

Mosier Wells Repair / Replacement and Abandonment Project Summary

by

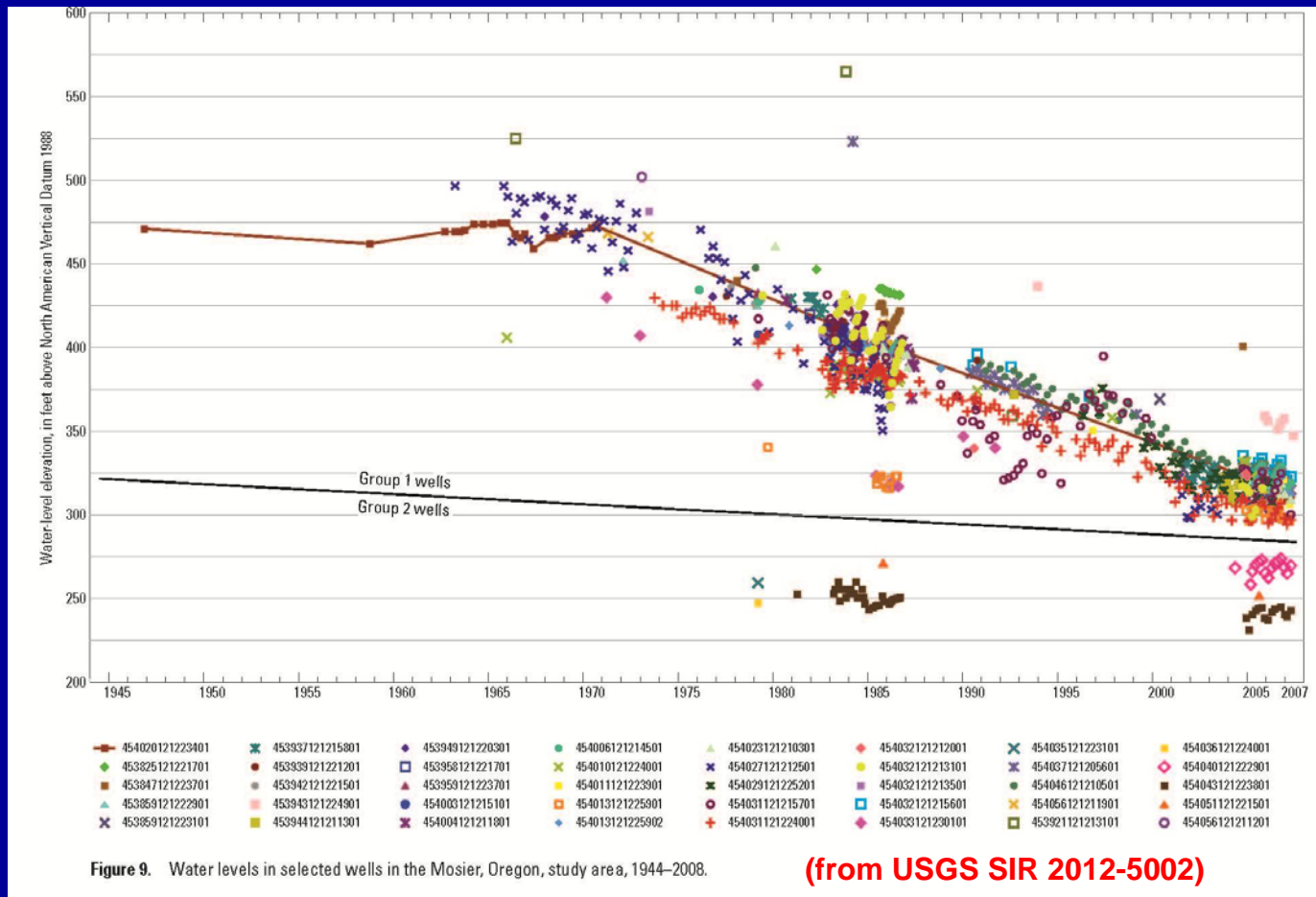
