

REGIONAL MONITORING: GREATER THAN THE SUM OF ITS PARTS

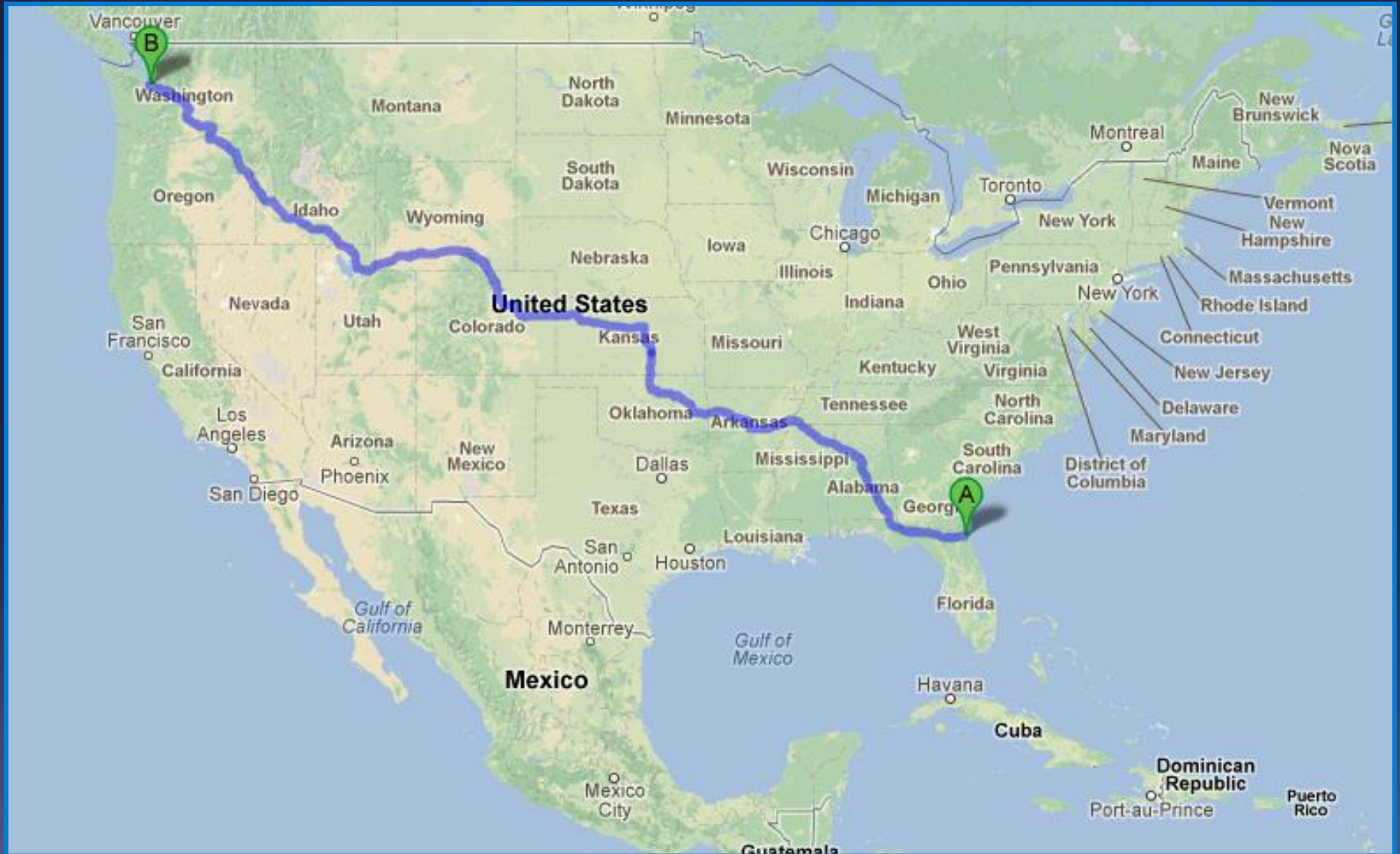


Jo Wilhelm & Deb Lester, King County
Leska Fore, Statistical Design
Gretchen Hayslip, EPA Region 10
Karen Adams, WA Dept. of Ecology

