in Harney.
  - Outdoor recreation accounts for over an estimated **$200 million in economic activity** in Harney County (Earth Economics, 2024).
- There are important impacts to migratory bird populations, but its difficult to separate the effect of groundwater management on Pacific Flyway populations given other external factors.
- Stock water, wetland habitat, migratory bird populations, fish and amphibian populations dependent on springs and stream baseflow are potentially affected by scenarios via ecosystem services.

Recap of Results

- Harney County's economy is dependent on agriculture
  - Approximately **1 in 5 jobs** are in agricultural related industries.
  - Agricultural economy is dependent on water-intensive crop and livestock production.
  - Estimated **$41 million reduction** in annual agricultural revenues if the currently-proposed groundwater management scenario is fully implemented.
- The proposed groundwater management scenario could lead to a **reduction of 320 jobs** and a **reduction of $61 million in annual economic output** at the end of 30 years.
- Both the benefits and impacts of the proposed groundwater management scenario are difficult to quantify, but **springs/streams do provide important ecosystem services that provide value for Harney County.**
- Harney County annual property tax revenue could **decrease by 1.3%.**
  - Local School Districts could be most impacted.
- This analysis assumes no adaptation (i.e., changes in farming practices, other kinds of businesses and jobs, etc.).

Key Takeaways

- The proposed groundwater management scenario will significantly reduce agricultural expenditures in the local economy.
- New production and/or mitigation strategies should be considered to minimize impacts to farmers/ranchers, small businesses, and local community.
- Potential options that warrant further research:
  - Feasibility of dryland farming practices and/or deficit irrigation.
  - Feasibility of leasing fallowed land for other uses
    - E.g., habitat, combined grazing/energy, etc.

Limiting Economic Impacts

- Setting goal of stability rather than recovery of groundwater levels
- Optimized the model to identify the smallest reductions in pumping required to achieve durable stability
- Not optimizing the model to limit impacts to streams, springs, natural ET, or dry wells
- Setting timeline to achieve the goal at 30 years rather than ASAP
- Phased reductions over 24 years in 6 yr increments, rather than ASAP
- Implementing adaptive management to prevent over-curtailment
- Allocation based historic use, not paper water rights
- CREP – incentivize and offset cost of pumping reductions
- Water measurement cost share

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Impacts to domestic wells

Total Cost (based on local grants approved)

- Average total cost: $25K
- Maximum total cost: $40K
- Minimum total cost: $8.7K

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Impacts to domestic wells

<u>Number of dry domestic wells at end of century:</u>

- Continued pumping scenario: 200
- Proposed management scenario: 98

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Impacts to domestic wells

Cost for continued pumping at end of century

- Average cost: $25K x 200 = $5M
- Maximum cost: $40K x 200 = $8M
- Minimum cost: $8.7K x 200 = $1.7M

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Impacts to domestic wells

Cost for proposed management scenario

- Average cost: $25Kx 98 = $2.4M
- Maximum cost: $40K x 98 = $4M
- Minimum cost: $8.7K x 98 = $850K

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Impacts to domestic wells

Cost savings

- Average: $5M - $2.5M = $2.5M
- Maximum: $8M - $4M = $4M
- Minimum: $1.7M - $0.8M = $0.9M

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Impacts to domestic wells

Input requested

- Did we miss anything in this analysis?

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Fiscal impact SWMPA

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SWMPA fiscal impact statement

SWMPA Fiscal Impact

- 336 new POAs required to install Flowmeters
- Average cost for flowmeter in Harney: $2,900 - $3,400 per well
- Total cost: $974K and $1.14M

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SWMPA fiscal impact statement

SWMPA Fiscal Impact

- Of the 1410 POAs, 748 will be required to report – minimal costs for reporting

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SWMPA cost of compliance: OWRD

Measurement Device Cost Share

- 1M$ currently in fund/ $50K next biennium

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SWMPA cost of compliance: OWRD

Water Use Reporting and Compliance

1. Water Use Reporting System (WURS) cannot track meter installation
2. WURS can intake newly reported data
3. OWRD do not have capacity to check quality of reported data
4. WURS does not allow for broad in-season enforcement
5. Watermaster staff can verify reporting and check use is within water right on a case-by-case basis

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SWMPA cost of compliance: OWRD

Water Use Reporting and Compliance

- Total Investment needed $430K per year to add staff to combine WURS and GWIS

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SWMPA cost of compliance: groundwater users

Limitations on rules

- Users who have been regulated off are not required to report

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SWMPA cost of compliance: number of small businesses

- Natural resources and mining: 40
- Construction: 43
- Manufacturing: 4
- Wholesale trade: 7
- Retail trade: 19
- Transportation, warehouse, and utilities: 7
- Information: 4
- Financial activities: 16
- Professional and business services: 21
- Private education and health services: 20
- Leisure and hospitality: 31
- Other services: 18

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SWMPA cost of compliance: number of small businesses

- 477 farms in Harney county, 22% of the farms are under 50 acres
- 95% of the 477 are family farms

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SWMPA cost of compliance: small business

- Required to install: Any business with a valid groundwater right
- $2,900 to $3,400 for installation of flowmeters
- Cost varies on how many POAS are connected to water right

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SWMPA fiscal impact statement

Input requested

- Are we missing anything for the SWMPA fiscal impact?

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Fiscal impact classification

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Classification fiscal impact statement

Classification Fiscal Impact

- No new groundwater rights – prevent growth of local agricultural economy

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Classification cost of compliance: OWRD

Processing water rights

- Classification does not allow for rejection of a water right. Staff time to process new water rights

Fee funded positions

- 19.93 full-time employees funded by fees

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Classification cost of compliance: small business

Reporting, recording, and administrative activities

- No direct costs for reporting, recording, and administrative activities

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Classification cost of compliance: small business

Fees for applying to a water right

- Groundwater Right Application Base Fee: $1,570.00
  - 1st cubic foot per second (cfs) or fraction thereof: $410.00
  - Each additional CFS or fraction thereof: $410.00
  - Each additional use, point of diversion, or well after the 1st: $410.00

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Classification fiscal impact

Input requested

- Are we missing anything for the classification fiscal impact?

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Break

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Proposed Management Scenario

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Updated OWRD Proposal

Goals of Conversation

- Present the updated OWRD proposal and highlight changes made based on feedback received
- Build a shared understanding of the results of the proposal
- Answer clarifying questions on results

Level of Participation

inform

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Proposed Management Parameters

Parameter	Proposed Management Scenario
Spatial extent	7 subareas
Stability success metric	Durable, Median (50th percentile) of well-cells - Fixed PTW in Weaver Springs, 75% reduction
Timeline to achieve goal	30 years
Frequency of adaptation	Every 6 years
Timeline for reductions	24 years with frontloading of reductions - 40%, 30%, 15%, 10%, and 5% of total - In Weaver Springs, 75% and 25%
Discharge to streams and springs	Not used to constrain PTW; limit impact with frontloading of curtailment
Natural evapotranspiration	
Dry domestic wells	

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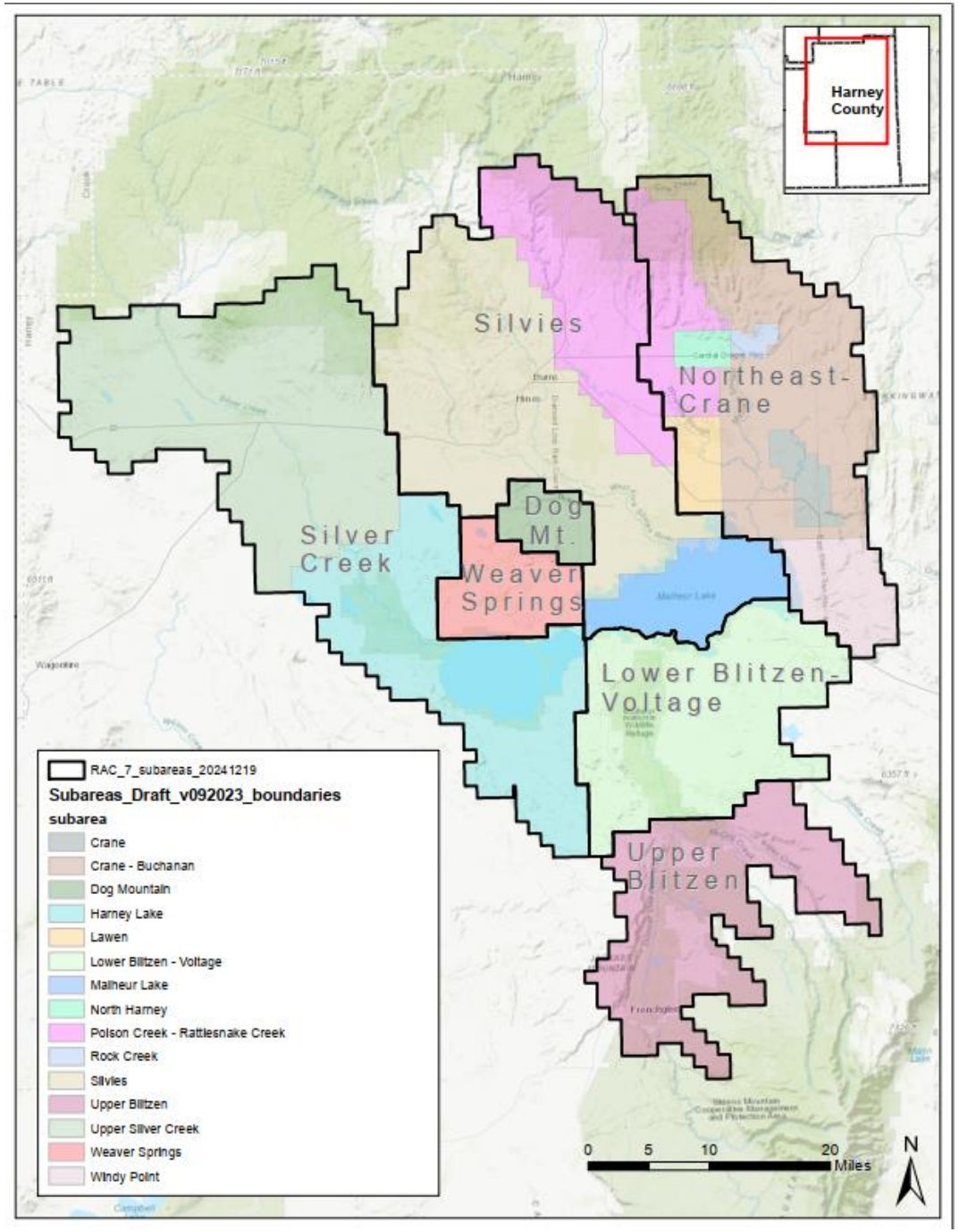
7 subarea map

- WRD proposed 7 subareas overlaid on the original proposed 15 subareas



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OWRD RAC 12 scenario compared with RAC 14 scenario: Changes in Pumpage Since 2018

Subarea	WRD RAC 12 Proposal Change (%)	WRD RAC 14 Proposal Change (%)	Modeled 2018 Nonexempt Pumpage (kaf/yr)	WRD RAC 14 Proposal PTW (kaf/yr)
Dog Mountain	-55%	**-9%**	4.6	**4.2**
Lower Blitzen-Voltage	-32%	**-39%**	13.7	**8.3**
Northeast-Crane	-48%	**-34%**	53.0	**35.0**
Silver Creek	-45%	**-28%**	21.0	**15.2**
Silvies	0%	**-15%**	24.9	**21.2**
Upper Blitzen	0%	**0%**	0.1	**0.1**
Weaver Springs	-49%	**-75%**	19.2	**4.8**
Overall	-38%	**-35%**	136.5	**88.8**

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Proposed Reductions by Subarea at Each Check-In (as a % from 2018)

Subarea	2028 (40%)	2034 (30%)	2040 (15%)	2046 (10%)	2052 (5%)	Total Reduction
Dog Mountain	-4%	-3%	-1%	-1%	-0.5%	-9%
Lower Blitzen-Voltage	-16%	-12%	-6%	-4%	-2%	-39%
Northeast-Crane	-14%	-10%	-5%	-3%	-2%	-34%
Silver Creek	-11%	-8%	-4%	-3%	-1%	-28%
Silvies	-6%	-5%	-2%	-2%	-1%	-15%
Upper Blitzen	0%	0%	0%	0%	0%	0%
Weaver Springs*	-56%	-19%	-	-	-	-75%
Overall	-18%	-10%	-4%	-2%	-1%	-35%

*Water use in the Weaver Springs subarea will be reduced to PTW with 75% of the total reduction in 2028 and 25% of the total reduction in 2034.

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Median Changes in Water Levels From 2018 to 2060 (feet)

Subarea	WRD Proposal RAC 12 (ft of change from 2018)	WRD Proposal RAC 14 (ft of change from 2018)	RAC 14 vs. RAC 12
Dog Mountain	-3.6	-5.1	Lower
Lower Blitzen-Voltage	-7.0	-6.4	Higher
Northeast-Crane	-13.5	-17.6	Lower
Silver Creek	-4.0	-6.1	Lower
Silvies	-1.8	-0.6	Higher
Upper Blitzen	+0.2	+0.2	Similar
Weaver Springs	-28.7	+7.0	Higher

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Lowland Natural Evapotranspiration 2058 vs. 2018 and RAC 14 vs. RAC 12

Subarea	2018 ET (kaf/yr)	2058 WRD RAC 12 Proposal (kaf/yr)	2058 WRD RAC 14 Proposal (kaf/yr)	RAC 14 vs. 2018	RAC 14 vs. RAC 12
Dog Mountain	0.3	0.25	0.20	Less	Less
Lower Blitzen-Voltage	4.8	3.6	4.1	Less	More
Northeast-Crane	2.0	0.35	0.38	Less	More
Silver Creek	17.9	13.5	14.7	Less	More
Silvies	21.8	15.1	17.5	Less	More
Upper Blitzen	1.5	1.5	1.5	Similar	Similar
Weaver Springs	0.7	0.4	0.6	Less	More
Overall	49.0	34.8	38.9	Less	More

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Wells That Lose Access to Water ("Go Dry") by 2060

Subarea	Total Domestic Wells	WRD RAC 12 Proposal (% of Wells That Go Dry)	WRD RAC 14 Proposal (% of Wells That Go Dry)	RAC 14 vs. RAC 12
Dog Mountain	45	16%	16%	Similar
Lower Blitzen - Voltage	51	28%	18%	Fewer
Northeast-Crane	337	13%	14%	More
Silver Creek	44	9%	9%	Similar
Silvies	394	6%	6%	Similar
Upper Blitzen	25	2%	2%	Similar
Weaver Springs	37	54%	24%	Fewer
Overall	953	12%	11%	Fewer

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Magnitude and Rate Trajectories for RAC 14 Proposed Scenario

- Magnitude trajectories:
  - Show the median magnitude of decline
  - Will be based on the start date of the timeline for curtailment (2028 in the proposed rules)
  - Will be used for adaptive management
  - Include sample individual wells (dashed lines)
- Rate trajectories:
  - Show how the rate of change will adjust after curtailment
  - Will not be used for adaptive management

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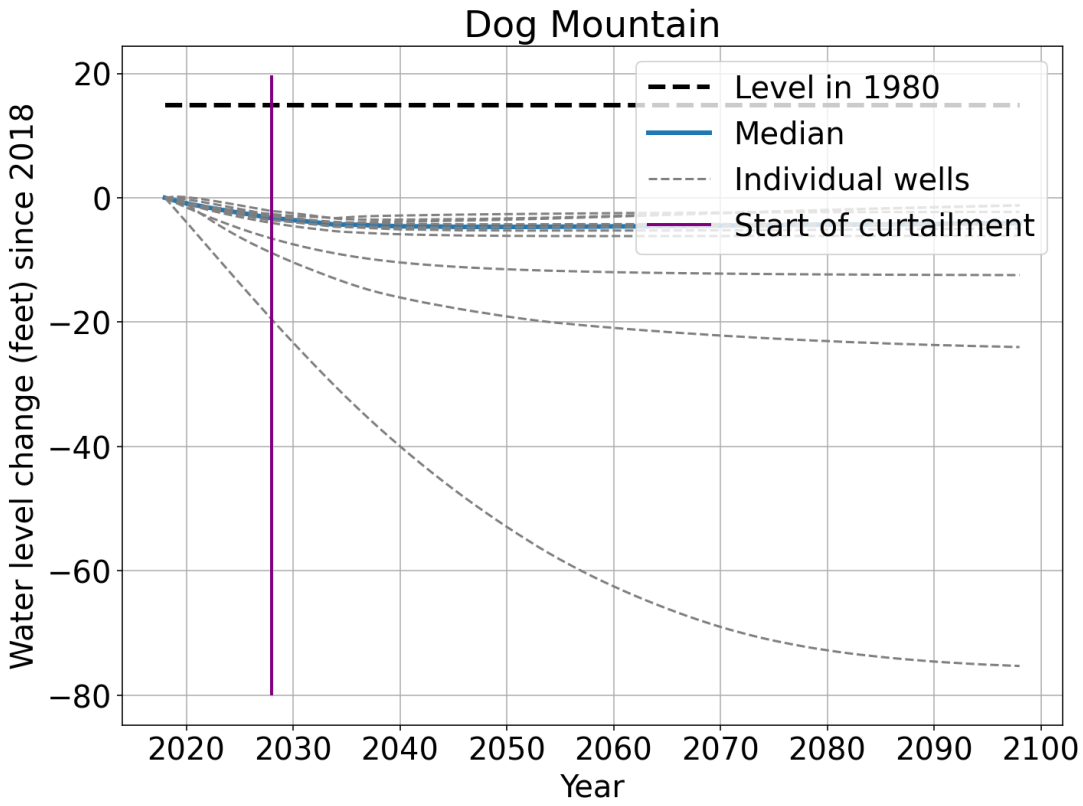
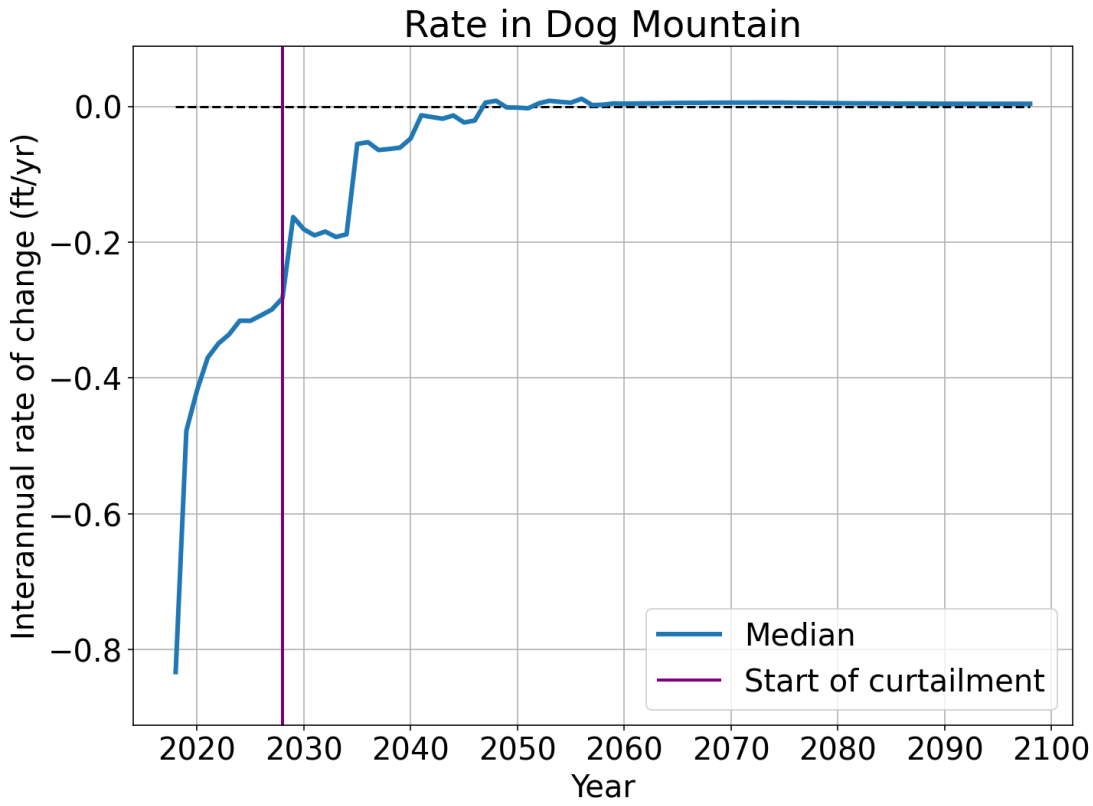
Trajectories: Dog Mountain





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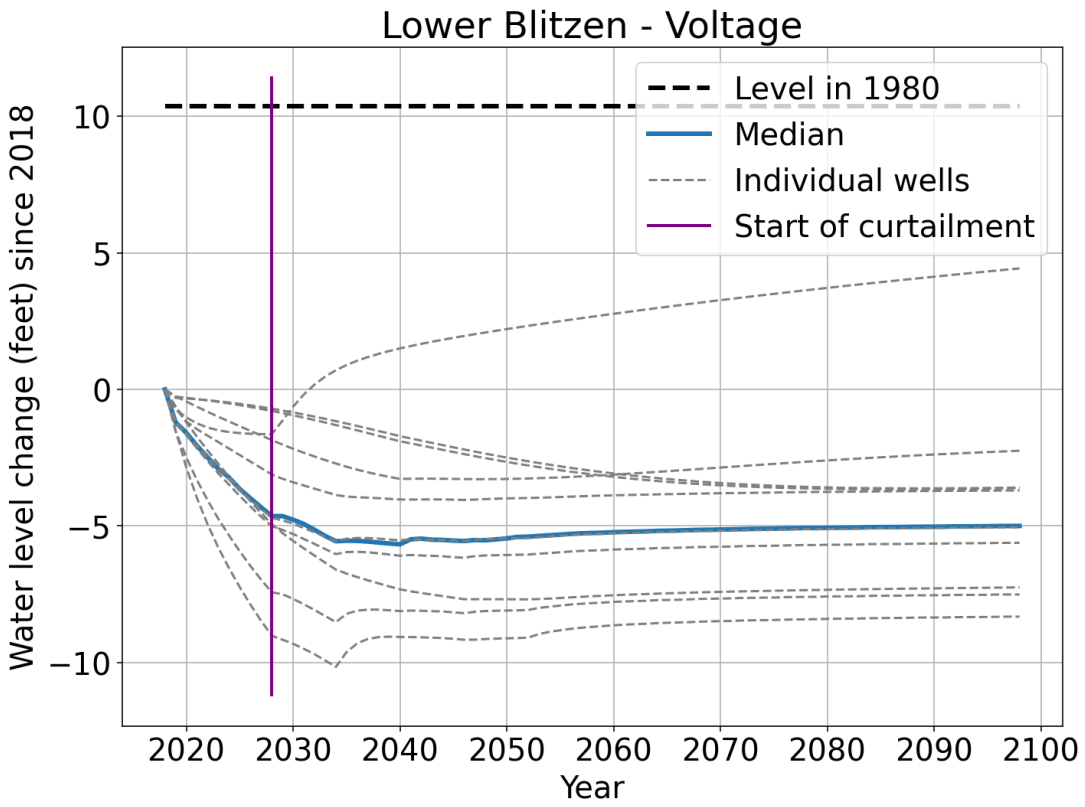
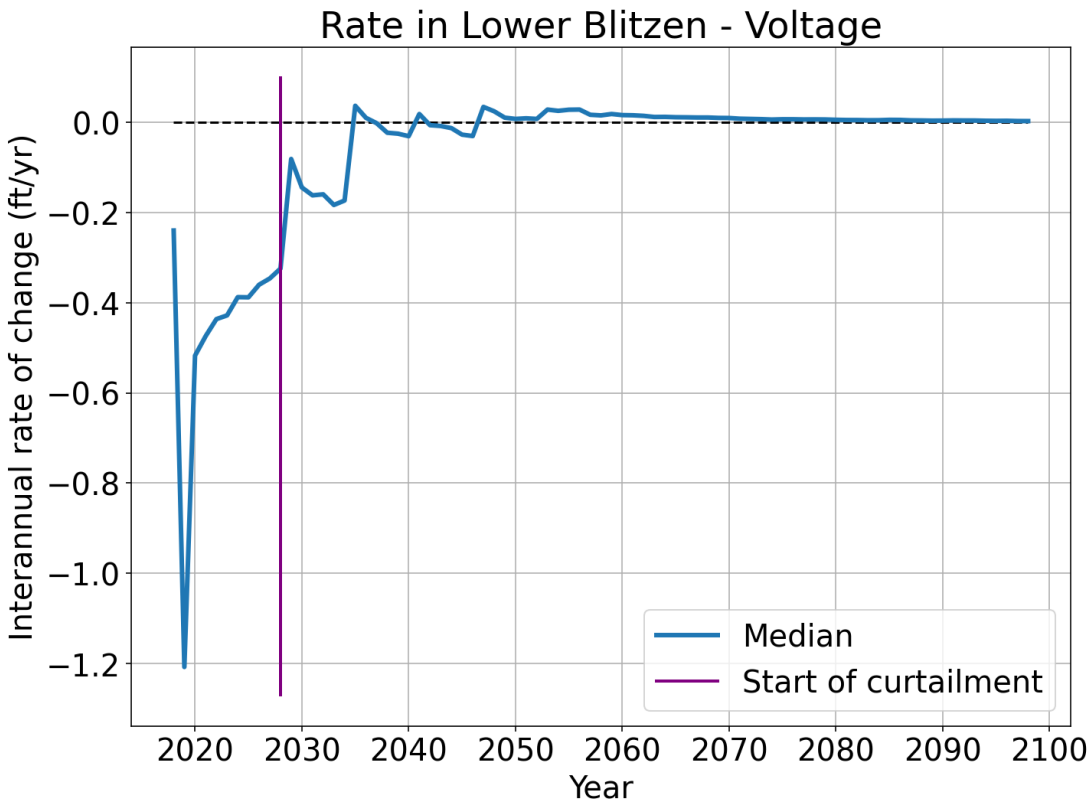
Trajectories: Lower Blitzen - Voltage





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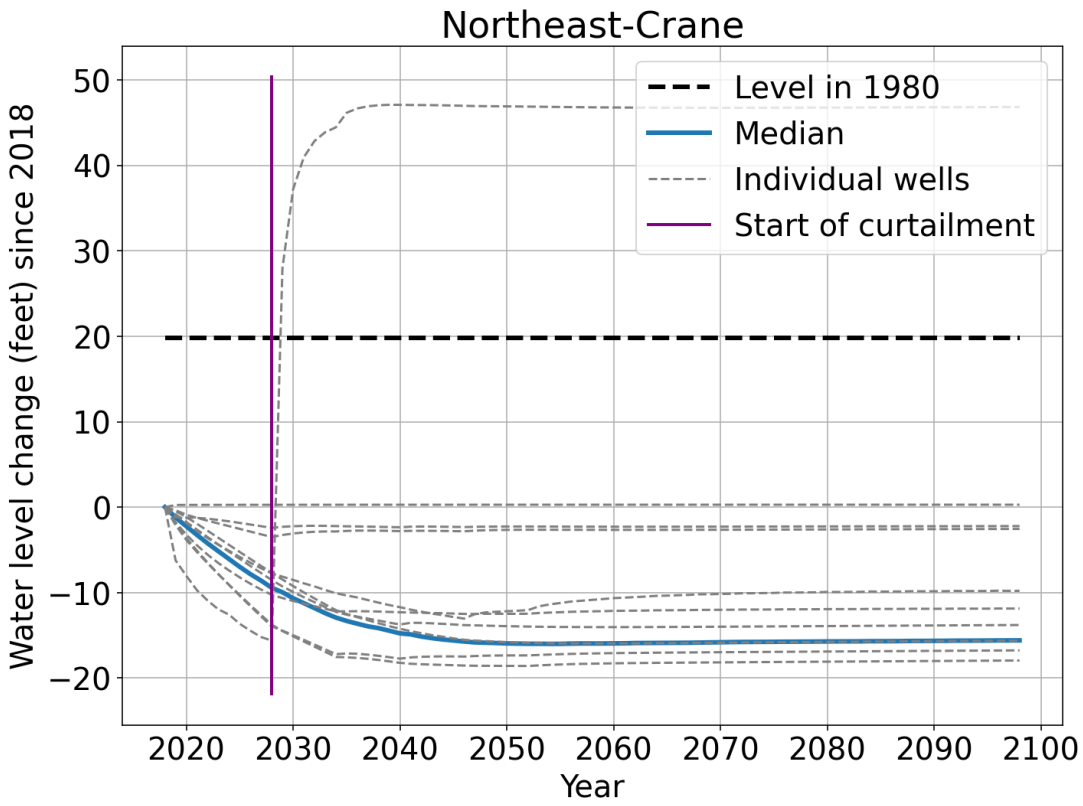
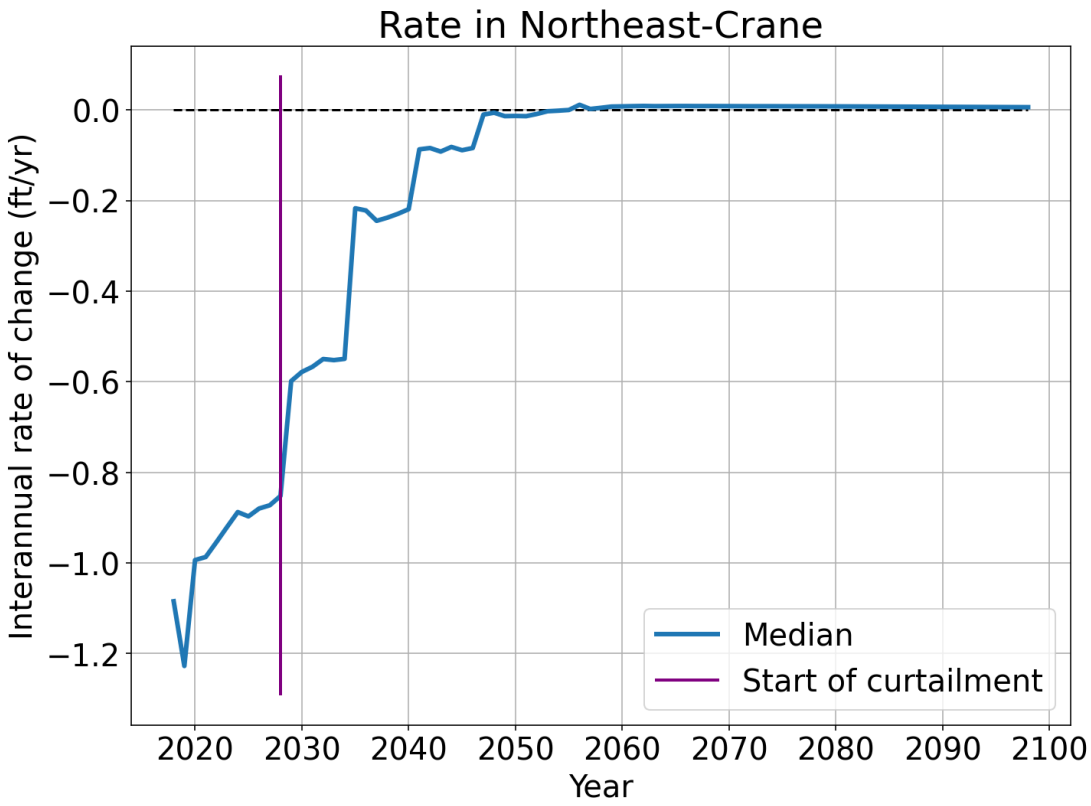
Trajectories: Northeast - Crane





