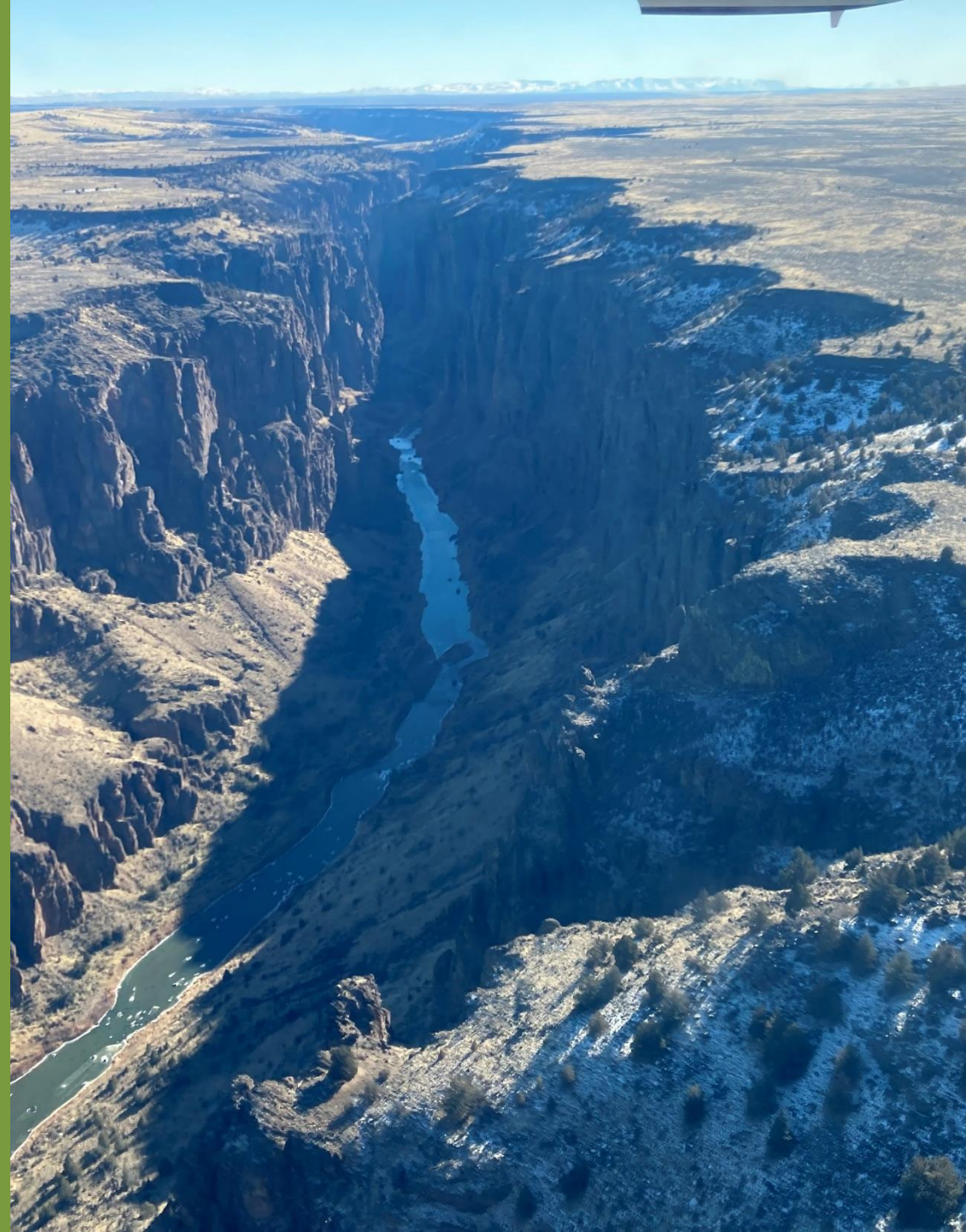
Division 512 Rulemaking

Groundwater Regulation for the Malheur Lake Administrative Basin Rules Advisory Committee

Oregon Water Resources Department

January 22, 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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Morning Meeting Agenda

8:00 AM (15 min)	Welcome and introductions
8:15 AM (20 min)	Recap of the Process so Far
8:35 AM (45 min)	Fiscal Impact
9:20 AM (60 min)	Adaptive Management
10:20 AM (5 min)	Public Comment
10:25 AM (10 min)	Break
10:35 AM (85 min)	Exploring Model Behavior

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Afternoon Meeting Agenda

12:45 PM (40 min)	Exploring Model Behavior
1:25 PM (60 min)	CGWA Rule Language
2:25 PM (30 min)	SWMPA/ Classification Rules
2:55 PM (5 min)	Public comment
3:00 PM (10 min)	Next Steps

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Goals for Today's Meeting

1. Provide a recap on the process so far
2. Build a shared understanding of the relationships between groundwater reductions and their economic impacts
3. Present the plan for adaptive management and gather feedback on the plan
4. Build a shared understanding of how and what we learned with model runs
5. Present the proposed management scenario and gather feedback.
6. Gather input around the CGWA rule language outline
7. Gather input around the draft SWMPA rule language
8. Gather input around the draft classification rule language

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Recap of the Process So Far

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Recap of the Process So Far

Goal of Conversation

- Provide a recap on the process so far

Level of Participation

Inform

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November 13 RAC Meeting

Topics discussed:

- Criteria to evaluate management scenarios
- Results of the 5 prescribed management scenarios
- Optimization of the 5 management scenarios
- Serious Water Management Problem Area (SWMPA)
- Fiscal Impact
- Voluntary Agreement Guidance Document

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Discussion Groups

Topics Discussed

- Understanding the results of the five management scenarios
- Adaptive Management

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Model Run Results for Five Management Scenarios

RAC 10/11 Discussion Groups

- Developed 3 RAC management scenarios
- Discussed results
- Answered questions for results

In between meetings

- Model sensitivity runs based on questions and input

RAC 12

- Sensitivity runs results – what we learned

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Criteria to Inform Model Iterations

RAC 11

- Conducted criteria weighting exercise

In between meetings

- Developed 2 model iterations using criteria results

RAC 12

- Present iteration results and what we learned

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Adaptive Management

RAC 11 / Discussion Group

- Discussed adaptive management during RAC meeting
- Discussion group topic

In between meetings

- Explored our authority
- Developed a plan based on conversations and input

RAC 12

- Present adaptive management plan

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Proposed Management Scenario

RACs 2 -5

- Proposed 15 subarea scenario
- Curtailment in 6 high priority subareas

In between meetings

- Harney Basin Groundwater Model published
- Start using model to better our understanding of how the system will react

RAC 12

- Present new proposed management scenario and take input

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Serious Water Management Problem Area

RAC 7,8, and 11 Discussion Groups

- Input gathered for SWMPA in RAC/ Discussion groups

In between meetings

- Considered input and adjusted rule language.

RAC 12

- Gather input around SWMPA rule language.

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Classification

RAC 7 and 8

- Discussed boundary – agreed on boundary

In between meetings

- Drafted rule language

RAC 12

- Gather input around rule language.

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Fiscal impact

RAC 10/11 Discussion groups

- Request to hire an economist to assess the fiscal impact
- OWRD hired ECONorthwest
- ECONorthwest presented methods

In between meetings

- OWRD gathered economic info on domestic wells
- ECONorthwest continued work

RAC 12

- Present preliminary findings

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Next RAC March 5, 2025

Next Steps:

1. Consider feedback, draft and modify proposed rule language
2. Discuss rule language and gather input during meeting
3. Discuss fiscal impact statement and gather input during meeting

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Fiscal Impact

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Fiscal Impact

Goal of Conversation

- Build a shared understanding of the relationship between groundwater reductions and their economic impact
- Present plan for assessing impacts on domestic wells

Level of Participation

Involve/Consult

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Fiscal impact

RAC 10/11 Discussion groups

- Request to hire an economist to assess the fiscal impact
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In between meetings

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RAC 12

- Present preliminary findings

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Why an Economic Analysis? And Scope

- The RAC asked for a more detailed economic analysis, in time to inform draft rules, and with enough detail to understand the overall impacts to the economy, local government revenue, small businesses, domestic well users, and ecosystems

- ECOnorthwest was asked to conduct that analysis using existing information, interviews to get local information, and running the IMPLAN model for economy-wide effects

- ECOnorthwest was asked to understand how different groundwater management scenarios might have different economic impacts

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We Looked at Current and Two Possible Future Considerations to Analyze

- Calculated a baseline economic value for the agriculture sector, the economy, and local government revenue (so we could measure change)

- OWRD provided two future management considerations
  - One possible future:
    - Managing by six subareas (less reductions than for the whole GHVGAC)
    - All reductions complete at the end of 30 years
  - Second possible future:
    - Managing by the whole GHVGAC (more reductions)
    - All reductions complete at the end of 30 years

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Assumptions for Ag Impact Analysis

- Used parcel-level agricultural information from Jaeger's model
  - Updated crop yields from interviews with eight farmers
  - Updated assumed crop output price to recent 2024 value
- Matched parcel information with groundwater modeling output for two example scenarios
- Changed number of irrigated acres based on the two future groundwater availability options to estimate change in agricultural production
  - DID 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

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Preliminary Findings of Ag Impacts

- Changes in irrigated acres and farm revenues are 1-to-1 with groundwater reductions.
  - Example: 10% reduction in groundwater translates to approx. 10% reduction in irrigated acres and farm revenues.
  - Why? There is one crop, highly dependent on water. This result would be different in Hood River, for example.
- Reductions in irrigated acres and revenues vary across both future groundwater considerations based on well location.
  - In the 6-subarea example, some subareas have larger irrigated acre reductions than others.
- Farm revenues from baseline and the future groundwater management considerations would be used in IMPLAN.

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What is IMPLAN?

- IMPLAN is a regional input-output model used to assess economic impacts of various projects. IMPLAN models linkages between 546 different economic sectors. Models how money moves through the economy.
- Impact Types:
  - **Direct** – Impacts of expenditures by water users (comes from Ag Impacts).
  - **Indirect** – Impacts of expenditures of suppliers to water users (Supply-Chain Effects like fuel, fertilizer/seed, and equipment).
  - **Induced** – Impacts of household spending directly/indirectly associated with water users (Household to Business Effects).
- Impact Measures:
  - **Output** – value of goods and services produced.
  - **Jobs** – average number of employees employed FT or PT.
  - **Personal Income** – sum of employee compensation and proprietary income.

Assumptions for Local Government Revenue (Harney Co. Tax) Analysis

- Informed by the changes in irrigated acres from Ag analysis
- Three different land classes are assumed based on conversation with County Tax Assessor.
  - Land Class 2 (Full Irrigation)
  - Land Class 3 (Some irrigation)
  - Land Class 5 (Fully Curtailed)
- Used average tax rate for the 6 subareas that will potentially be impacted.
- 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.)

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Preliminary Findings in Local Government Revenue Analysis

- Reductions in property tax revenue are not 1-to-1 with groundwater reductions.
  - Example: 10% reduction in groundwater pumping yields less than 10% reduction in property tax revenue
  - This is due to land still being taxed, albeit at a lower tax rate, even if it isn't in production.
- Mixture of parcels moving across land classes
  - Some parcels would potentially stay at the higher value Land Class 2
  - Some would move to Land Class 3 (some irrigation)
  - Some would move to Land Class 5

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Assumptions for Ecosystem Services Analysis

- Conducted expert interviews and literature review
- Ecosystem service benefits and costs for this analysis are categorical and ordinal, rather than quantitative.
- Springs are a key potential mechanism for scenarios to affect ecosystem services. River and stream baseflow potentially as another pathway.
- Stock water, wetland habitat, migratory bird populations, and fish and amphibian populations dependent on springs and stream baseflow are potentially affected by scenarios via ecosystem services.
- Interviews also explored recreation impacts.

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Preliminary Findings for Ecosystem Services Analysis

- Springs are important, especially the Double O Springs that support baseflow to the most productive parts of the Refuge
- Direct impacts on recreation from changes in groundwater management (positive or negative) are likely minimal
- There are important impacts to migratory bird populations, but it is difficult to separate the effect of groundwater management on Pacific Flyway populations given everything else those birds experience
- Stock water, wetland habitat, migratory bird populations, and fish and amphibian populations dependent on springs and stream baseflow are potentially affected by scenarios via ecosystem services.

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Next Steps & Key Takeaways

- The Harney County economy is **A)** dependent on agriculture, which is **B)** dependent on a hay crop that needs water, and **C)** has an economy that is quite isolated from other economic opportunities
- Thus, a % reduction in groundwater use, is close to the same % reduction in agriculture economic output and overall economic output
- This analysis assumes no adaptation (i.e., changes in farming practices, other kinds of businesses and jobs, etc.)

- **NEXT STEP:** ECOnorthwest has reserved budget to do a final analysis based on one more groundwater management scenario the RAC/OWRD lands one

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Plan for Impacts to Domestic Wells

Sources of Local Data

Well, Abandonment, Repair, and Replacement Fund (WARRF)

- Have Harney Specific grant information

Harney Domestic Well Fund in Greater Harney Valley Groundwater Area of Concern (HDWF)

- Data from the first round of grant applications

Business Case Assessment

- Alternatives for delivering water

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Note: Model will provide the estimated number of dry wells

Plan for Impacts to Domestic Wells

Costs from the WARRF and HDWF include:

- Repair costs: deepening costs, pump
- Replacement costs: drilling, pump, trenching, electrical etc.
- Abandonment costs

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Plan for Impacts to Domestic Wells

Total Cost (based on local grants approved)

- Average total cost: $24,987
- Maximum total cost: $39,980
- Minimum total cost: $8,700

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Plan for Impacts to Domestic Wells

Business Case Assessment

Harney Collaborative explored two alternatives:

1. Building a 4000-gallon cistern filled 26 times a year servicing 1086 households
   - Total annualized cost (O&M) 10.5 million
   - Annualized cost per household $9,600

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Plan for Impacts to Domestic Wells

Business Case Assessment

Harney Collaborative explored two alternatives:

2. Mixture of cistern, community wells and connecting some of 1086 households to the Hines and Burns systems
   - Total annualized (O&M) cost $7.5 million
   - Total annualized cost per household $6,800

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Plan for Impacts to Domestic Wells

<u>Total fiscal impact assessed by:</u>

- Number of estimated dry wells times the min, average, and max values of well repair/replacement
- Exploring Collaborative's alternatives for water delivery

Assessment will be at a 30-year time frame

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Adaptive Management

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Adaptive Management

RAC 11 / Discussion Group

- Discussed adaptive management during RAC meeting
- Discussion group topic

In between meetings

- Explored our authority
- Developed a plan based on conversations and input

RAC 12

- Present adaptive management plan

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Adaptive Management

Goals of Conversation

- Present the plan for adaptive management
- Gather feedback around:
  - Check in intervals
  - What conditions trigger adaptation
  - How much to adapt if we are “off schedule”
  - How to account for variability

Level of Participation

Involve/Consult

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An approach to adaptive management

Adaptive management is a systematic and iterative approach for improving resource management by emphasizing learning from management outcomes (Holling, 1978; Bormann et al., 2007).

