



# Hydraulic Continuity in Washington Water Law

University of Idaho School of Law

One Source Symposium, April 15, 2011



CLEAN, FLOWING WATERS FOR WASHINGTON

The Center for  
Environmental Law & Policy

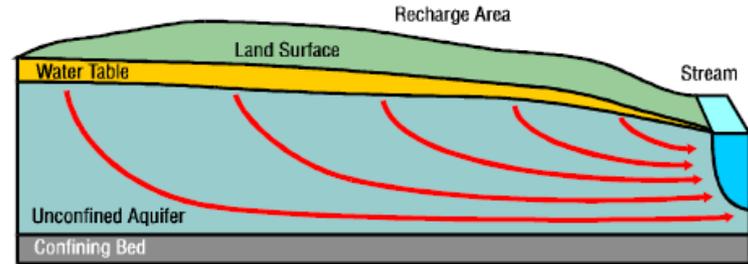
**Rachael Paschal Osborn**

**Executive Director**

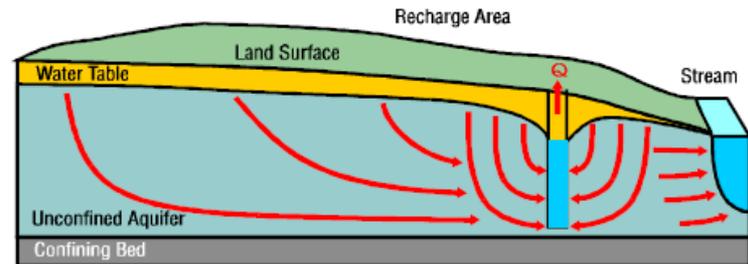
**Center for Environmental Law & Policy**

# Source of Water Derived From Wells

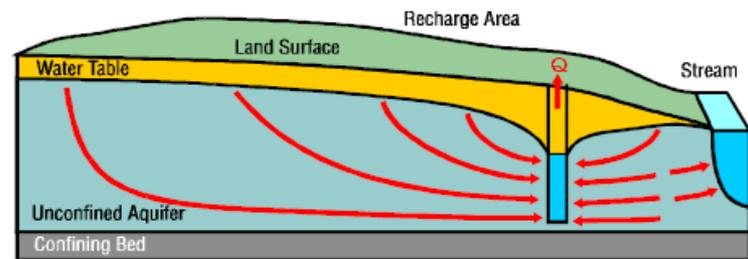
From Heath,  
1983



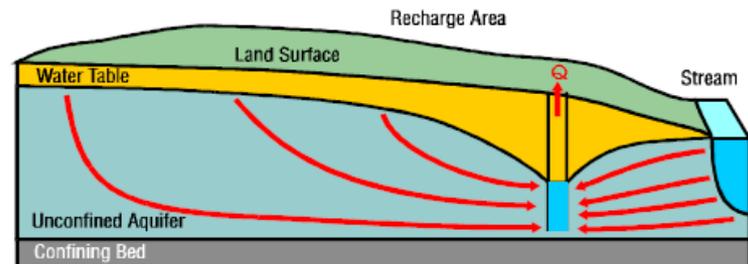
$$\text{Discharge (D)} = \text{Recharge (R)}$$



$$\text{Withdrawal (Q)} = \text{Reduction in storage } (\Delta S)$$

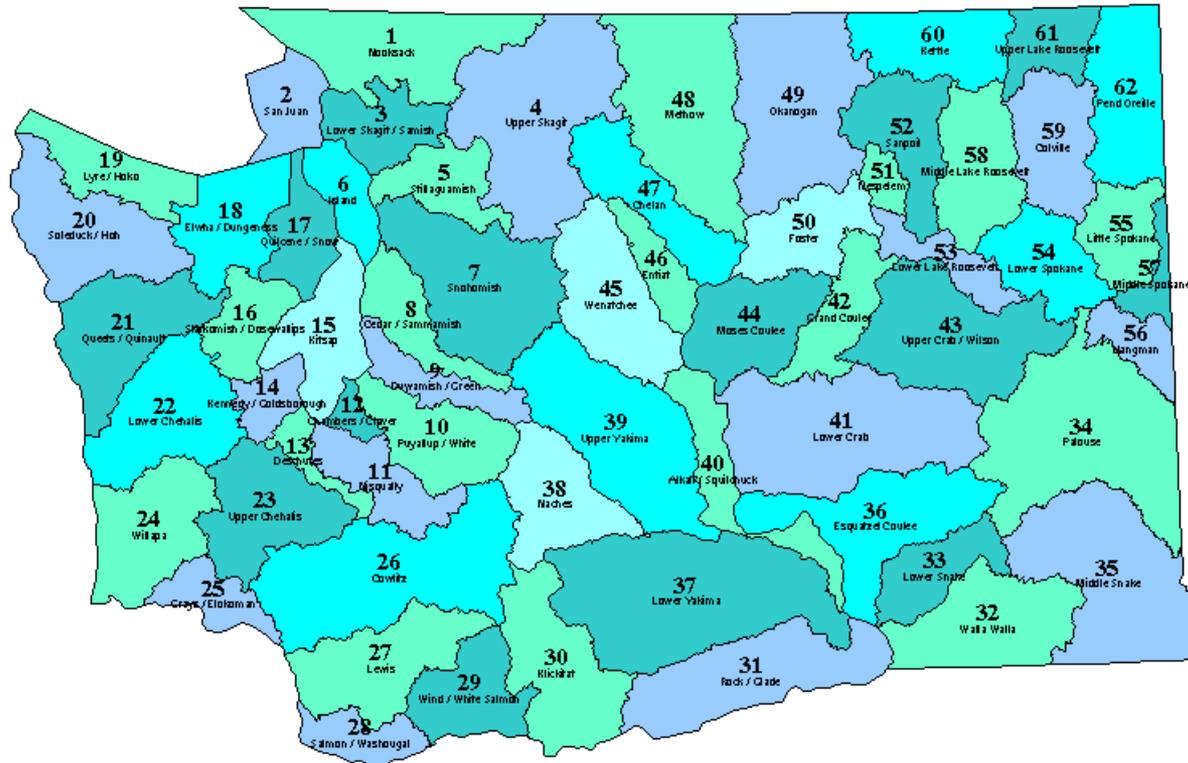


$$\text{Withdrawal (Q)} = \text{Reduction in storage } (\Delta S) + \text{Reduction in Discharge } (\Delta D)$$



$$\text{Withdrawal (Q)} = \text{Reduction in Discharge } (\Delta D) + \text{Increase in recharge } (\Delta R)$$

# Longstanding recognition of “hydraulic continuity” in Washington statutes



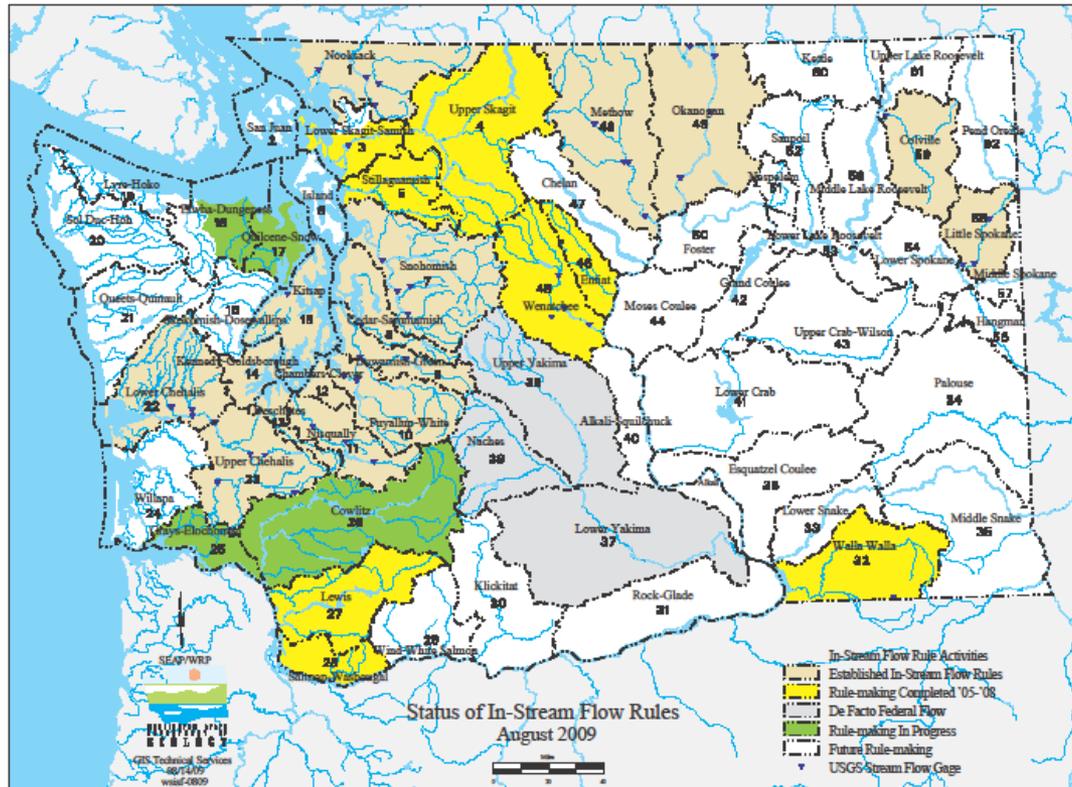
# Groundwater Code of 1945

- RCW 90.44.060 (1945)
  - To the extent any groundwater is part of or tributary to any surface stream or lake, or that the withdrawal of groundwater may affect the flow of any surface water body, the right of the surface water appropriator shall be superior to any subsequent right hereby authorized to be acquired in or to groundwater.
- First in time principles apply to groundwater rights

