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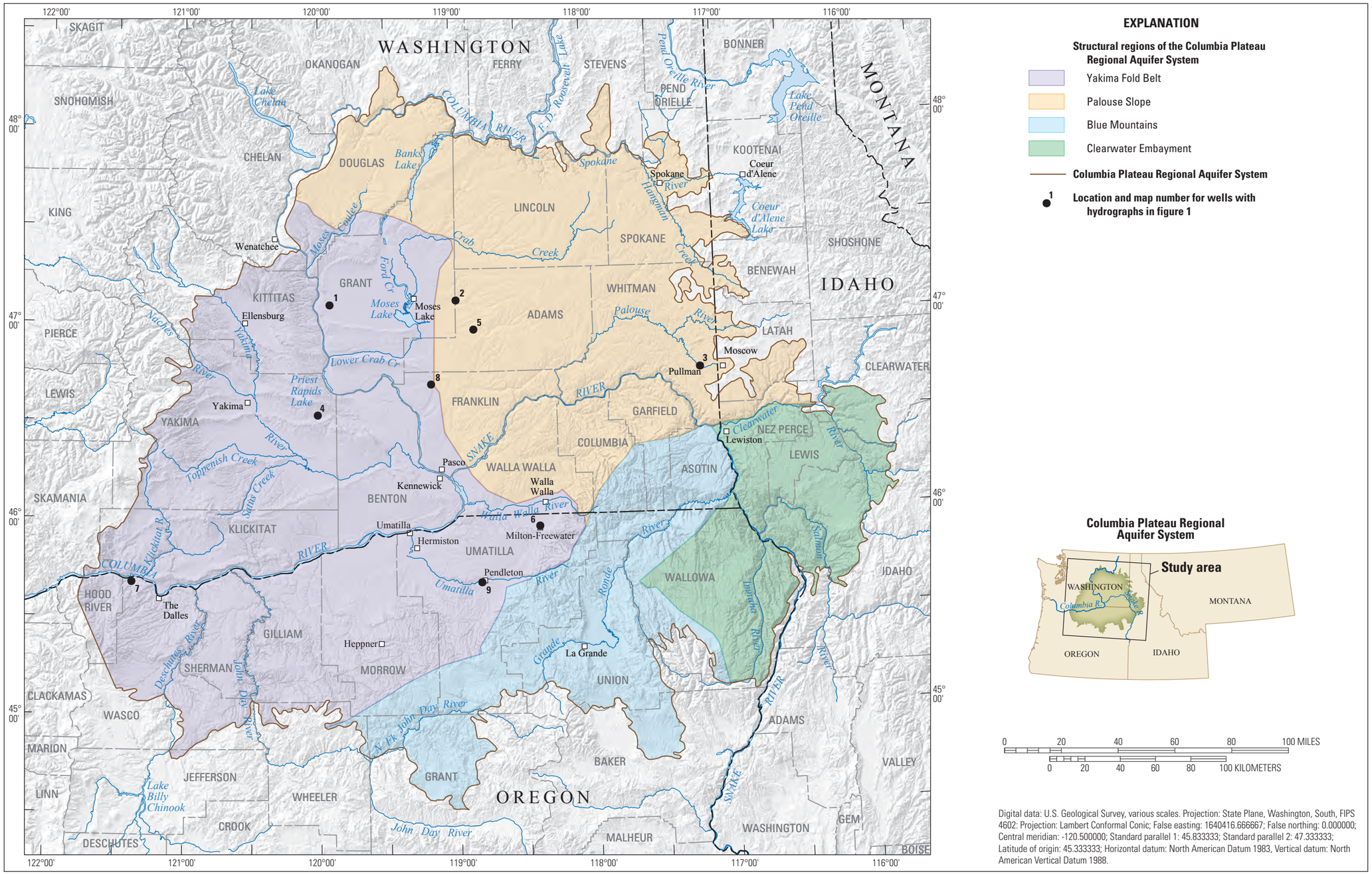
Snyder, D.T., and Haynes, J.V., 2010, Groundwater Conditions During 2009 and Changes in Groundwater Levels from 1984 to 2009, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho



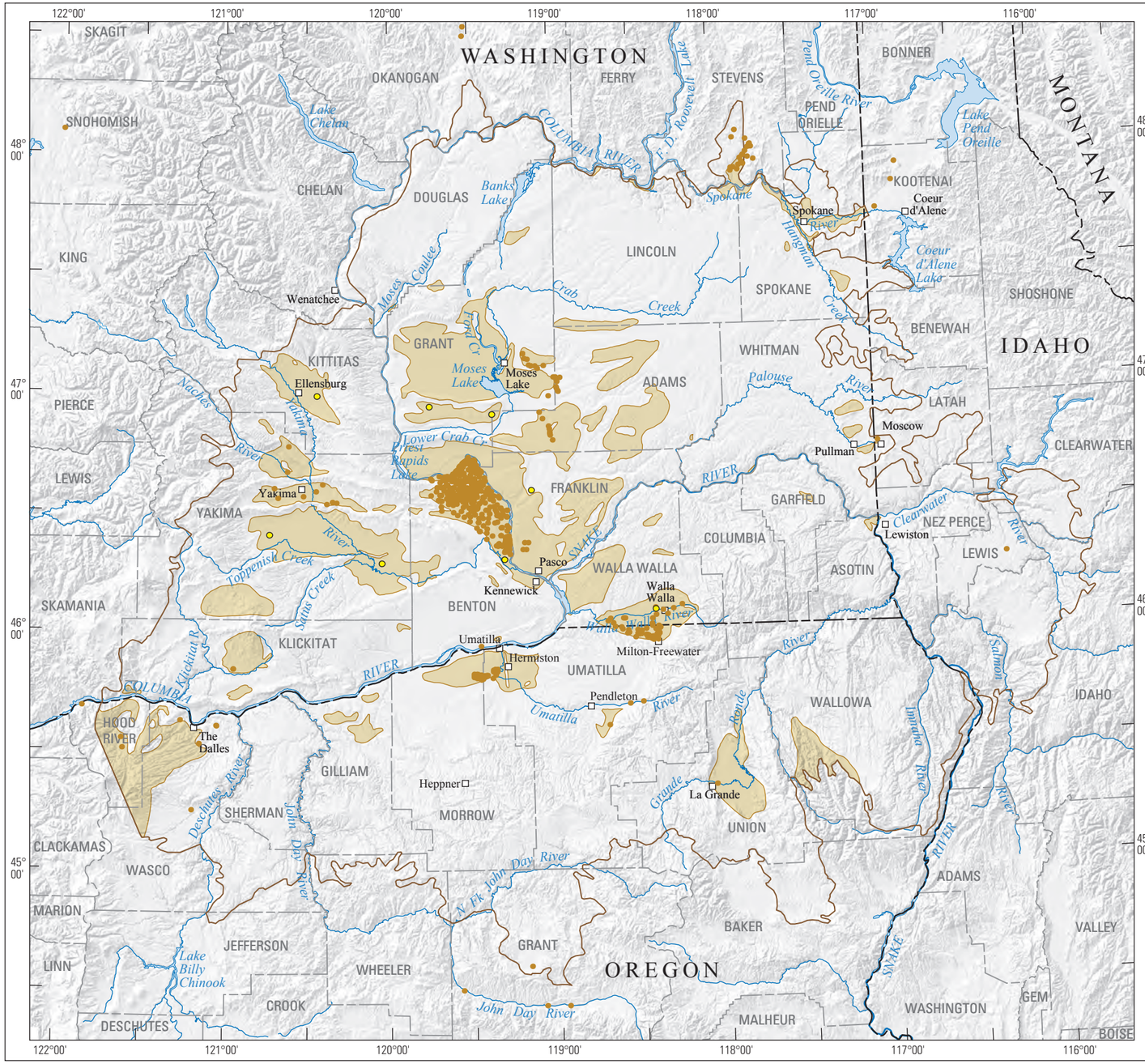

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum 1983, Vertical datum: North American Vertical Datum 1988.

Modified from Reidel and others (2002)

# Structural Regions of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho

By
Daniel T. Snyder and Jonathan V. Haynes
2010

Snyder, D.T., and Haynes, J.V., 2010, Groundwater Conditions During 2009 and Changes in Groundwater Levels from 1984 to 2009, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho




## EXPLANATION

- Extent of Overburden unit
- Columbia Plateau Regional Aquifer System
- Well with spring 2009 water-level measurement in the Overburden unit
  - Measured by U.S. Geological Survey
  - Measured by other agencies

### Columbia Plateau Regional Aquifer System

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Locations of Wells and Estimated Groundwater Levels for the Overburden Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 2009