- Rules curtailing groundwater use must be supported by substantial evidence in the rulemaking record of the Department
  - Rules based on future data cannot be used to modify PTW
  - Rules can provide the framework for management
- Orders can be implemented using the Department's regulatory discretion
- Rules and Orders combined provide the tools to adaptively manage

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What We Can and Can't Do in Rule

In Rule	In Order
Can • Set PTW by Subarea • Define the timeline to achieve the goal • Set timeline for evaluation of progress – Check-in • Set provision curtailment schedule • Define allocation of PTW • Define how OWRD will measure progress **Cannot** • Adjust overall PTW based on conditions • Make changes to subarea boundaries after rule adoption	**Can** • Modify amount of curtailment at each check in period based on conditions up to the allotted PTW defined in rule • Issue orders for future expected curtailment **Cannot** • Curtail outside of priority date in the same subarea • Modify PTW

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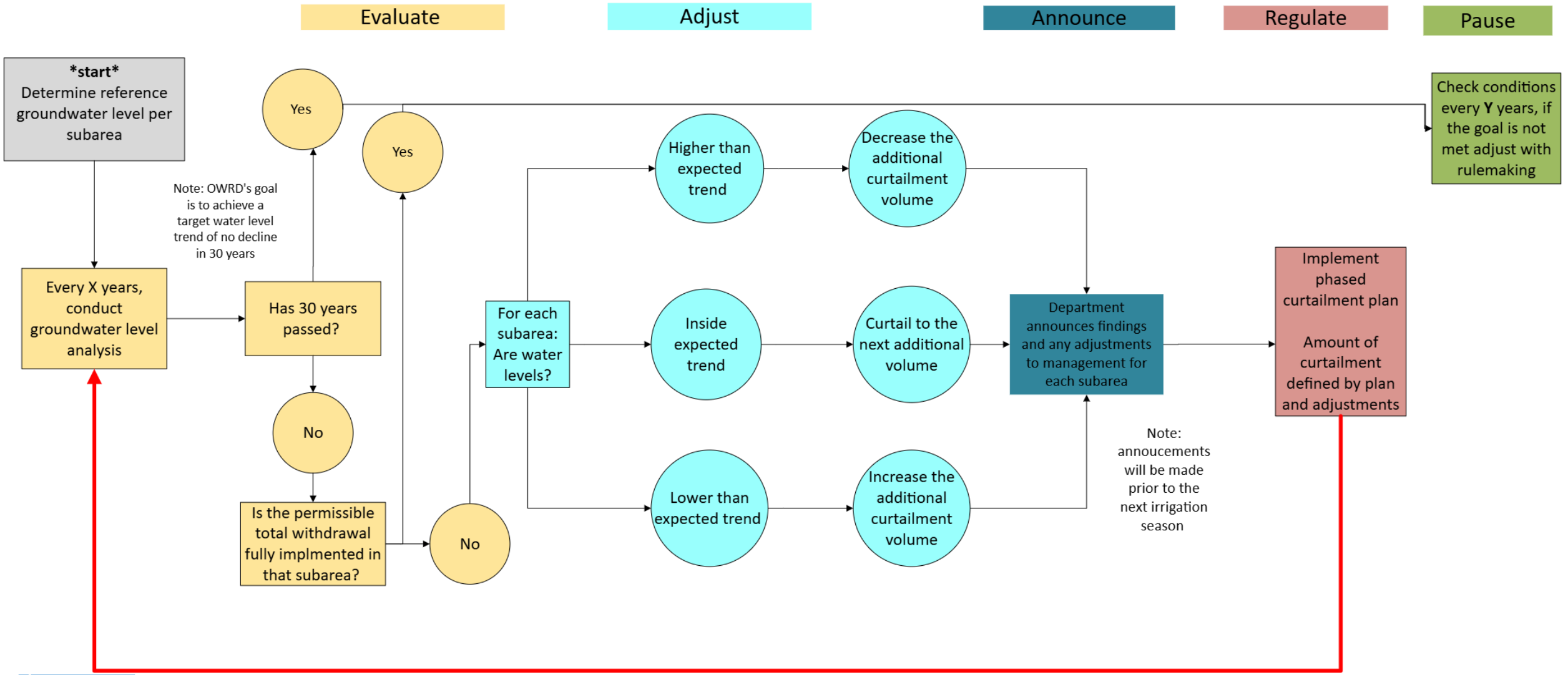
Proposed Adaptive Management Plan



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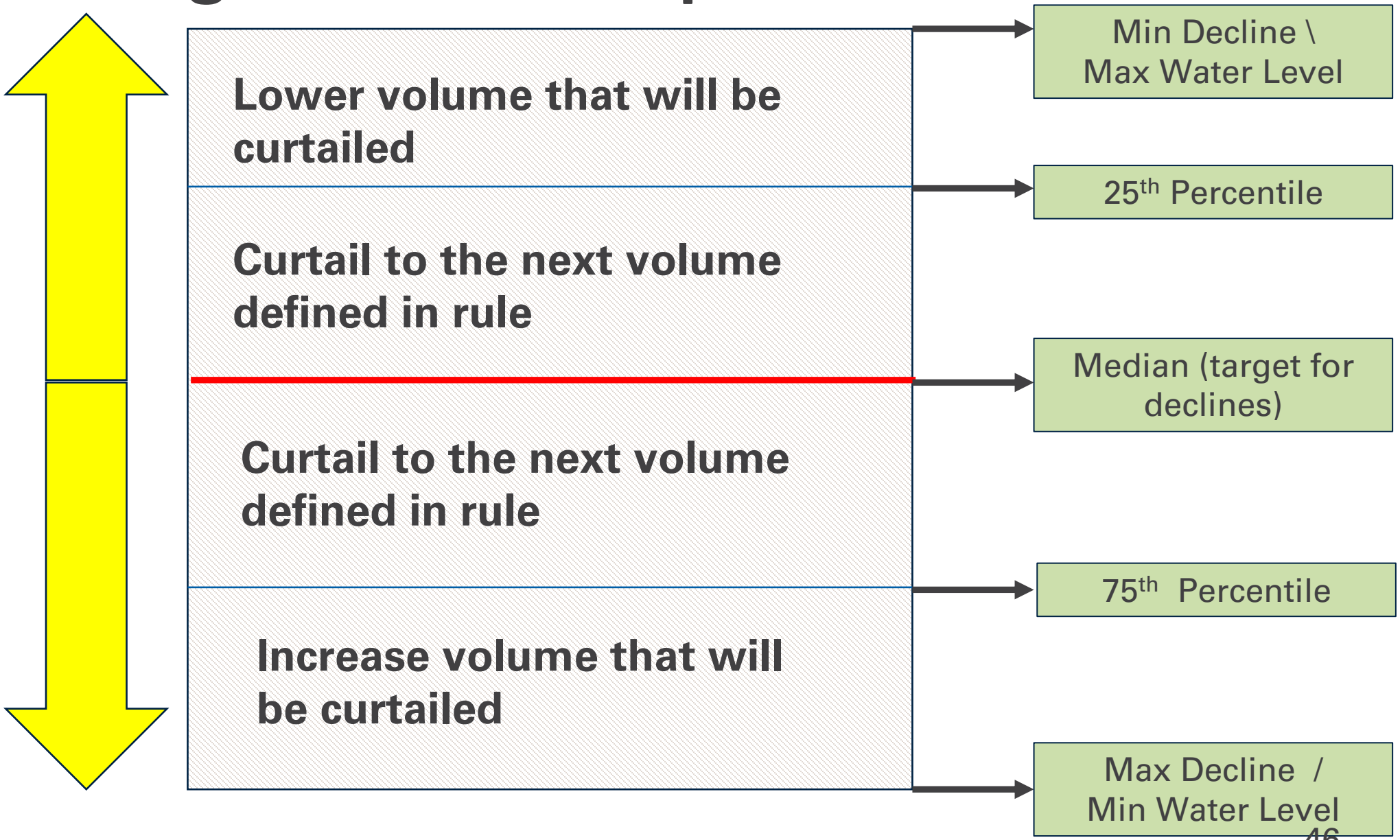
Decline Magnitude Envelope



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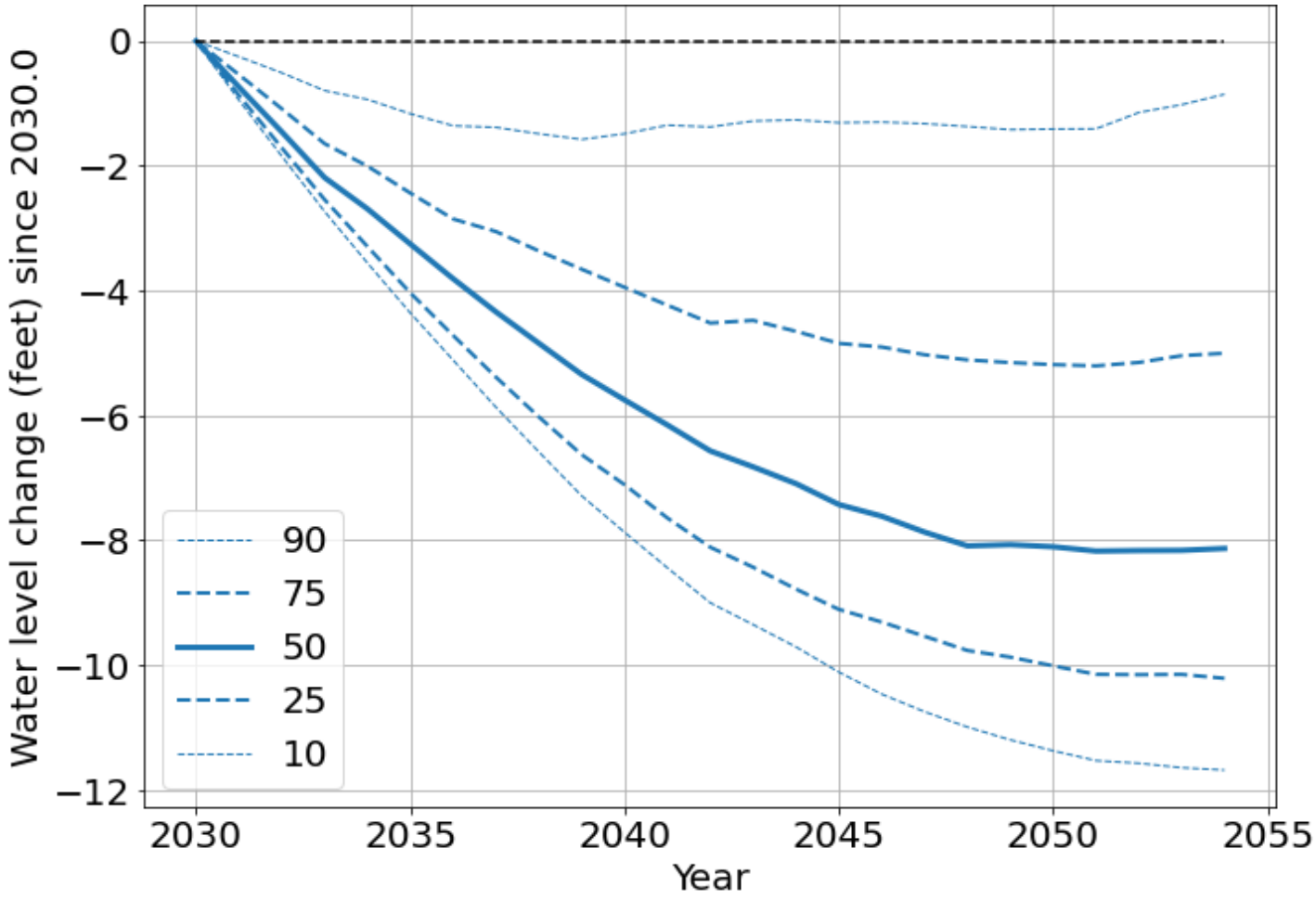
Decline Magnitude Envelope

- Magnitude used instead of rate due to short-term recovery resulting from curtailment
- Modeled median decline magnitude in each subarea used to generate target trajectory
- Envelope defined by specified percentiles of decline magnitude in each subarea



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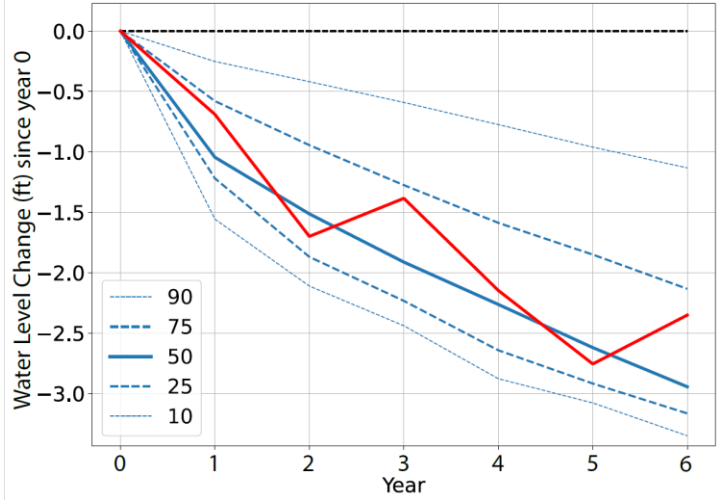
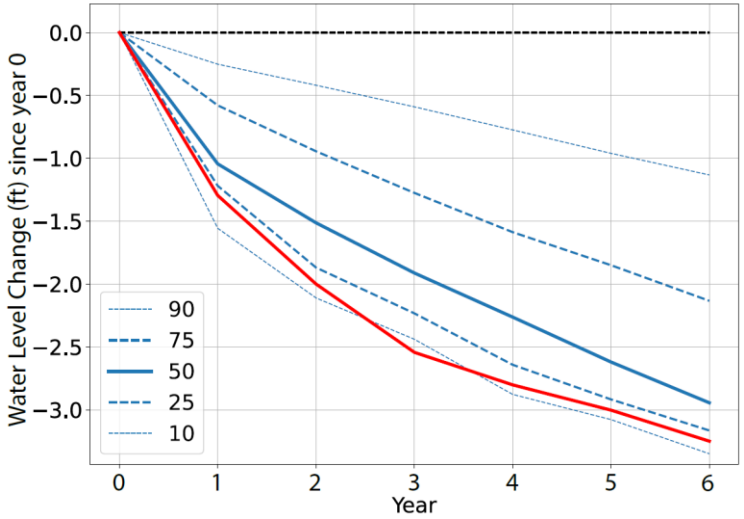
Deciding When to Adapt

Blue = modeled trajectory
Red = measured data

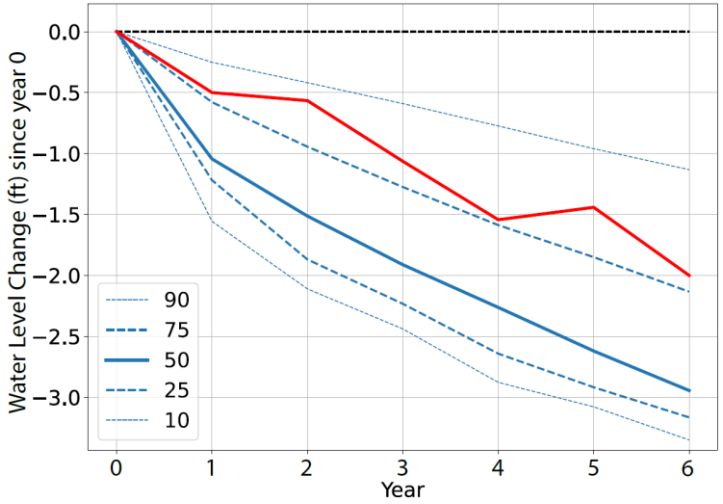
On track: continue scheduled curtailment



Behind schedule: increase curtailment



Ahead of schedule: decrease curtailment



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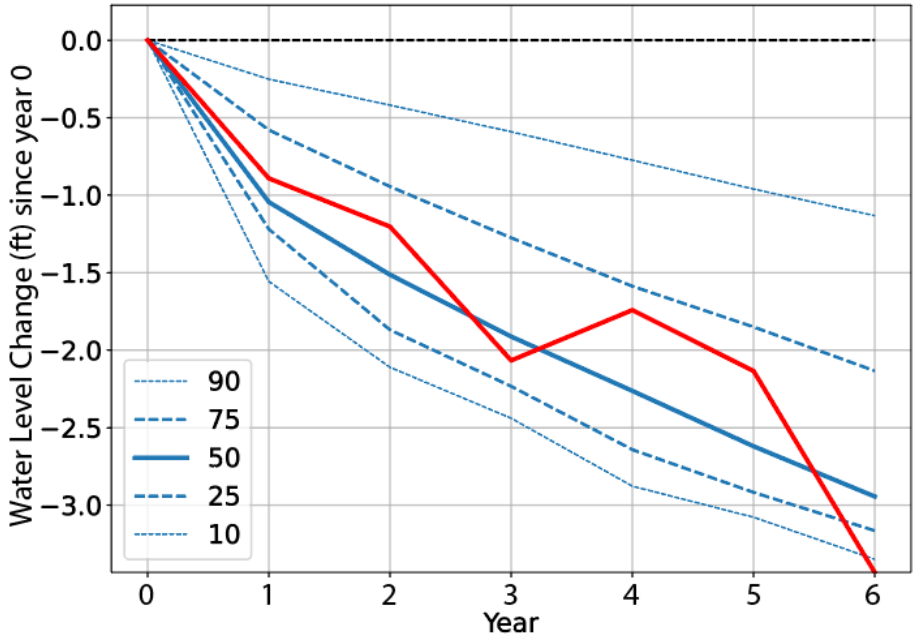
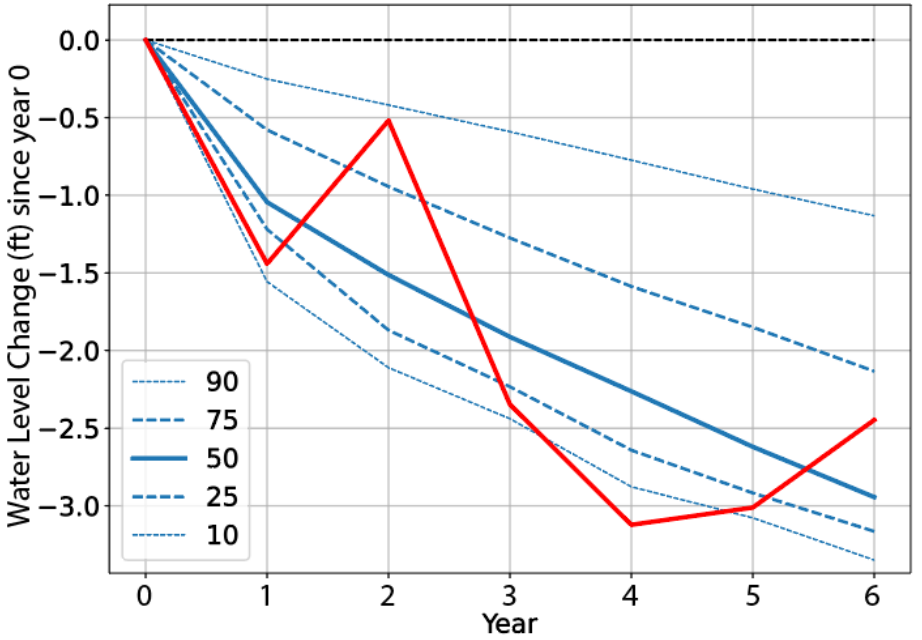
Deciding When to Adapt

Considering the preceding years



- On track years 1-5
- Below envelope year 6



- Below envelope 4/6 years
- Within envelope year 6

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Proposed Adaptation Plan

- Adapt every 6 years, adjusting the additional curtailment:
- If the current year's water level is:
  - Above the 90th percentile: -60%
  - Above the 75th percentile: -30%
  - Between 25th and 75th percentiles: no change
  - Below the 25th percentile: +30%
  - Below the 10th percentile: +60%
- And, if net (years above 75th) – (years below 25th) is:
  - 3 or more: -30%
  - -2 to 2: no change
  - -3 or less: +30%

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Input Requested

- How frequently should we check-in and adapt?
- What are the appropriate percentiles for defining the envelope?
- How much should we adapt when “off schedule”?
- How much should adaptation depend on the status in the check-in year (more responsive, less stable) vs. all preceding years (more stable, less responsive).

