Division 512 Rulemaking: Ground Water Regulation for the Malheur Lake Administrative Basin

Oregon Water Resources Department

Rules Advisory Committee Meeting

October 2, 2024

OREGON WATER RESOURCES DEPARTMENT

Ground Rules

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

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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.

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

15 Minutes	Welcome and Introductions
25 Minutes	August and September Recap
120 Minutes	Measuring Success
30 Minutes	Overview of Management Scenario Conversation
10 Minutes	Public Comment
60 Minutes	Lunch
130 Minutes	Development of Management Scenario
10 Minutes	Public Comment
20 Minutes	Wrap-up/ Next Steps

Future RAC Schedule

- RAC Number 11, November 13, 2024: 8 a.m. – 3 p.m.
- RAC Number 12, December 18, 2024: 8 a.m. – 3 p.m.
- RAC Number 13, January 22, 2025: 8 a.m. – 3 p.m.

Goals of Today's Meeting

1. Gather feedback on how to evaluate success around stabilizing groundwater levels.

2. Iterate on the first results with an OWRD Management Scenario

3. Develop 3 Management Scenarios for the Harney Basin Groundwater Model.

August and September Recap

August and September Recap

Main Topics Covered Last RAC:

1. Goals of Harney Groundwater Levels

Summary of Comments

1. Statute is defined as reasonably stable, not “stabilizing groundwater levels,” and this should be the basis by which goals are set.
2. Different factors in meeting the goal need to be considered outside of the rate of decline. The capacity of the resources and human consumption needs, and upland management are important
3. Don’t look at historical levels when defining the rate or magnitude of an individual well. Have a conversation around the appropriate starting point.
4. Look at potentially designating different multiple critical areas.

August and September Recap

Main topics of the Discussion Groups

1. Management Scenarios
2. Fiscal Impact

Key Questions

1. From what annual pumpage will reductions occur?
2. How will the Department allocate water?
3. How will unused water rights be canceled?

August and September Recap

- We are going to use 2018 pumpage because that is the best available estimate of pumpage.
- Using the model, we are trying to find the amount of pumpage that results in stable water levels
- We are still working to calculate estimated pumpage for 2019-2023. On hold waiting for a new data set to be published.

Measuring Success

Measuring Success

Goals of Conversation

- Discuss different methods and considerations for measuring success in the model and in the real-world.
- Explore challenges and pros and cons of each method.
- Receive input on the RAC's preferred approach

Level of Participation

Involve/Consult

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Goal: Stabilizing Water Levels

OWRD's current position is that all areas need to achieve a minimum target water level trend of no decline, meaning:

- Water levels do not show long-term declines
- Water levels should exist in a dynamically stable range
- Some wells will show declines, some will be stable, some will show recovery
- No individual well should exceed some defined rate or magnitude of decline (how do we handle extremes?)

Measuring Success: Modeled vs. Real-World

Modelled outcomes vs real-world outcomes

- Modeled:
  - Groundwater levels modeled at every location and depth within the model
  - Simplified system with much less variability than real-world
  - Groundwater levels modeled as mathematical solutions dependent on the model inputs and resolution
  - Impacts to springs and GDE's can be modeled
- Real-world:
  - Groundwater levels only known at measured wells
  - More variability than is captured in the model
  - Groundwater levels dependent on variables not always captured by the model
  - Impacts to springs and GDE's are challenging to monitor

Measuring Success: Calculating Trends

Modeled trends vs real-world trends

- Modeled:
  - Simplified system with much less variability than real-world
  - Trends can be calculated over a single year
- Real-world:
  - More variability than is captured in the model
  - Trends have been calculated using Sen’s slope with minimum of 4 data points (annual spring-high measurements)

Measuring Success: Timing

Longer timelines to stability results in more impacts

- Dry wells
- Decreased natural discharge (ET and spring discharge)
- Loss of groundwater storage (lower groundwater levels)
- Possible decrease in water quality and land subsidence

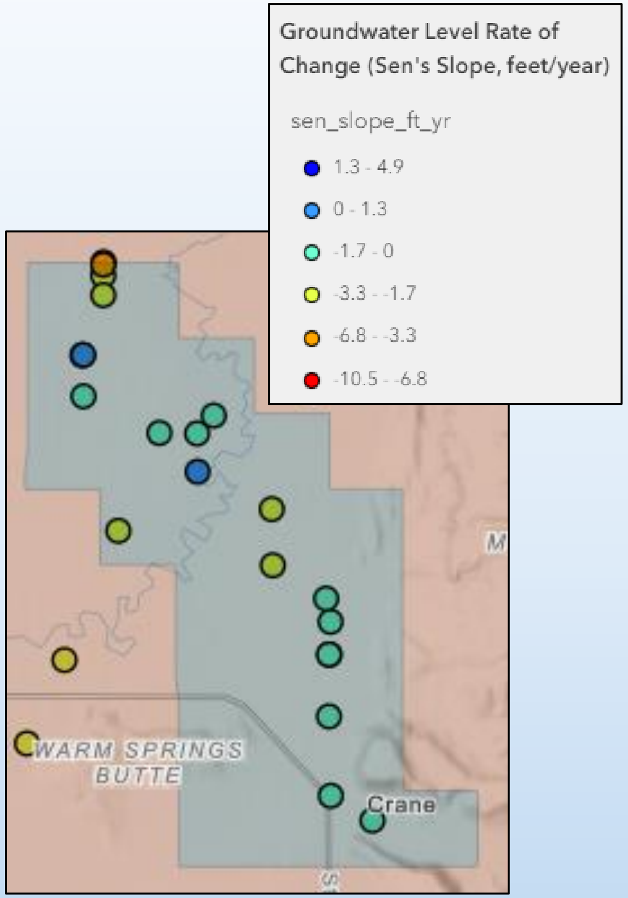
What is an acceptable timeline to reaching stable water levels?

- Should this depend on the current rate of decline?
- Should this depend on the existing magnitude of decline that has already occurred?

Measuring Success: Subarea Summaries

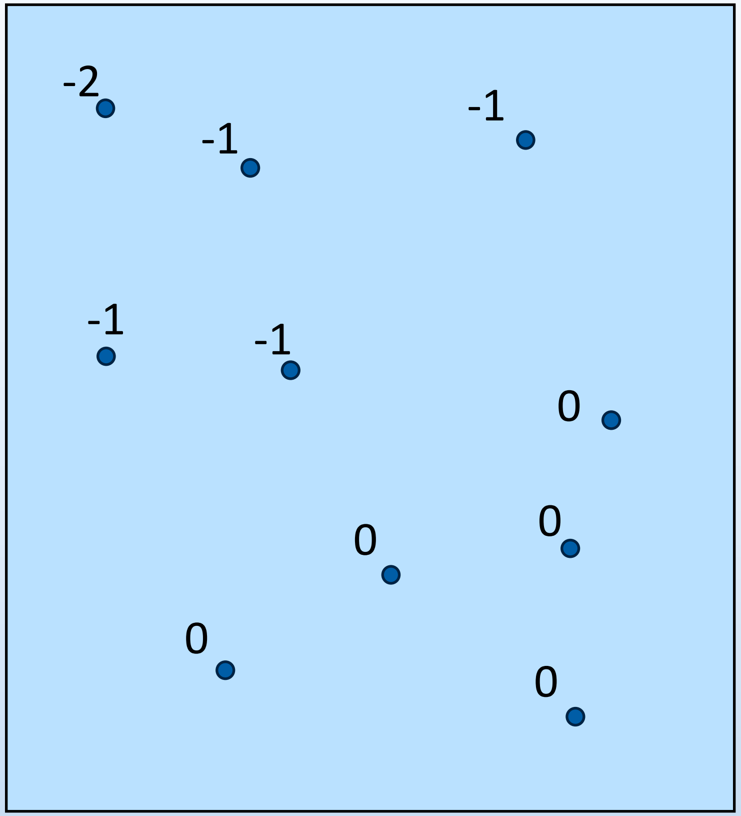
Calculating trends and summarizing by subarea:

- Summary statistics by subarea:
  - **<u>All wells</u>** have trend of 0 feet per year in each subarea
    - Some wells may take a very long time to stabilize completely
  - **<u>90% of wells</u>** have trend of 0 feet per year in each subarea
    - Allows 10% of wells to continue declining
  - **<u>Median</u>** trend of 0 feet per year in each subarea
    - Potentially allows half of wells to continue declining
  - **<u>Average</u>** trend of 0 feet per year in each subarea
    - May require some positive trends for average to be 0 ft/yr



Measuring Success: Subarea Summaries

The effect of subarea delineation:



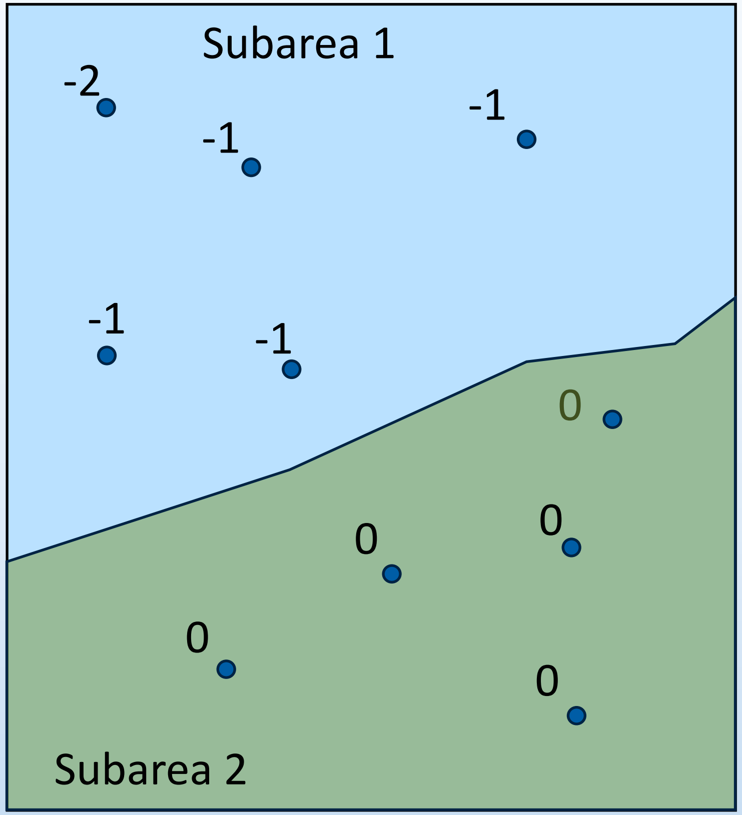
Single subarea

Well	Decline Rate (ft/yr)
1	-2
2	-1
3	-1
4	-1
5	-1
6	0
7	0
8	0
9	0
10	0
median	**-0.5**
average	**-0.6**
% stable	**50%**

- Single subarea with range of decline rates
- Overall groundwater level trends <u>are not stable by any standard</u> when summarized across the entire subarea

Measuring Success: Subarea Summaries

The effect of subarea delineation:



Two subareas

Subarea 1

Well	Decline Rate (ft/yr)
1	-2
2	-1
3	-1
4	-1
5	-1
median	**-1**
average	**-1.2**
% stable	**0%**

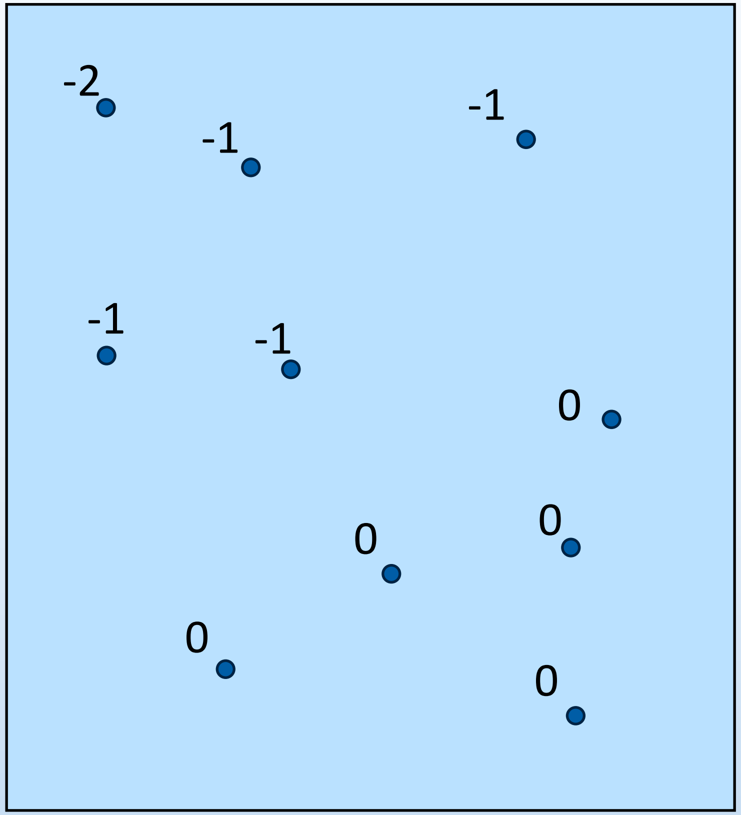
Subarea 2

Well	Decline Rate (ft/yr)
1	0
2	0
3	0
4	0
5	0
median	**0**
average	**0**
% stable	**100%**

- Two subareas grouped by groundwater level trend
- Groundwater level trends are not stable in subarea 1
- Groundwater level trends are stable in subarea 2

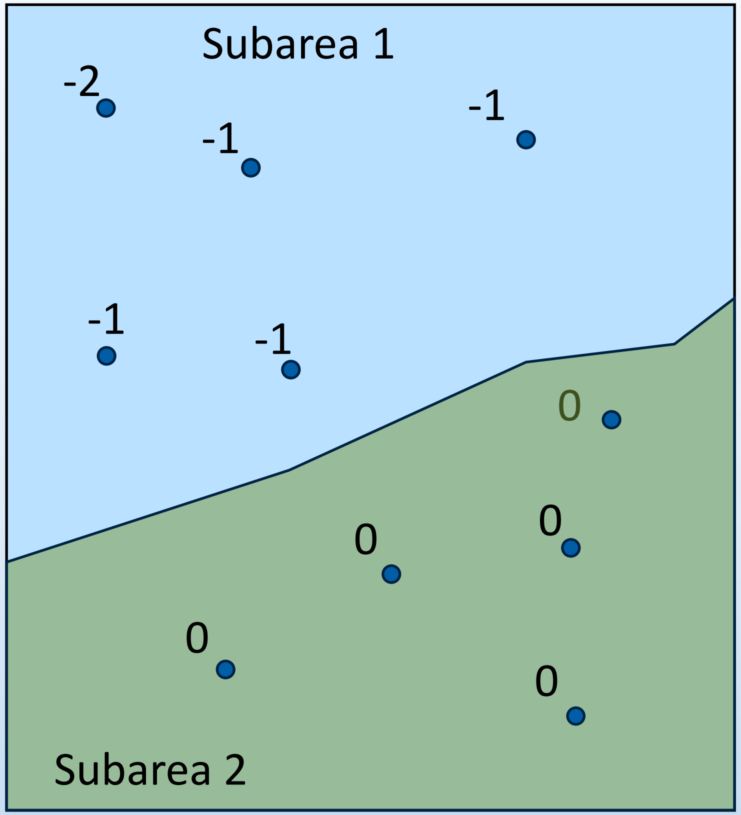
Measuring Success: Subarea Summaries

The effect of subarea delineation:



Single subarea

median	**-0.5**
average	**-0.6**
% stable	**50%**



Two subareas

Subarea 1

median	**-1**
average	**-1.2**
% stable	**0%**

Subarea 2

median	**0**
average	**0**
% stable	**100%**

Measuring Success: Data Availability

Data Availability (real-world):

- <u>Evaluate trends using all available data -OWRD observation wells + permit condition measurements</u>
  - Better captures the variability within a subarea
  - Irrigations wells often oily; pumping; hang-ups
  - Will require additional data review
- <u>Evaluate only selected “sentinel wells” - OWRD observations wells or a subset of representative wells</u>
  - May miss some of the variability within a subarea
  - Simplifies the evaluation
  - Can be limited to reviewed data only

Measuring Success: RAC Discussion

RAC Discussion Questions:

1. What is the appropriate timeline to stabilize water levels?
2. How should trends be summarized by subarea?
3. Which wells/data should be used?

Measuring Success

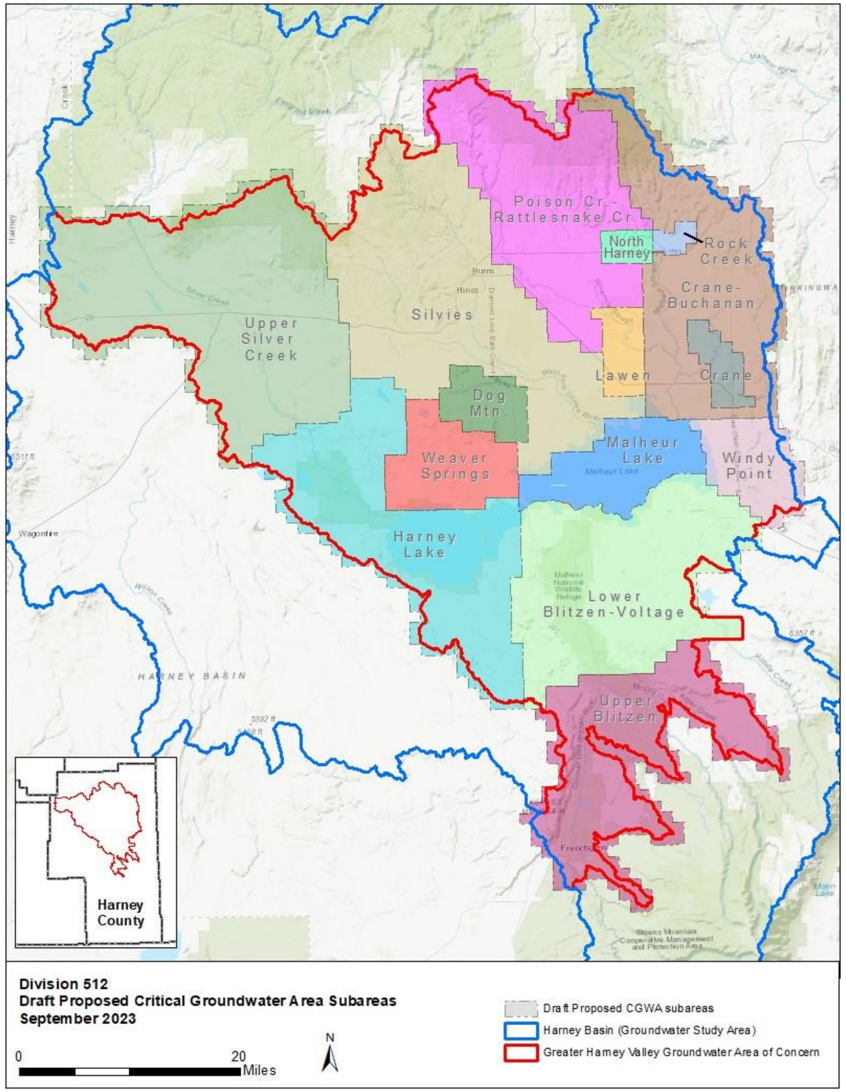
RAC Discussion and Feedback

Initial Results of 15 Subarea Management Scenario

Model Layers

- 10 layers in the model representing different depths
  - Layers 1-5 are each 100 feet thick
  - Layers 6-10 vary in thickness from 135 – 1,397 feet thick
  - Bottom of model grid is at 2,085 ft elevation
- For simplicity we are going to review results only for layer 2
  - More layers will be evaluated when OWRD is reviewing results
  - Different types of information will require reviewing different layers

