

# Watershed Health Monitoring

Standardized Monitoring Methods  
& Support for Cooperators

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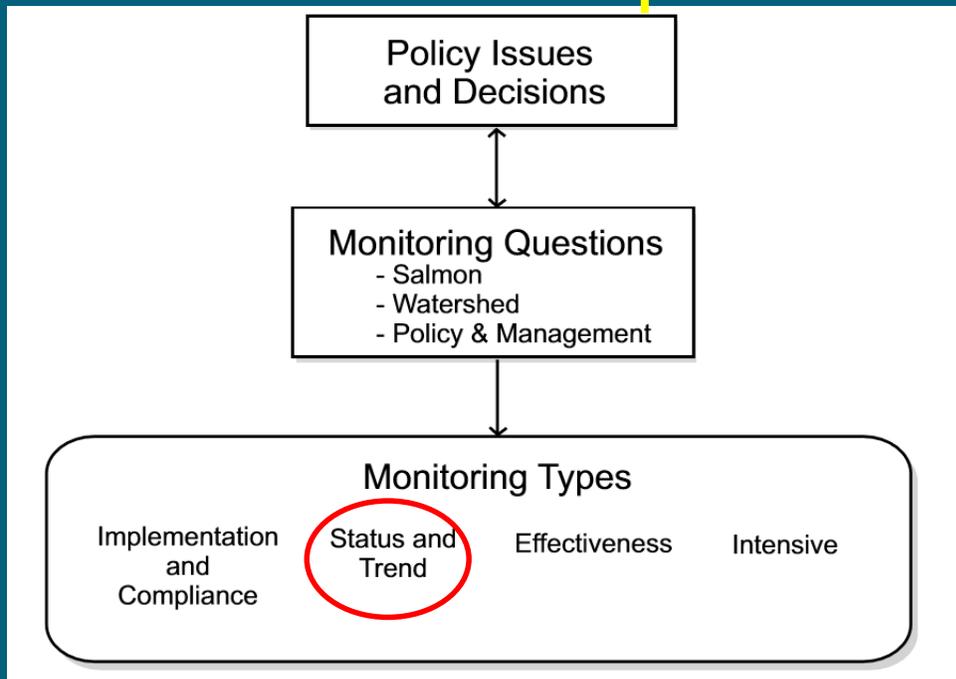
<http://ecology.wa.gov/WatershedHealthMonitoring>

# Outline

- Monitoring program origins
- Goal/objectives that include salmon recovery
- Help for local monitoring groups
- Products