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2010

U.S. DEPARTMENT OF THE INTERIOR
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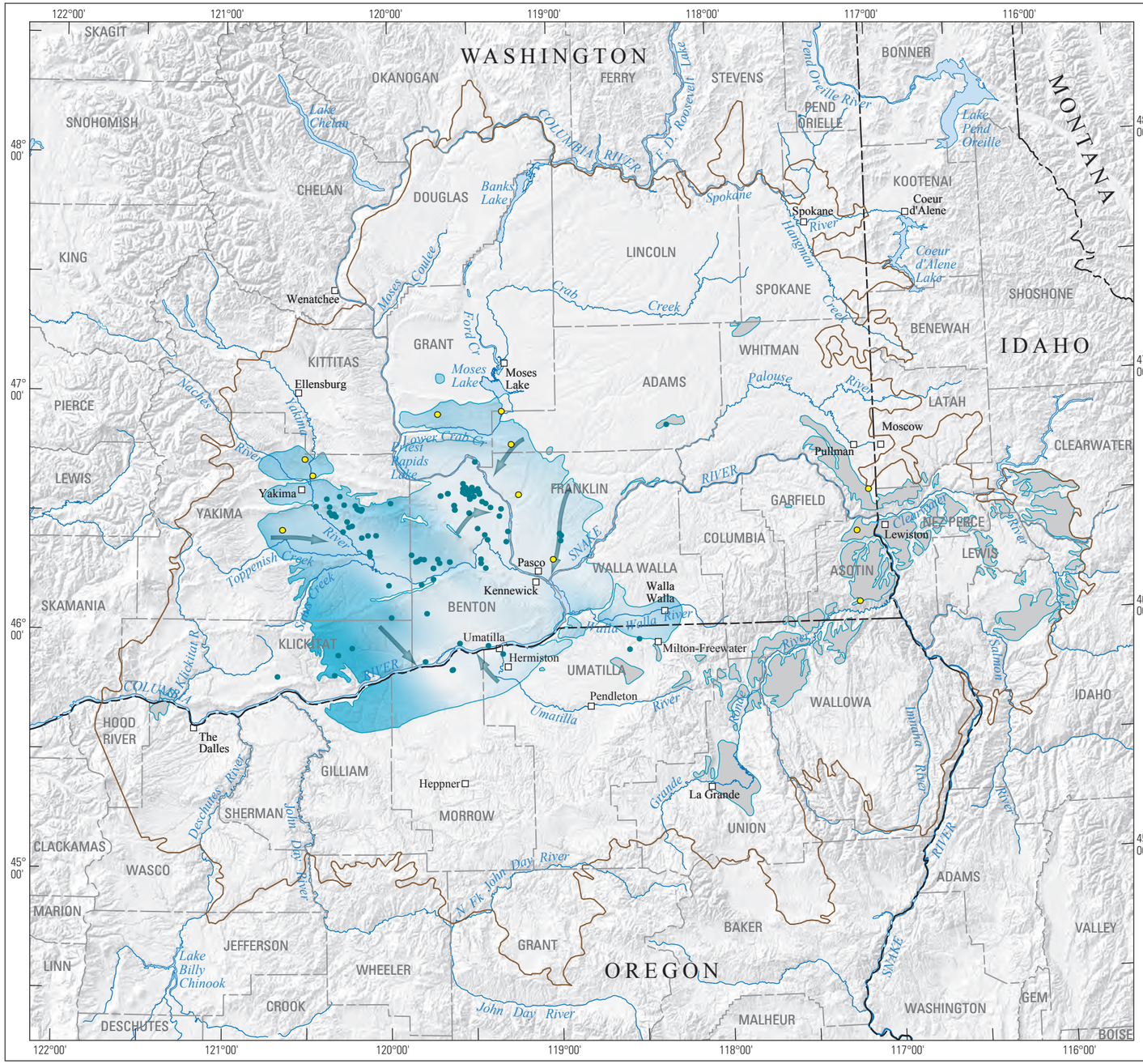


## EXPLANATION

**Estimated groundwater elevation**

Lowest — Highest

- **Insufficient data**
- **Generalized groundwater flow direction**
- **Extent of Saddle Mountains unit**
- **Columbia Plateau Regional Aquifer System**
- **Well with Spring 2009 water-level measurement in the Saddle Mountains unit**
  - Measured by U.S. Geological Survey
  - Measured by other agencies

**Columbia Plateau Regional Aquifer System**

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

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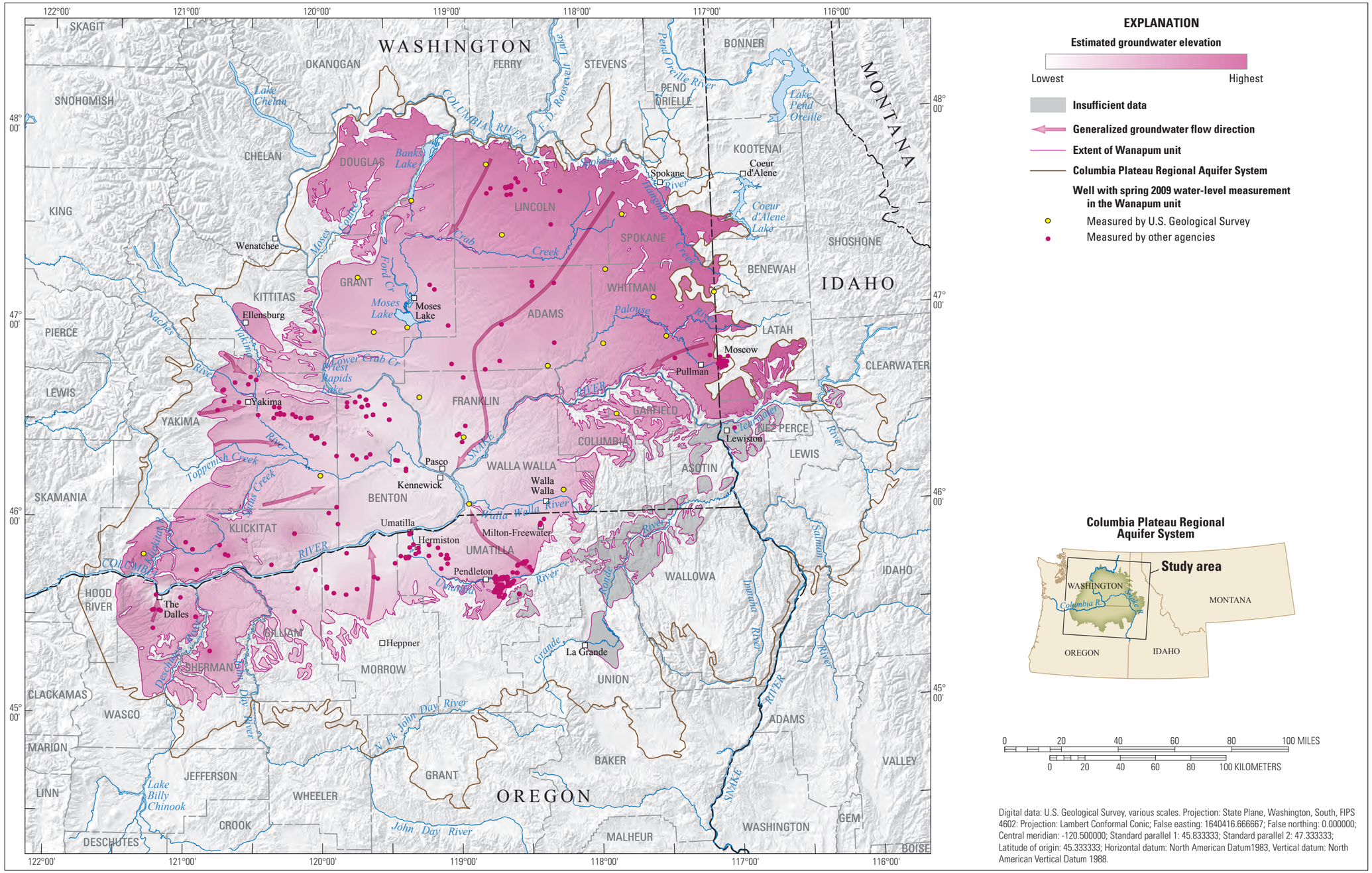


Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Locations of Wells and Estimated Groundwater Levels for the Wanapum Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 2009

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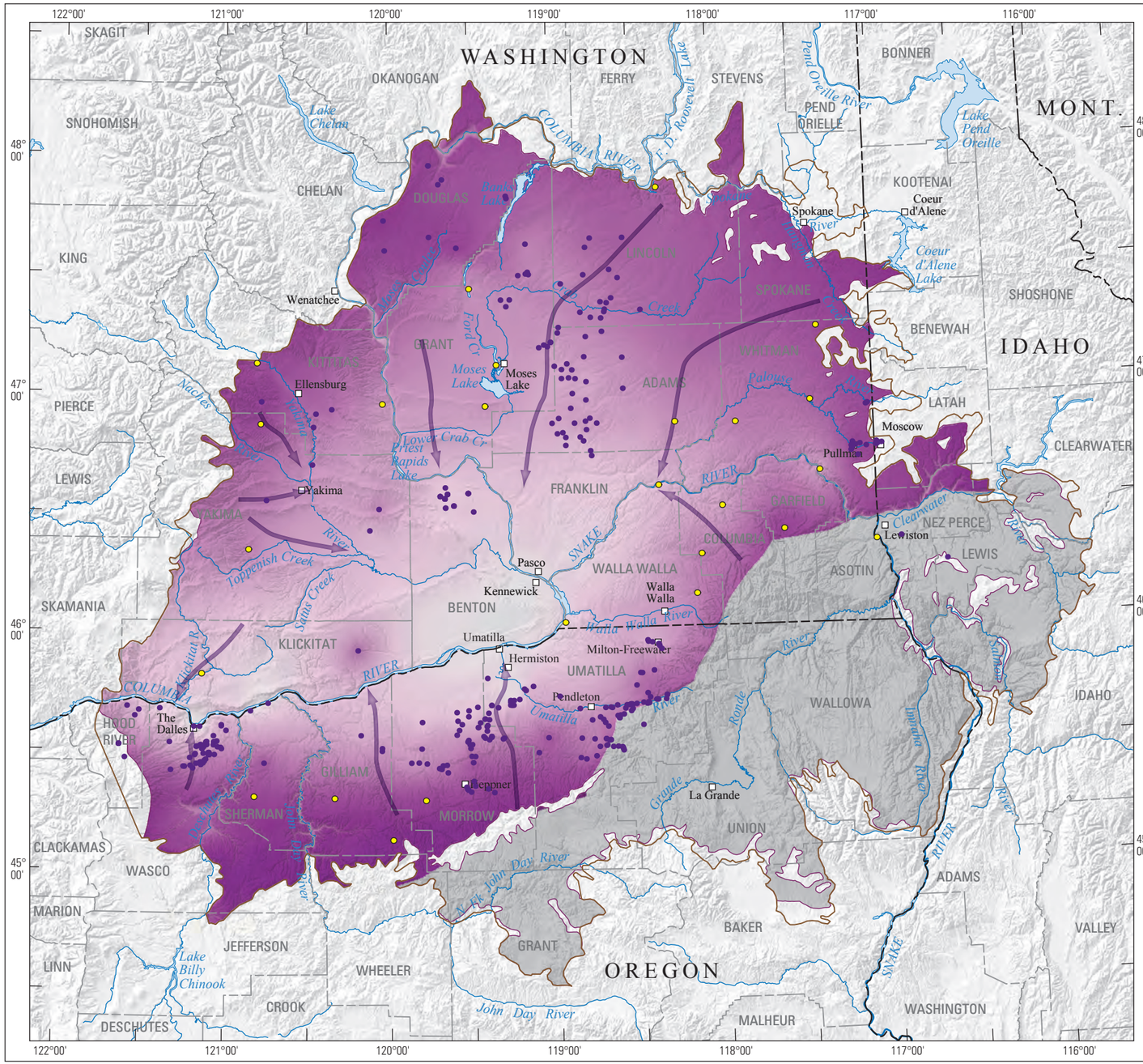


## EXPLANATION

**Estimated groundwater elevation**

Lowest — Highest

- **Insufficient data**
- **Generalized groundwater flow direction**
- **Extent of Grande Ronde unit**
- **Columbia Plateau Regional Aquifer System**
- **Well with spring 2009 water-level measurement in the Grande Ronde unit**
  - Measured by U.S. Geological Survey
  - Measured by other agencies