OWRD 15 Subarea Scenario



15 Subareas with reductions focused in 6 high priority areas starting immediately in 2026.

High Priority

- Crane
- Dog Mountain
- Lawen
- North Harney
- Rock Creek
- Weaver Springs

Lower Priority

- Crane-Buchanan
- Harney lake
- Lower Blitzen – Voltage
- Malheur Lake
- Poison Creek – Rattlesnake Creek
- Silvies
- Upper Blitzen
- Upper Silver Creek
- Windy Point

OWRD 15 Subarea Scenario Use Reductions

Subarea	15 Subarea PTW	2018 Modeled Pumpage	% Reduction
Dog Mountain	3,400	4,521	25%
Rock Creek	1,400	2,464	43%
Lawen	1,400	3,534	60%
Crane	3,800	9,662	61%
North Harney	1,900	5,273	64%
Weaver Springs	5,000	18,991	74%
Total	**108,905**	**135,268**	**21%**

Types of Information to Compare

- Hydrographs
- Maps showing:
  - Water level rate of change
  - Length of time to achieve “near stable” (<0.1 ft/year)
  - Change in water levels
  - Locations of dry wells
- Water budget figure comparing
  - Pumpage
  - Spring flow
  - ET
  - Groundwater storage

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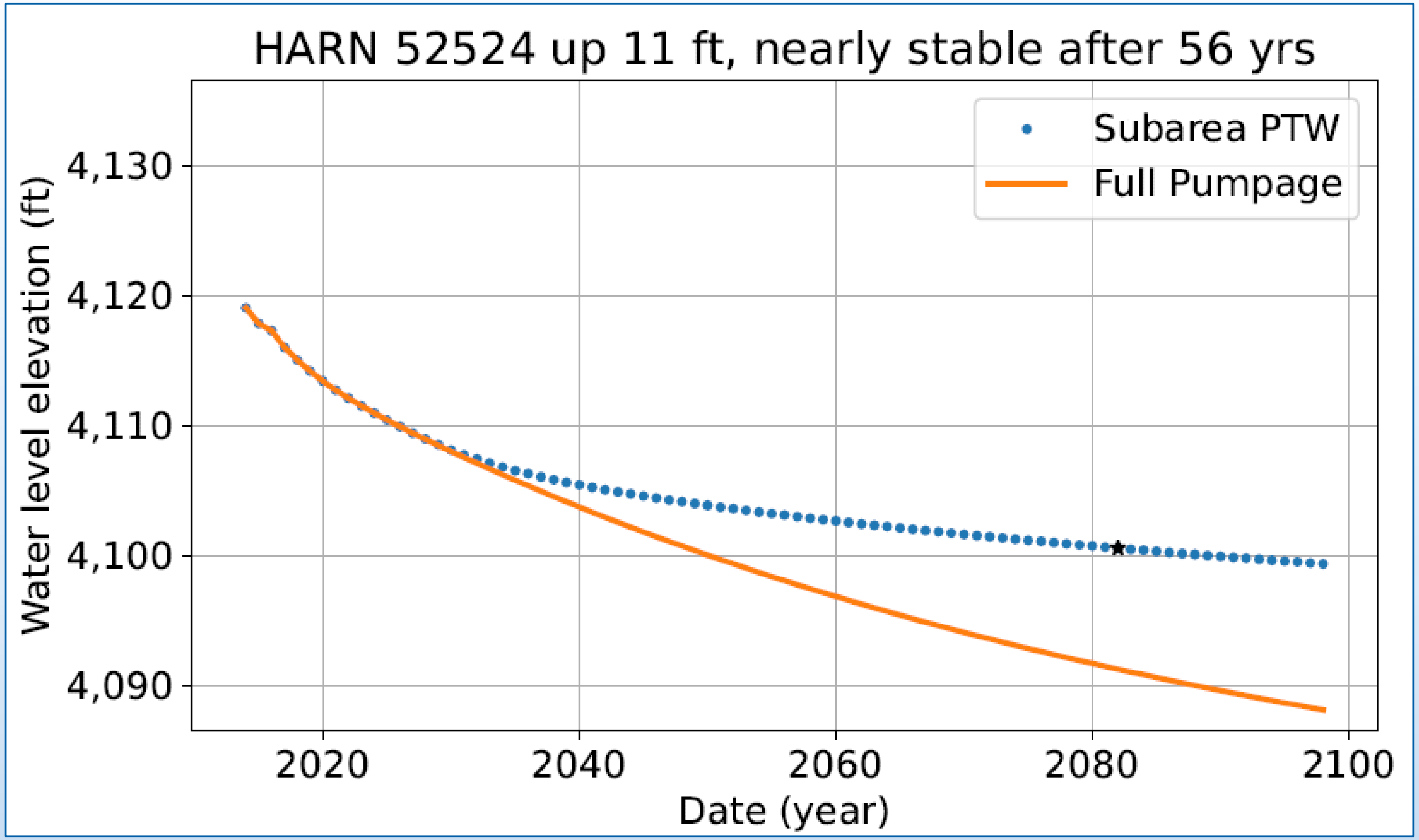
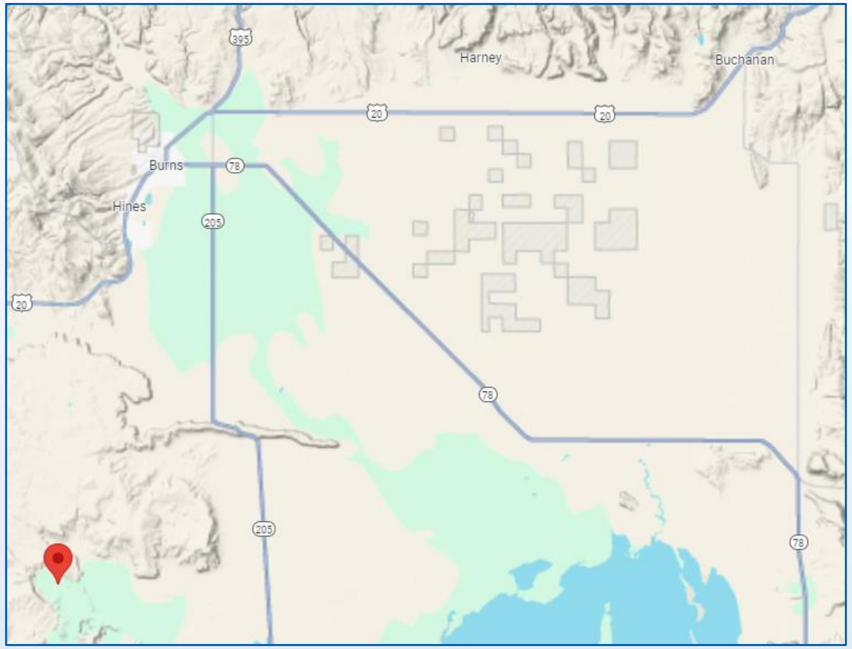
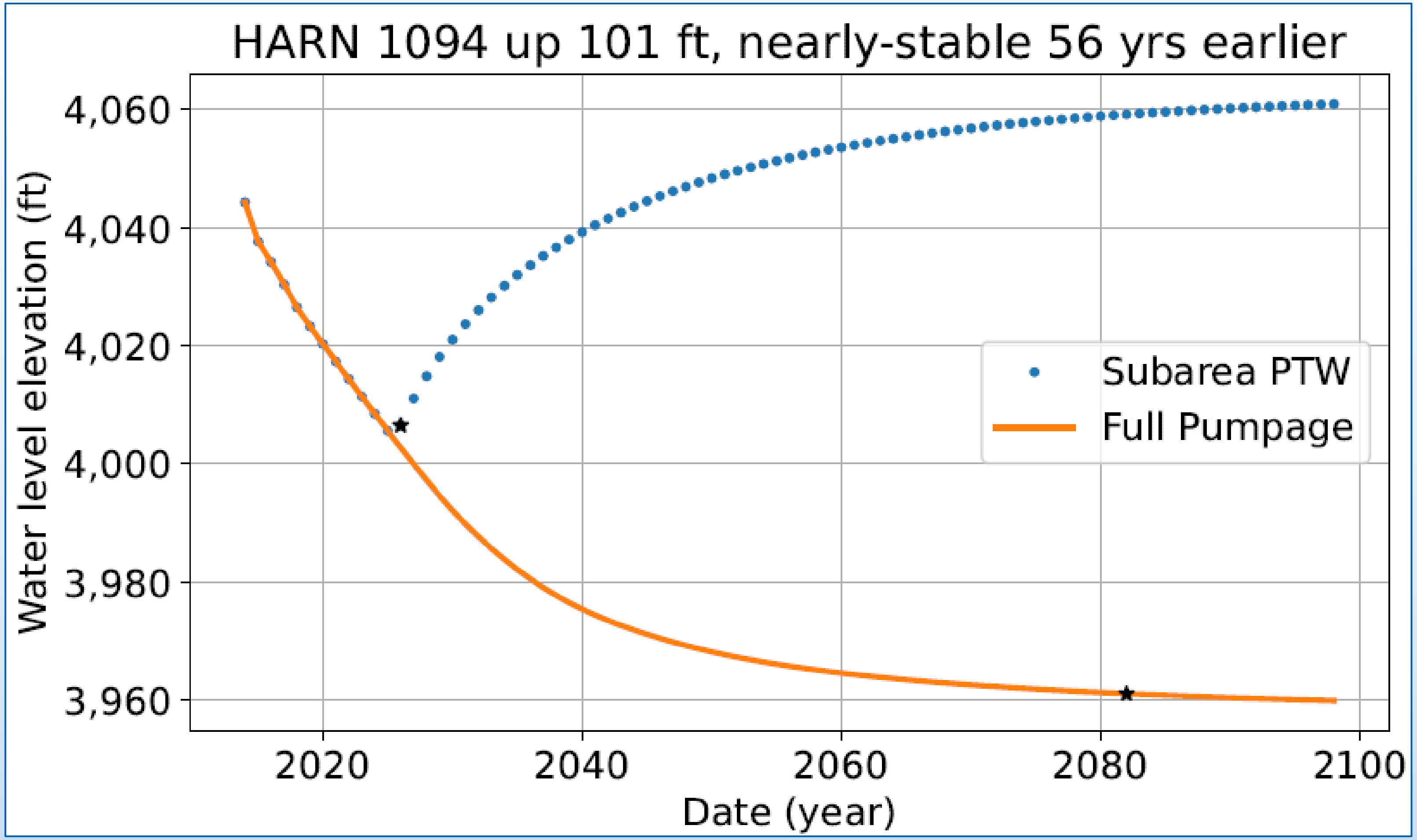
Hydrographs

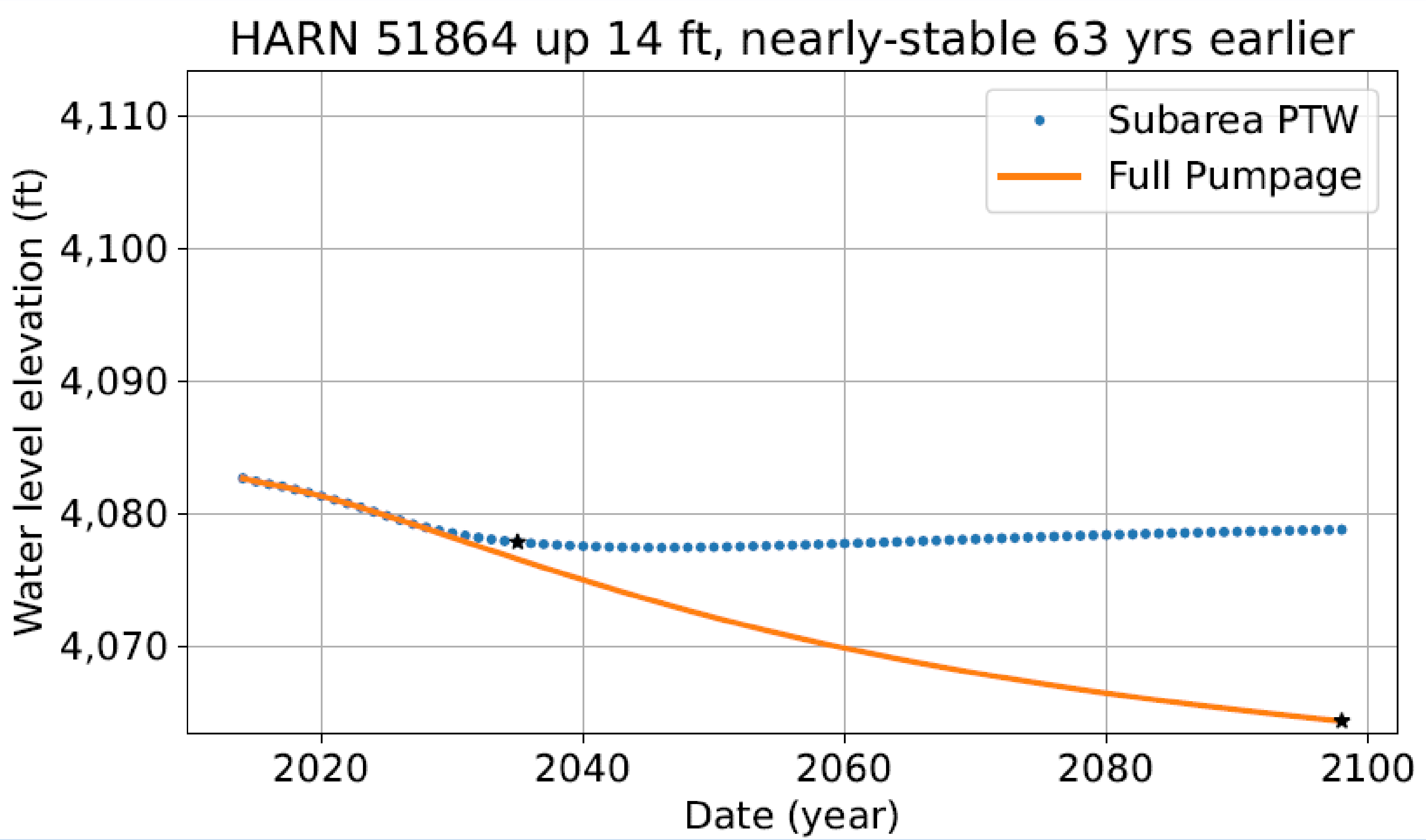


Hydrographs



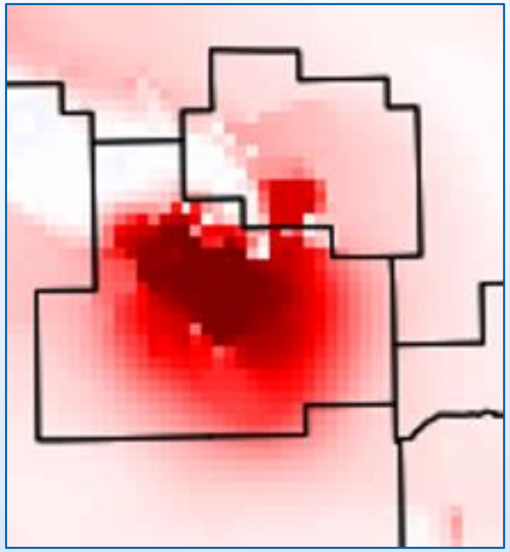


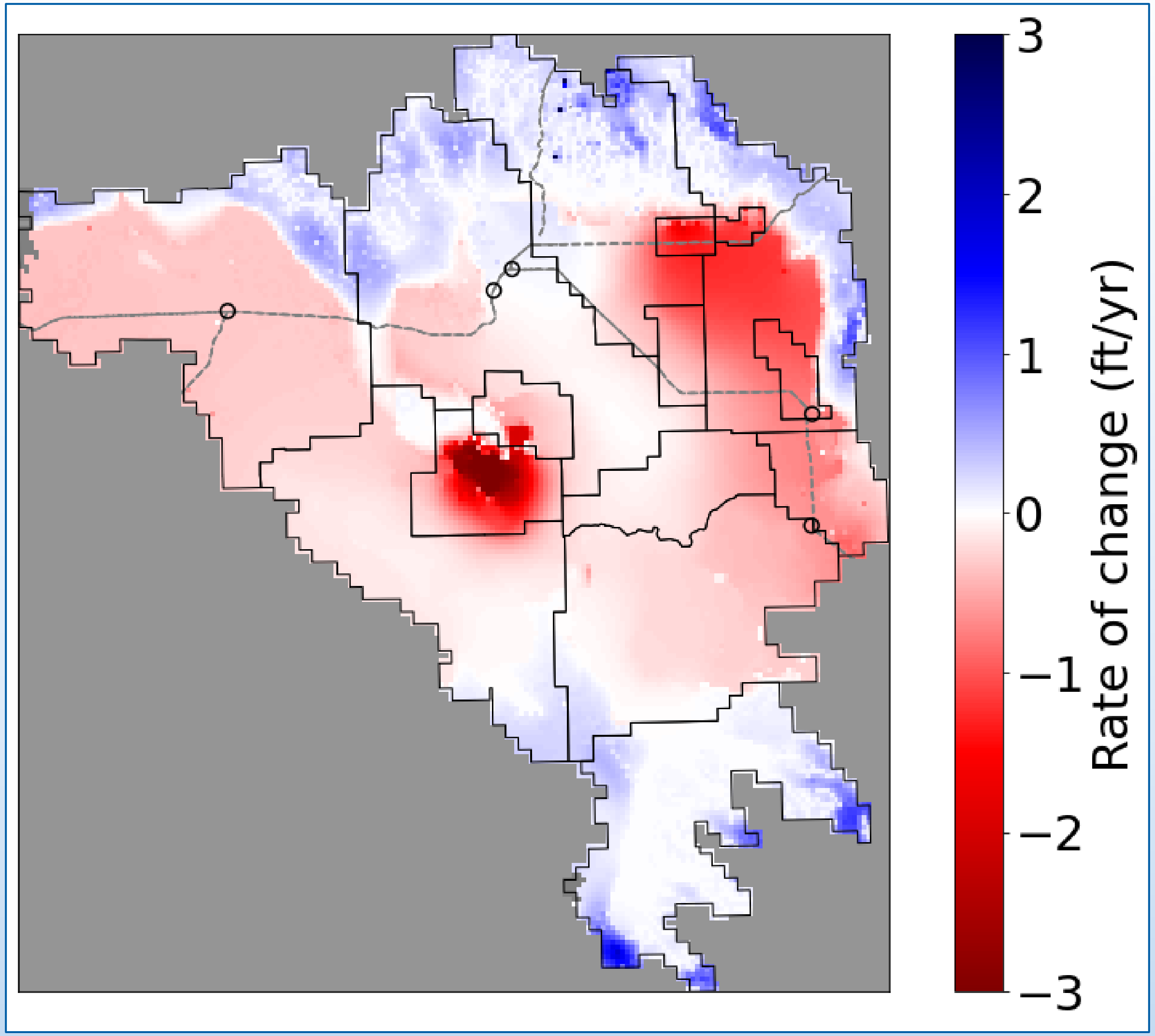
Hydrographs



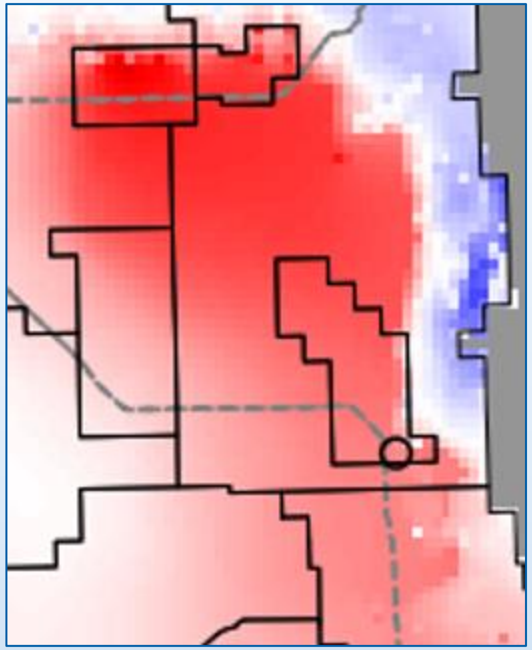
Water Level Annual Rate of Change Before Pumpage Reductions Begin

Weaver Springs/Dog Mtn.