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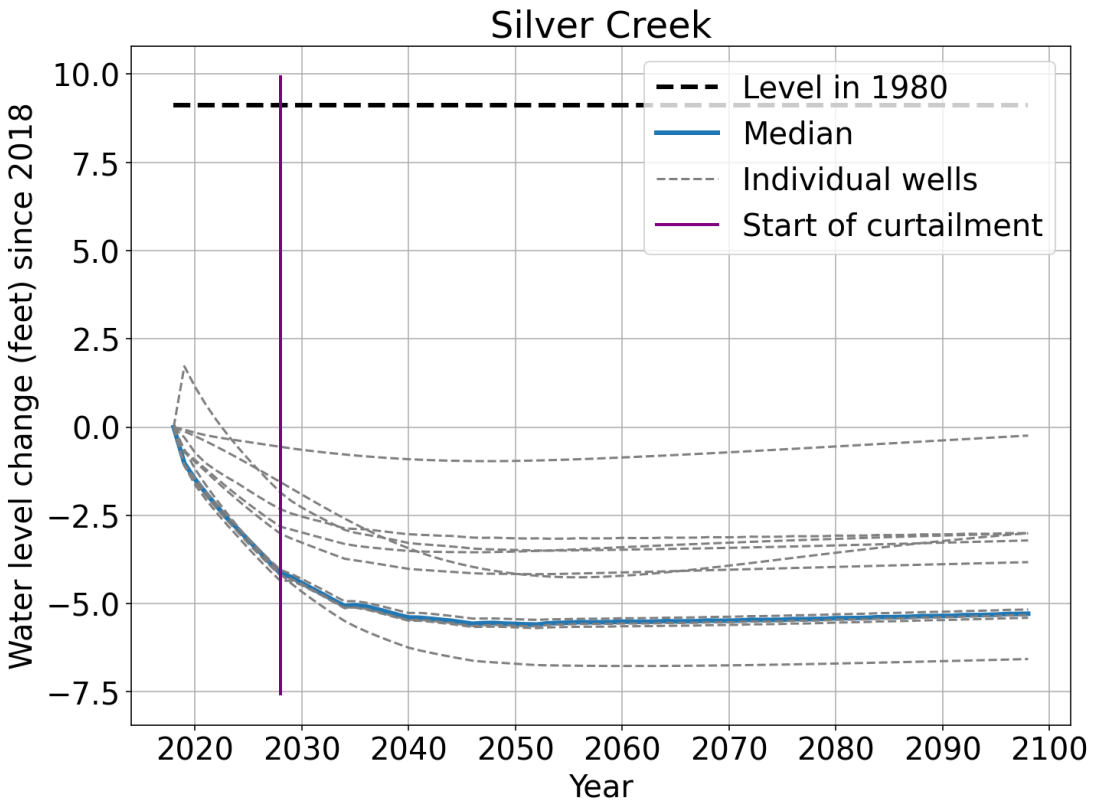
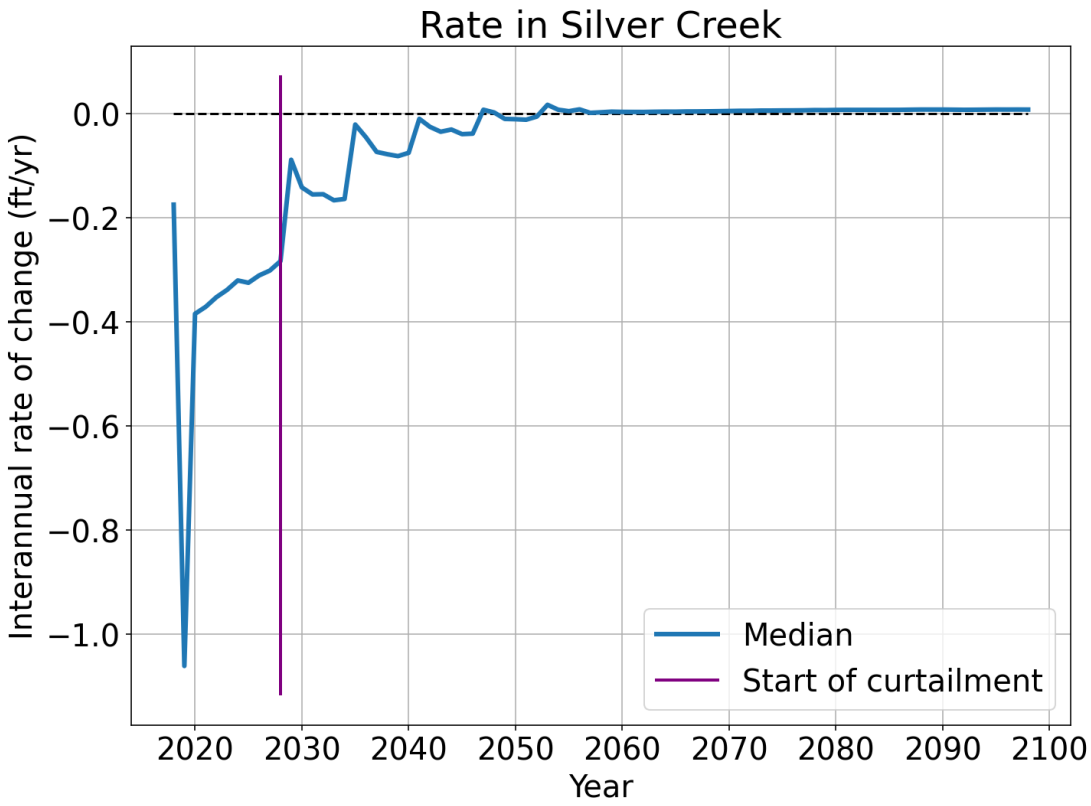
Trajectories: Silver Creek





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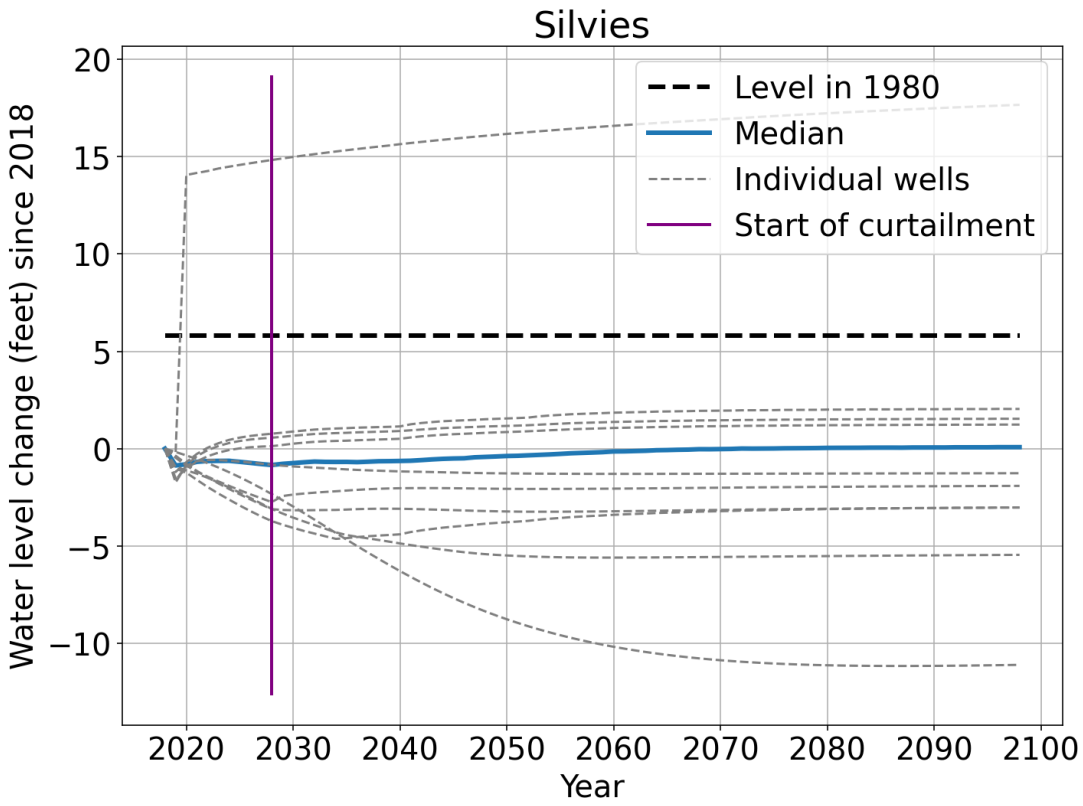
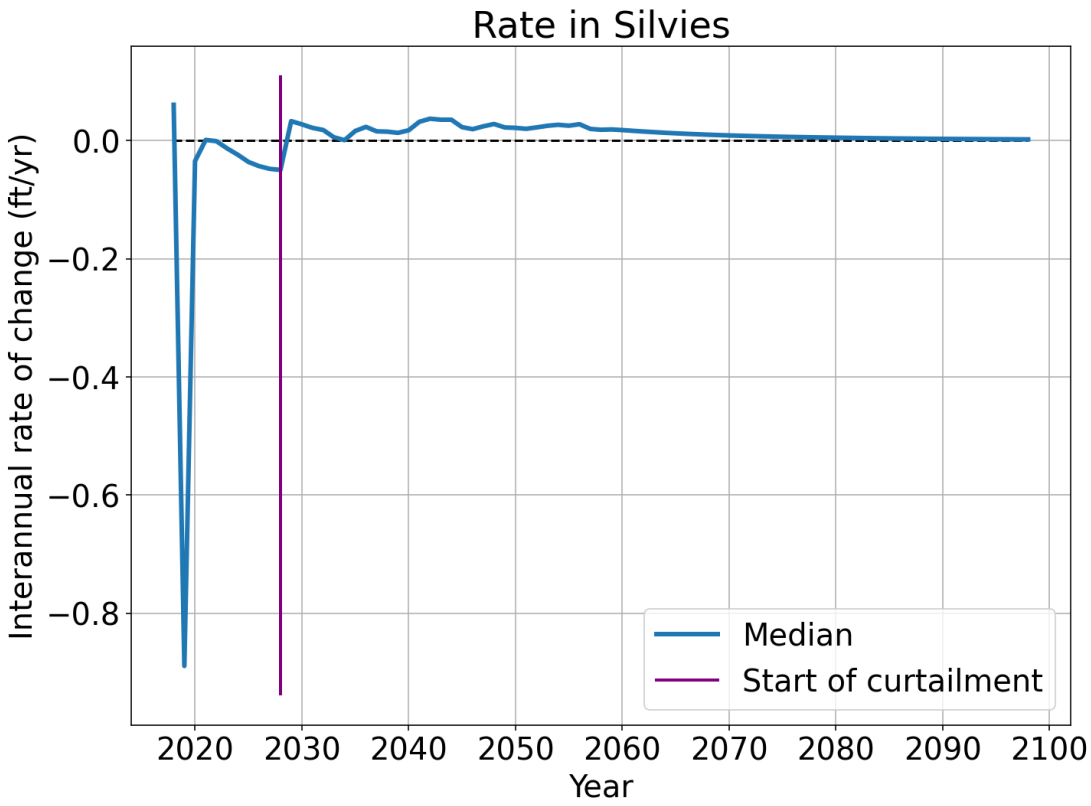
Trajectories: Silvies





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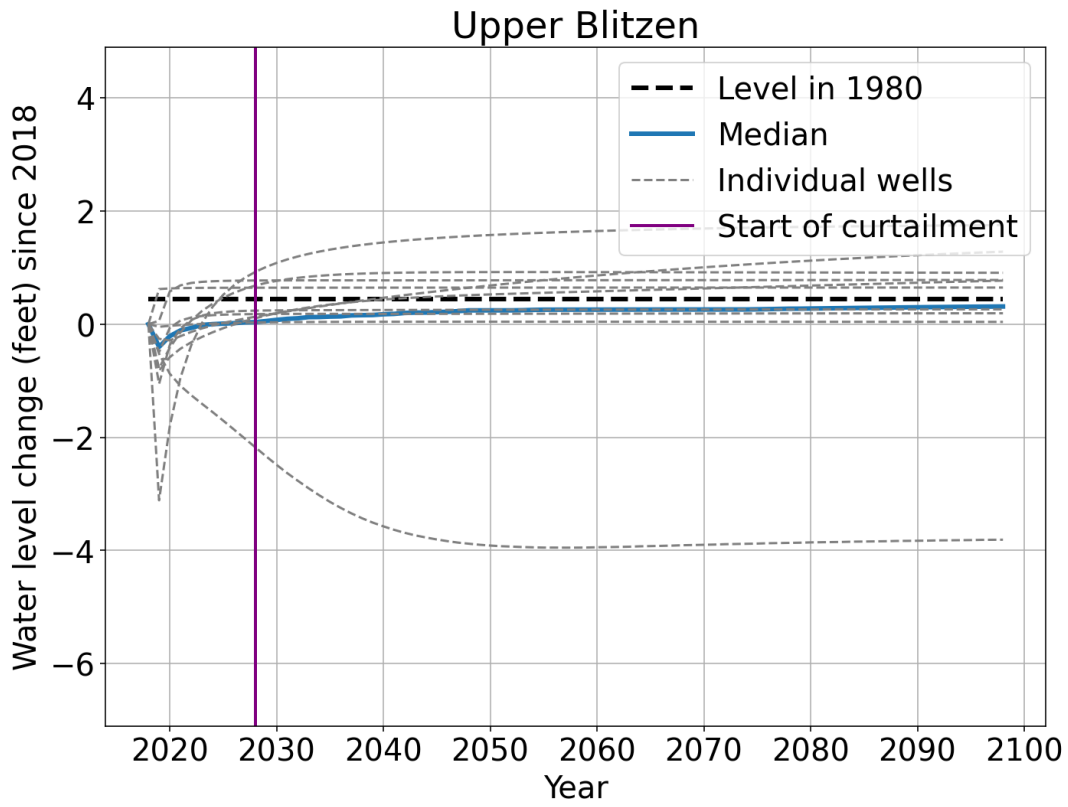
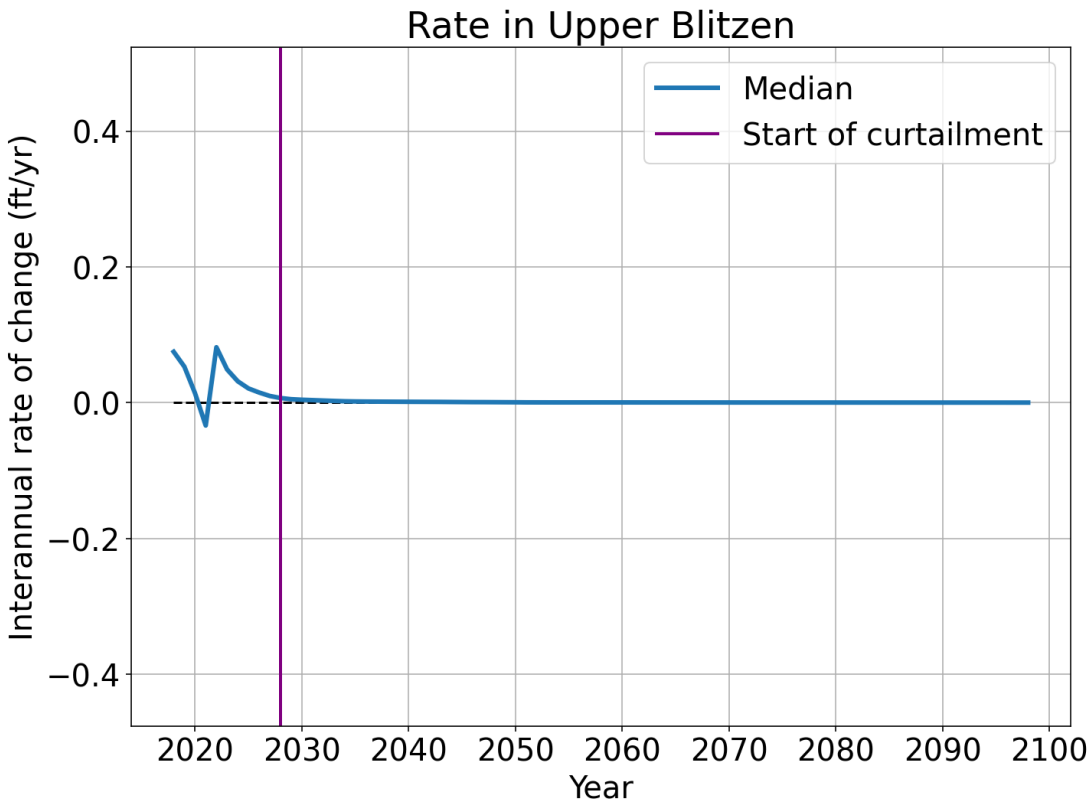
Trajectories: Upper Blitzen





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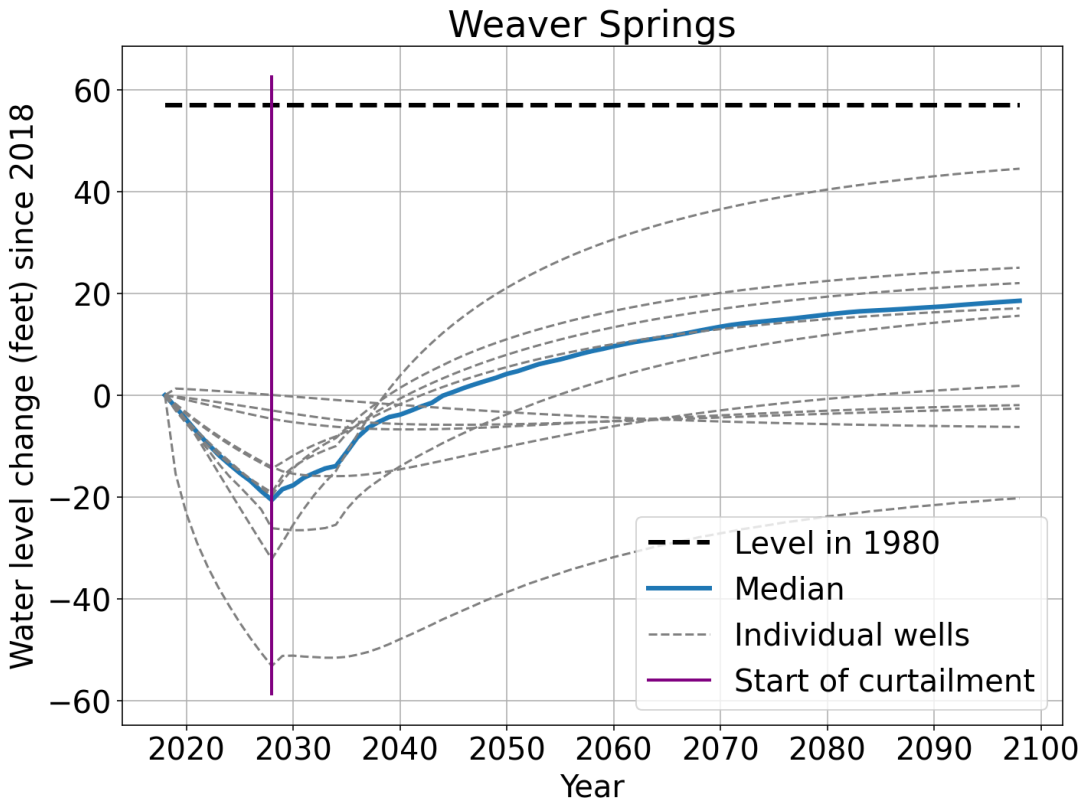
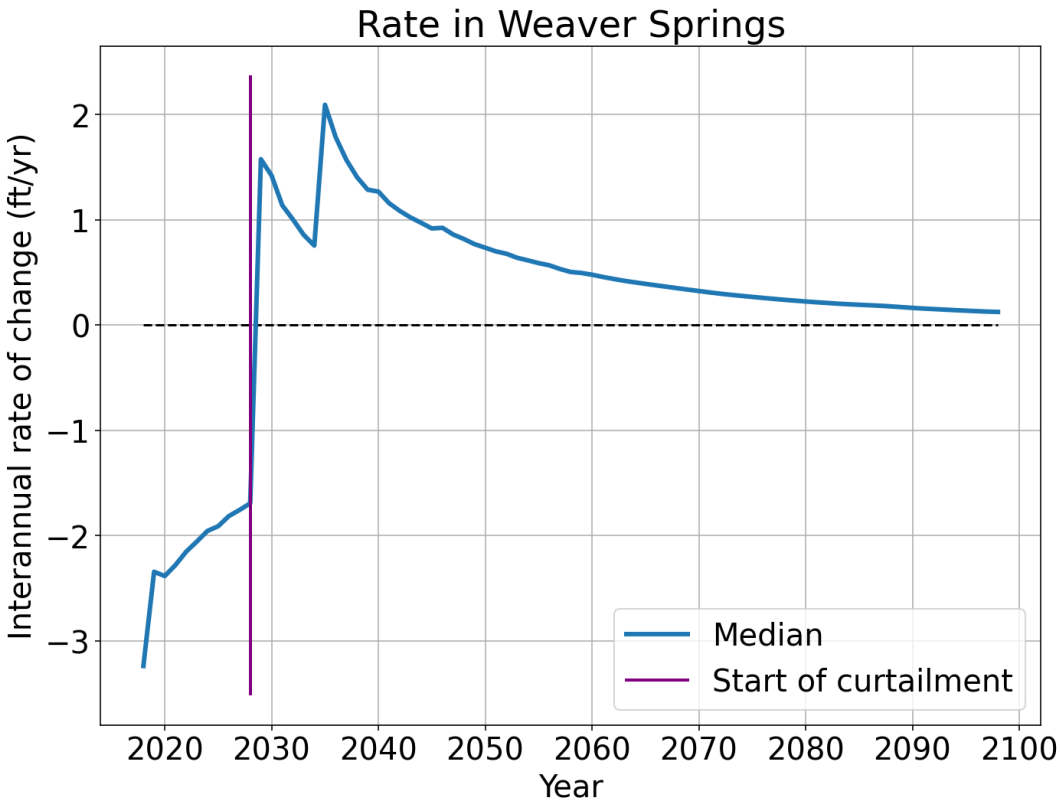
Trajectories: Weaver Springs





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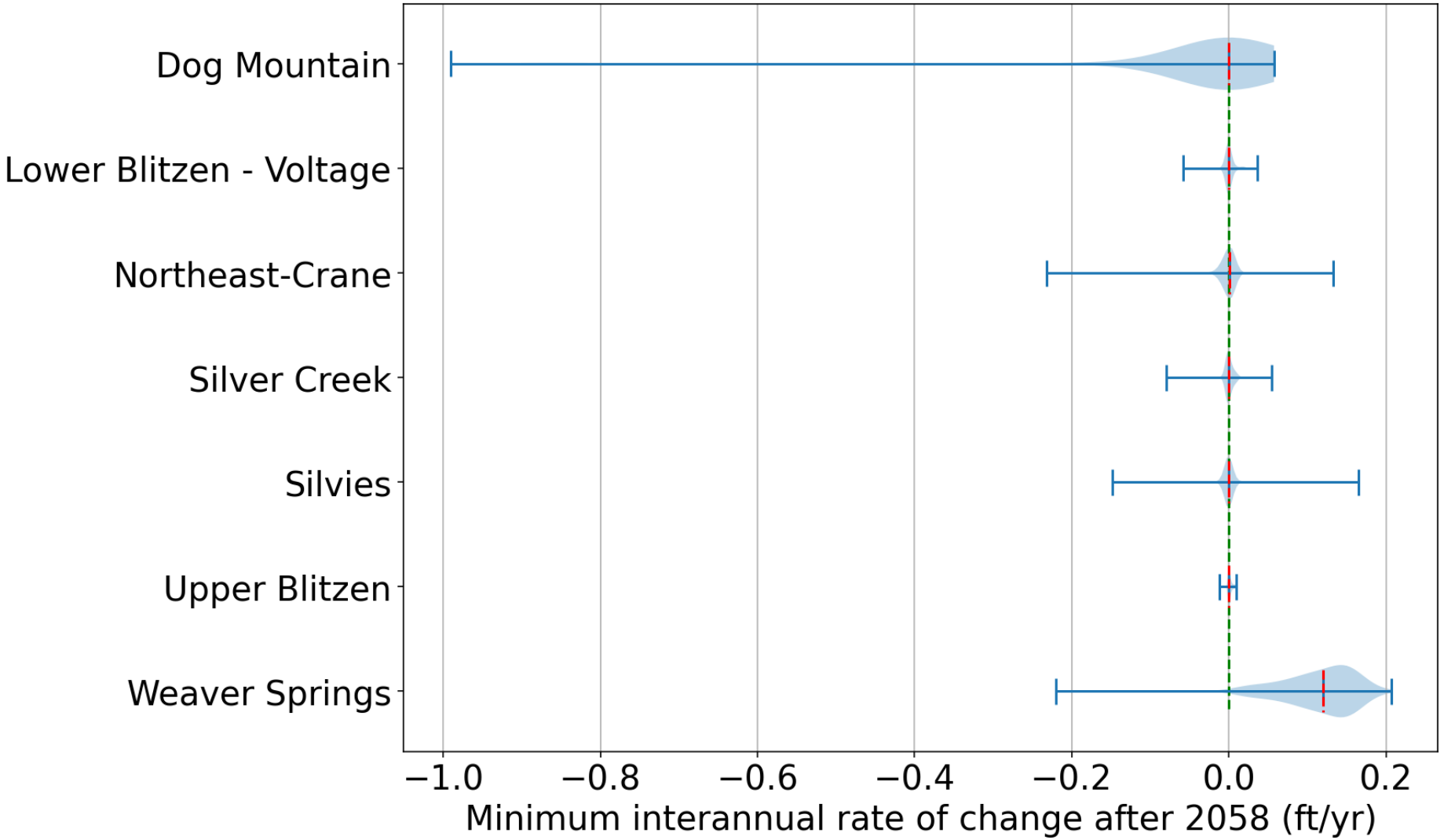
Spatial Variability within Subareas



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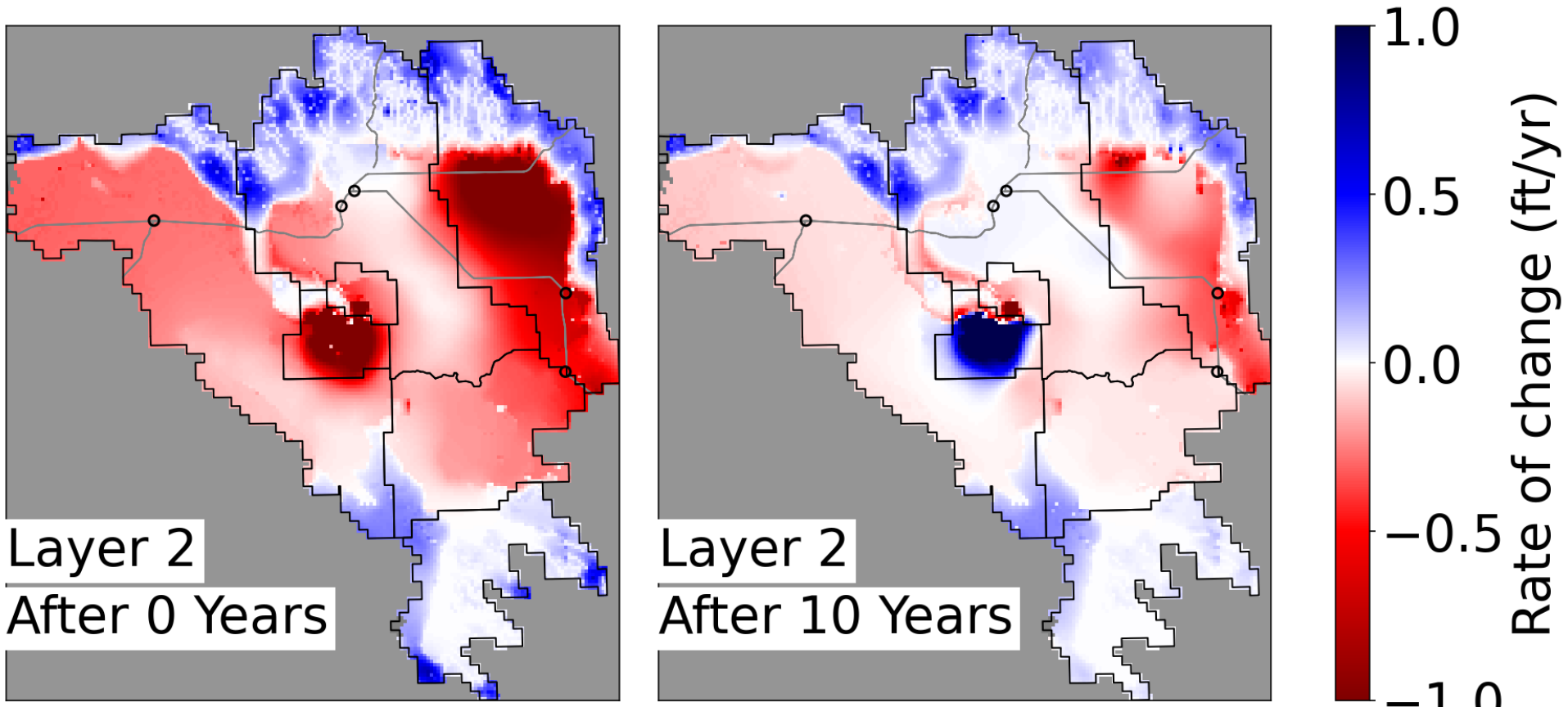
Water Level Rates of Change



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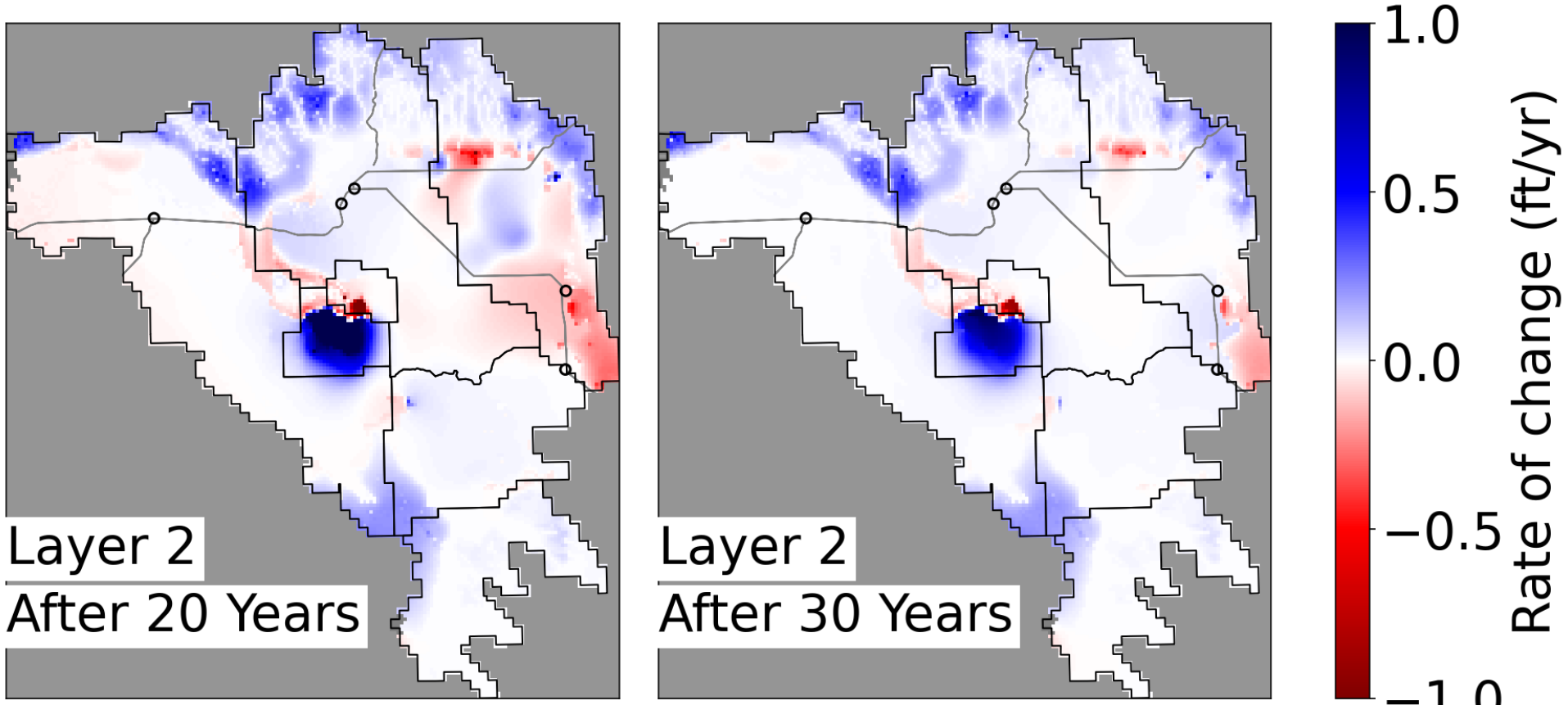
Water Level Rates of Change



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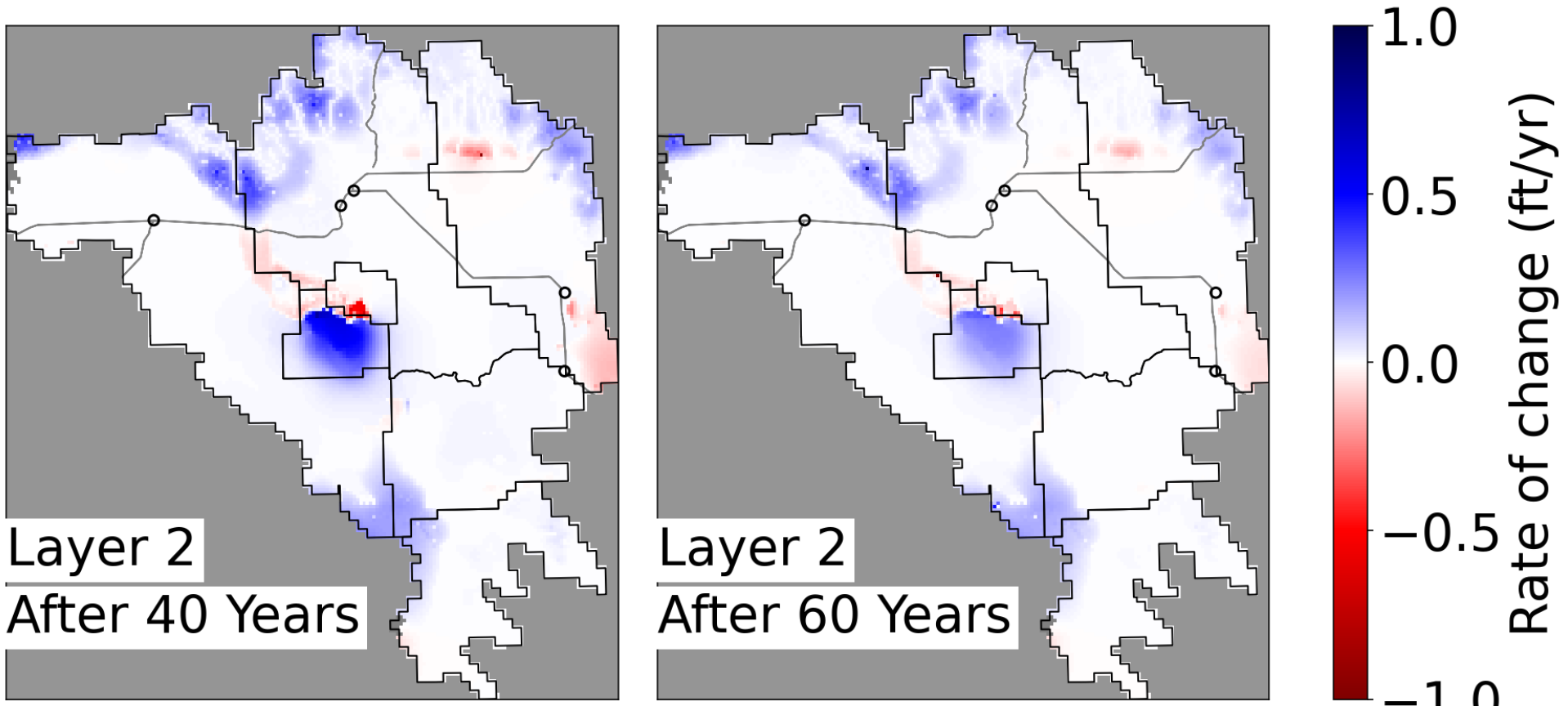
Water Level Rates of Change