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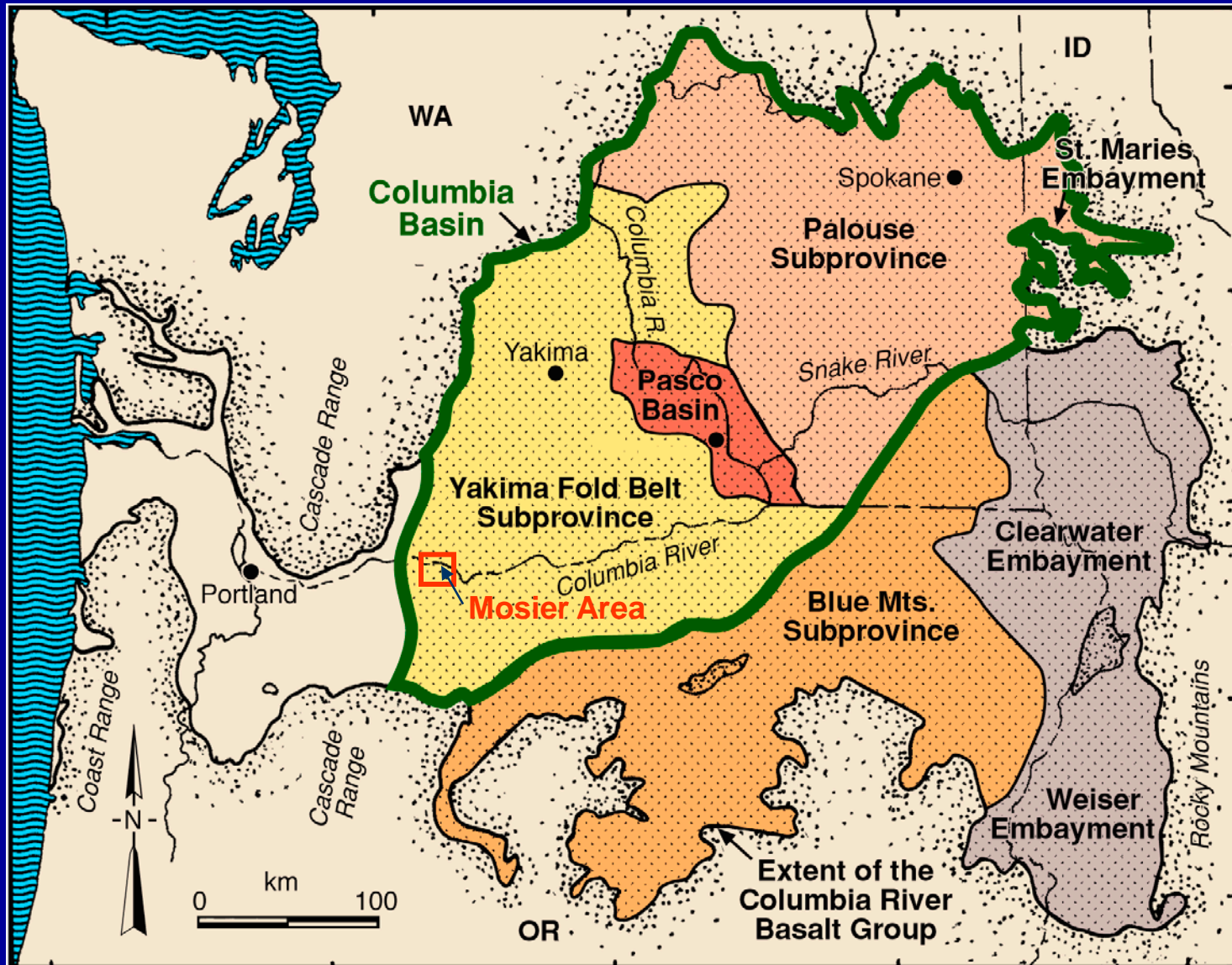
The Problem:

Commingling causes:

- Water level decline in wells
- Decreased streamflow in interconnected streams



The Setting:



Background:

Department History in Mosier...

- Completed Basalt Aquifers Study: 1987
 - Overdraft of Aquifers
 - Commingling Wells
- Public Meeting and Hearings: 1987-1989
 - Adoption of Withdrawal Orders: 1988
 - City of Mosier Stipulated Order: 1989

Department History in Mosier (cont.)...

Well Construction:

- Well Remediation Activities: 1989 - Present
 - Mosier Well # 3 Repairs: 1991, 1992, 2007
 - Mosier Well # 3 Abandoned: 2013
- Adoption of Special Area Standards: 2015
- Assisting with Commingling Wells Assessments: Ongoing

Columbia River Basalt Aquifers

Surface Geology near Mosier

STATE OF OREGON
WATER RESOURCES DEPARTMENT (1988)

GROUNDWATER REPORT NO. 33

PLATE NO. 2

RECONNAISSANCE GEOLOGIC MAP AND SECTIONS IN THE MOSIER AREA, WASCO COUNTY, OREGON



EXPLANATION

LITHOLOGIC DESCRIPTIONS

- Qal** — Alluvium: Unconsolidated silt, sand, and gravel in channels, flood plains, and terraces along intermittent and perennial streams. Predominantly found in Mosier Creek, south of the West Fork confluence. Only shown where alluvium completely covers bedrock.
- Qls** — Landslide deposits: Mostly unstratified, unsorted mixtures of rock and soil. Two rock slide areas occur adjacent to Rock Creek near Mosier.
- Qgf** — Glaciofluvial deposits: Coarse, unsorted, characteristically poorly bedded gravel, sand and silt. Gravels are commonly openwork, with a coarse sand matrix partially filling interstices. Foreset beds are common near Mosier and Rock Creeks. Includes Ql of Newcomb (1969).