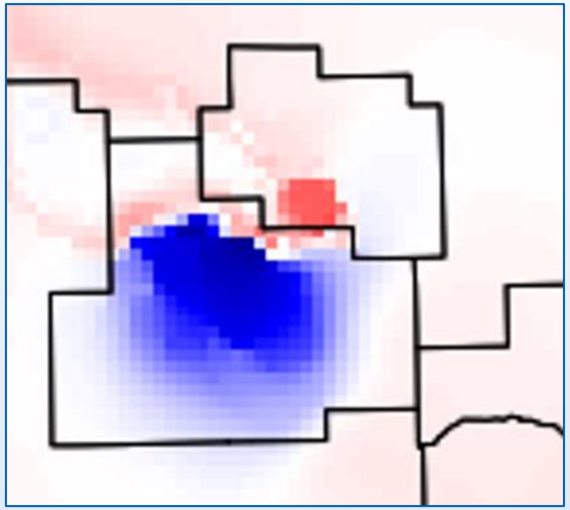


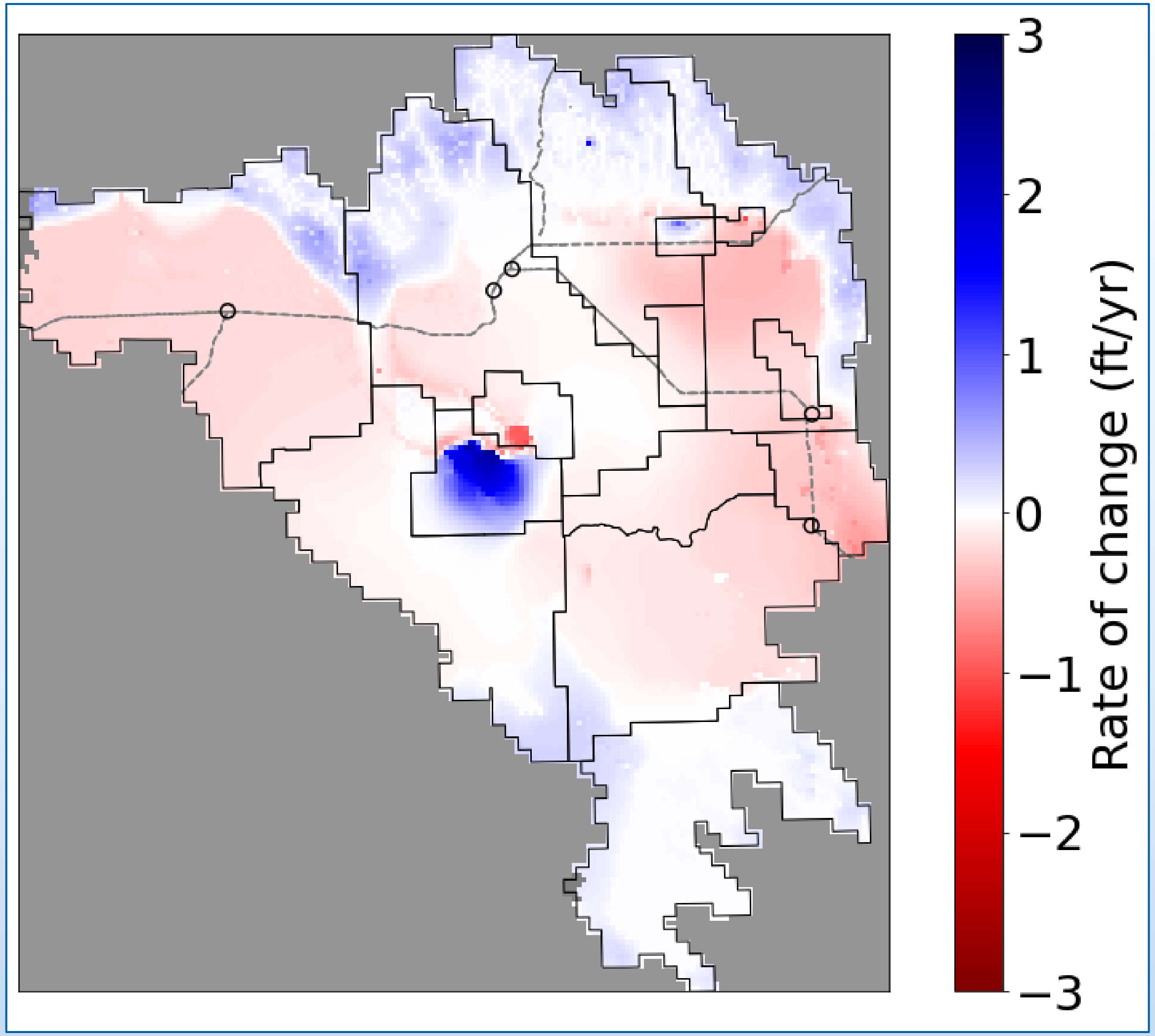
Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



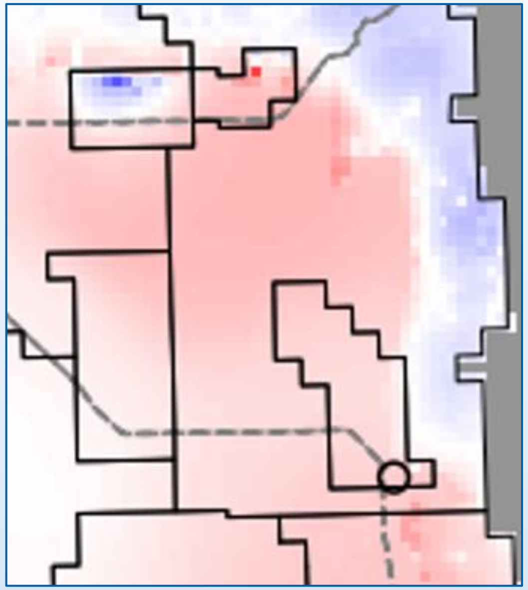
Water Level Annual Rate of Change 10 Years After Pumpage Reductions Begin

Weaver Springs/Dog Mtn.



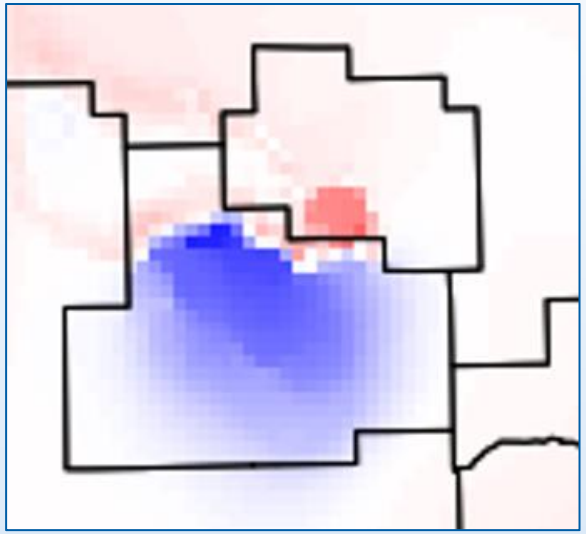


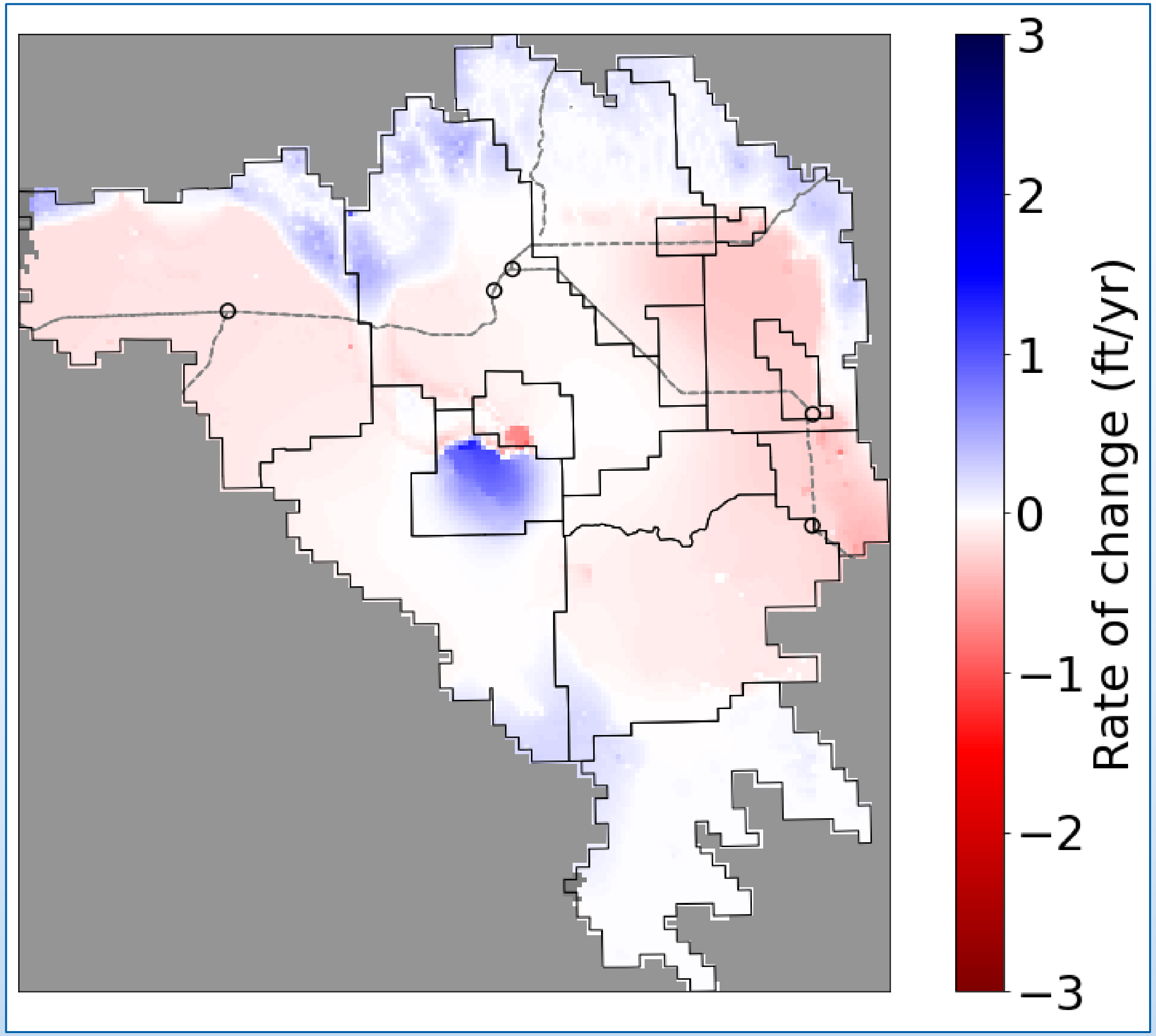
Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



Water Level Annual Rate of Change 20 Years After Pumpage Reductions Begin

Weaver Springs/Dog Mtn.





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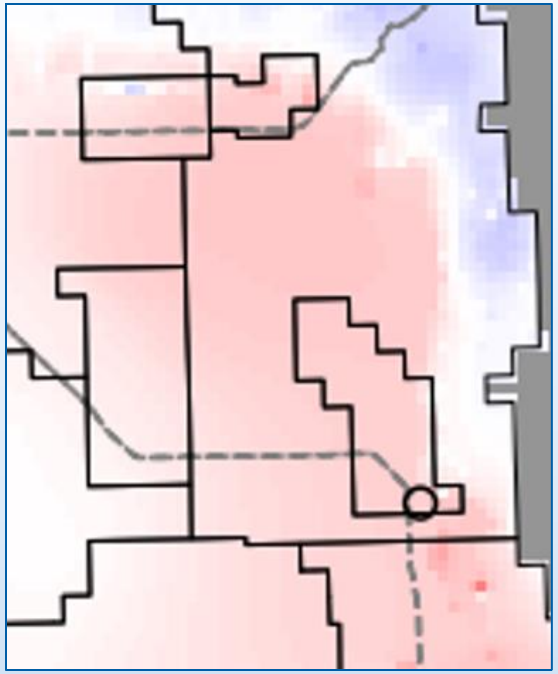
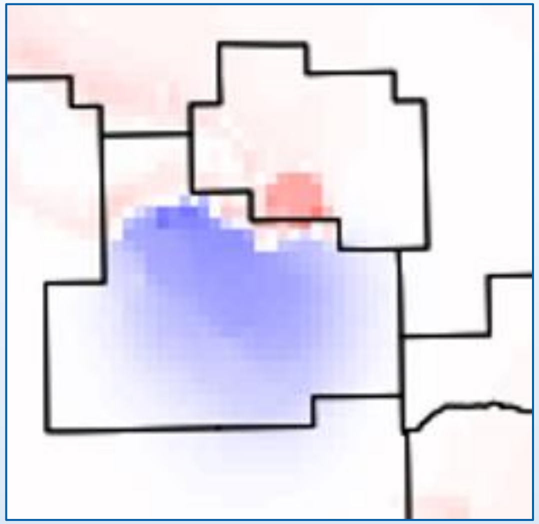
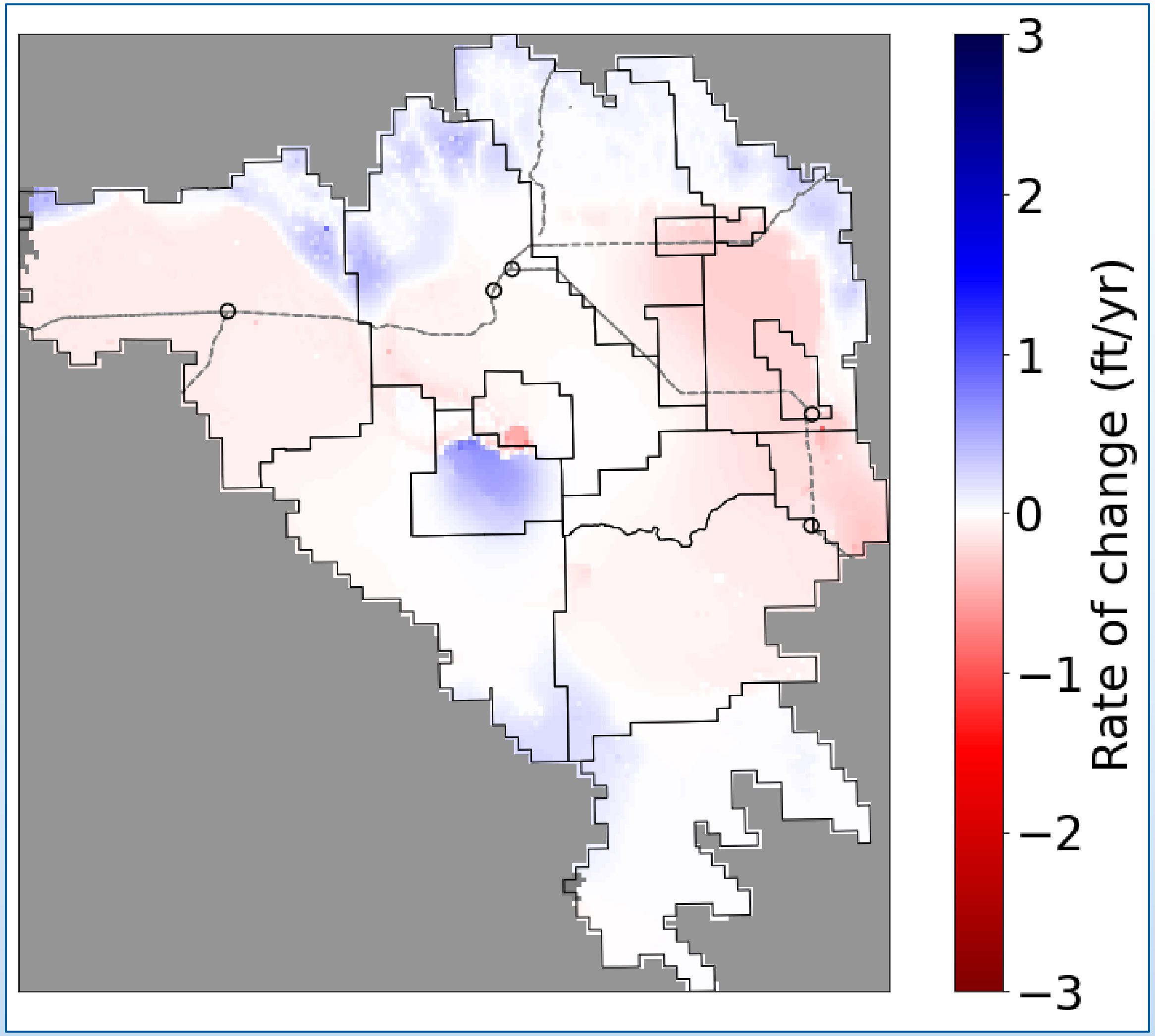


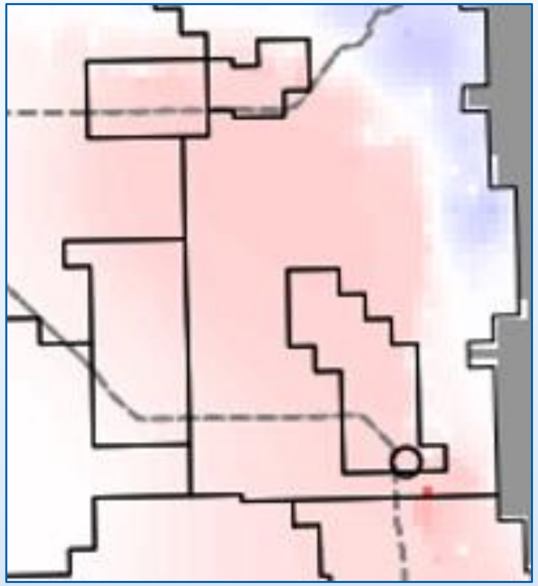
Water Level Annual Rate of Change 30 Years After Pumpage Reductions Begin

Weaver Springs/Dog Mtn.



