

# Mosier Groundwater

Mosier Watershed  
Council

January 24, 2018



Oregon Water Resources Department (OWRD) Well Location

2.00N/12.00E-7BDA

OWRD Logid

WASC 2861

OWRD Well Tag (Well ID)

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OWRD State Observation Well Number

493

Total well depth (feet below land surface)

380

Land surface elevation (feet above mean sea level)

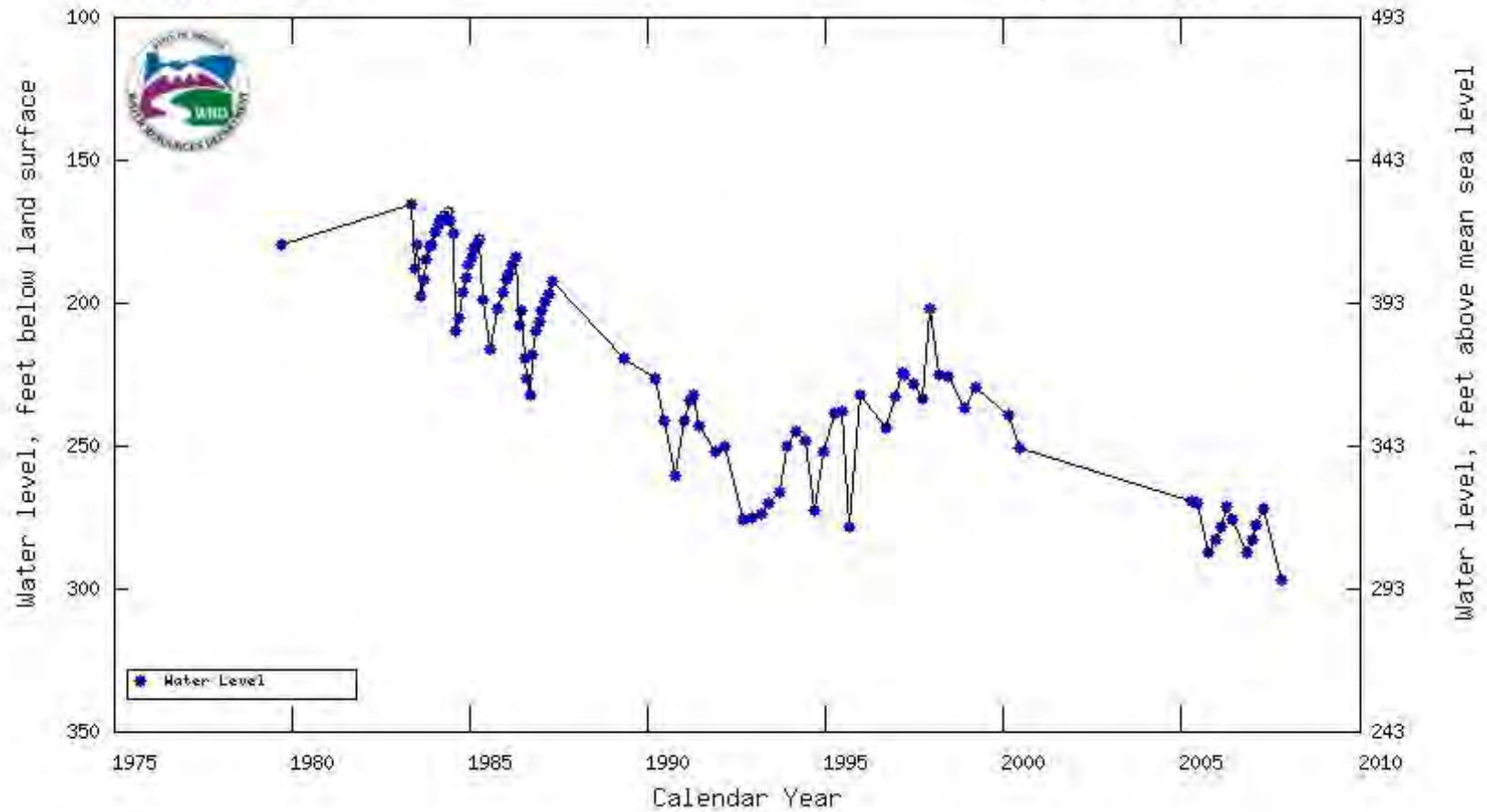
593

Primary use of well

IRRIGATION

Primary aquifer system

Late Tertiary Basalt Aquifers



# Earlier Studies

- 1985: OWRD began studying Mosier area hydrogeology Lite and Grondin (1988) – ‘Commingling happens’
- 1988: OWRD delineated an administrative area and withdrew the Pomona and Priest Rapids aquifers from further appropriation other than exempt uses.