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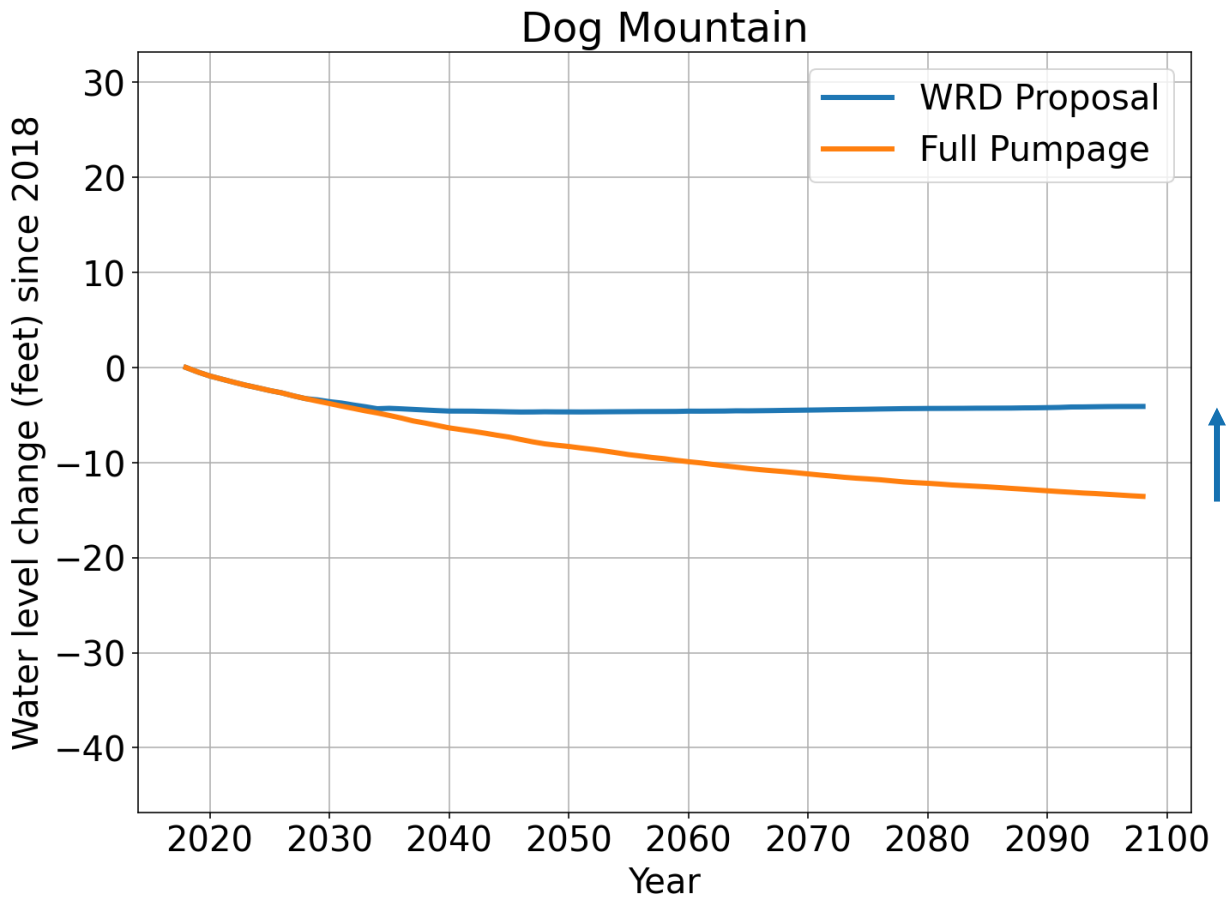
Water Levels vs. Full-Pumpage



10 feet higher

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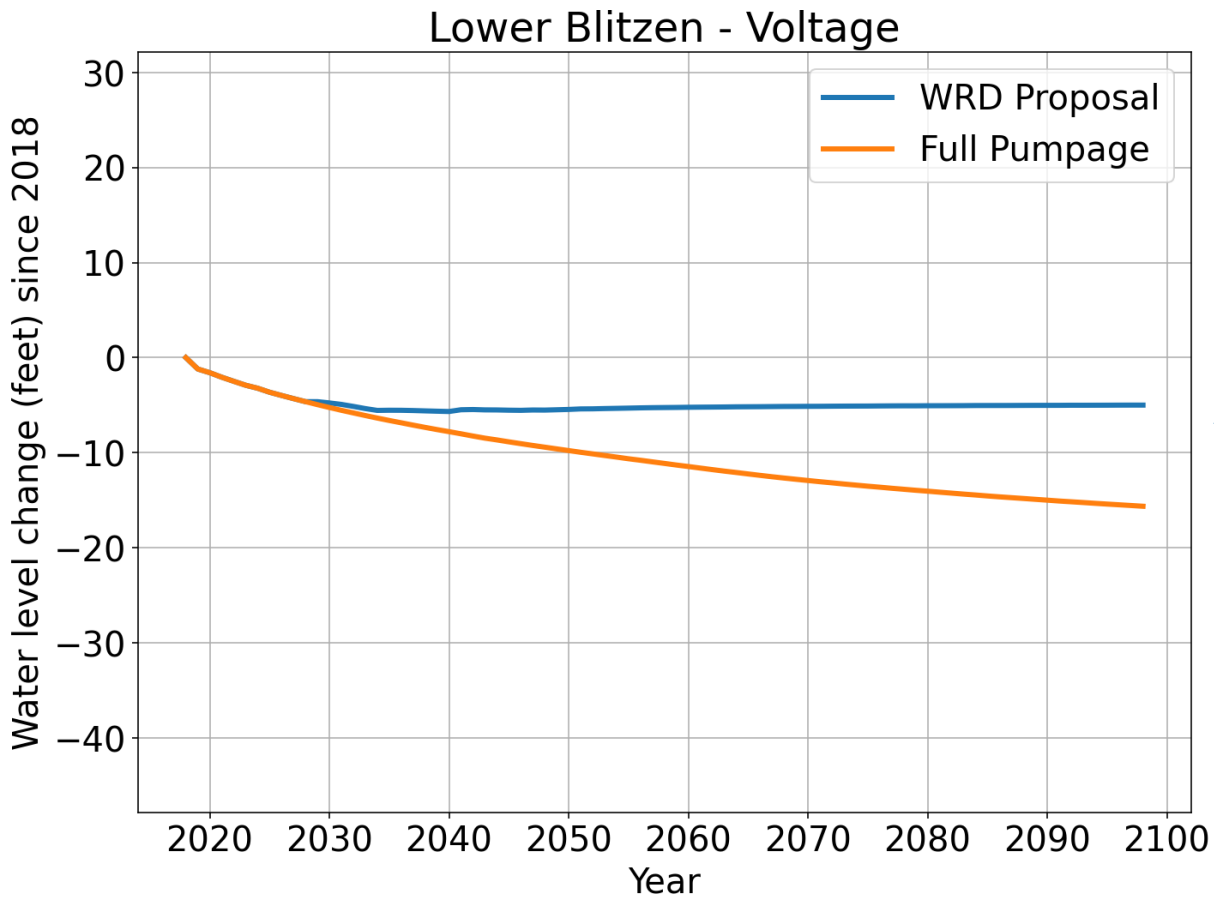
Water Levels vs. Full-Pumpage



12 feet higher

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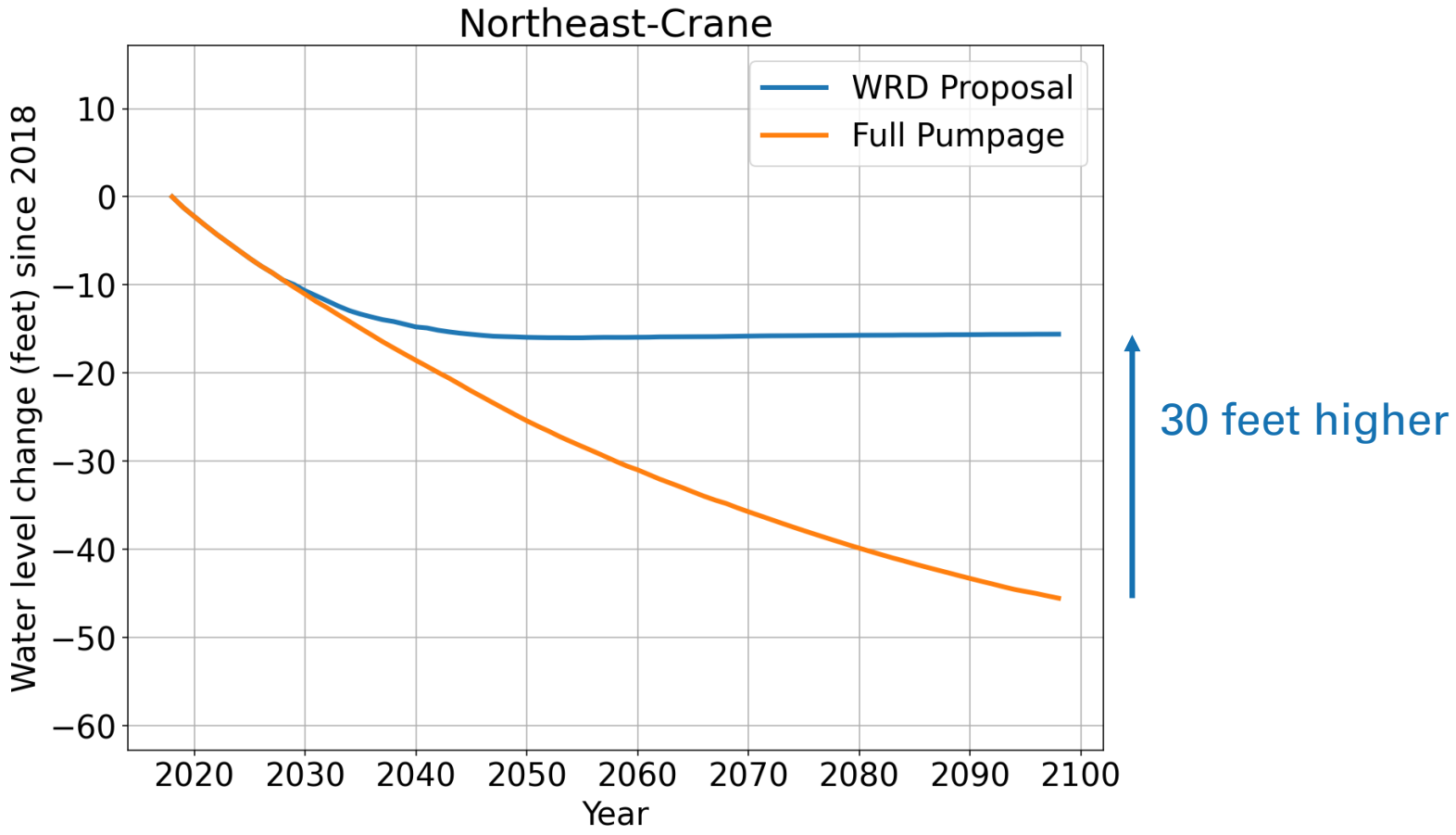
Water Levels vs. Full-Pumpage



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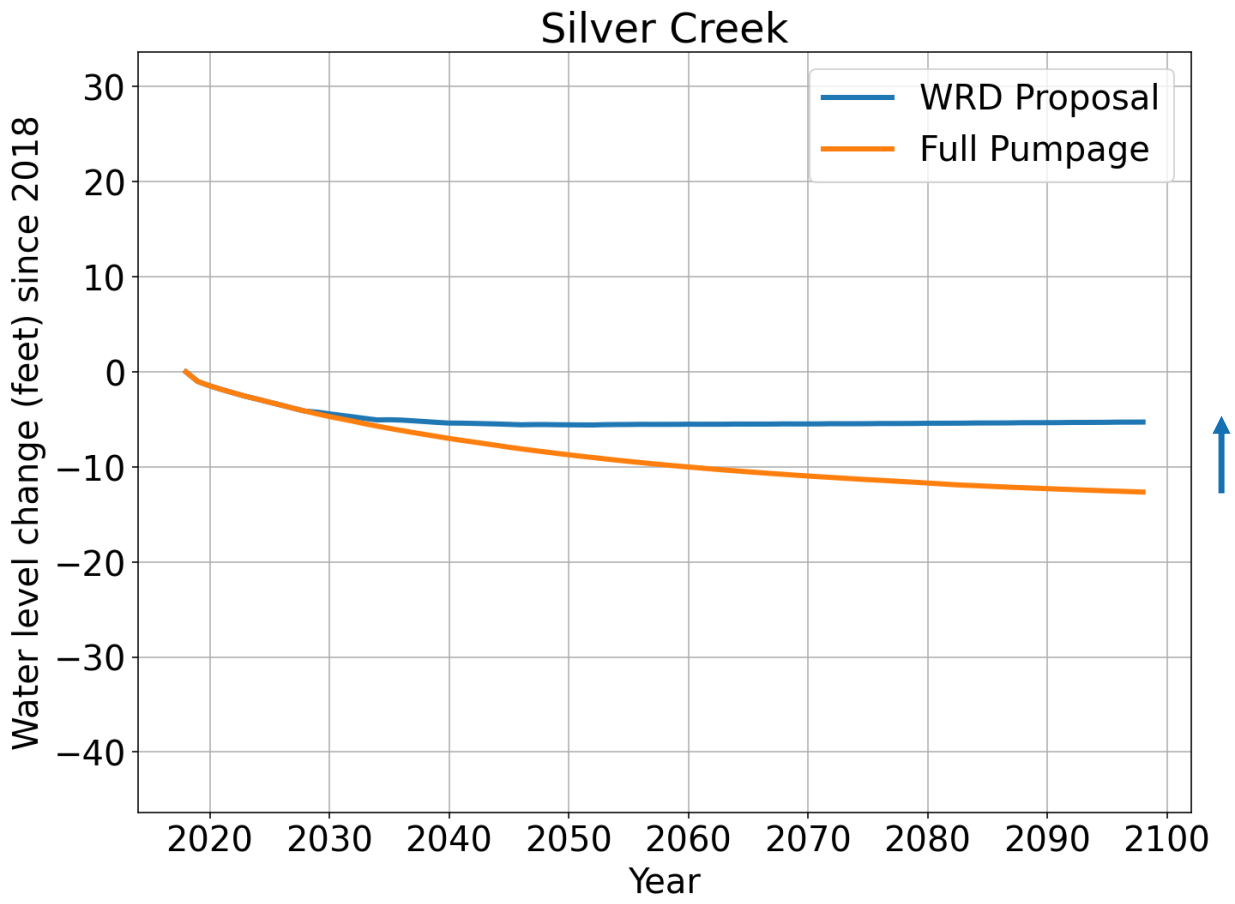
Water Levels vs. Full-Pumpage



8 feet higher

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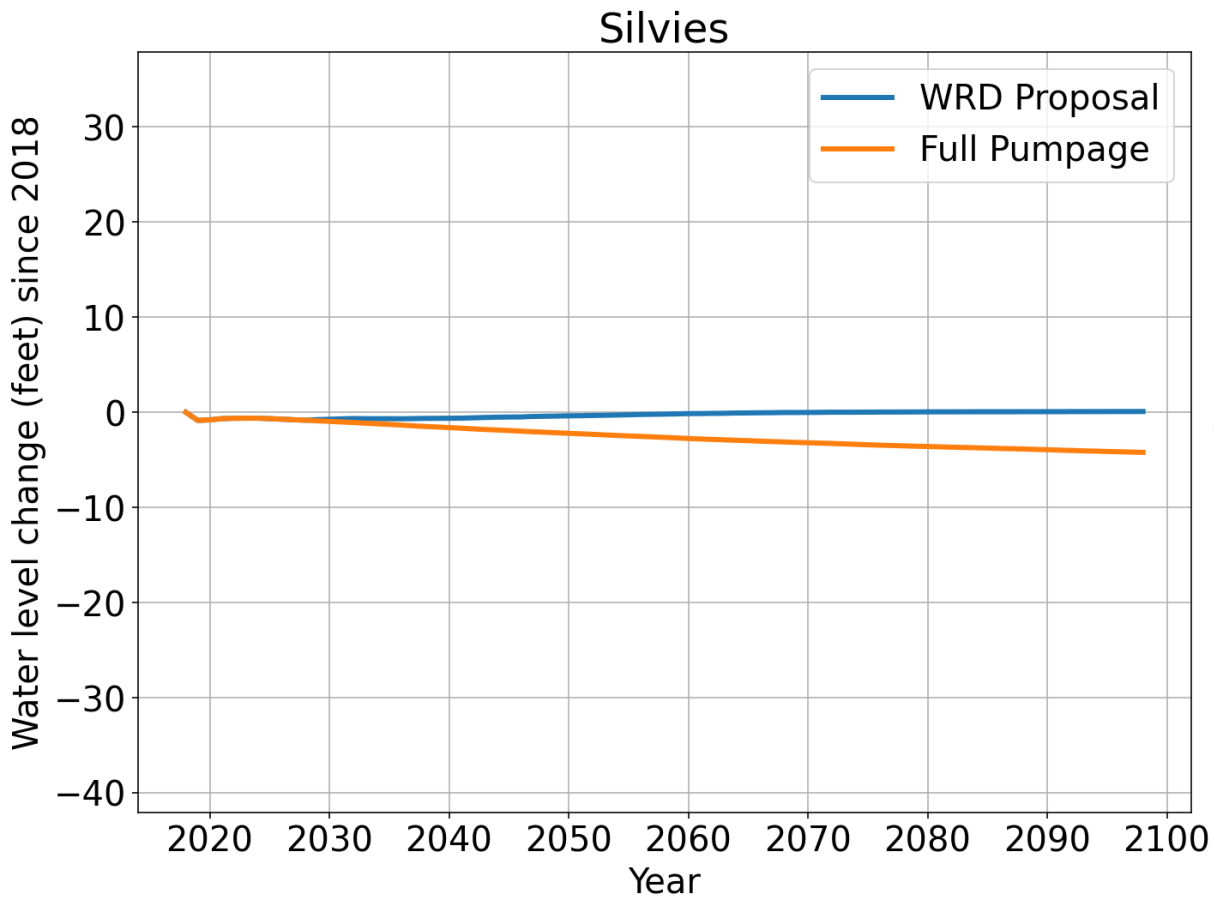
Water Levels vs. Full-Pumpage



5 feet higher

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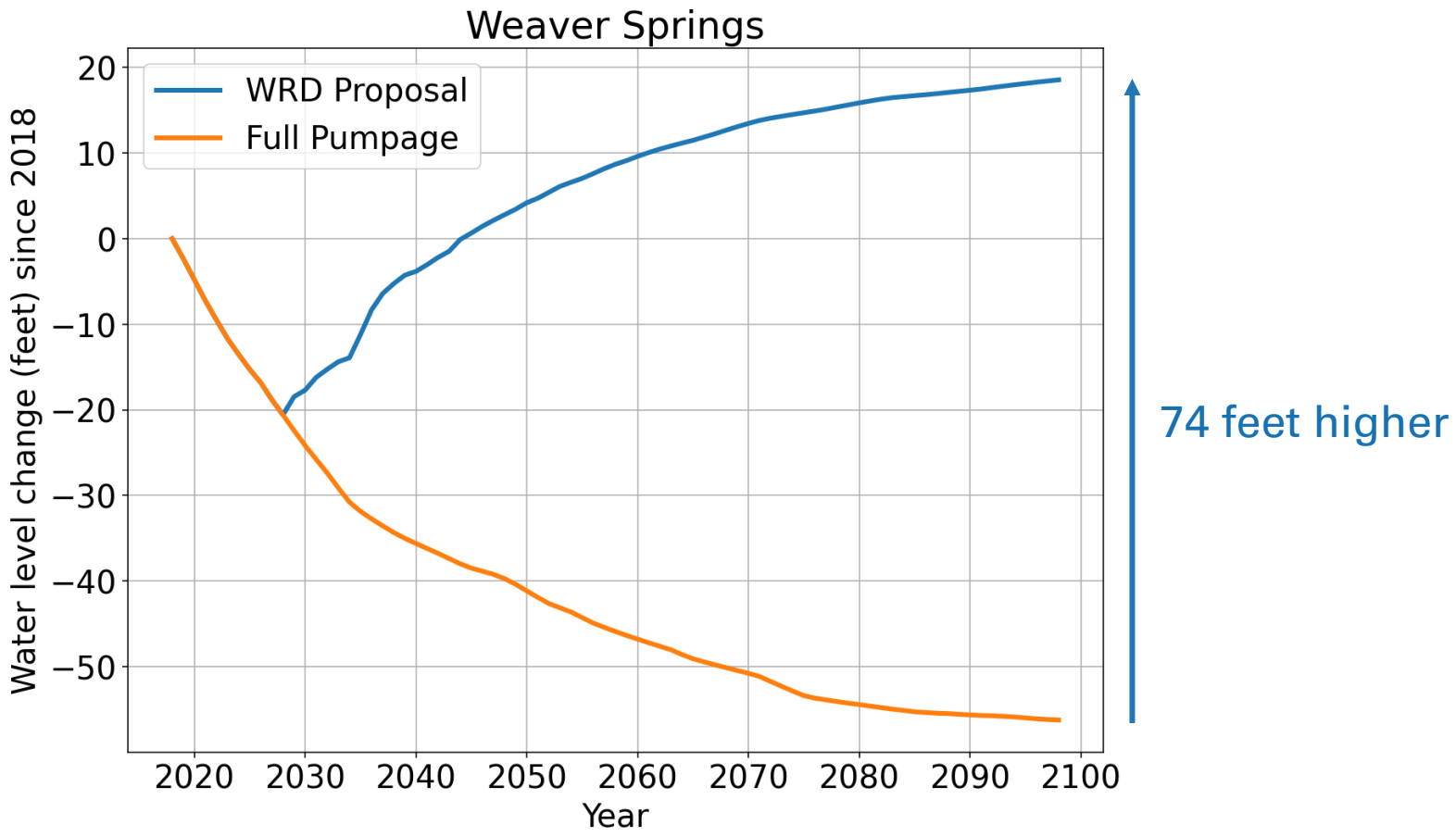
Water Levels vs. Full-Pumpage



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Questions

- Do you have any questions on the results?

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Implementation and Adaptive Management

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Implementing Curtailment

1. Set PTW and process for adaptive management in rule
2. Initially allocate water to each right
3. Schedule the reductions
4. Prepare orders and initiate the contested case
5. Regulate (unless a VA supersedes)
6. Adaptively manage

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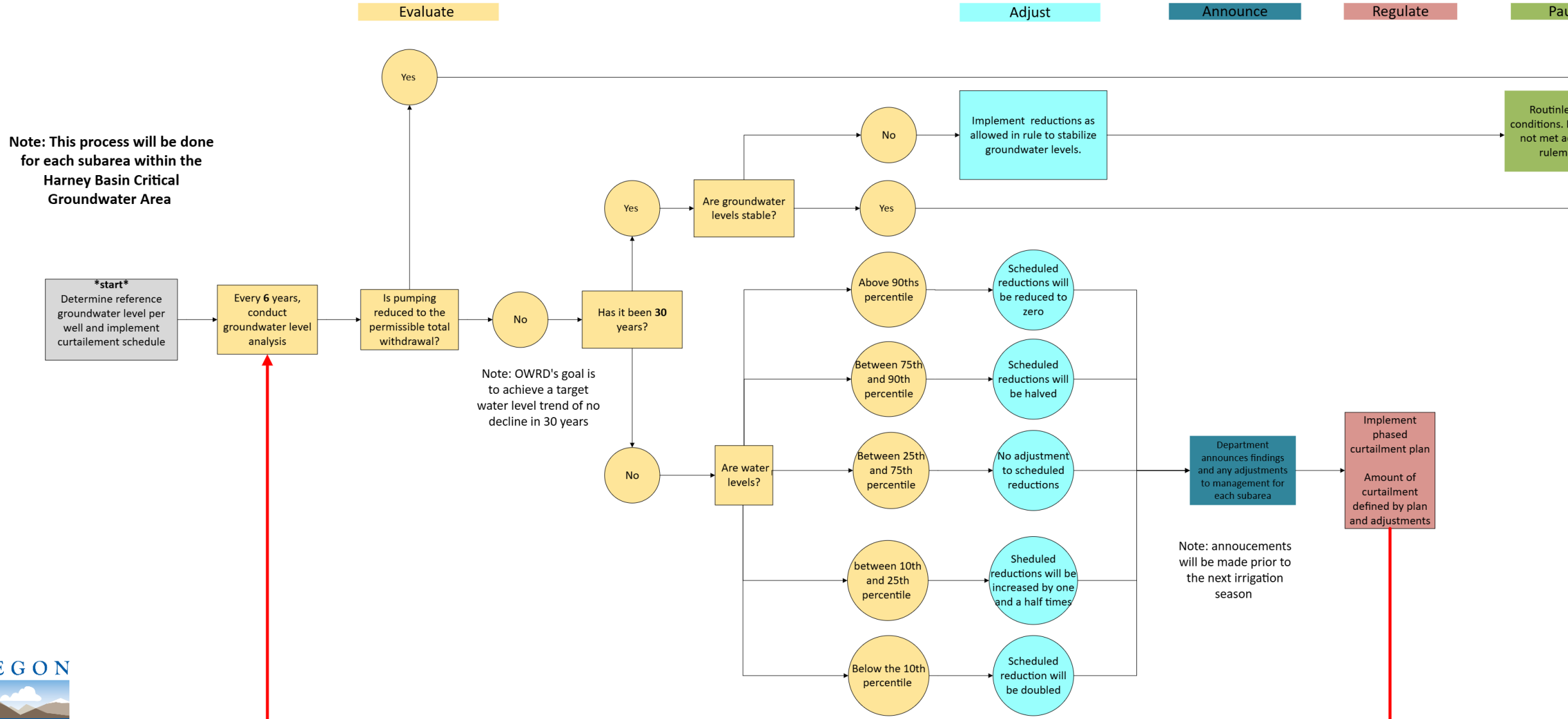
Proposed Adaptive Management Plan



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Proposed management scenario in rule

Within the CGWA Rules:

1. Define subarea/CGWA boundaries
2. Define the goal
3. Set the permissible total withdrawal for each subarea
4. Define how the initial allocation for each groundwater right will be determined
5. Define the schedule for reductions
6. Define how the Harney Basin will be adaptively managed.

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Public Comment

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Lunch

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Critical Groundwater Area Rule Language

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Critical groundwater area rule language

Goals of Conversation

- Gather input around the draft critical groundwater area rule language
- Ensure rule language matches the proposal

Level of Participation

Consult

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690-512-0010 Definitions

Rule Language	Rule Language Explainer
1) "Adaptive Management Checkpoint" means the scheduled interval at which the Department adaptively manages the groundwater resource and adjusts the schedule for reductions in groundwater use.	1) Defines adaptive management checkpoint.
2) "Groundwater Level Change Envelope" means the trajectory for groundwater levels within each subarea relative to the groundwater levels in 2028 that are modeled with the Harney Basin Groundwater Model.	2) Defines groundwater level change envelope.

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690-512-0010 Definitions

Rule Language	Rule Language Explainer
3) "Initial Allocation" means the quantity of water authorized for use by each groundwater right upon completion of contested case.	3) Defines initial allocation.
4) "Permissible Total Withdrawal" means the total volume of groundwater allowed to be pumped annually within a subarea of the critical groundwater area. The unit of measurement for the permissible total withdrawal is acre-feet.	4) Defines permissible total withdrawal.

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690-512-0010 Definitions

Rule Language	Rule Language Explainer
5) "Subarea" means a portion of the critical groundwater area defined for administrative purposes. 6) "Target Groundwater Level Trend" means the goal for the rate of change in groundwater levels within a subarea of the critical groundwater area.	5) Defines subarea. 6) Defines target groundwater level trend.

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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0020 Administrative Boundaries

Rule Language	Rule Language Explainer
1) The Greater Harney Valley Groundwater Area of Concern (GHVGAC) is defined for administrative purposes and is described and shown in Exhibit 1. 2) The boundary of the Harney Basin Groundwater Reservoir is coincident with the Harney Basin boundary as shown in Exhibit 2. 3) The boundary of the Harney Basin Critical Groundwater Area is defined as the GHVGAC boundary shown in Exhibit 1 and contains, in part, the Harney Basin Groundwater Reservoir.	1) Defines the Greater Harney Valley Groundwater Area of Concern. 2) Defines the Harney Basin Groundwater Reservoir and Harney Basin boundary. 3) Defines the boundary of the Harney Basin Critical Groundwater Area.