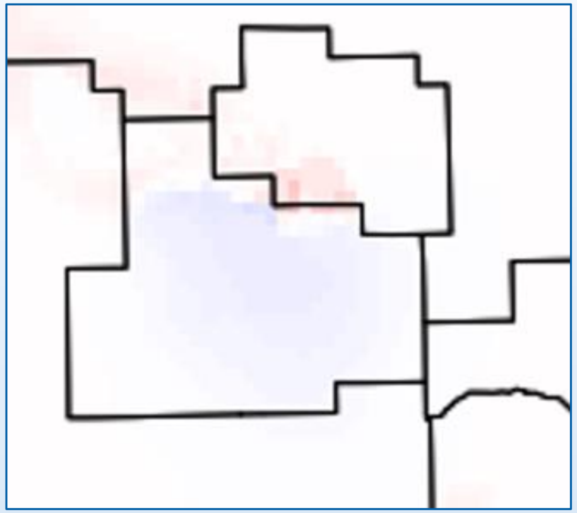


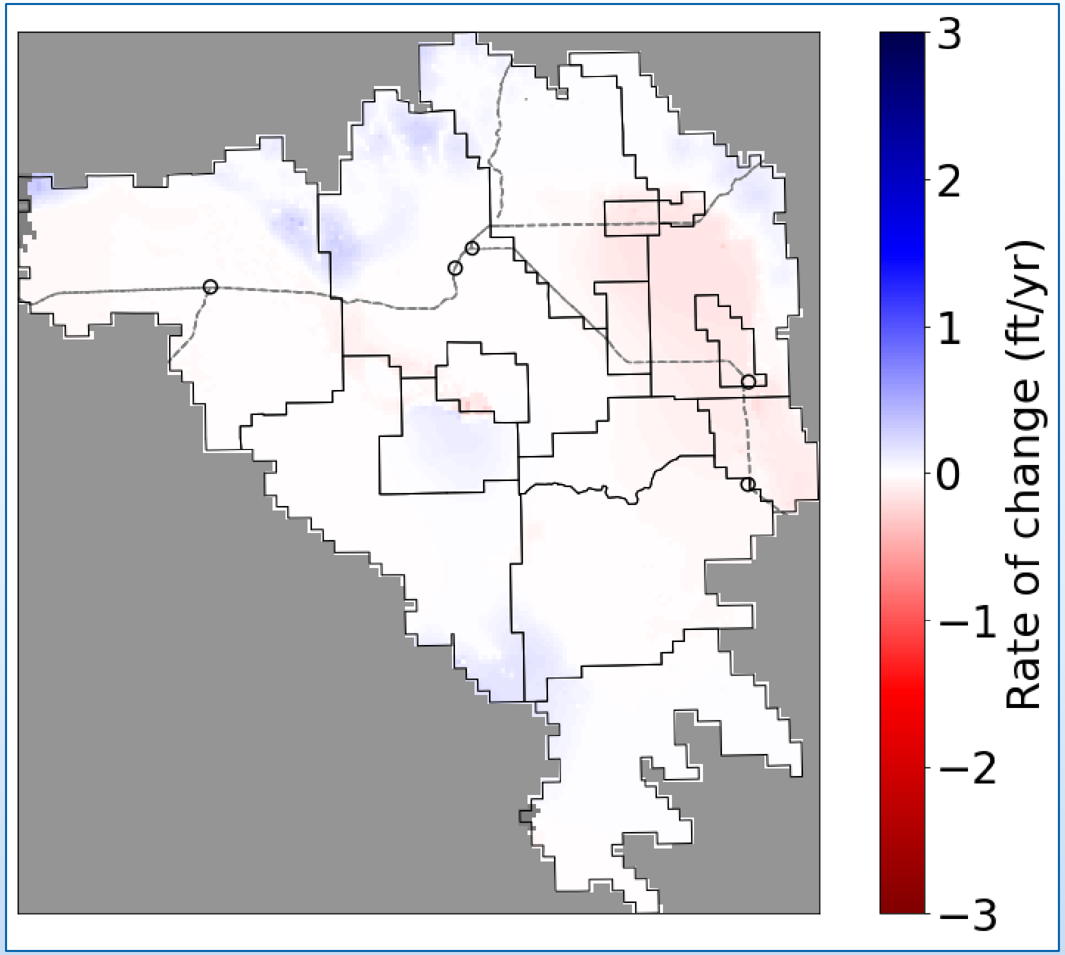
Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



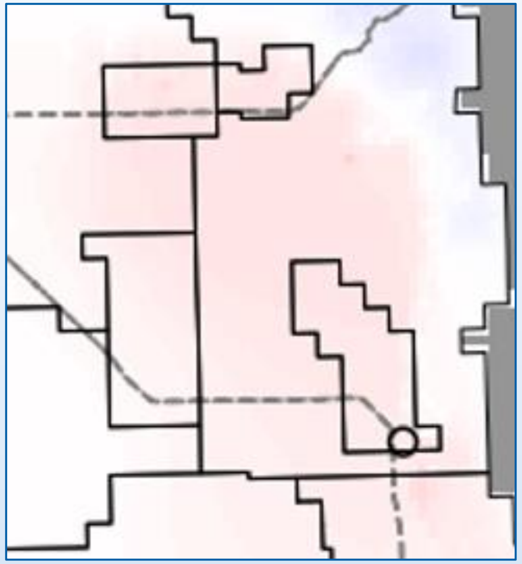
Water Level Annual Rate of Change 70 Years After Pumpage Reductions Begin

Weaver Springs/Dog Mtn.



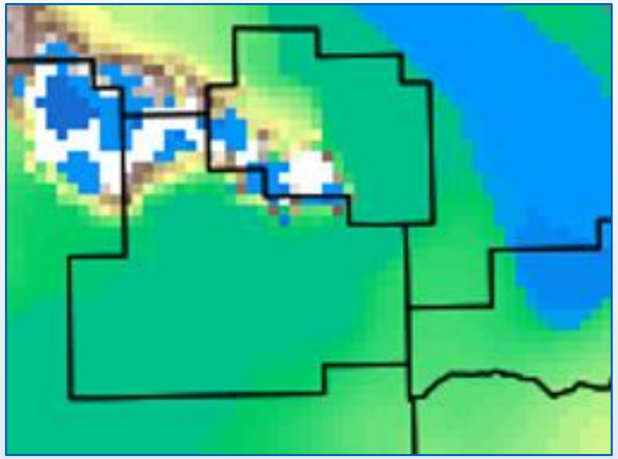


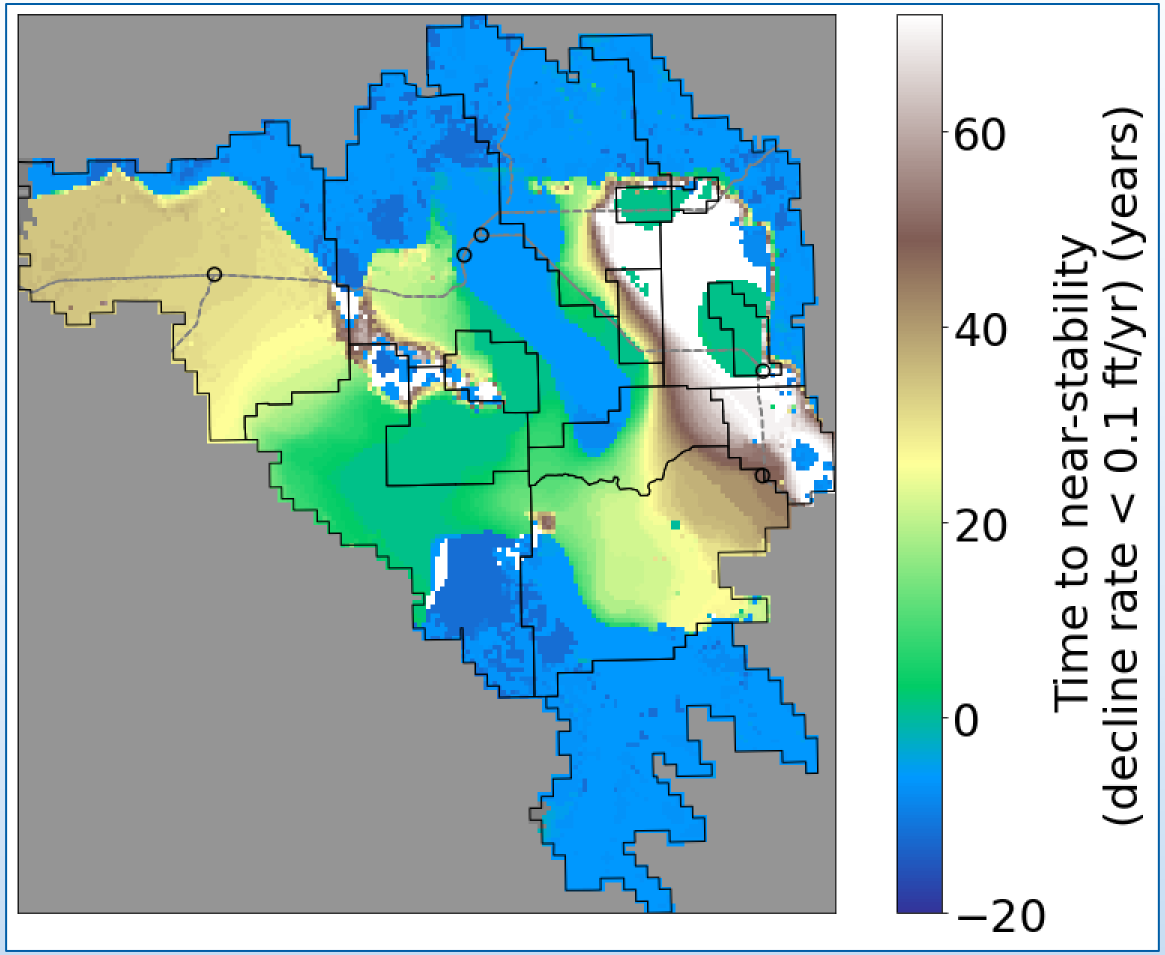
Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



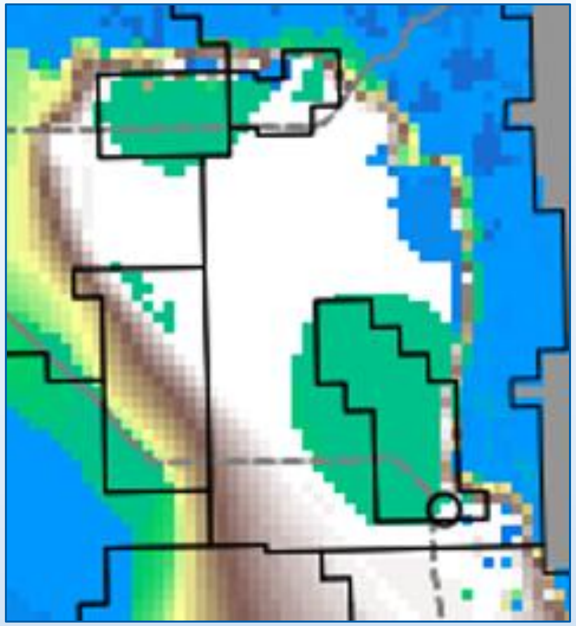
Length of Time to Achieve Near-Stability, a Rate of Decline <0.1 ft/year

Weaver Springs/Dog Mtn.



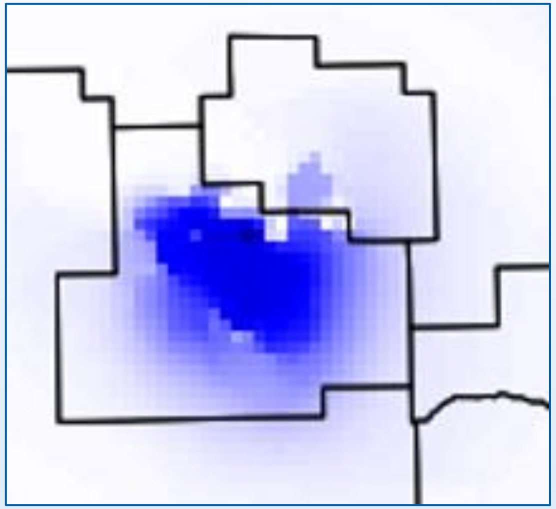


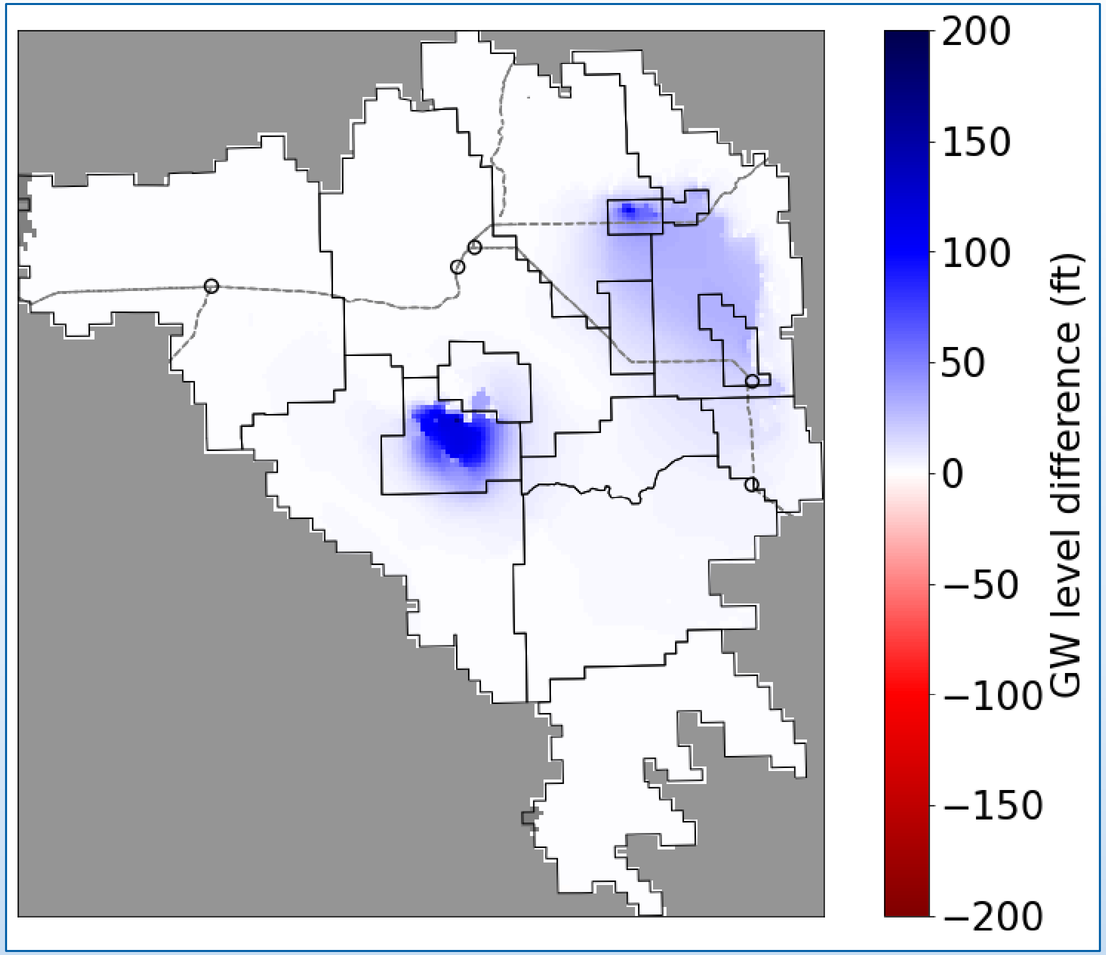
Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



Difference in Water Levels at End of Century Compared with Full-Pumpage Scenario

Weaver Springs/Dog Mtn.





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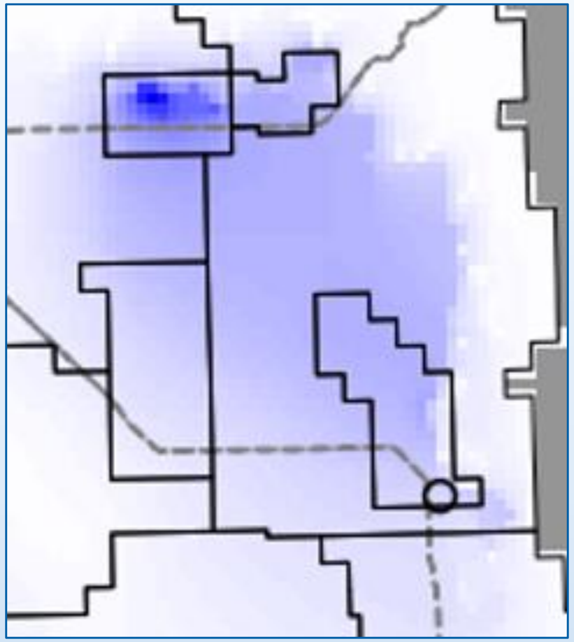

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Takeaways

- The OWRD 15 subarea scenario results indicate:
  - Positive effect on water levels but didn’t achieve the target water level trend of 0 decline.
  - Reductions in high priority subareas affect decline rates in lower priority subareas.
  - Weaver Springs (74% reduction) and North Harney (64% reduction) show recovery in a short time, indicating reductions may be more severe than necessary.
  - Portions of the basin never achieve “near stable” indicating broader geographic reductions are necessary, including in lower priority subareas

Overview of Management Scenario Conversation

Overview of Management Scenario

Goals of Conversation

Outline the process for designing a management scenario

Review an example(s) of a management scenario

Level of Participation

Inform

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Overview of Management Scenario Conversation

Step 1: Define the objective of the management scenario

- What is this scenario trying to achieve?
- Will the management scenario result in recovery or stabilization?
- What areas of the basin are being tested and why?
- What timeline(s) are being tested and why?

Overview of Management Scenario Conversation

Step 2 (where): Define the management area where pumpage reductions will occur.

Define the exterior boundaries of the management area or areas.

- The boundaries must contain all areas that meet the Critical Groundwater Area Designation criteria as specified in the Groundwater Report for the Harney Basin CGWA Rulemaking.
- The management area could be defined by one exterior boundary, multiple non-contiguous exterior boundaries, or one exterior boundary divided into subareas.
- Boundaries should be drawn using physical boundaries (rivers, roads, recharge areas, discharge areas, or other natural features, etc.) or section lines for clarity

Step 3 (How Much): Determine the volume of pumping reduction

- The amount of pumping reduction must be specified for each management area or subarea delineated.
  - 2018 modeled actual pumpage should form the baseline from which pumping is reduced. This restriction is not necessarily a requirement for final rule development but is necessary for making meaningful comparisons against the published model.
  - Define how to determine pumping reductions for the management areas delineated:
  - Reduction by percentage within an area (i.e. reduce pumping by 30% compared to 2018 pumpage)
  - Reduction to the actual pumpage value for a specific year before 2018 (i.e. reduce to the amount pumped in 2004)
  - Reduction to a particular volume specified for each subarea, where the method for determining that volume is specified.
  - Define how groundwater should be allocated within each management area or subarea - by full paper water right or by actual use.

Step 4 (when): Determine the timeframe for implementation of pumping reductions

- A timeline for pumping reductions must be defined, including the year when reductions begin and the year when they are to be fully implemented. Those years may be the same.
- If more than one management area or subarea is delineated, the timeline should be specified for each.