**Columbia Plateau Regional Aquifer System**

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

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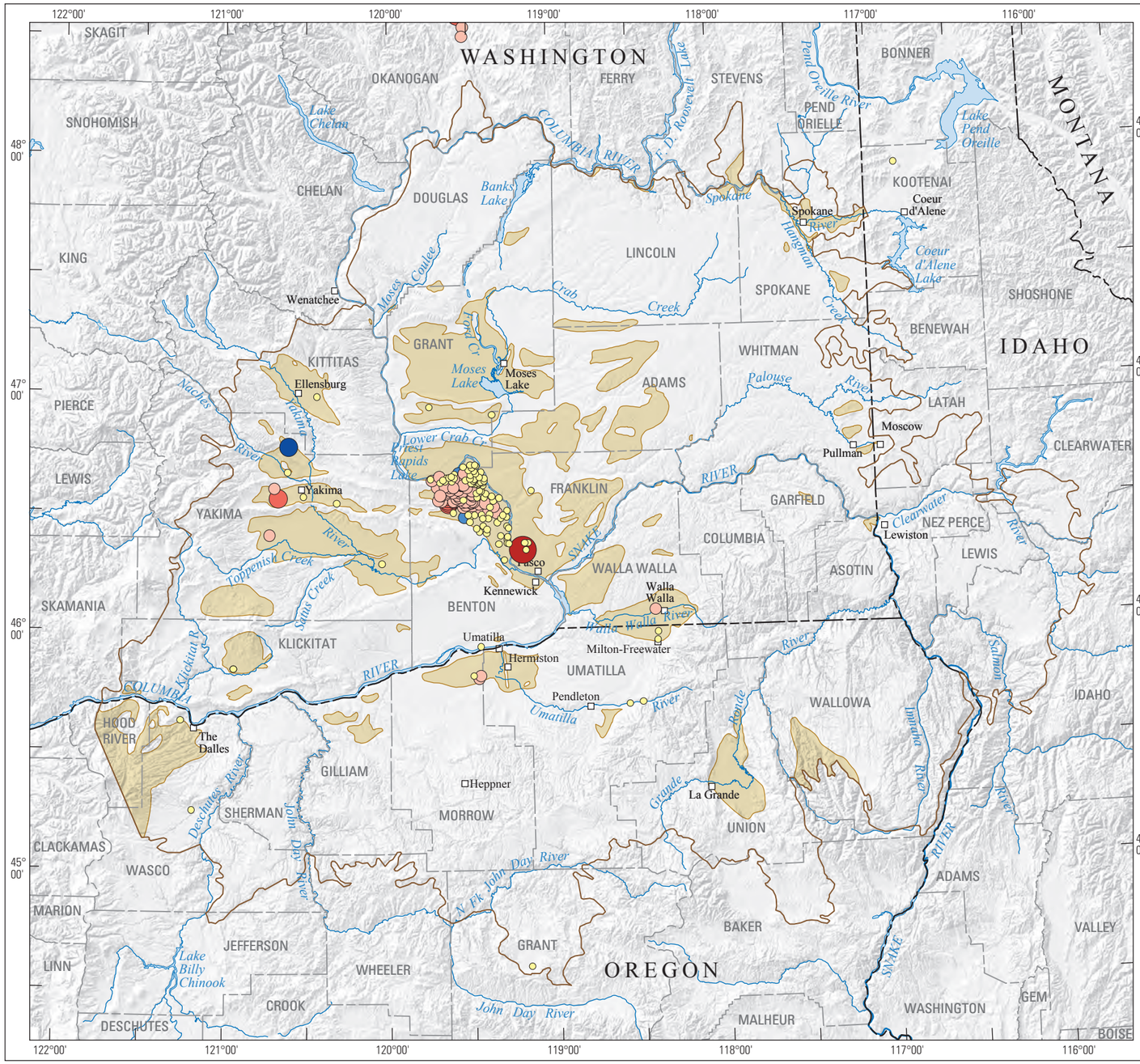


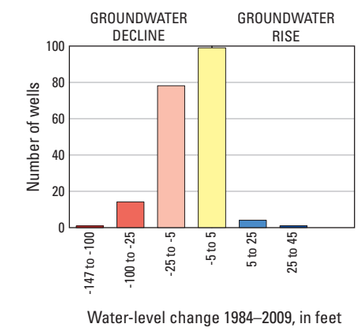

## EXPLANATION

Extent of Overburden unit

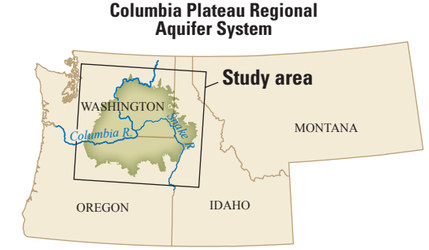
Columbia Plateau Regional Aquifer System

**Water-level change in the Overburden unit for spring 1984 to spring 2009**—in feet. The contributing unit is greater than 75 percent of open interval.

| | | | |
|---|---|---|---|
| 25 | to | 45 | Groundwater rise |
| 5 | to | 25 | |
| -5 | to | 5 | |
| -25 | to | -5 | |
| -100 | to | -25 | |
| -147 | to | -100 | Groundwater decline |