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Exhibit 1

Greater Harney Valley Groundwater Area of Concern (GHVGAC)

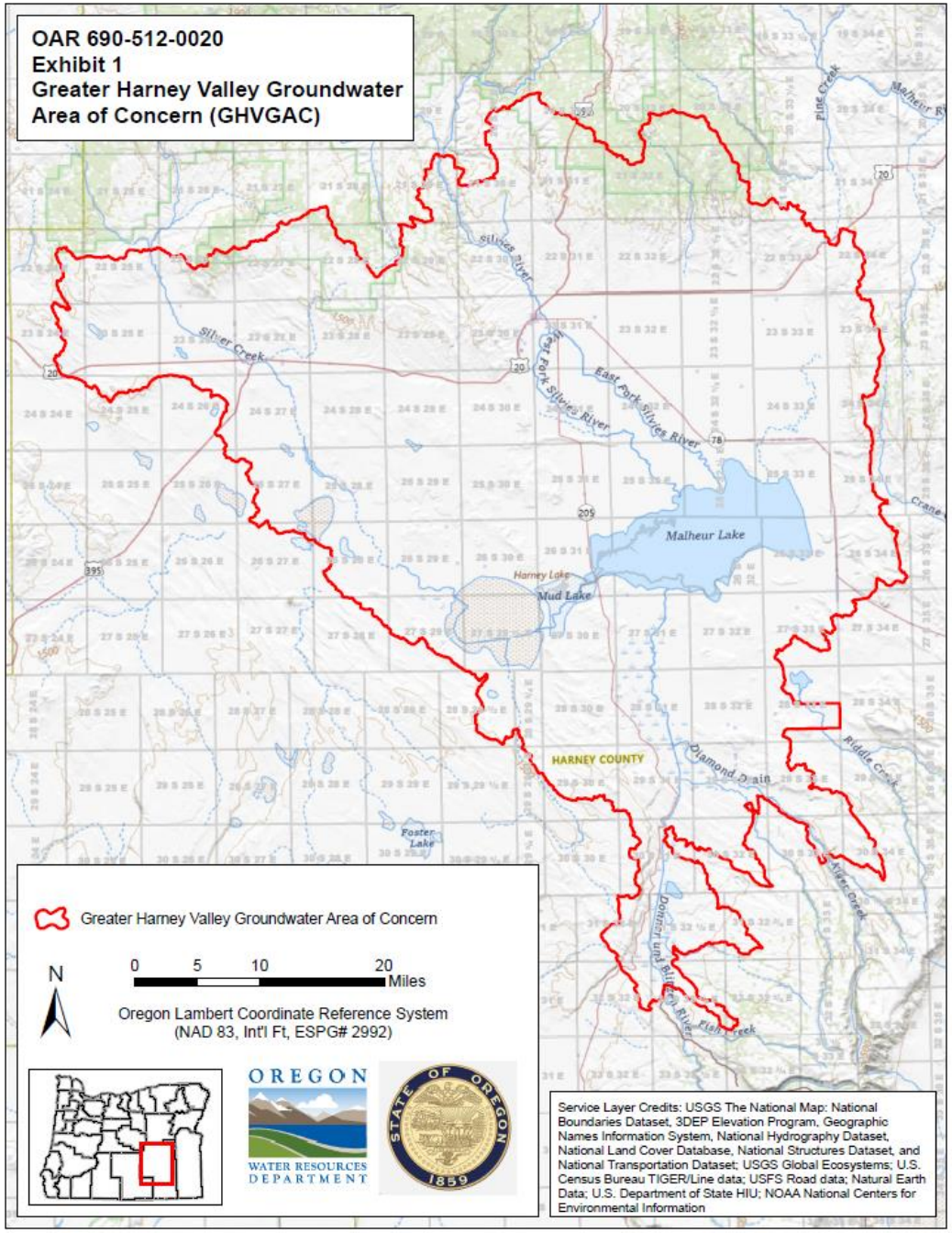

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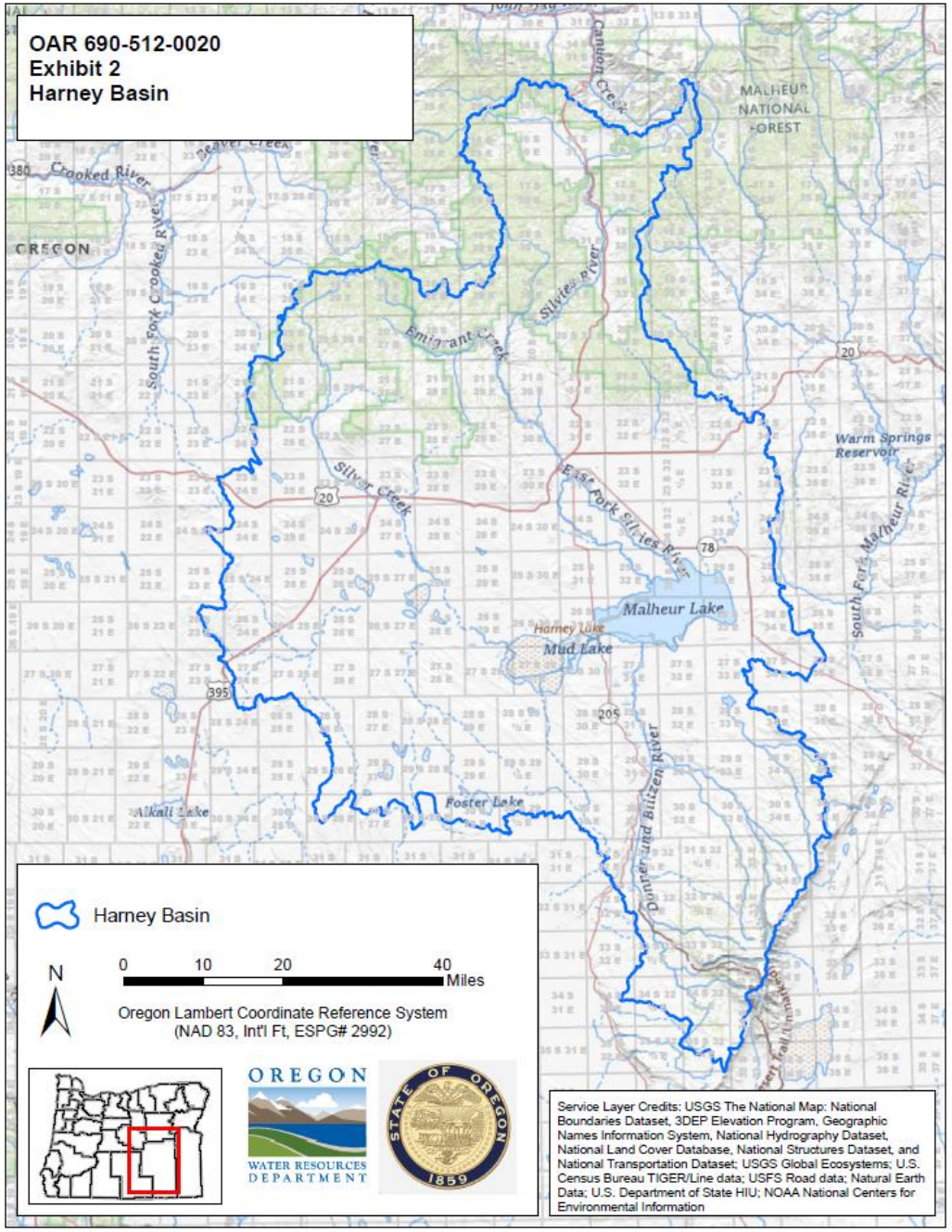
Exhibit 2

Harney Basin



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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0040 Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
1) The target groundwater level trend within the Harney Basin Critical Groundwater Area is a median groundwater level decline rate of no more than 0 feet per year in each subarea. The median will be calculated for each subarea using representative wells with sufficient data as determined by the Department.	1) Defines the goal for the Harney Basin Critical Groundwater Area.

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690-512-0040 Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
2. A review of the Harney Basin Critical Groundwater Area rules shall be completed once every 3 years. The review shall be presented at a Commission meeting which has been publicly noticed and provides opportunity for public comment. 3. A review of the conditions in the Harney Basin Critical Groundwater area shall be completed no less frequently than once every 10 years and the findings reported at a Commission meeting which has been publicly noticed and provides opportunity for public comment.	2. Requires three-year review of the effectiveness of the rules. 3. Requires ten-year review of the conditions in the basin.

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690-512-0040 Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
4) Except as defined in rule 690-512-0030(#) Classifications, the Department will not accept new applications for groundwater permits within the Harney Basin Critical Groundwater Area.	4. Closes the critical groundwater area to any further appropriation of groundwater, except as defined in the classification.

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690-512-0040 Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
5) The Harney Basin Critical Groundwater area defined in section 690-512-0020(5) shall be divided into seven subareas for the purpose of management as shown in Exhibit 3. a. The Dog Mountain subarea is shown in Exhibit 4. b. The Lower Blitzen-Voltage subarea is shown in Exhibit 5. c. The Northeast-Crane subarea is shown in Exhibit 6. d. The Silver Creek subarea is shown in Exhibit 7. e. The Silvies subarea is shown in Exhibit 8. f. The Upper Blitzen subarea is shown in Exhibit 9. g. The Weaver Springs subarea is shown in Exhibit 10.	5) Defines the boundaries of the 7 subareas.

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Exhibit 3

Harney Basin Critical Groundwater Area Subareas

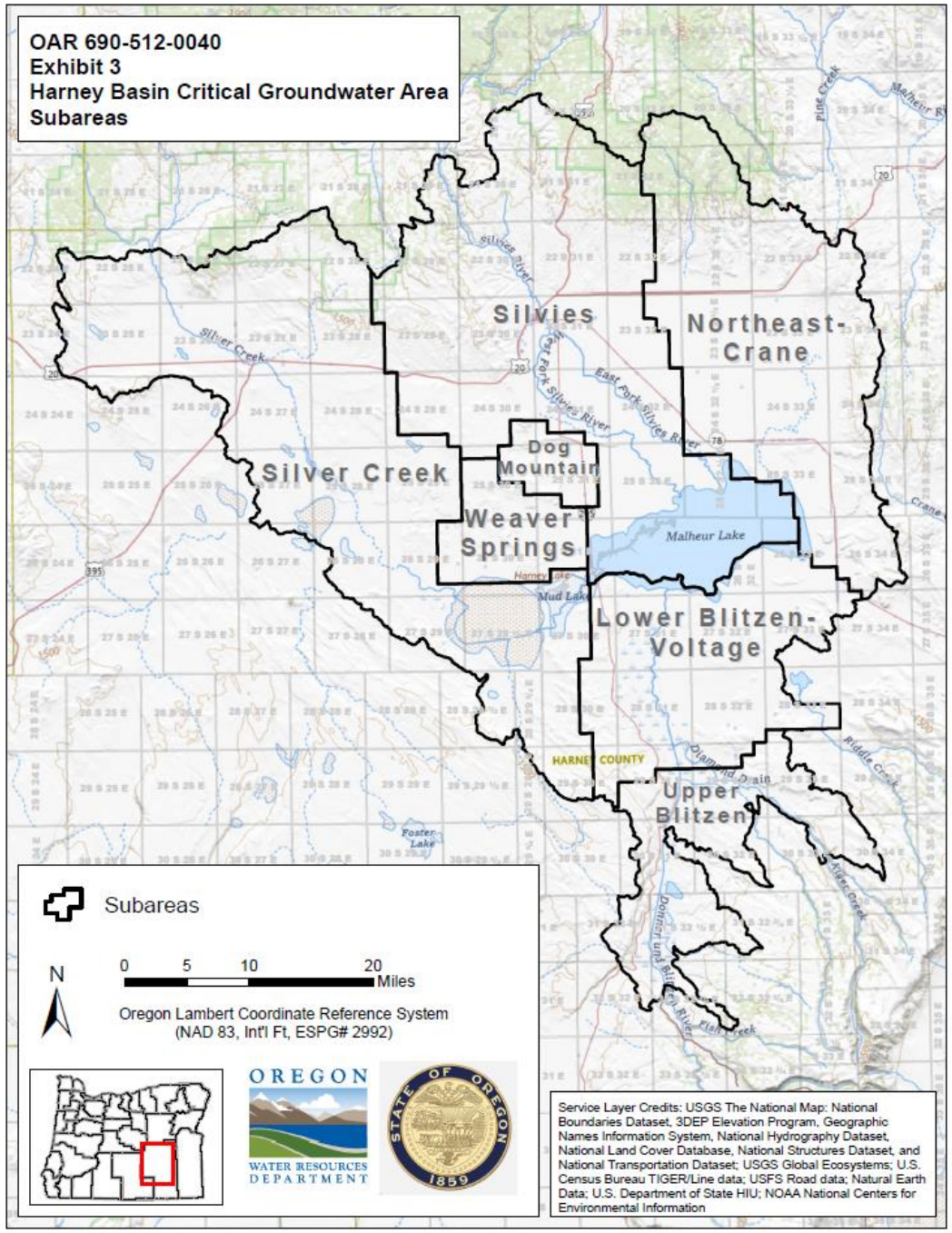

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Exhibit 4

Dog Mountain Subarea

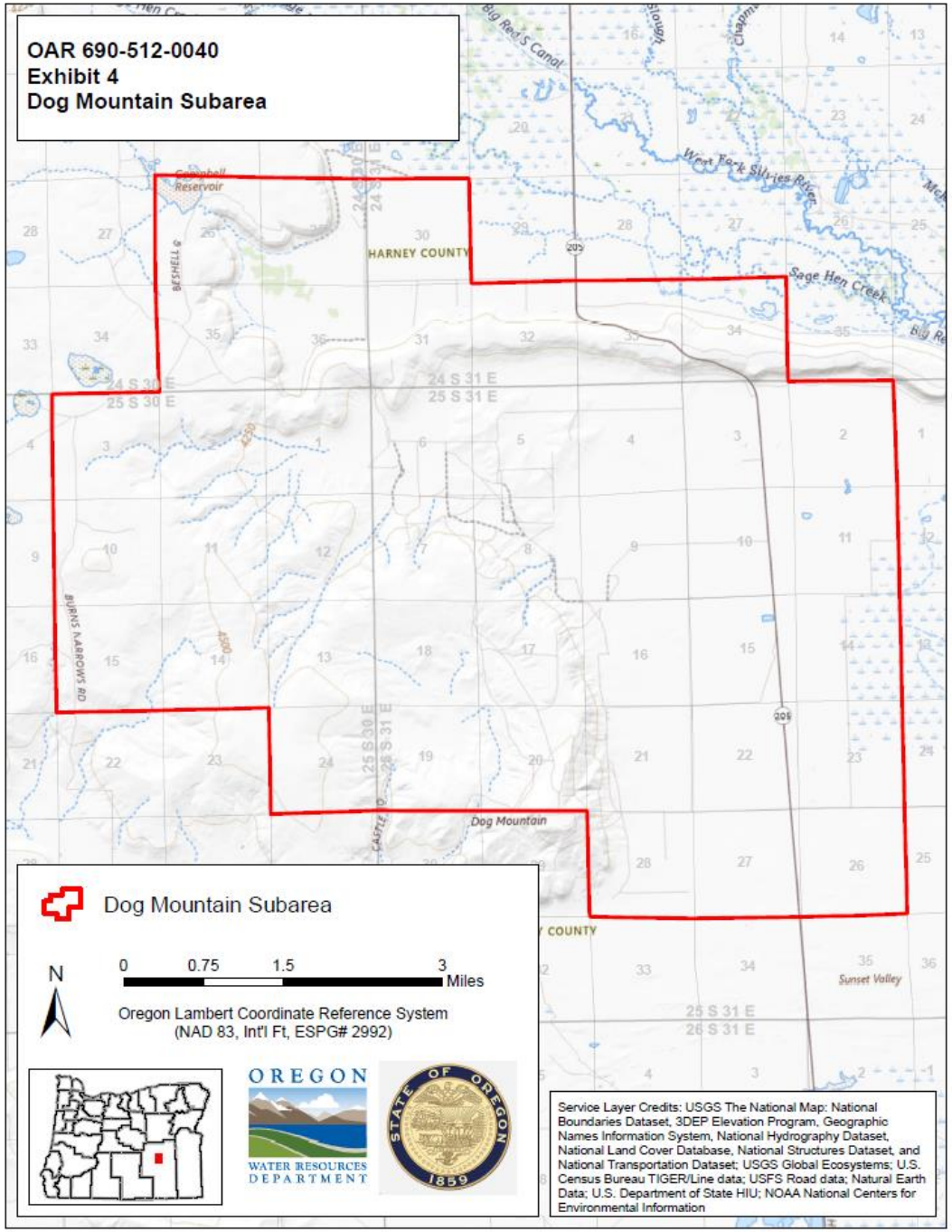

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Exhibit 5

Lower Blitzen-Voltage Subarea

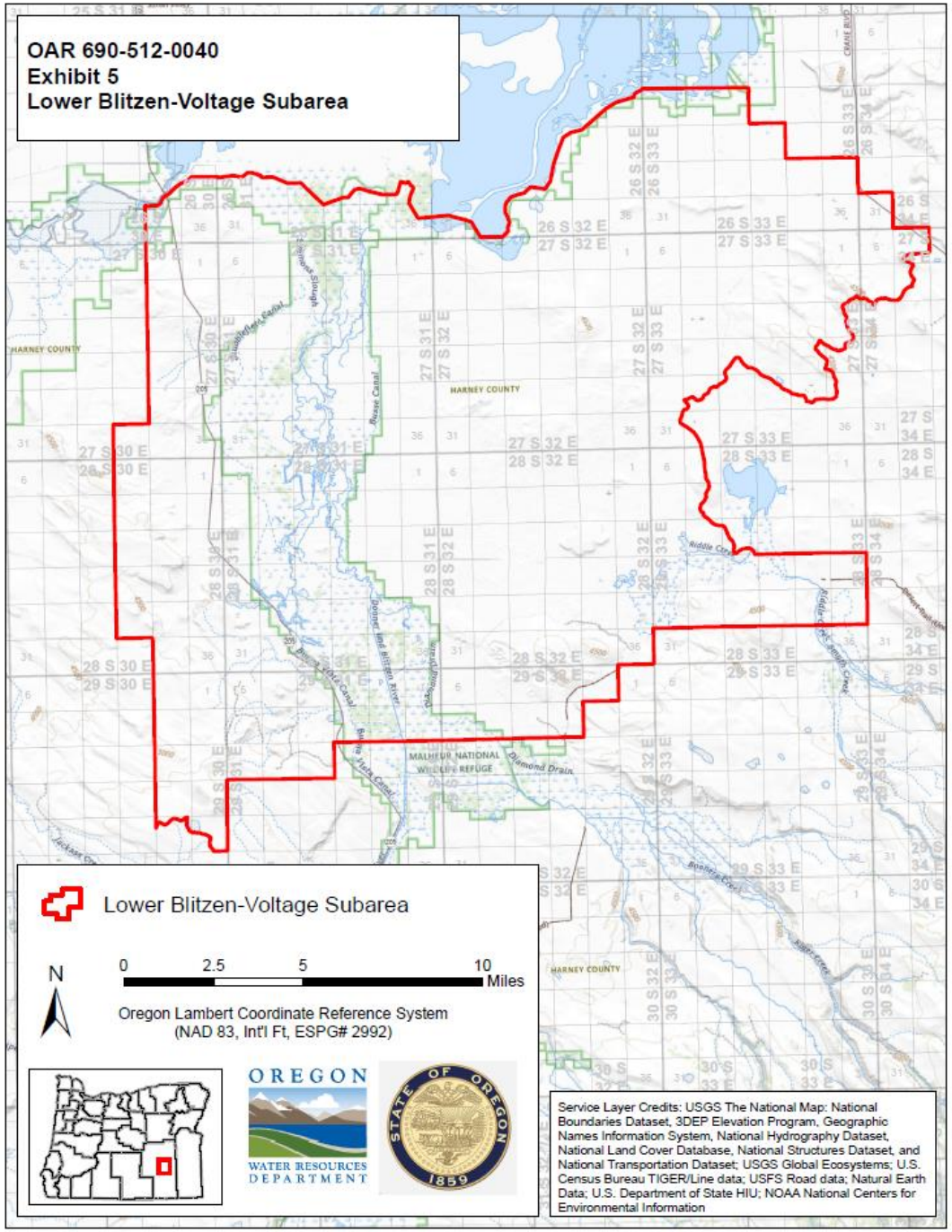

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Exhibit 6

Northeast-Crane Subarea

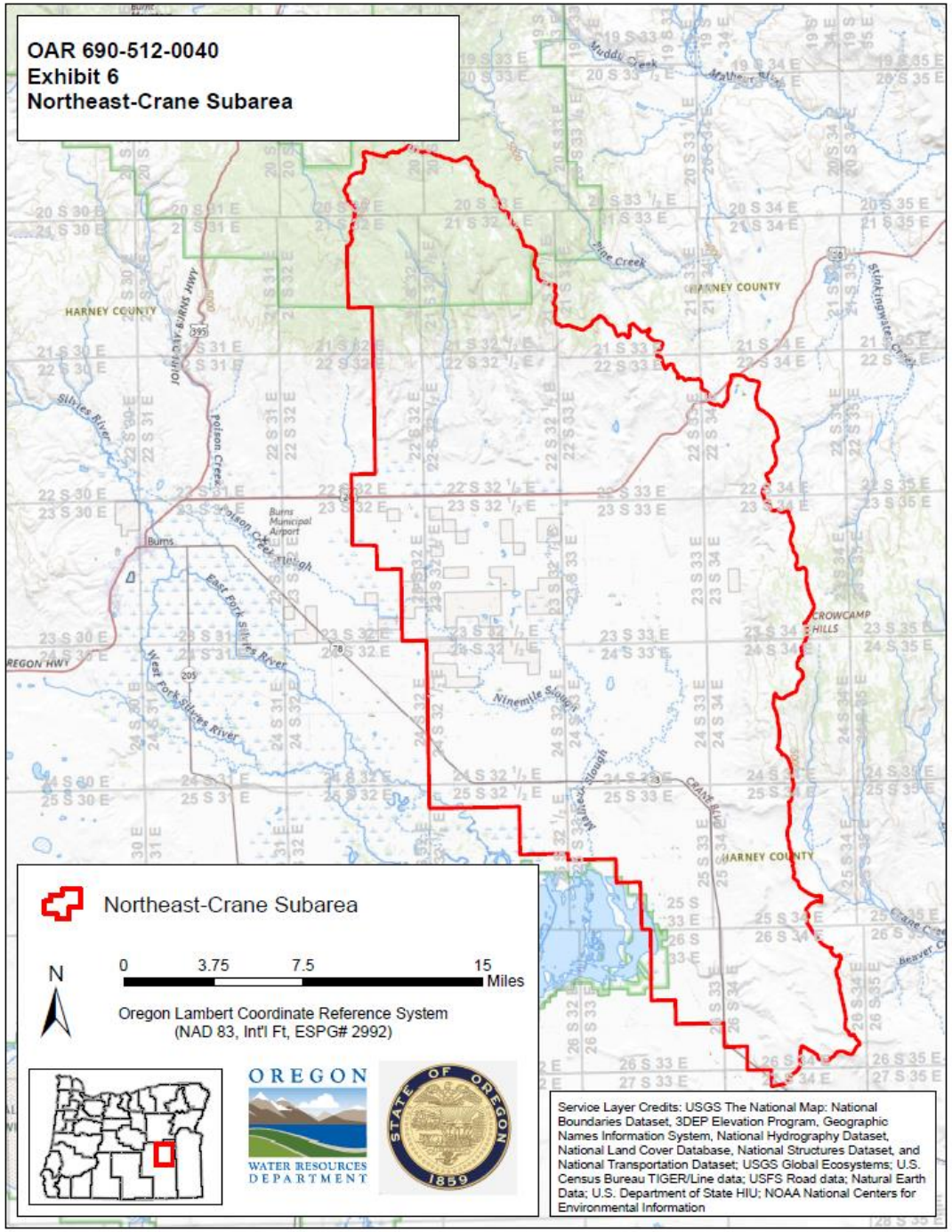

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Exhibit 7

Silver Creek Subarea

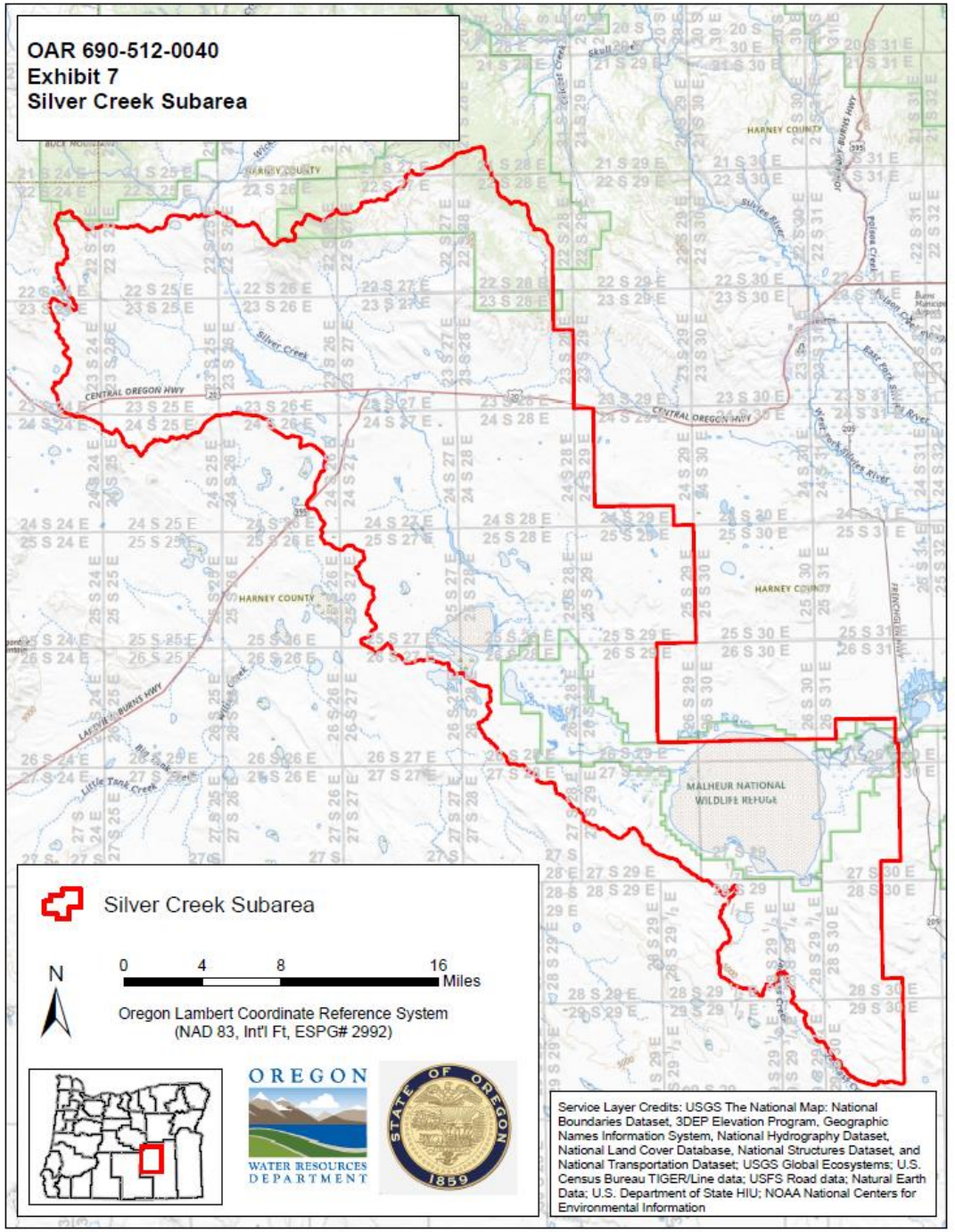

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Exhibit 8

Silvies Subarea

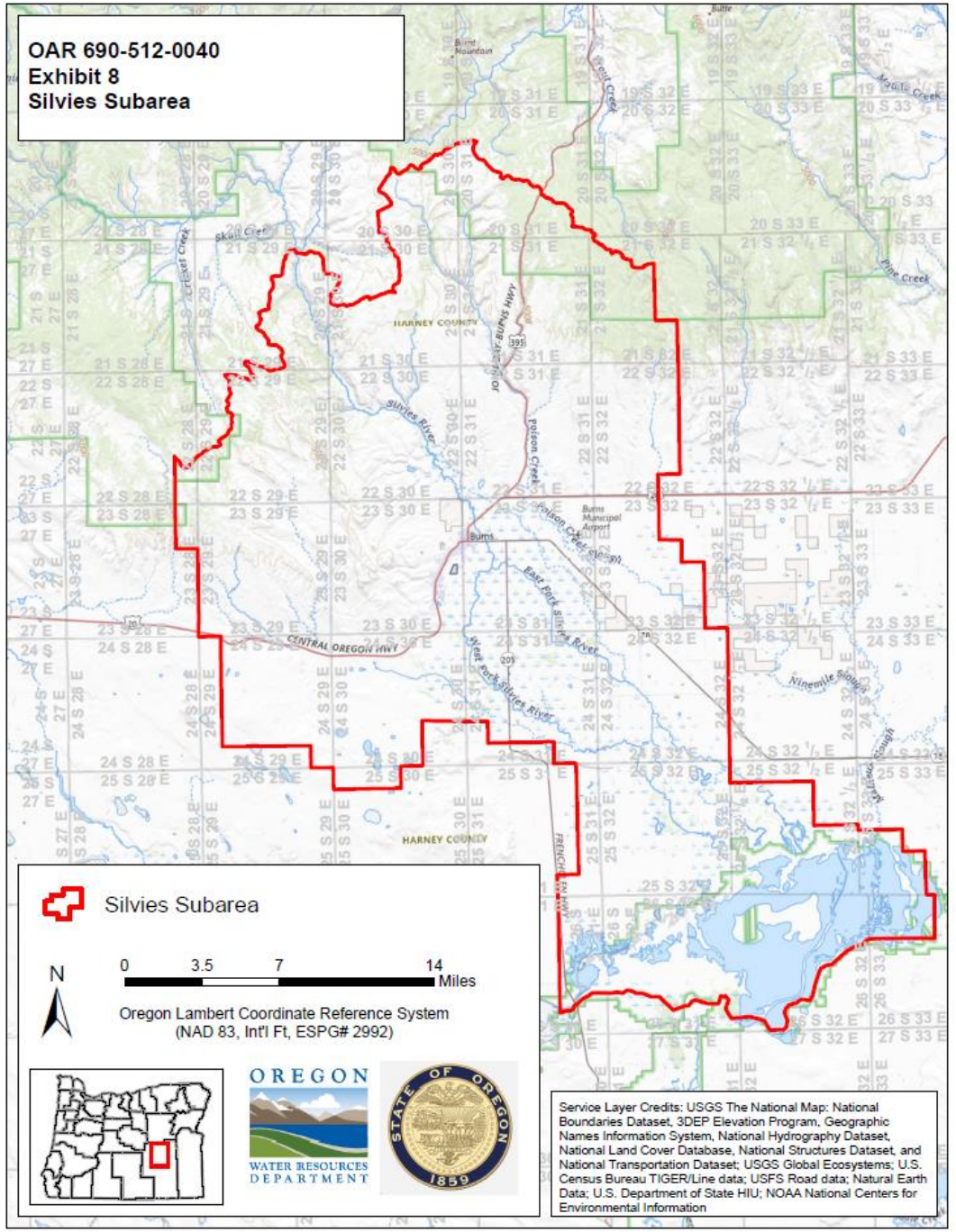

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Exhibit 9

Upper Blitzen Subarea

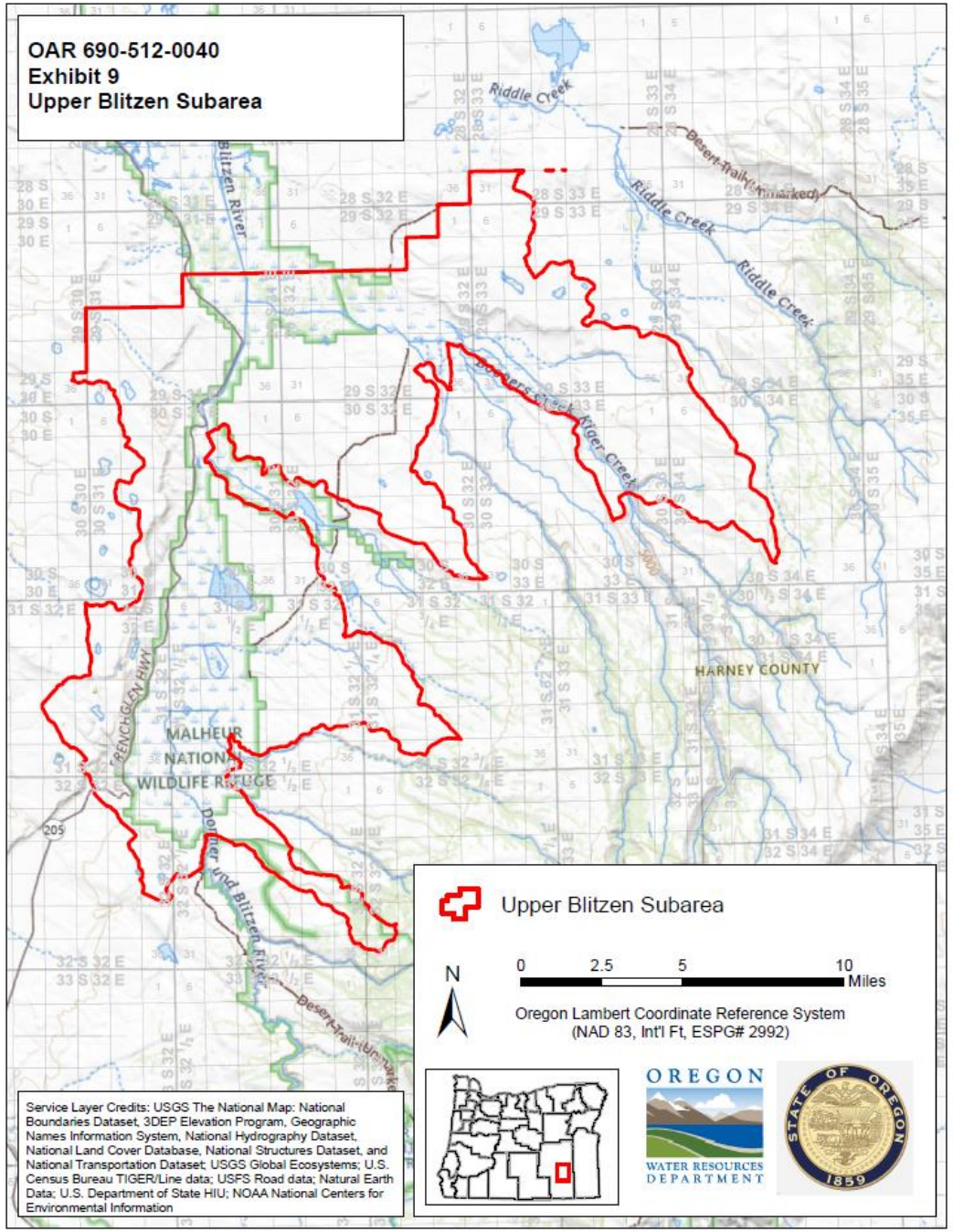

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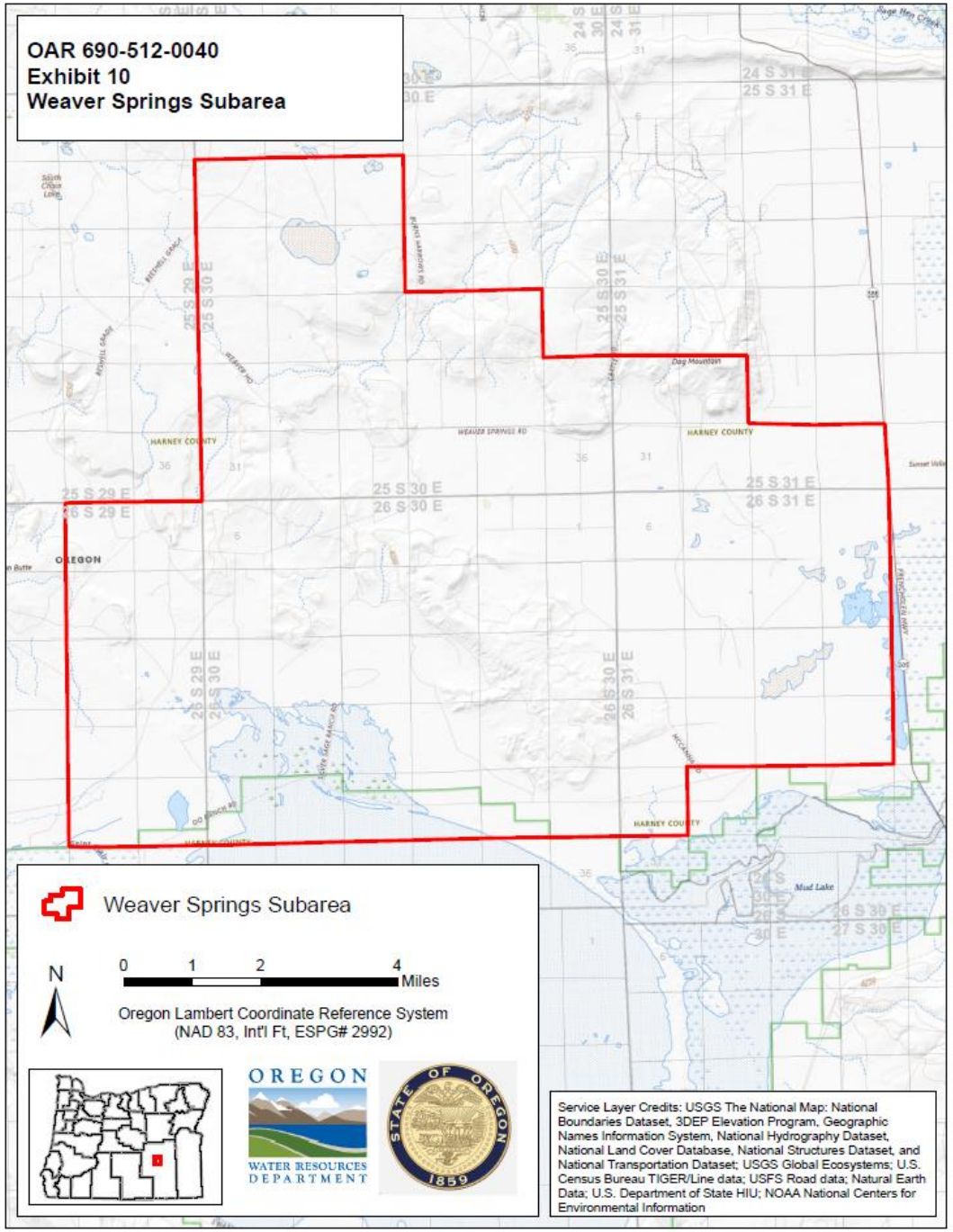
Exhibit 10

Weaver Springs Subarea



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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0050 Permissible Total Withdrawal for Each Subarea Within the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
1) The permissible total withdrawal for the Dog Mountain subarea shall be 4,200 acre-feet per year. 2) The permissible total withdrawal for the Lower Blitzen-Voltage subarea shall be 8,300 acre-feet per year. 3) The permissible total withdrawal for the Northeast-Crane subarea shall be 35,000 acre-feet per year. 4) The permissible total withdrawal for the Silver Creek subarea shall be 15,200 acre-feet. 5) The permissible total withdrawal for the Silvies subarea shall be 21,200 acre-feet per year. 6) The permissible total withdrawal for the Upper Blitzen subarea shall be 76 acre-feet per year. 7) The permissible total withdrawal for the Weaver Springs subarea shall be 4,800 acre-feet per year.	(1-7) Defines the volume of groundwater that can be pumped annually in each subarea (PTW).