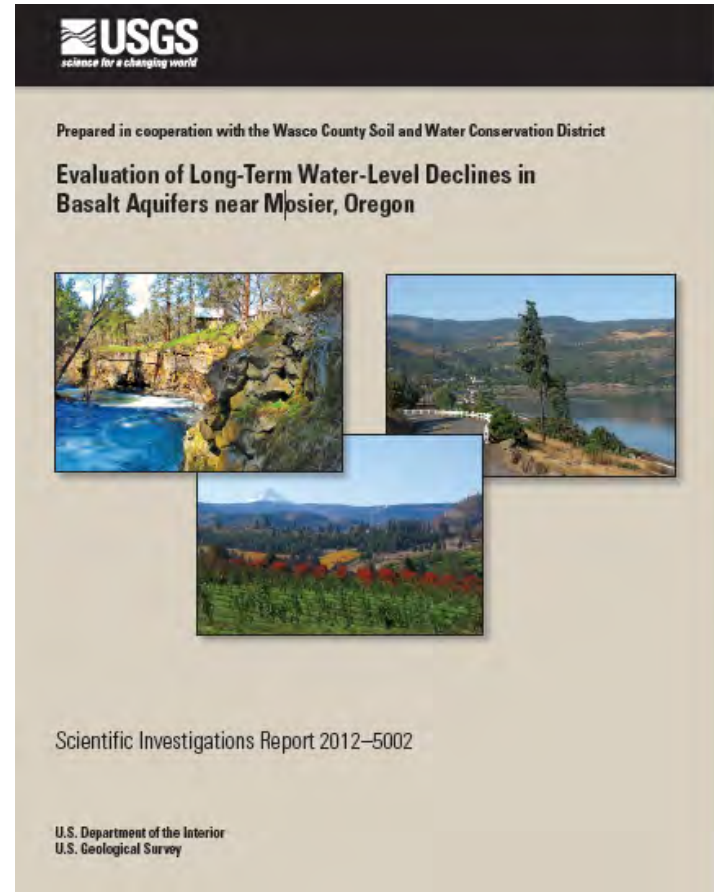


# Stakeholder Response

- Declining water levels and the consequent threat to a stable supply of water identified by stakeholders as the highest priority concern within the watershed
- Primary objectives for the watershed
  1. Stabilize or reverse water level declines in principal aquifers
  2. Increase summer base flows in Mosier Creek, and
  3. Support a viable agricultural economy in the valley.

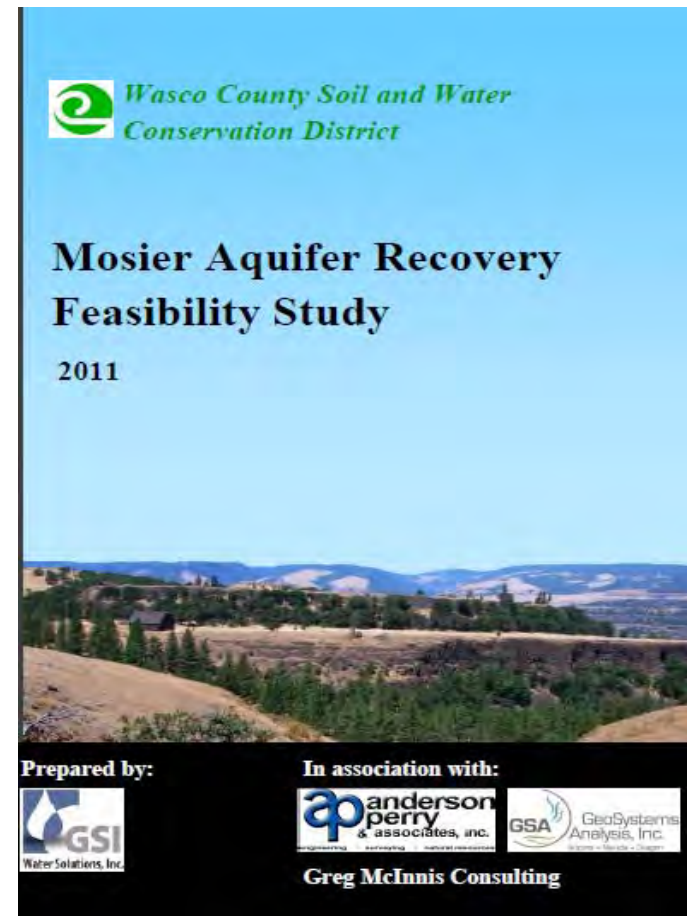
# USGS Study (Burns and Others, 2012)

- Modeled basalt groundwater system
- Commingling is significant in the Mosier groundwater study area, and is probably the dominant cause of well water level declines.