# Water Resource Act of 1971

- Water Resources Act of 1971
- RCW 90.54.020(9)
  - Full recognition shall be given in the administration of water allocation and use programs to the natural interrelationships of surface and ground-waters
- RCW 90.54.020(3)
  - Perennial flows shall be maintained to protect fisheries, navigation, recreation, and other public uses

# Washington Water Resources Inventory Areas (WRIAs)

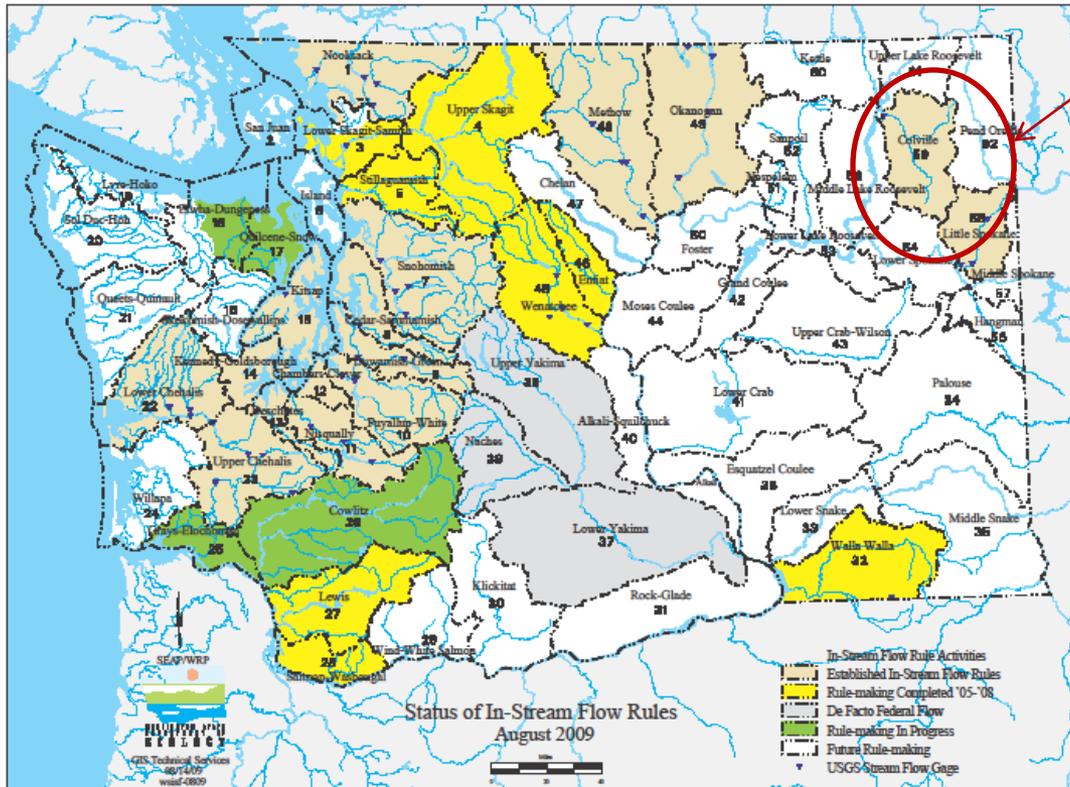


# WRIA Rules

- Rules adopted in 18 (out of 62) WRIAs
- Establish minimum instream flows
  - Min. flows are a form of water right
  - Priority date, quantity, place of use (reach of river)
- Basin closures
- Discussion of hydraulic continuity
  - But, inconsistent

# Washington Water Resources Inventory Areas (WRIAs)

Colville

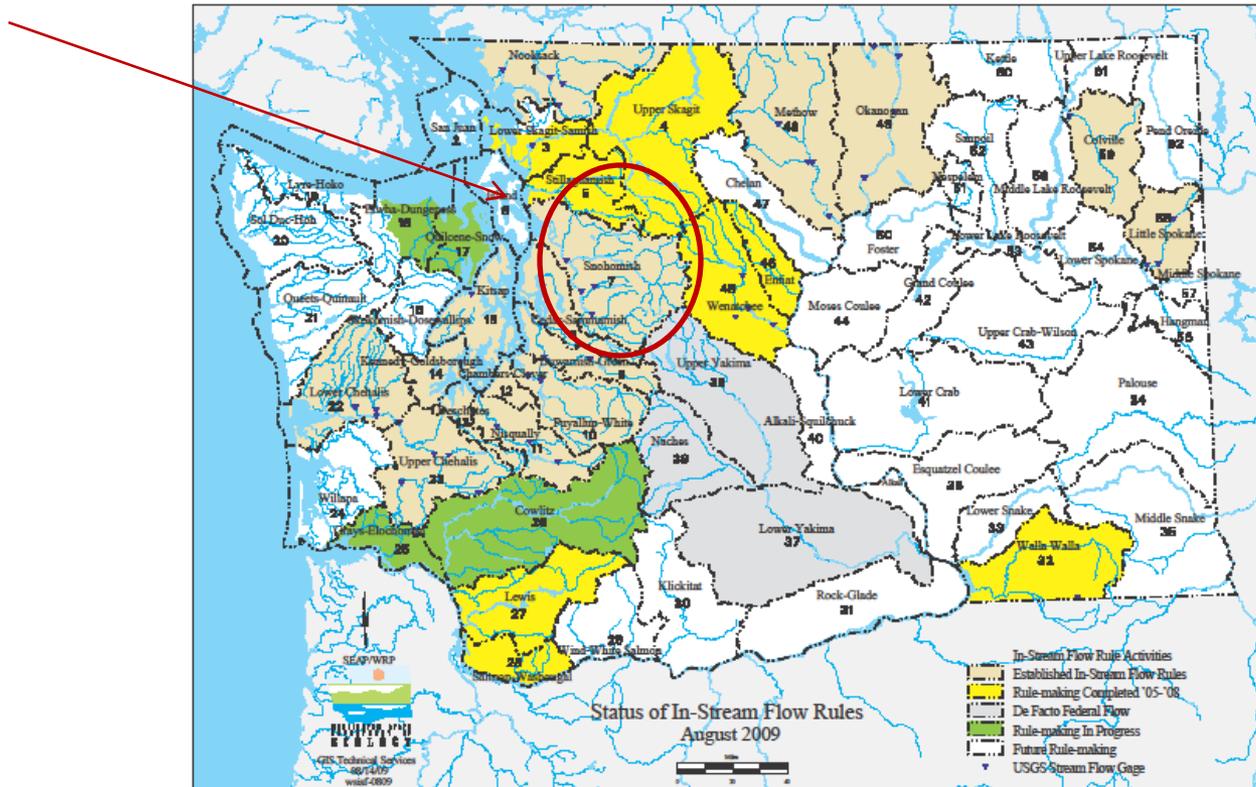


# WRIA Rules

- Colville
  - If future development of groundwater affects surface waters, then groundwater rights shall be subject to the same conditions as affect surface rights

# Washington Water Resources Inventory Areas (WRIAs)

Snohomish

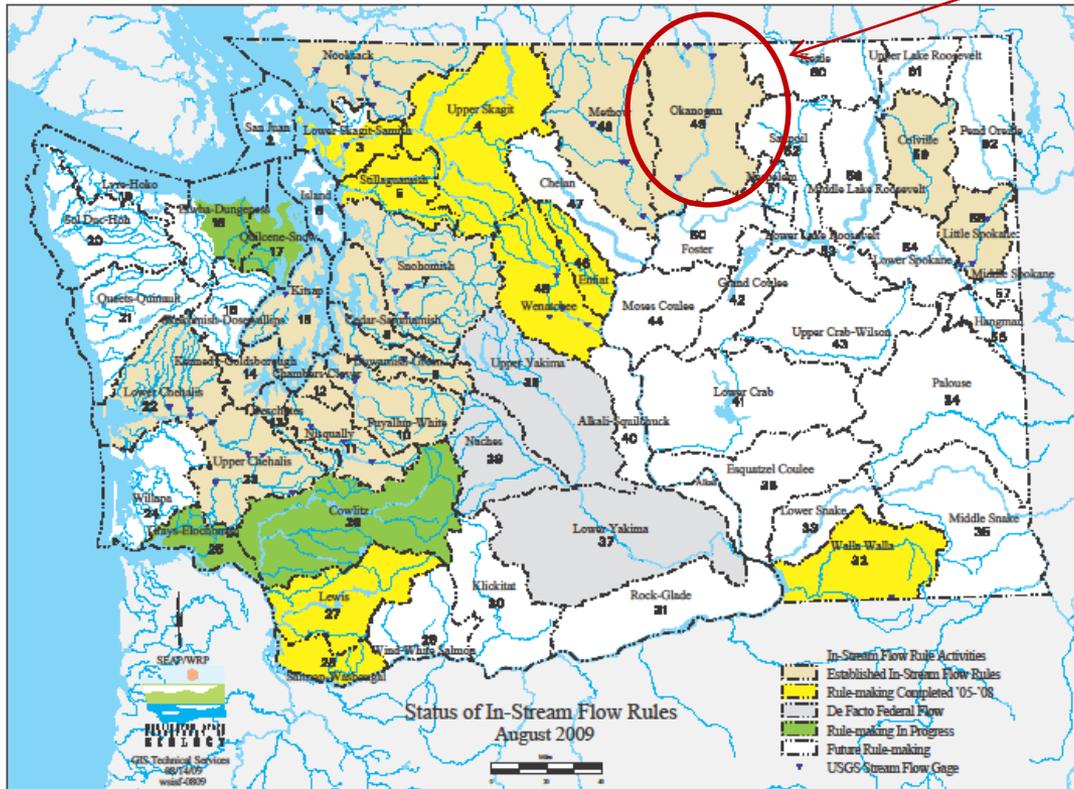


# WRIA Rules

- Snohomish
  - The natural interrelationship of surface and ground waters shall be fully considered