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Public Comment

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Break

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Exploring Model Behavior

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Exploring Model Behavior

Goals of Conversation

- Build a shared understanding of how and what we learned with model runs

Level of Participation

Inform

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Model Run Results for Five Management Scenarios

RAC 11/ Discussion Groups

- Discussed results
- Answered questions for results

In between meetings

- Model sensitivity runs based on questions and input

RAC 12

- Sensitivity runs results – what we learned

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What We Learned: Spatial Extent

- More subareas means generally larger PTW (less curtailment)

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What We Learned: Success Metric

- More stringent success metric (e.g. 80th percentile) means:
  - Higher final water levels
  - Smaller PTW (more curtailment)

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What We Learned: Timeline for Success

- Shorter timelines for success:
  - Results in higher final water levels
  - Results in smaller PTW (more reductions)
  - Provides less time for adaptive management

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What We Learned: Phased Reductions

- Shorter timelines for phasing reductions:
  - Result in higher final water levels
  - Result in larger natural discharge
  - Result in fewer dry wells
  - Leave less opportunity for adaptive management

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Model Insights

- Sensitivity of the results to…
  - 6 vs 7 subareas
  - Frequency of check-ins and adaption
  - Changes in long-term recharge

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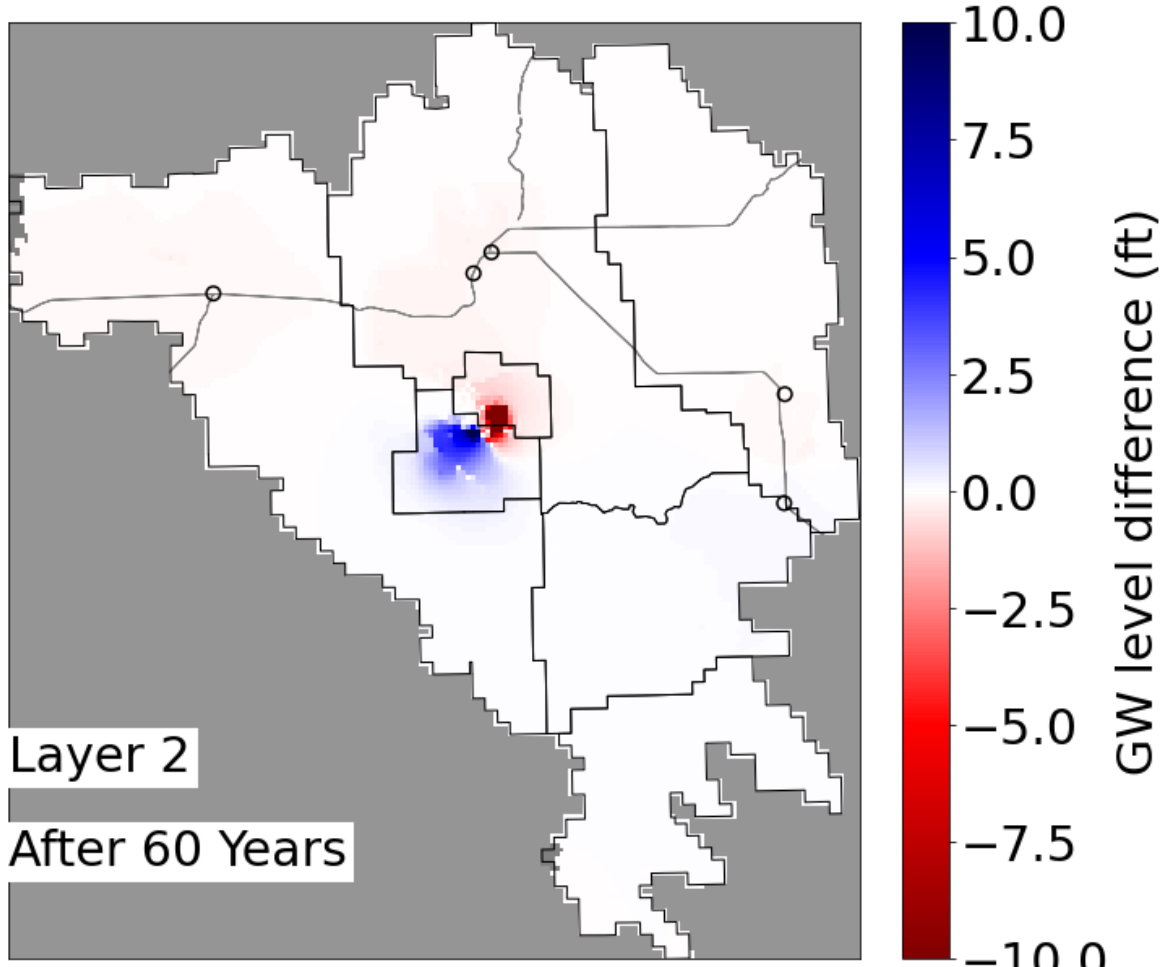
Impact of Splitting Weaver Springs from Dog Mountain

- To achieve durable stability in each subarea within 30 years, pumpage is greater in Dog Mountain and lesser in Weaver Springs:

PTW (kaf/yr) per Subarea	Combined Allocation	Separate Allocation
Dog Mountain	2.3	2.7
Weaver Springs	11.5	11.2

- Basin-wide pumpage is the same
- Groundwater levels decline more in Dog Mountain and less in Weaver Springs →



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Frequency of Reducing Pumpage

All scenarios:
- 1 subarea (GHVGAC)
- Maximize PTW to achieve durable stability after 30 years
- Phase in PTW over 18 years

Vary frequency of reducing pumpage, and get equivalent PTWs within the error of the optimization:

Frequency of Reducing Pumpage	Max PTW (kaf/yr)	% Reduction from 2018
3	92.8	32%
6	93.0	32%
9	92.9	32%

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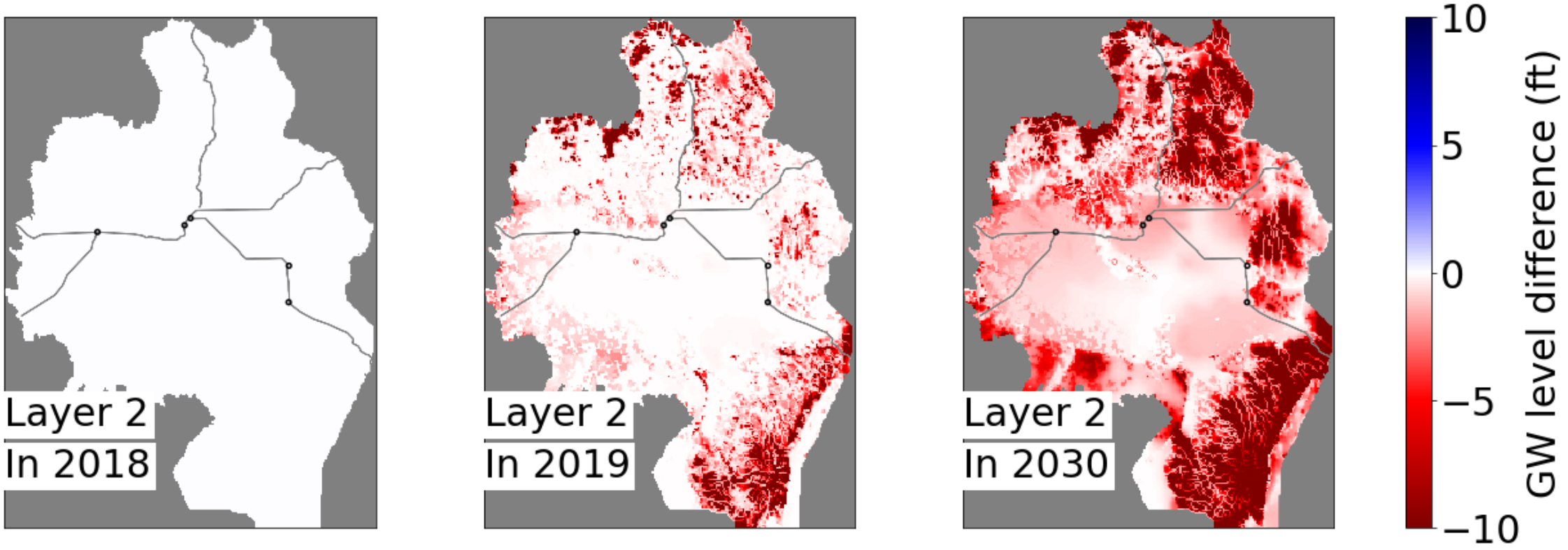
Recharge Reduced by 10%

Full pumpage through 2100



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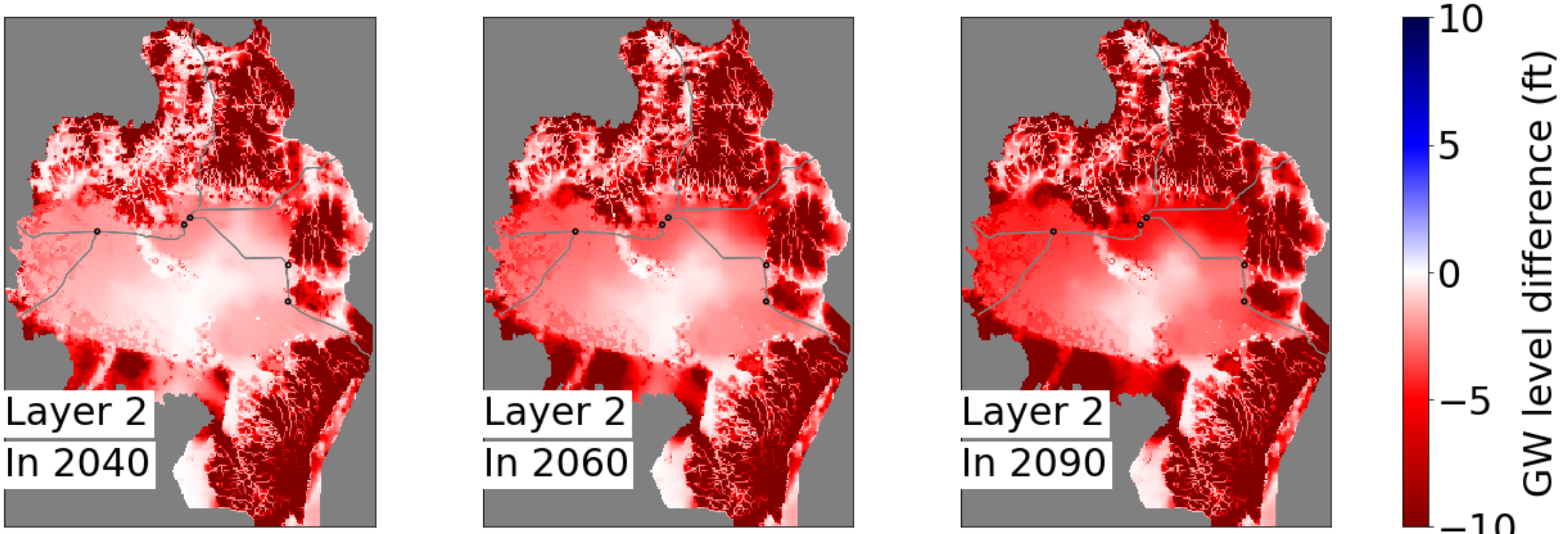
Recharge Reduced by 10%

Full pumpage through 2100



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Recharge Reduced by 10%

- Maximum PTWs that achieve durable stability after 30 years, with a 10-year phase-in:
  - 100% recharge: 93 kaf/yr
  - 90% recharge: 87 kaf/yr (6 kaf/yr lower)
- 10% reduction in recharge causes a 6% reduction in stable PTW. Expect the inverse would be true with a 10% increase.

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Summary of Sensitivity Analyses

- Splitting WS from DM and seeking independent stability in each redistributes some pumpage and declines from WS to DM
- Frequency of reducing pumpage has negligible impact on stable PTW
- Reducing recharge by 10% reduces stable PTW by 6%

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Criteria Survey Results

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Criteria to Inform Model Iterations

RAC 11

- Conducted criteria weighting exercise

In between meetings

- Developed 2 model scenarios using criteria results

RAC 12

- Present scenario results and what we learned

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Criteria Survey Results

- Using the survey data we applied some statistical methods to try and understand preferences
  - Principle component analysis
  - K-means clustering
- Two main profiles became apparent
  - Irrigation-Prioritized
    - Top priority: adhering to prior appropriation;
    - Middle priority: economic impact, adaptive management and voluntary agreements
    - Low priority: Achieving GW trends on time, domestic well impacts, natural discharge impacts
  - Conservation-Prioritized
    - Top priority: natural discharge impacts, domestic well impacts, and achieve GW trend on time
    - Middle priority: economic impact, adhering to prior appropriation
    - Low priority: voluntary agreements and adaptive management

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Incorporating Criteria Survey Results

- Based on the two profiles, OWRD staff designed a management scenario for each profile intended to:
  - Capture the preferences of each profile
  - Test the impact of success criteria on:
    - PTW
    - Final water levels
    - Natural discharge (springs, streamflow, and natural ET)
    - Domestic wells that lose access to water
- In both scenarios, optimization was run to identify the maximum amount of pumpage that could occur and achieve the desired outcomes.

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New Scenarios Reflect the Goals of Earlier Prescribed Scenarios

Goal of Earlier Scenarios	Which Scenarios?	Irrigation	Conservation
Groundwater levels	Stable (A, B, E), recovery (C, D)	Stable	Stable
Minimize economic impacts	A, B, C, D	Yes	Yes, with new constraints
Targeted reductions	A	No	6 subareas, but no targeting
Balanced reductions	B, C, D	N/A	Yes
Economic adjustment period	B, C	21 years	No
Impacts to ecosystems	C (minimize) D (recover)	No	Limit declines in natural evapotranspiration
Recovery to springs and surface flows	C (gradual), D (rapid)	No	Recovery* to springs and stream discharge.
Recovery to domestic wells	C (gradual), D (rapid)	No	Limit additional dry domestic wells.