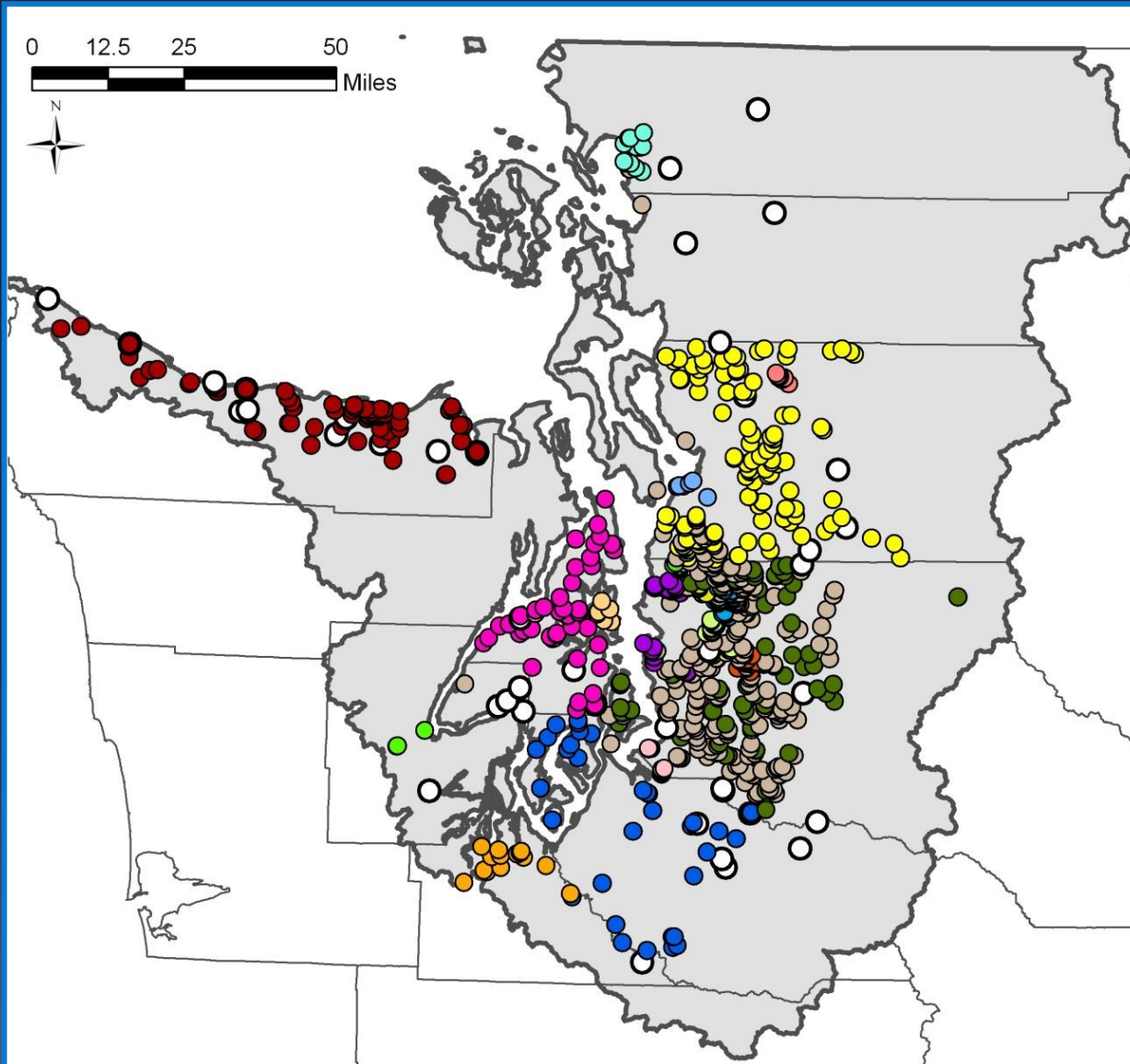
Society for Freshwater Science, May 20th, 2013