Overview of Management Scenario Conversation

Step 4 (when): Determine the timeframe for implementation of pumping reductions

Examples of timelines:

- Reductions occur at Y percent per year for X years beginning in year Z (Example: reduce pumping by 6% per year for five years beginning in 2028 to achieve a 30% total reduction)
- No action will be taken until the year 2027. Then, full reduction is implemented immediately in 2027.

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Model Runs OWRD Will be Running

Variable/ Scenario	A. Targeted reductions (focus on hot spots), minimize impact to small business (OWRD)	E. Reductions to 1990 volume
Definition of Success (Objective)	Stable (zero rate of decline) achieved ASAP in "hot spots"	Stable (zero rate of decline)
Management Areas (Where)	15 subareas	One basin, no subareas
Baseline for pumping reductions (How Much)	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage
Volume of pumping reductions (How Much)	Pumpage reductions for 6 subareas; 9 subareas with no reduction from 2018 estimated pumpage	Reduce pumpage by priority year (1990)
Start time and intervals of reduction (When)	2026 start; No phasing (all reductions in 2026)	2030 start; No phasing (all reductions in 2030)
Allocation of reductions (When)	Proportional reductions (all users reduce use) based on permissible total withdrawal.	Reduce pumpage to 1990 volume

Public Comment

Lunch: 1 hour

Development of Management Scenarios

Developing Management Scenarios

Goals of Conversation

Develop up to 3 management scenarios to test with the model

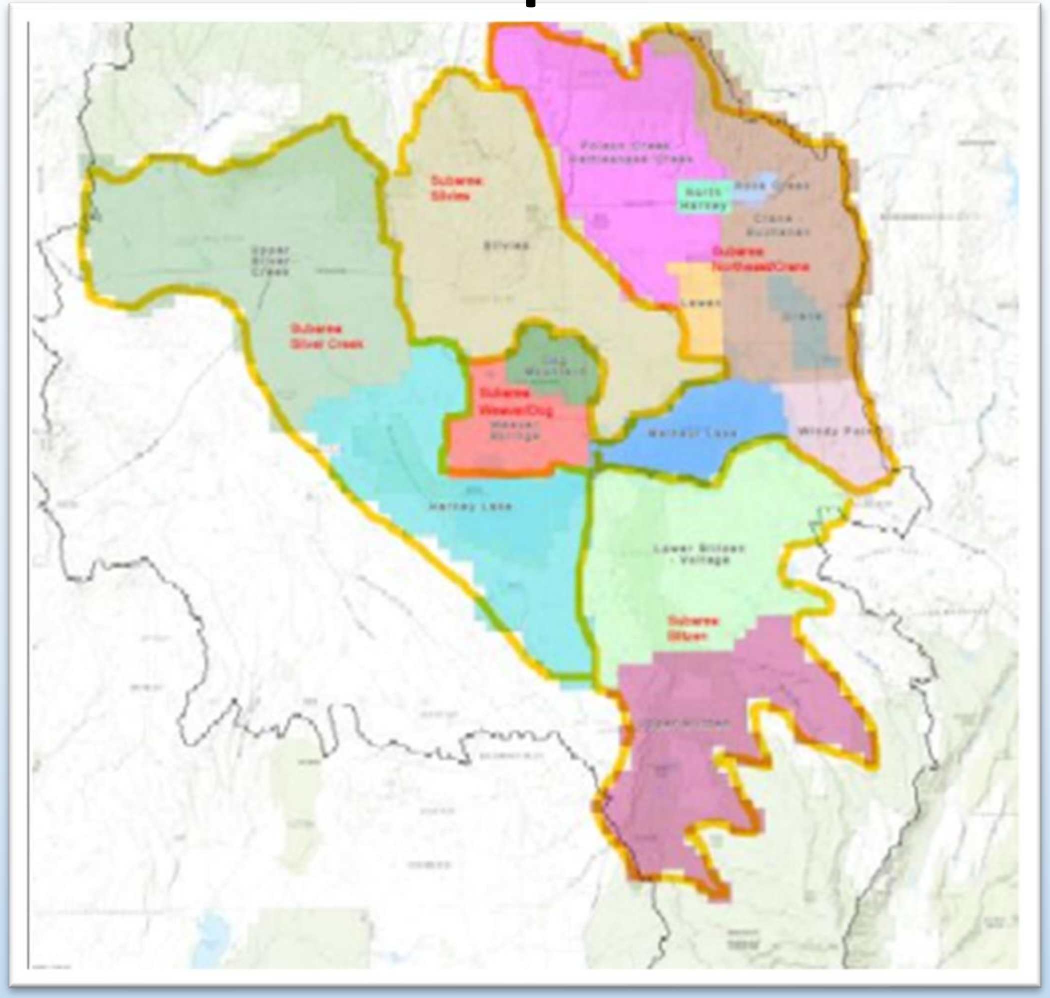
Level of Participation

Collaborate

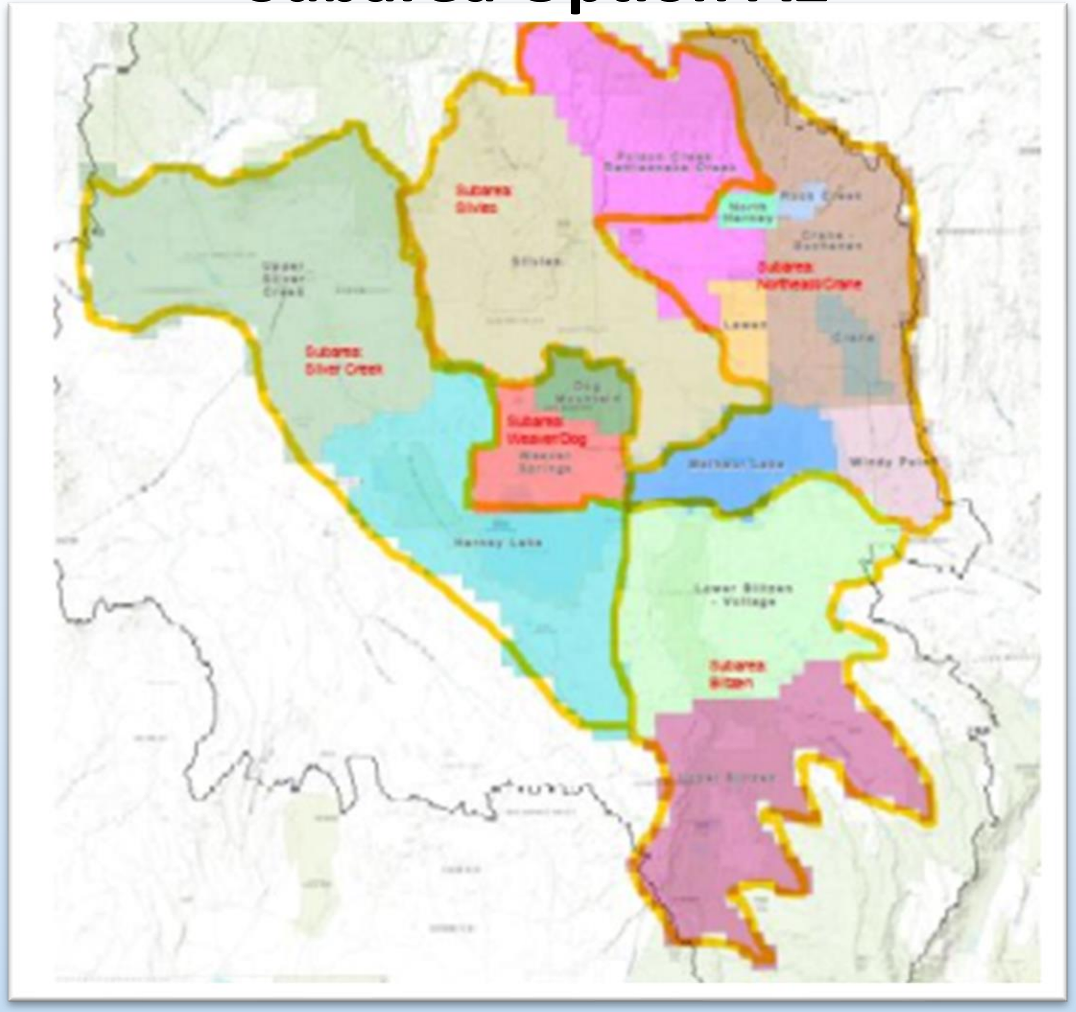
Discussion Group Management Scenarios Summary

Developing Management Scenarios

Subarea Option A1

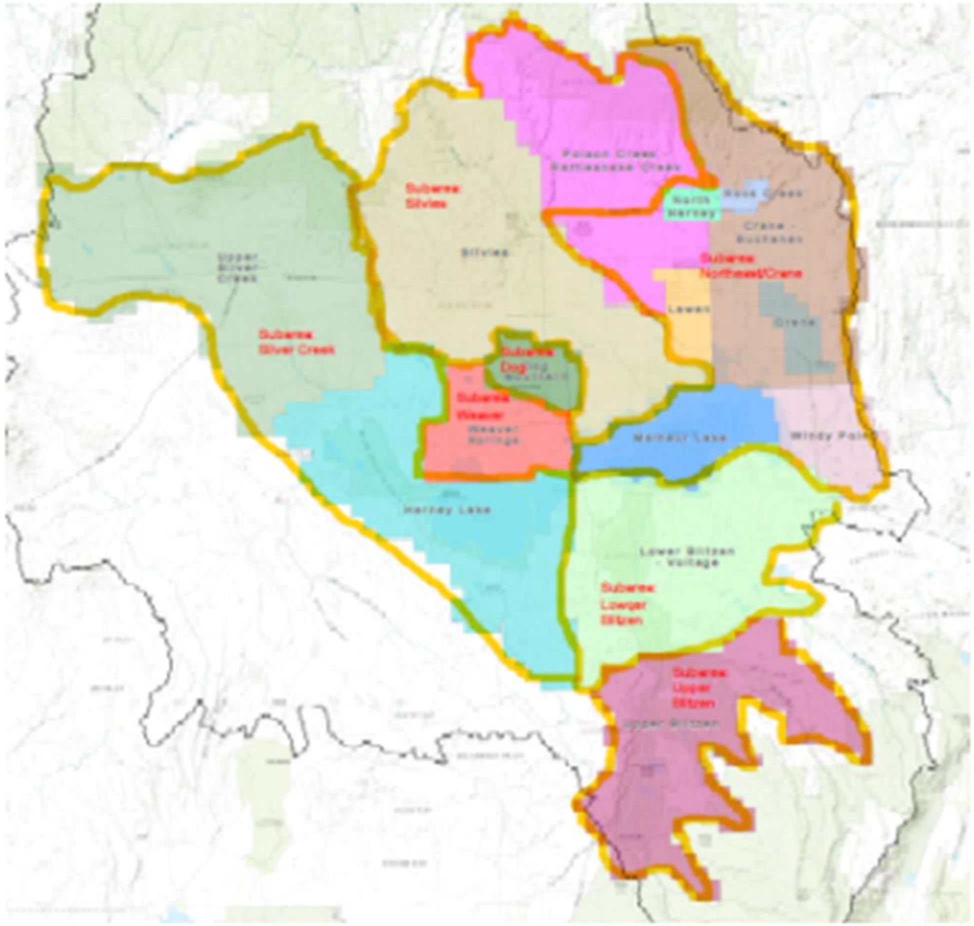


Subarea Option A2

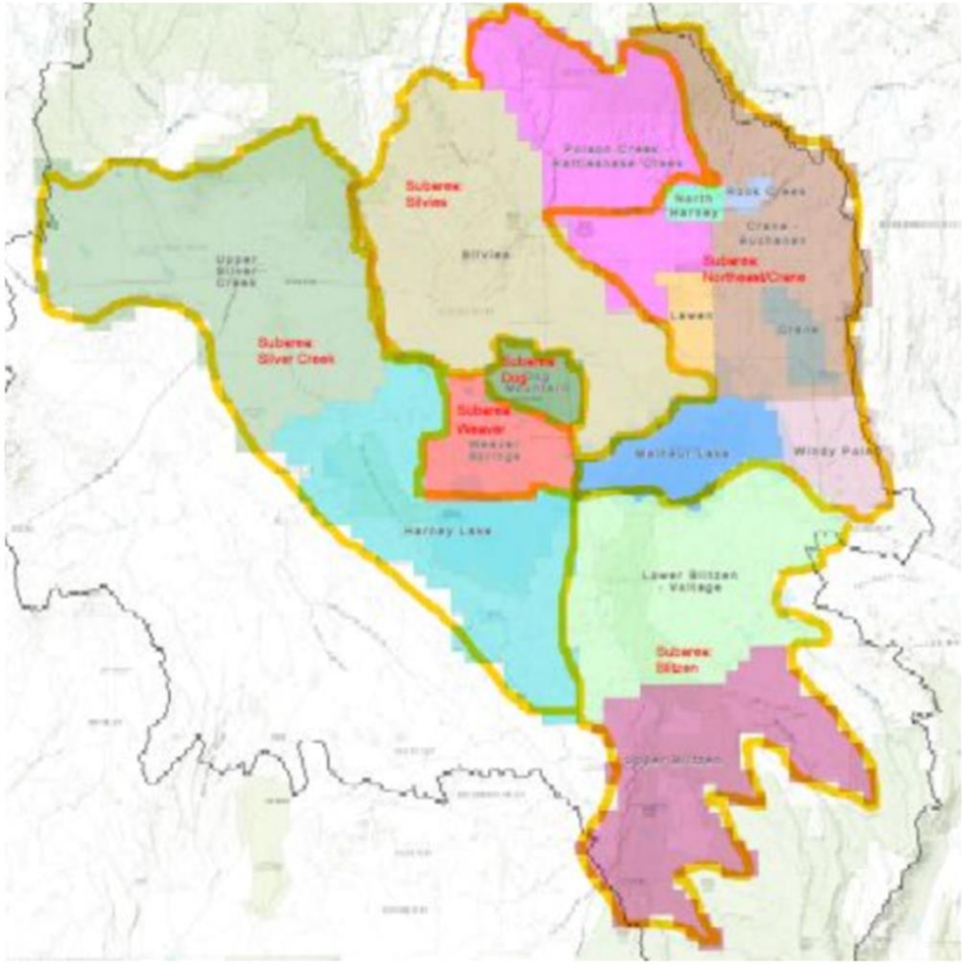


Developing Management Scenarios

Subarea Option B1



Subarea Option B2



Variable/ Scenario	A. Targeted reductions (focus on hot spots), minimize impact to small business (OWRD)	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, recover supply for ecosystem and exempt uses	E. Reductions by priority date
Definition of Success	Stable (zero rate of decline) achieved ASAP in "hot spots"	Stable (zero rate of decline) achieved by 2060 with graduated rates of decline achieved in decadal intervals	Gradual recovery (to support springs, surface flows, and domestic wells) achieved by 2060	Rapid recovery (to support springs, surface flows, and domestic wells) achieved ASAP	Stable (zero rate of decline)
Management Areas	15 subareas (C above)	5 subareas (A1,A2,B1, or B2 above)	5 subareas (A1, A2, B1, or B2)	5 subareas (A1, A2, B1, or B2)	One basin, no subareas (D above)
Baseline for pumping reductions	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage
Volume of pumping reductions	Pumpage reductions for 6 subareas; 9 subareas with no reduction from 2018 estimated pumpage	Pumping reductions different by subarea (less aggressive - phased in) See Table 3 below	Pumping reductions different by subarea (more aggressive - phased in) See Table 3 below	Pumping reductions different by subarea (more aggressive) See Table 3 below	Reduce pumpage by priority year (1990)
Start time and intervals of reduction	2026 start; No phasing (all reductions in 2026)	2026 start for reductions phased over a 30-yr period in 10 year intervals	2026 start for reductions phased over a 30-yr period in 10 year intervals	2030 start; No phasing (all reductions in 2030)	2030 start; No phasing (all reductions in 2030)
Allocation of reductions	Proportional reductions (all users reduce use) based on permissible total withdrawal.	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.	Reductions by priority date.

Discussion Group Management Scenarios

Questions

1. Discussion group – Does this reflect what was shared in your meetings?
2. Non-discussion group participants – Questions or clarifications about the process?

Management Scenarios Objective

Developing Management Scenarios

Objective/ Definition of success for each Management Scenario

- **Scenarios A and E are OWRD Management Scenarios**
- **Scenarios B through D were developed by the discussion groups**

Variable/ Scenario	A. Targeted reductions (focus on hot spots), minimize impact to small business (OWRD)	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, recover supply for ecosystem and exempt uses	E. Reductions by priority date
Definition of Success	Stable (zero rate of decline) achieved ASAP in "hot spots"	Stable (zero rate of decline) achieved by 2060 with graduated rates of decline achieved in decadal intervals	Gradual recovery (to support springs, surface flows, and domestic wells) achieved by 2060	Rapid recovery (to supp ort springs, surface flows, and domestic wells) achieved ASAP	Stable (zero rate of decline)

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Developing Management Scenarios

Roundtable Questions:

1. Do you see your interests represented in one of these scenarios?
2. Do these scenarios capture the appropriate range of alternatives?

Requirements of Model Run

RAC driven **scenario must** indicate the "**how**" and the "**when**"

Potential examples of what outcomes could look like:

- Return to (past date) levels recovery everywhere by (future date)
- Restore (percentage) of streamflows to rates from (past date) by (future date)

Developing Management Scenarios

Define the Measures of Recovery

How do we measure recovery? Options:

- Groundwater levels – e.g. return to 2010 levels
- Groundwater level rates – e.g. water levels rising .5 ft/year
- Dry wells – e.g. half of wells that went dry become functional again
- Spring and/or surface water flows – e.g. return to 2015 rates

- When should the recovery condition be met?
  - Rapid – e.g. by 2040, or within 10 years of beginning reductions
  - Gradual – e.g. by 2060, or within 30+ year

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Potential Examples of Scenario Measures

Potential examples of what outcomes could look like:

- Return to (past date) levels recovery everywhere by (future date)
- Restore (percentage) of streamflows to rates from (past date) by (future date)

*Examples:

- Return to 2010 (past date) levels everywhere by 2060 (future date)
- Restore 90% (percentage) of streamflows to rates from year 2018 (past date) by year 2040 (future date)

* *For illustrative purposes only*

Developing Management Scenarios

Roundtable Questions

1. What and when is gradual recovery?
2. What and when is rapid recovery?

Where – Subarea Boundaries For Model Scenarios

Developing Management Scenarios

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Variable/ Scenario	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, recover supply for ecosystem and exempt uses
Definition of Success (Objective)	Stable (zero rate of decline) achieved by 2060 with graduated rates of decline achieved in decadal intervals	Gradual recovery (to support springs, surface flows, and domestic wells) achieved by 2060	Rapid recovery (to supp ort springs, surface flows, and domestic wells) achieved ASAP
Management Areas (Where)	**A1, A2, B1, B2**	**A1, A2, B1, B2**	**A1, A2, B1, B2**
Baseline for pumping reductions (How Much)	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage
Volume of pumping reductions (How Much)	Pumping reductions different by subarea (less aggressive - phased in)	Pumping reductions different by subarea (more aggressive - phased in)	Pumping reductions different by subarea (more aggressive)
Timeline of Reductions (When)	2026 start for reductions phased over a 30-yr period in 10 year intervals	2026 start for reductions phased over a 30-yr period in 10 year intervals	2030 start; No phasing (all reductions in 2030)
Allocation of reductions (When)	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.