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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0060 Determination of Initial Allocation for All Groundwater Rights

Rule Language	Rule Language Explainer
1) To establish a schedule for reductions in groundwater use, the Department will determine an initial allocation for each groundwater right within the critical groundwater area which will be implemented through an order after completion of the contested case process as required in OAR 690-010. The initial allocation shall not exceed the total quantity of water authorized on the water right.	1) Describes the concept of initial allocation and the process of implementation.

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690-512-0060 Determination of Initial Allocation for All Groundwater Rights

Rule Language	Rule Language Explainer
2) In determining the initial allocation for each groundwater right with an irrigation use, the Department will: a. Use a duty of 2.7 acre-feet per acre for groundwater rights for primary and supplemental irrigation and b. Consider the historical, beneficial use when identifying the number of acres that will be allocated water.	2) Describes the process for determining initial allocation for irrigation rights. a. Defines the duty used for initial allocation for irrigation rights. b. States that historical beneficial use will be considered for initial allocation of irrigation rights.

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690-512-0060 Determination of Initial Allocation for All Groundwater Rights

Rule Language	Rule Language Explainer
3) The initial allocation for municipal and quasi-municipal rights shall be a quantity of water equal to 110% of the greatest single-year quantity reported to the Department in the six years preceding the adoption of these rules.	3) Describes the process for determining initial allocation for municipal and quasi-municipal groundwater rights.

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690-512-0060 Determination of Initial Allocation for All Groundwater Rights

Rule Language	Rule Language Explainer
4) In determining the initial allocation for each groundwater right with use types other than irrigation, municipal, and quasi-municipal. The department will consider: a. The limits of the groundwater rights; b. Historical beneficial use; c. Whether or not a water user is physically capable of pumping and putting the allocated water to a beneficial use; and d. Any other factors deemed appropriate by the Department	4) Describes the process for determining initial allocation for groundwater rights other than irrigation, municipal and quasi-municipal.

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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
1) Notwithstanding adjustments made by the adaptive management methodology defined in OAR 690-512-0080, upon consideration of all water rights and determining the initial allocation for each: a. Water use within the Weaver Springs subarea will be scheduled to be reduced to the permissible total withdrawal with 75% of the total reduction being scheduled for 2028 and the remaining 25% of the reduction scheduled for 2034.	1) Defines the schedule for water use reductions in the 7 subareas. a) Defines schedule of water use reductions for the Weaver Springs subarea.

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
b. Water use within all remaining subareas of the Critical Groundwater Area will be scheduled for reduction to the permissible total withdrawal with 40% of the total reduction scheduled in 2028, 30% of the total reduction scheduled for 2034, 15% of the total reduction scheduled for 2040, 10% of the total reduction scheduled for 2046, and 5% of the total reduction scheduled for 2052.	b. Defines schedule of water use reductions for the other 6 subareas.

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
c. The schedule for reductions will be based on the relative priority dates of the water rights within each subarea, with the most junior water rights being curtailed first.	c. Describes how prior appropriation will be implemented by subarea.

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
d. Municipal and quasi-municipal water use will be evaluated at each adaptive management checkpoint and the schedule of reductions may be adjusted so that the allocation for each municipal or quasi-municipal right is increased or decreased to 110% of the greatest single year quantity reported to the Department in the preceding 6 years. The allocation shall not exceed the total quantity of water authorized on the water right.	d. Describes the process of allocation for municipal and quasi-municipal rights at each checkpoint.

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
e. Uses exempt under ORS 537.545 are not subject to reduction. f. Corrective control orders reducing use will not be enforced until the completion of the contested case process specified in OAR 690-010-0170 through 230.	e. States that exempt uses are not subject to curtailment. f. States that curtailment cannot occur until after contested case.

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690-512-0070 Scheduling Water Use Reductions to Meet the Permissible Total Withdrawal

Rule Language	Rule Language Explainer
g. If reductions in use are unable to be implemented as scheduled in 2028, then at the time when reductions in use are implemented through regulatory orders, all reductions scheduled to be implemented by that point in time will be enforced including any adjustments that should have occurred at the adaptive management checkpoints defined in 690-512-0080.	g. Provides for immediate implementation of reductions if contested case is delayed past 2028.

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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
1) Weaver Spring subarea is exempt from the adaptive management process as defined in this rule.	1) Excludes the Weaver Springs subarea from adaptive management.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
2) Groundwater level changes will be evaluated using representative wells with sufficient data as determined by the Department. a. For each representative well the groundwater level change will be evaluated based on a reference groundwater level determined by the Department. The reference groundwater level for a well shall be the spring high static water level measurement in calendar year 2028 , if one exists. Otherwise, the Director may establish the reference groundwater level based on an analysis of other water-level data. b. For each representative well, the groundwater level change will be calculated as the difference between the current spring high static water level at the adaptive management checkpoint and the reference groundwater level.	2) Describes how groundwater level changes will be evaluated. a. Describes how reference groundwater levels will be determined. b. Describes how groundwater level changes will be determined.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
3) The median groundwater level change for each subarea will be evaluated at each adaptive management checkpoint using representative wells with sufficient data as determined by the Department. 4) The groundwater level change envelope for each subarea is defined in Exhibit 11.	3) States that the median groundwater level change will be determined for each subarea. 4) Defines the groundwater level change envelope for each subarea.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
5) At each adaptive management checkpoint, the Department will compare the median groundwater level change for each subarea defined in OAR 690-512-0040 with the groundwater level change envelope. If the median groundwater level change for a subarea is: a. Below the 10th percentile, the scheduled quantity of reduction will be doubled. b. Between the 10th and 25th percentiles, the scheduled quantity of reduction will be increased by one and a half times. c. Between the 25th and 75th percentiles, no adjustment will be made. d. Between the 75th and 90th percentiles, the scheduled quantity of reduction will be halved. e. Above the 90th percentile, the scheduled quantity of reduction will be reduced to zero.	5) Describes the evaluation at each checkpoint and the adjustments to curtailment based on changes in groundwater levels.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
6) At the end of each adaptive management checkpoint and after the Department has completed sections 1 through 4 of this rule, the Department will hold at least one public meeting at a location within the critical groundwater area boundary at which the Department will present: a. The findings of the evaluation of groundwater level changes. b. The comparison to the groundwater level change envelope. c. Any adjustments to the scheduled reductions.	5) Describes the requirements for a public hearing after each checkpoint.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
7) No sooner than 2058, the Department will evaluate the groundwater level decline rate to identify if the target groundwater level trend has been achieved. The groundwater level decline rate will be calculated using the Sen's slope method using annual high measurements for representative wells with sufficient data as determined by the Department from the 6 years preceding the evaluation.	7) Describes the timing and process for evaluating for the target groundwater level trend.

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690-512-0080 Adaptive Management of the Harney Basin Critical Groundwater Area

Rule Language	Rule Language Explainer
8) After the evaluation in section 7 of this rule, if the target water level trend has not been achieved and all scheduled reductions have not been implemented, the Department will evaluate groundwater conditions and implement additional reductions as needed to achieve the target water level trend. Pumping in each subarea shall not be reduced below the permissible total withdrawal as defined in OAR 690-512-0050.	8) Allows for implementation of any remaining reductions to PTW if the target groundwater level trend is not achieved.

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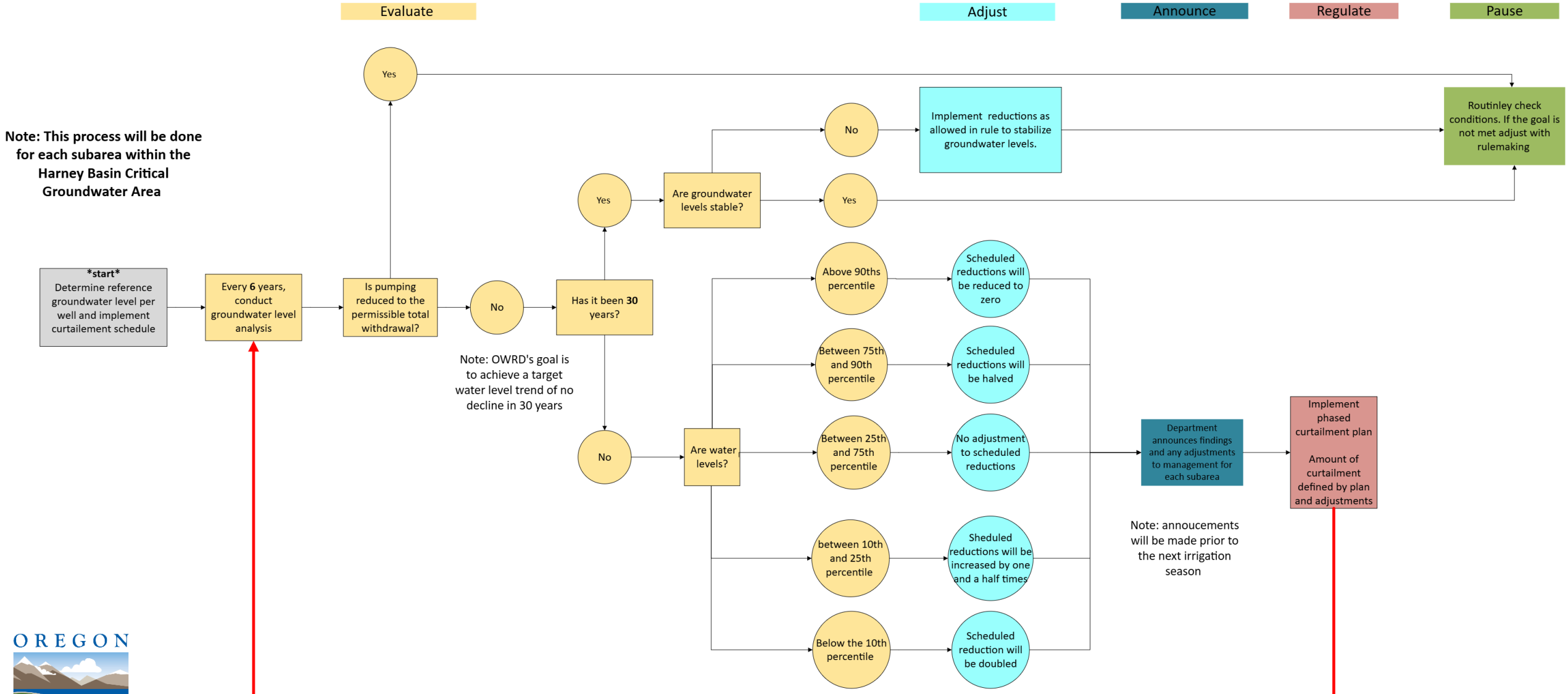
Proposed Adaptive Management Plan



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Input

Questions or feedback for the RAC

- Is this section clear and understandable?
- Is there anything we should change?
- Is there anything else we need to consider?

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Racial equity statement

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Racial equity statement

Elements of racial equity statement

- Community outreach/RAC formation
- Tribal coordination and potential impacts
- Local government coordination and potential impacts
- Water & energy supply impacts
- Domestic well impacts
- Impacts on existing water rights holds – SWMPA
- Impacts on future water right availability – classification
- Environmental impacts

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Racial equity statement

- Is there any other element we need to consider in the racial equity statement?

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Public Comment

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Next Steps

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Next Steps

Discussion groups

- Are there any topics that should be discussed in the discussion groups?

Next RAC

- May 15, 2025, 8 am to 3 pm at the Harney County Community Center.

Deadline for written RAC input:

- Please provide any written input by April 28 close of business to have them considered for the next RAC meeting

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Thank you!

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Appendix

These slides may provide additional insight and information related to certain topics and were left out of the main presentation for brevity.

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Water levels vs Full-Pumpage

- Another way of showing the affect of management changes compared with doing nothing is in map form
- The following maps depict the difference in water levels between the OWRD proposed scenario and the USGS full-pumpage scenario.
- Blue means higher water level in the OWRD proposed scenario; Red means lower water levels

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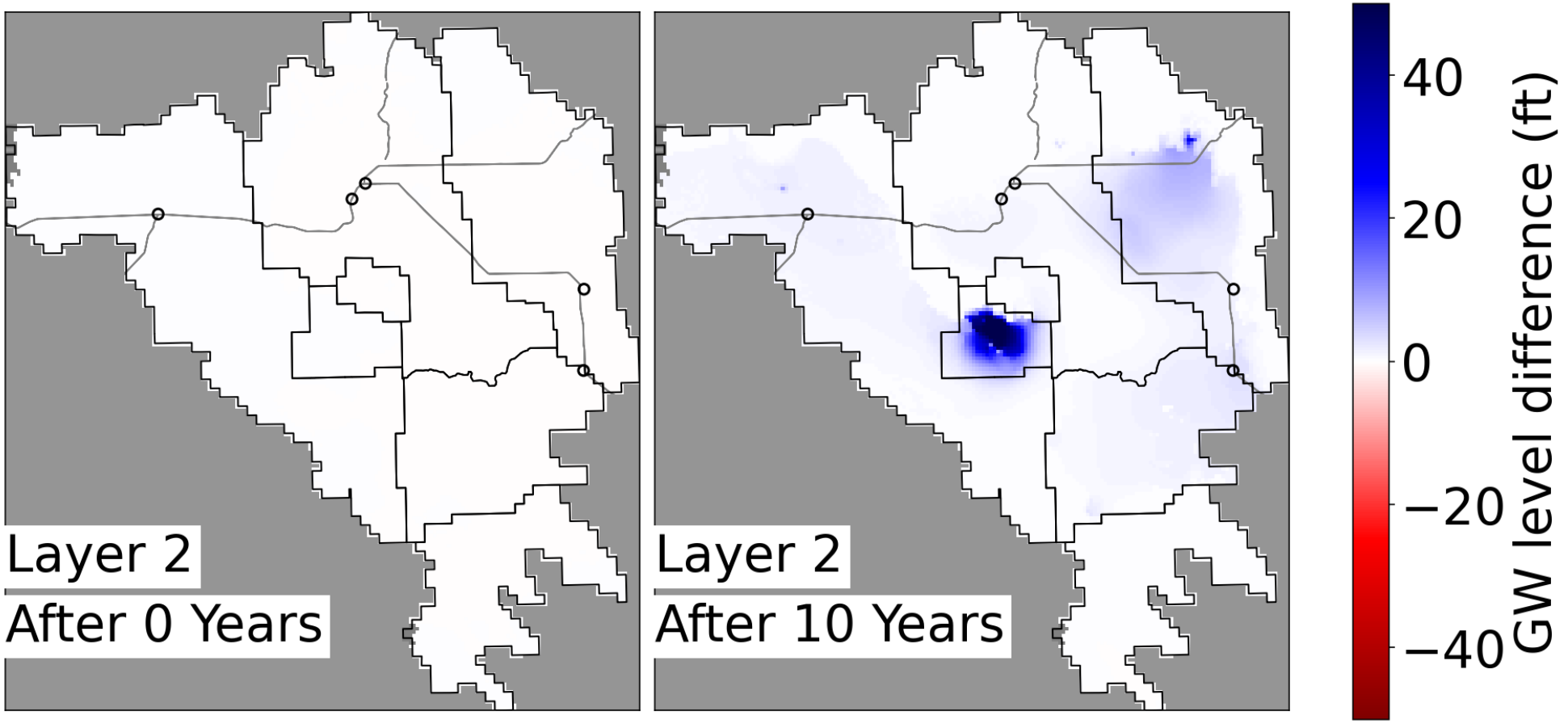
Water Levels vs. Full-Pumpage



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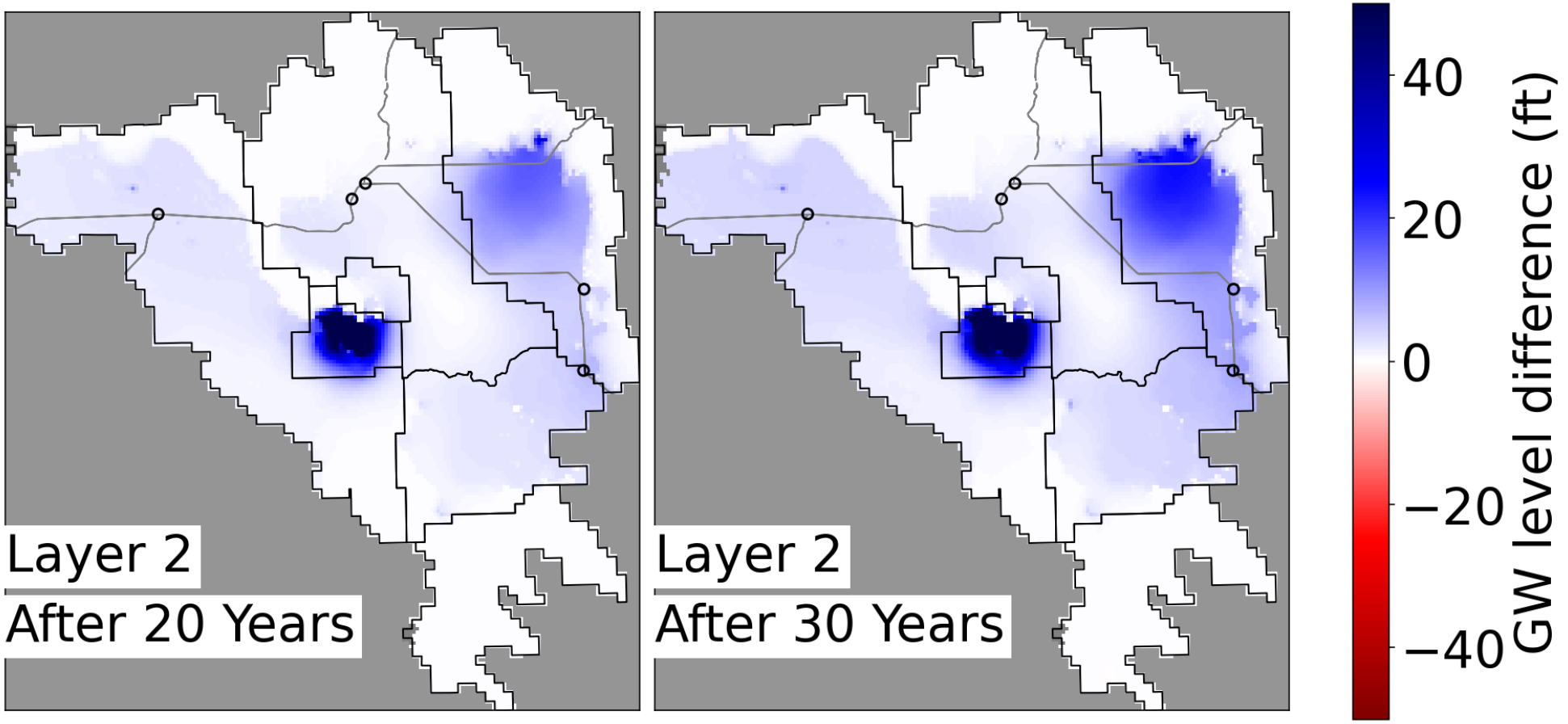
Water Levels vs. Full-Pumpage



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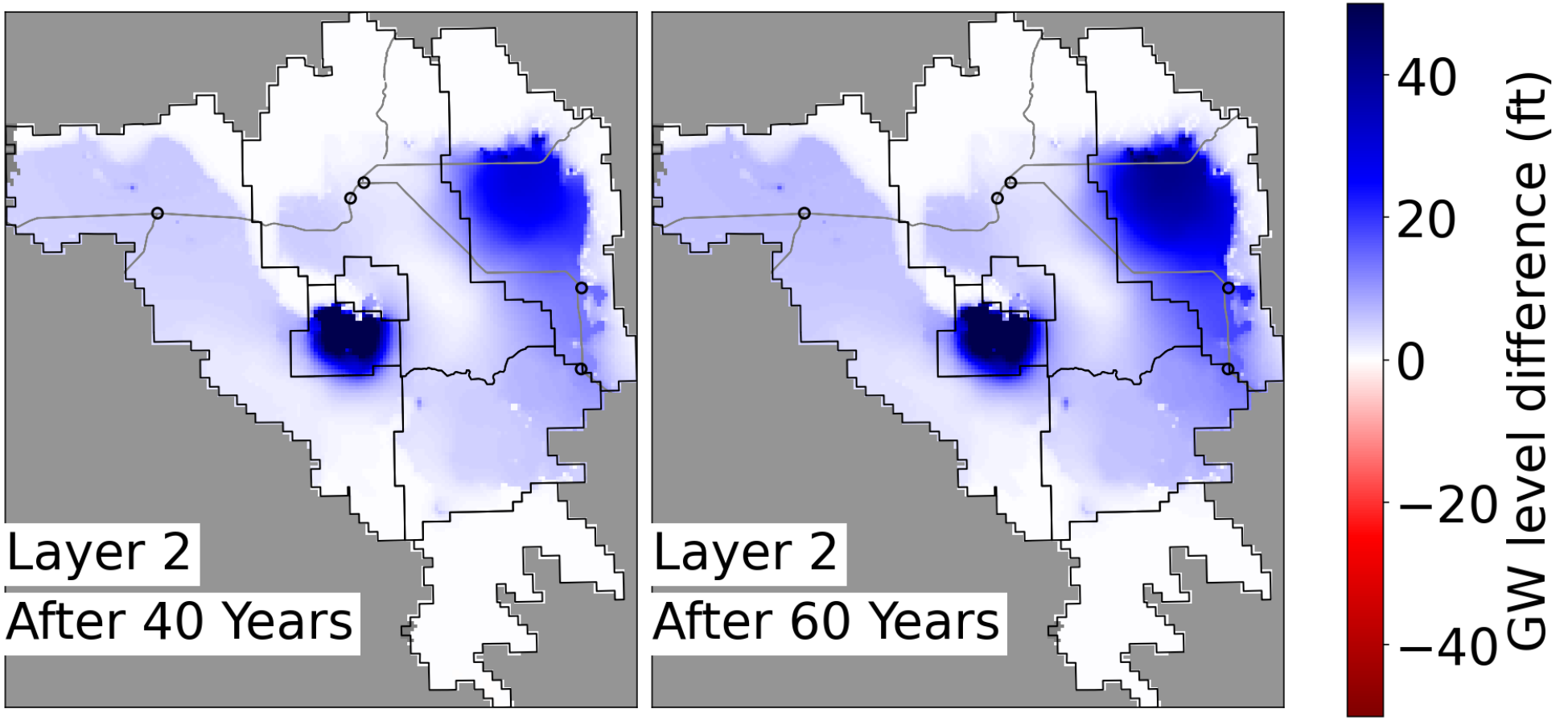
Water Levels vs. Full-Pumpage



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Proposed Management Scenario Results: Percents by Subarea in 2060

Subarea	Pumpage (% vs 2018)	Lowland Spring & Stream (% vs 1980)	Lowland Natural ET (% vs 2018)	Dry Wells (% of Domestic)
Dog Mountain	**-9%**	N/A	-39%	16%
Lower Blitzen - Voltage	**-39%**	-59%	-19%	22%
Northeast-Crane	**-34%**	-46%	-83%	14%
Silver Creek	**-28%**	-42%	-19%	9%
Warm Springs Valley	**N/A**	-83%	N/A	N/A
Silvies	**-15%**	-59%	-23%	6%
Upper Blitzen	**0**	N/A	+2%	2%
Weaver Springs	**-75%**	-100%	-14%	27%
Overall	**-35%**	-59%	-23%	10%

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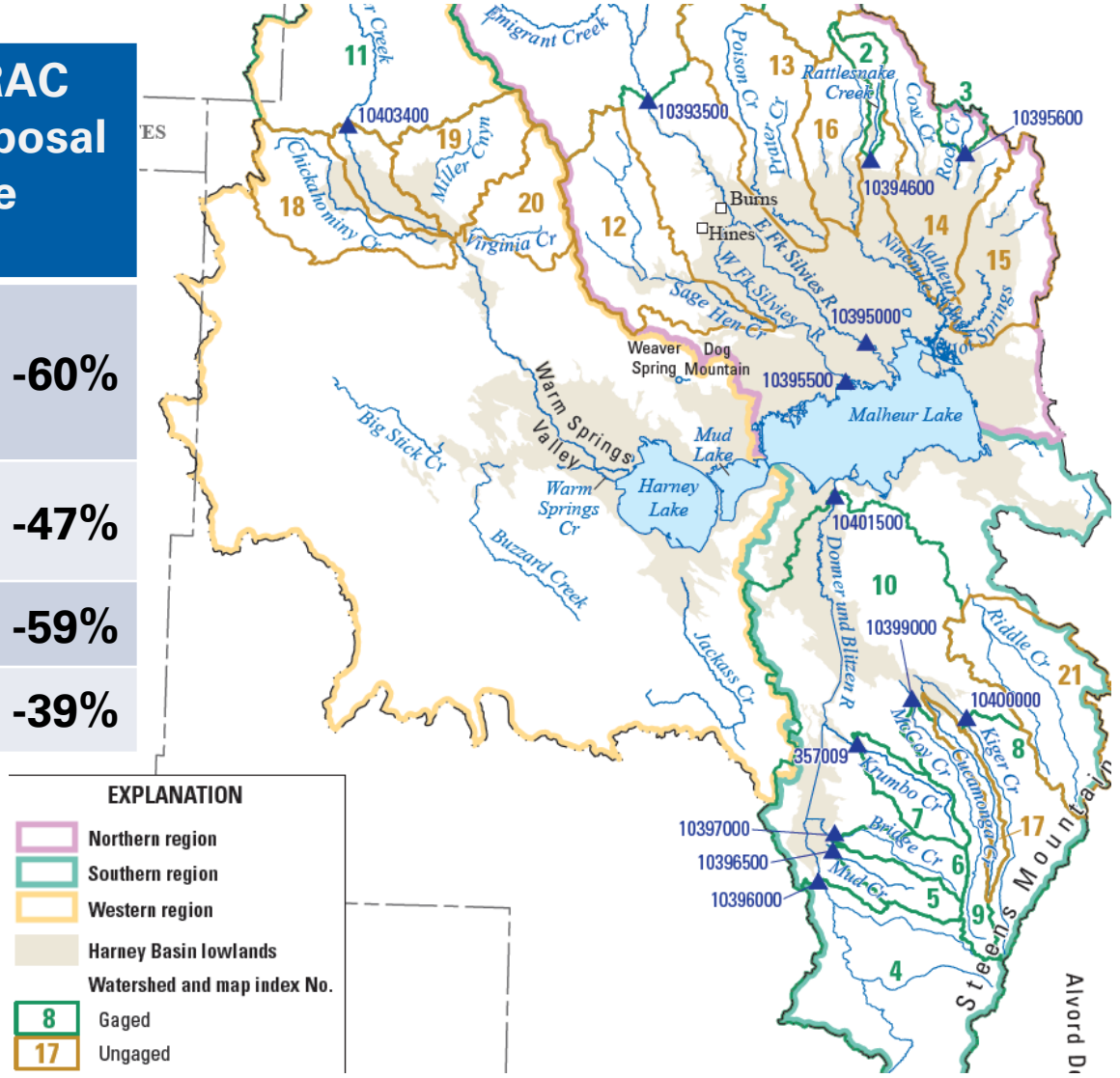
Changes in Lowland Streams & Spring Discharge From 1980 to 2060

Subarea	1980 Discharge (kaf/yr)	WRD RAC 12 Proposal Change (% '80)	WRD RAC 14 Proposal Change (% '80)
Lower Blitzen-Voltage	8.4	-61%	**-60%**
NE-Crane	3.7	-44%	**-47%**
Silvies	8.2	-62%	**-59%**
Overall	47.5	-41%	**-39%**



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Water Budget Trajectories by Subarea

- Left side figures show flows into and out of groundwater
  - Inputs like recharge have positive values.
  - Outputs like pumpage have negative values.
  - Exchange between subareas is shown when it exceeds 2 kaf/yr
- Right side figures show changes in groundwater storage
  - Increases in storage are positive and decreases negative.
  - Net storage changes are the sum of all others
  - Gain and loss can both be nonzero because some cells within a subarea gain while others lose.