# Aquifer Recovery Feasibility Study (GSI, GSA and AP, 2011)

- OWRD Grant Funded
- Artificial recharge potentially feasible but expensive to test and implement
- Recharge to Priest Rapids and Frenchman Springs aquifers likely to be of minimal benefit with commingling wells



# Three-Prong Approach

- Identify and Fix Commingling Wells/Prevent new ones (holes in the bucket)
- Develop New Water Sources (reduce withdrawals from Pomona/Priest Rapids)
- Reduce Use/Conserve (conversion to high-efficiency irrigation)

# Commingling Wells

## Fix Commingling Wells

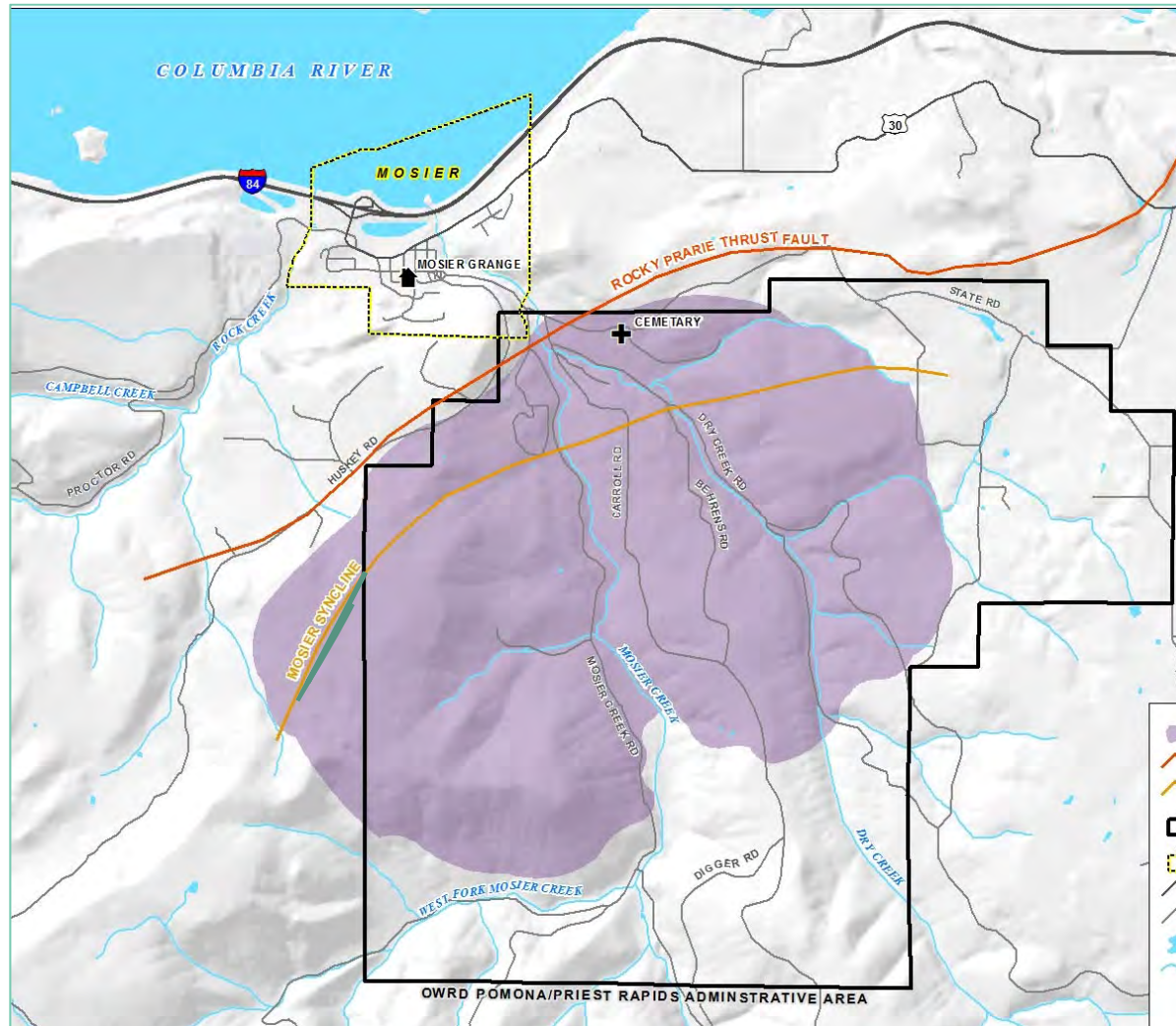
- Identify – Kienle (1995)/USGS, OWRD, Well Owners, Tax Lot Survey
- Assess and Prioritize
- Repair/Replace - \$1M from State of Oregon