# Washington Water Resources Inventory Areas (WRIAs)

Okanogan



# WRIA Rules, cont.

- Okanogan:
- If there is significant hydraulic continuity between surface water and proposed groundwater source, any permit shall be subject to the same conditions as affected surface waters

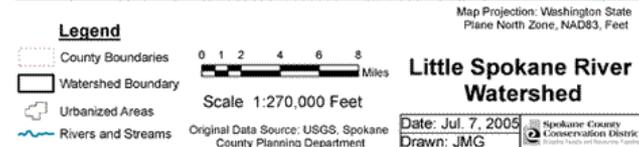
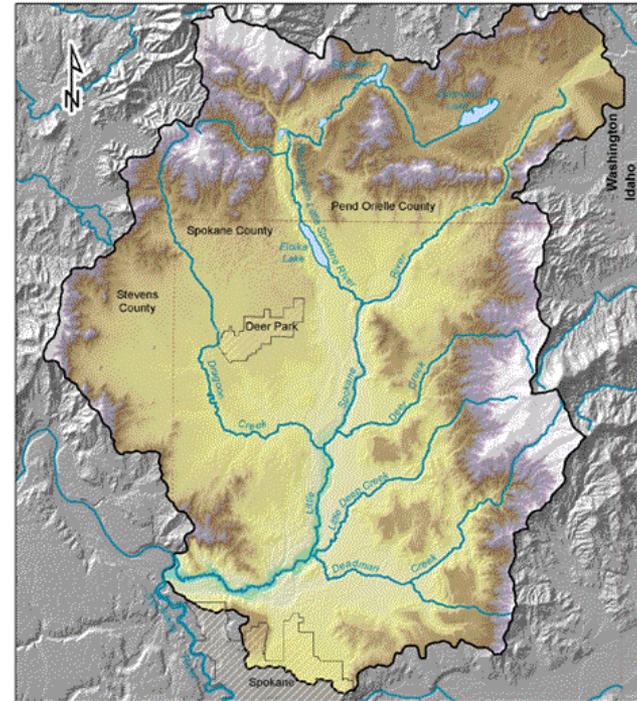


# WRIA Rules

- Green-Duwamish
- Groundwater permits shall not be affected unless the withdrawal would clearly have an adverse impact upon the surface water system

# Little Spokane

- Rule-based summer season instream flow
- Annual curtailment orders to ~ 200 surface water right holders 9 out of last 10 years
- “measurable effect on streams” protected by minimum flow rule



# The Struggle between Science and Policy

- 1960 Water Bulletins and USGS studies identify ground and surface water connections in several basins
- 1980 Hydraulic Continuity Guidelines
  - Limitations on groundwater permit only if proposed withdrawal
    - Is within certain distance of stream in unconfined system, or
    - Capture 5% or more of the stream flow

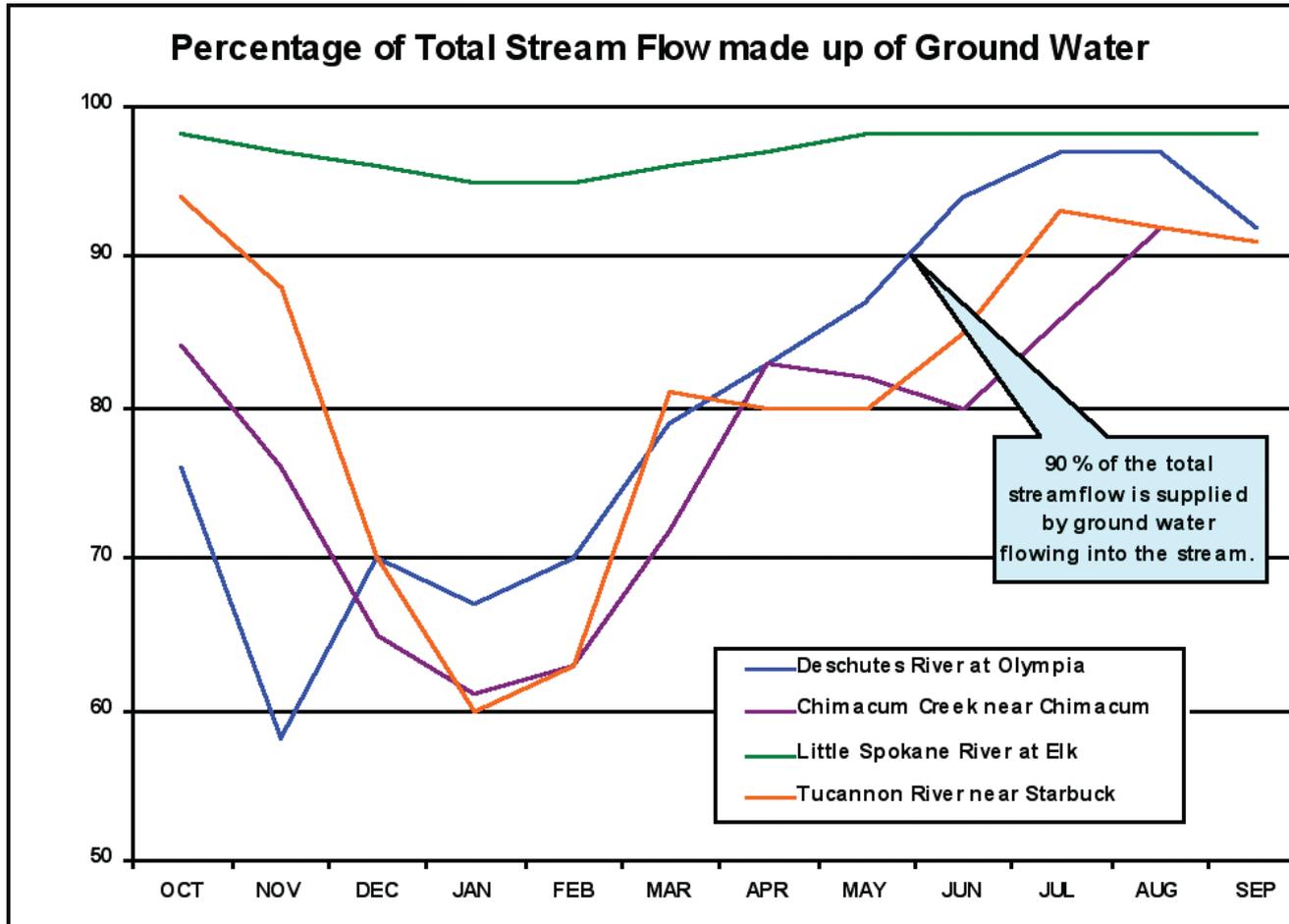
# Science & Policy - 2

- 1985 – Washington Ecological Commission identifies need for
  - “analytical procedures and standards for determining hydraulic continuity”
- 1988 – Joint Select Committee on Water Resources Policy (Steven Shupe Report)
- 1989 Centennial Accord
  - government-to-government relationship between state and tribes re natural resource management

# Science & Policy - 3

- 1989 Chelan Agreement
- 1992 Water Resources Forum
- 1989 Ecology-Dept Fish & Wildlife interagency MOU
- 1993 Procedural Guidelines for Hydrogeologic Investigations
- 1994 Initial Watershed Assessments (16 basins with instream flow rules)

# Base Flow & Stream Impact Examples



# The Courts Weigh In

- Hubbard v. Ecology (1998)
  - Ecology may condition groundwater permits on rule-based minimum instream flows
  - “Significant” hydraulic continuity means connection exists, not the quantity

