

Building Management Scenarios to Model



Harney GW RAC Discussion Groups – 09.16.24

Build Your Own Management Scenarios

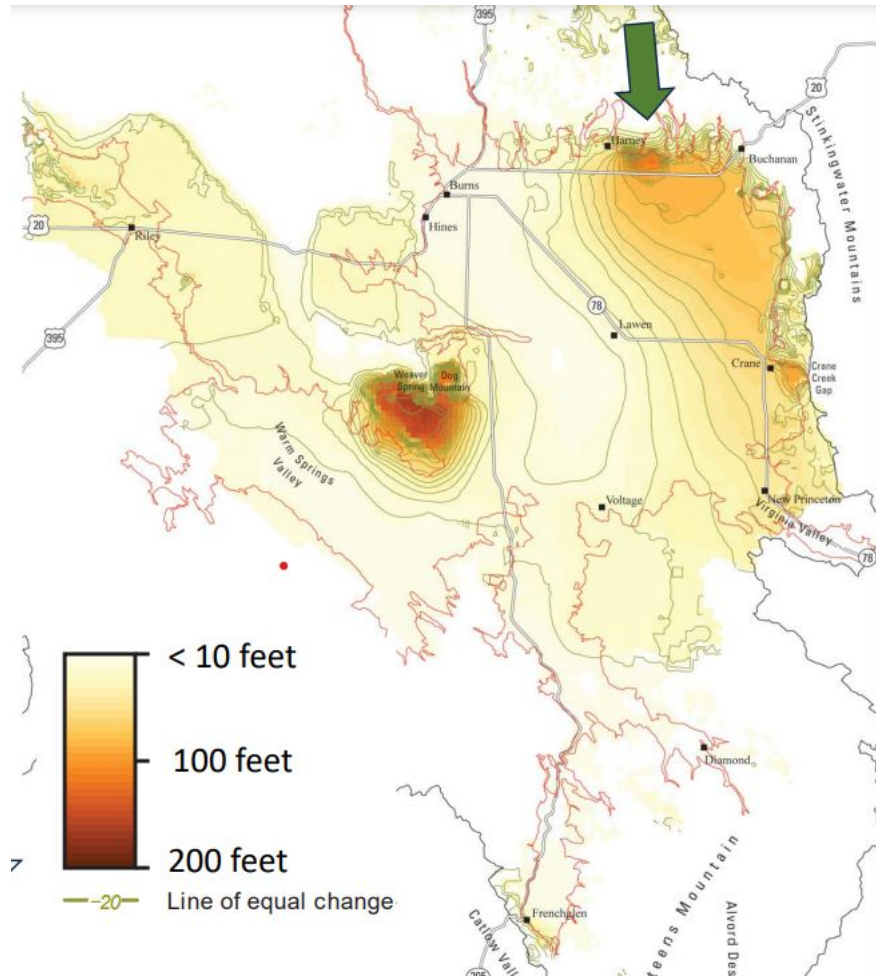
- OWRD has invited the RAC to develop up to 3 management scenarios.
- The discussion group will generate options and considerations for the RAC.
- A suite of “management scenarios” will help us examine how the groundwater system *might* respond over time to different reductions in different areas.
- At a minimum we need to know:
 - Where reductions in groundwater pumping will occur;
 - The amount of reductions in groundwater pumping;
 - The timing of reductions in groundwater pumping.

