

Explanation of Draft Harney Basin Critical Groundwater Area Map

This document is intended to provide context for the Division 512 draft subareas map provided as part of the rulemaking process. The recently adopted rules detailing the process for designation of a critical groundwater area (OAR 690-010) require that the basin program rules define the boundaries of the critical groundwater area (CGWA) and may divide the area into smaller subareas. The draft map shows the proposed exterior boundary of the CGWA area as the current Greater Harney Valley Groundwater Area of Concern (GHVGAC) boundary and then divides that area into 15 smaller proposed subareas. Please note that while there are 15 proposed subareas, the Department does not intend to propose curtailment in all of them.

Below are some questions and answers regarding the subareas and the map.

What is a subarea?

A CGWA subarea is a portion of a groundwater reservoir 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. The intent of dividing a CGWA into subareas is to group wells that similarly impact the local portion of the groundwater reservoir and where reductions in groundwater pumpage, through voluntary or regulatory action, will have a timely, measurable, efficient, and similar groundwater response within that sub area.

What criteria were used to determine the subarea boundaries?

Three primary criteria were used for defining subarea boundaries:

1. Hydraulic gradient (groundwater flow direction)
2. Groundwater level trends
3. Subsurface materials

These three criteria were discussed in detail at RAC #2 and more information about the criteria can be found at the end of this document.

How can subareas be used?

Subareas can be used in several ways:

- Voluntary Agreements: Subareas clarify which groundwater users could work together on a voluntary agreement within that portion of the groundwater reservoir.
- Curtailment: Subareas can facilitate targeted curtailment implementation within the CGWA with the goal of reducing groundwater level declines within portions of the groundwater reservoir where declines are most severe. This approach attempts to minimize the impact to groundwater rights not located in areas of greatest decline.
- Transfers: Under consideration is the concept that subareas could be useful to help assess “same source” for the purposes of transfers, meaning that transfers within a sub area could be allowed and transfers between sub areas may not. Again, this relates to timely, efficient, and similar impacts with respect to establishing subareas.
- Water use measurement and reporting (SWMPA): Subareas can facilitate targeting water use measurement and reporting requirements to specific areas, which may delay the cost and burden of measurement and reporting in other portions of the CGWA.

Will all subareas have groundwater use curtailed?

The Department will discuss at RAC #3 OWRD proposed curtailment criteria and RAC alternative ideas. One possible approach is to apply the criteria adopted to each subarea to determine if or when groundwater use should be curtailed. The Department does not anticipate curtailment in all subareas. How the curtailment process is timed and implemented is open to discussion and has not been determined.

How will curtailment criteria be applied to subareas?

The Department anticipates establishing curtailment criteria for the entire CGWA that are applied universally when evaluating each subarea for a possible need for curtailment. The criteria could function as a curtailment threshold for each subarea. If the curtailment threshold is crossed, curtailment implementation would follow applicable statutes and rules. The Department hopes the curtailment threshold would function as an incentive for voluntary agreements between water users within a subarea to prevent crossing the threshold and subsequent regulation within that subarea.

PRIMARY CRITERIA CONSIDERED IN DELINEATION OF SUBAREA BOUNDARIES

A Critical Groundwater Area (CGWA) subarea is a portion of a groundwater reservoir that shares similar hydrogeologic properties and groundwater conditions or behavior that may include similar water level elevations, seasonal and annual water level trends, and response to natural and human stresses. The intent of dividing a CGWA into subareas is to group wells together that have similar local impacts on the groundwater reservoir and where reductions in groundwater pumpage, through voluntary or regulatory action, will have a timely, efficient, and similar groundwater response within that subarea.

1. Hydraulic gradient (groundwater flow direction)

The horizontal and vertical hydraulic gradient is the driving force of groundwater flow. Groundwater in the proposed HBCGWA generally flows radially inward from the margins toward the central part of the Harney Basin near Harney and Malheur Lakes, with some local perturbations due to groundwater withdrawals and a small amount of groundwater exiting the Harney basin toward the Malheur River Basin. Groundwater level elevation contours representing both the water table elevation and the potentiometric surface for wells deeper than 150 feet (Gingerich and others, 2022) provide information on hydraulic gradient (both horizontal and vertical). Where existing groundwater level data are sparse, surface topography and surface water drainage divides can also provide information on likely groundwater flow directions. Where hydraulic gradient indicates distinct recharge sources, divergent groundwater flow directions exist, or vertical hydraulic gradient changes occur, this can inform the delineation of boundaries for subareas within which aspects of this criterion are similar.

The following data sources are available to inform evaluation of this criterion:

- Groundwater level elevation contours (Gingerich and others, 2022)
- Surface topography
- USGS hydrologic units from the National Watershed Boundary Dataset (WBD)
- Groundwater level hydrographs

2. Groundwater level trends

Seasonal and long-term groundwater level trends provide information on groundwater response to both natural and pumping-induced stresses. Where distinct trends in seasonal and/or long-term groundwater response to stresses exist, groundwater level trends from groups of wells can inform the delineation of boundaries for subareas within which aspects of this criterion are similar.

The following data sources are available to inform evaluation of this criterion:

- USGS and OWRD annual, quarterly, and hourly static groundwater level measurements archived in USGS and OWRD databases
- Water right required groundwater level measurements and other groundwater level measurements reported to OWRD archived in OWRD database

3. Subsurface materials

Subsurface materials control the storage and flow of groundwater. Variations in the hydraulic properties of subsurface materials occur widely across the proposed HBCGWA. Subsurface materials in the Harney Basin have been grouped into nine (9) hydrostratigraphic units (HU), which are distinguished and characterized by common hydraulic properties and consist of one or more stratigraphic units that occupy a similar stratigraphic position (Gingerich and others, 2022; Grondin and others, 2022). Although the nine (9) hydrostratigraphic units have distinct hydraulic properties, groundwater flows between individual hydrostratigraphic units and is hydraulically connected both laterally and vertically. Where variations of subsurface materials occur, this can inform the delineation of boundaries for subareas within which aspects of this criterion are similar.

The following data sources are available to inform evaluation of this criterion:

- Published geologic mapping
- Hydrostratigraphic unit determinations from Grondin and others (2022); Gingerich and others (2022)
- Drillers' formation descriptions
- Aquifer test and specific capacity data