- Tdc** — Cloweth Formation: Volcaniclastic and sedimentary rock consisting of laharic deposits of andesitic agglomerate, tuff breccia and fluvial deposits of conglomerate, tuffaceous sandstone and siltstone.

Dalles Group

- Tp** — Pomona Member: Gray to black, fine grained, porphyritic basalt. Easily recognized in surface exposures by its slender, wavy enclathrate-like jointing pattern. The Pomona Member has reversed paleomagnetic polarity.

Columbia River Basalt Group

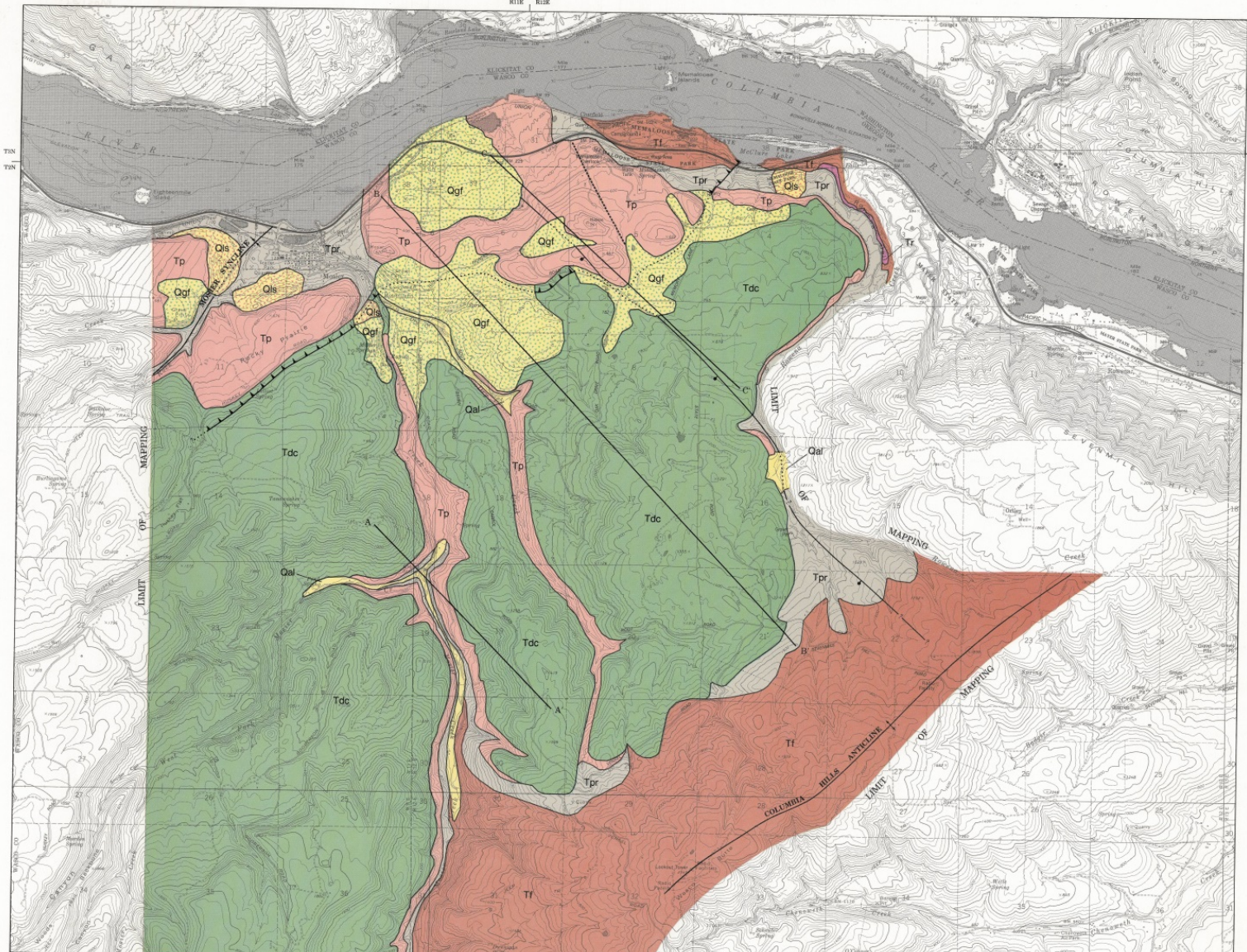
- Tpr** — Priest Rapids Member: Dark gray to black, fine to coarse grained basalt. The upper part of the member often exhibits a platy jointing pattern. Two flows apparently exist in the Mosier Area. Both flows have reversed paleomagnetic polarity.
- Tr** — Ross Member: Dark gray to black, medium grained, porphyritic basalt. Easily recognized by the occurrence of abundant, relatively large (less than 1 cm) plagioclase phenocrysts. The Ross Member has transitional paleomagnetic polarity. Only exposed near Rosses Dell.
- Tf** — Frenchman Springs Member: Dark gray to black, fine to medium grained, aphyric to porphyritic basalt. Frenchman Springs Member consists of a number of individual units. The upper flow near Mosier is probably part of the aphyric Sectional Cap unit. (Besson, personal comm., 1986). Frenchman Springs Member has normal paleomagnetic polarity.