# Origins



S&T (extensive) design

- not cause-effect
- means of assessing condition

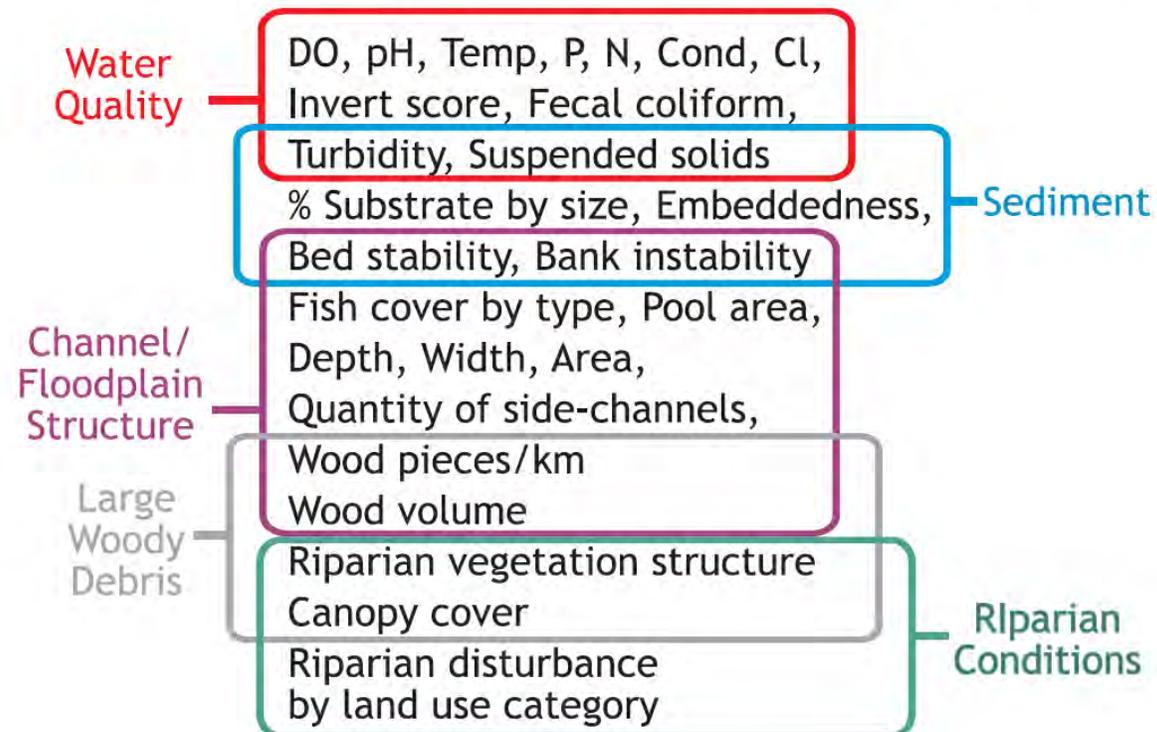
Major themes of CMS

- Need for habitat data
- Standard methods
- Data sharing

# Monitoring Objectives

Goal: Estimate habitat status & trends,  