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Criteria Based Management Scenarios

Parameter	Irrigation	Conservation
Spatial extent	1 subarea	6 subareas
Timeline to achieve goal	30 years	30 years
Phasing timeline	21 years	0 years (full in first year)
Pumpage reduction step	Every 3 years	N/A
Stability success metric	Median (50th percentile)	Median (50th percentile)
Spring & stream discharge	No limit	> 80-120% of 2022 discharge
Natural evapotranspiration	No limit	> 80% of 2018 rates
Domestic wells going dry	No limit	< 130% of 2018 counts

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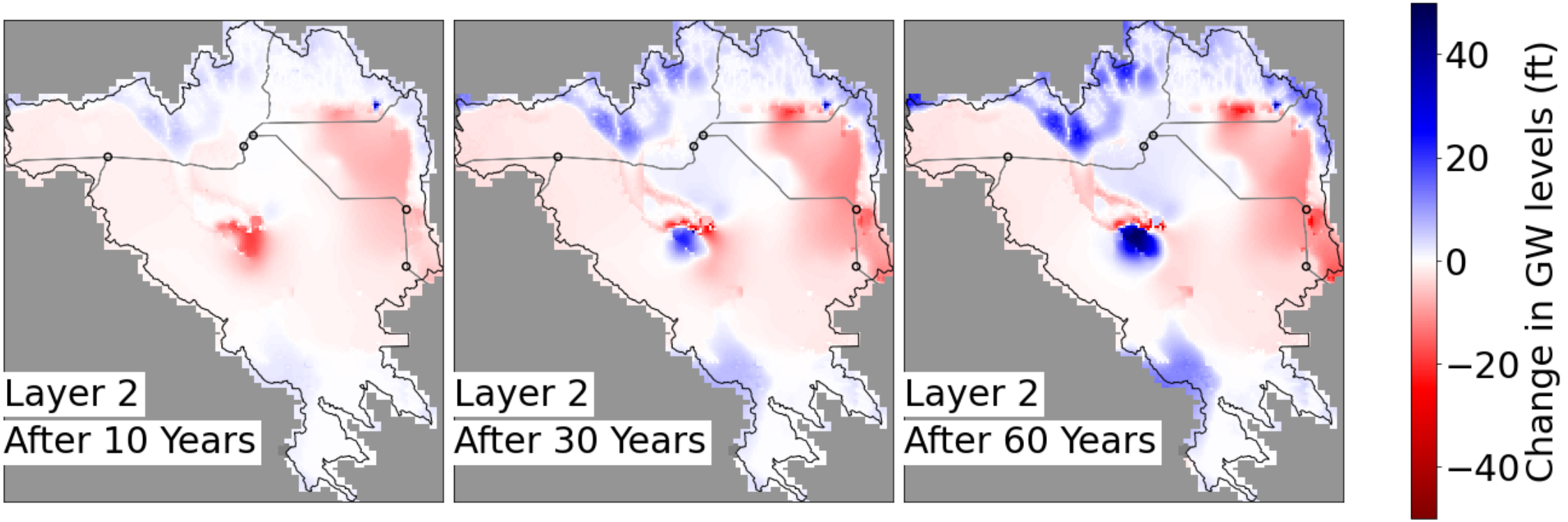
Irrigation-Prioritized Scenario Results



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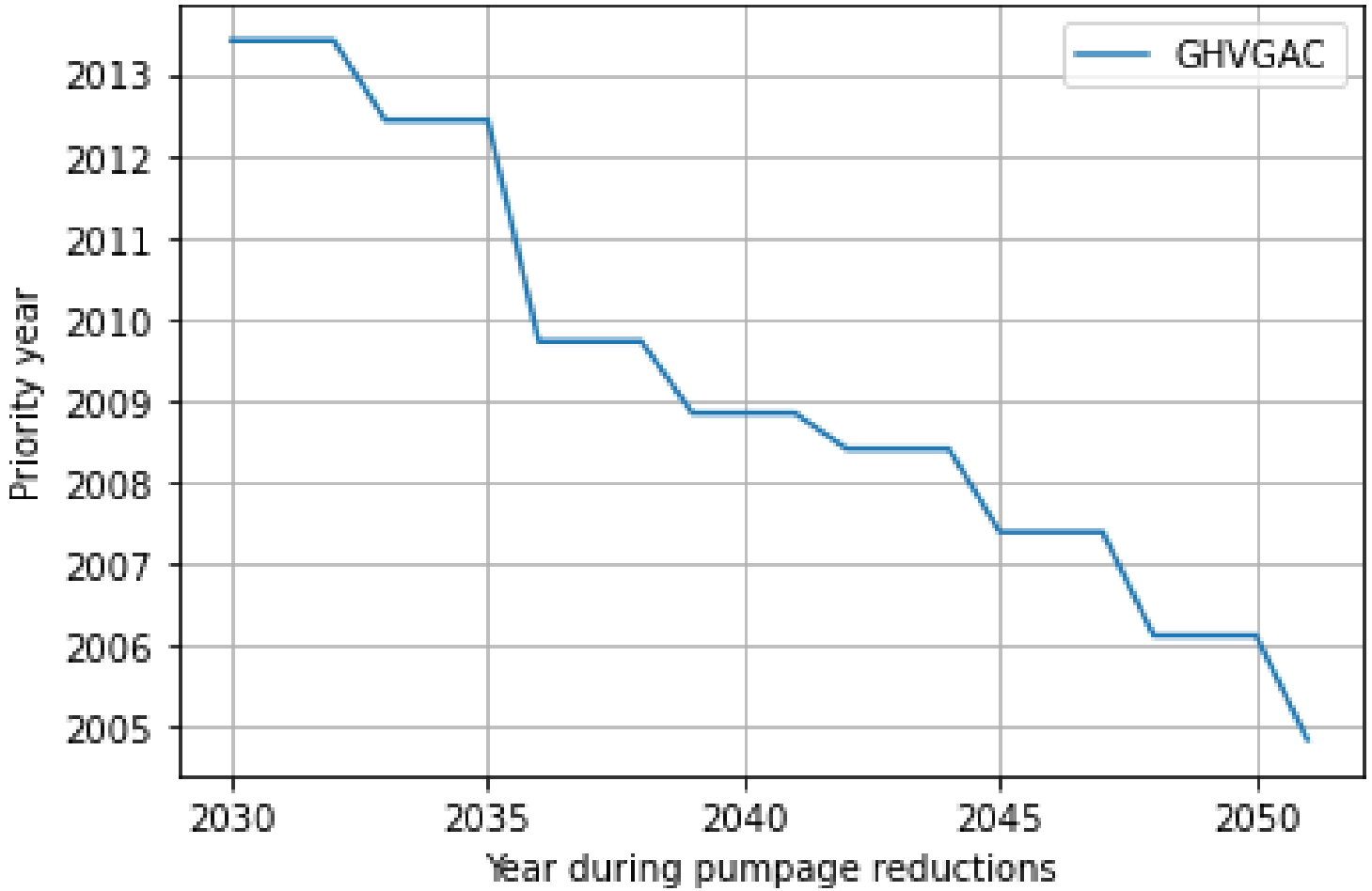
Which Water Rights Would Continue to be Allocated Water?

Priority year indicates the cutoff between rights that are curtailed or not



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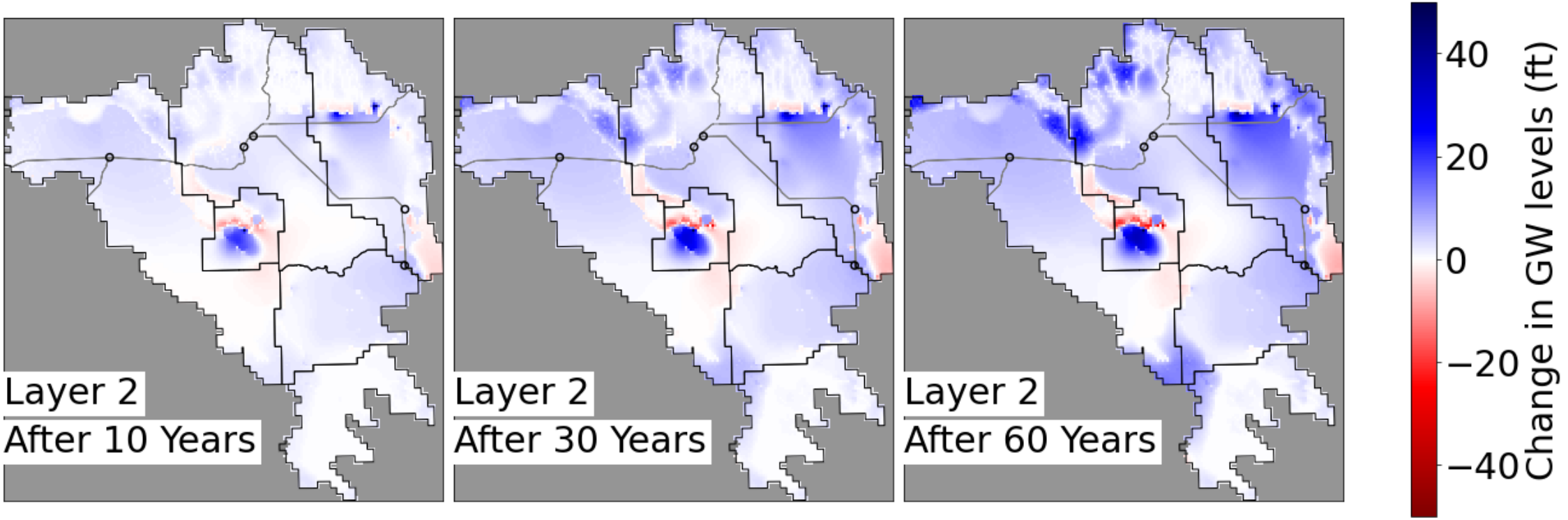
Conservation-Prioritized Scenario Results



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Conservation-Prioritized Scenario Results

- PTW limited by different goals in different subareas:
  - Lowland streams and springs (>= 120*% of 2022 rate):
    - Silver Creek (Double O), Lower Blitzen – Voltage, Silvies
  - Lowland evapotranspiration (>= 80% of 2018 rate):
    - Northeast - Crane
  - Dry wells (<= 130% of 2018 count)
    - Dog Mountain

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Comparison of Results between Irrigation and Conservation Prioritization

Attribute	Irrigation	Conservation
Final PTW (kaf/yr)	94.7	71.3
Change in pumpage from 2018 (kaf/yr)	-41.8	-65.2
Percent change in pumpage from 2018	-31%	-48%
Median water level change from 2018 (ft)	-5.9	+0.8
Median water level change from 2030 (ft)	-1.5	+4.9
Change in lowland springs & streams (% of 2022)	-15%	+3%
Change in Double O area spring flow (% of 2022)	-67%	+22%
Change in Lowland natural evapotranspiration (% of 2018)	-31%	-5%
Change in dry well count (% of 2018)	+53%	+1%
Change in dry well count (# vs. 2018)	+42	+5

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Changes in Pumpage Since 2018

Subarea	2018 Pumpage (kaf/yr)	Irrigation Change (%)	Conservation Change (%)
Dog Mountain	4.6	-53%	-56%
Lower Blitzen - Voltage	13.7	-25%	-61%
Northeast-Crane	53.0	-29%	-45%
Silver Creek	21.0	-24%	-61%
Silvies	24.9	-12%	-23%
Upper Blitzen	0.08	0%	0%
Weaver Springs	19.2	-60%	-50%
Overall	136.5	-31%	-48%

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Changes in Water Levels From 2018 to 2098

Subarea	Irrigation Median Change (ft)	Conservation Median Change (ft)
Dog Mountain	-1.2	0.7
Lower Blitzen - Voltage	-9.0	0.4
Northeast-Crane	-20.3	0
Silver Creek	-6.7	+2.1
Silvies	+0.5	+2.7
Upper Blitzen	0	0
Weaver Springs	-4.1	-8.7
Overall	-5.9	+0.8

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Changes in Lowland Streams & Spring Discharge From 2022 to 2098

Subarea	2022 Discharge (kaf/yr)	Irrigation Change (%)	Conservation Change (%)
Dog Mountain	0	N/A	N/A
Lower Blitzen - Voltage	3.3	-12%	+20%
Northeast-Crane	2.0	-12%	+13%
Silver Creek	11.7	-29%	-5%
Springs around Double O	2.4	-67%	+22%
Silvies	3.2	+4%	+36%
Upper Blitzen	10.4	-7%	-6%
Weaver Springs	0	N/A	N/A
Overall	30.6	-15%	+3%

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Percent Changes in Lowland Natural Evapotranspiration From 2018 to 2098

Subarea	2018 ET (kaf/yr)	Irrigation Change (%)	Conservation Change (%)
Dog Mountain	0.3	-7%	+16%
Lower Blitzen - Voltage	4.8	-37%	0%
Northeast-Crane	2.0	-86%	-18%
Silver Creek	17.9	-29%	-13%
Silvies	21.8	-29%	+3%
Upper Blitzen	1.5	-7%	-7%
Weaver Springs	0.7	-32%	-31%
Overall	49.0	-31%	-5%

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Changes in Dry Wells From 2018 to 2098

Subarea	2018 count	Irrigation Change (#)	Conservation Change (#)
Dog Mountain	5	+3	+2
Lower Blitzen - Voltage	7	+5	0
Northeast-Crane	29	+32	+1
Silver Creek	4	0	0
Silvies	24	+1	-1
Upper Blitzen	1	0	0
Weaver Springs	13	+1	+3
Overall	83	+42	+5

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Lunch

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Department Proposed Management Scenario

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Department Proposed Management Scenario

Goals of Conversation

- Present the proposed management scenario and gather feedback.

Level of Participation

Consult/involve

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Proposed Management Scenario

RACs 2 -5

- Proposed 15 subarea scenario
- Curtailment in 6 high priority subareas

In between meetings

- Harney Basin Groundwater Model published
- start using model to better our understanding of how the system will react

RAC 12

- Present new proposed management scenario and take input

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Proposed Management Parameters

Parameter	Proposed Management Scenario
Spatial extent	7 subareas
Stability success metric	Median (50th percentile) of well-cells
Timeline to achieve goal	30 years
Phasing timeline	24 years
Frequency of adaption	Every 6 years
Discharge to streams and springs	At least 50-70% of 2022 rates
Natural evapotranspiration	At least 60% of 2018 rates
Dry domestic wells	No more than 170% of 2018 counts

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Comparison of Proposal Results

Attribute	Irrigation	WRD Proposal	Conservation
Final PTW (kaf/yr)	94.7	82.8	71.3
Change in pumpage from 2018 (kaf/yr)	-41.8	-53.7	-65.2
Percent change in pumpage from 2018	-31%	-38%	-48%
Median water level change from 2018 (ft)	-5.9	-2.2	+0.8
Median water level change from 2030 (ft)	-1.5	+1.2	+4.9
Change in lowland spring & streamflow (% of 2022)	-15%	-9%	+3%
Change in Double O area spring flow (% of 2022)	-67%	-30%	+22%
Change in lowland natural ET (% of 2018)	-31%	-29%	-5%
Change in dry well count (% of 2018)	+53%	+24%	+1%
Change in dry well count (# vs. 2018)	+42	+19	+5

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Proposed Management Scenario Results

Subarea	PTW (kaf/yr)	Change (% of 2018)	Limiting Constraint
Dog Mountain	2.2	-55%	Dry wells
Lower Blitzen - Voltage	9.2	-32%	Dry wells
Northeast-Crane	26.3	-48%	Natural ET
Silver Creek	11.5	-45%	Springs & streams
Silvies	24.8	0%	Stabilize declines
Upper Blitzen	0.08	0	2018 pumpage
Weaver Springs	10.4	-49%	Natural ET
Overall	84.5	-38%	

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Proposed Management Scenario Results: Percent Changes by Subarea

Subarea	Pumpage (% vs 2018)	Lowland Spring & Stream (% vs 2022)	Lowland Natural ET (% vs 2018)	Dry Wells (# vs 2018)
Dog Mountain	-55%	N/A	-27%	+3
Lower Blitzen - Voltage	-32%	-5%	-25%	+5
Northeast-Crane	-48%	+13%	-47%	+5
Silver Creek	-45%	-21%	-23%	0
Springs around Double O	N/A	-31%	N/A	+1
Silvies	0	0	-28%	0
Upper Blitzen	0	-7%	-7%	+5
Weaver Springs	-49%	N/A	-40%	+19
Overall	-38%	-11%	-26%	+3

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Changes in Pumpage Since 2018

Subarea	2018 Pumpage (kaf/yr)	Irrigation Change (%)	WRD Proposal Change (%)	Conservation Change (%)
Dog Mountain	4.6	-53%	-55%	-56%
Lower Blitzen - Voltage	13.7	-25%	-32%	-61%
Northeast-Crane	53.0	-29%	-48%	-45%
Silver Creek	21.0	-24%	-45%	-61%
Silvies	24.9	-12%	0	-23%
Upper Blitzen	0.08	0	0	0
Weaver Springs	19.2	-60%	-49%	-50%
Overall	136.5	-31%	-38%	-48%

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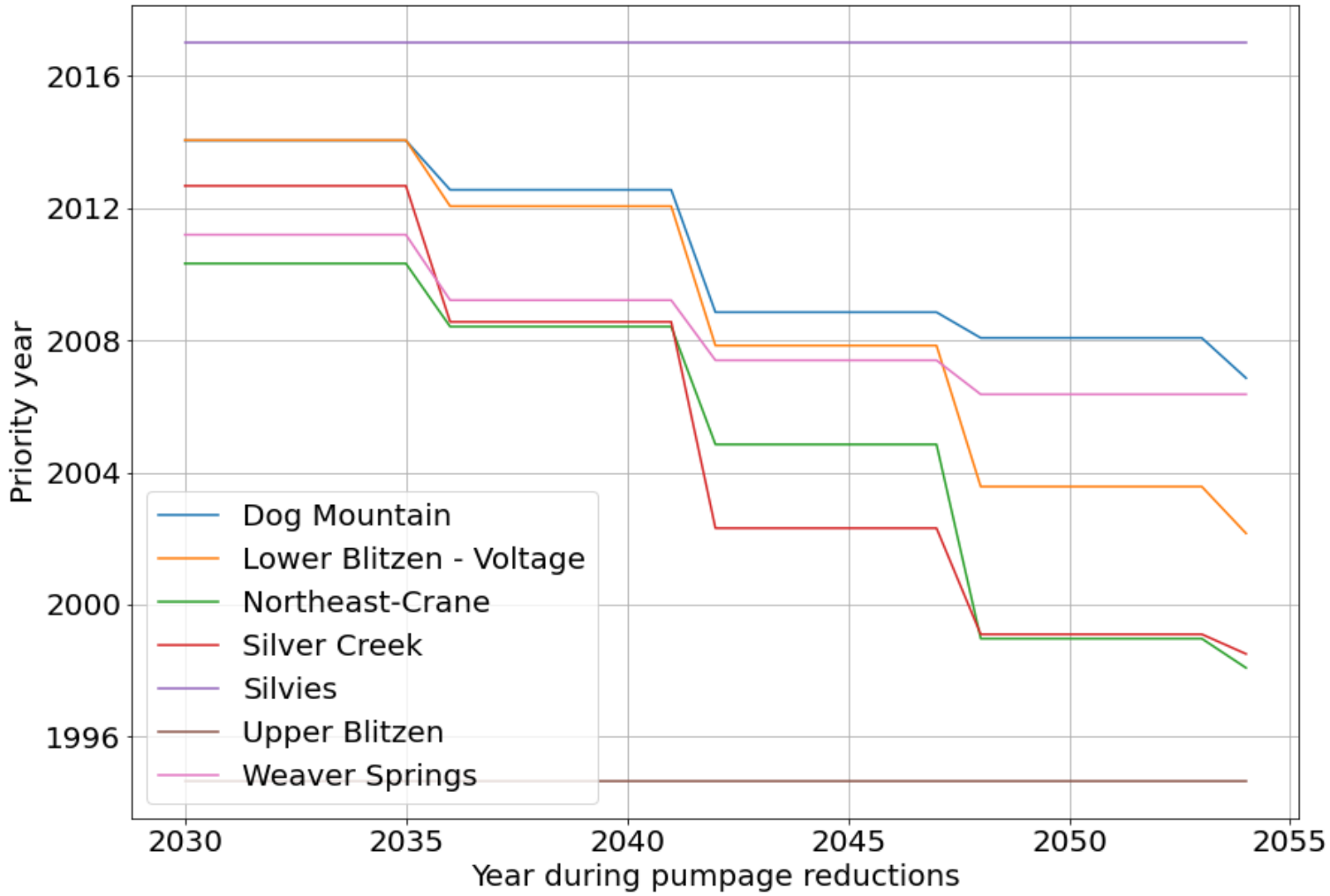
Which Water Rights Would Continue to be Allocated Water?