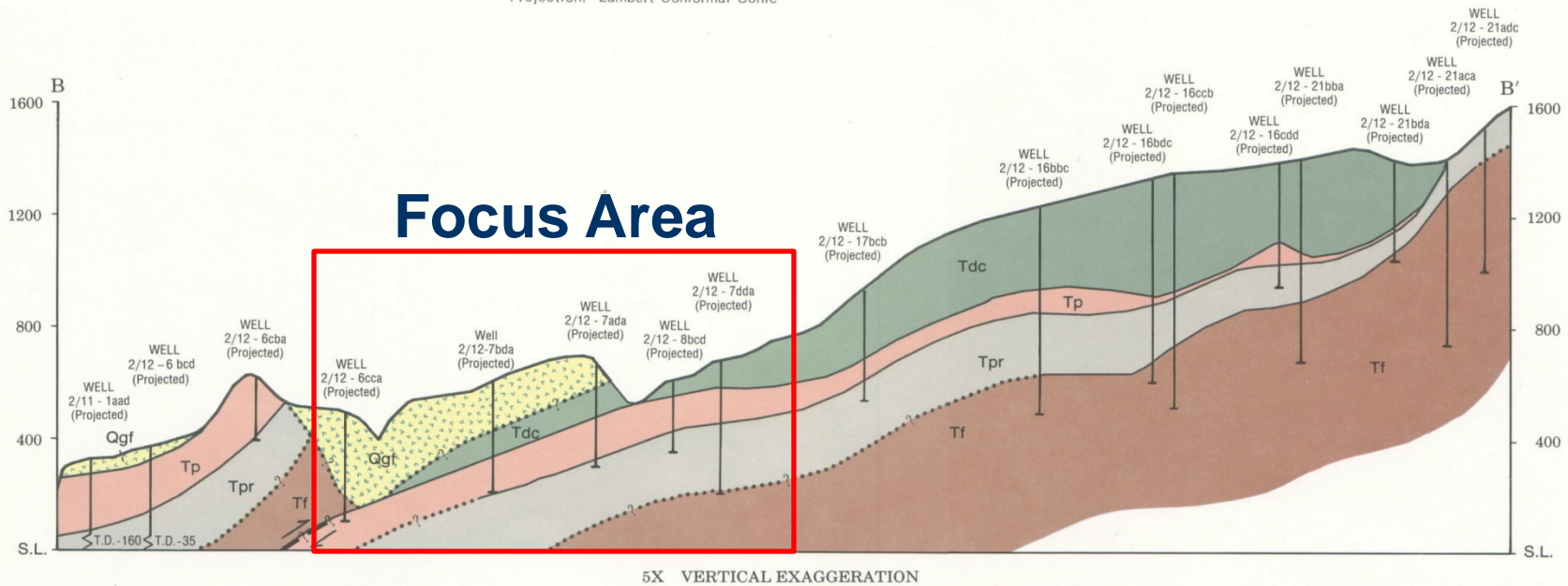
WANAPUM BASALT

- Tf** — Frenchman Springs Member: Dark gray to black, fine to medium grained, aphyric to porphyritic basalt. Frenchman Springs Member consists of a number of individual units. The upper flow near Mosier is probably part of the aphyric Sectional Cap unit. (Besson, personal comm., 1986). Frenchman Springs Member has normal paleomagnetic polarity.

GEOLOGIC SYMBOLS

- Anticline
- Syncline
- Fault: ball on down thrown side; dotted where concealed
- Thrust: teeth on upper side; dotted where concealed
- Photo lineament
- Contact: dotted where inferred
- Line of Section A to A'





- Dalles Formation

- Pomona

- Selah interbed

- Priest Rapids

- Frenchman Springs

- Grande Ronde

**Columbia
River
Basalt
Group**

Dalles Formation

Pomona Basalt

Lolo Flow: →

Priest Rapids Basalt

Rosalia Flow:
Priest Rapids Basalt

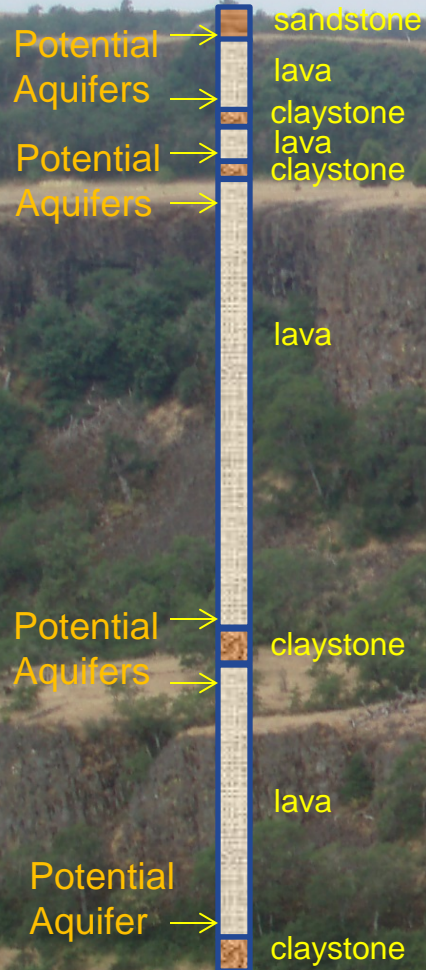
Roza Basalt

Frenchman Springs Basalt



Hypothetical Well

Dalles Formation



Pomona Basalt

Lolo Flow: →
Priest Rapids Basalt

Rosalia Flow:
Priest Rapids Basalt

Roza Basalt

Frenchman Springs Basalt

Commingling Wells

Water jetting into a borehole wall (near the base of the Priest Rapids Basalt).



+275.1f

Well Casing



Water moving up the space between the casing and the borehole wall.

Claystone (Selah interbed)

The Remedy

1. Defining the Project Scope

Assessing the Wells...

- Identified: 70
- Desktop Assessments Completed: 70
 - Potential for Commingling: 47
 - Not Likely Commingling: 23
- Field Assessed: 25
 - GSI: 17
 - OWRD / USGS: 8
- Remaining Wells in Need of Field Assessments: 22