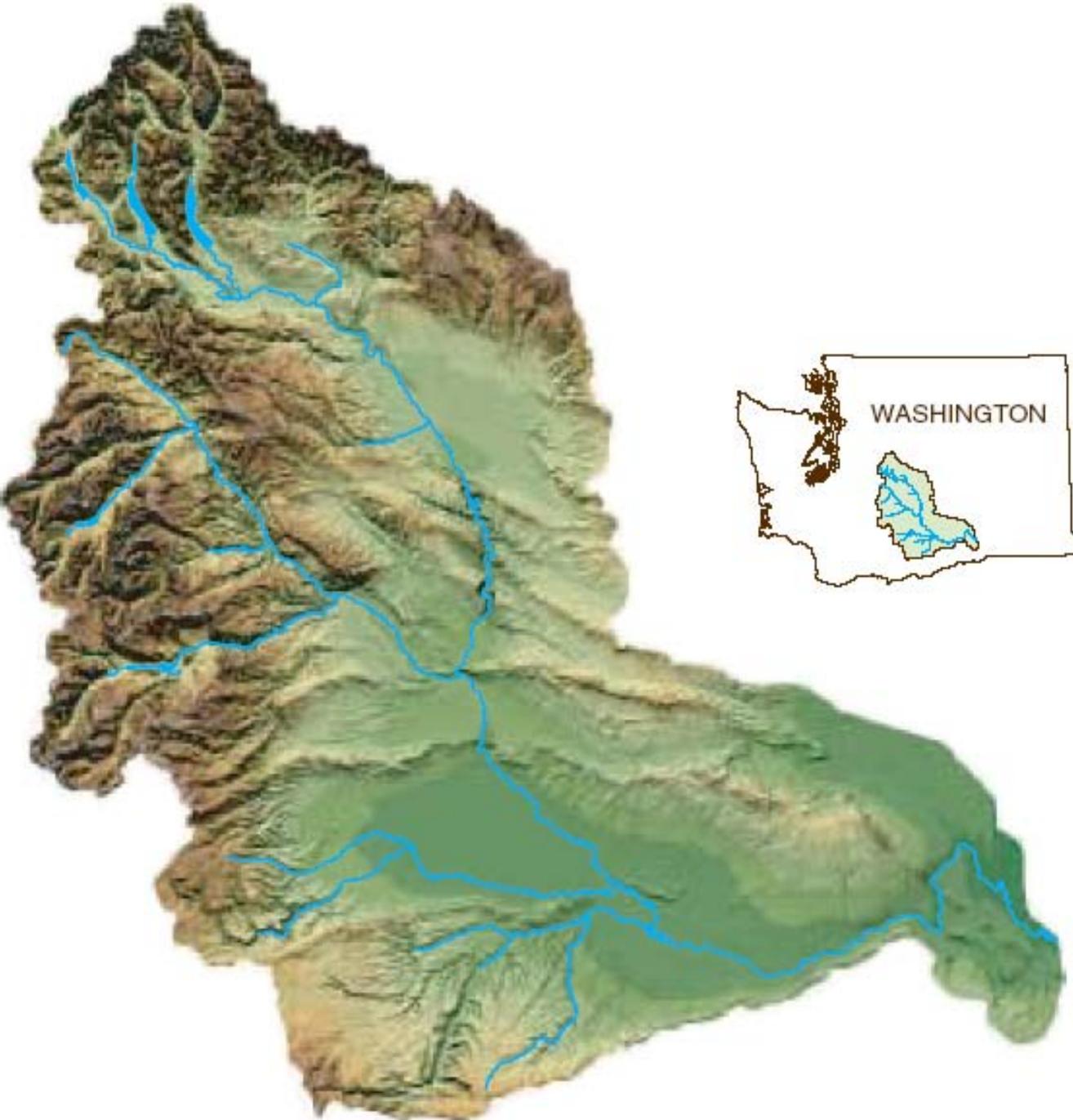
# The 1998 Capture Report

- Draft Report on Capture of Surface Water by Wells
  - In the long run, any groundwater withdrawal will reduce surface water flow
  - The questions are: how much, where, when, how long
  - No “one size fits all” technical approach

# The “Statewide Appeals”

- 1996: 600 groundwater decisions
  - 300-plus denials based on HC
  - 130 appeals
- Postema v. PCHB (2000)
  - Groundwater permits may be denied based on impacts on instream flows
  - “Measurable” means ascertainable
  - Ecology may use new scientific methods as they become available

# Yakima River Basin



# Synclinal Basin in Yakima Fold and Thrust belt

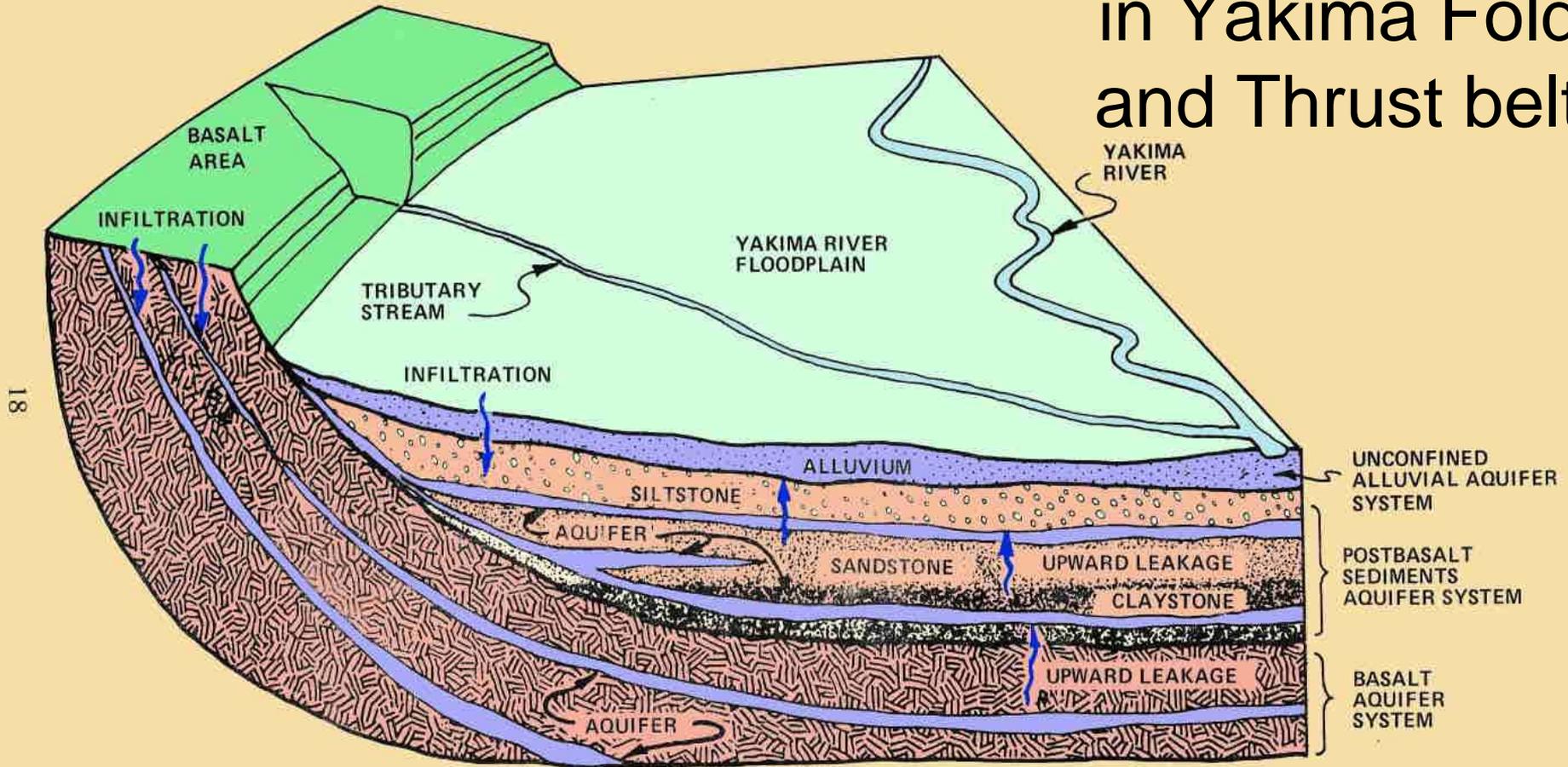


Figure 3. The Three Principal Aquifer Systems in the Yakima River Basin

From U.S. Army Corps of Engineers, 1978,  
Yakima Valley Regional Water Management Study