**Columbia Plateau Regional Aquifer System**




0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

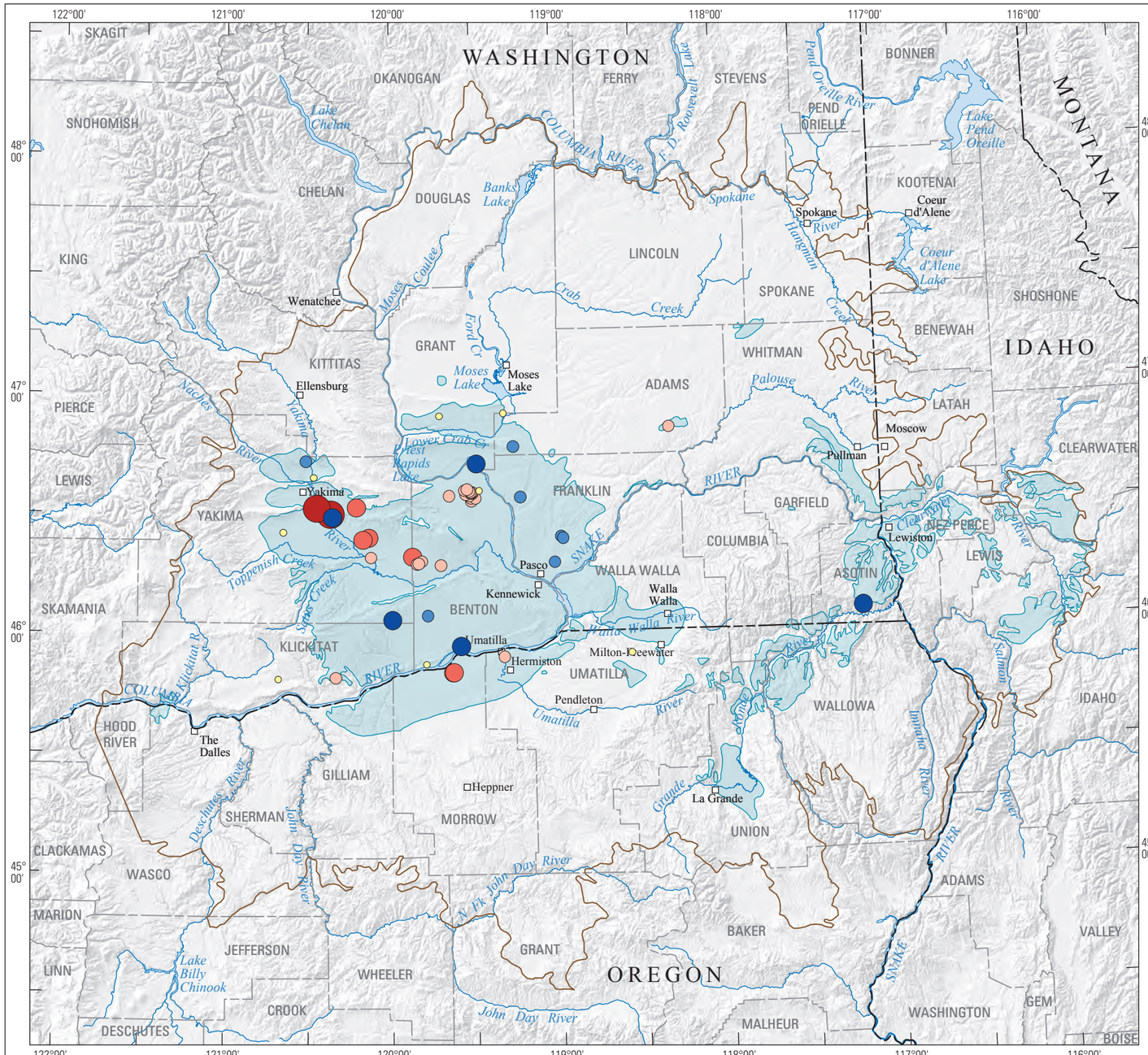
Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Groundwater-Level Changes for the Overburden Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 1984 to Spring 2009

By
Daniel T. Snyder and Jonathan V. Haynes
2010

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Scientific Investigations Report 2010-5040
Groundwater level changes for the Saddle Mountains unit—PLATE 7 of 9
Snyder, D.T., and Haynes, J.V., 2010, Groundwater Conditions During 2009 and Changes in Groundwater Levels from 1984 to 2009, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho



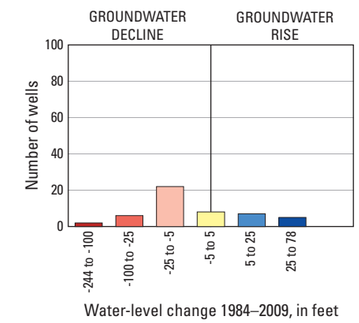

## EXPLANATION

Extent of Saddle Mountains unit

Columbia Plateau Regional Aquifer System

**Water-level change in the Saddle Mountains unit for spring 1984 to spring 2009**—in feet. The contributing unit is greater than 75 percent of open interval.

| | | | |
|---|---|---|---|
| 25 | to | 78 | Groundwater rise |
| 5 | to | 25 | |
| -5 | to | 5 | |
| -25 | to | -5 | |
| -100 | to | -25 | |
| -244 | to | -100 | Groundwater decline |




**Columbia Plateau Regional Aquifer System**

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Groundwater-Level Changes for the Saddle Mountains Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 1984 to Spring 2009