Example Management Scenarios

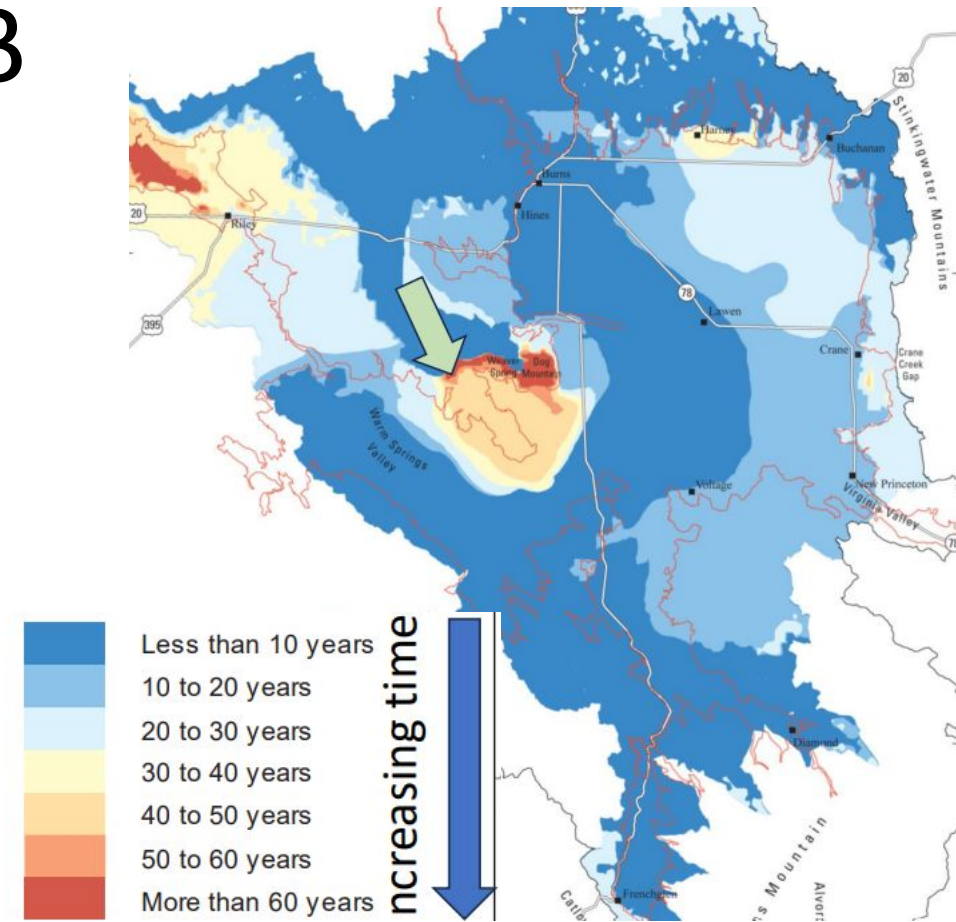
- USGS model report looked at two scenarios (both hypothetical):
 - Scenario A - Continue 2018 pumping until 2100 (status quo).
 - Scenario B - All groundwater pumping ceases after 2018 until 2100 (no groundwater pumping).
- OWRD management scenario:
 - Scenario C – OWRD implements PTW in 15 subareas
 - Results not yet available/presented
- TNC explored different levels reductions (10%, 40%, 65%) to see how it played out in different areas of the basin – for learning purposes only
- OSU explored 15 different scenarios along with economic impact
 - Not yet published/available

USGS Scenario Results (example outputs)

A



B



Delineating Sub-areas

“A [...] subarea is a portion of the [basin] that shares similar hydrogeologic properties and similar groundwater conditions including groundwater level elevations, seasonal and annual water level trends, and response to natural and human stresses. Subarea boundaries do not represent barriers to groundwater flow – groundwater is hydraulically connected across these boundaries. The intent of [delineating subareas] is to group wells together that similarly impact the [groundwater system] and where reductions in groundwater pumpage, through voluntary or regulatory action, will have a timely, measurable, efficient, and similar groundwater response within that subarea.”

- Adapted from [2024 Groundwater Level Trends Analysis](#)

Example Criteria for Sub-Area Delineation

OWRD Criteria (select)

- Groundwater flow direction
- Groundwater level trends (rate and magnitude of decline)
- Subsurface materials
- Timely, measurable, efficient, similar groundwater response

RAC Considerations (select)

- Include uplands and lowlands?
- Distinguish between shallow and deep groundwater?
- Spatial expression of reductions?
- How do people in the basin organize themselves hydrologically?
- Effectiveness of voluntary agreements?