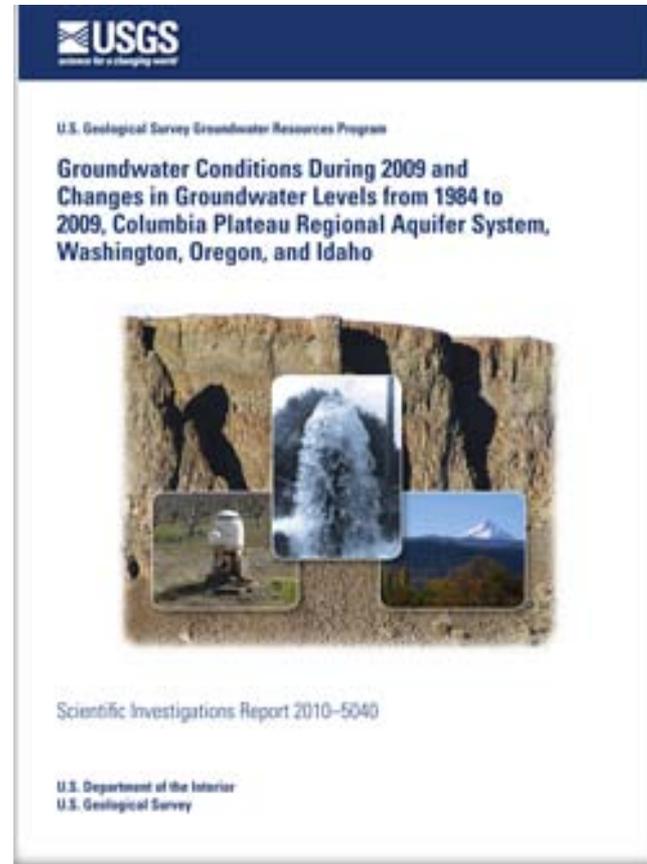


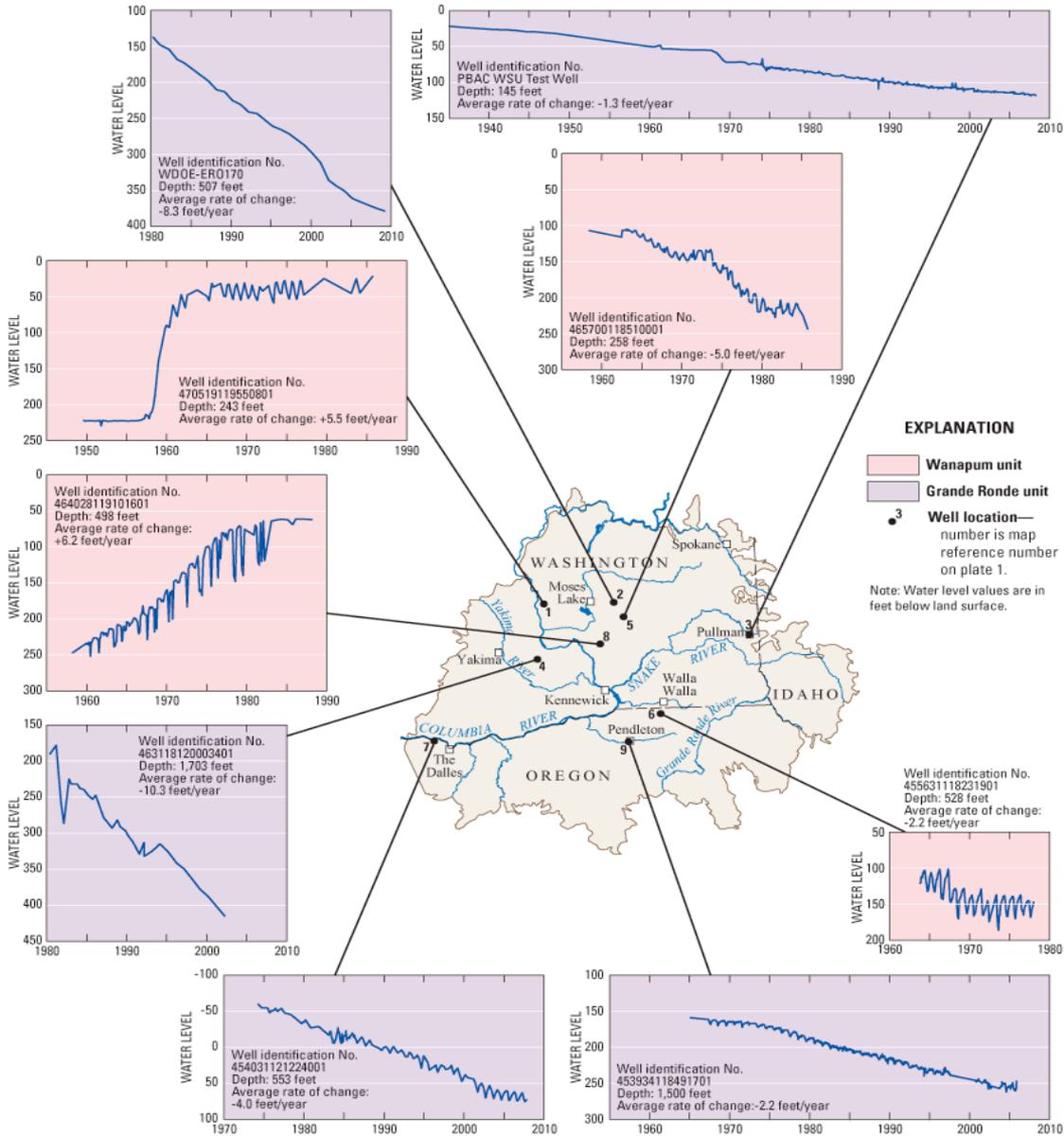
# Yakama Nation v. Ecology

- 1993 - 43 appeals of deep basalt groundwater permits
- Six years of litigation
- 1999 Settlement
  - Groundwater permitting moratorium
  - USGS study of river-aquifer interaction
    - Results released in 2010
    - Wells intercepting 200 cfs in stream flow

# Columbia Plateau

Groundwater levels of the Columbia Plateau have declined over the past 25 years in about 80 percent of the nearly 500 wells measured





Snyder &  
Haynes,  
USGS,  
2010

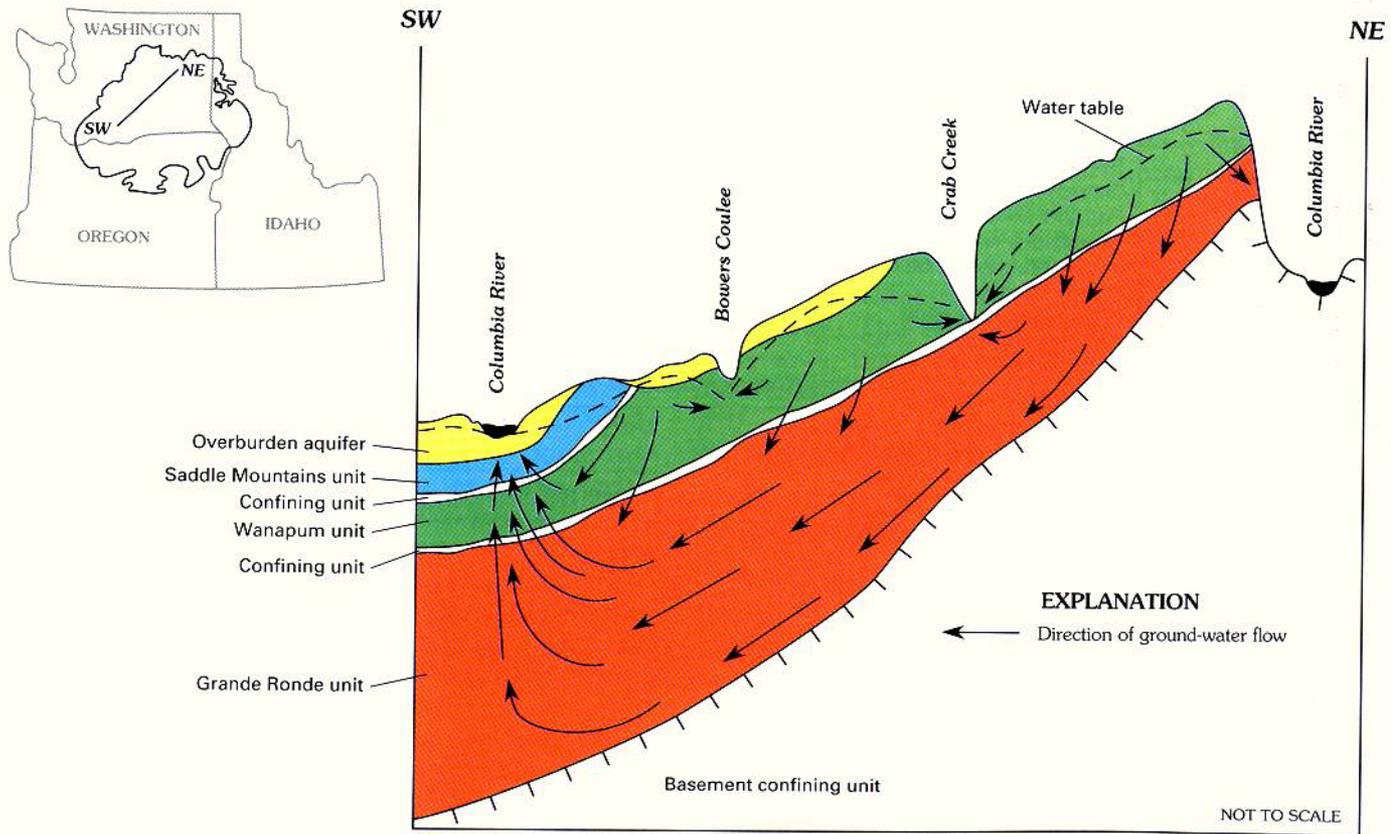


FIGURE 21.—Generalized ground-water-flow pattern in the Columbia Plateau aquifer system.