including salmonid limiting factors

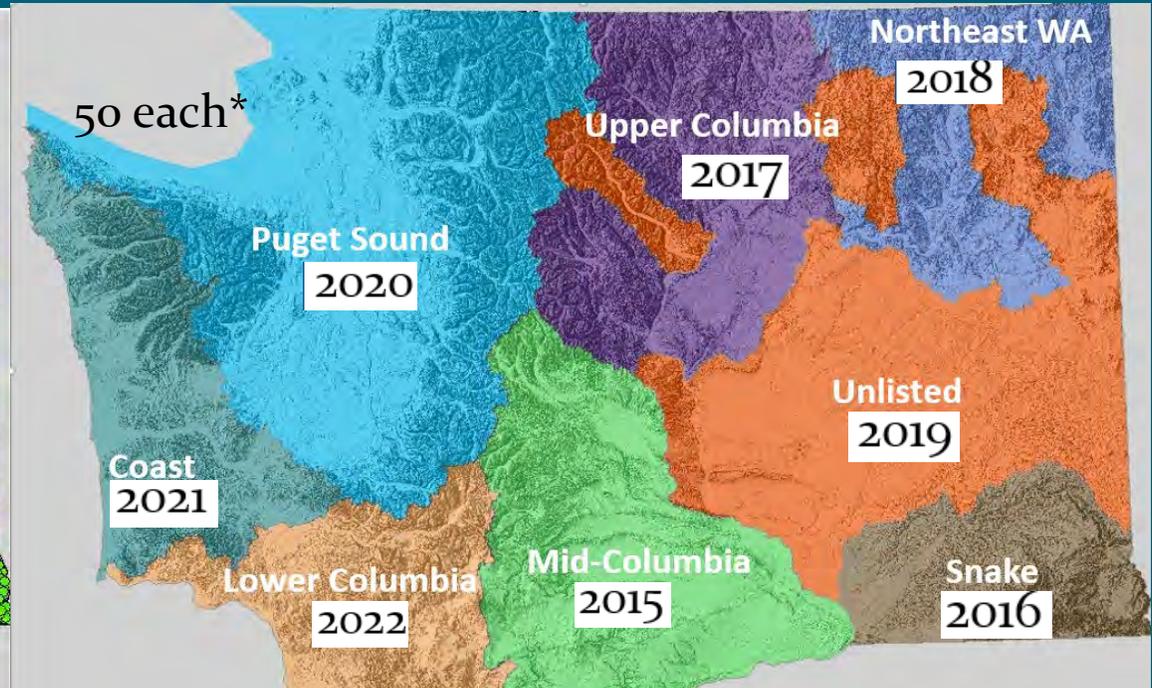
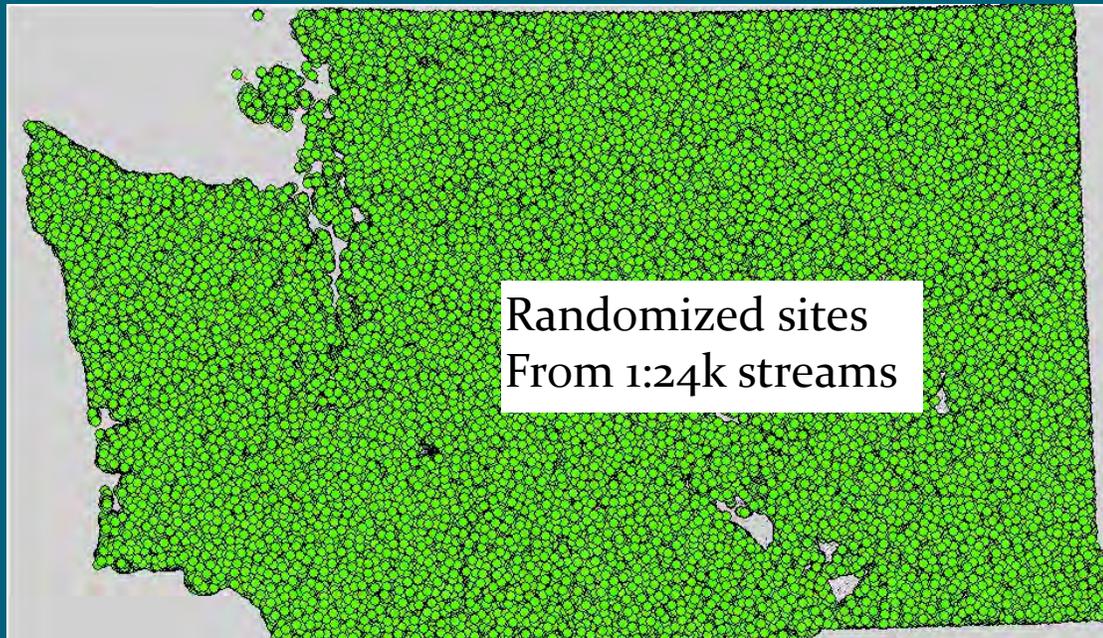
Figure 3: The relationship of field-sampled metrics to limiting factors.



## Objectives

- Standard Methods
- 80% Confidence
- Multi-scale
- Existing information
- Partnerships