Results of a Field Assessment

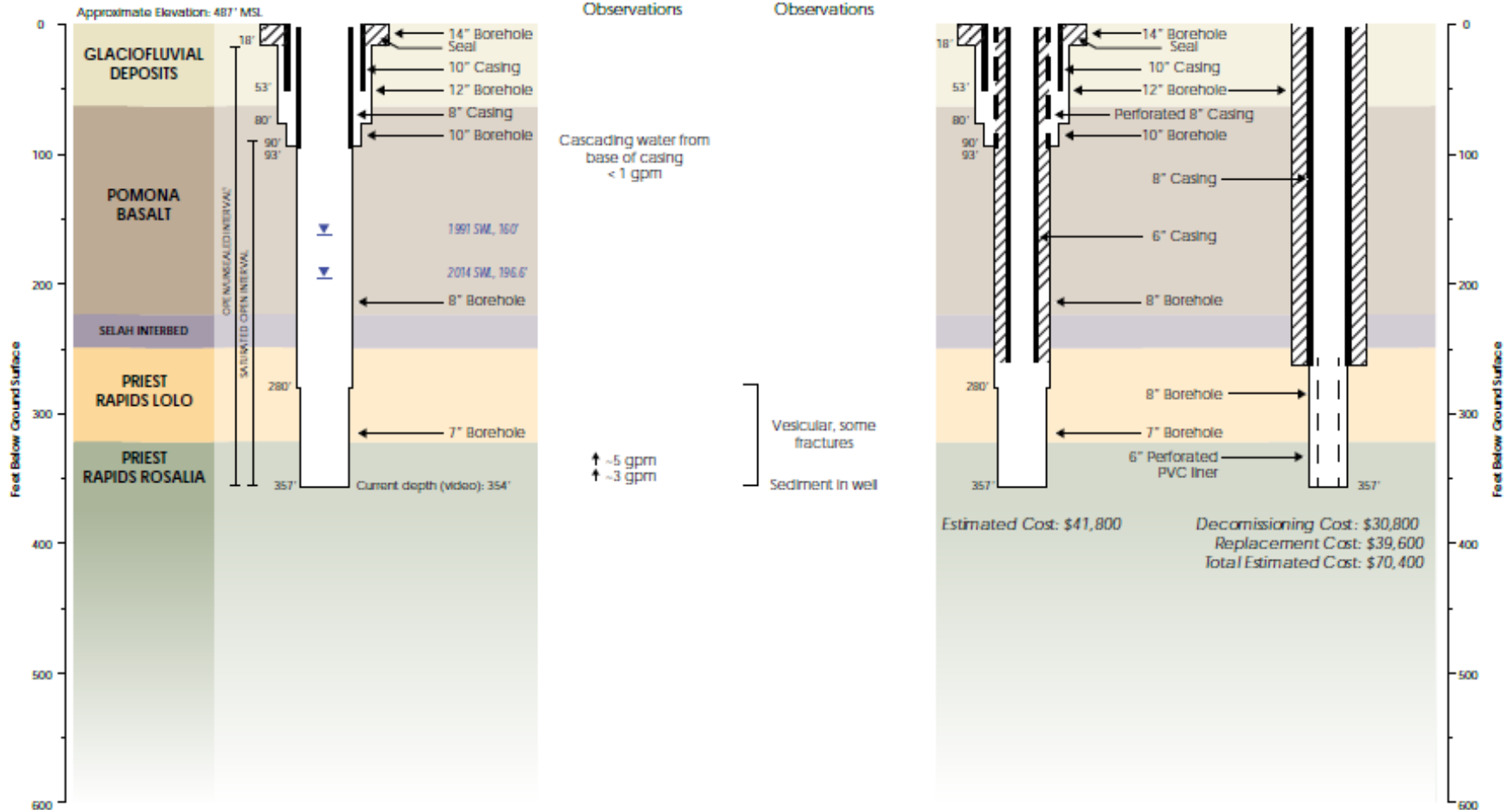
WELL ID: 30

ASSESSMENT COMPLETION DATE: March 26, 2014

WELL CONSTRUCTION (OWRD WELL REPORT)

