

ATTACHMENT K:
SPOKANE COUNTY HYDROGEOLOGICAL DATA
PRESENTATION
APRIL 26, 2012 ADVISORY GROUP MEETING



SPOKANE COUNTY REGIONAL HYDROGEOLOGIC DATA

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4/26/12

Overview

- General overview of available information
- Watershed planning assessments
- Recent & current efforts
 - Little Spokane Basin
 - West Plains
 - Latah Basin
- Additional data gathering

General Overview of Available Information

- Academic studies
 - Little Spokane
 - West Plains
 - Environmental assessments that are public information
 - Colbert Landfill
 - Well logs on file with Ecology
 - Long term monitoring
 - USGS, Spokane County, Ecology
-

- Drawbacks
 - Localized information
 - Often not associated with water quantity
 - Requires expertise to locate information and apply it
- Benefits
 - No field work required
 - Public information available at no cost

Watershed Planning Assessments

- Completed for all areas of Spokane County
- Include comprehensive look at
 - Hydrogeologic framework (groundwater system)
 - Hydrologic system (rivers, precipitation, etc.)
 - Water use
- Relied on existing information, and often general in nature

Little Spokane Basin

- Groundwater Inventory & Mapping Project
 - Spatial distribution of well yield

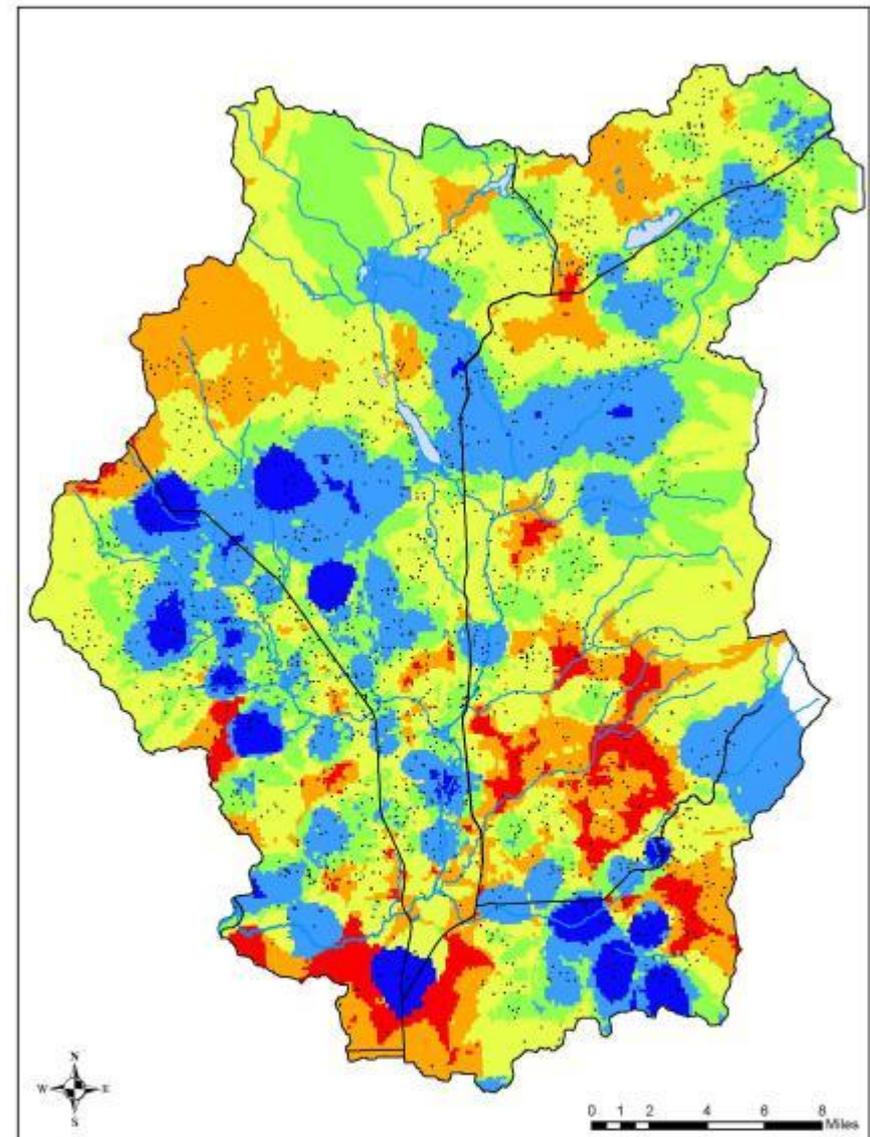


Figure 2-3
WRIA 55
Water Well Yield Spatial Variation

Note:
Fading is geostatistical technique I was allowed to interpolate
the spatial variation of well yield from well log data.
Points on the map represent the actual data
points added to generate the map.