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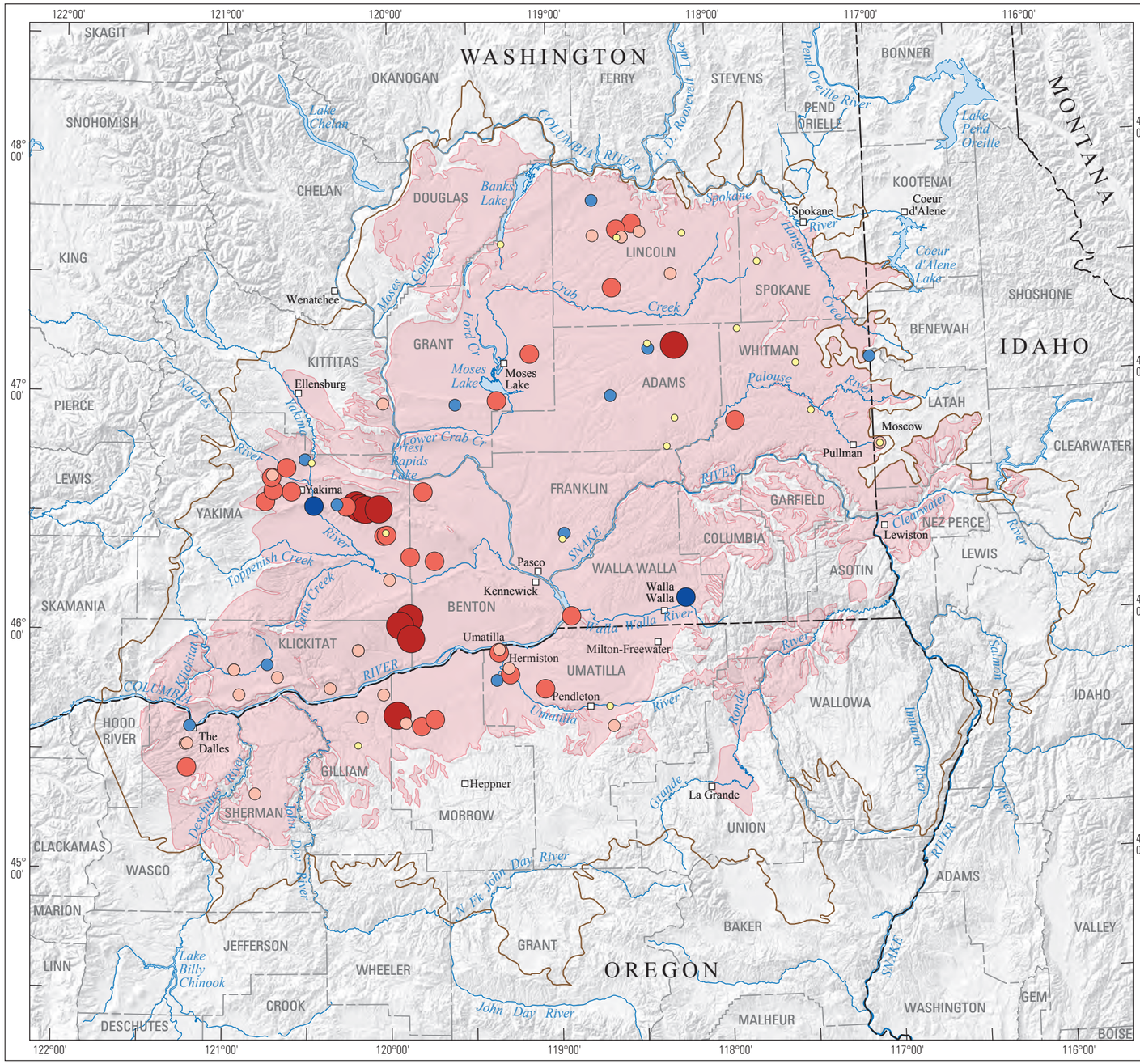
Scientific Investigations Report 2010-5040
Groundwater level changes for the Wanapum unit—PLATE 8 of 9
Snyder, D.T., and Haynes, J.V., 2010, Groundwater Conditions During 2009 and Changes in Groundwater Levels from 1984 to 2009, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho



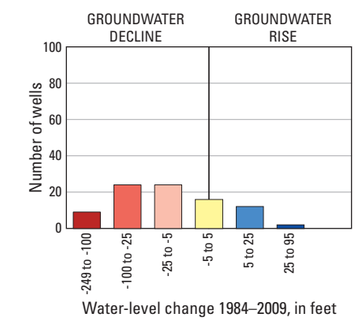

## EXPLANATION

Extent of Wanapum unit

Columbia Plateau Regional Aquifer System

**Water-level change in the Wanapum unit for spring 1984 to spring 2009**—in feet. The contributing unit is greater than 75 percent of open interval.

| | | | |
|---|---|---|---|
| 25 | to | 95 | Groundwater rise |
| 5 | to | 25 | |
| -5 | to | 5 | |
| -25 | to | -5 | |
| -100 | to | -25 | |
| -249 | to | -100 | Groundwater decline |




**Columbia Plateau Regional Aquifer System**

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Groundwater-Level Changes for the Wanapum Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 1984 to Spring 2009