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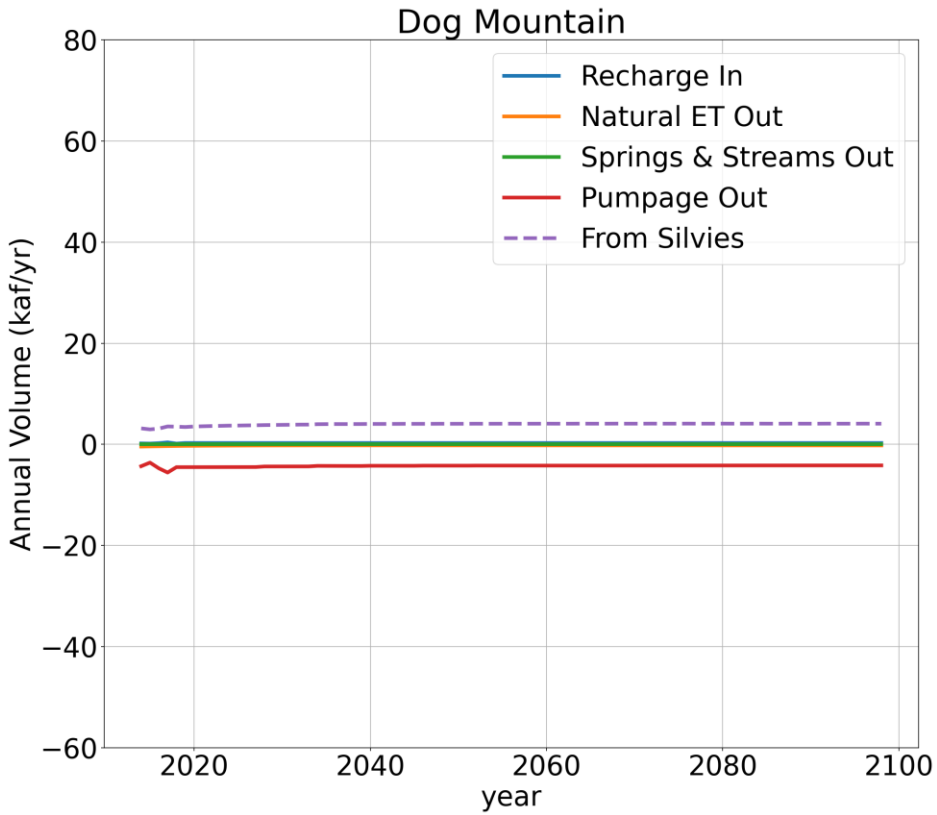
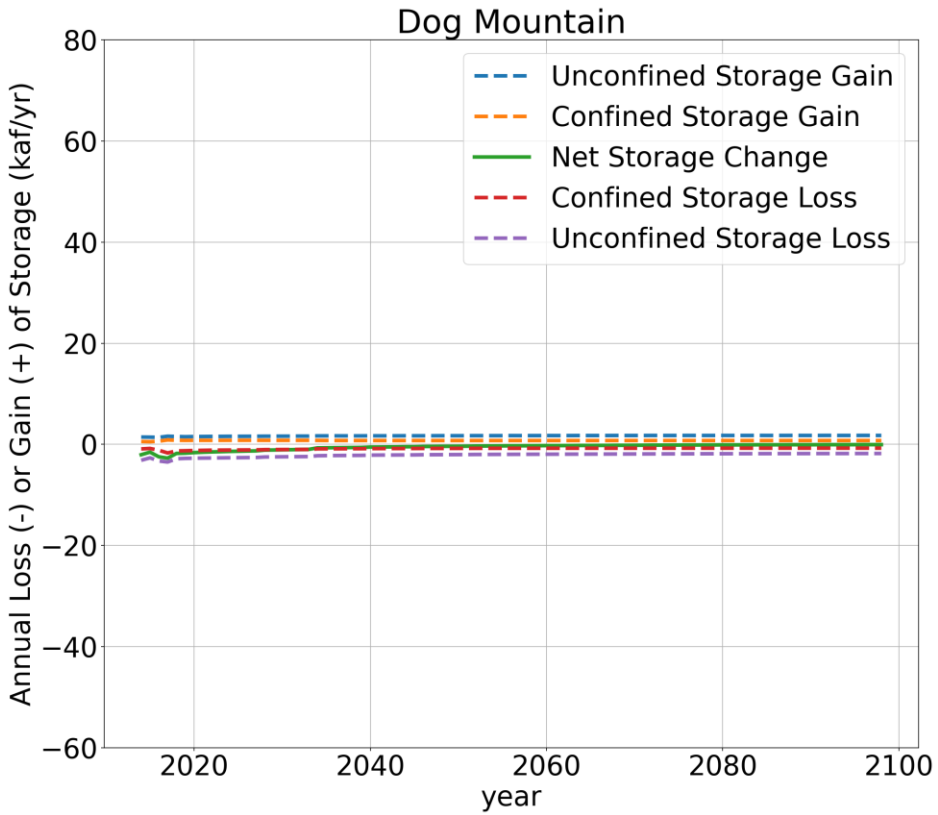
Dog Mountain





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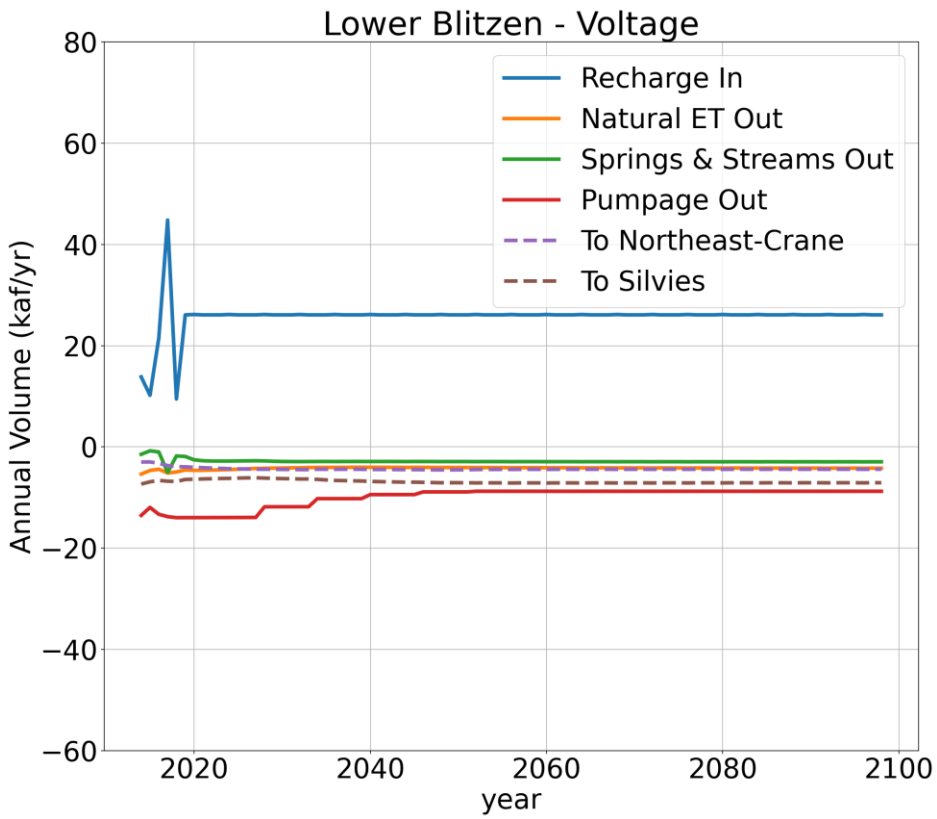
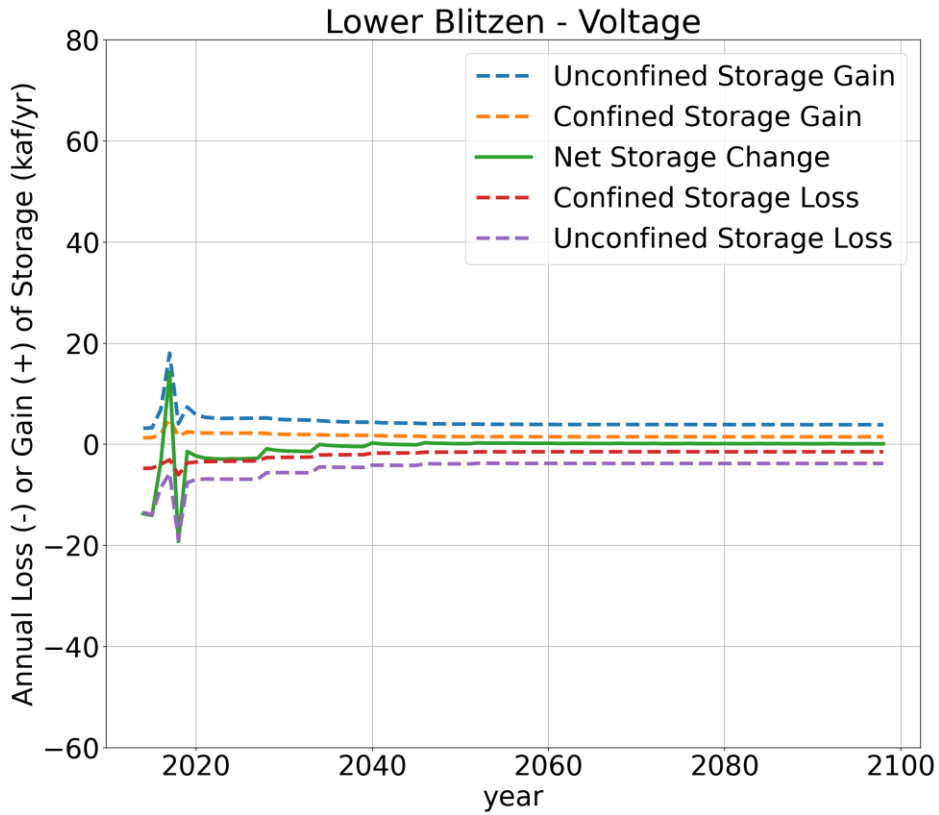
Lower Blitzen - Voltage





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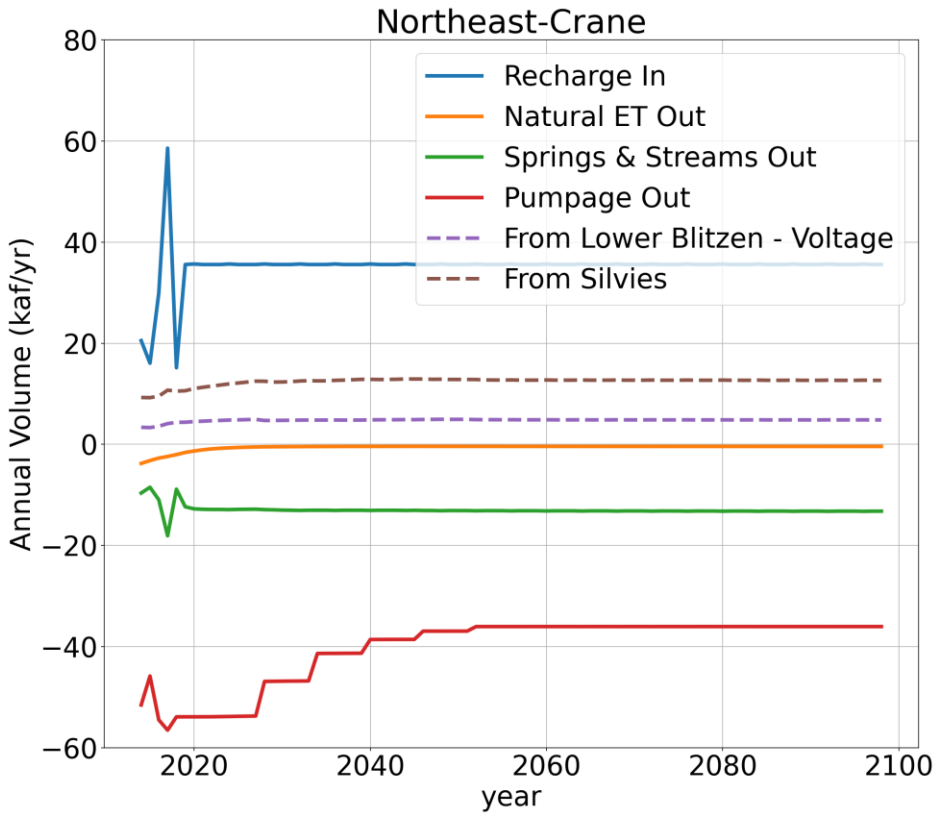
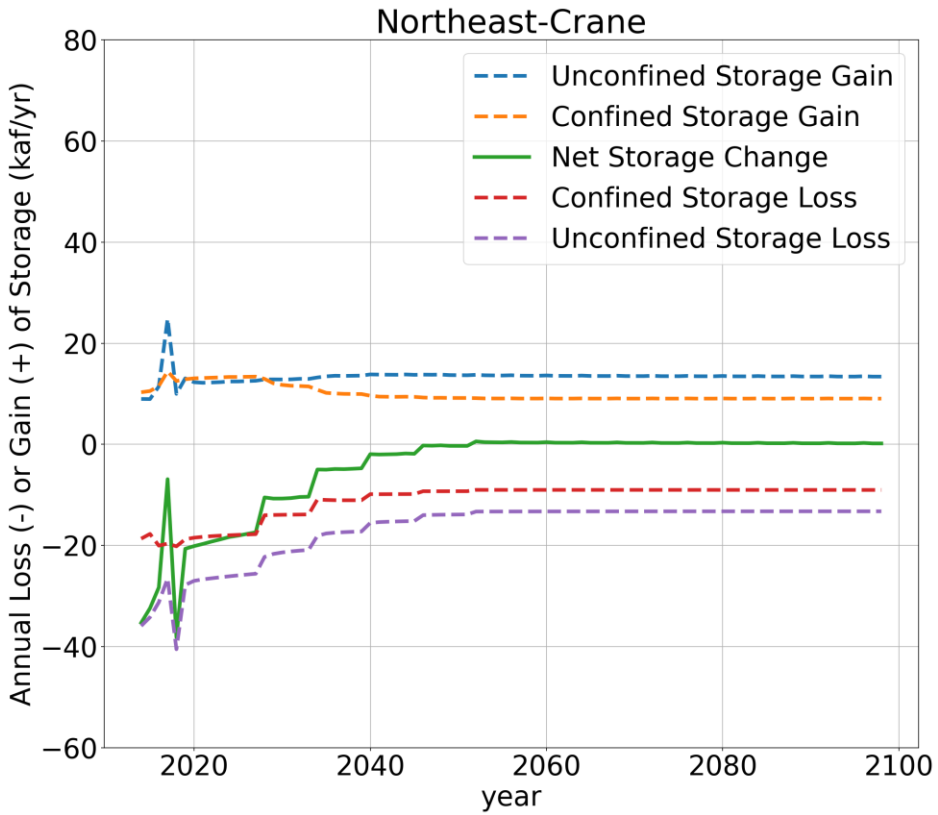
Northeast - Crane





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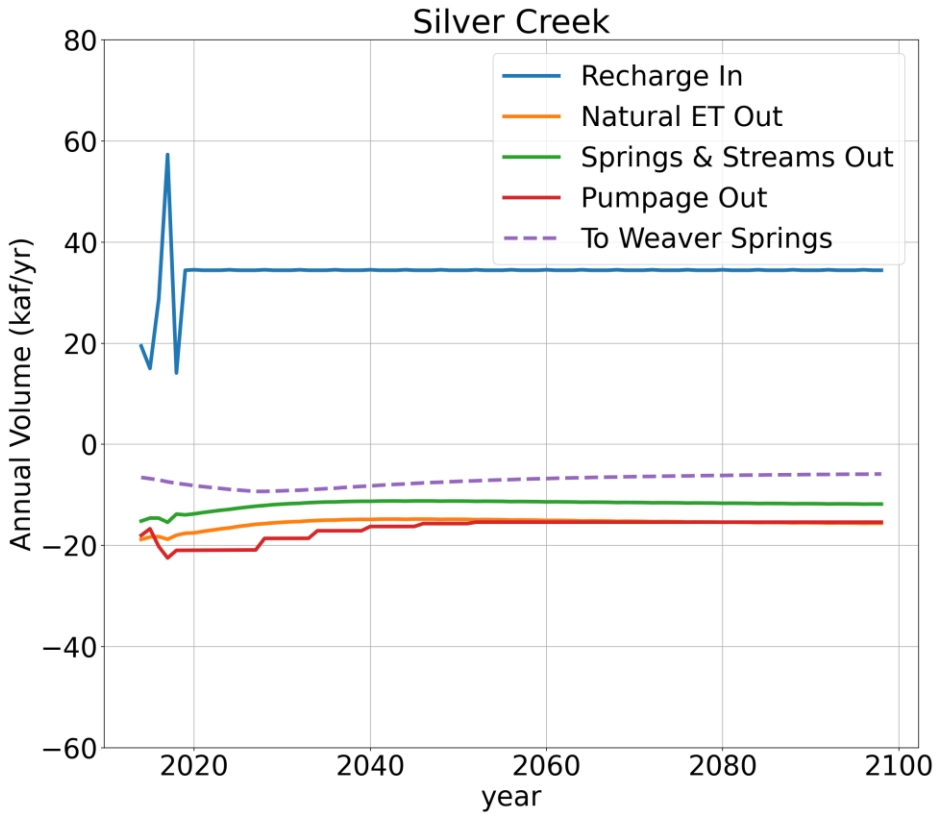
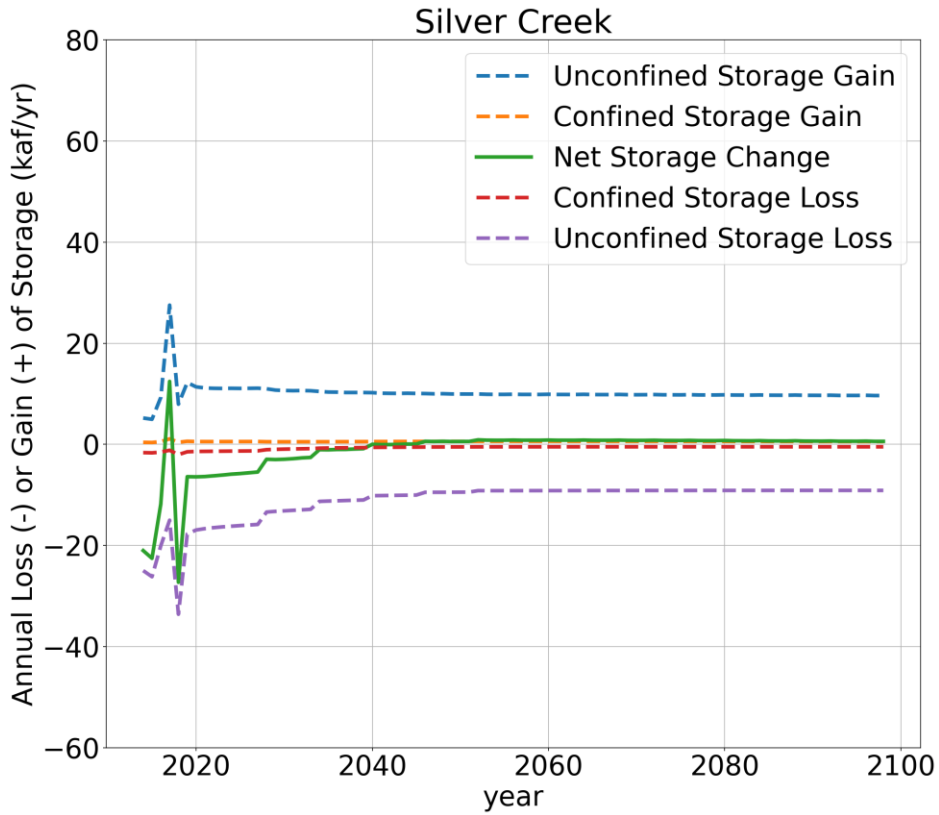
Silver Creek





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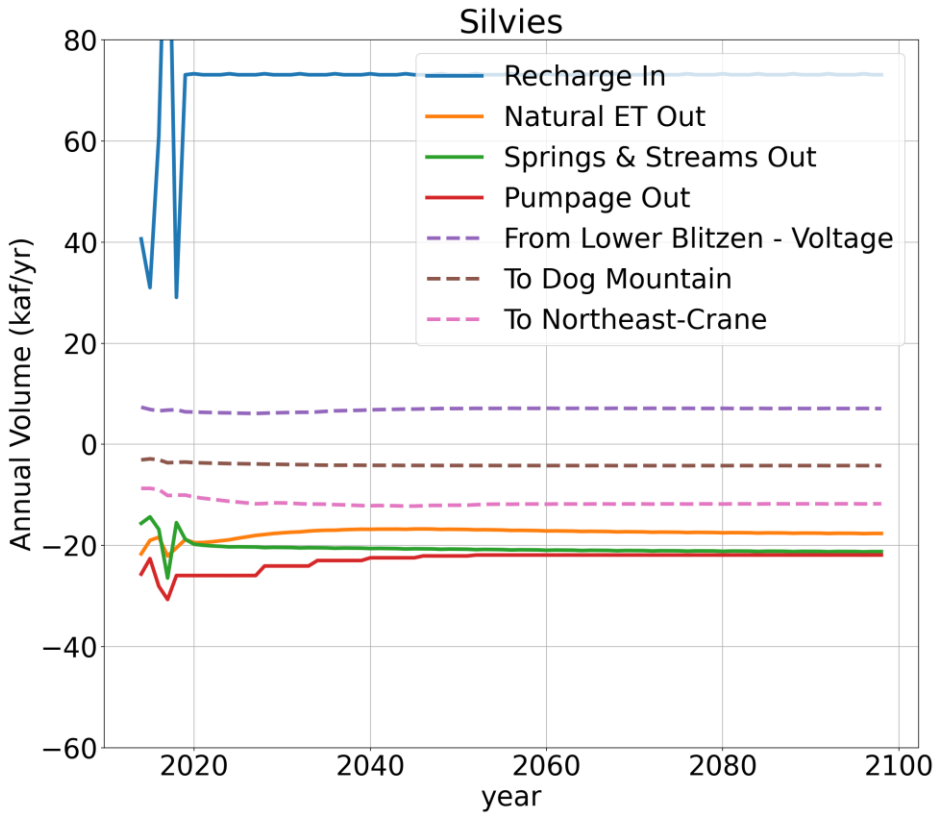
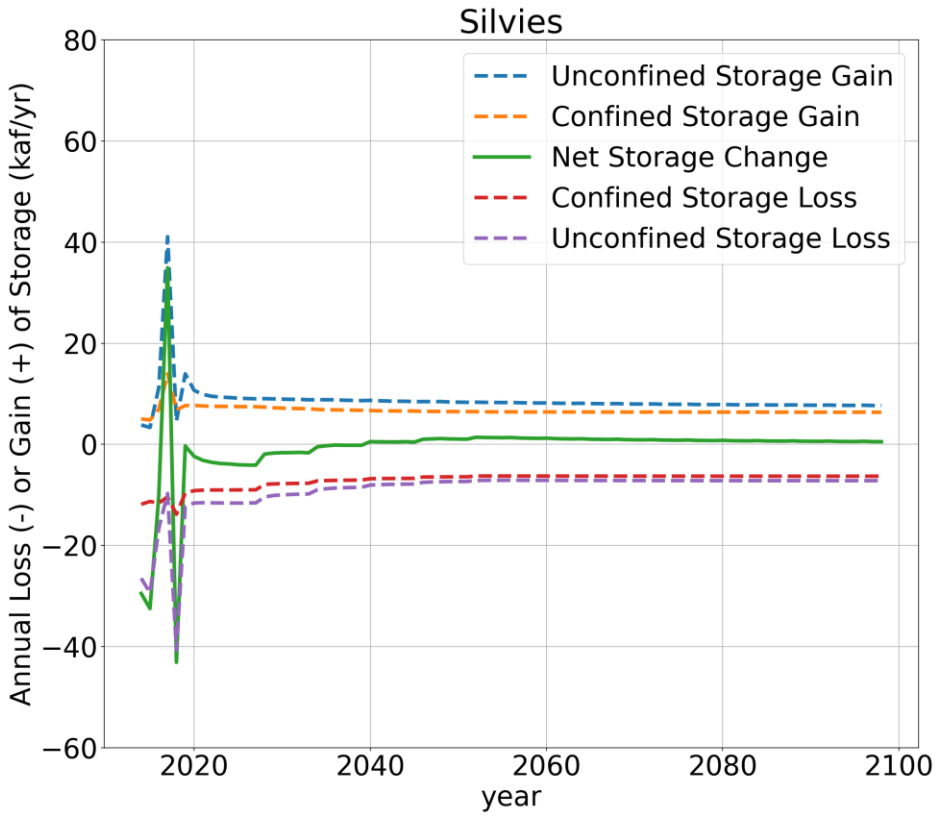
Silvies





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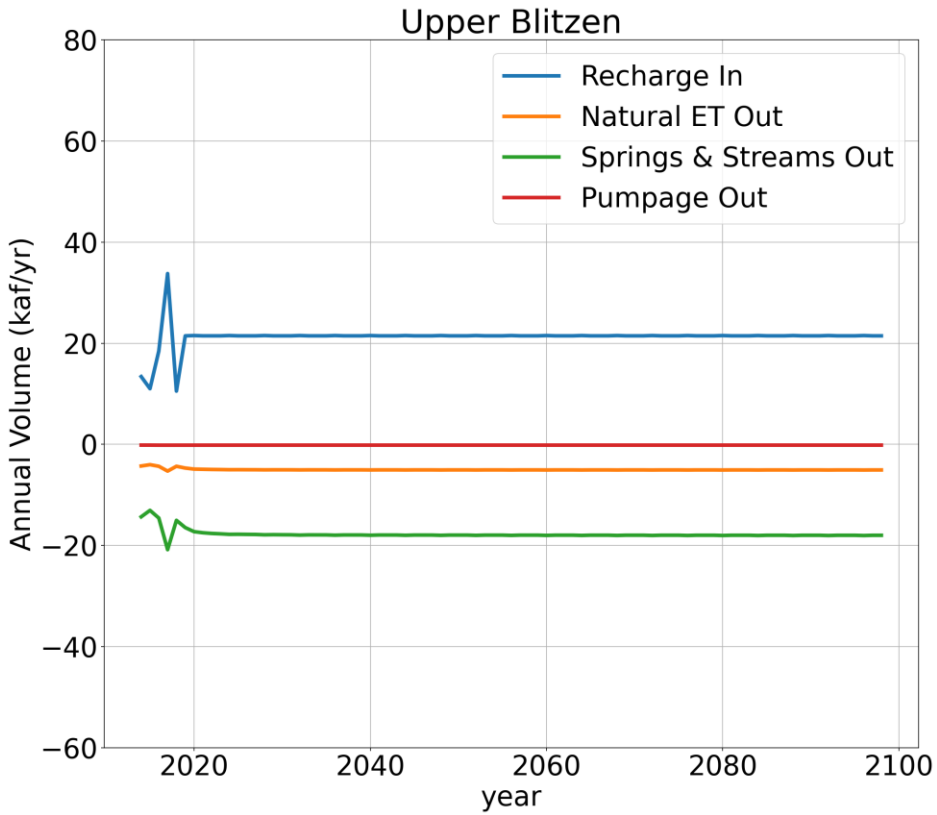
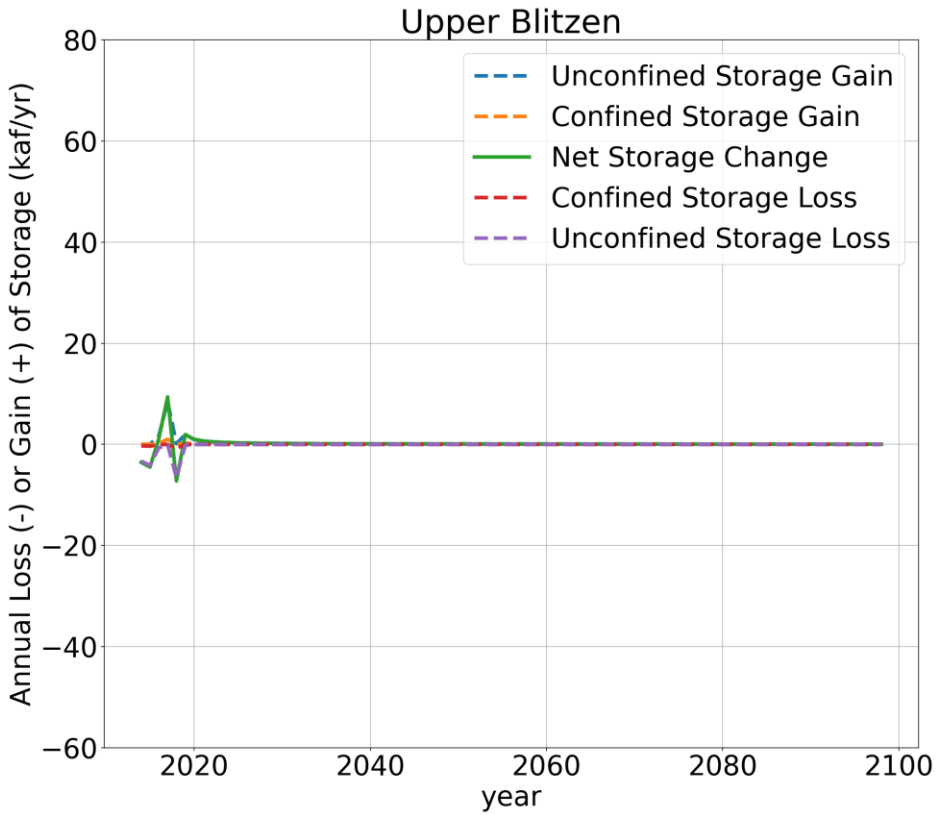
Upper Blitzen





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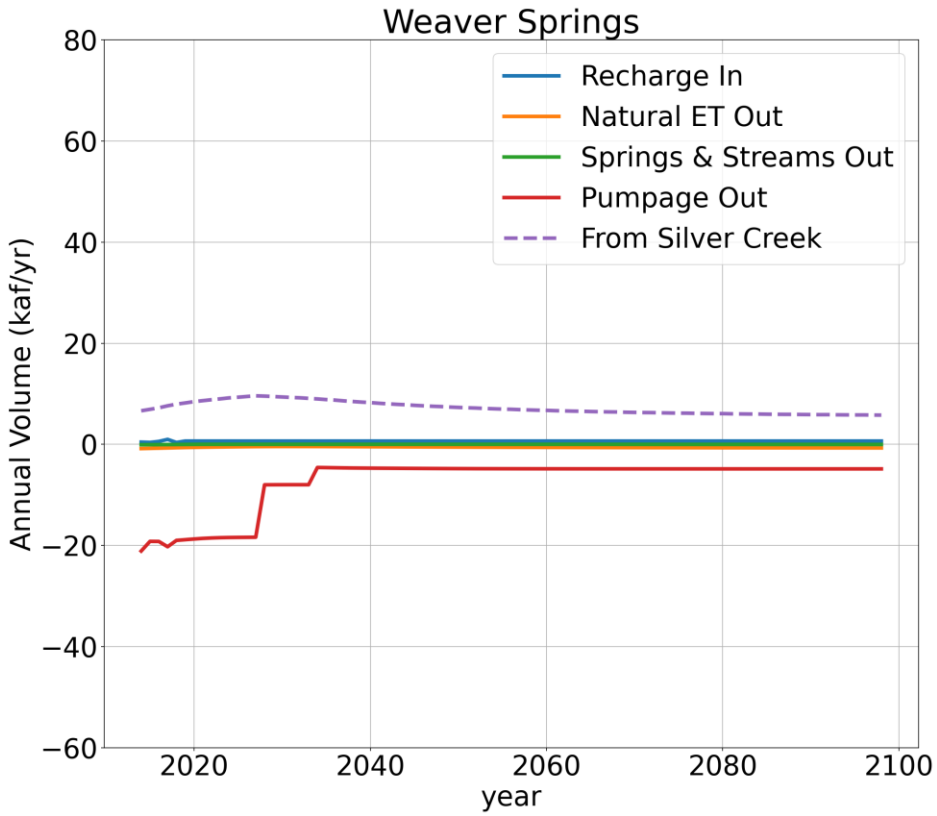
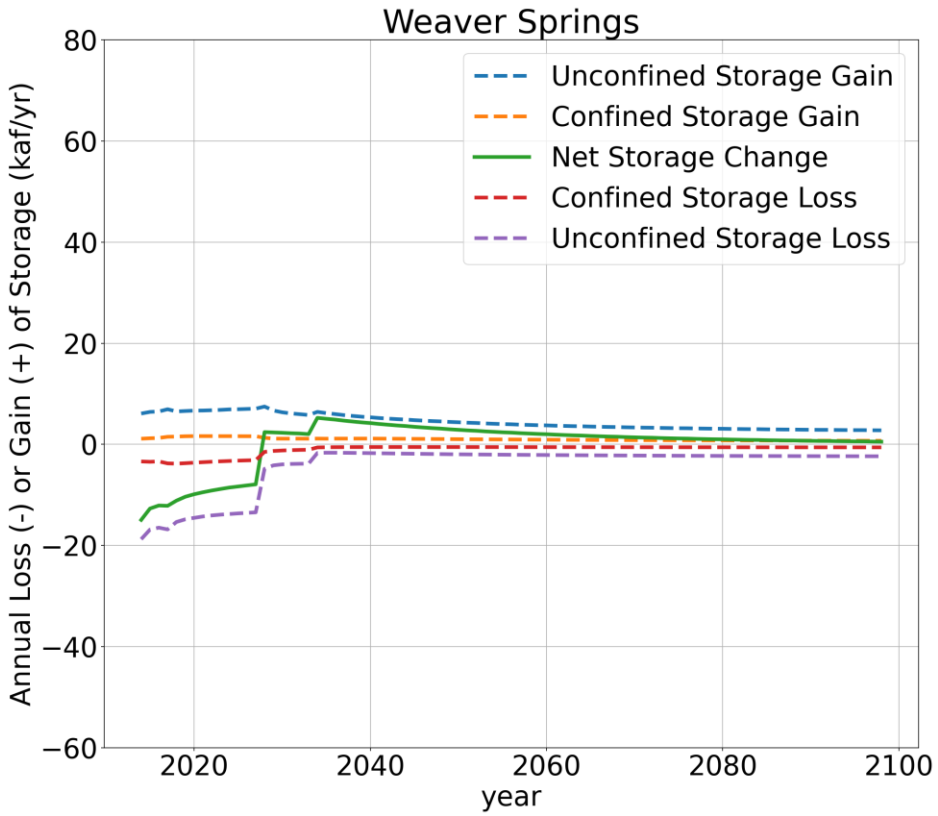
Weaver Springs





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Water Budget Trajectories by Subarea: Lowland Portions of Each Subarea

- Left side figures show flows into and out of groundwater
  - Inputs like recharge have positive values.
  - Outputs like pumpage have negative values.
  - Exchange between subareas is shown when it exceeds 2 kaf/yr
- Right side figures show changes in groundwater storage
  - Increases in storage are positive and decreases negative.
  - Net storage changes are the sum of all others
  - Gain and loss can both be nonzero because some cells within a subarea gain while others lose.