Priority year indicates the cutoff between rights that are curtailed or not



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Median Changes in Water Levels From 2018 to 2098 (feet)

Subarea	Irrigation	WRD Proposal	Conservation
Dog Mountain	-1.2	-3.7	0.7
Lower Blitzen - Voltage	-9.0	-5.4	0.4
Northeast-Crane	-20.3	-3.1	0
Silver Creek	-6.7	-1.9	+2.1
Silvies	+0.5	-1.2	+2.7
Upper Blitzen	0	0	0
Weaver Springs	-4.1	-20.0	-8.7
Overall	-5.9	-2.2	+0.8

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Changes in Lowland Streams & Spring Discharge From 2022 to 2098

Subarea	2022 Discharge (kaf/yr)	Irrigation Change (%)	WRD Proposal Change (%)	Conservation Change (%)
Dog Mountain	0	N/A	N/A	N/A
Lower Blitzen - Voltage	3.3	-12%	-5%	+20%
Northeast-Crane	2.0	-12%	+13%	+13%
Silver Creek	11.7	-29%	-21%	-5%
Springs around Double O	2.4	-67%	-31%	+22%
Silvies	3.2	+4%	0	+36%
Upper Blitzen	10.4	-7%	-7%	-6%
Weaver Springs	0	N/A	N/A	N/A
Overall	30.6	-15%	-11%	+3%

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Amended Changes in Lowland Natural Evapotranspiration From 2018 to 2098

Subarea	2018 ET (kaf/yr)	Irrigation Change (%)	WRD Proposal Change (%)	Conservation Change (%)
Dog Mountain	0.3	-7%	-23%	+16%
Lower Blitzen - Voltage	4.8	-37%	-24%	0%
Northeast-Crane	2.0	-86%	-40%	-18%
Silver Creek	17.9	-29%	-23%	-13%
Silvies	21.8	-29%	-28%	+3%
Upper Blitzen	1.5	-7%	-7%	-7%
Weaver Springs	0.7	-32%	-40%	-31%
Overall	49.0	-31%	-26%	-5%

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The numbers presented in the highlighted cells in the RAC meeting were for the closest-fit model run but do not perfectly meet the constraints. Those are saved in the Original slide below. Updated numbers shown here are interpolated to meet the constraints, especially in Northeast-Crane.

Changes in Dry Wells From 2018 to 2098

Subarea	2018 count	Irrigation Change (#)	WRD Proposal Change (#)	Conservation Change (#)
Dog Mountain	5	+3	+3	+2
Lower Blitzen - Voltage	7	+5	+5	0
Northeast-Crane	29	+32	+5	+1
Silver Creek	4	0	0	0
Silvies	24	+1	+1	-1
Upper Blitzen	1	0	0	0
Weaver Springs	13	+1	+5	+3
Overall	83	+42	+19	+5

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Sensitivity to Different Constraints for Proposed Scenario

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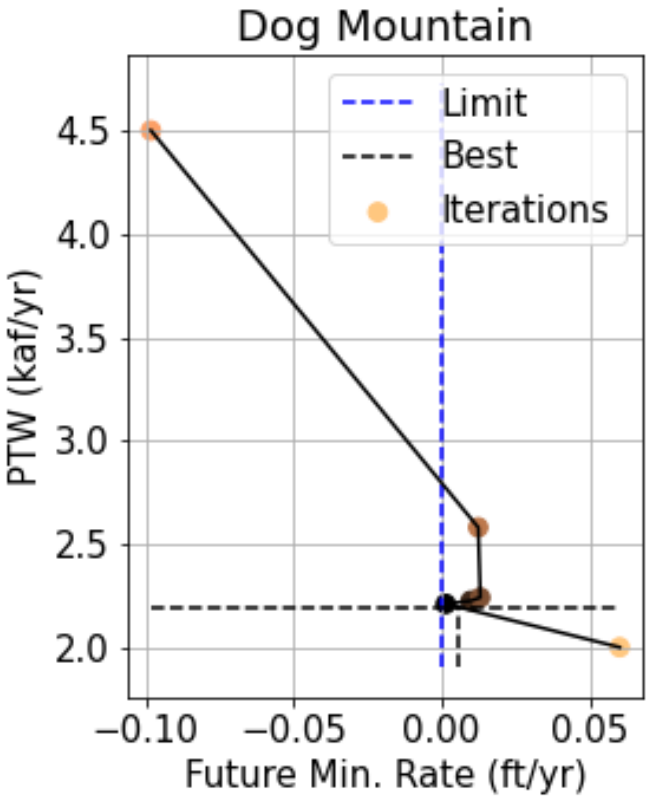
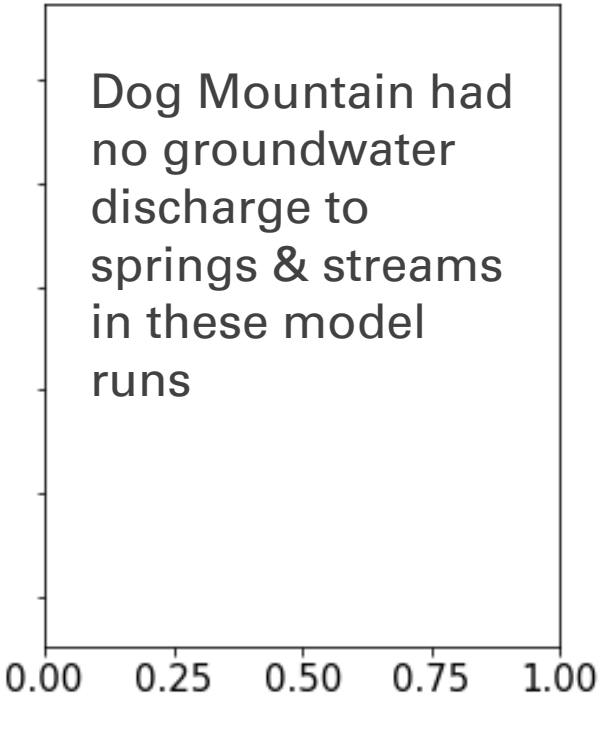
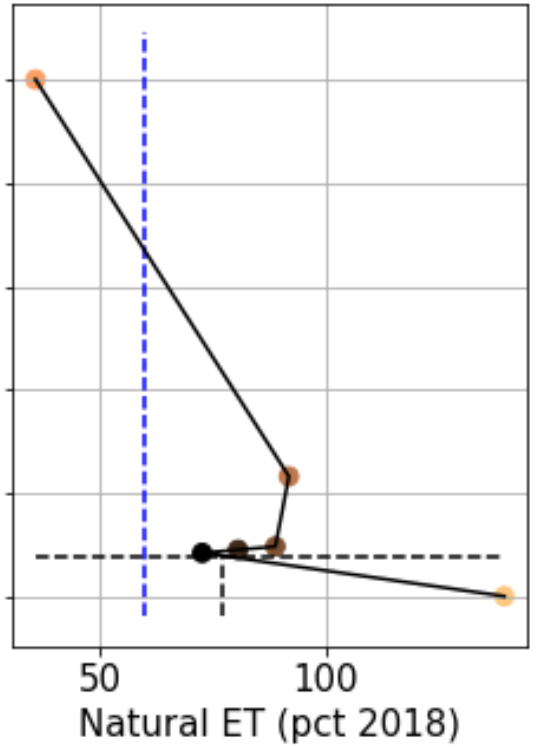
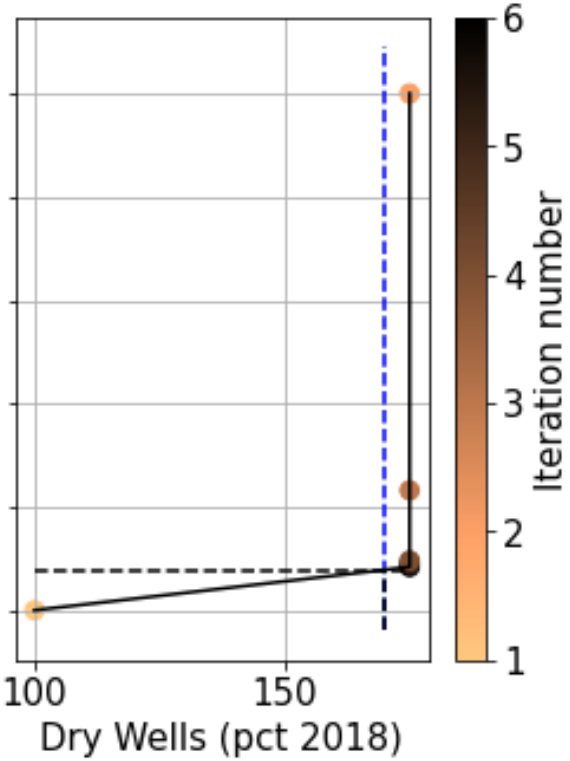
Dog Mountain
Limited by Dry Wells





Dog Mountain had no groundwater discharge to springs & streams in these model runs





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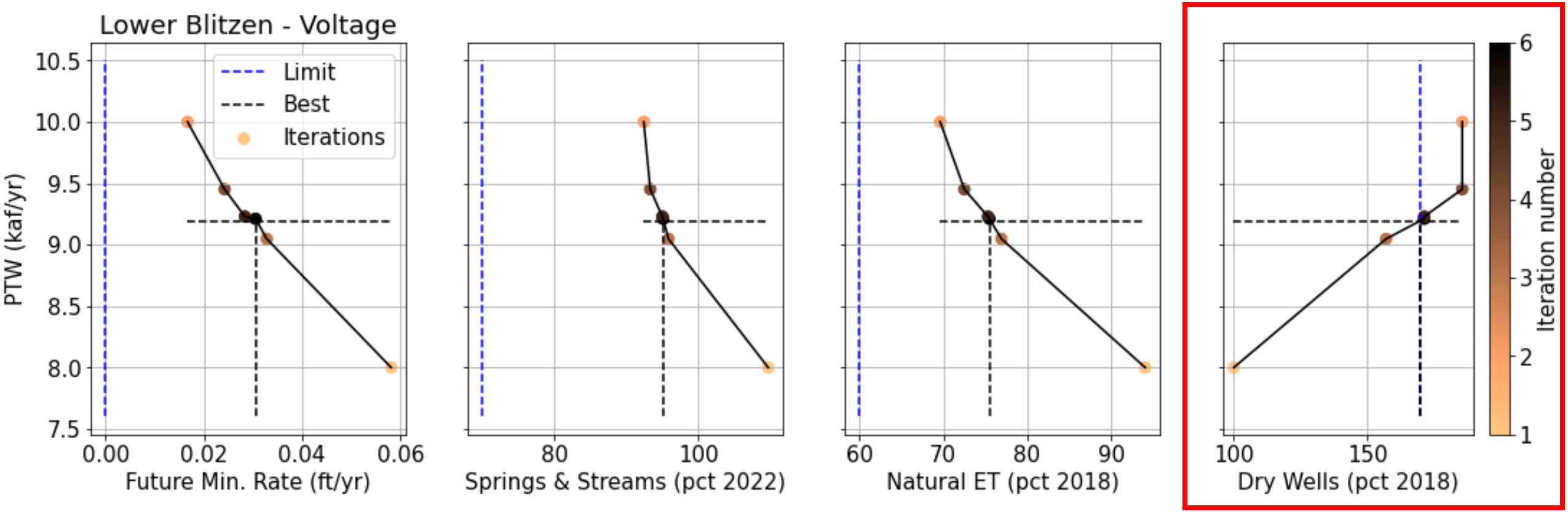
Lower Blitzen – Voltage Limited by Dry Wells



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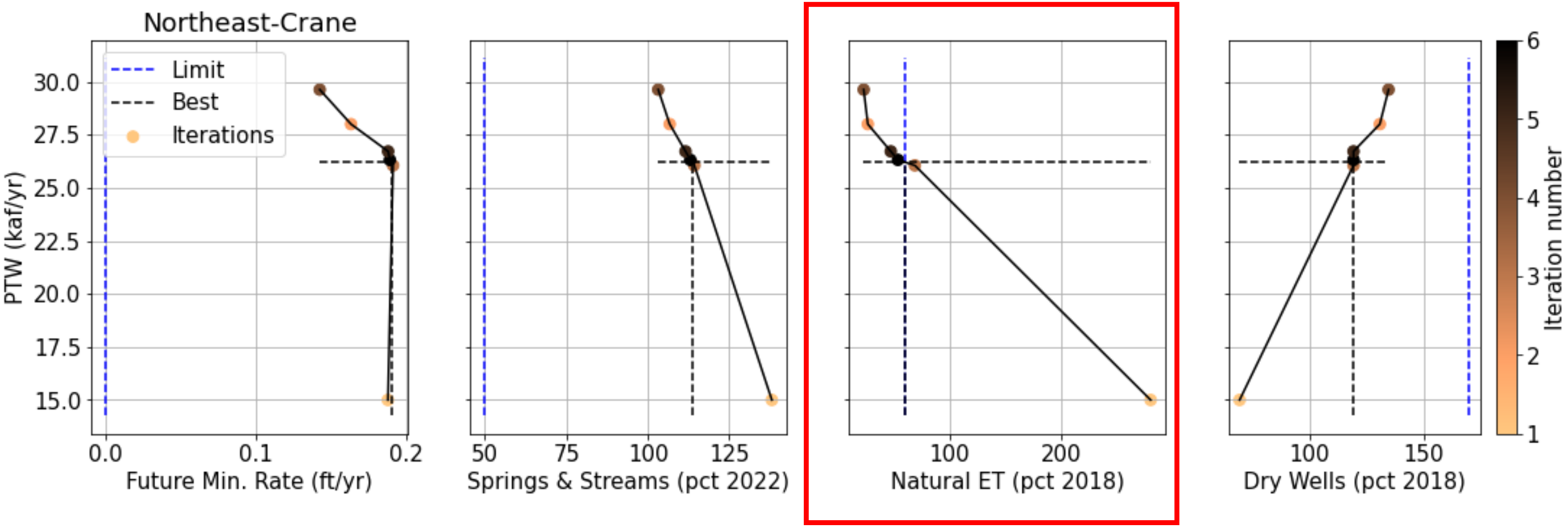
Northeast - Crane
Limited by Natural Evapotranspiration