## Prevent New Ones

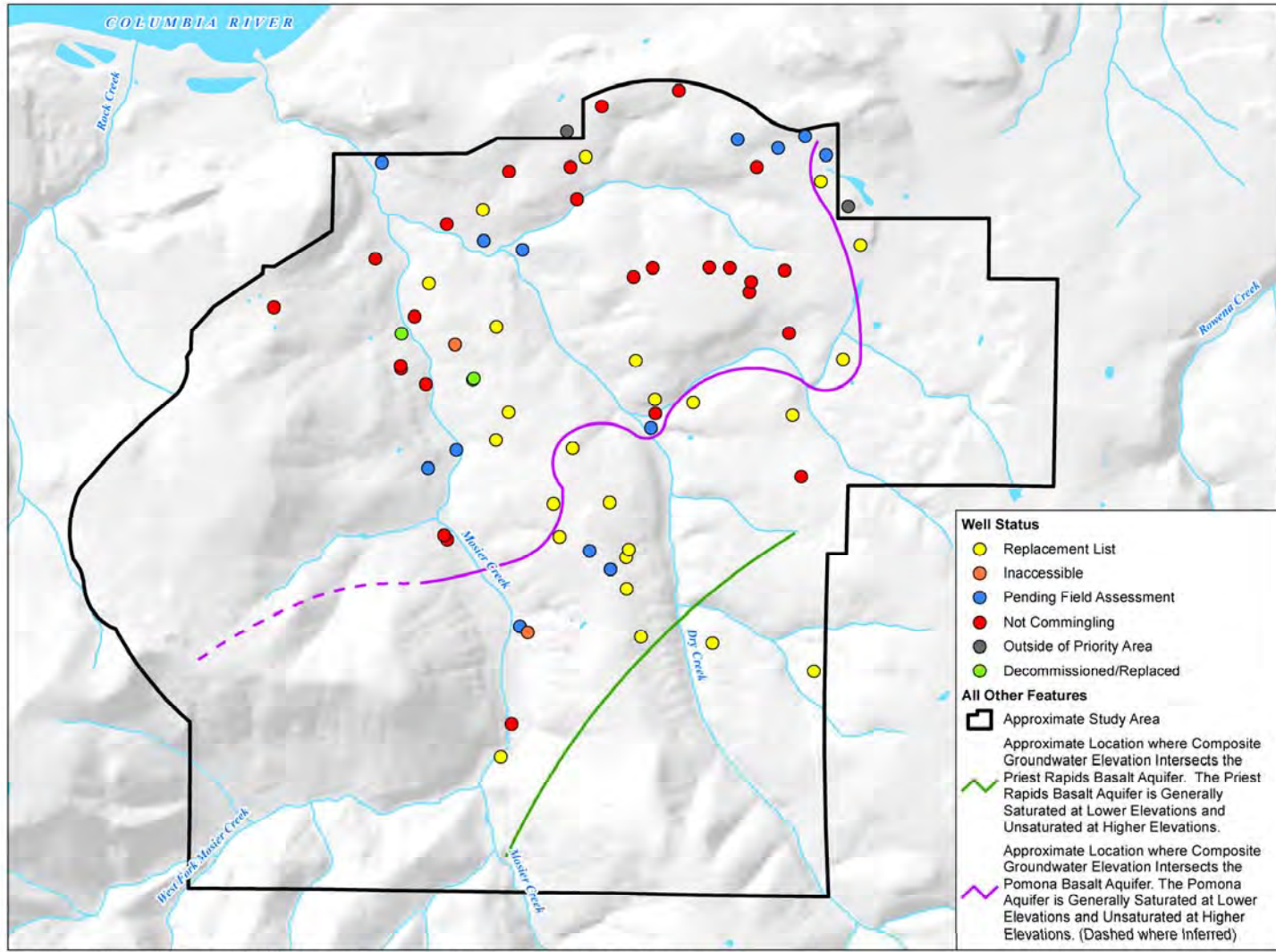
- Special Area Construction Standards (2015)