# Objective: Standard Methods

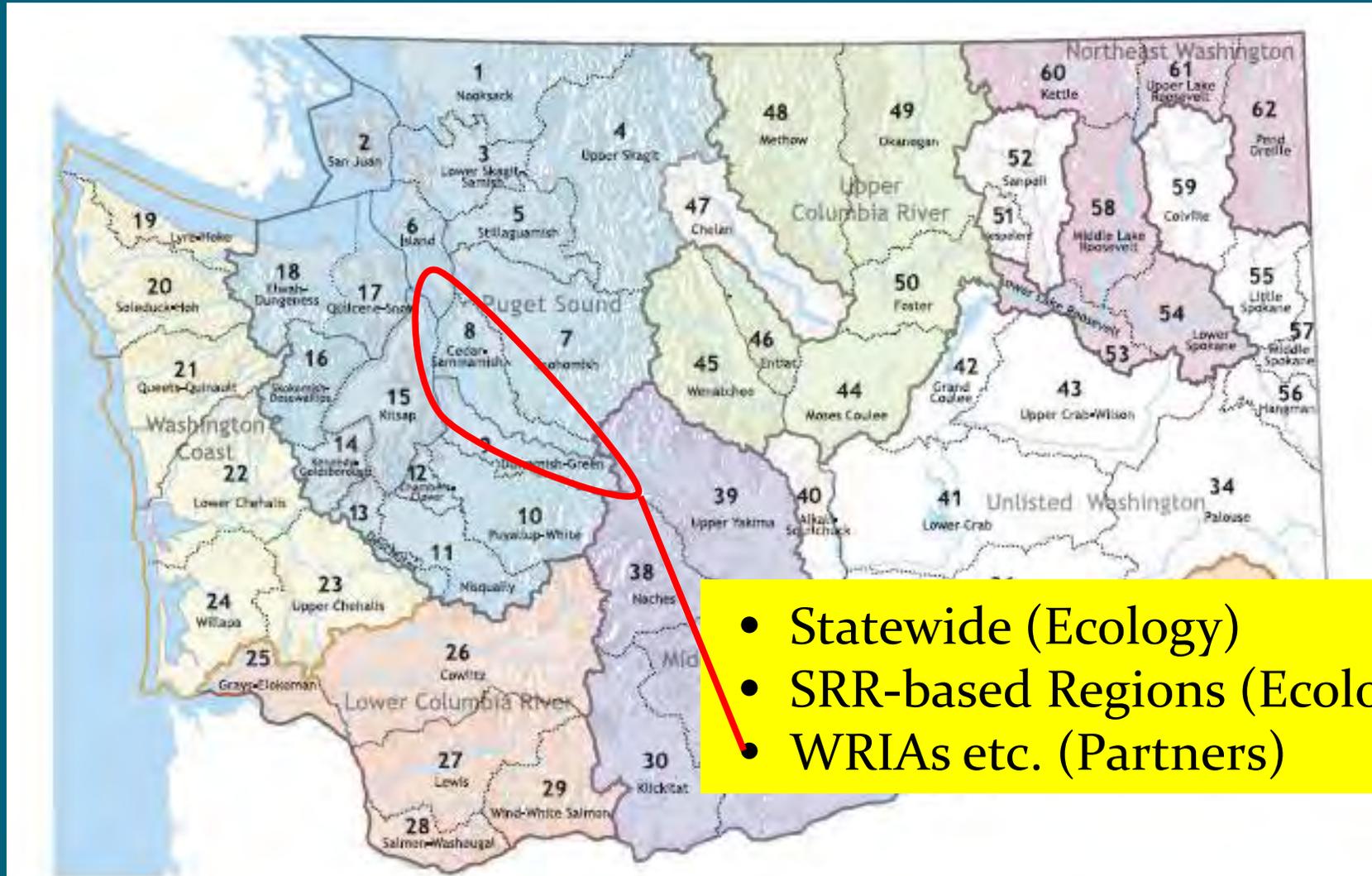


<https://tinyurl.com/WHMSOPs>

Table 2. Idealized daily work flow.

ACTIVITY	PERSONS	Time Since Arrival On-site (Hrs)					
		1	2	3	4	5	6
Verification & Layout	AB	█					
Water/In Situ	CD						█
Benthos/Sediment	AB		█				
Habitat	CD			█			
Vertebrates	AB+			█			█