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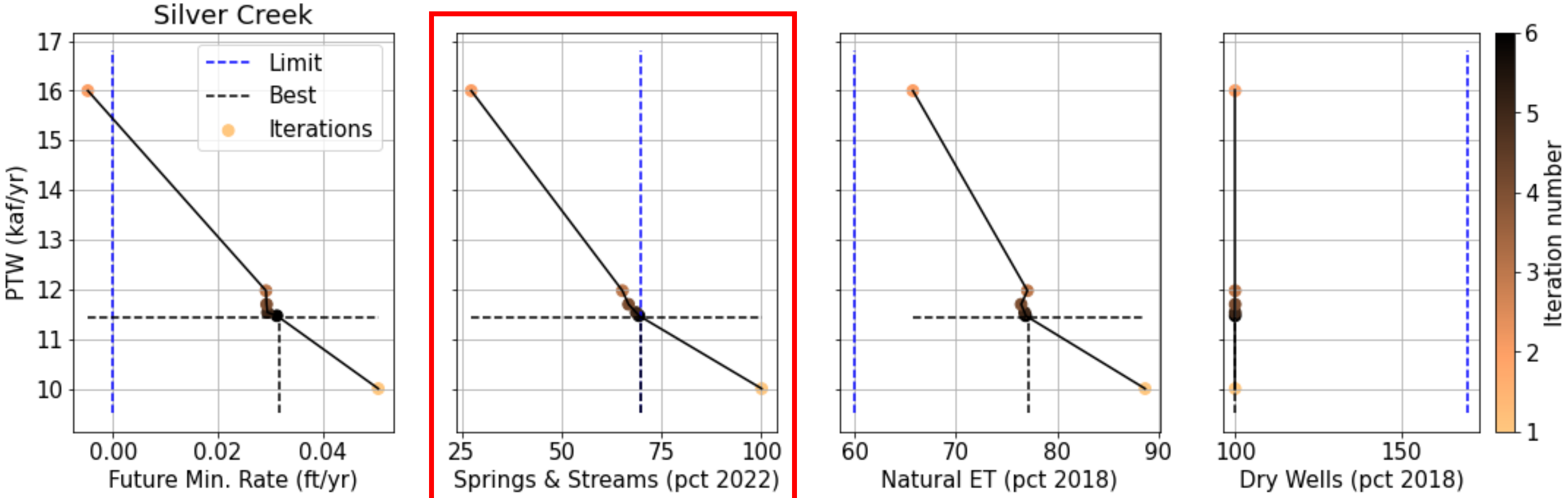
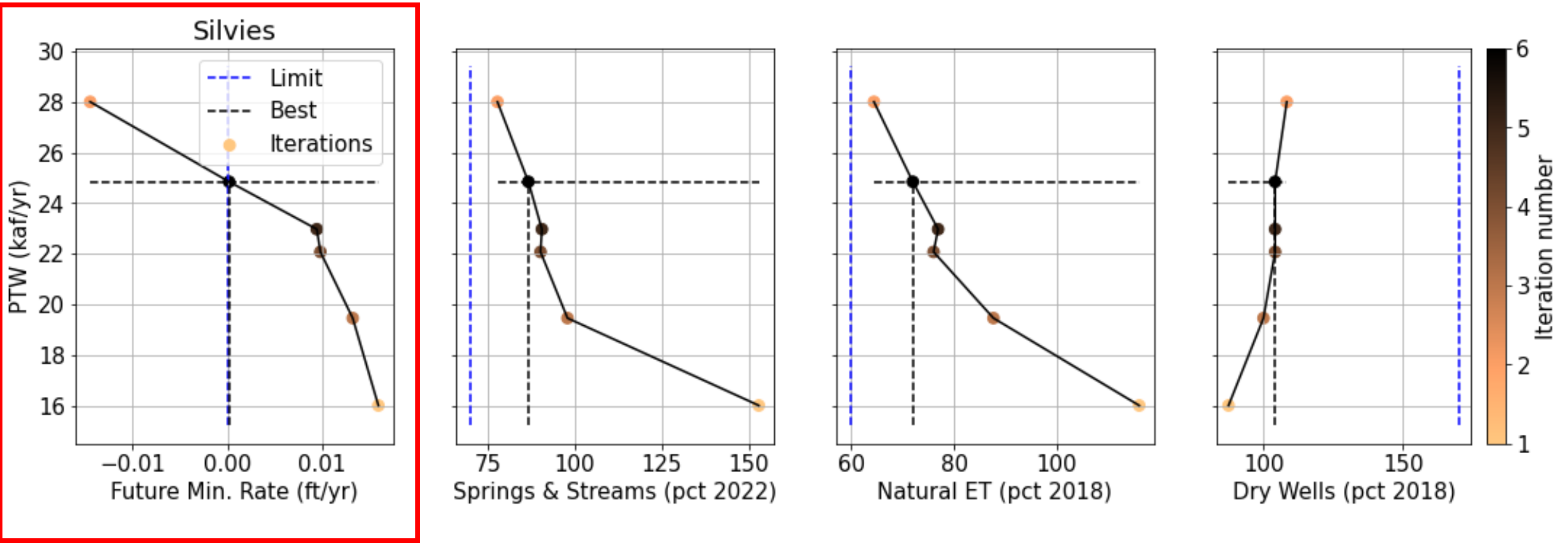
Silver Creek
Limited by Springs & Streams (Double O)



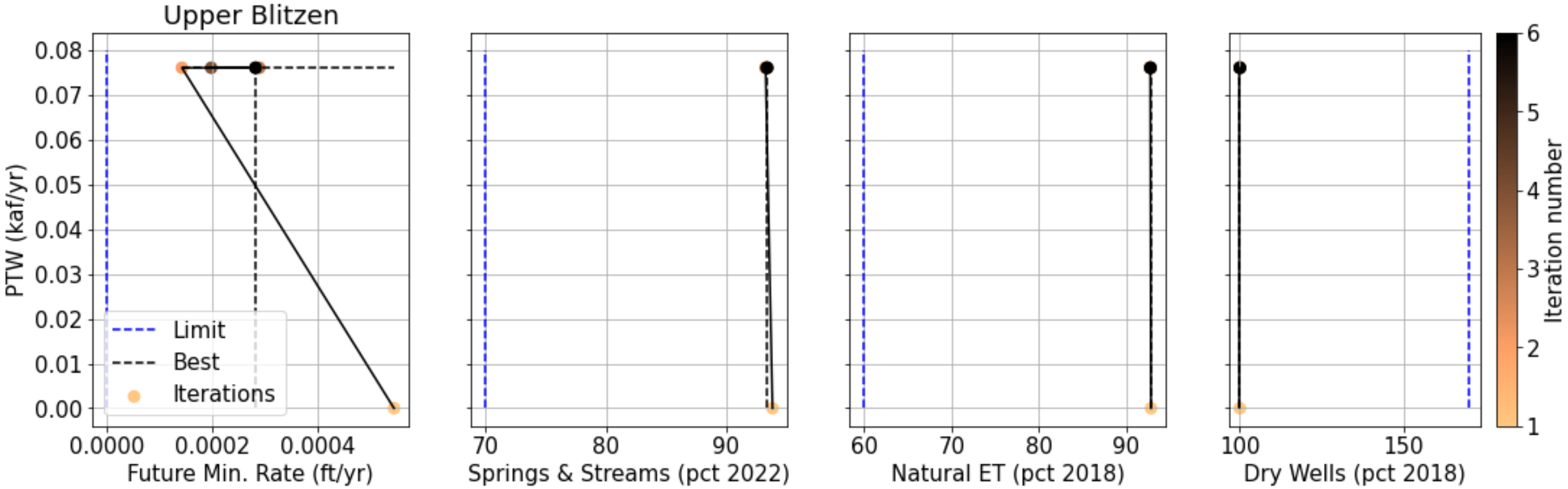
For Silver Creek, groundwater discharge to springs and streams was evaluated in the area around Double O Spring for the purposes of constraining PTW.

Silvies
Limited by Stabilizing Rate of Decline



For Silvies, groundwater discharge to springs and streams was evaluated in the area south of highway 78 for the purposes of constraining PTW.

Upper Blizen
Limited by 2018 Pumpage



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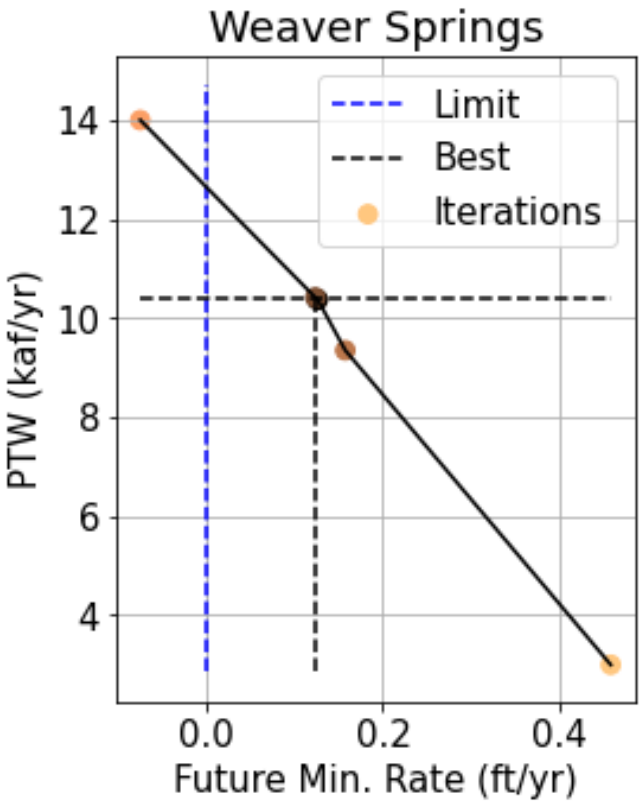
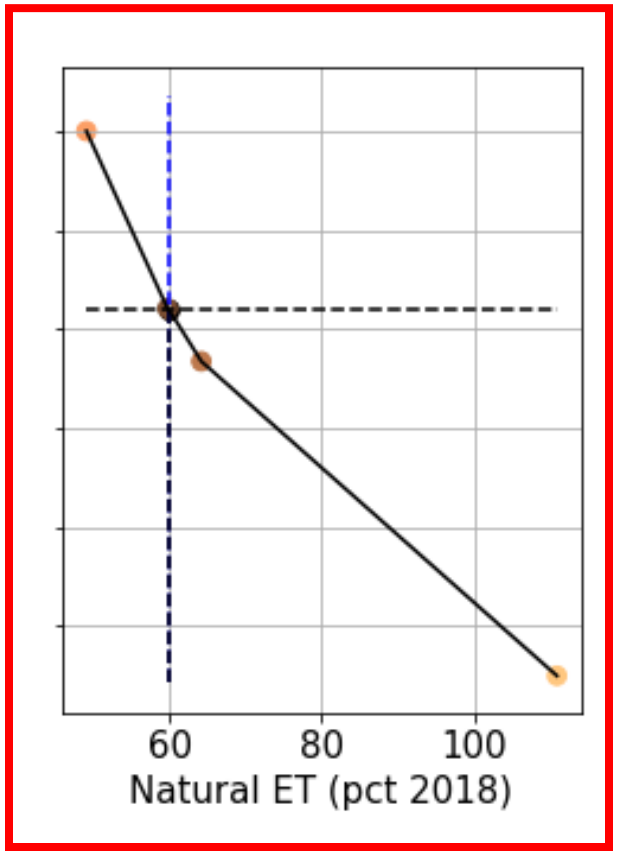
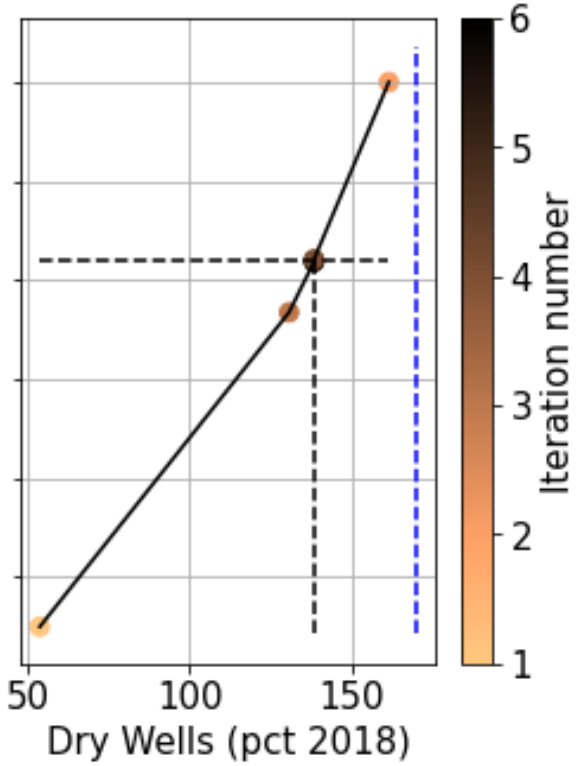
Weaver Springs
Limited by Natural Evapotranspiration



Weaver Springs had no groundwater discharge to springs & streams in these model runs





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Adaptive Management Trajectories for Proposed Scenario

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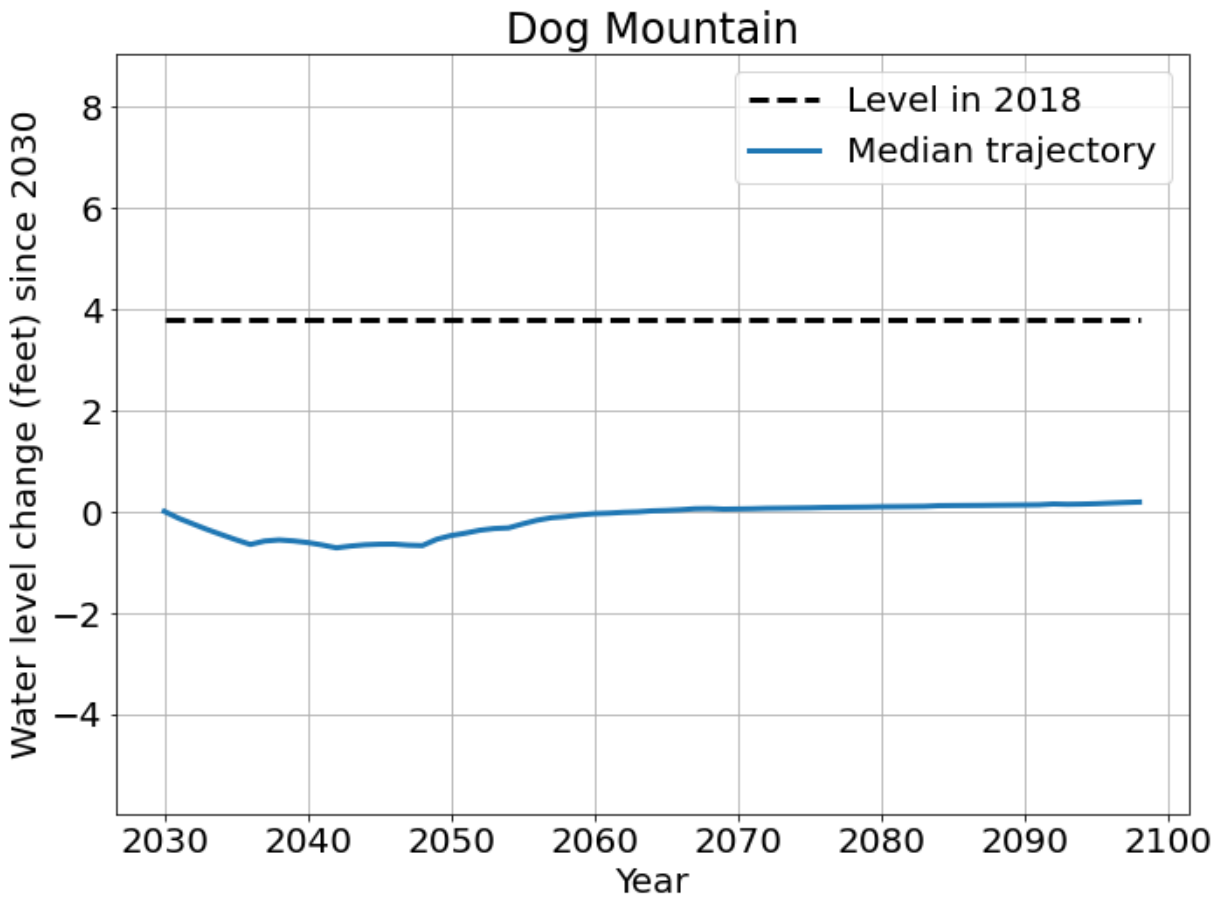
Dog Mountain



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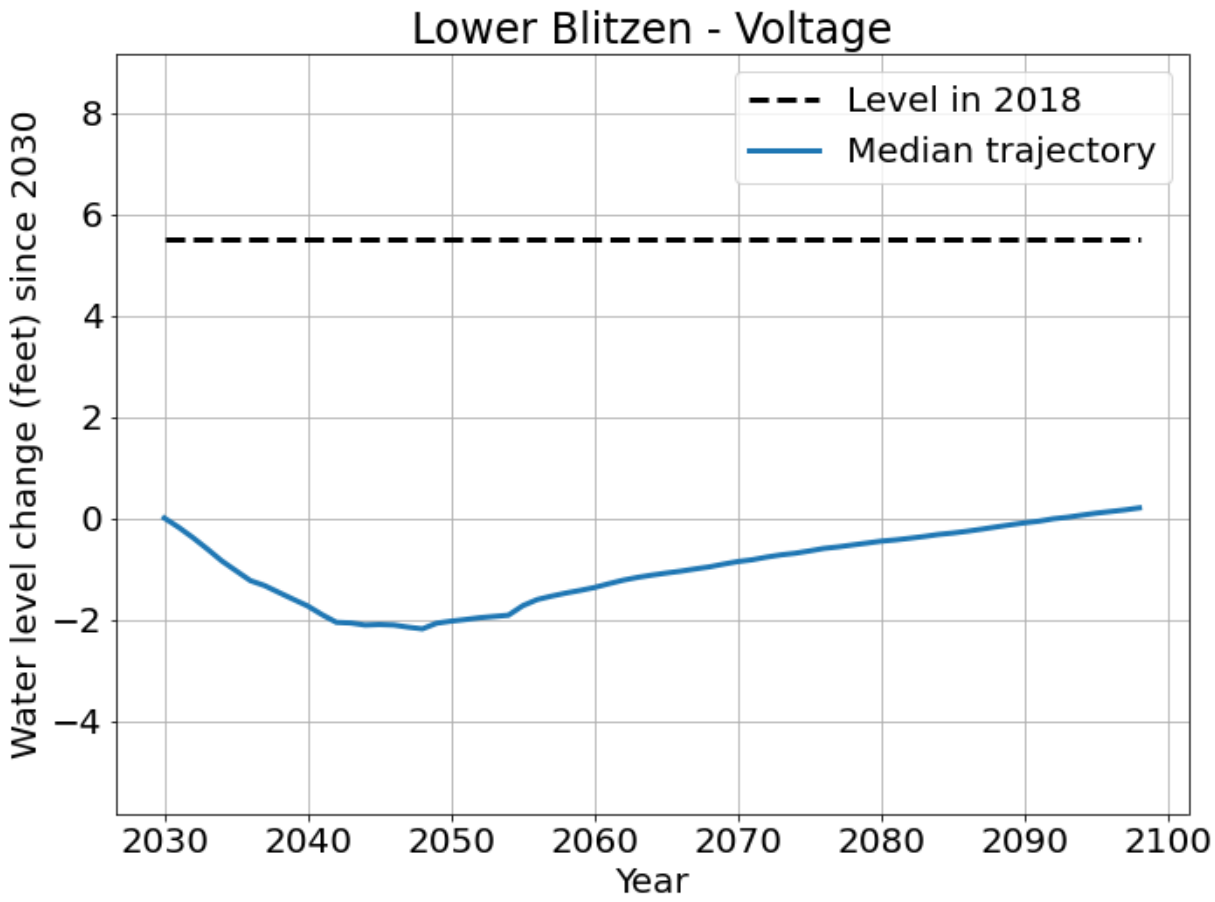
Lower Blitzen – Voltage



