Reevaluating Palouse Groundwater Basin Compartmentalization

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Objectives

1.0: Background and Water Level Preprocessing

2.0: Aquifer Compartmentalization in the Palouse Groundwater Basin (PGB)

3.0: Computation of Calculated Drawdown from Regional Trends

4.0: Aquifer Test Analysis
Columbia River Basalt Group (CRBG)
2.0: Aquifer Compartmentalization in the Palouse Groundwater Basin
Compartment Forming Features

- **Faults**: offsets tabular, permeable interflow zones and create linear features of low horizontal and high vertical permeability.

- **Folds**: disrupts the principal directions of anisotropy.

- **Dikes**: result in significant contrasts in well yields and water levels.
Lateral Compartmentalization

• Defined as the division of the Grande Ronde Formation into irregularly shaped blocks (i.e., compartments) that are hydraulically separated laterally by sub-vertical, low hydraulic conductivity zones.

• Wells within an individual compartment respond predictably to short-term pumping stresses.
Hydraulic Connection Types

- Drawdown spikes (no compartment walls between them)
- Damped response (i.e., a non-theoretically predicted response)
Determining Lateral Compartments
Lateral Compartment 1 (LC 1)
Lateral Compartment 1 (LC 1)

Moscow Fault Zone mapped by Conrey and Crow (2014)
Lateral Compartment 2 (LC 2)

Moscow Fault Zone mapped by Conrey and Crow (2014)
Upper Aquifer Connection to Lower Aquifer

Modified from CBGM, 2011
Lateral Compartment 3 (LC 3)

SF Fault mapped by Conrey and Wolff (2010)
Lateral Compartment 4 (LC 4)
Lateral Compartment 5 (LC 5)

Clear Creek Fault mapped by Crow and Conrey (2014)
Hydrograph Characteristics
Compartment Boundary Estimation

Folnagy (2012)
Compartment Boundary Estimation

<table>
<thead>
<tr>
<th>Compartment Size</th>
<th>Area (mi²)</th>
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<tr>
<td>Lateral Compartment 1</td>
<td>23.9</td>
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Conclusions

• Aquifers within the PGB Grande Ronde basalts are distinctly compartmentalized in the horizontal dimension on daily, monthly and yearly time scales.

• Conrey (2014) basalt stratigraphy and mapped faults are evidence for proposed groundwater boundaries.

• Understanding Compartment boundaries will be important for choosing a location for Aquifer Storage and Recovery Projects.
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References