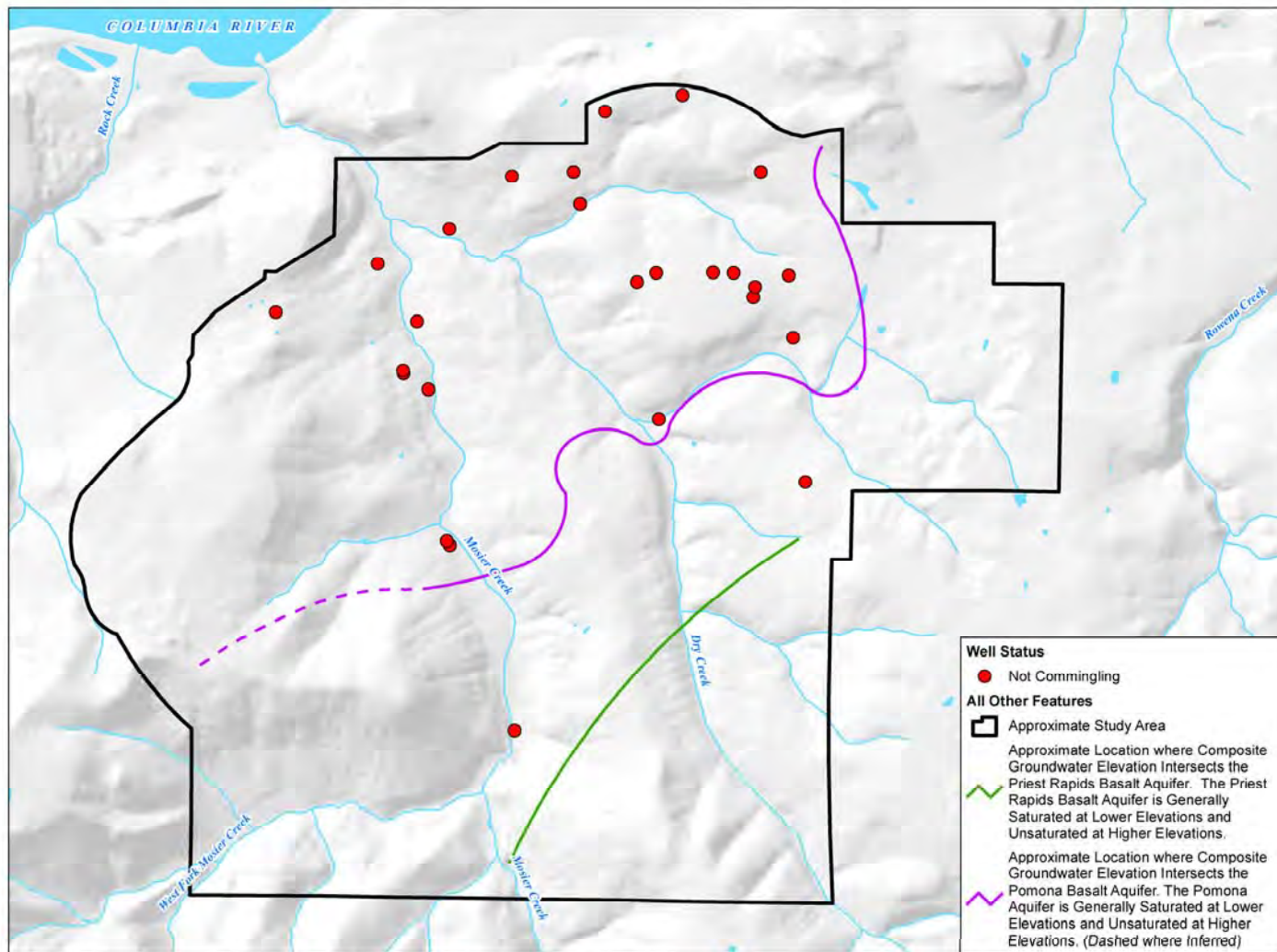
# Commingling Wells



# Commingling Wells

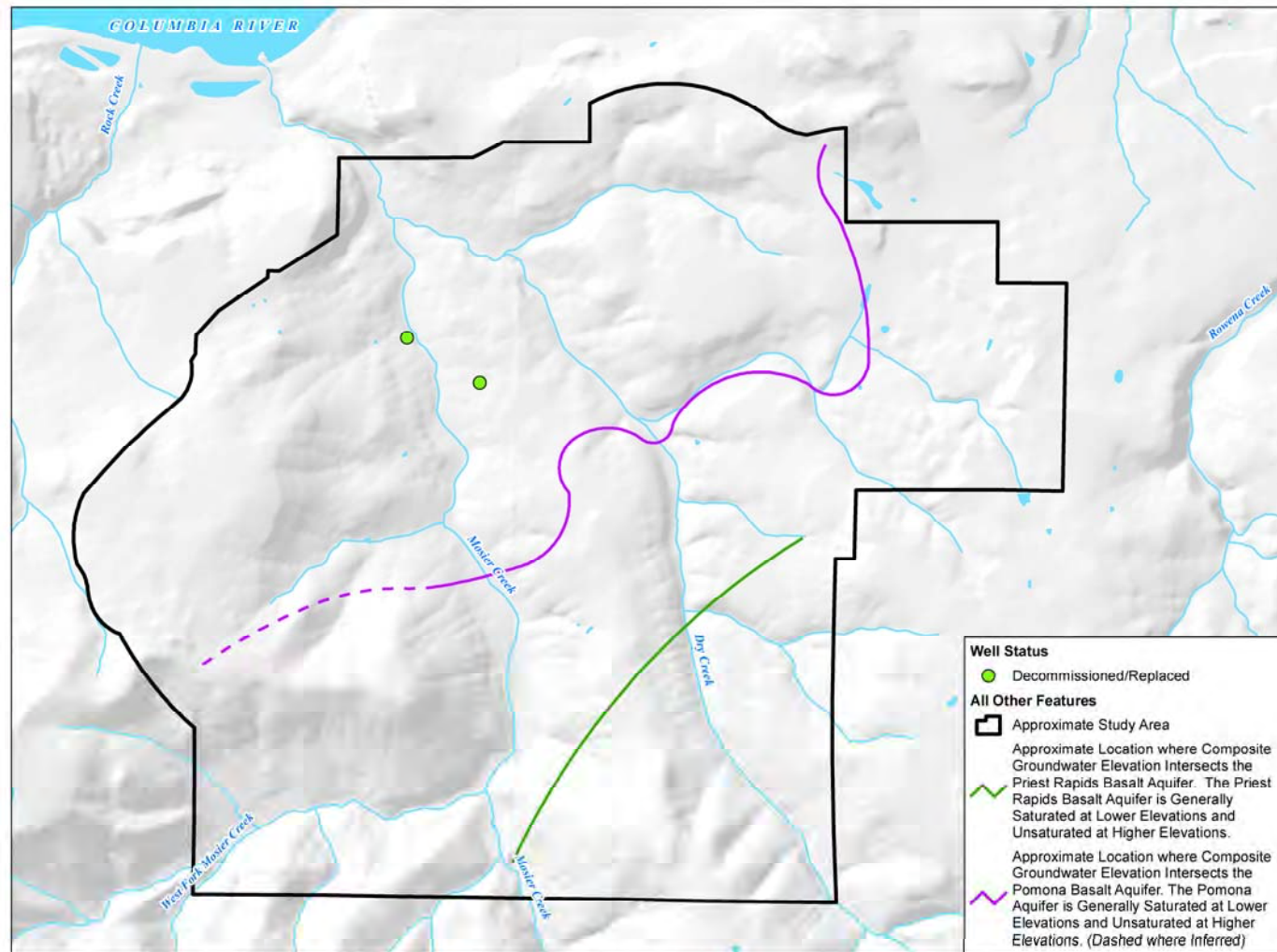


# Not Commingling (Desktop)



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# Repaired/Replaced



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# Repair and Replacement Prioritization Scheme

Up-gradient  
proximity to the  
Rocky Prairie  
Thrust fault

- < 1/2 mile: 8 points
- 1/2-1 mile: 4 points
- > 1-2 miles: 2 points
- > 2 miles: 1 point

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Contributing  
Aquifer

- Columbia River Basalt: 4 points
- Dalles Formation: 2 points
- Other: 1 point

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Commingling  
Flow Rate  
(highest rate estimated)

- > 10 gallons per minute: 8 points
- 6-10 gallons per minute: 4 points
- 3-5 gallons per minute: 2 points
- 1-2 gallons per minute: 1 point
- No commingling: 0 points