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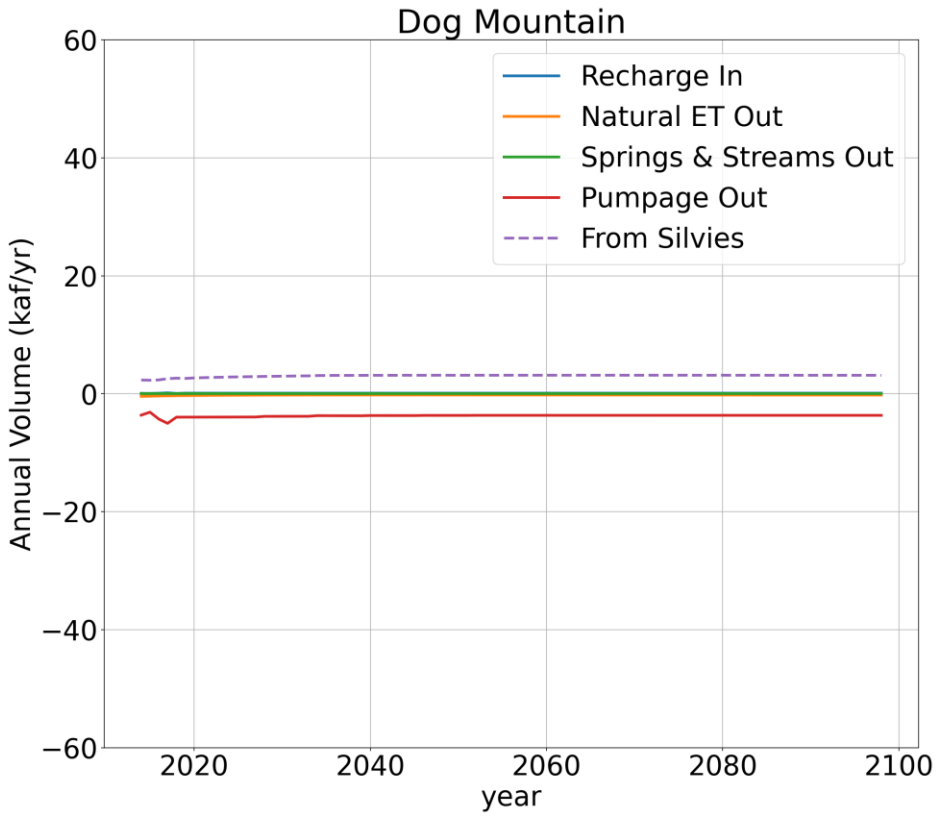
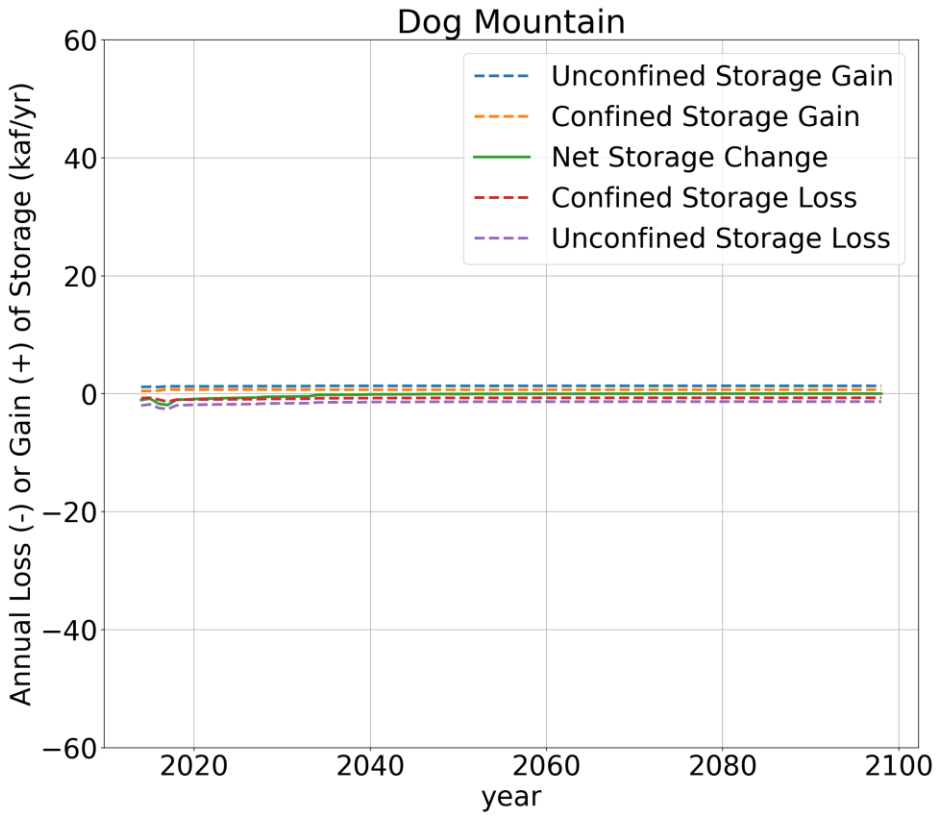
Dog Mountain Lowlands





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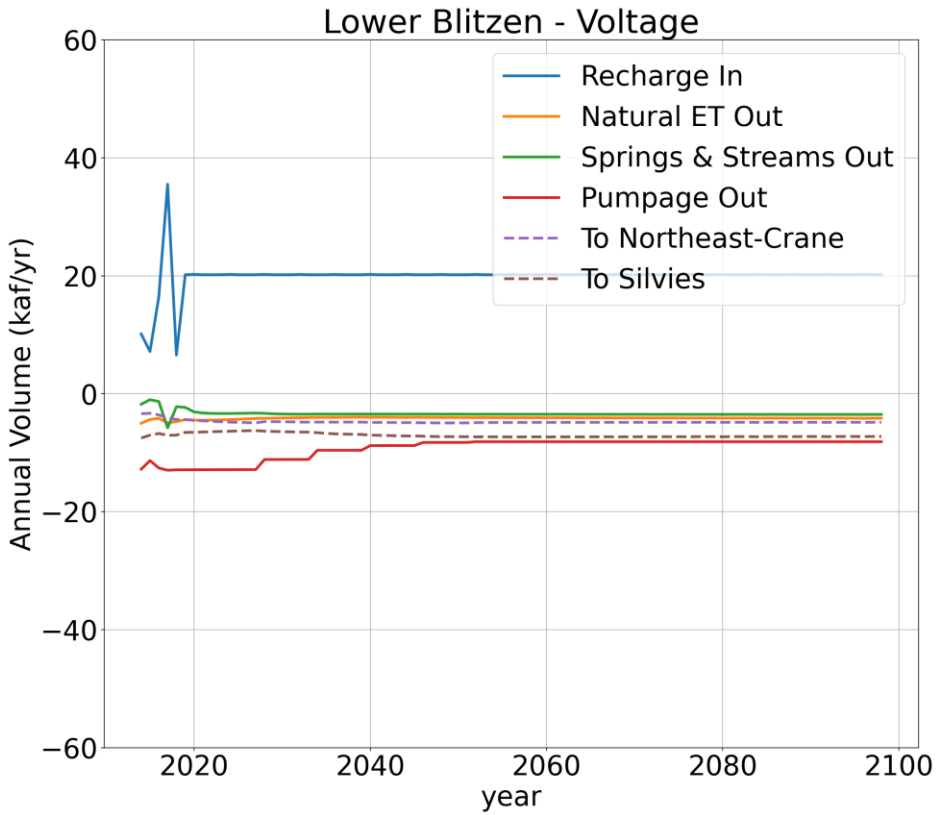
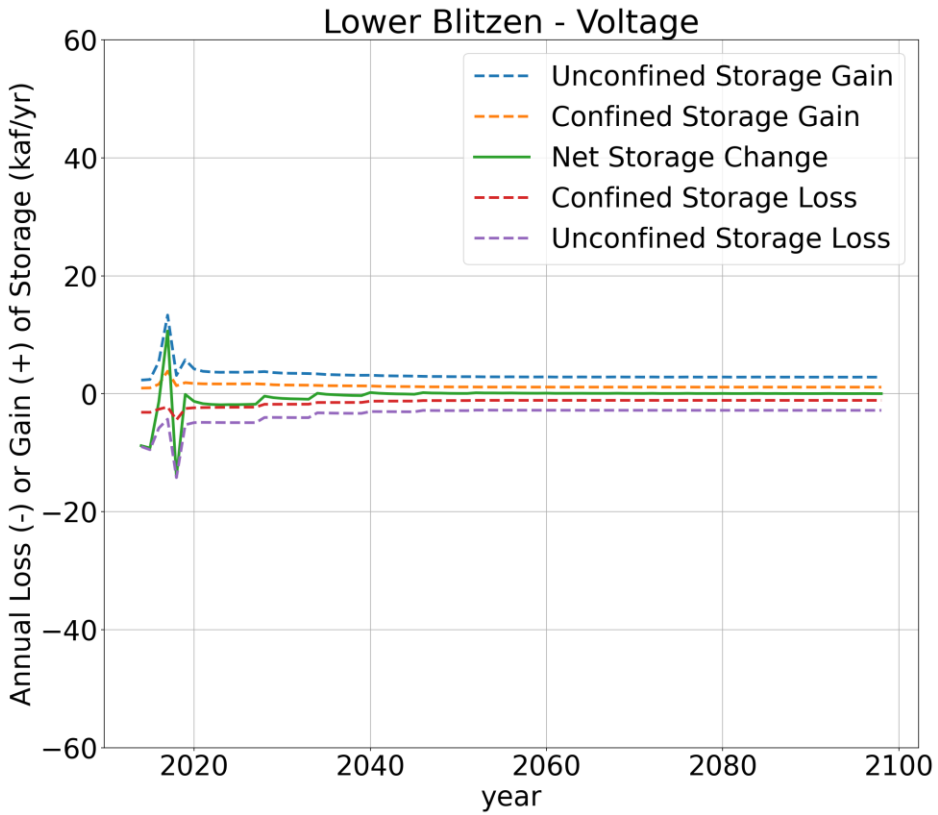
Lower Blitzen - Voltage Lowlands





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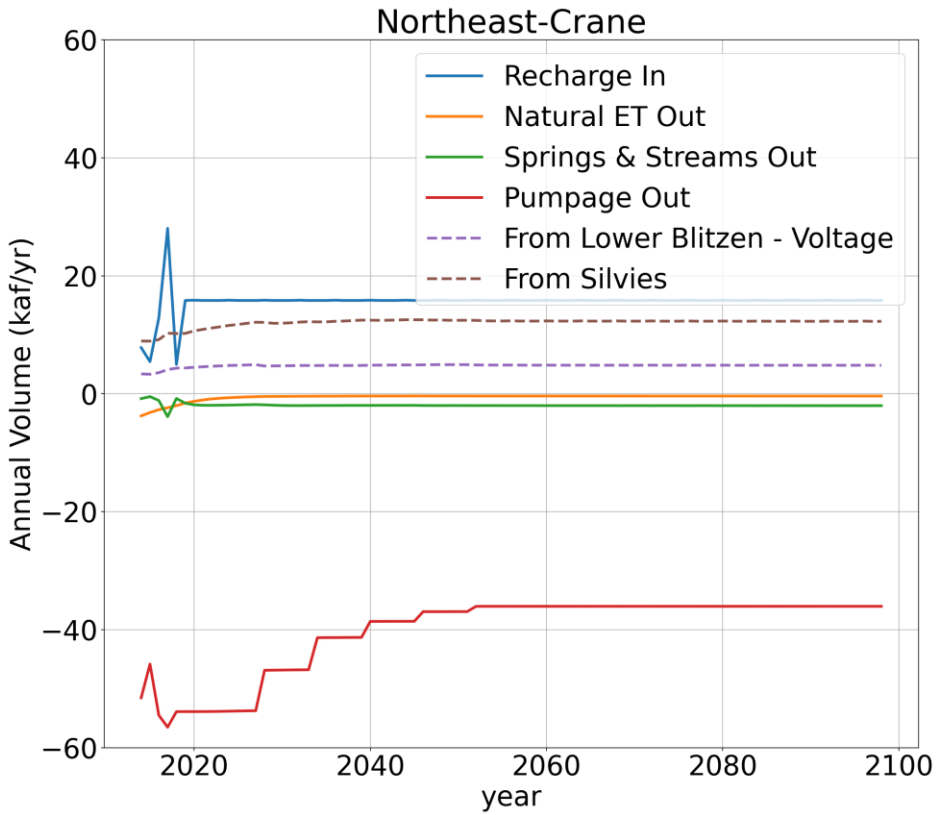
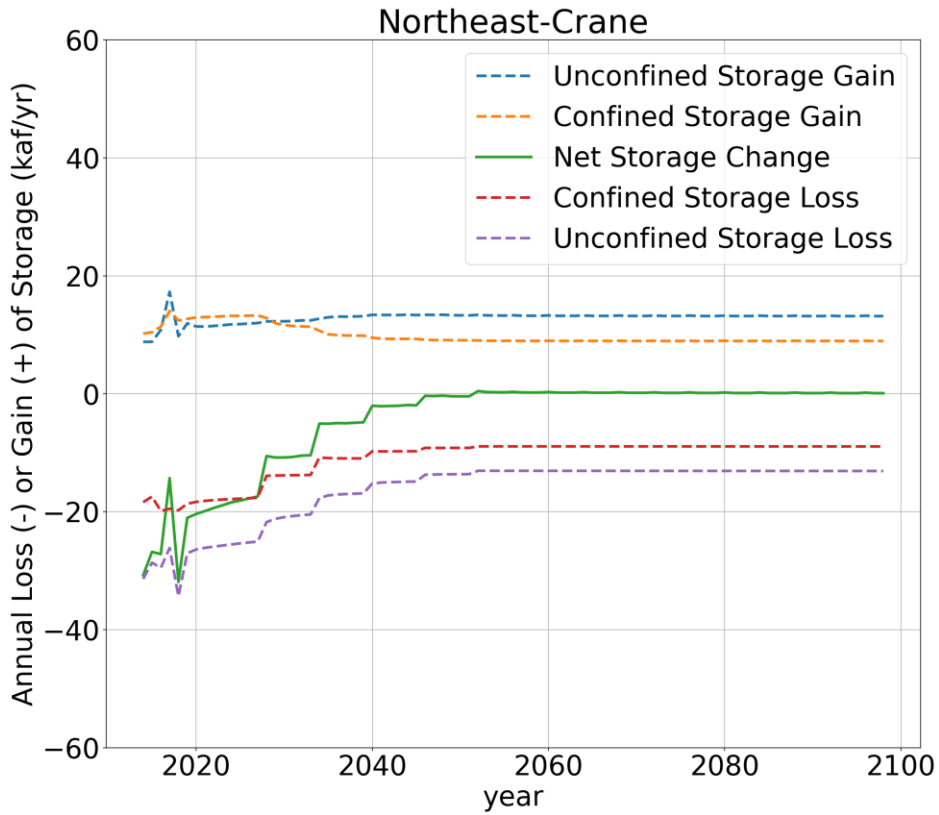
Northeast - Crane Lowlands





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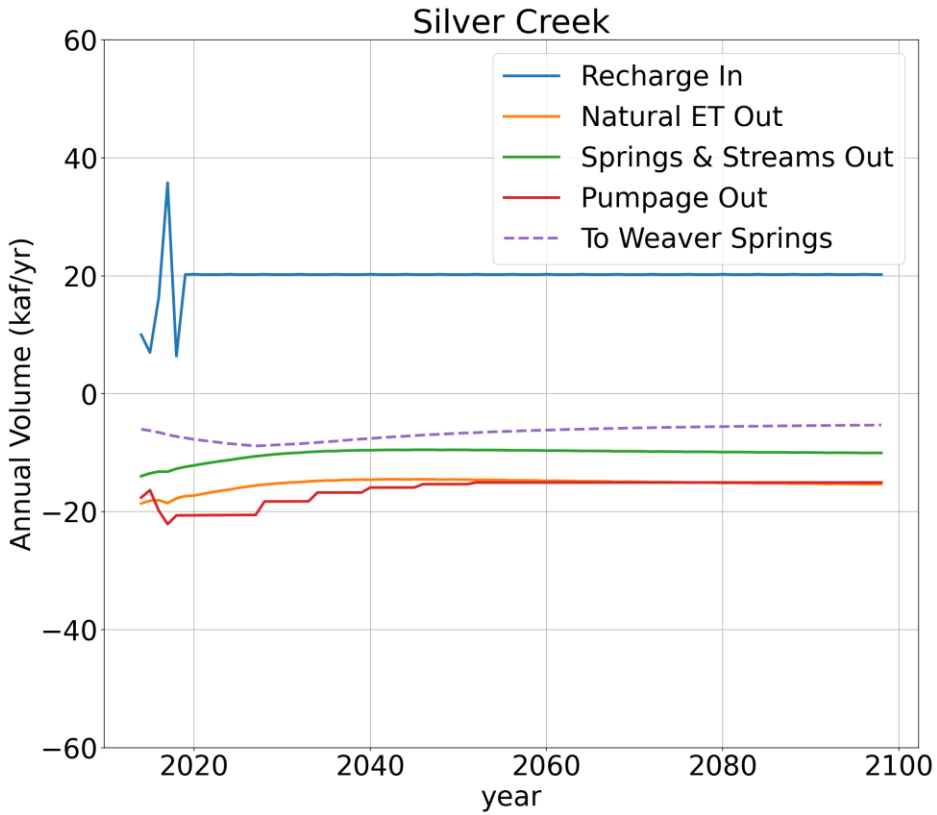
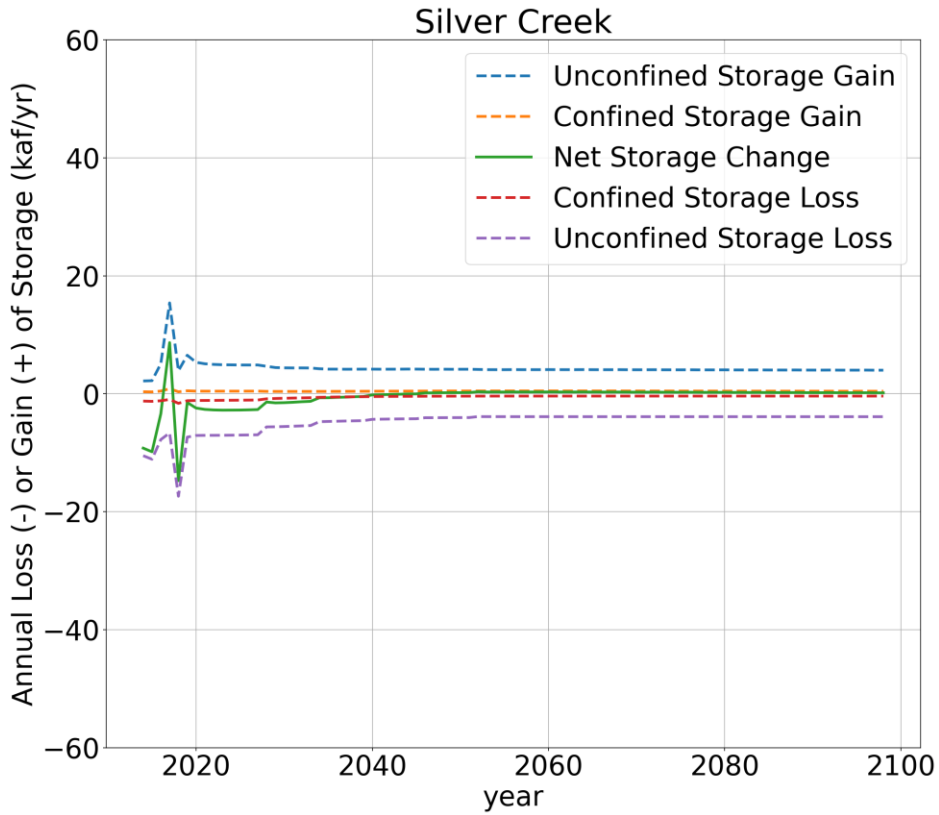
Silver Creek Lowlands





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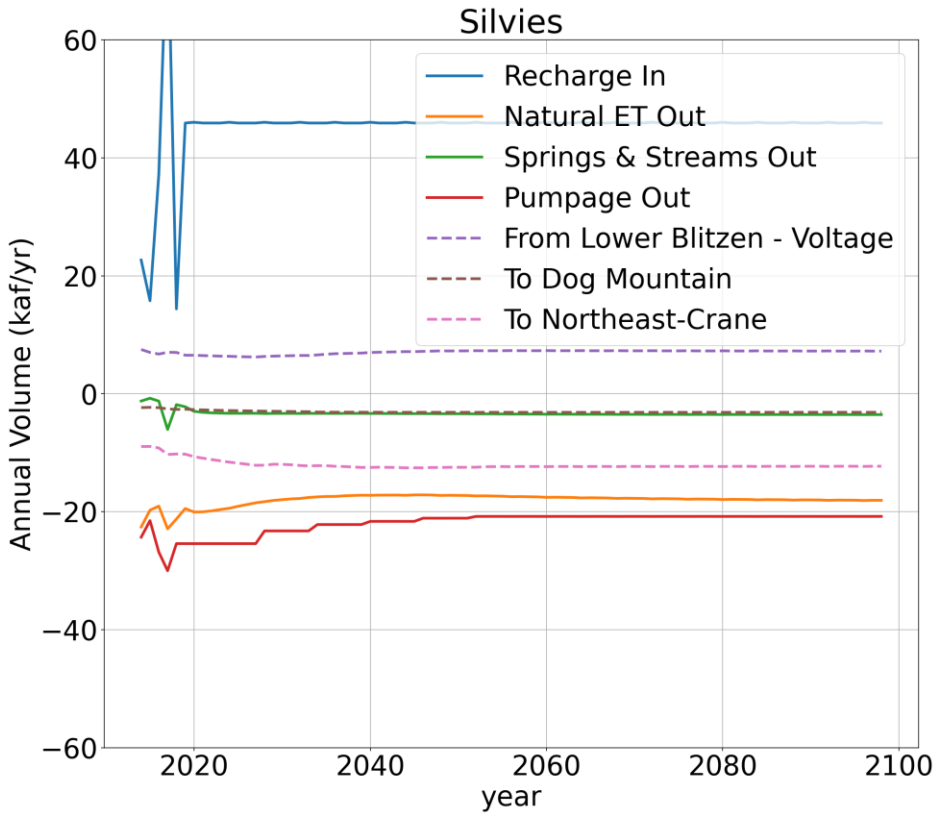
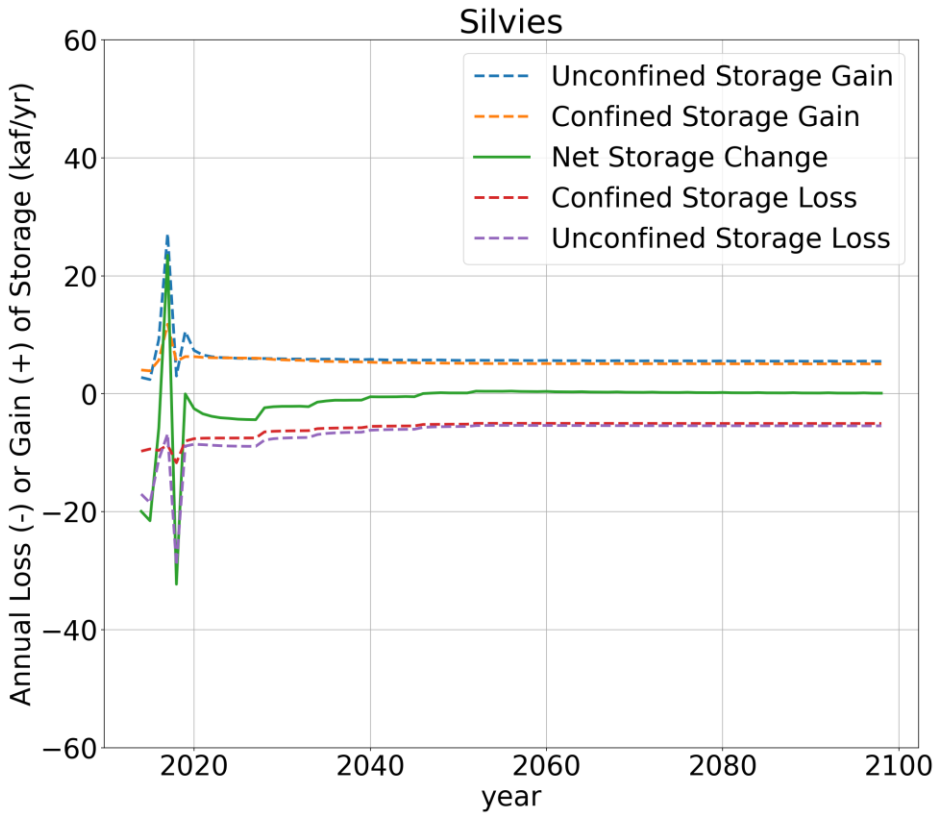
Silvies Lowlands





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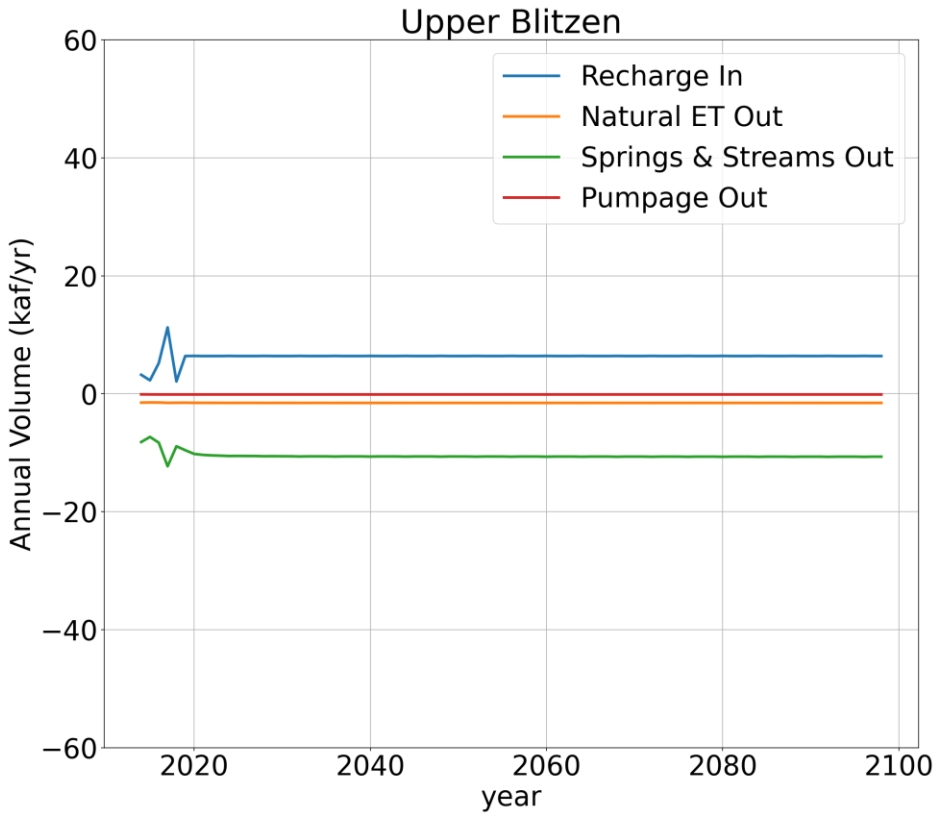
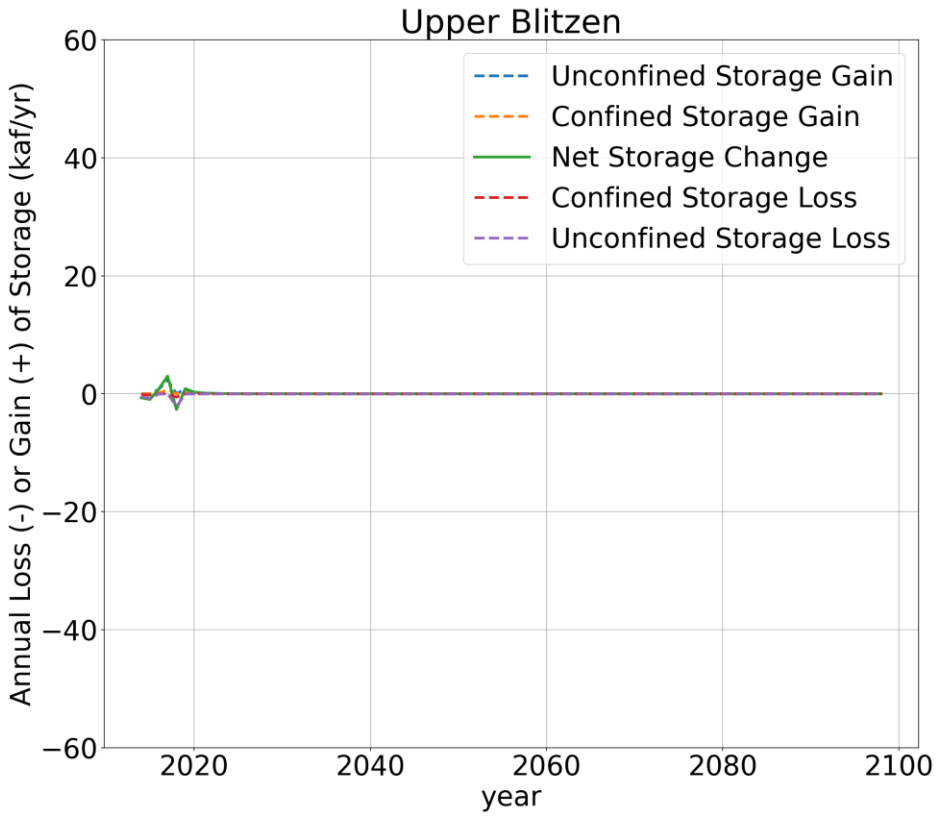
Upper Blitzen Lowlands





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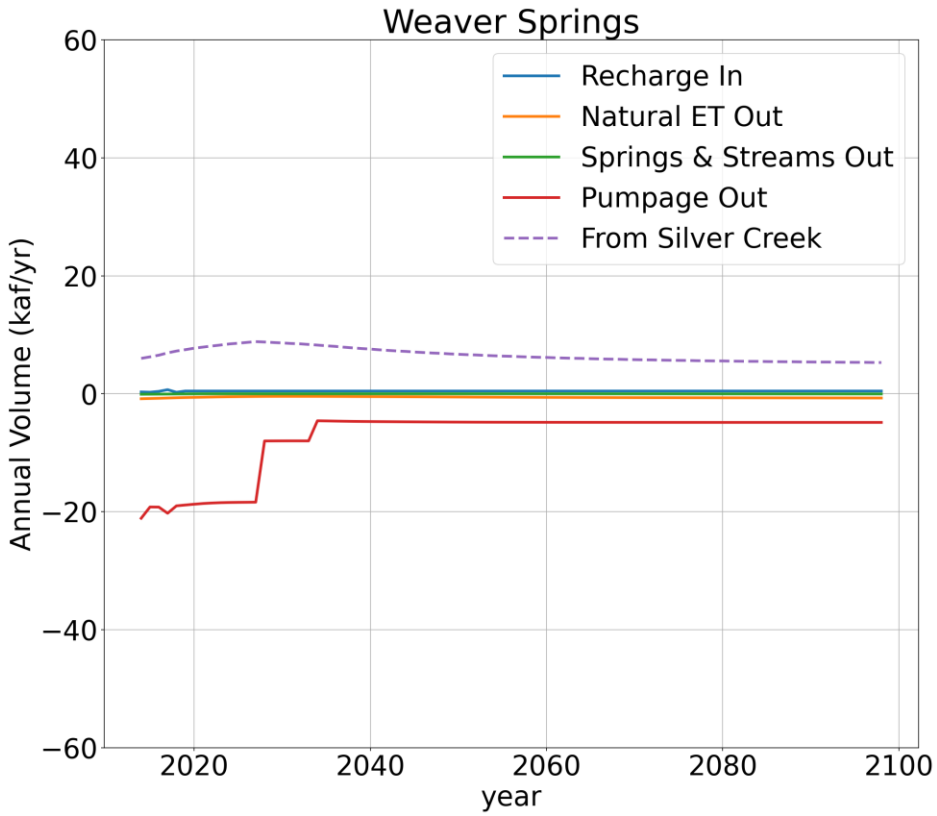
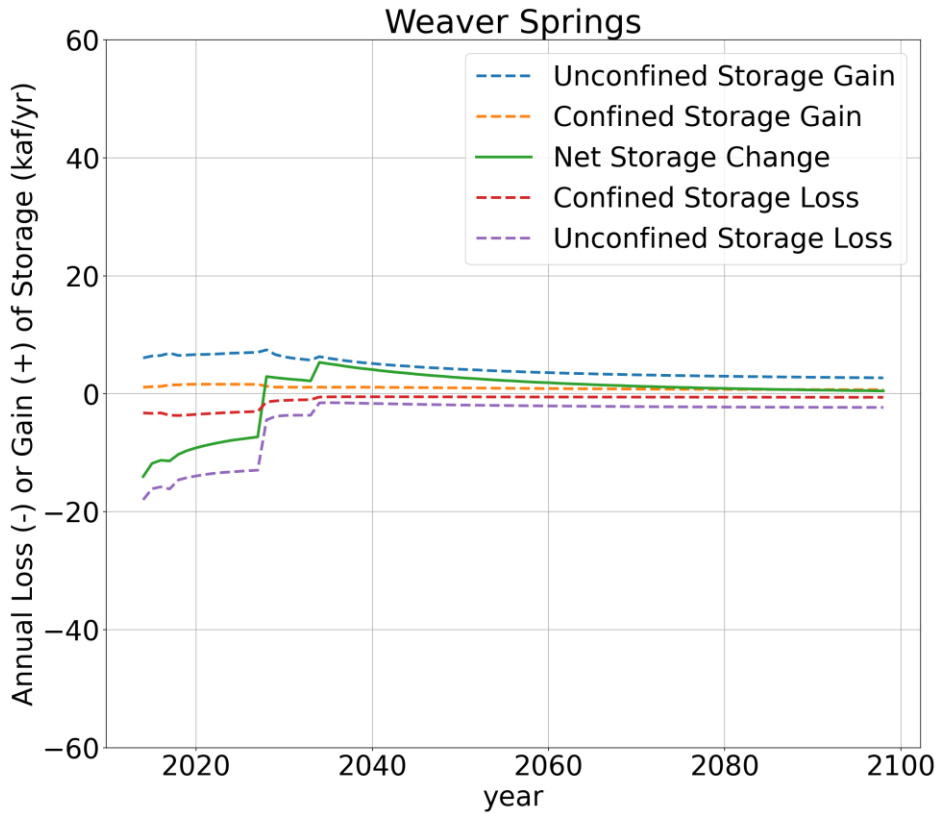
Weaver Springs Lowlands





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2018-2024 Measured vs Projected Trajectory Figures

- Figures showing the adaptive management trajectory based on the USGS full-pumpage scenario including the 10th, 25th, 50th, 75th, and 90th percentile envelopes with the red measured median line plotted over the top
- The intent of these figures is to show how the median of actual measurements in 2018-2024 match up with model projections by subarea.