Vaccaro, J.J., Summary of the Columbia Plateau, regional aquifer-system analysis, Washington, Oregon & Idaho, U.S. Geological Survey Professional Paper 1413-A (1999)

- 2006 Columbia River Water Management Program (RCW 90.90)
- Legislates zone of hydraulic continuity with Columbia River
  - 1 mile on each side

# Spokane Valley-Rathdrum Prairie (SVRP) Aquifer

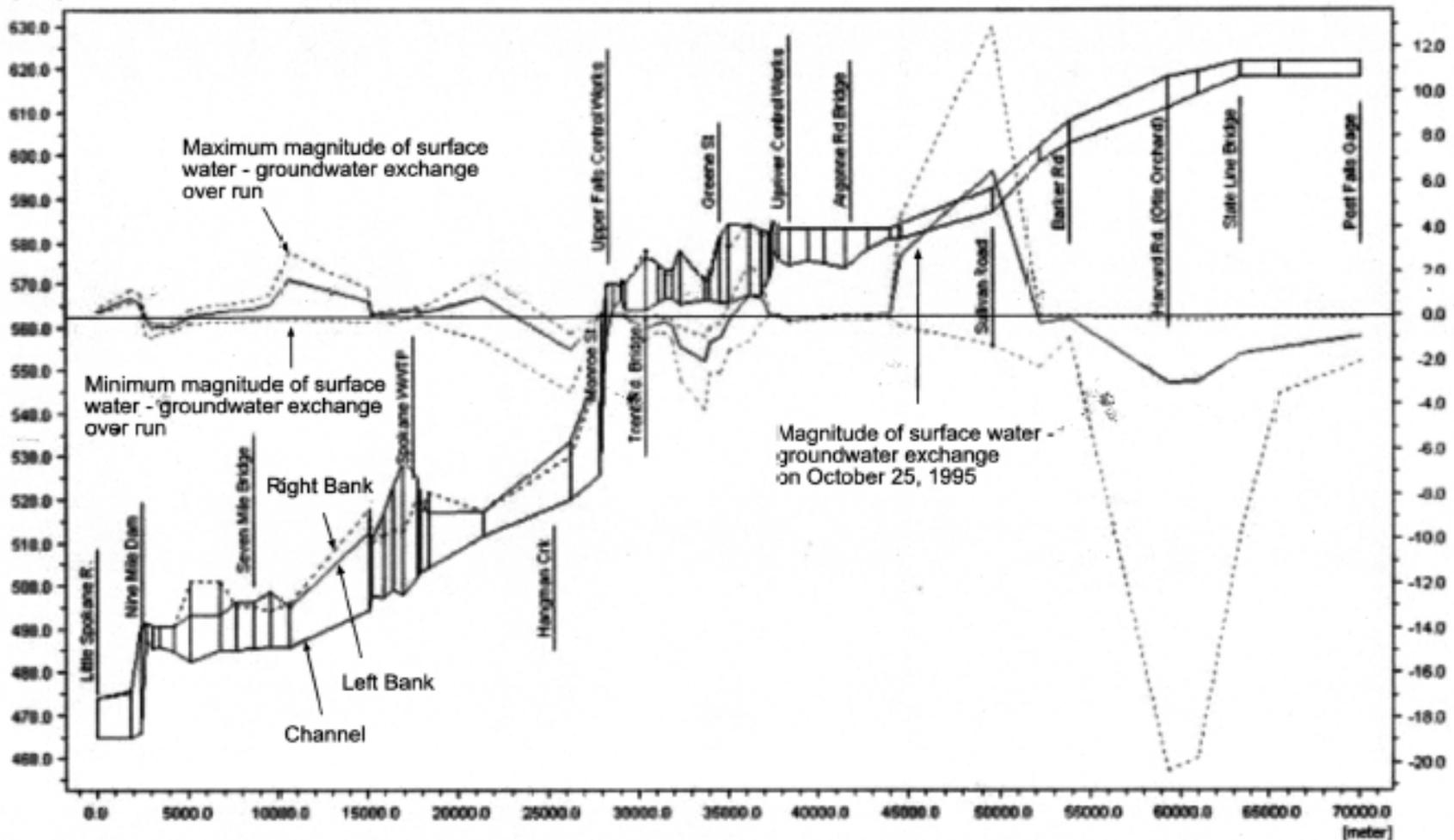


The Spokane Valley-Rathdrum Prairie Aquifer Atlas  
2009 Update

Spokane County, et al., 2009

Elevation

[meter]



Flow

[m<sup>3</sup>/s]

Colored lines indicate the range of surface water - aquifer interactions simulated as baseflow during a typical run.  
 A line that is below 0.0 m<sup>3</sup>/s (right side y-axis) indicates that river water is infiltrating and recharging the aquifer (losing river reach).  
 Lines above 0.0 m<sup>3</sup>/s indicate that groundwater is discharging to surface water (gaining river reach).