ASSESSMENT SUMMARY

POTENTIAL REPAIR/REPLACEMENT OPTION²



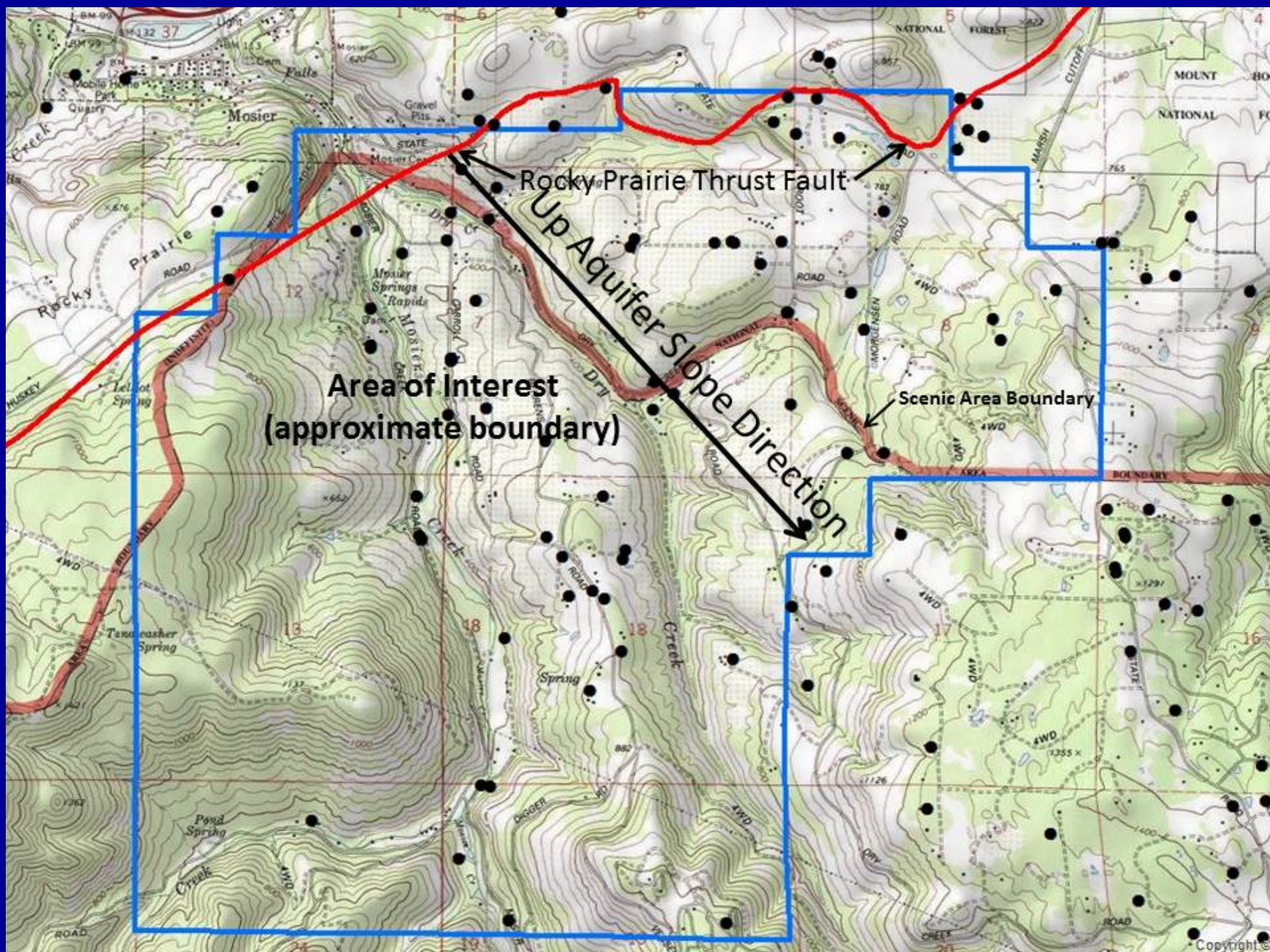
SUMMARY INFORMATION:

Well is sealed into the Dalles Formation and cased into the Pomona Basalt. Open/unsealed in Dallas/Pomona/Priest Rapids. Movement of particulates observed in the well video indicates a small amount of upward movement from around 350 feet up to approximately 330 feet. Groundwater was also observed dripping into the borehole at the bottom of the casing (within the Pomona Basalt). Commingling pathway appears to be from the Priest Rapids into the Pomona Basalt aquifer. If pump diameter allows, attempt upper repair. Otherwise, replacement recommended for a well targeting the Priest Rapids Basalt aquifer.

2. Initiating The Project: \$1M Grant

- Partners and Cost Share
 - Wasco Co SWCD and Mosier Watershed Council
 - Cost Share: State 90% Local 10%
 - Estimated Cost per Well: \$20-70K
- Program Implementation
 - Selecting Wells for Repair or Replacement
 - Landowner Agreements
 - Driller Contracts
 - Well Inspections
- Program Tracking

Criteria for Selecting Wells for Repair or Replacement



Questions?????



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