# Objective: Multi-scale design



# Objective: Build Partnerships

Services that WHM provides

Standard methods

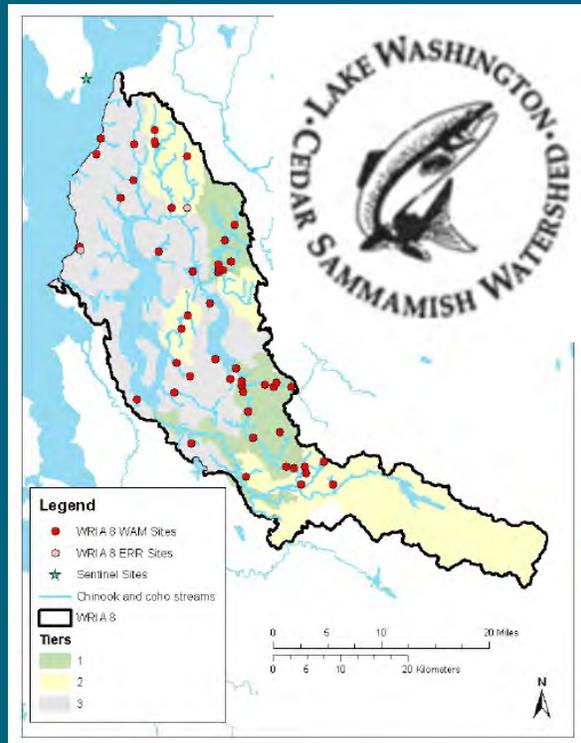
Annual field training

Public, secure database



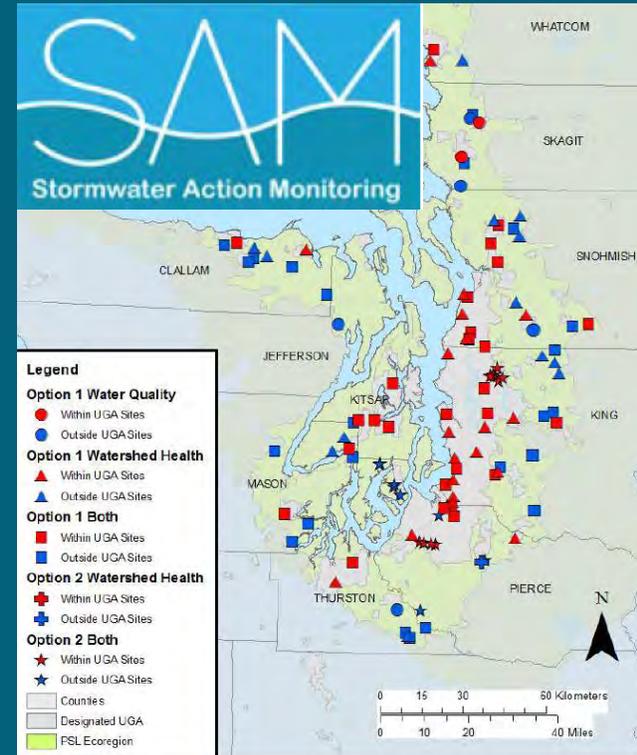
# Example local partners

Lake Washington/Cedar/Sammamish (WRIA 8) Salmon Recovery Council



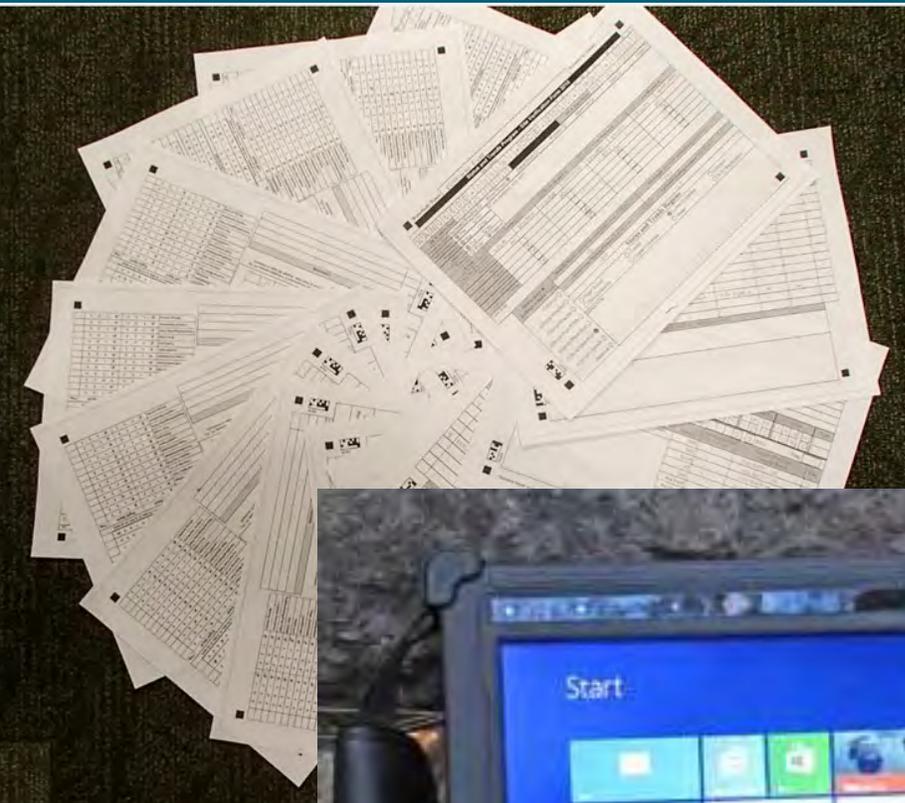
<https://your.kingcounty.gov/dnrp/library/2015/kcr2671.pdf>

Stormwater Action Monitoring for Puget Sound regional permittees.



<https://your.kingcounty.gov/dnrp/library/2018/kcr2968/kcr2968.pdf>

# The database: a major effort



 DEPARTMENT OF  
**ECOLOGY**  
State of Washington

**Dictionary of Metrics for  
Physical Habitat**

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**Definitions and Calculations Used  
for Watershed Health Monitoring  
and Related Studies**