Note: Results shown are from run for WY 1995-1997

FIGURE 9.10  
**SIMULATED SPOKANE RIVER BASE FLOWS**  
 WRIA 55 & 57/WATERSHED PLANNING/WA

Run #1227

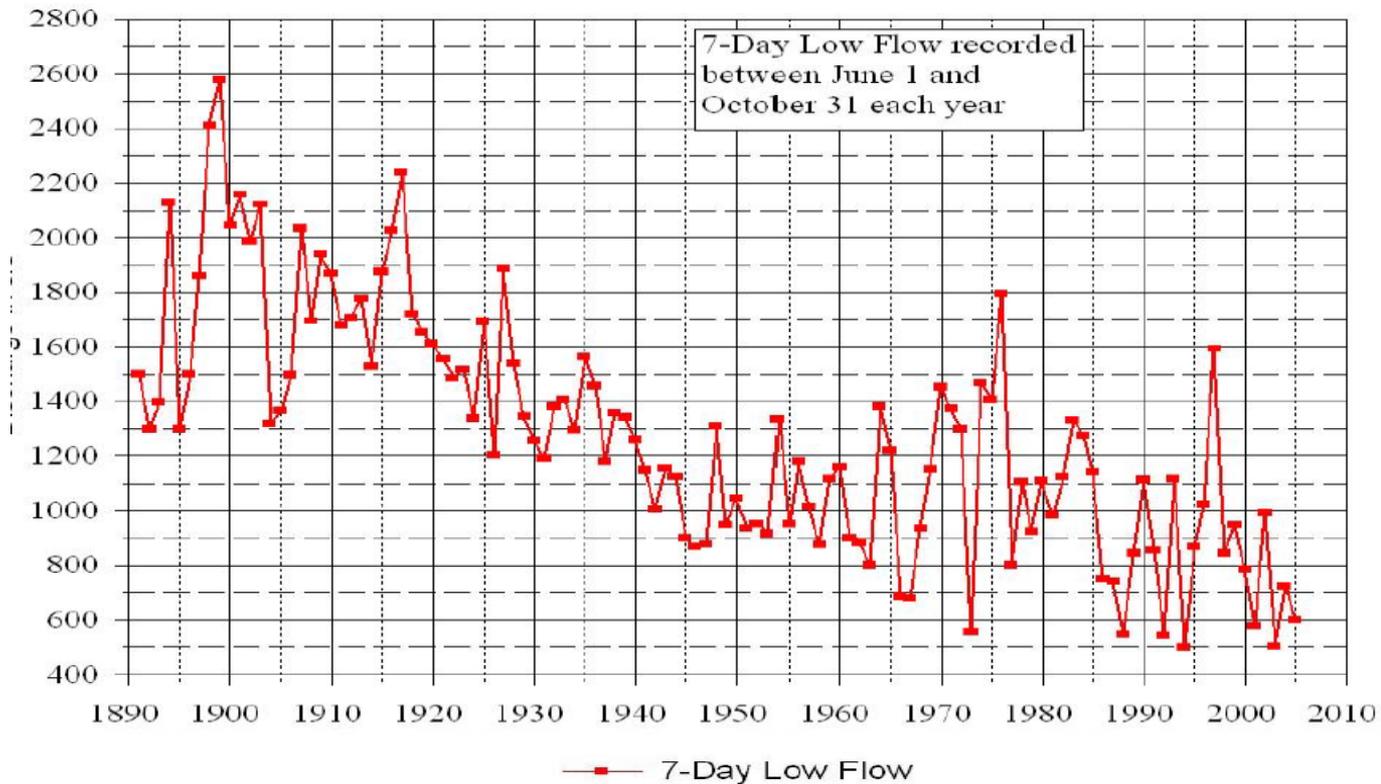
# Spokane River, 2003



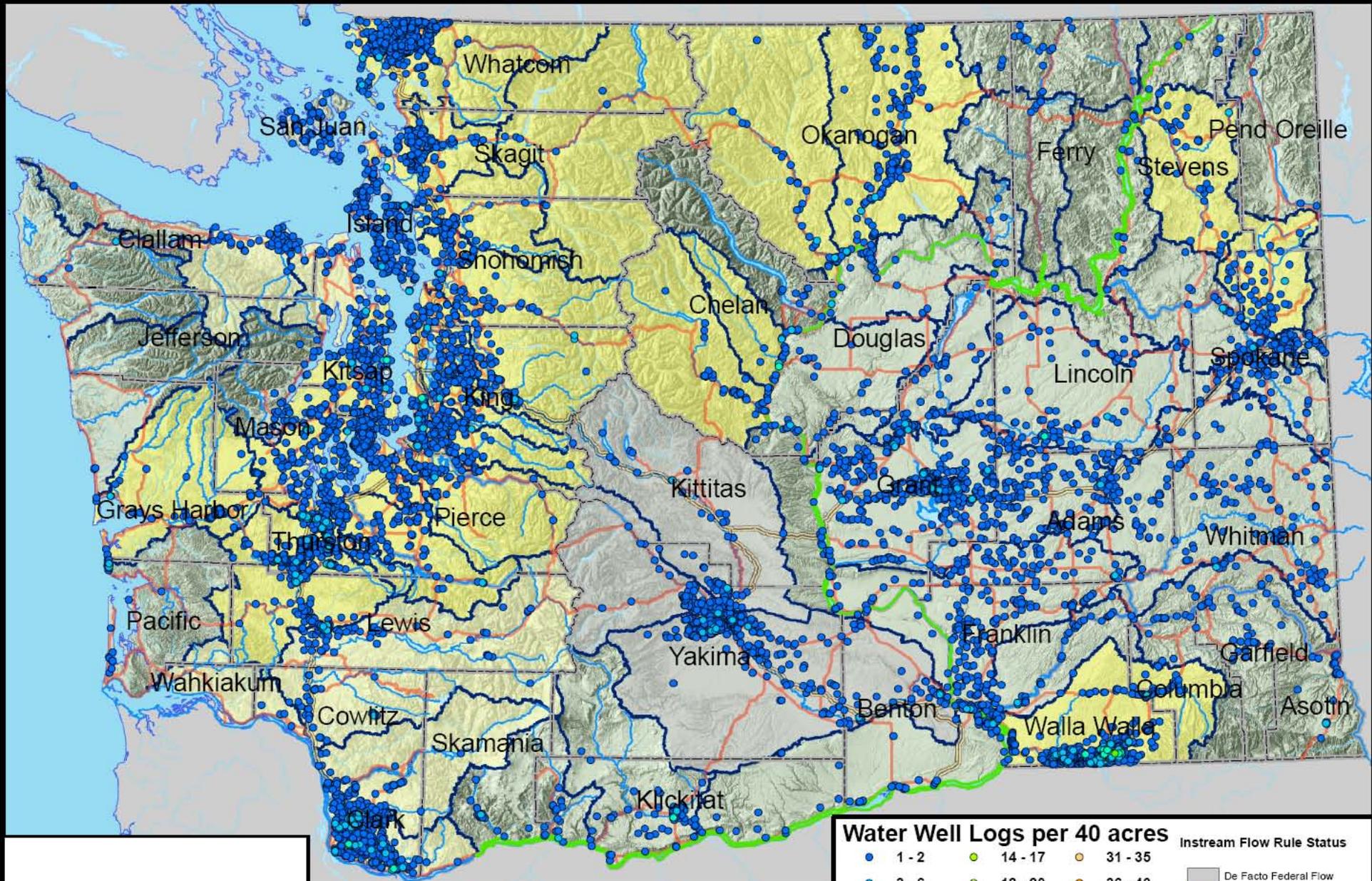
# Springs, TJ Meenach Bridge



# Spokane River 7-day Low Flow (1891-2008)

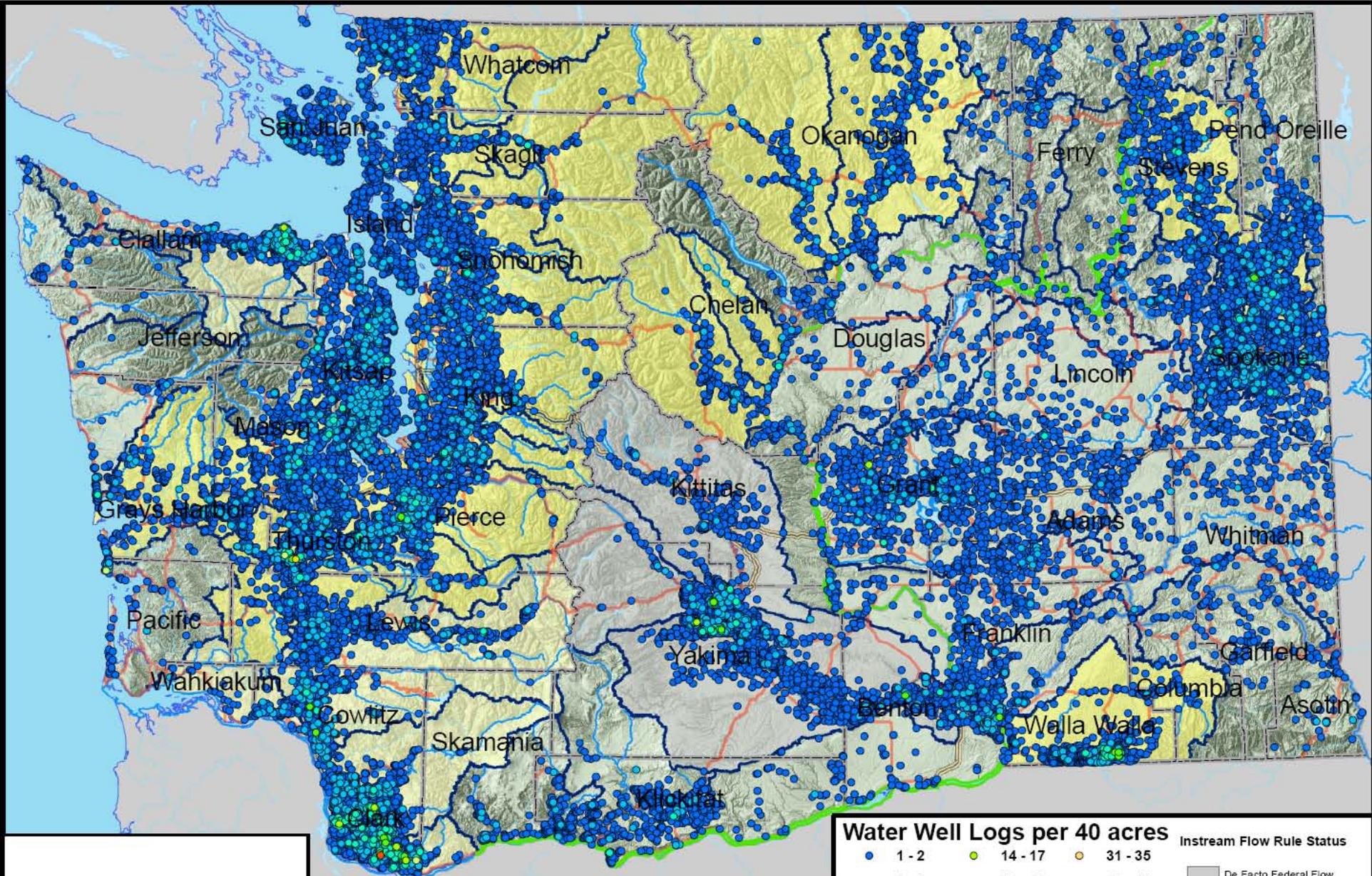


# Groundwater Development Over Time



1970

N  
 0 25 50 Miles  
 WASHINGTON STATE Department of Ecology  
 October 2007



**1980**

**Water Well Logs per 40 acres**

● 1 - 2	● 14 - 17	● 31 - 35
● 3 - 6	● 18 - 20	● 36 - 40
● 7 - 10	● 21 - 25	● 41 - 55
● 11 - 13	● 26 - 30	● 56 - 77

**Instream Flow Rule Status**

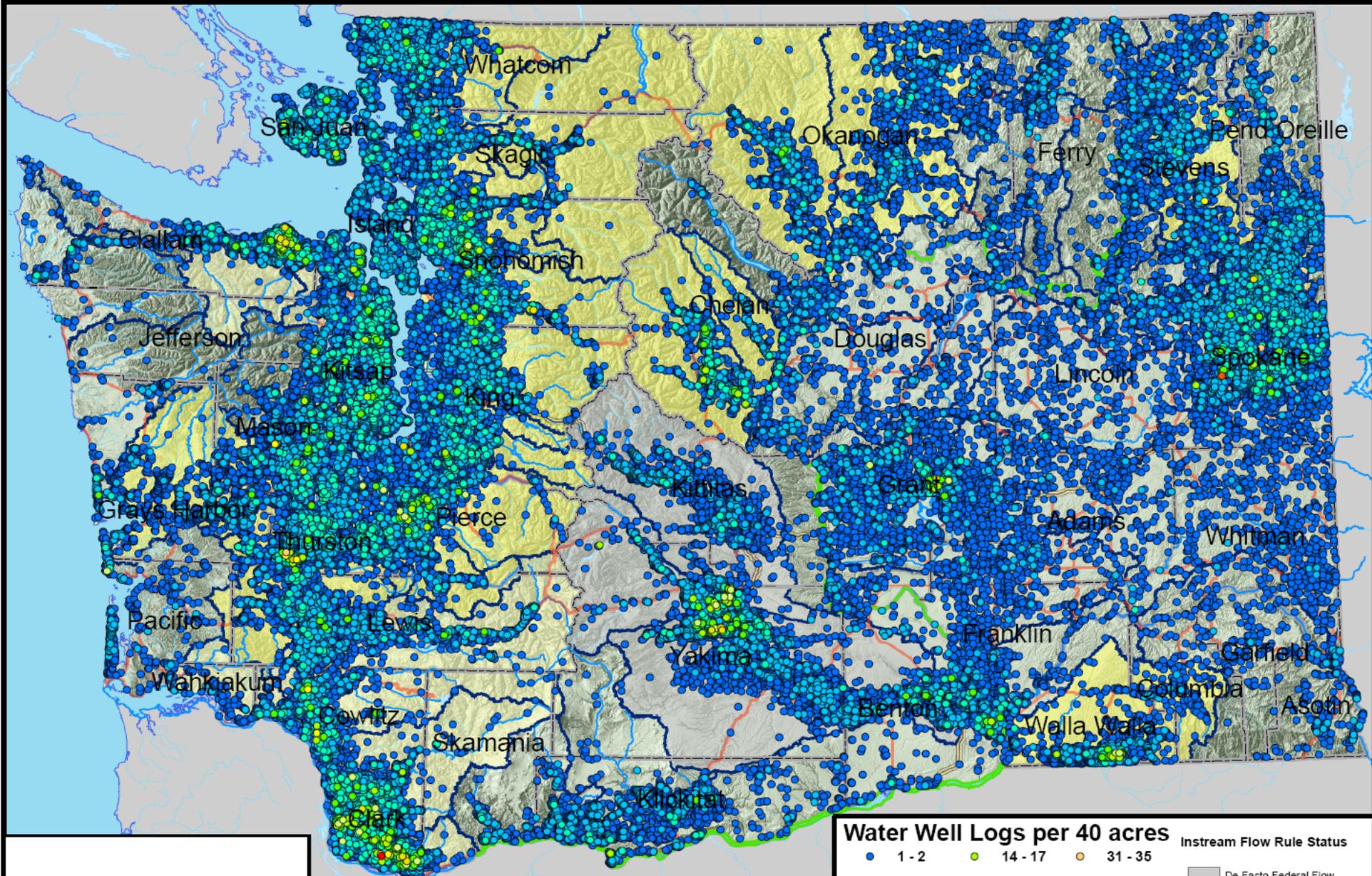
- De Facto Federal Flow
- Existing Rule
- Rule in Process
- Columbia River Instream Flow