Water Well Yield Estimate



Little Spokane Basin

- Groundwater Inventory & Mapping Project
 - Spatial distribution of well depth

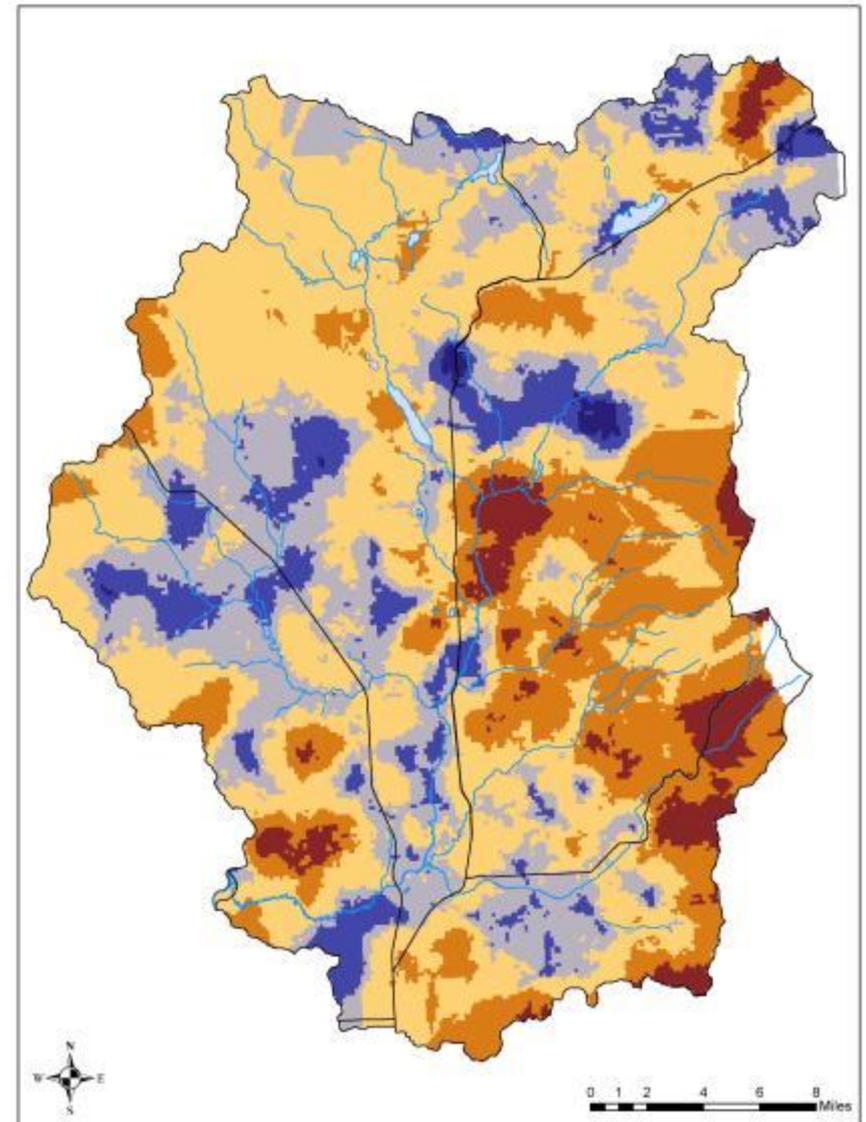


Figure 2-4
WRIA 55
Water Well Total Depth Spatial Variation

Notes:
Kriging (a geostatistical technique) was utilized to interpolate the spatial variations of total well depth.
Total well depth varies from water well logs.



Little Spokane Basin

- Groundwater Inventory & Mapping Project
 - Spatial distribution of Static Water Level

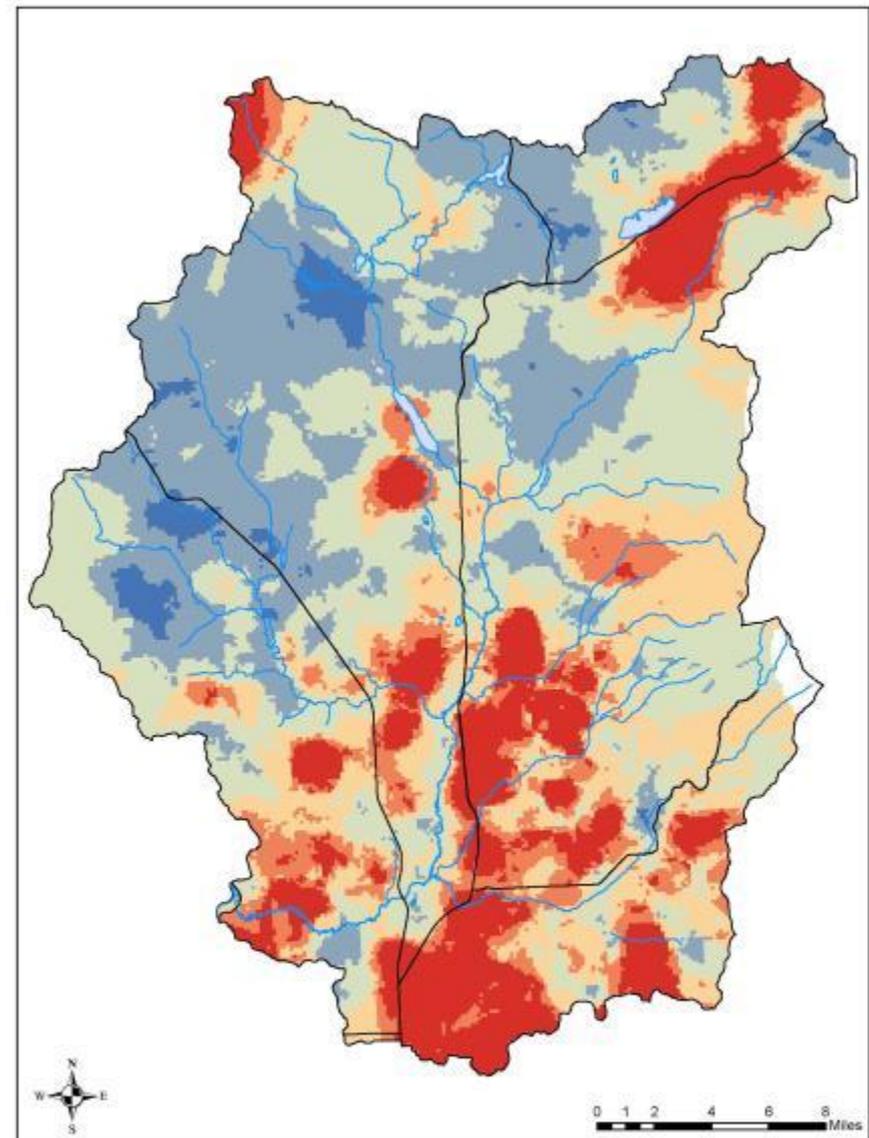
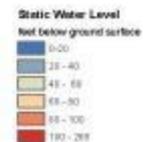


Figure 2-5
WRIA 55
Water Well Static Water Level Spatial Variation

Note:
Kriging (a geostatistical technique) was utilized to interpolate the spatial variation of static water level.
Static water level represents the water level reported on the water well log.