- About 262 metrics
- More coming



Fish assemblage +

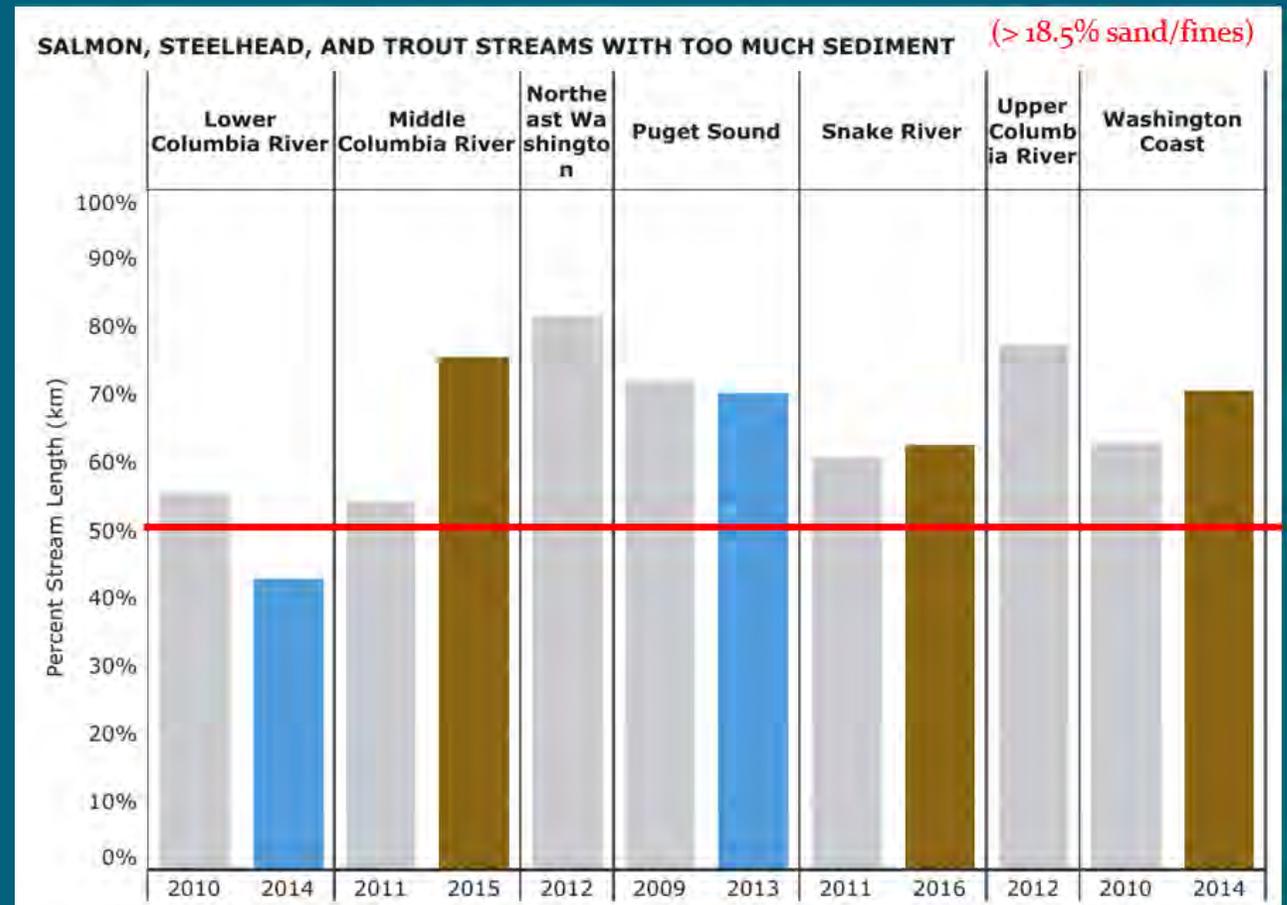
# Results

- 1) Puget Sound tributaries: [Pub # 12-03-029](#)
- 2) Least-impacted conditions: [Pub # 15-03-011](#)
- 3) Risk analysis: [Ecological Indicators, July 2019, 175-185](#)
- 4) 2016 State of the Salmon
- 5) 2018 State of the Salmon

Excess in most salmonid habitat 11/12 surveys



- 1) Sediment
- 2) Copper in sediment
- 3) Large woody debris
- 4) Riparian disturbance
- 5) Canopy cover
- 6) Invertebrates
- 7) Non-native species



# Data availability

<https://tinyurl.com/WatershedHealthData>

The screenshot displays the 'EIM WHM Map Search' interface. On the left, there are filter sections: 'Study Filters' and 'Site Filters' (both with red arrows pointing to them), and 'Habitat Monitoring Filters' (with a red arrow pointing to it). The 'Site Filters' section includes input fields for 'Site ID' (e.g., WAM06600-000223), 'Site Description' (e.g., Toutle River), and 'Data Collection Event' (e.g., WAM06600-000223-DCE-2009-0829-10:10). Below these are dropdown menus for 'Watershed Resource Inventory Area (WRIA)' (options: 01 - Nooksack, 02 - San Juan, 03 - Lower Skagit-Samish, 04 - Upper Skagit) and 'County' (options: PEND OREILLE, PIERCE, SAN JUAN). The 'Habitat Monitoring Filters' section is partially visible at the bottom left. On the right, a map shows a watershed boundary with 42 blue diamond markers representing selected sites. A toolbar above the map includes 'Pan', 'Zoom In', 'Zoom Out', 'Zoom Full', 'Zoom Last', 'Zoom Next', and 'Identify' buttons. At the bottom right, a 'Download All' button is circled in red, and the text '42 sites selected' is displayed.

# What's next

- Return to Puget sound in 2020 to start 3<sup>rd</sup> statewide survey
  - Updating the plan
  - Updating the Master Sample
- Local partners in 2019 include
  - Municipalities
  - Effectiveness studies
  - A Puget Sound regional EPA study
- Climate-change effects on species distributions
- Want to know more?  
<http://ecology.wa.gov/WatershedHealthMonitoring>

# Questions?