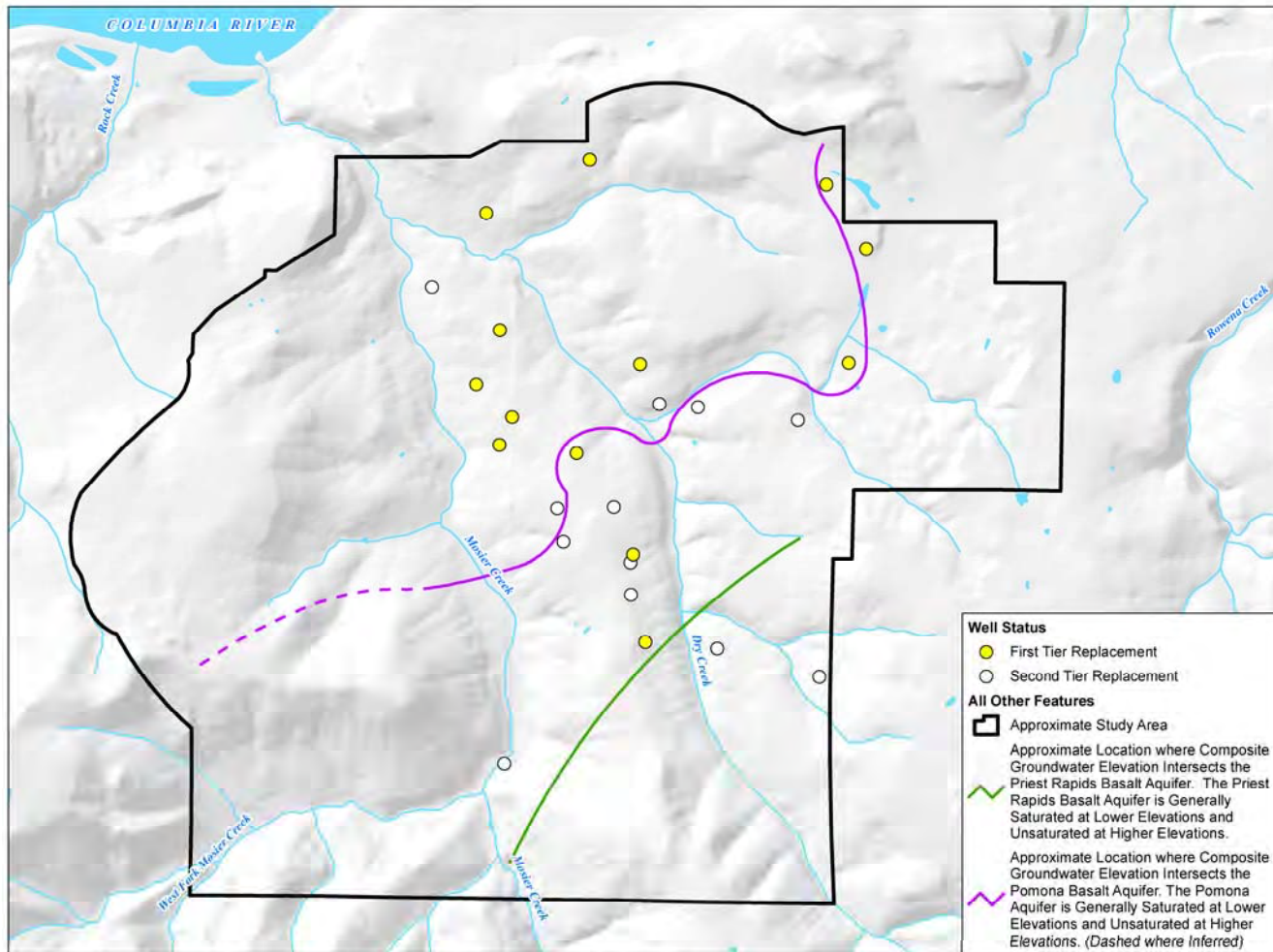
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Total Possible Points: 2 - 20