Little Spokane Basin

- Comparison of depth to water measurements from 1990s to 2009/10

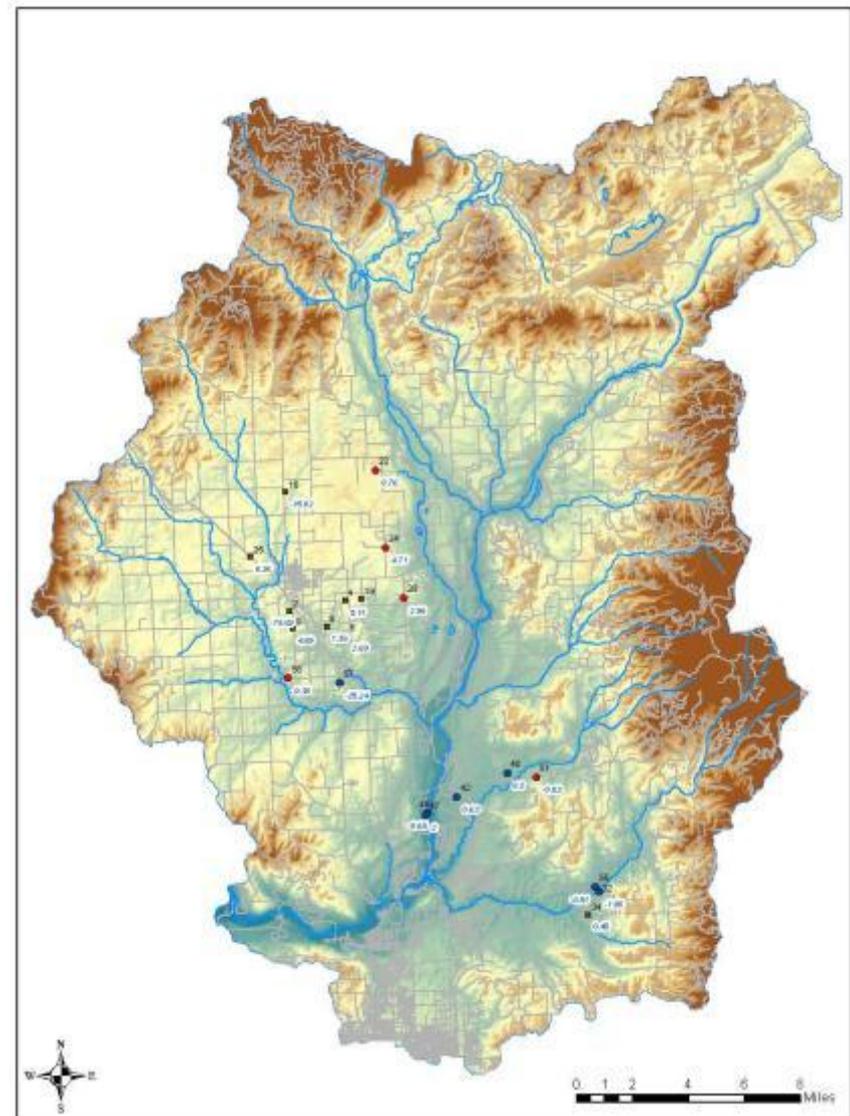


Figure 3-1
Snap Shot Measurement Locations

Notes:
-Number in black are the study ID for each location.
-Numbers in blue are the change in water level in feet, from 1991/96 to 2009/10.
See report for specific dates of the measurements.