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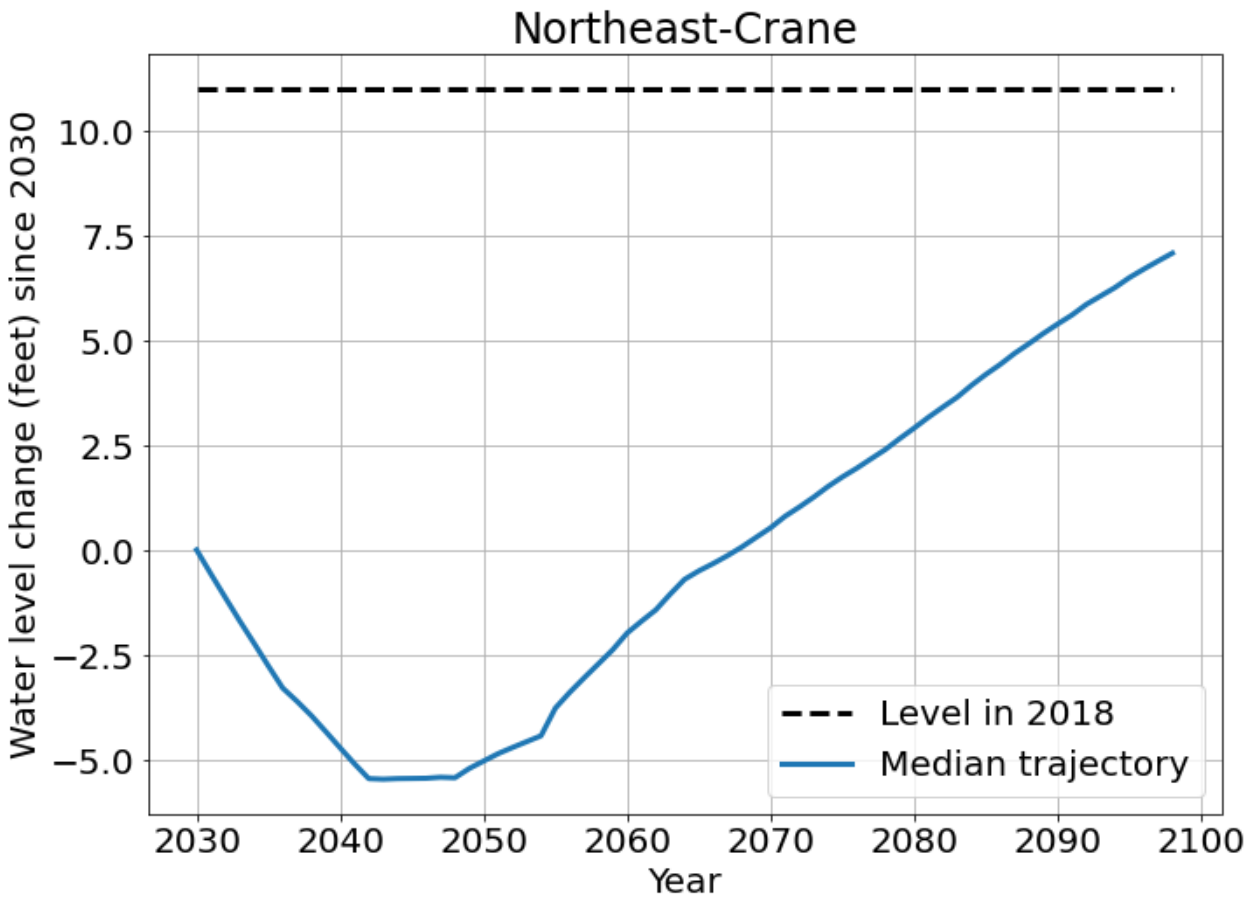
Northeast-Crane



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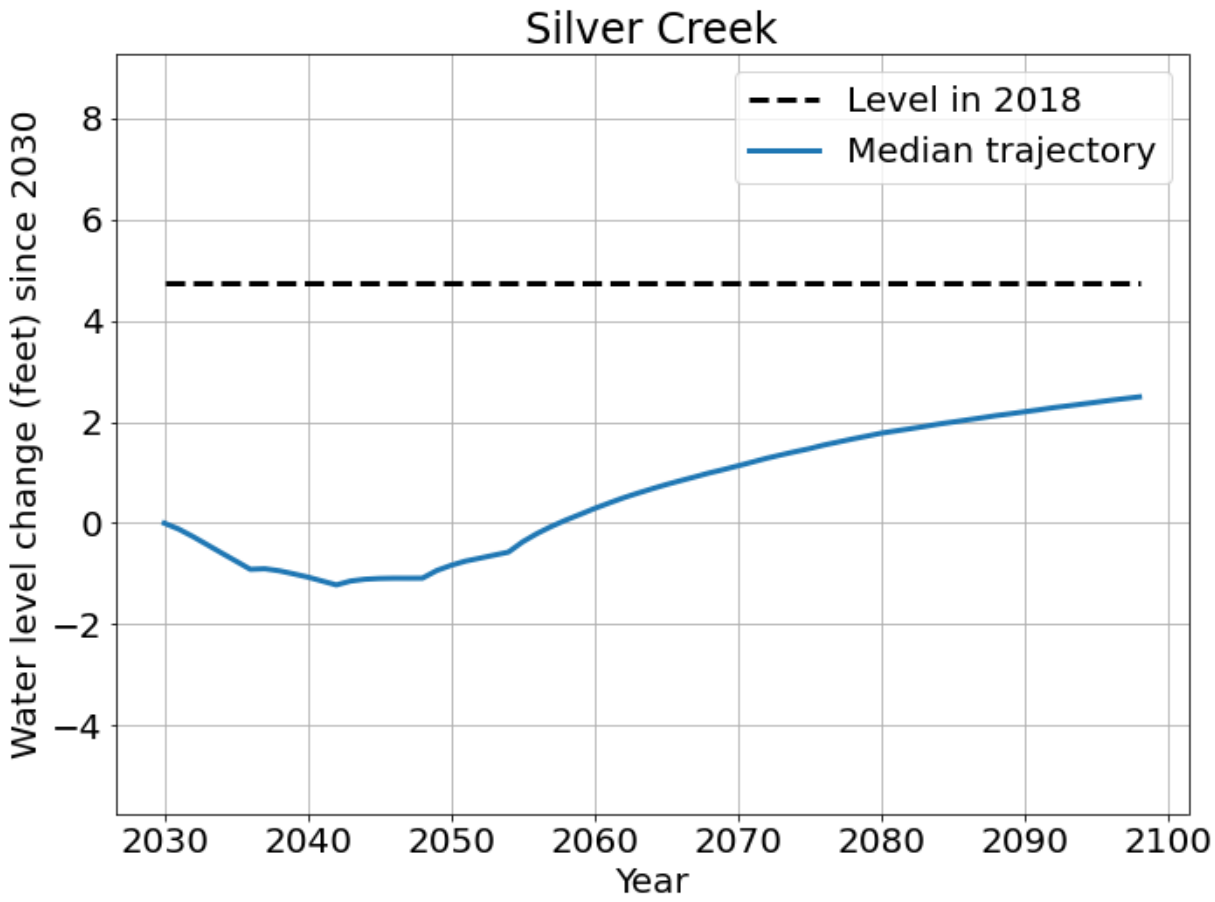
Silver Creek



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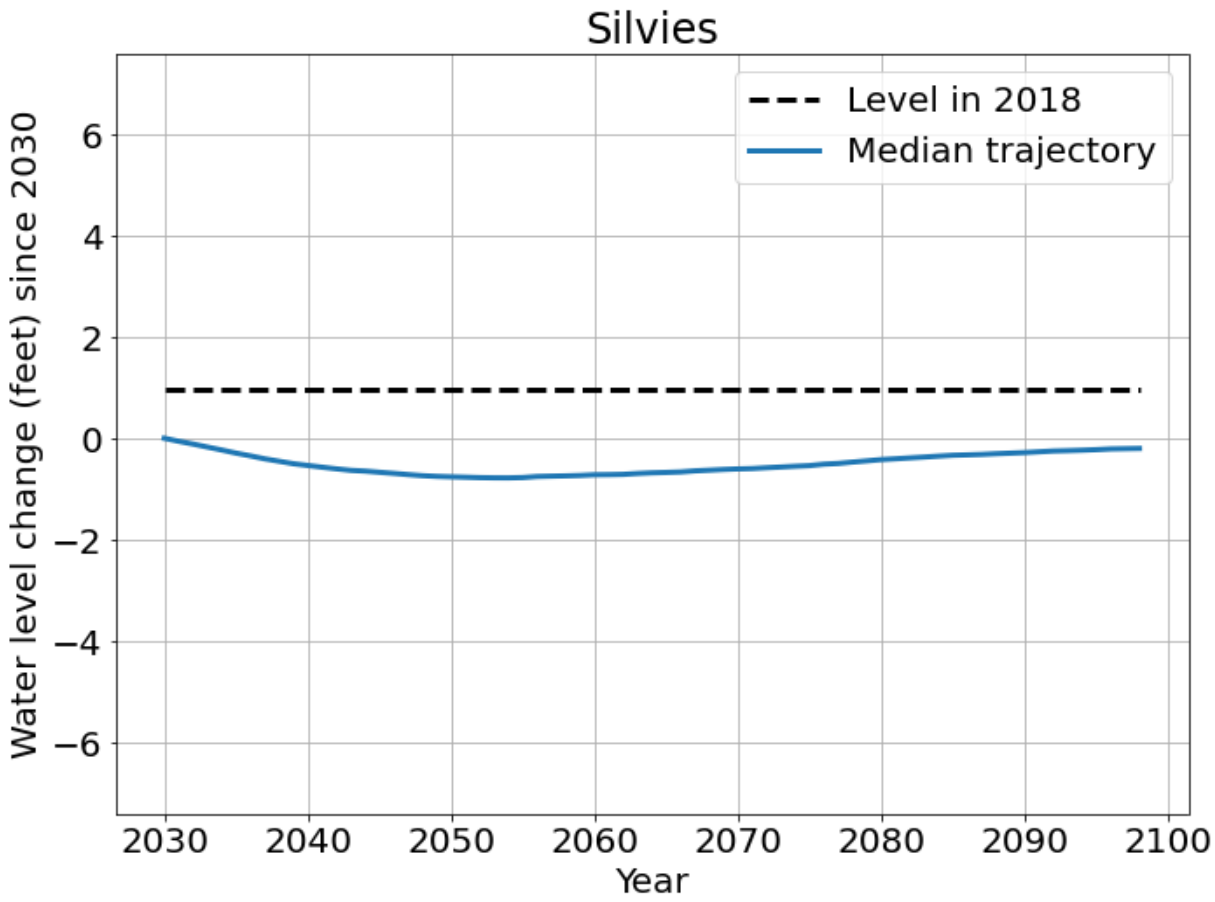
Silvies



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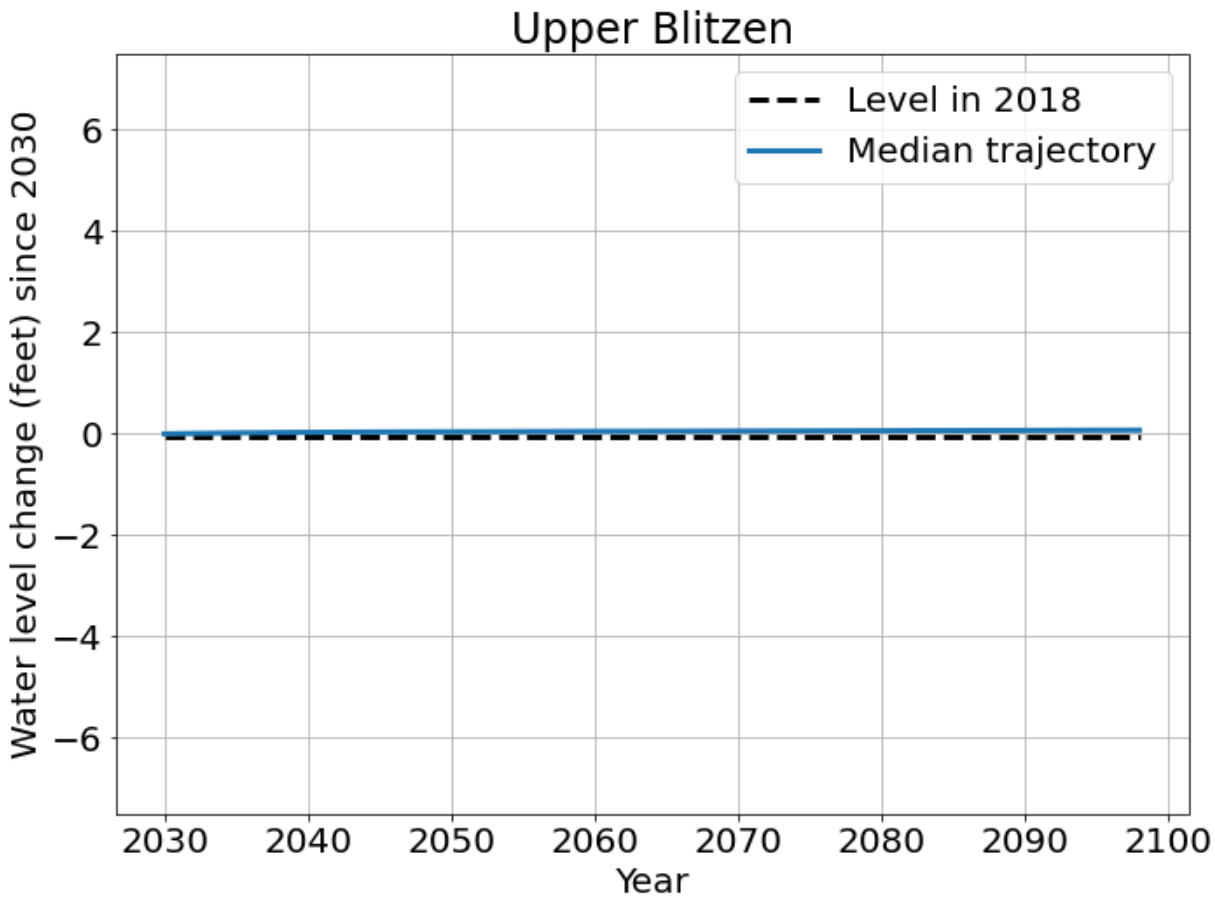
Upper Blitzen



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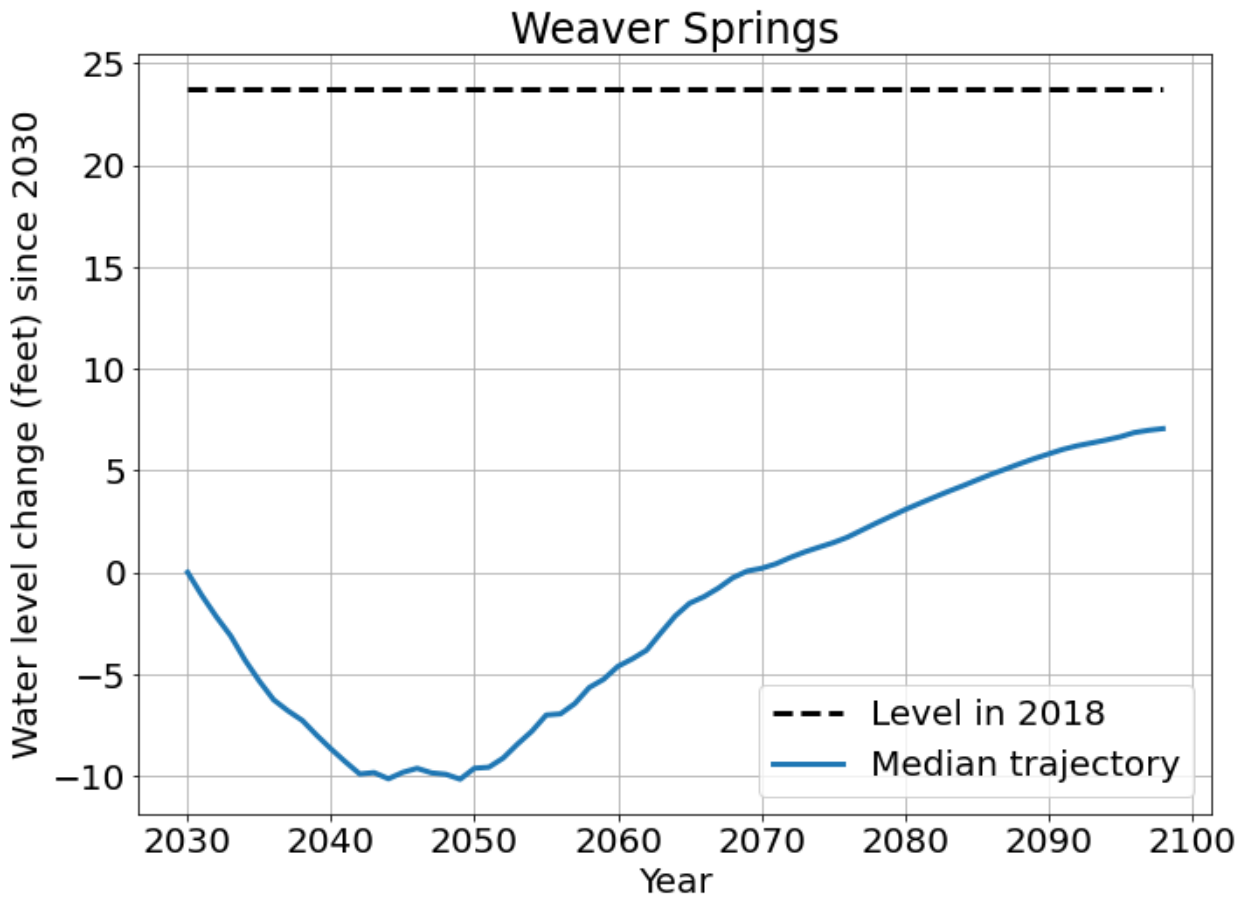
Weaver Springs



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Input Requested

- Based on the information we've presented over the past few months and what we've learned about how the parameters change the results:
  - What feedback do you have regarding our proposal?
  - What would you change and why?