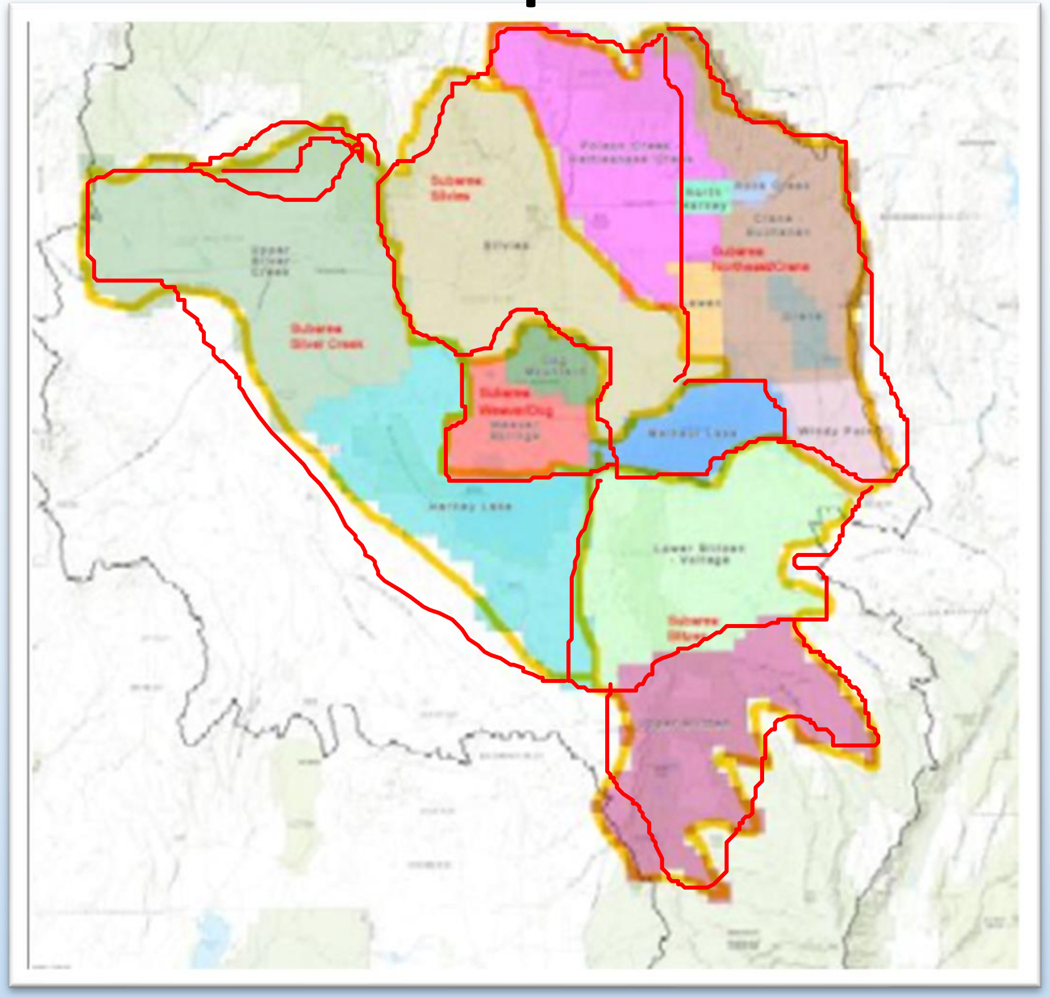
Developing Management Scenarios

Subareas Boundary Considerations

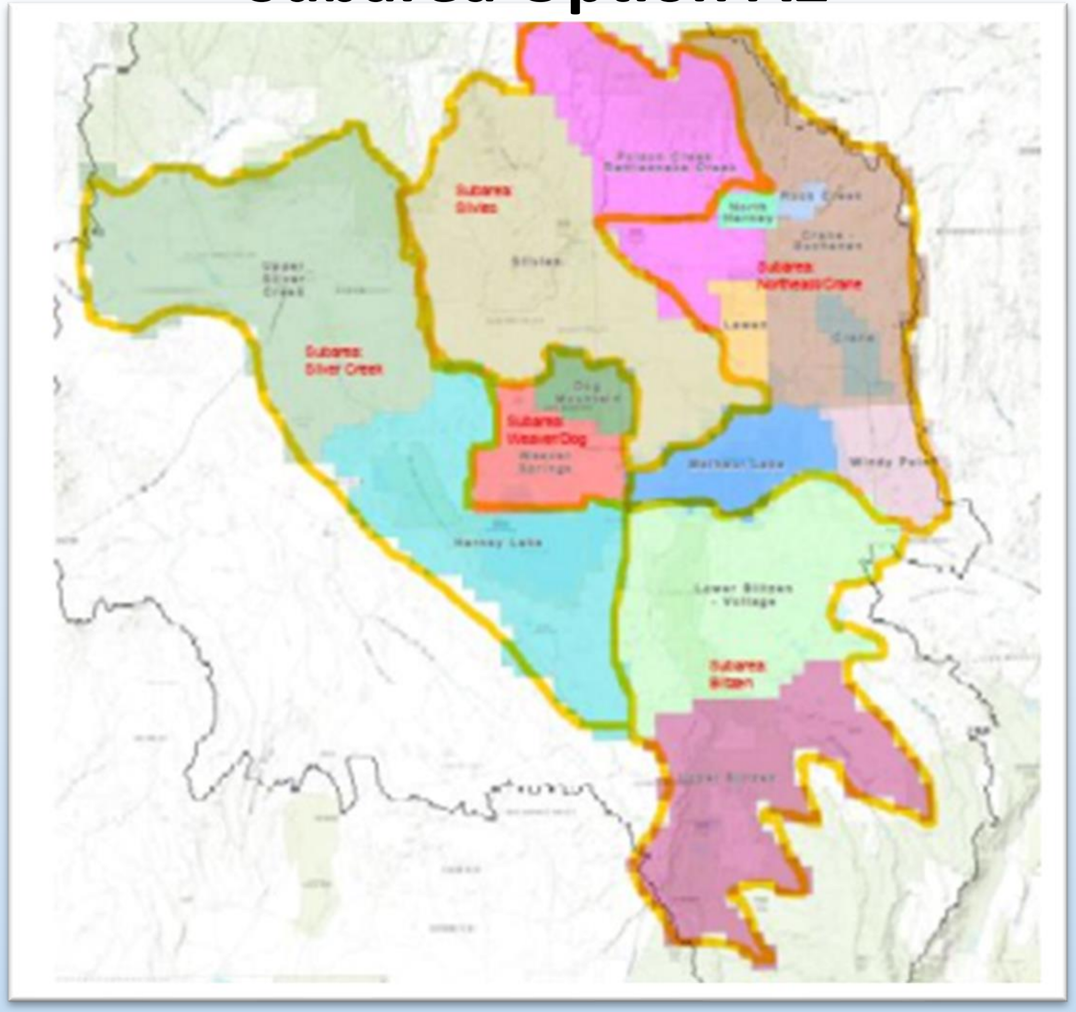
- It is clearer to compare management scenarios if they all use the same boundaries
- 15 subareas could give us a good insight into what might occur in the five subareas if Dog Mountain and Weaver Springs were split or combined

Developing Management Scenarios

Subarea Option A1

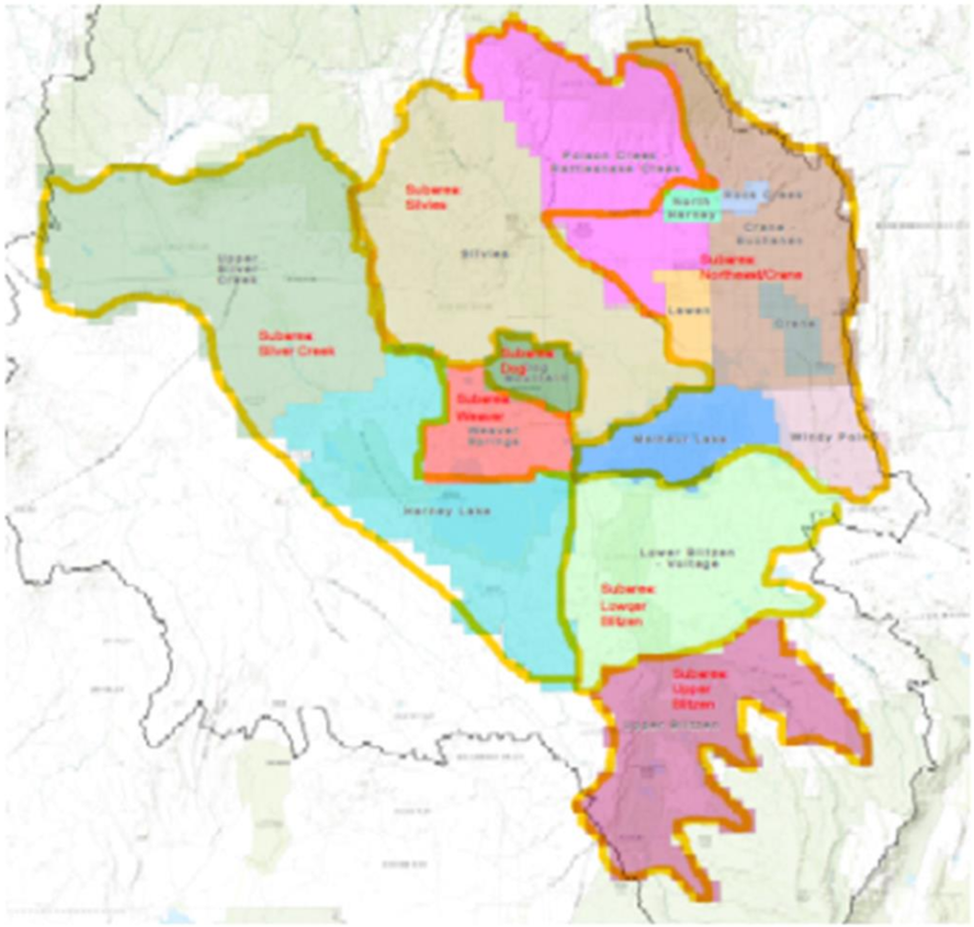


Subarea Option A2

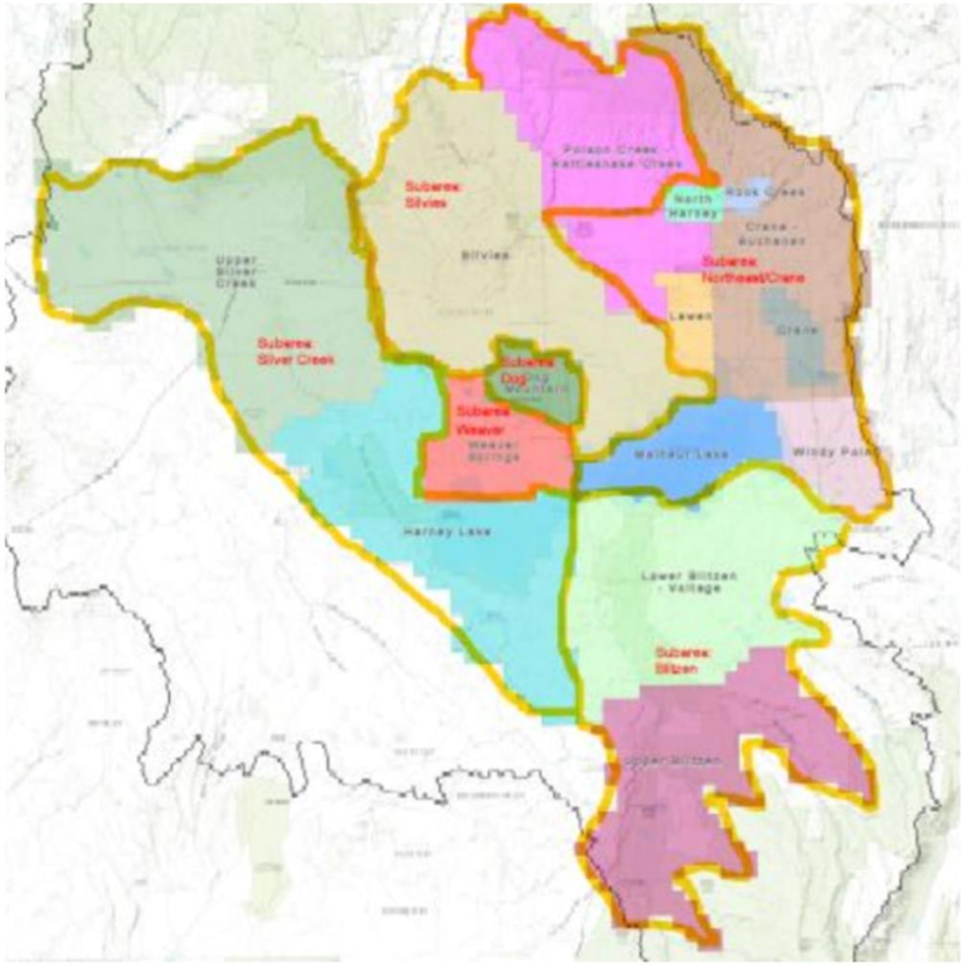


Developing Management Scenarios

Subarea Option B1



Subarea Option B2



Developing Management Scenarios

Poll Question

What option do you prefer? A1, A2, B1, B2

In-person: Please scan QR code

Online: Please fill out the Zoom survey (RAC members only, please)

When – Timeline for Reductions in the Management Scenarios

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Developing Management Scenarios

Variable/ Scenario	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, recover supply for ecosystem and exempt uses
Definition of Success (Objective)	Stable (zero rate of decline) achieved by 2060 with graduated rates of decline achieved in decadal intervals	Gradual recovery (to support springs, surface flows, and domestic wells) achieved by 2060	Rapid recovery (to supp ort springs, surface flows, and domestic wells) achieved ASAP
Management Areas (Where)	**A1, A2, B1, B2**	**A1, A2, B1, B2**	**A1, A2, B1, B2**
Baseline for pumping reductions (How Much)	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage
Volume of pumping reductions (How Much)	Pumping reductions different by subarea (less aggressive - phased in)	Pumping reductions different by subarea (more aggressive - phased in)	Pumping reductions different by subarea (more aggressive)
Timeline of Reductions (When)	2026 start for reductions phased over a 30-yr period in 10 year intervals	2026 start for reductions phased over a 30-yr period in 10 year intervals	2030 start; No phasing (all reductions in 2030)
Allocation of reductions (When)	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.

Developing Management Scenarios

Roundtable Questions

1. Do these reduction timelines meet your expectations?
2. Should we allocate the reductions equally across the wells in the model or by senior water right?

Consideration:

1. We can apply reductions equally in the model, but we cannot do that in practice
2. OWRD's management scenario allocates by senior water right

How Much – Volume Reduction for Management Scenarios

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Developing Management Scenarios

Variable/ Scenario	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, recover supply for ecosystem and exempt uses
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Baseline for pumping reductions (How Much)	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage	Estimated 2018 groundwater pumpage
Volume of pumping reductions (How Much)	Pumping reductions different by subarea (less aggressive - phased in)	Pumping reductions different by subarea (more aggressive - phased in)	Pumping reductions different by subarea (more aggressive)
Timeline of Reductions (When)	2026 start for reductions phased over a 30-yr period in 10 year intervals	2026 start for reductions phased over a 30-yr period in 10 year intervals	2030 start; No phasing (all reductions in 2030)
Allocation of reductions (When)	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.	Proportional reductions (all users reduce use) by some %.

Developing Management Scenarios

2018 Baseline Data in the Model

- 2018 was the last year in which pumpage was estimated in the groundwater basin study
- Pumpage estimates are the actual, measured values (rather than paper water rights)
- 2018 pumpage estimates were used by USGS to model the "full pumpage" scenario in the model report
- For a clear comparison, both for the USGS and OWRD 15 subareas scenarios used 2018 pumpage

5 Subareas	B. Balanced reductions, economic adjustment period	C. Balanced reductions, minimize impacts to ecosystem and exempt uses (domestic and stockwater wells), economic adjustment period	D. Balanced reductions, resto supply to ecosystem and exempt uses (domestic and stockwater wells)
Weaver Springs/Dog Mountain	54% reduction from estimated 2018 pumpage implemented over 30 year period (18% each decade)	75% reduction from estimated 2018 groundwater pumpage implemented over 30 year period (25% each decade)	65% reduction from estimated 2018 groundwater pumpage implemented in 2030
Northeast/Crane Area	30% reduction from estimated 2018 pumpage over 30 year period (10% each decade)	45% reduction from estimated 2018 groundwater pumpage implemented over 30 year period (15% each decade)	40% reduction from estimated 2018 groundwater pumpage implemented in 2030
Silver Creek	9% reduction from estimated 2018 pumpage over 30 year period (3% each decade)	24% reduction from estimated 2018 groundwater pumpage implemented over 30 year period (6% each decade)	18% reduction from estimated 2018 groundwater pumpage implemented in 2030
Silvies	0% reduction from estimated 2018 pumpage	9% reduction from estimated 2018 groundwater pumpage implemented over 30 year period (3% each decade)	5% reduction from estimated 20 groundwater pumpage implemented in 2030
Donner Und Blitzen	0% reduction from estimated 2018 groundwater pumpage	9% reduction from estimated 2018 groundwater pumpage implemented over 30 year period (3% each decade)	5% reduction from estimated 20 groundwater pumpage implemented in 2030

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Developing Management Scenarios

Roundtable Questions:

1. Do these reductions meet your expectations?

Developing Management Scenarios

Future Iteration of Model Runs

- We will evaluate the results and adjust the PTW to try achieve the stated goal
- We will present the base scenario results and the iteration