Aquifer

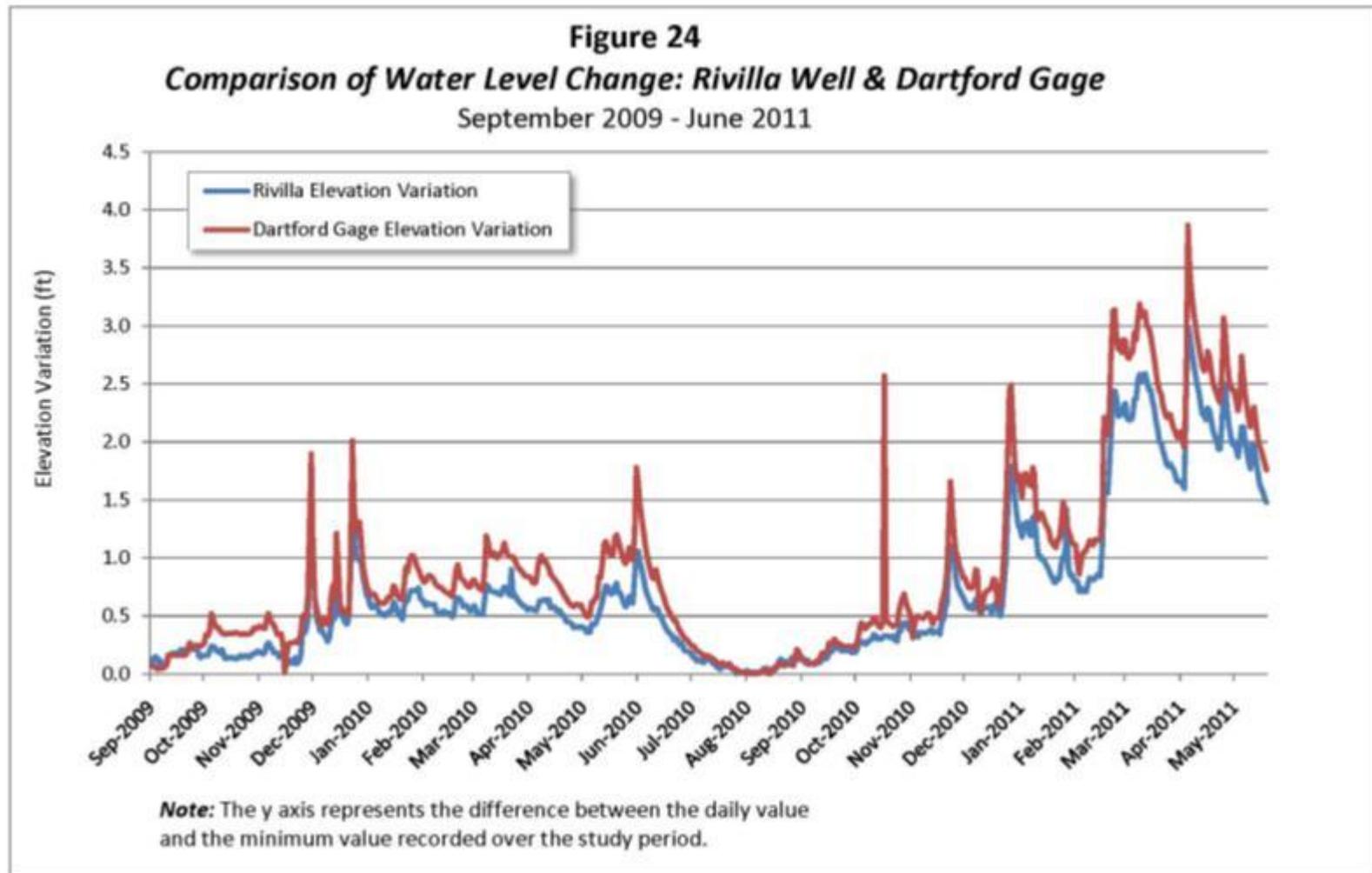
- Basalt
- Granite
- Lower Sand and Gravel
- ▲ Unknown
- Upper Sand and Gravel