# Replacement Prioritization

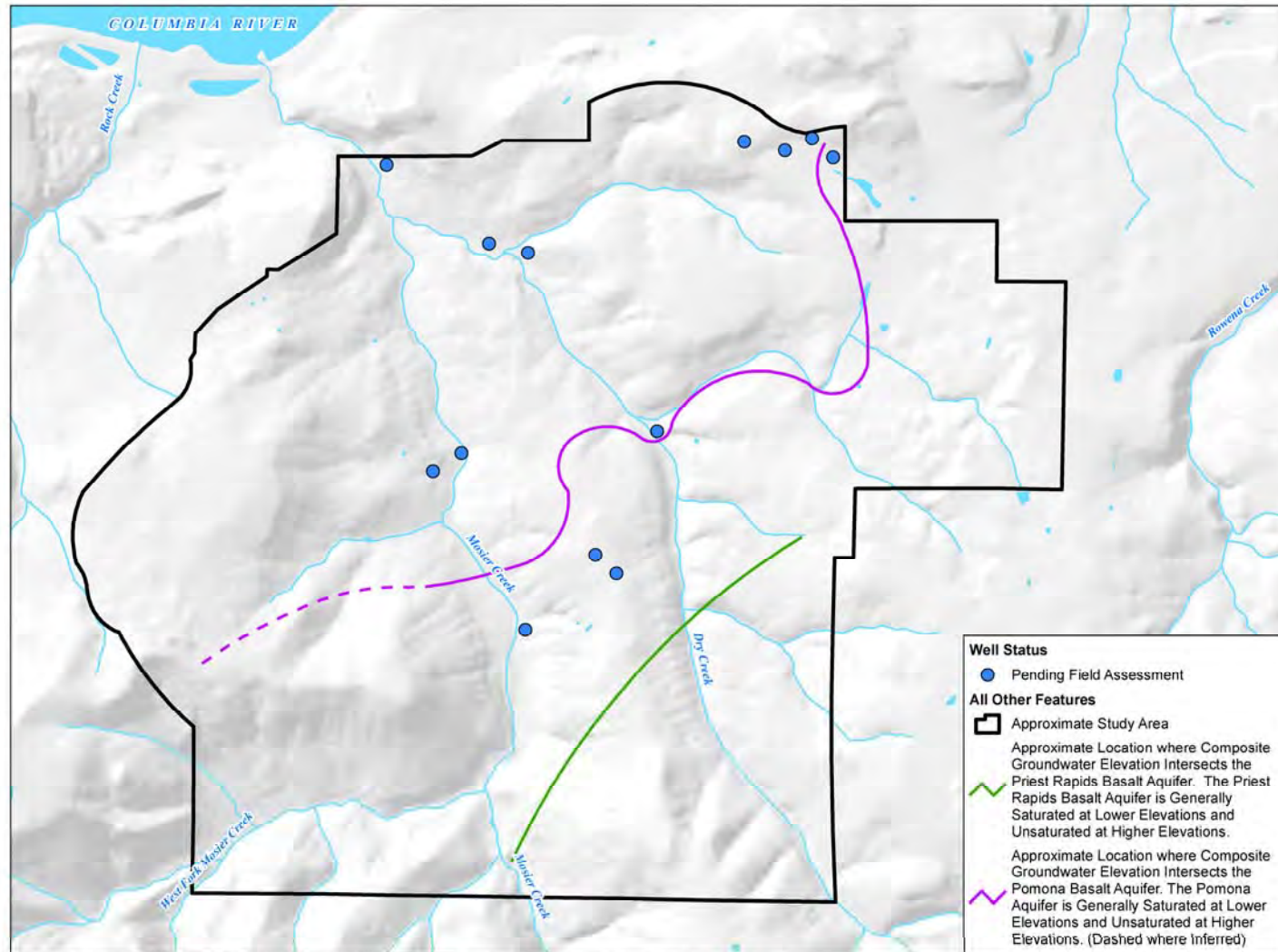
Wells	Proximity to Thrust Fault (points 1 to 8)	Contributing Aquifer (points 1 to 4)	Commingling Flow Estimate (points 1 to 8)	Total Points (points 4 to 20)
	8	4	2	14
	8	4	1	13
	8	4	1	13
	8	4	0	12
	4	4	2	10
	4	4	1	9
	4	4	1?	9?
	4	4	?*	8
	4	4	0	8
	4	4	0	8
	2	4	1	7
	2	4	1	7
	2	4	1	7
	2	4	1	7
	2	4	1	7
	2	4	1	7
	2	4	1	7
	2	4	0	6
	2	4	0	6
	2	4	?*	6
	2	4	?*	6
	2	4	?*	6
	0	4	0	4

# Prioritized for Replacement



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# Pending Field Assessment



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# Commingling Well Assessment and Repairs

- Identified in High Priority Area: 71
- Desktop Assessments Completed: 71
  - Not Commingling: 26
  - Potential for Commingling: 45
- Field Assessed: 29
  - GSI: 21
  - OWRD/USGS: 8
- Decommissioned: 1 (City of Mosier)
- Repaired: 1 (Well 14 replaced)
- 25 wells prioritized for replacement; 15 currently scheduled for replacement in 2018; additional to follow
- Remaining wells to assess: 13

# Pumping Also Factor In Declines

- OWRD and Jones (2016)
- Elevation of change in slope of Priest Rapids hydrograph corresponds to exposure in Mosier Creek
- Continued declines (though lower rate)
- Seasonal response in streamflow and water levels to pumping

# New Sources

- \$1M OWRD Grant to Develop New Sources for Two Larger Agricultural Users - “Deep Well Project”
  - Reduce Withdrawals from Shallower Aquifers
- New Source of Supply for City
  - Potentially move primary source out of watershed - (estimated 10% of withdrawals)
  - Water Quality a Consideration

# Reduced Water Use

- NRCS, OWEB and SWCD Conservation Projects (drip and micro-sprinkler systems)
- Significant reduction in annual per acre use over past 15 years

# Now What?

- Repair other wells?
  - Reluctant Landowners?
  - Move up hill?
  - Take Breath and Monitor the Effectiveness of Recent Work?
  - SWCD and State Resources and Priorities

# Now What?

- Additional Conservation Opportunities?
  - Orchardists
  - City
  - Rural Residents

# Now What?

- New Sources
  - New Primary Source for City?
  - Aquifer Recharge?
    - Pomona and Priest Rapids aquifers suitable; less known about the Frenchman Springs
    - New dedicated injection well(s) needed
    - Treatment of source water needed, either through natural filtration or treatment plant
    - Recharge of minimal benefit to Priest Rapids and Frenchman Springs with commingling wells.

# Questions?