Management Scenarios Summary

Public Comment

Wrap up/Next Steps

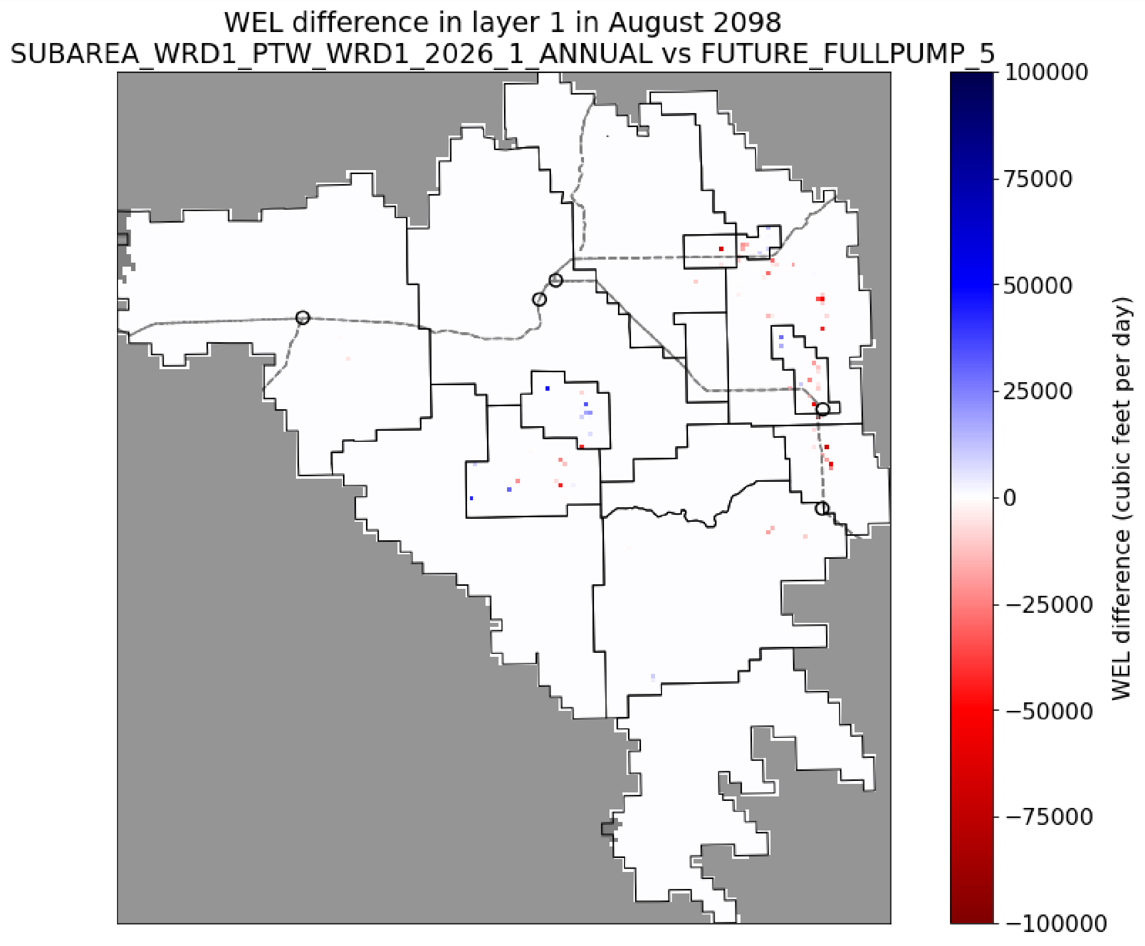
Next Steps/ Wrap Up

Next RAC

- When: November 13, 2024
- Where: Harney County Community Center
- Time : 8 am to 3 pm

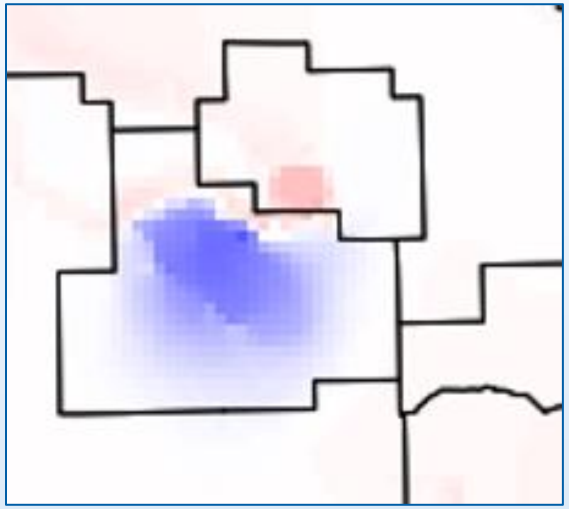
Thank you

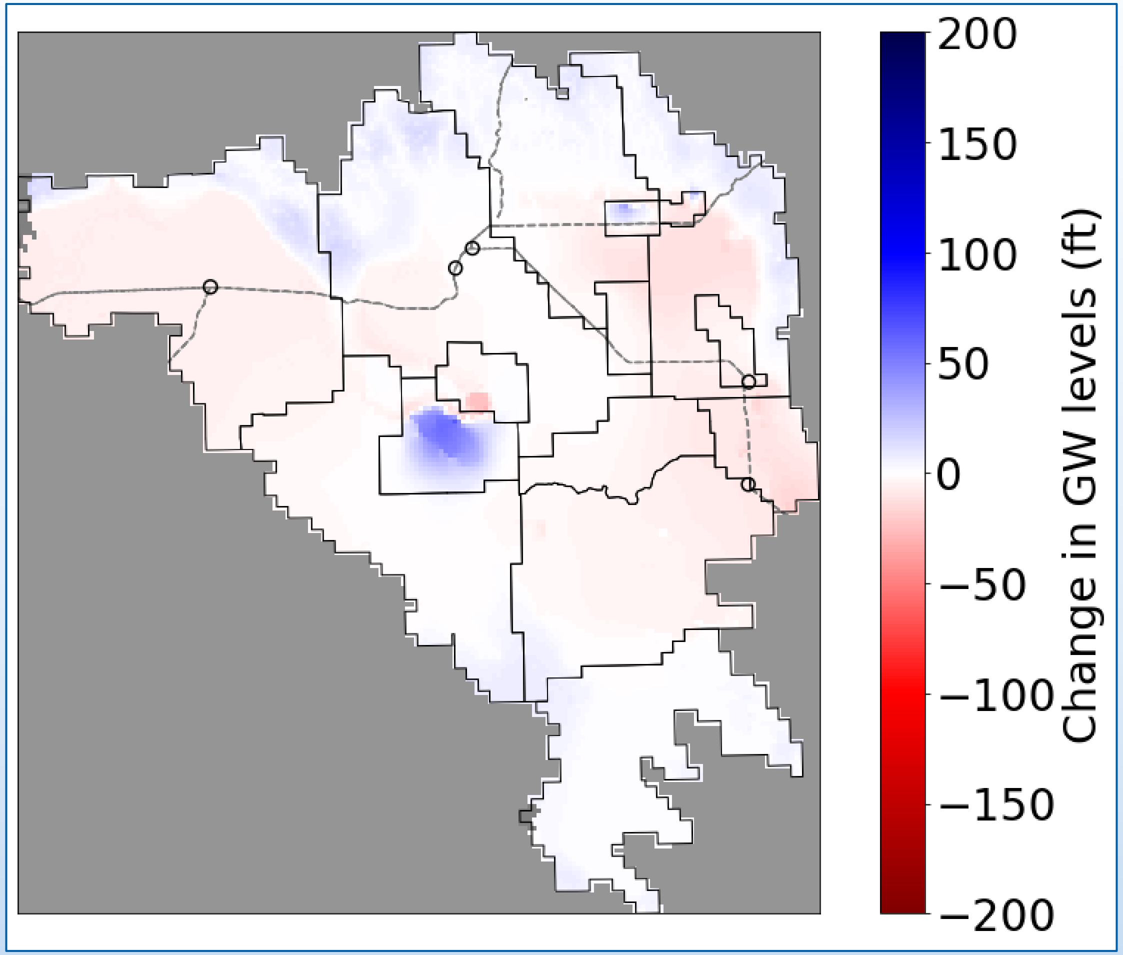
Locations of Dry Wells



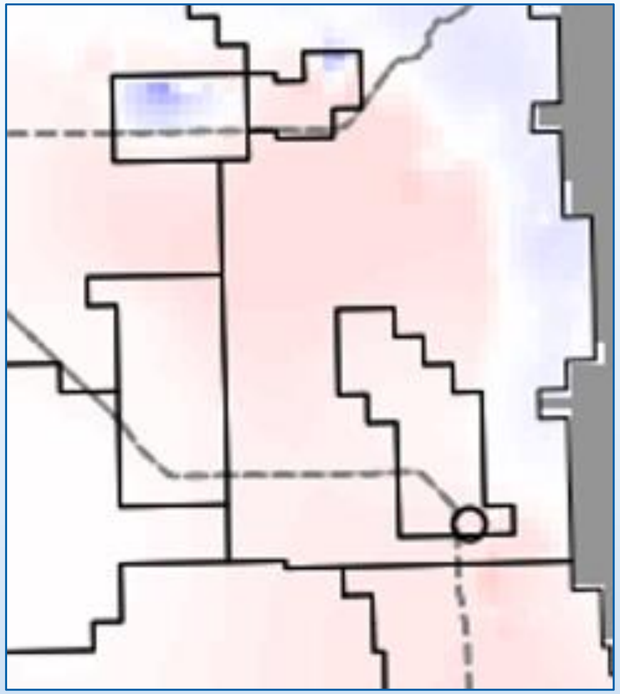
Change in Water Levels 2056 Compared to 2026

Weaver Springs/Dog Mtn.

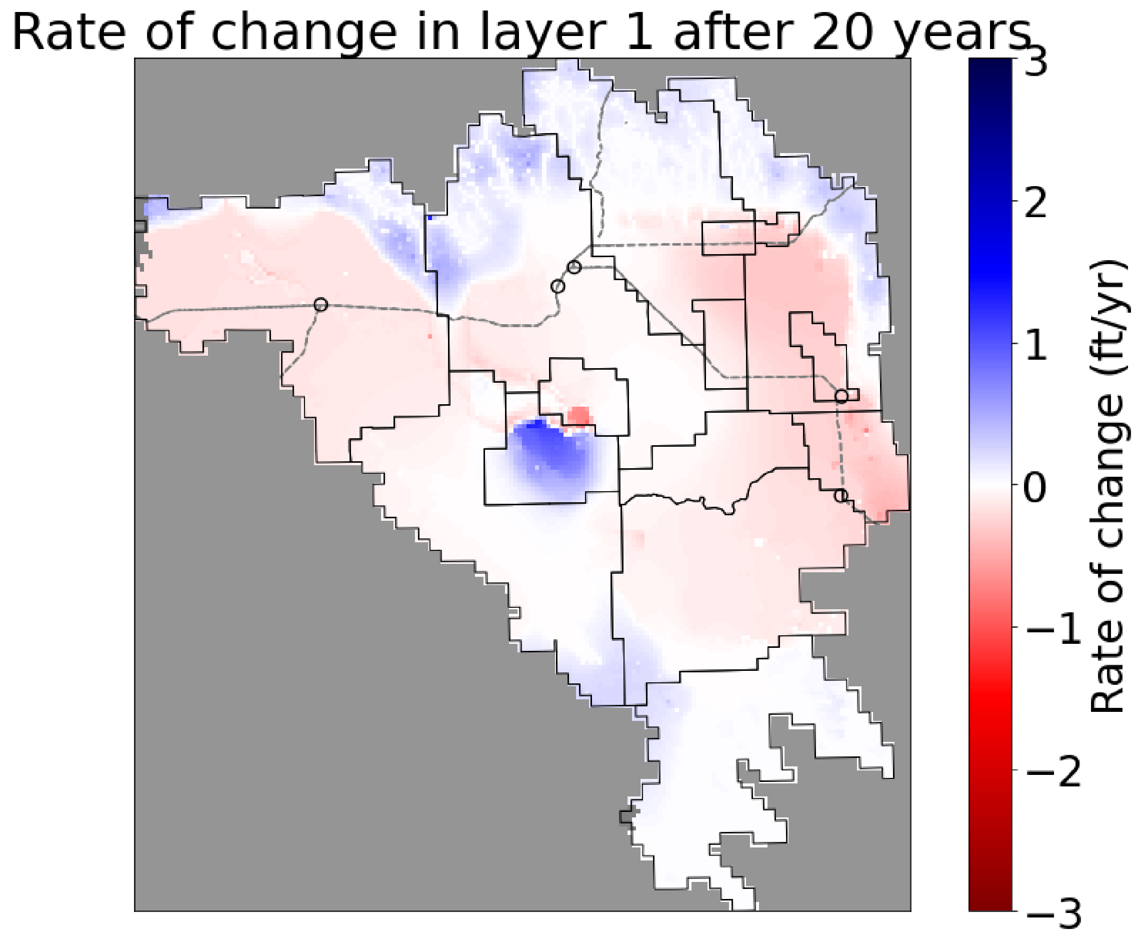




Northeastern subareas (North Harney, Rock Creek, Lawen, Crane-Buchanan, Crane, etc)



Results by Depth (model layer)



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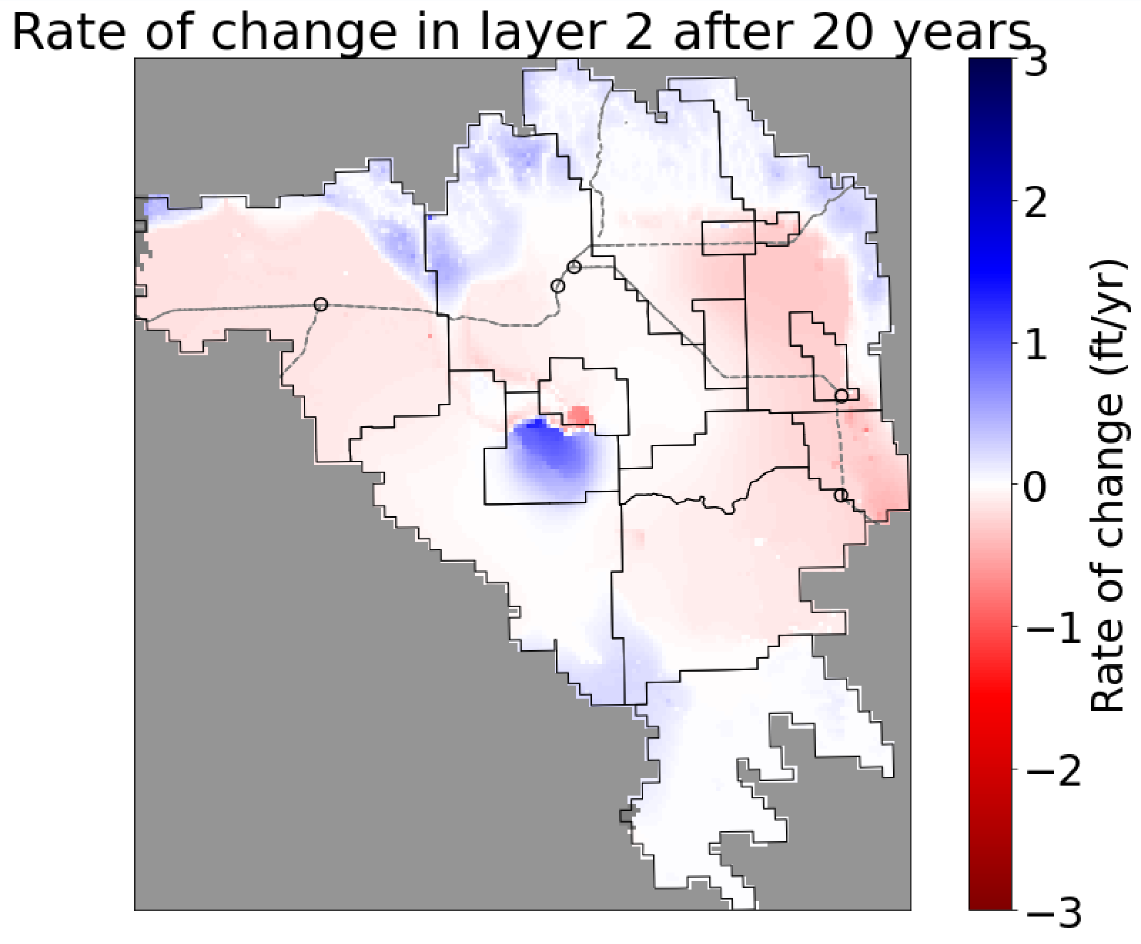

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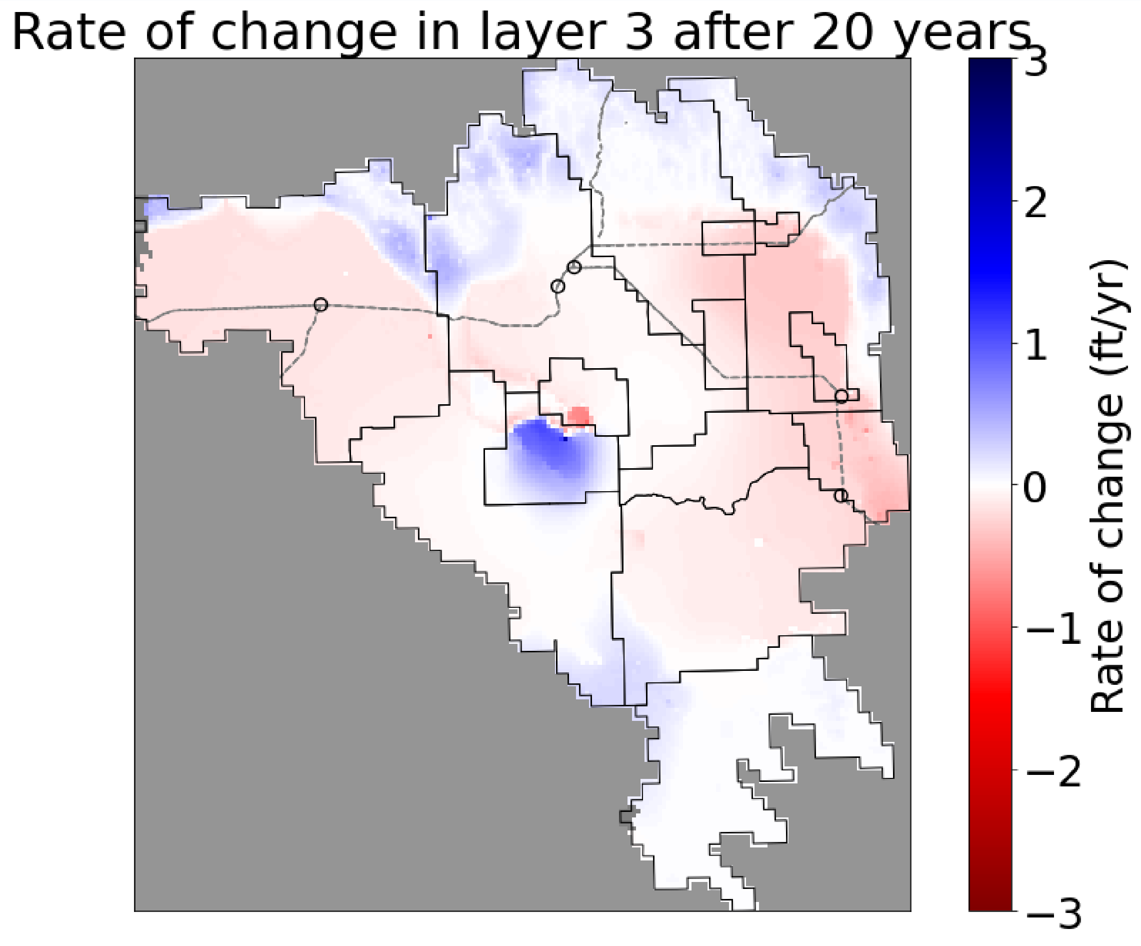