Little Spokane Groundwater Elevation
& Stream Flow Monitoring Project

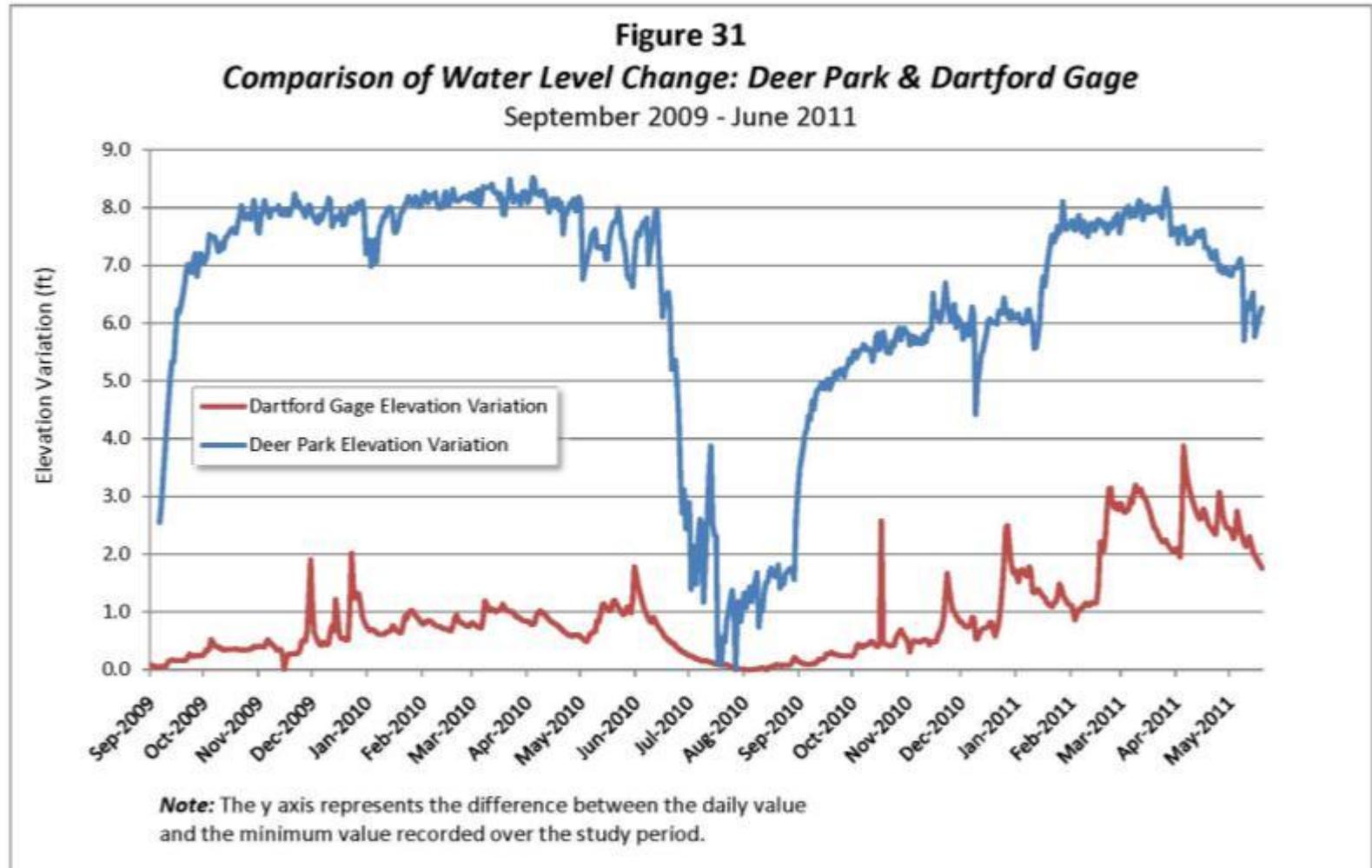
Little Spokane Basin

- Groundwater Monitoring & Stream Flow



Little Spokane Basin

- Groundwater Monitoring & Stream Flow



West Plains Hydrogeologic Database

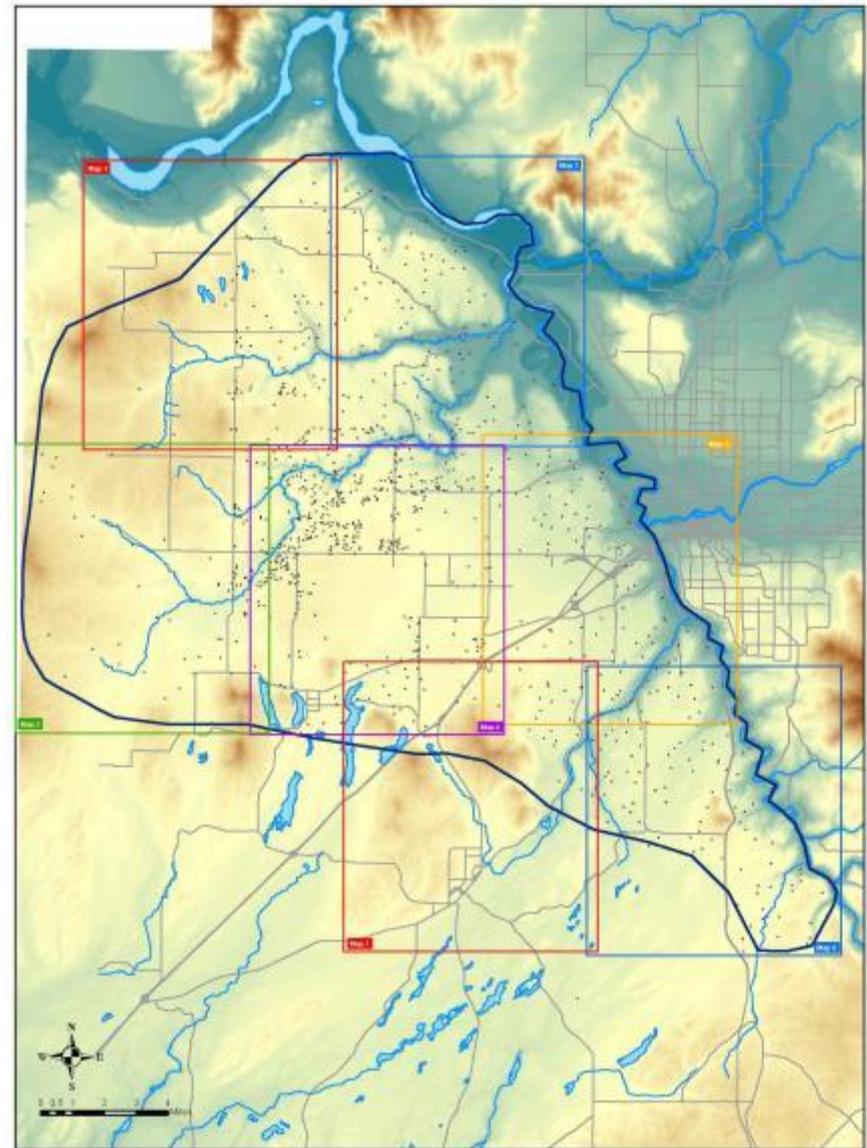


Figure 1 - Study Area & Database Map Key

- West Plains Hydrogeologic Database Data Points
- Study Area

Notes:
This map shows the study area for the West Plains Hydrogeologic Database project. Also included is a key for the larger database maps. The data point density required that the study area be split into separate areas so that all West ID could be shown without overlapping point labels.