WRIA Boundary
  County Boundary

N  
 0 25 50 Miles

WASHINGTON STATE  
 Department of Ecology

October 2007



**2000**

**Water Well Logs per 40 acres**

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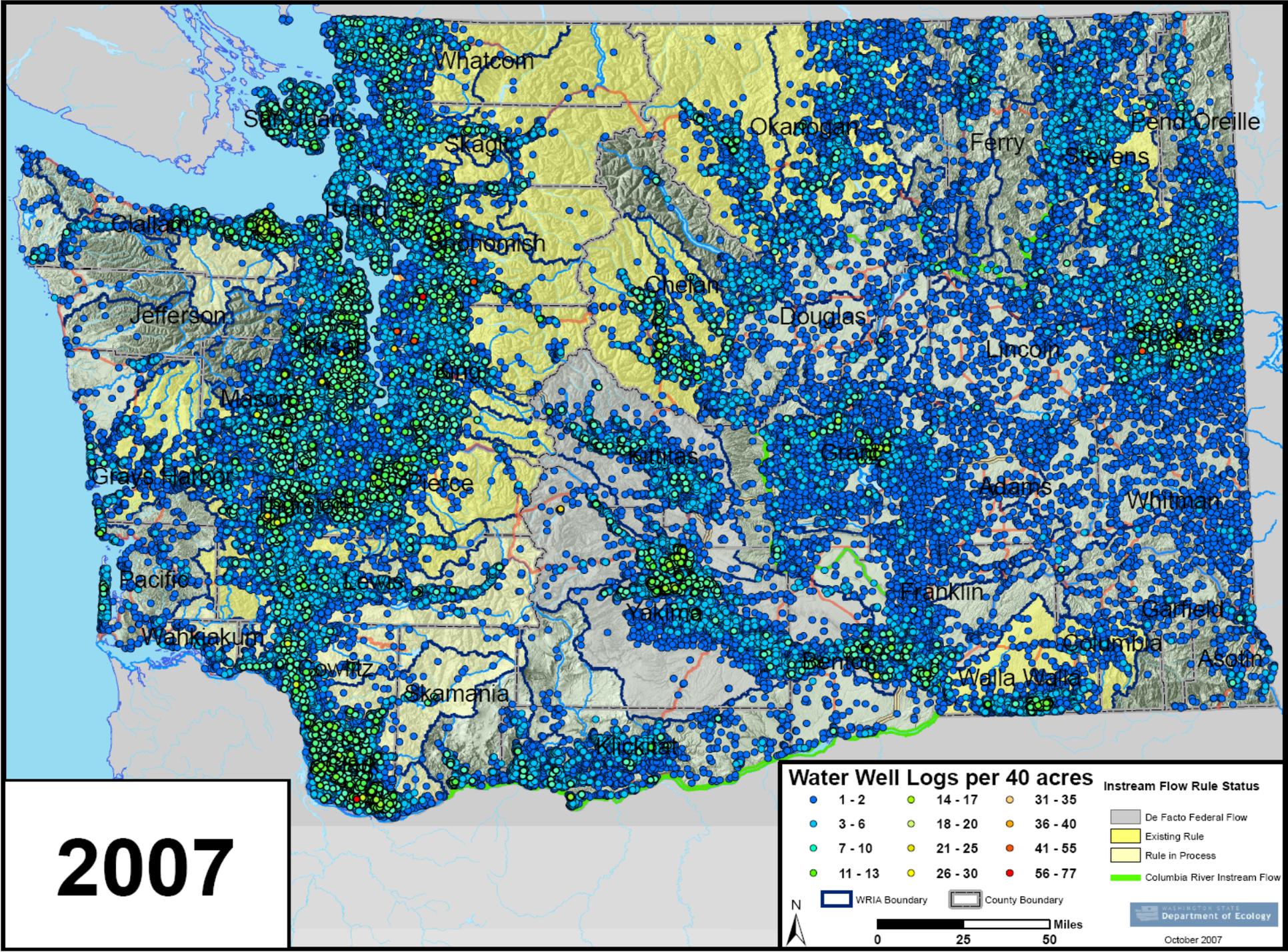
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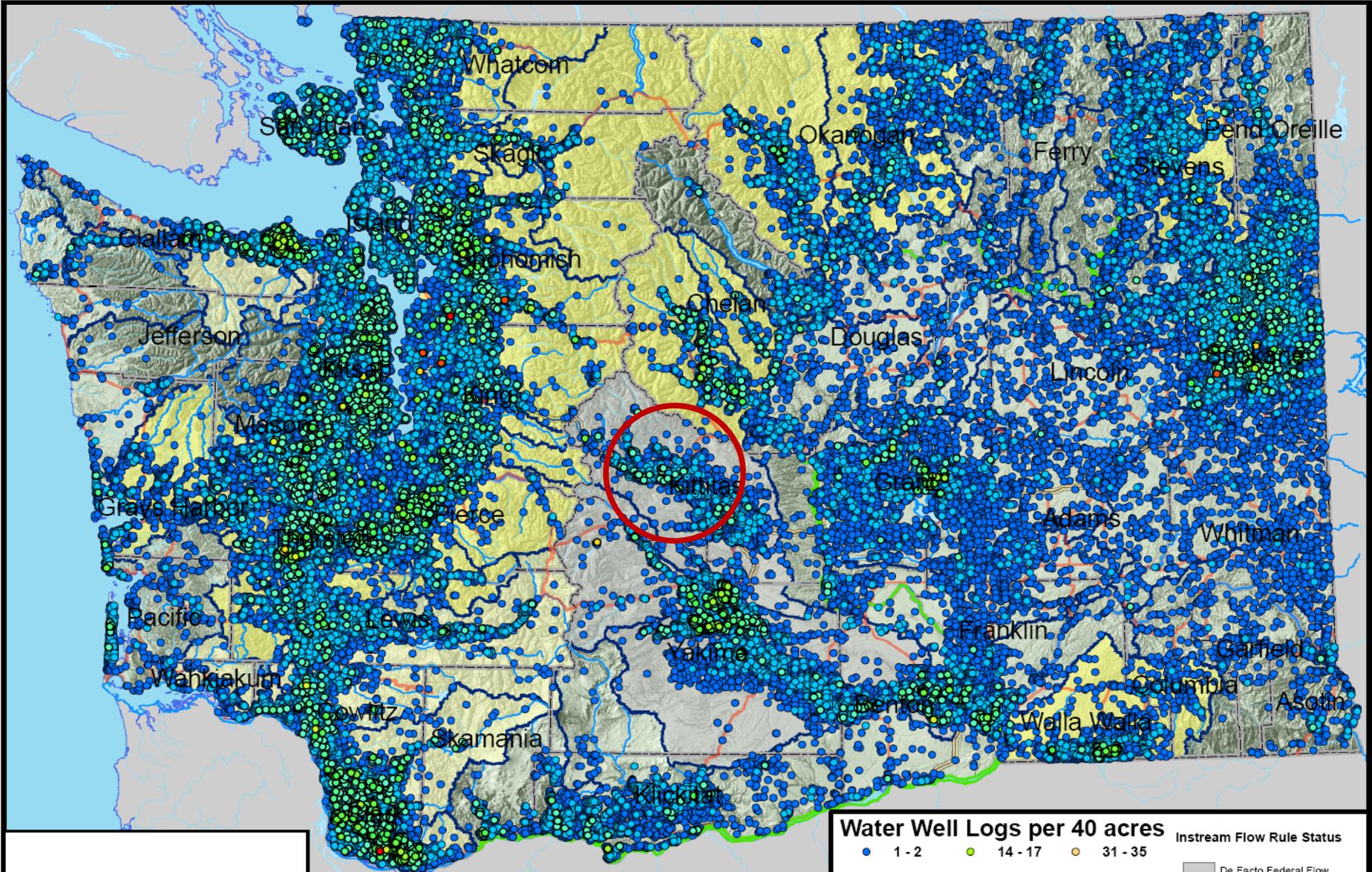
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October 2007

# 2007





**2007**

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■ WRIA Boundary    ■ County Boundary

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October 2007

# Kittitas Valley Closure

- Permit-exempt well development fueling rural sprawl
- Yakima basin junior surface users curtailed as hundreds of new wells are drilled.
- Petition to Ecology to close the basin to all new well drilling (with and without permit)
- 2010 Rule closes basin to all new “unmitigated” groundwater development

# A Few Observations



the future



Thank You!