How we'll use your feedback:

- WRD will review the input
- Make adjustments as appropriate
- March RAC: return with proposal in rule language and reasoning for each parameter and adjustments made

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Criteria Based Management Scenarios

Parameter	Irrigation	WRD Proposal	Conservation
Spatial extent	1 subarea	7 subareas	6 subareas
Phasing timeline	21 years	24 years	0 years
Pumpage reduction step	Every 3 years	Every 6 years	N/A
Spring & stream discharge	No limit	> 50-70% of 2022	> 80-120% of 2022
Natural ET	No limit	> 60% of 2018	> 80% of 2018
Dry domestic wells	No limit	<170% of 2018	< 130% of 2018
Resulting pumpage reduction %	30%	38%	48%

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Original Changes in Lowland Natural Evapotranspiration From 2018 to 2098

Subarea	2018 ET (kaf/yr)	Irrigation Change (%)	WRD Proposal Change (%)	Conservation Change (%)
Dog Mountain	0.3	-7%	-27%	+16%
Lower Blitzen - Voltage	4.8	-37%	-25%	0%
Northeast-Crane	2.0	-86%	-47%	-18%
Silver Creek	17.9	-29%	-23%	-13%
Silvies	21.8	-29%	-28%	+3%
Upper Blitzen	1.5	-7%	-7%	-7%
Weaver Springs	0.7	-32%	-40%	-31%
Overall	49.0	-31%	-26%	-5%

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The numbers presented here were for the closest-fit model run but do not perfectly meet the constraints. Updated numbers in the Amended slide above are interpolated to meet the constraints, especially in Northeast-Crane.

Critical groundwater area rule language outline

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Critical groundwater area rule language outline

Goals of Conversation

- Gather input around the CGWA rule language outline

Level of Participation

Consult

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690-512-####: definitions

This section will contain:

1. The definition of permissible total withdrawal.
2. The definition of target groundwater level trend.
3. The definition of subarea.
4. The definition of the GHVGAC.
5. The definition of groundwater magnitude envelope.
6. Additional definitions as needed.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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690-512-####: Administrative Boundaries

This section will contain:

1. Language defining the exterior boundary of the Harney Basin Critical Groundwater Area.
2. Language defining the subareas of the Harney Basin Critical Groundwater Area.
3. References to exhibits illustrating the administrative boundaries.
4. Language characterizing the Harney Basin groundwater reservoir.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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690-512-####: Harney Basin Critical Groundwater Area

This section will contain:

1. The goal of the department for groundwater level trends.
2. Language for a provision to check the rules every 3 years.
3. Language for a provision to check groundwater conditions at least every 10 years.
4. Language for a provision closing the entire basin to future appropriation.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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690-512-####: Permissible total withdrawals for the X number of subareas within the Harney basin critical groundwater area

This section will contain:

1. Language defining the permissible total withdrawal for each defined subarea.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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690-512-####: Allocation of the permissible total withdrawal

This section will contain:

1. Language defining how the permissible total withdrawal will be allocated.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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690-512-#### adaptive management of the Harney basin critical groundwater area

This section will contain:

1. Purpose statement.
2. Language defining the process for evaluating groundwater level trends.
3. Language defining the provisional timeline for implementing the permissible total withdrawal and the process of allocating groundwater.
4. Language defining the process for evaluating incremental progress towards achieving a target groundwater level trend of zero decline.
5. Language defining the process for adjusting the provisional timeline.
6. Language defining the process for announcing the adaptive management analysis and decisions.

Input:

- Are there other items we have discussed with you all that we have not represented here?

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SWMPA draft rule language

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SWMPA rule language

Goals of Conversation

- Gather input around the draft SWMPA rule language

Level of Participation

Consult

OREGON WATER RESOURCES DEPARTMENT

Section 1: SWMPA boundary and the nature of the problem

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Section 1

Rule Language	Rule language Explainer
1.The SWMPA boundary is defined in 690-512-#### and meets the groundwater conditions defined in 690-085-0020(1)(a) and 690-085-0020(1)(f).	**Defining the boundary:** •The SWMPA boundary includes the Harney Basin Groundwater Study Area boundary and portions of Grant County, mainly around Seneca. The administrative boundaries section in the Division 512 rules will define the boundary. The reference 690-512-#### will be the administrative boundary section. **Defining the nature of the problem**: •OAR 690-085-0020(1)(a): Groundwater decline in the area is of such a magnitude that the aquifer does not recover annually. •OAR 690-085-0020(1)(f): There are frequent occurrences of surface or groundwater shortages caused by using water from streams or wells. Shortages may be evidenced by complaints from water rights holders, requests to regulate water use, degraded water quality, or failure to meet administrative restrictions or minimum stream flows.

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Section 1

Relevant Input Received

- Set the boundary as the Greater Harney Valley Area of Concern (GHVGAC).
- Set the boundary as the RAC-recommended Classification boundary.
- Set the boundary as the Harney Basin Groundwater Study Area boundary.

Tentative Decision

- Set the boundary as the RAC-recommended Classification boundary.

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SWMPA: section 1 – boundary and the nature of the problem

Remaining Questions or feedback for the RAC

- Are we okay with the proposed boundary?
- Are there any concerns around the proposed boundary?

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Section 2: timeline for implementation, who is required to install measuring devices, and the type of device required

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Section 2

Rule Language	Rule language Explainer
(2) By no later than March 1, 2028, each groundwater right holder, well owner, or well operator shall properly install and thereafter properly maintain a totalizing flow meter on each well within the Harney SWMPA boundary as defined in 690-512-#### listed as a point of appropriation on a valid water right. Totalizing flow meters shall be properly installed according to manufacturer's specifications and must meet the specifications in subsection 5.	**Timeline for implementation:** • Flow meters must be installed by March 1, 2028. **Users required to install a flow meter:** • Each groundwater right holder, well owner, or well operator. **Where to install a flow meter:** • A totalizing flow meter must be installed at each well (POA). **Type of device required:** • A totalizing flow meter shall be installed following the manufacturer's specifications and must meet the specifications defined in subsection 5.

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Section 2

Relevant Input Received

- Timeline to install within one year
- Timeline varies by subarea – each subarea is required to install at different times
- All groundwater users should be required to report

Tentative Decision

- Date required for installation is March 1, 2028
- All groundwater rights need to install a flowmeter
- Measurement by each well not by field

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Section 2

Remaining Questions or feedback for the RAC

- Do you have any concerns about the March 1, 2028 date?
- Is the rule language clear and understandable?

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Section 3: Approval of the totalizing flow meter

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Section 3

Rule Language	Rule language Explainer
(3) Totalizing flow meters and the method of flow meter installation may be subject to approval by Department Staff. Once installed, totalizing flow meters must be maintained in good working order. Department staff shall have reasonable access to the totalizing flow meters upon request pursuant to ORS 537.780(1)(e).	**Approval for the totalizing flow meter:** • Any totalizing flow meter and installation methods may be subject to approval by department staff. **Maintenance of the flow meter:** • Flow meters must be maintained in good working order after installation. **Reasonable access to the flow meter:** • Department staff shall have reasonable access to the flow meter. • ORS 537.780(1)(e) – With authority from the Water Resources Commission, Department staff can "Enter upon any lands to inspect wells, including wells exempt under ORS 537.545, casing, fittings, valves, pipes, pumps, measuring devices, and back siphoning prevention devices."

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Section 3

Relevant Input Received

- Operating flow meters in the basin can be difficult, the sand in the basin can cause the flow meter to break
- Devices mentioned: pulse meters, uniform meters
- Installing flowmeters may require large system changes. Hard to justify in the face of uncertainty

Tentative Decision:

- No preference on the types of meter brand as long as it is a totalizing flow meter

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Section 3

Remaining Questions or feedback for the RAC

1. Should we write an exception for users who are shut off or will be shut off in the rule?
2. Is the rule language clear and understandable?

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Section 4: specification for the annual report

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Section 4

Rule Language	Rule language Explainer
(4) The groundwater right holder, well owner, or well operator shall keep a complete record of the volume of water appropriated each month. The groundwater right holder, well owner, or well operator shall submit a report that includes water use measurements to the Department on an annual basis by December 31 of each calendar year for the preceding water year (October 1 to September 30). Reports shall be submitted on a form developed and maintained by the Department.	**Annual report requirements:** • Groundwater right holders, well owner, or well operators shall record their use each month • Groundwater right holders, well owner, or well operators must report their use on December 31 each year for the previous water year. **Submittal of the reports:** • The report will be submitted online in the water use reporting database.

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Section 4

Relevant Input Received

- Can OWRD require more frequent reporting?
- Can we make reporting methods easier?

Tentative Decision:

- Annual reporting with monthly measurements

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Section 4

Remaining Questions or feedback for the RAC

1. Is there a reason why we would need to require more than annual reporting?
2. Is the rule language clear and understandable?

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Section 5: Specifications for the totalizing flow meter

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Section 5

Rule Language	Rule Language Explainer
(5) A totalizing flow meter shall meet the following specifications: **a.** A totalizing flow meter shall have a rated accuracy of plus or minus 2 percent of actual flow for all flow rates for which the meter is expected to measure. **b.** A totalizing flow meter shall measure the entire discharge from the well. **c.** A totalizing flow meter shall have a sweep hand or digital readout so that instantaneous flow rate can be read.	**Specifications:** • This rule describes the required specifications for the installed totalizing flow meter measurement device.

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Section 5

Rule Language	Rule Language Explainer
d. The totalizing part of the flow meter shall have sufficient capacity to record the quantity of water authorized to be pumped over a period of 2 years. Units of water measurement shall be in acre-feet, cubic feet, or gallons and the totalizer shall read directly in one of these units. Flow meters recording in acre-feet shall, at a minimum, read to the nearest 1/10th acre foot, and the decimal multiplier shall be indicated on the face of the register head. **e.** Totalizers on each meter shall not be field reset without notice to and written permission from the local watermaster. Prior to resetting the totalizers, the final reading must be recorded and reported.	**Specifications:** • This rule describes the required specifications for the installed totalizing flow meter measurement device.

OREGON WATER RESOURCES DEPARTMENT

Section 5

Rule Language	Rule Language Explainer
f. The totalizing flow meter shall be installed in accordance with all manufacturer specifications. There shall be no turnouts or diversions between the well and the flow meter. The flow meter shall be installed not less than five pipe diameters downstream from any valve, elbow, or other obstruction which might create turbulent flow, or other provisions shall be made that meet the manufacturer's specifications to control or eliminate turbulent flow. **g.** The totalizing flow meter shall be installed no more than 100 feet away from the well head.	**Specifications:** • This rule describes the required specifications for the installed totalizing flow meter measurement device.

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Section 5

Relevant Input Received

- Specifications not discussed yet

Tentative Decision:

N/A

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Section 5

Remaining Questions or feedback for the RAC

- Are these specifications reasonable for Harney County?
- Are these rules clear and understandable?

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Section 6: reporting requirements if the totalizing flow meter is broken

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Section 6:

Rule Language	Rule Language Explainer
(5) A water user shall report broken flow meters to the local watermaster's office within 48 hours after determining that the flow meter is broken. A water user shall not appropriate for more than 60 days without an operating flow meter.	**Reporting of a broken flow meter:** • If a flow meter is broken, the water user must report it to the local water master within 48 hours. **Appropriating water when the flow meter is broken:** • The maximum amount of days water can be appropriated while the flow meter is broken is 60 days.

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Section 6

Relevant Input Received

- Operating flow meters in the basin can be difficult, the sand in the basin can cause the flow meter to break

Tentative Decision:

- If a flow meter breaks, the flow meter needs to be reported in 48 hours to the watermaster
- Broken flow meter needs to be repaired or replaced within 60 days

OREGON WATER RESOURCES DEPARTMENT

Section 6

Remaining Questions or feedback for the RAC

- Is the 60 days a reasonable timeframe to repair or replace a flowmeter?

OREGON WATER RESOURCES DEPARTMENT

Section 7: measuring and reporting requirements while the totalizing flow meter is broken

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WATER RESOURCES DEPARTMENT

Section 7

Rule Language	Rule Language Explainer
(7) While the flow meter is broken, the water user shall use other methods of measurement defined under OAR 690-085-0015(5)(a) –(c) until the flow meter is replaced or repaired. The water user shall keep the monthly data and mail the data to the Department in Salem upon request of the Department. The data shall include a statement of the initial reading on the newly installed flow meter, the current power meter reading, and the time of operation. The water user shall notify the watermaster within 48 hours of installing the repaired or replacement flow meter.	**Other methods of measurement allowed while the flow meter is broken:** • OAR 690-085-0015(5)(b) – Power consumption method • OAR 690-085-0015(5)(c) – The time of operation method **Reporting of data while the flow meter is broken:** • The water user shall keep the monthly data and may need to report it upon request. • The data reported shall include the initial reading on the newly installed flow meter, the power meter reading, and the time of operation. **Reporting the installed flow meter:** • Within 48 hours of installment of the flow meter the water user shall report to the local watermaster.

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Section 7

Relevant Input Received

- Consistent operation of flow meters in the basin is a challenge, users need latitude to measure use

Tentative Decision:

- If a flow meter is broken, measurements can be taken by power consumption and time of operation for up to 60 days while the meter is replaced or repaired

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Section 7

Remaining Questions or feedback for the RAC

1. Are there other considerations for keeping and reporting data while the meter is being repaired or replaced?
2. Are the rules clear and understandable?

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Section 8: Regulation for failure to install a totalizing flow meter

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Section 8

Rule Language	Rule Language Explainer
(8)Failure to have and maintain a properly installed, functioning totalizing flow meter by March 1, 2028, will result in the local watermaster regulating and controlling an unmetered well such that no groundwater may be pumped or appropriated until a flow meter is obtained and installed consistent with these rules.	**Penalty for not installing a flow meter:** • If a groundwater user does not install by March 1, 2028, the water master will regulate and control an unmetered well until a flow meter is obtained and installed.

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Section 8

Relevant Input Received

- No discussion yet

Tentative Decision:

- N/A

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Section 8

Remaining Questions or feedback for the RAC

- Are the other items around regulation for failure to install we need to consider?
- Are the rules clear and understandable?

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Classification draft rule language

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Classification rule language

Goals of Conversation

- Gather input around the draft classification rule language

Level of Participation

Consult

OREGON WATER RESOURCES DEPARTMENT

Administrative boundary: classification boundary

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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

Relevant Input Received

- Discussed the classification boundary during the RAC 7 and 8 slides
- Recommended the classification boundary that includes the groundwater study area and parts of grant county.

Tentative Decision:

- Set the boundary as the recommendation from the RAC

OREGON WATER RESOURCES DEPARTMENT

Classification boundary

Remaining Questions or feedback for the RAC

- Do you still support the proposed classification boundary?
- Are the rules clear and understandable?

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Section 1: allowed uses for the Malheur lake administrative basin

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Section 1

Rule Language	Rule Language Explainer
(1) Except as provided in OAR 690-512-####(2), the groundwater and surface water of the Malheur Lake Basin are classified for direct appropriation of, or storage of surface water and use of, water for domestic, livestock, irrigation, municipal, quasi-municipal, industrial, mining, agricultural water use, commercial, power development, forest management, public uses, road watering, dust abatement, and wildlife refuge management.	**<u>Allowed uses within the Malheur Lake Basin:</u>** • This section specifies what surface water and groundwater can be used for within the Malheur Lake Basin. • These uses are allowed outside the classification boundary defined in **690-512-####(2)**.

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Section 2: allowed uses in the classification boundary

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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.	**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.

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Input

Remaining Questions or feedback for the RAC

- Is there anything else we need to consider?

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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

- March 5, 2025 8 am to 3 pm at the Harney County Community Center.

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Thank you!

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