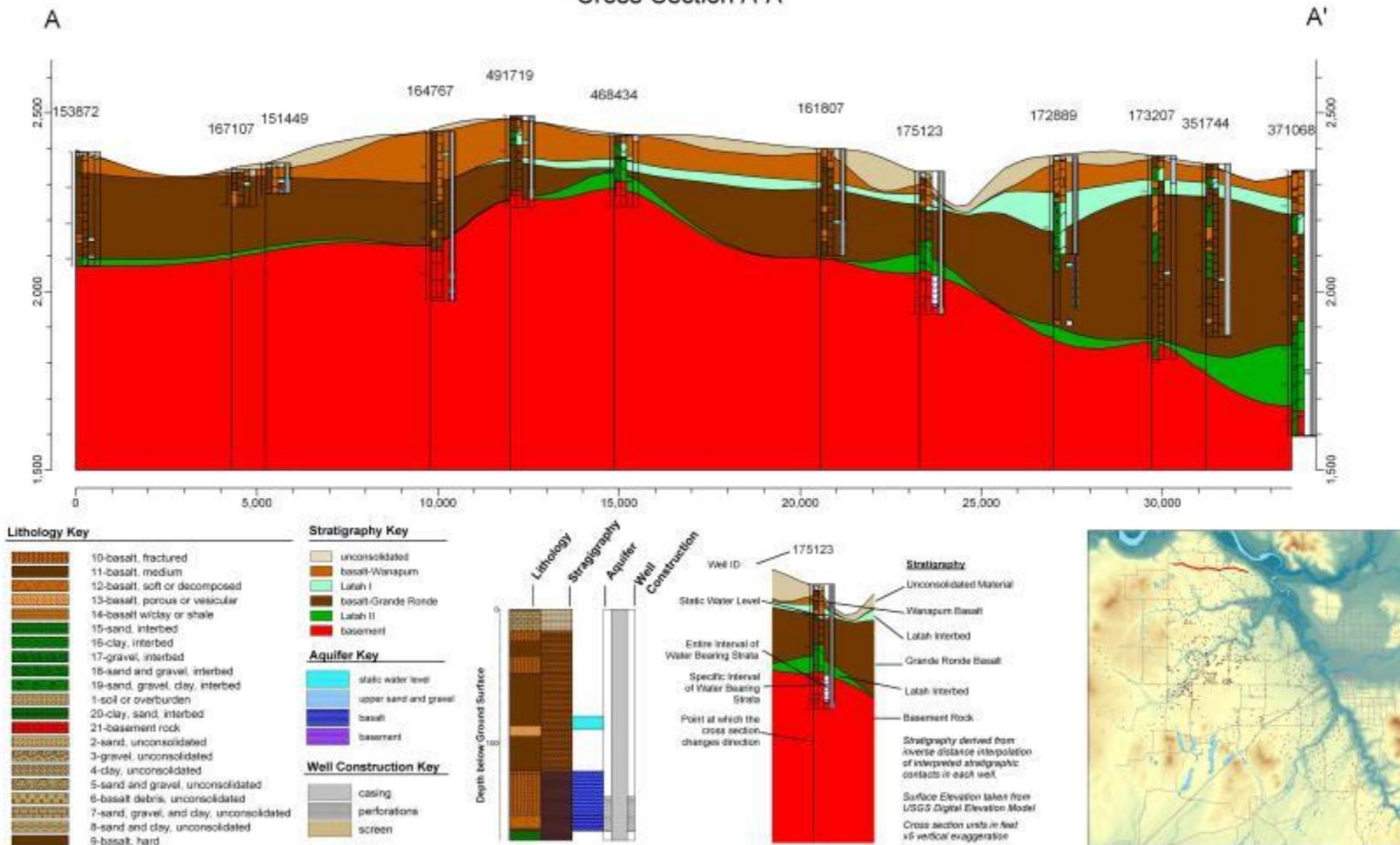
West Plains Hydrogeologic Database
WRRA 54 Phase IV
Implementation Project

West Plains Hydrogeologic Database

WRM #4 Phase IV Implementation Project

West Plains Hydrogeologic Database

Cross-Section A-A'



West Plains Hydrogeologic Database

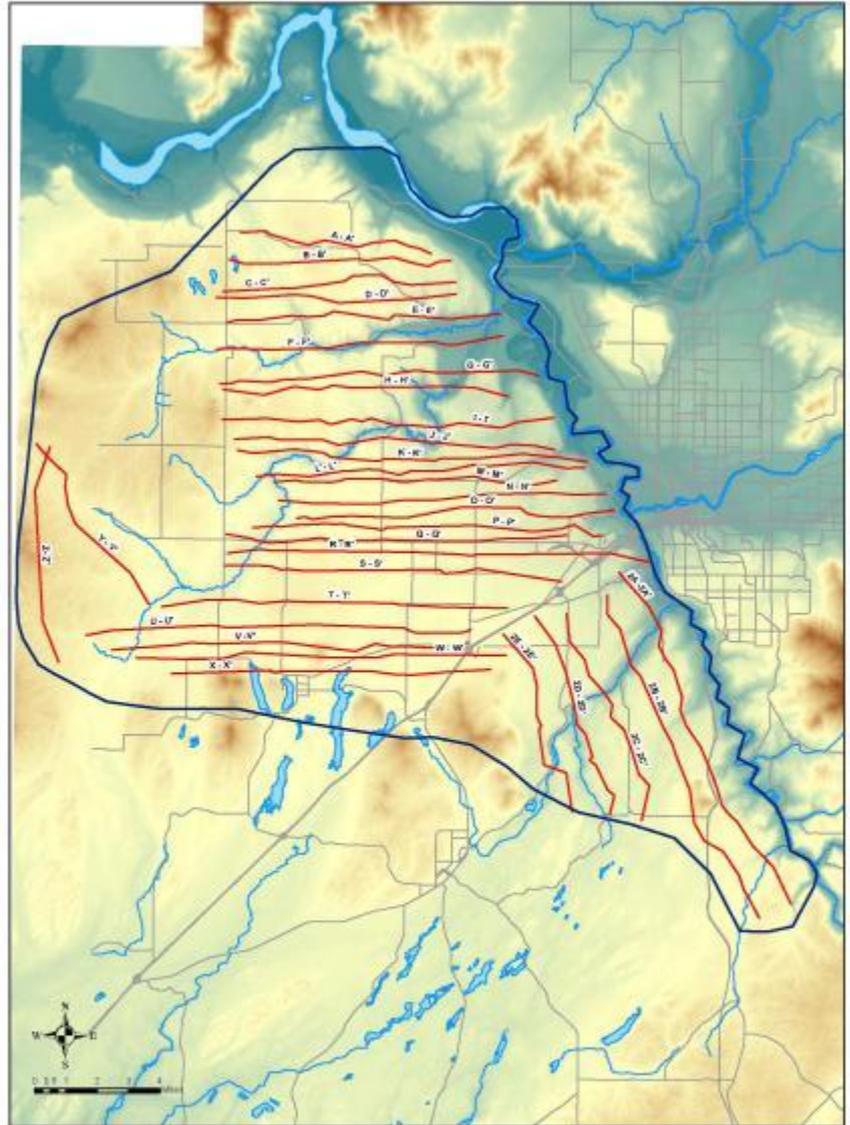


Figure 19 - Geologic Cross Section Key

- Well Location with interpreted aquifer
- Bellevue
 - grande ronde
 - not identified
 - unconsolidated
 - wells/poth
- Study Area
- Geologic Cross Section