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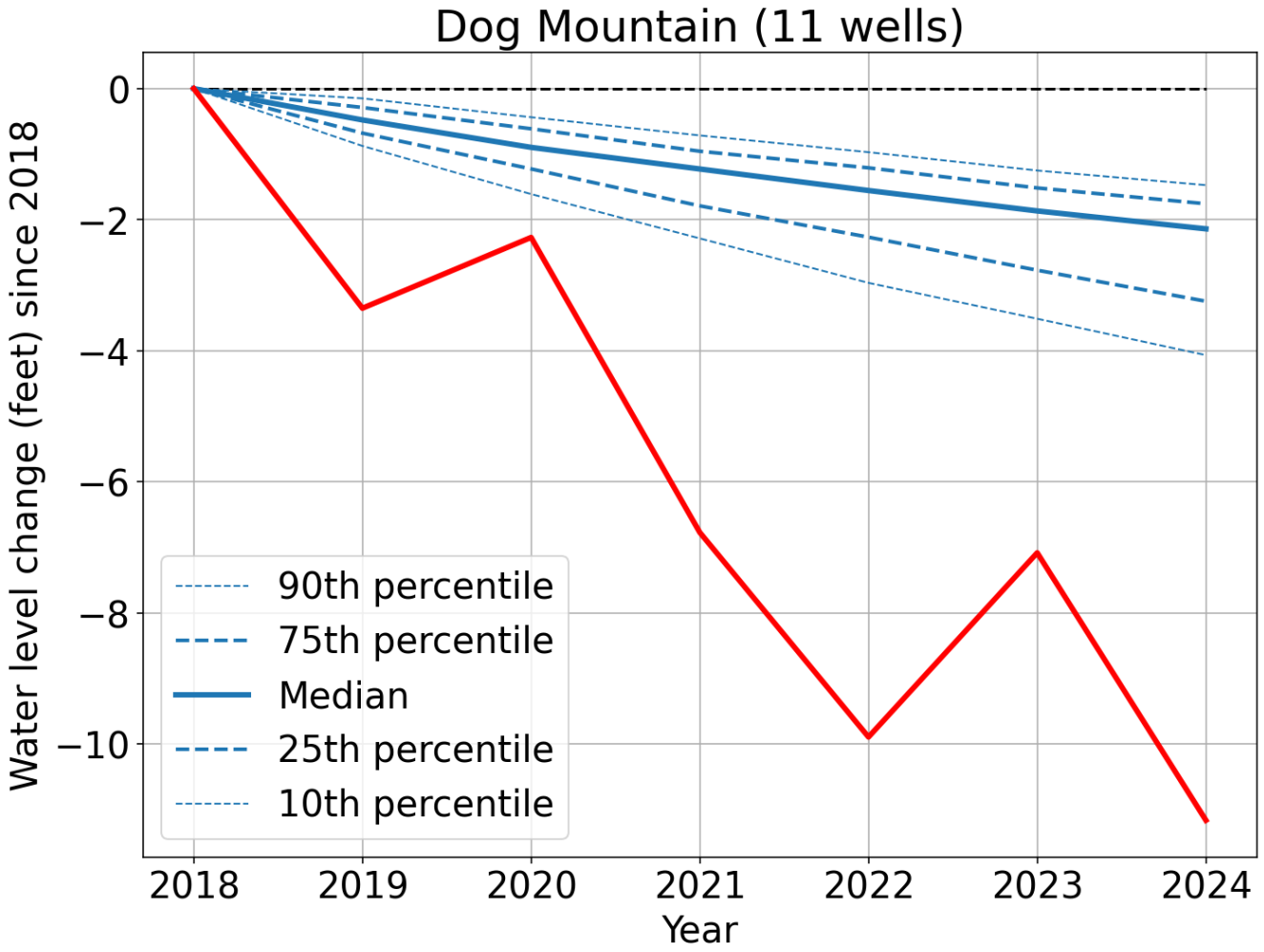
Measured vs Projected: Dog Mountain



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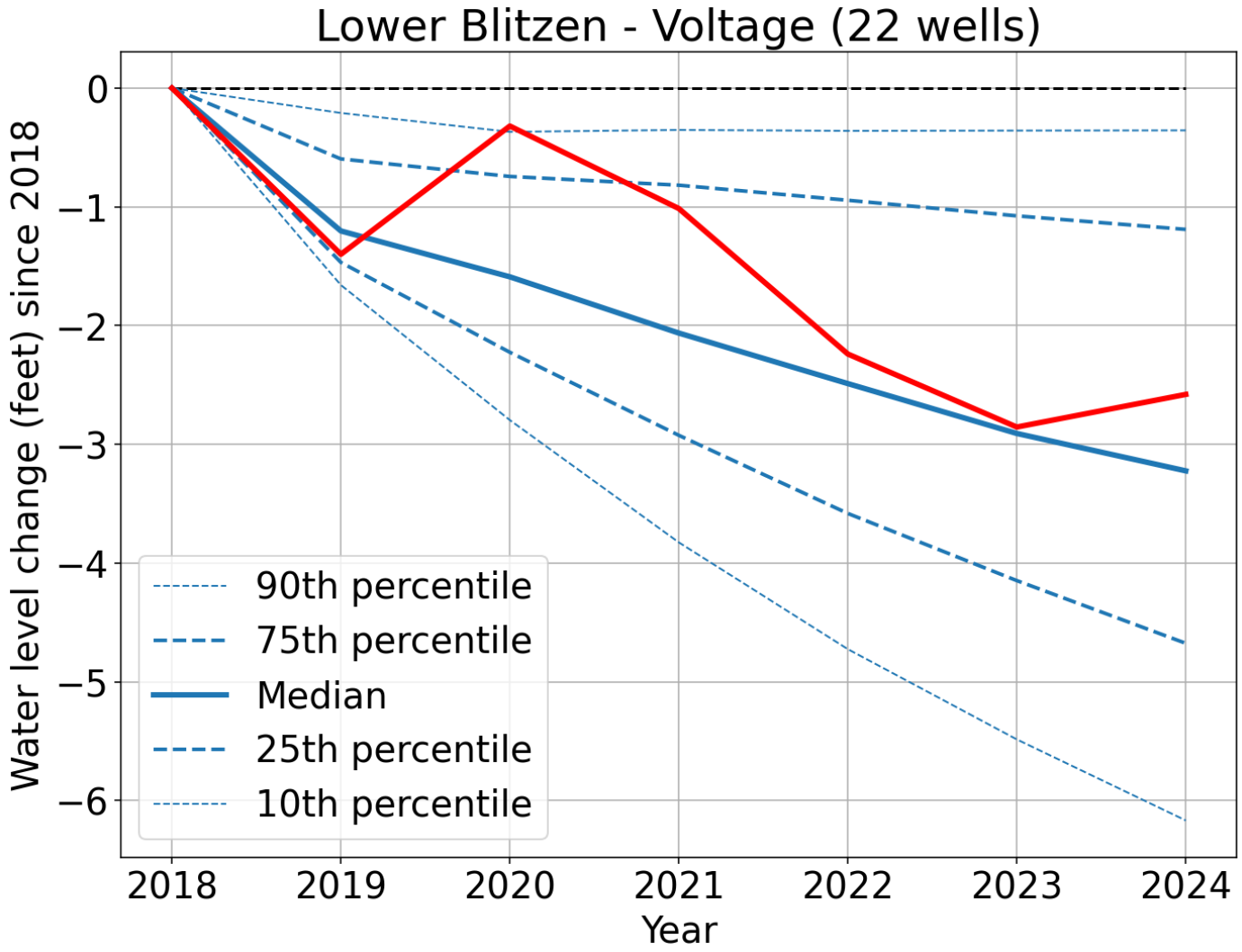
Measured vs Projected: Lower Blitzen-Voltage



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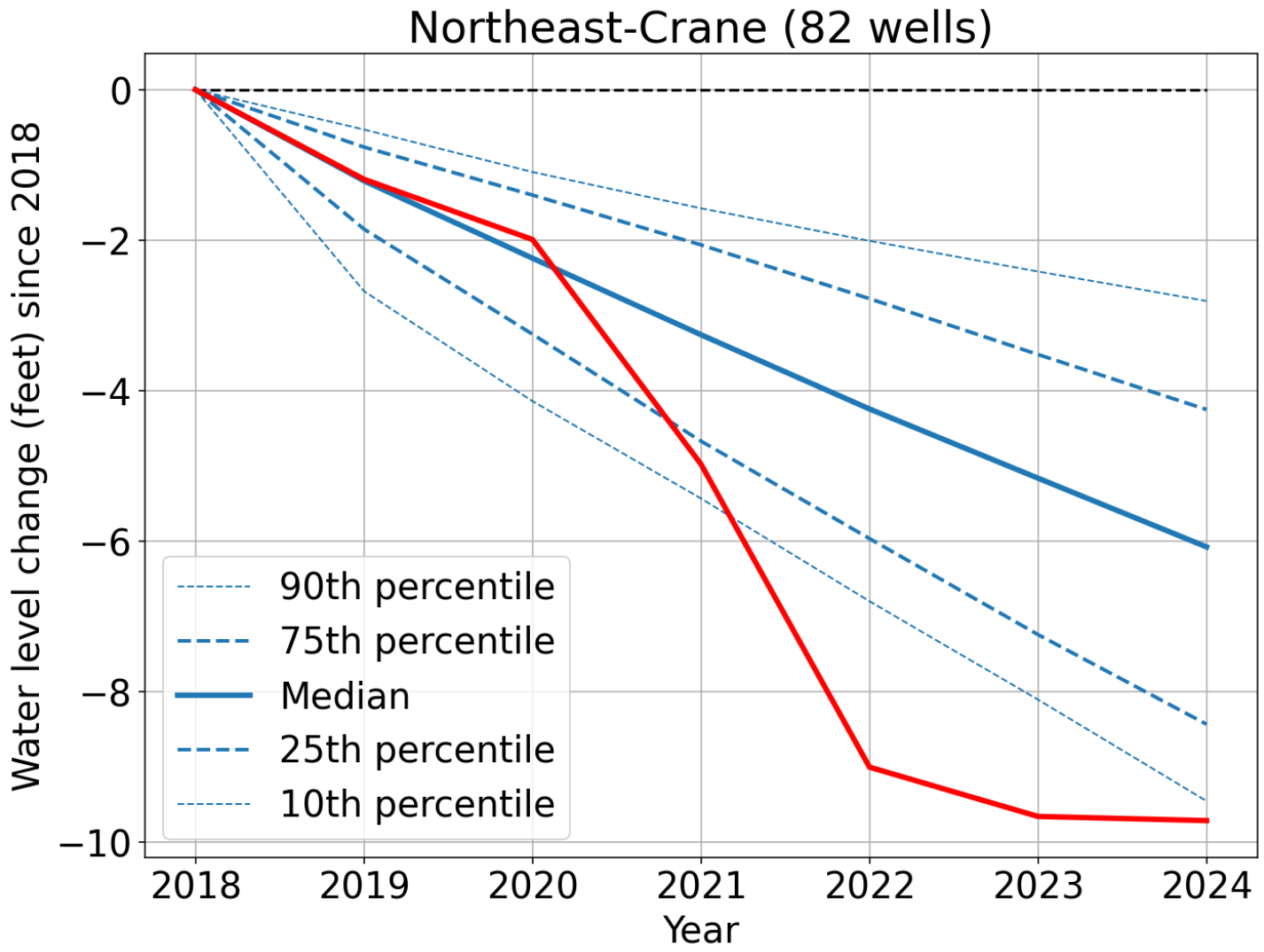
Actual vs Projected: Northeast-Crane



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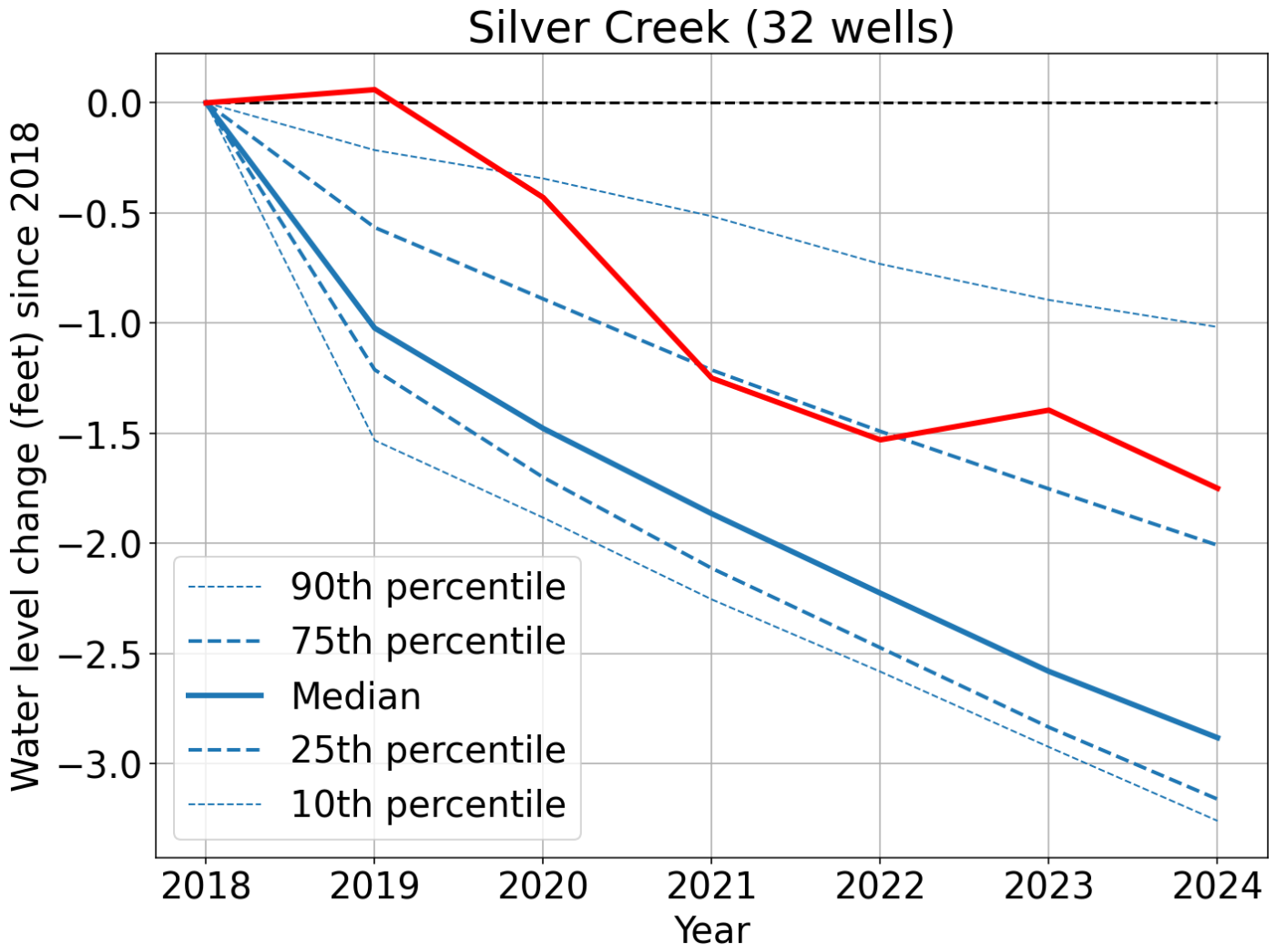
Measured vs Projected: Silver Creek



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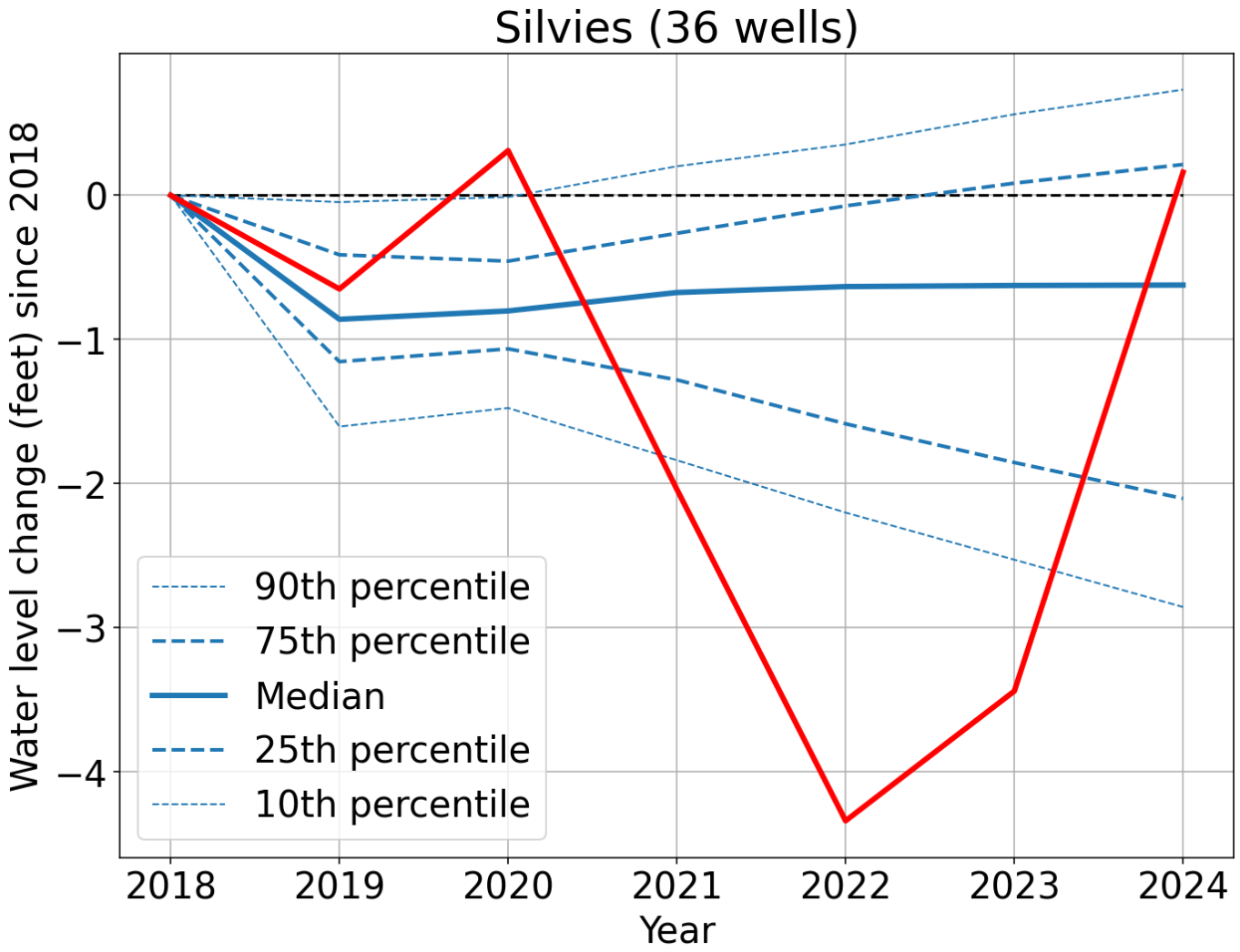
Measured vs Projected: Silvies



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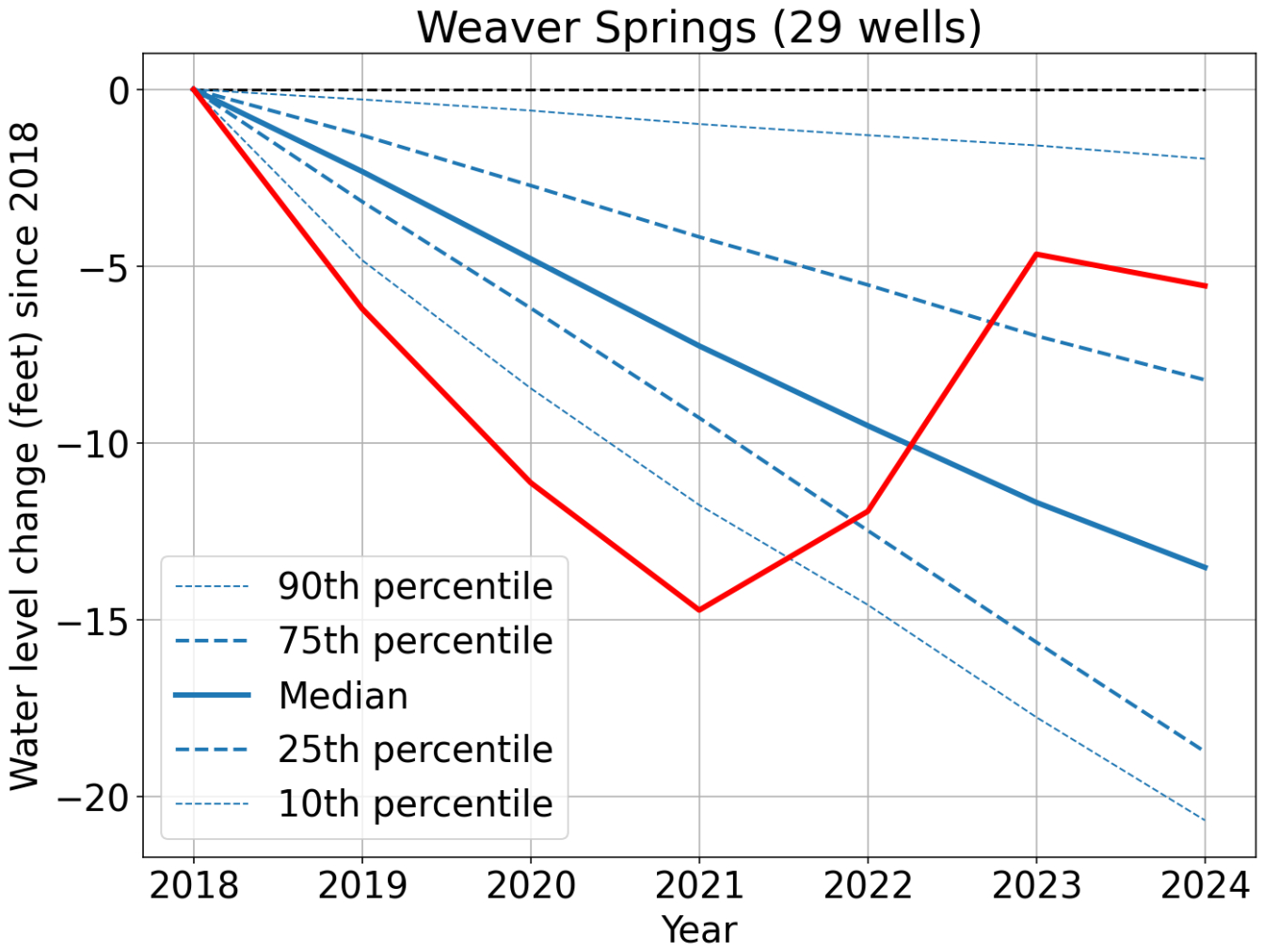
Measured vs Projected: Weaver Springs



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Water Use Estimate Updates

- Estimated groundwater pumpage update used data compiled by the Desert Research Institute (DRI), OpenET, and OWRD
- Used ET from remote sensing combined with modelling to estimate field-level applied irrigation water
- Estimates of applied water were summed to determine total groundwater pumpage
- Data did not show a large increase or decrease in pumpage over the 2018-2022 period
- Groundwater Study (Beamer and Hoskinson) and the update generally agreed
  - Local differences identified including field properties and irrigation patterns

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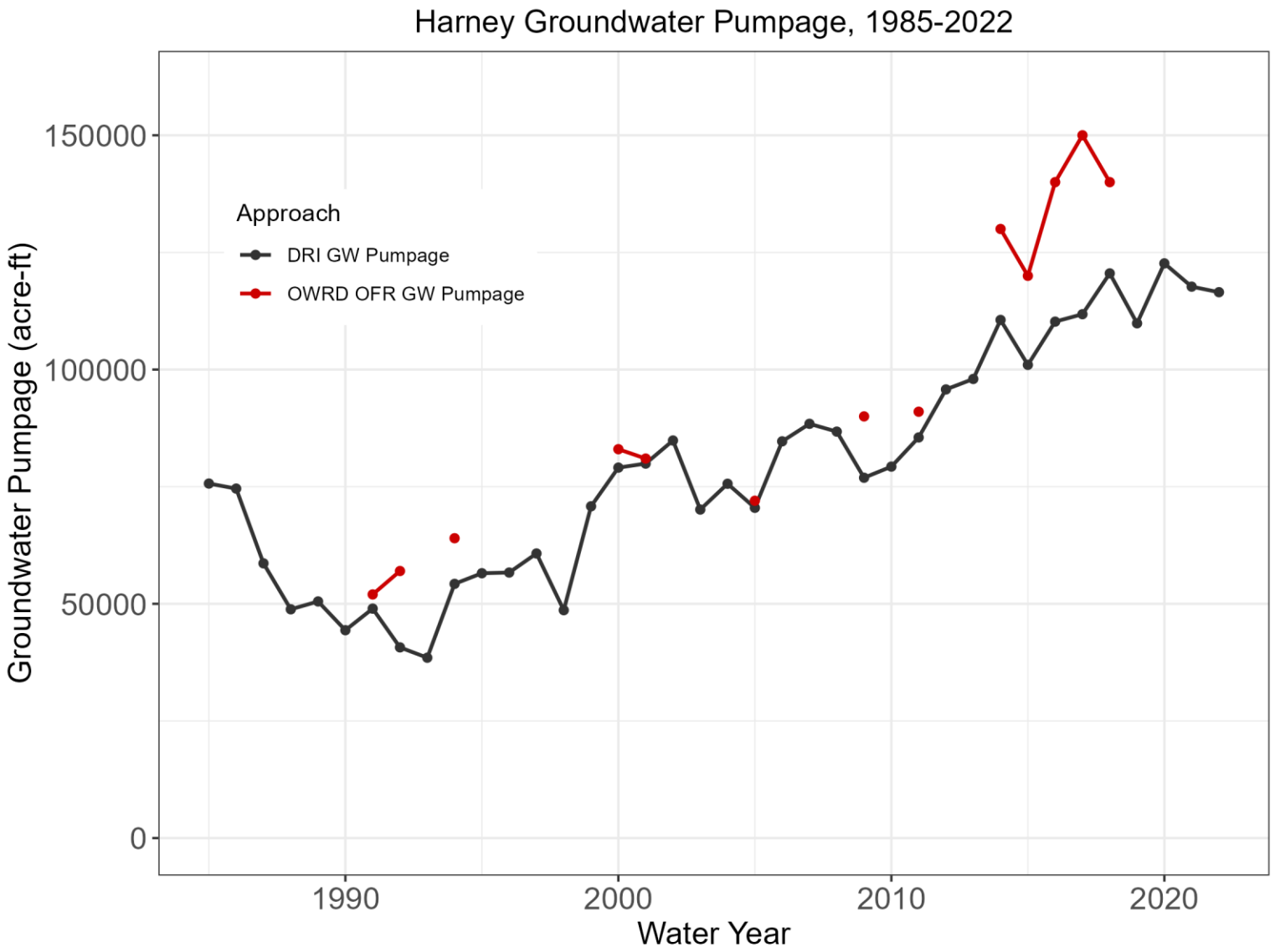
Pumpage Estimates by Year



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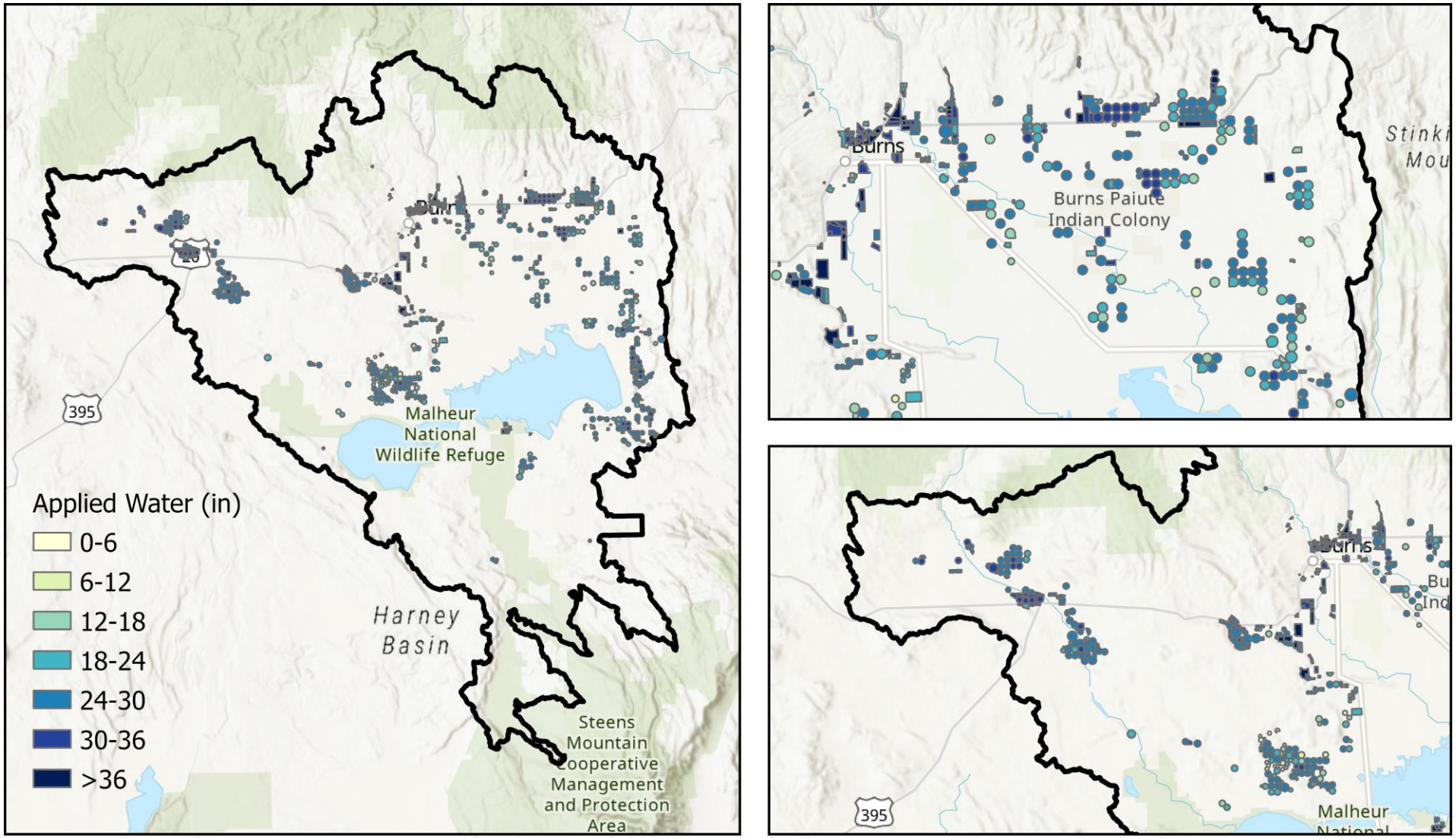
Map: Fields Where Pumpage Estimated



Oregon State Parks, State of Oregon GEO, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Oregon State Parks, Esri, TomTom, Garmin, FAO, NOAA, USGS, Bureau of Land Management, EPA, NPS, USFWS, Esri, NASA, NGA, US

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Fiscal Impact Statement

Components of Fiscal Impact Statement

- **Statement of fiscal impact**
- Cost of compliance

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Statement of Fiscal Impact

- **Statement of Fiscal Impact (ORS 183.335(2)(b)(E))**
- Identifies state agencies, units of local government and the public that may be economically affected by proposed rule changes
- Estimates economic impact on those entities
- Uses available information to project significant economic effect of proposed rule changes on businesses, including cost of compliance effects on small businesses

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Fiscal Impact Statement

Components of Fiscal Impact Statement

- Statement of fiscal impact
- **Cost of compliance**

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Cost of Compliance

Components of the cost of compliance

1. Identify any state agencies, units of local government, and members of the public likely to be economically affected by the rule(s)
2. Cost of compliance effect on **small business**

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Cost of compliance

Small Business (ORS 183.310(10)(a))

- Corporation, partnership, sole proprietorship, or other legal entity
- Formed for purpose of making a profit
- Independently owned and operated from all other businesses
- 50 or fewer employees

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Cost of compliance effect on small business

- Estimate the number of small businesses subject to new rules
- Identifies types of businesses subject to new rules
- Briefly describes administrative activities required for compliance
- Identifies equipment, supplies, labor, and increased administration required for compliance
- Describes how agency proposing rules involved small businesses
- Uses available information

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