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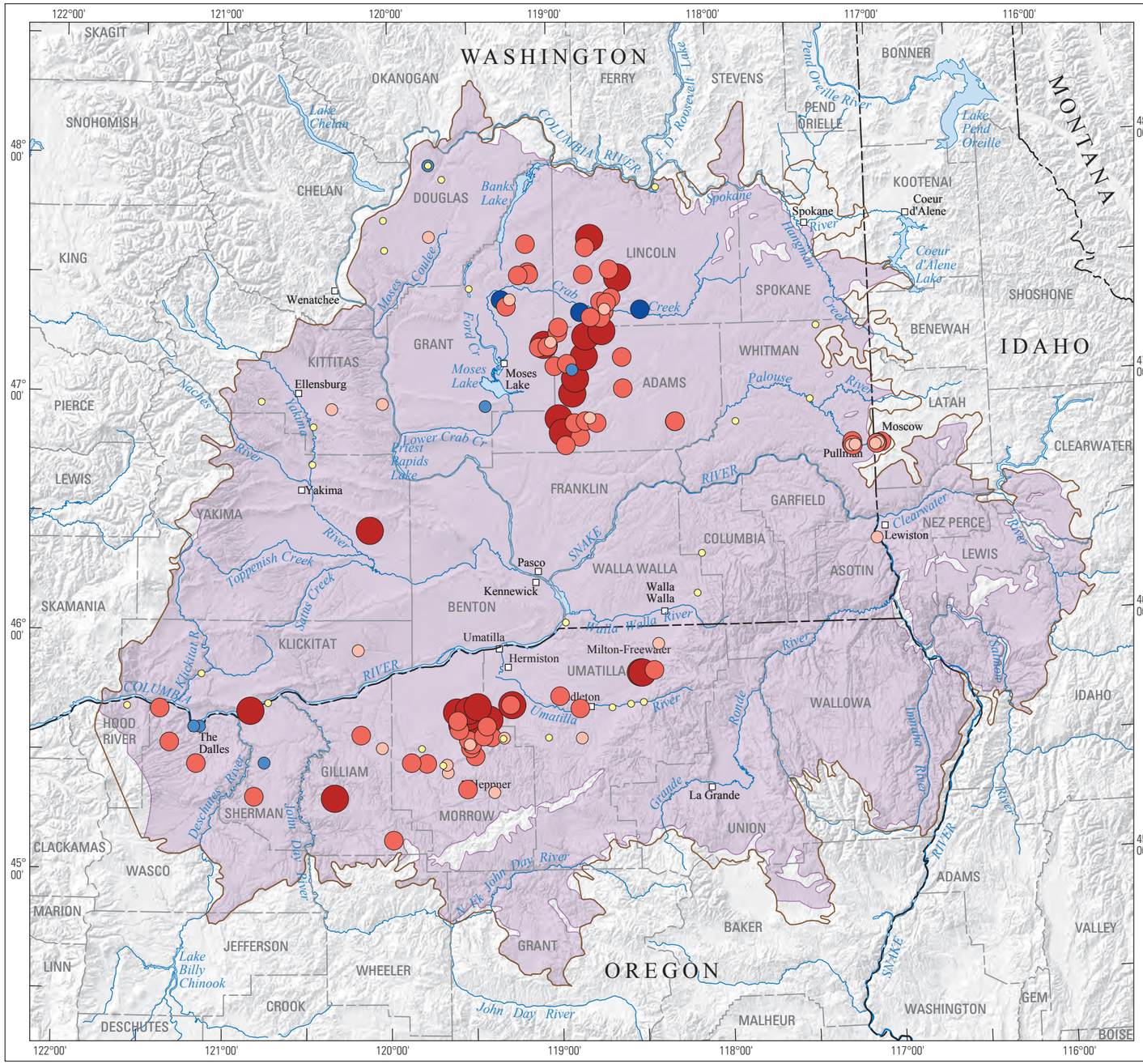


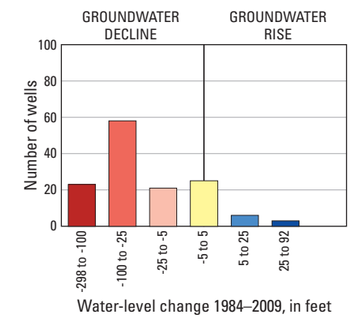

## EXPLANATION

Extent of Grande Ronde unit

Columbia Plateau Regional Aquifer System

**Water-level change in the Grande Ronde unit for spring 1984 to spring 2009**—in feet. The contributing unit is greater than 75 percent of open interval.

| | | | |
|---|---|---|---|
| 25 to 92 | Groundwater rise | | |
| 5 to 25 | | | |
| -5 to 5 | | | |
| -25 to -5 | | | |
| -100 to -25 | | | |
| -298 to -100 | Groundwater decline | | |




**Columbia Plateau Regional Aquifer System**

0 20 40 60 80 100 MILES
0 20 40 60 80 100 KILOMETERS

Digital data: U.S. Geological Survey, various scales. Projection: State Plane, Washington, South, FIPS 4602: Projection: Lambert Conformal Conic; False easting: 1640416.666667; False northing: 0.000000; Central meridian: -120.500000; Standard parallel 1: 45.833333; Standard parallel 2: 47.333333; Latitude of origin: 45.333333; Horizontal datum: North American Datum1983, Vertical datum: North American Vertical Datum 1988.

# Groundwater-Level Changes for the Grande Ronde Unit, Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho, Spring 1984 to Spring 2009

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