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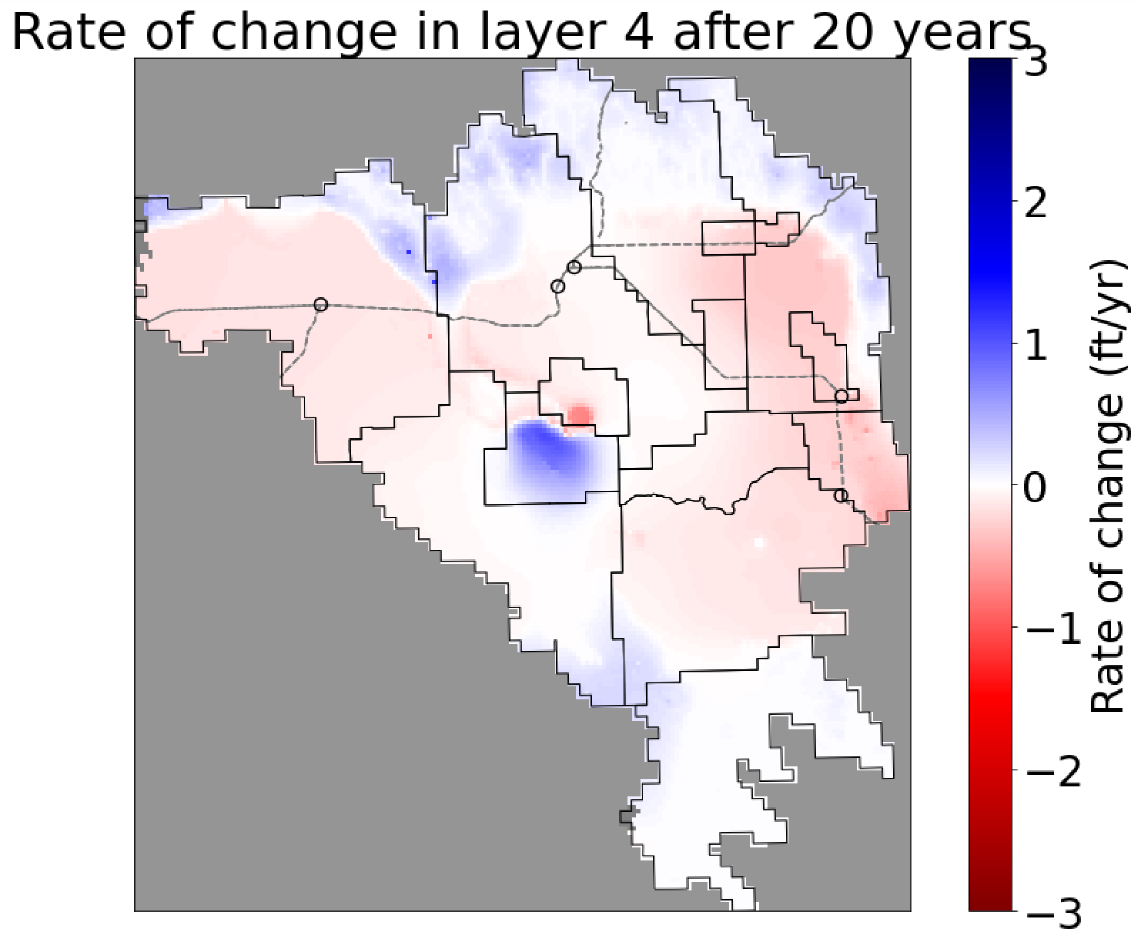

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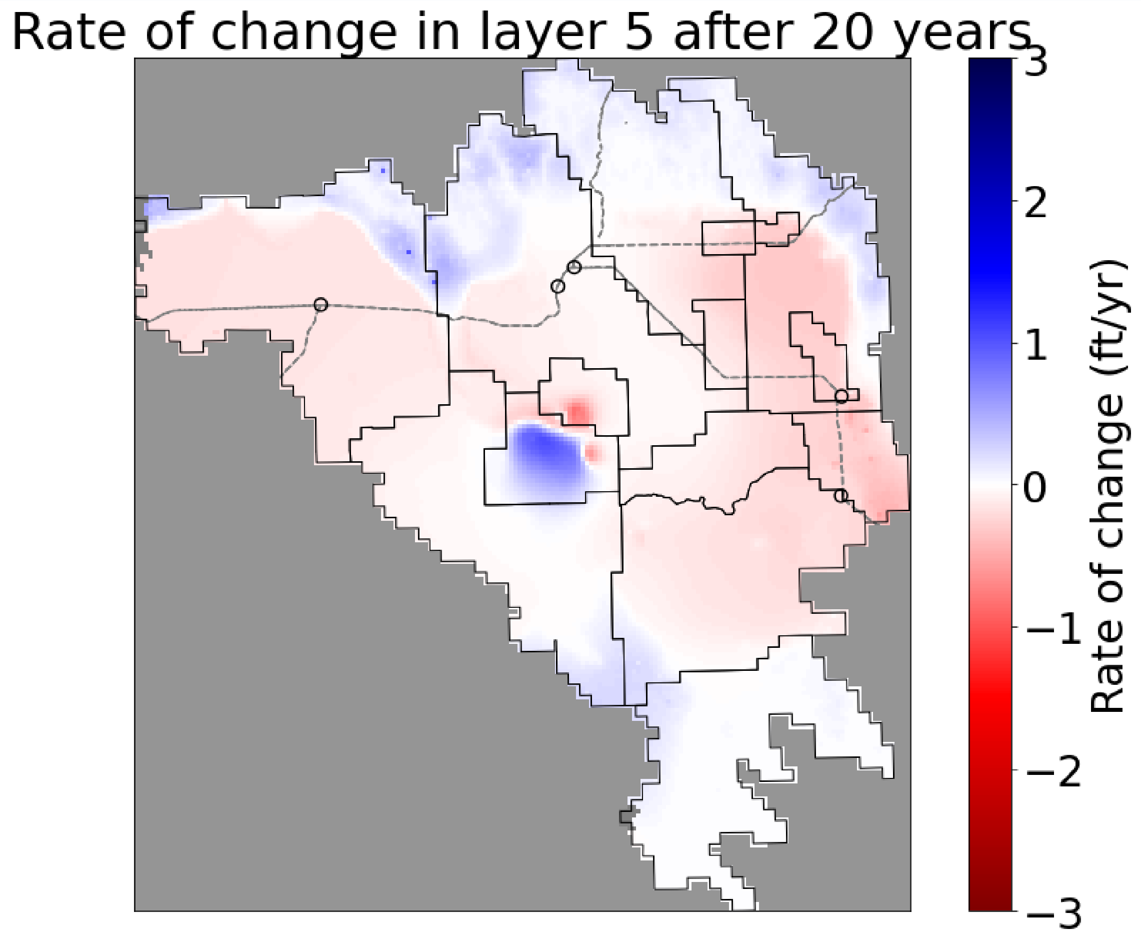

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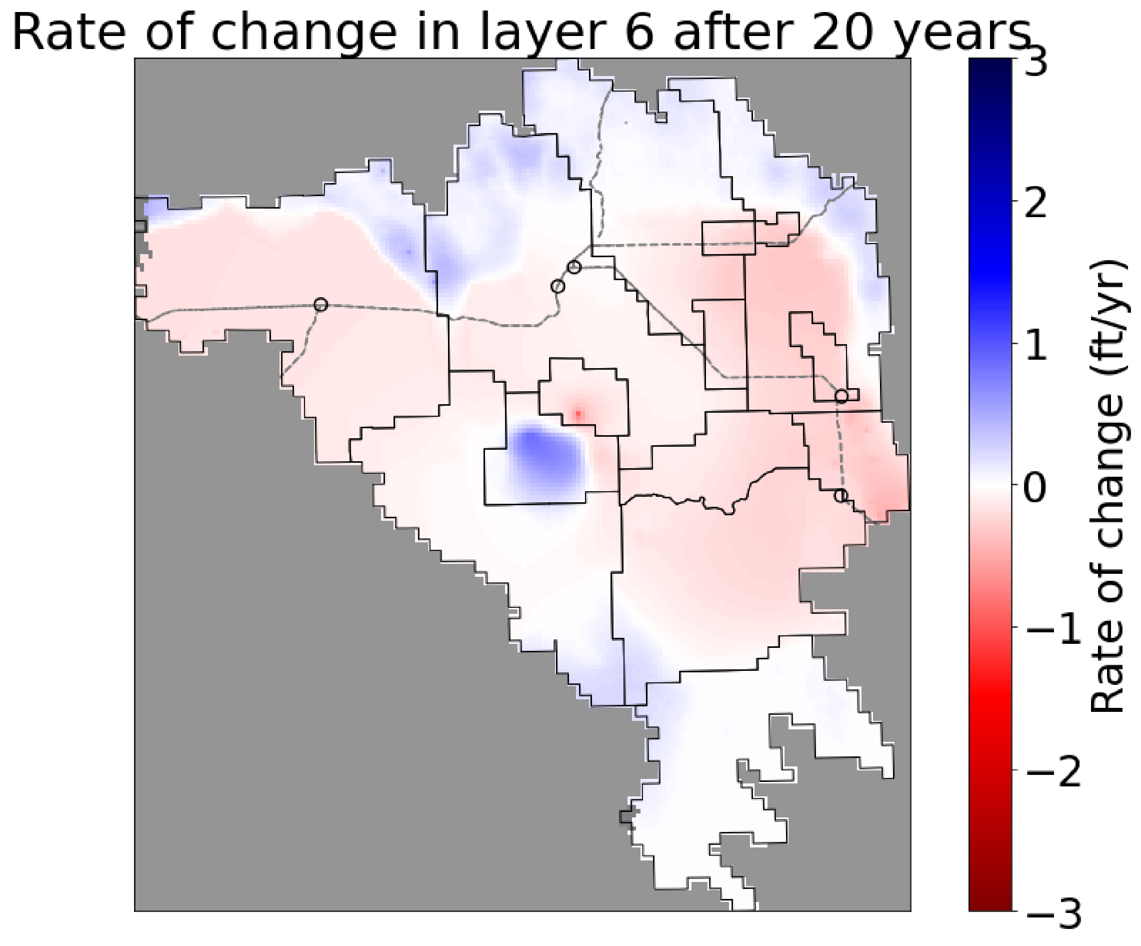

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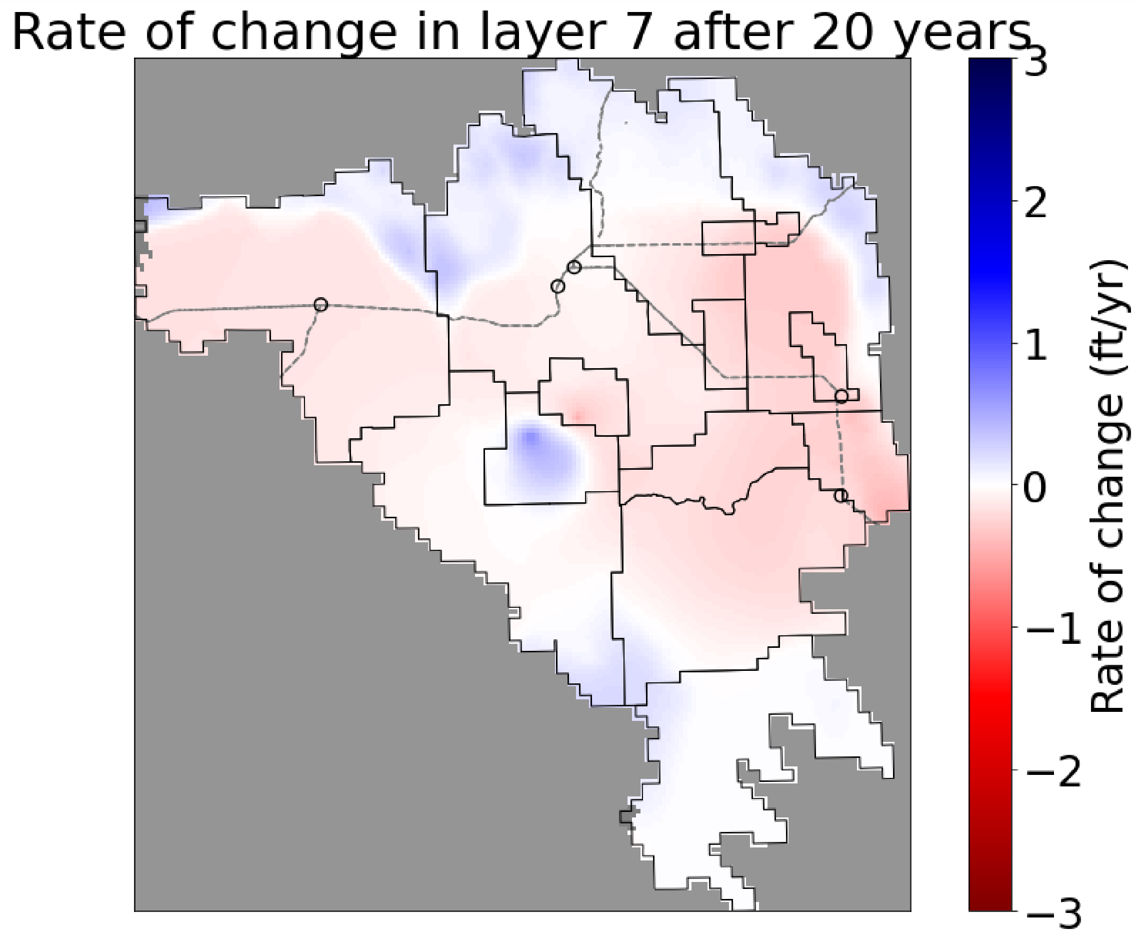
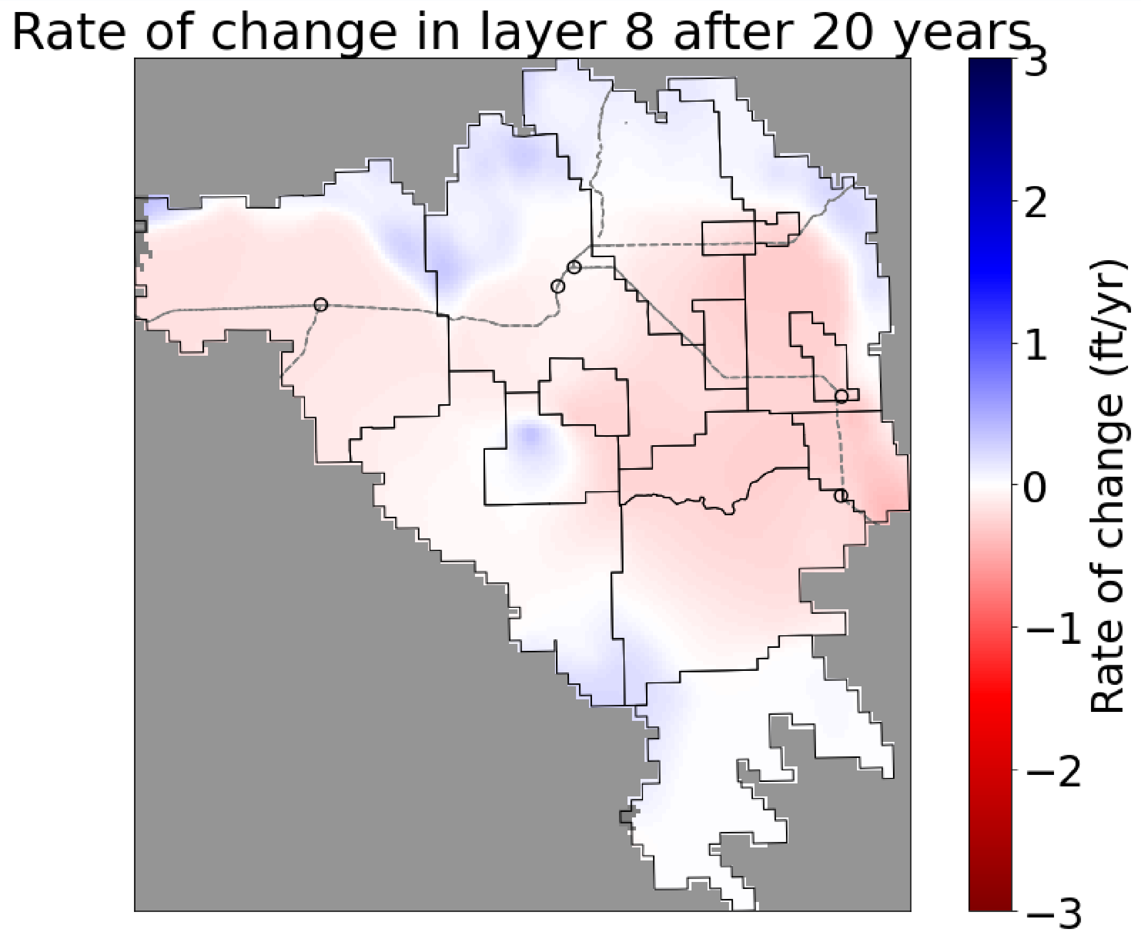


Results by Depth (model layer)



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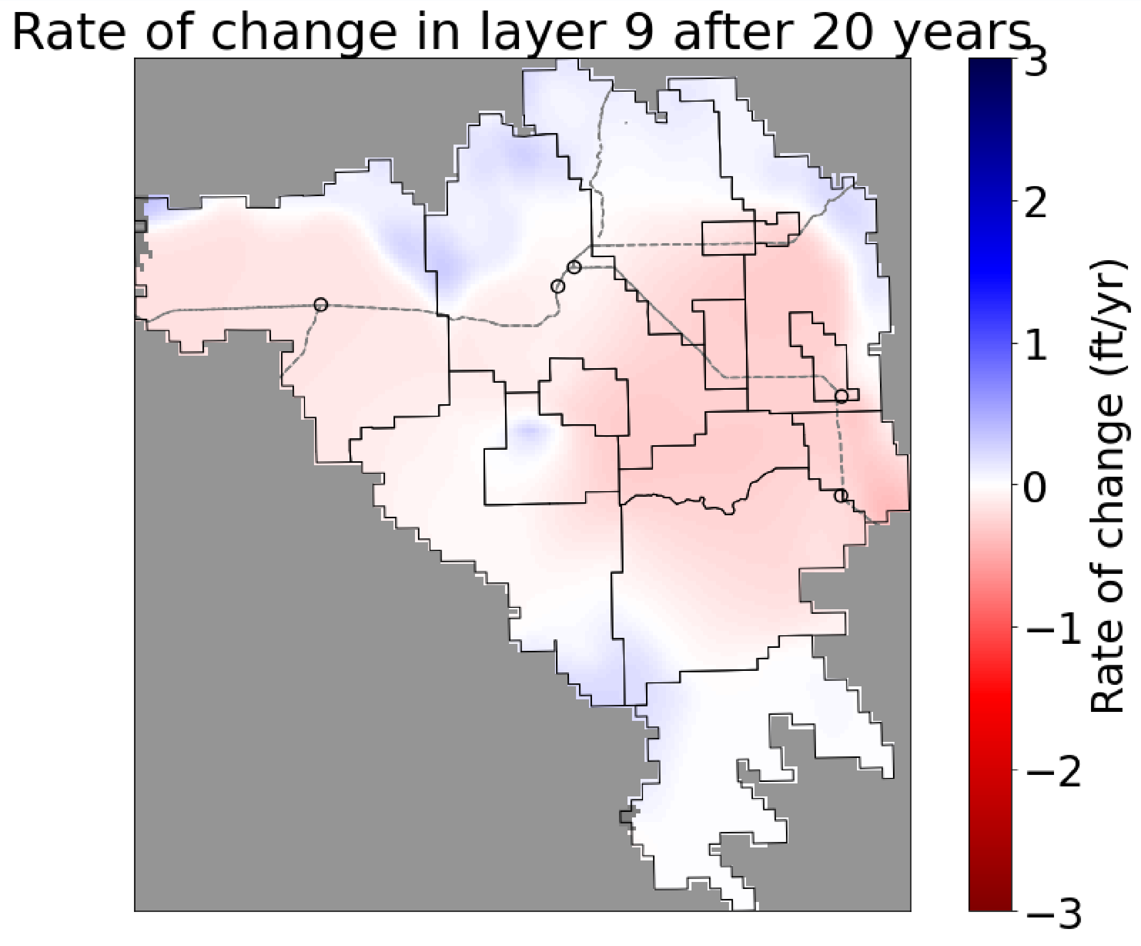

Results by Depth (model layer)