West Plains Hydrogeologic Database

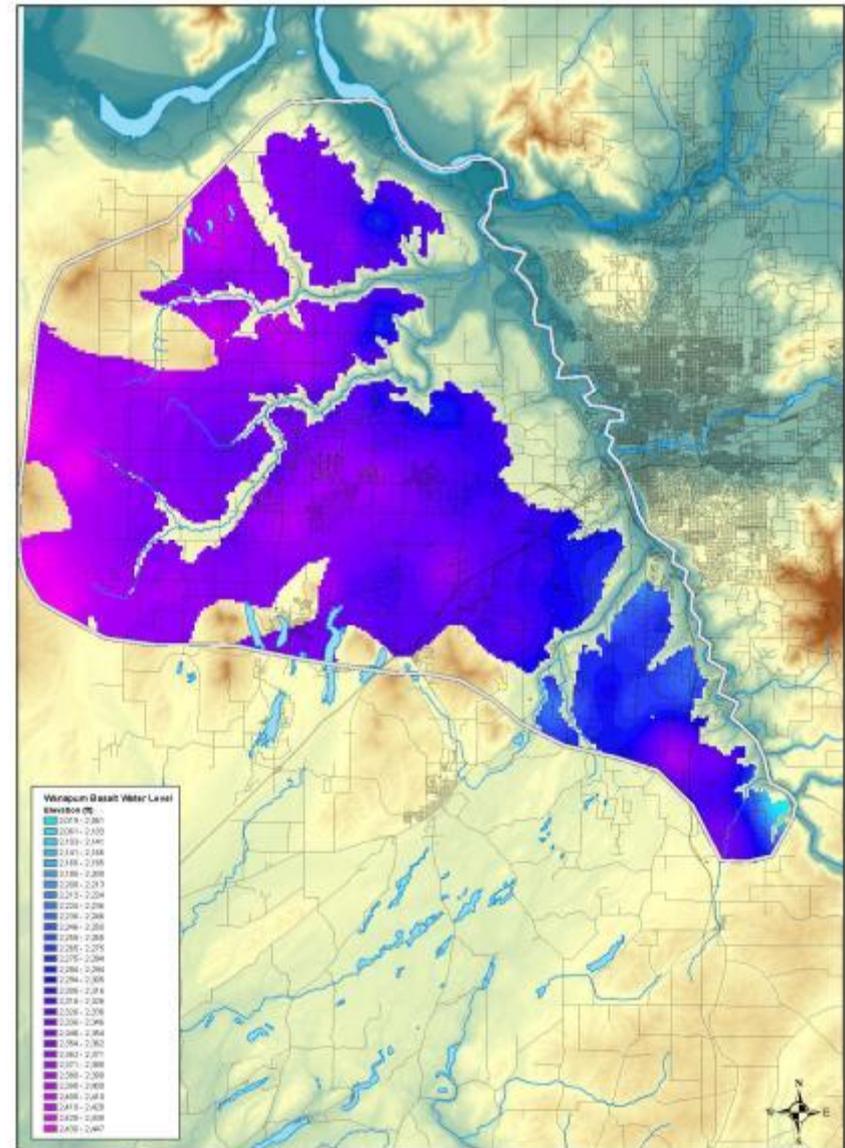


Figure 15 - Wanapum Basalt Potentiometric Water Surface

Wanapum hydrologic unit

 Study area boundary

Notes

This figure represents the potentiometric water surface for the Wanapum basalt unit. The surface was developed from an interpolation of static water levels recorded on-dike well logs. The data base used for this project is 1950-2018. The plot surface includes the entire study area. Areas where the interpolated water surface elevation exceeded the land surface elevation were removed. Areas where the Wanapum basalt does not occur were also removed.

West Plains Hydrogeologic Database

174265

Easting: 1,499,695.0
Northing: 17,307,039.2
Longitude: -117.570923
Latitude: 47.628651
Elevation: 2,370.1
Total Depth: 242.0

Lithology:

- 0.0 - 5.0 (5.0): 1-soil or overburden
- 5.0 - 8.0 (3.0): 5-sand and gravel, unconsolidated
- 8.0 - 18.0 (10.0): 3-gravel, unconsolidated
- 18.0 - 75.0 (57.0): 4-clay, unconsolidated
- 75.0 - 79.0 (4.0): 9-basalt, hard
- 79.0 - 108.0 (29.0): 11-basalt, medium
- 108.0 - 109.0 (1.0): 12-basalt, soft or decomposed
- 109.0 - 122.0 (13.0): 16-clay, interbed
- 122.0 - 124.0 (2.0): 11-basalt, medium
- 124.0 - 131.0 (7.0): 12-basalt, soft or decomposed
- 131.0 - 156.0 (25.0): 12-basalt, soft or decomposed
- 156.0 - 191.0 (35.0): 9-basalt, hard
- 191.0 - 199.0 (8.0): 12-basalt, soft or decomposed
- 199.0 - 205.0 (6.0): 16-clay, interbed
- 205.0 - 242.0 (37.0): 16-clay, interbed

Stratigraphy:

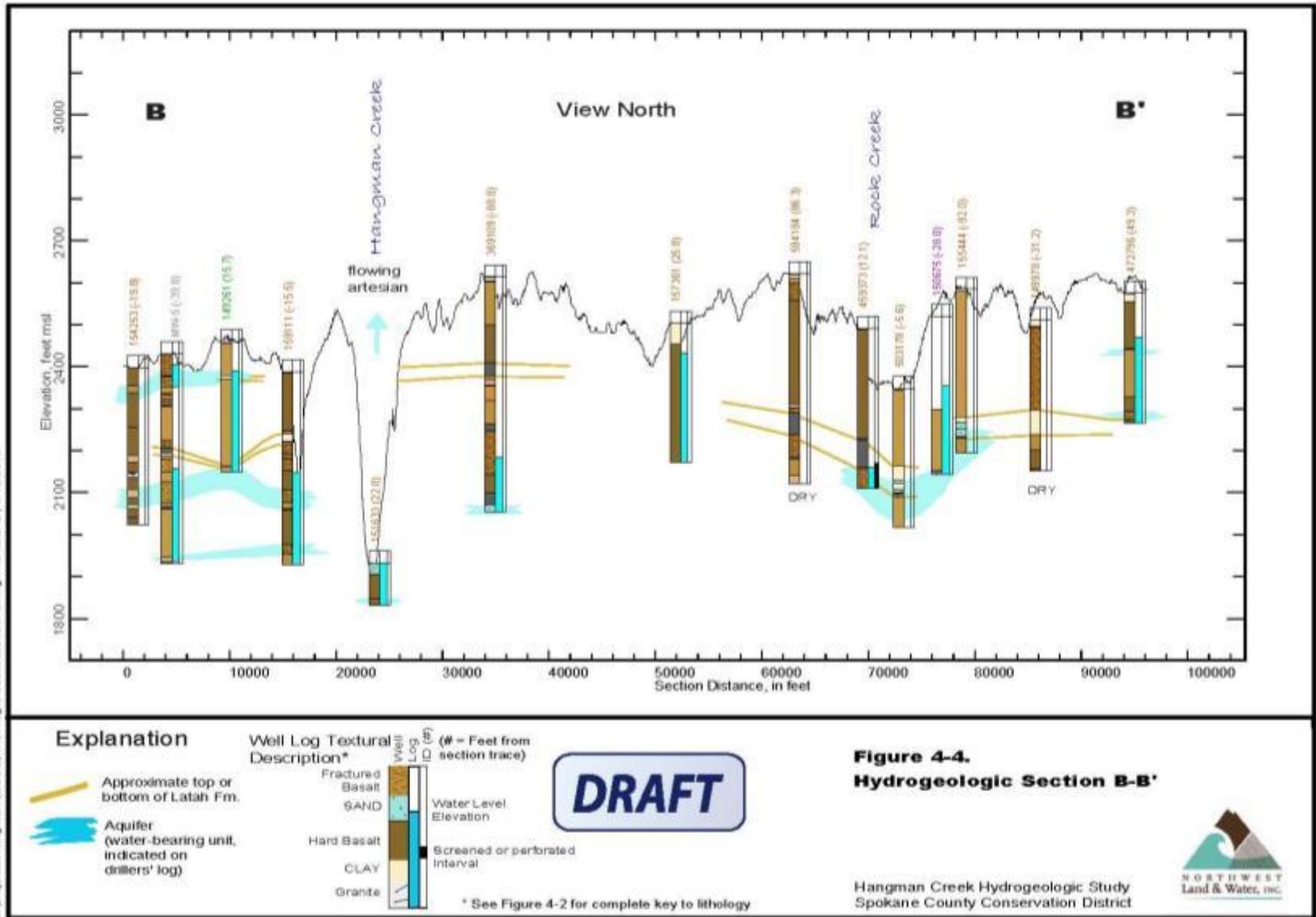
- 0.0 - 75.0 (75.0): unconsolidated
- 75.0 - 199.0 (124.0): basalt-Wanapum
- 199.0 - 242.0 (43.0): Latah I

Water Levels:

- 11/19/1988: 53.0 - 63.0 (10.0)
- 11/19/1988: 75.0 - 79.0 (4.0)
- 11/19/1988: 75.0 - 205.0 (130.0)
- 11/19/1988: 124.0 - 131.0 (7.0)
- 11/19/1988: 199.0 - 205.0 (6.0)

© 2012 Google
Imagery Date: 8/20/2011 1995
47°39'18.47" N 117°34'05.32" W elev 2365.6 ft
Eye alt 48037 ft

Latah Creek Basin



Potential Future Work

- Basin wide hydrogeologic framework
 - Location and extent of aquifers
 - Hydraulic properties of aquifers (transmissivity, specific storage)
 - Aquifer recharge/aquifer withdrawals
 - Groundwater flow directions
 - Groundwater/surface water connections
- Development of groundwater flow models
- Long term water level monitoring

Groundwater Flow Models

- Spokane Valley Rathdrum Prairie Aquifer Model
- Models can aid in understanding impacts of groundwater withdrawals on surface water
- USGS currently working on project in the Little Spokane Basin that could serve as the basis for a groundwater flow model

Table 2

Actual & Modeled Spokane River Flows August 2000-2005				
Year	No Change	Full Inchoate Right Exercised		
		Septic and Landscape Return	Landscape Return	No Return
Post Falls Gage (Stream Segment 33)				
2000	533	533	533	533
2001	376	376	376	376
2002	854	854	854	854
2003	360	360	360	360
2004	1002	1002	1002	1002
2005	473	473	473	473
Barker (Stream Segment 66)				
2000	284	284	284	284
2001	134	134	134	134
2002	592	592	592	592
2003	119	119	119	119
2004	739	739	739	739
2005	226	226	226	226
Spokane Gage (Stream Segment 125)				
2000	1084	853	844	810
2001	671	463	449	411
2002	1334	1110	1097	1054
2003	680	469	457	415
2004	1264	1055	1045	1004
2005	714	497	487	444
Gun Club (Stream Segment 159)				
2000	1169	948	939	898
2001	755	551	538	494
2002	1422	1203	1190	1141
2003	764	558	546	499
2004	1345	1144	1134	1087
2005	796	587	577	529
Nine Mile (Stream Segment 179)				
2000	1314	1094	1085	1044
2001	944	741	728	683
2002	1616	1398	1384	1335
2003	935	731	719	670
2004	1525	1326	1315	1268
2005	968	761	751	701

Long term groundwater level monitoring