Activity – Identify Criteria

- On sticky notes write down 3-5 criteria YOU would use to delineate sub-areas
- Get together with a partner and compare notes – combine similar sticky notes and discuss what is different
- Get together with another pair to compare notes – combine similar sticky notes and discuss what is different
- Debrief as a big group

Group brainstorming of criteria for delineating sub-areas

- Aquifer subsurface materials / Geology +2

- Water level trends / declines +2

- Areas that showed change / no change in the USGS model

- Recharge areas / how the areas are recharging and how much

- Depth of wells - shallow and deep groundwater

- Static water levels within “areas” - how wells track together

- Ownership / common usage

- Groundwater contours

- Community relationships

- Groundwater dependent ecosystems - how they're grouped and areas of impact

- Historical development

- Surface water drainage areas / recharge

- Hydraulic connection between wells

- USGS modeled scenarios

Sub-area Options

A. Harney Basin Groundwater Study Area

**B. 15 subareas within the Greater Harney Valley Area of Concern
GHVGAC (delineated by OWRD)**

**C. Five subareas within the GHVGAC (delineated by OWRD based on
RAC feedback)**

D. Three subareas based on modified surface water drainages

E. Three subareas based on USGS groundwater budget analysis

F. Delineation by HUCs

**G. Multiple subareas (number not set) based on groundwater study
results and local knowledge**

Activity – Delineate Sub-area Options

- Within a group take turns discussing how you would apply the criteria to delineate the basin (feel free to draw on maps!!!)
- Talk about what knowledge you bring to the table that can aid in applying the criteria as well as acknowledge any knowledge gaps and what you might do to fill them (write these down).
- If the group is finding some agreement on potential boundaries, draw them in red (?).
- Discuss and write down strengths and weaknesses or remaining questions and uncertainties of the options the group discussed.

Additional Considerations

- Priority/prior appropriation (don't single out senior water rights holders)

- North and South are easier to distinguish than Northeast and Northwest - can we use the model to help explore boundaries?

- Weaver Springs is different (subsurface geology/cinder cones) - where is the recharge to Weaver Springs?

- Extent of "Weaver Springs" subarea is uncertain - where does Dog Mountain fit in?

- Silvies and Donner Und Blitzen are the biggest recharge areas, but they're not recharging areas equally
 - for eastside of the basin, how much recharge is coming from Silvies?

- What groundwater levels do domestic well owners/stockwater users care about in each area? How can we model for these?

- What groundwater levels are important to maintain for GDEs in each area? How can we model for these?

Current Conditions/Problem Identification

- The understanding of the problem will affect the course of action
- Groundwater level declines vary across the basin
- The nature and magnitude of the problem affects management
 - Acute declines (smaller radius, steep, fast) vs spread out (gradual, larger radius, slower)
 - Existing vs future declines
- Nature, extent, and timing of impacts affects management
 - What impacts will occur when?
 - What impacts have already occurred?
- Select a subarea to focus on - What current conditions or problems have you observed or experienced? What problems would you like to avoid?
 - What data, knowledge, or information do you have to support your observations and concerns?

Indicators/Measures of Success

- The definition of “success” will affect the course of action
- Everyone might have a different indicator or measure of success that they will use to evaluate against
 - Success might be expressed as a groundwater level achieved and maintained as well as the time to achieve it
 - Success might be expressed as a more personal goal
 - Success might be expressed as a larger community goal
- Select a subarea to focus on – What does success look like in this subarea? How would you know when success is achieved?
 - What data, knowledge, or information do you have to “measure” or “indicate” success?

Management Scenarios

- Management scenarios describe the amount of reductions in a place over a period of time that would correct or avoid “problems” and achieve “success.”
- The model won’t give us the answer but it will help us “test” different alternatives.
- The amount of reductions will be informed by:
 - How we organize management areas/subareas;
 - Our current understanding of the problems;
 - How we define success.
- We don’t have to get it RIGHT right now – we need to identify options for further exploration.

Management Scenarios

- Reflect on the amount of reductions that they would like to explore/examine in a model
 - What reductions do you think would avoid problems and achieve success as we've previously discussed?
 - Are there different amounts you would like to explore or examine?
 - Would you base these reductions on paper water rights or an estimate of actual use?
- Reflect on the timing of those reductions
 - Would reductions occur immediately or gradually?
 - When would you like to achieve "success" and how long do you think it might take?
 - What is your sense of urgency and why?
- Reflect on the allocation of reductions
 - How would reductions be allocated amongst users?
 - Would you prefer reductions happen proportionally (a shared approach) or by priority or another approach? Why do you have this preference?

Putting it All Together...

- What will the outputs look like and how does that affect the construction of a management scenario?
- This exercise won't tell us WHAT to do or HOW to do it, it will only help us visualize different courses of action
- See the management scenario table or worksheet