Puget Sound: 3,000 miles NW

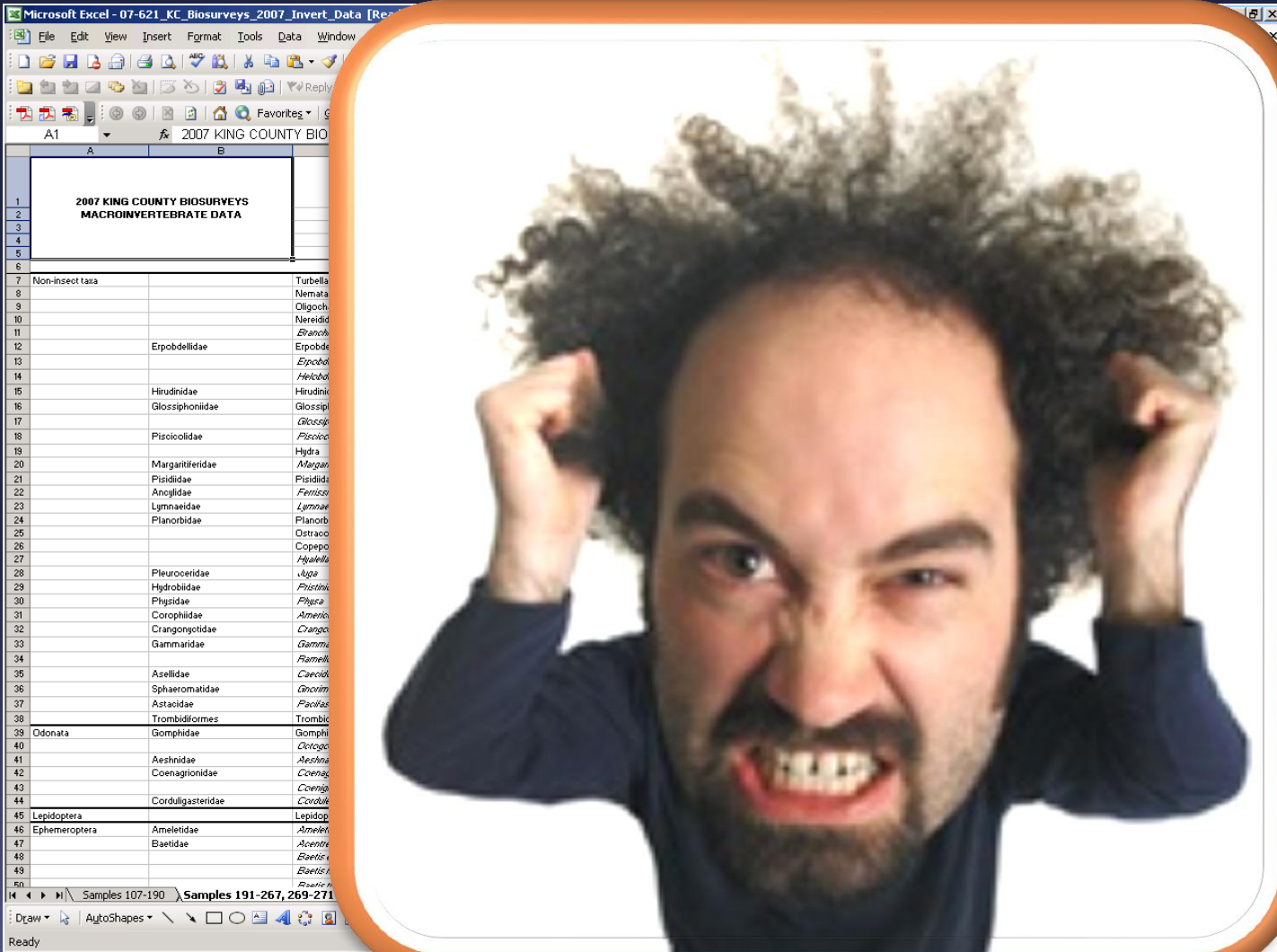


Puget Sound Stream Monitoring



- Adopt-A-Stream
- Bainbridge Island
- Bellevue
- Bellingham
- Everett
- Federal Way
- Issaquah
- Kirkland
- Lake Forest Park
- Redmond
- Seattle
- Clallam County
- King County - DNRP
- King County - Roads
- Kitsap County
- Pierce County
- Skokomish Tribal Nation
- Snohomish County
- Thurston County
- Ecology

Life Before Collaboration



	08SAM2865/07	08WES	
	07-621-192	07-62	
	8/27/2007	8/15,	
	30	2	
		PA	
?	Count	Unique?	Count
	26		12
	2		2
	6		3
	8		2
	2		1
	14		4
	4		1
	3.41		10.87
	20.45		4.63
	46.02		64.53
	3		1
	1		1
	3		1
	3		1
	3		1

© DESPAIR.COM



COLLABORATION

WHEN A MOTIVATED GROUP OF PEOPLE JOIN TOGETHER,
THEY CAN TURN PROBLEMS INTO OPPORTUNITIES. ESPECIALLY DRINKING PROBLEMS.

Puget Sound Stream Benthos

Home Analysis ▶ Monitoring Projects ▶ Login About Us Site Map

Analyzing Stream Health

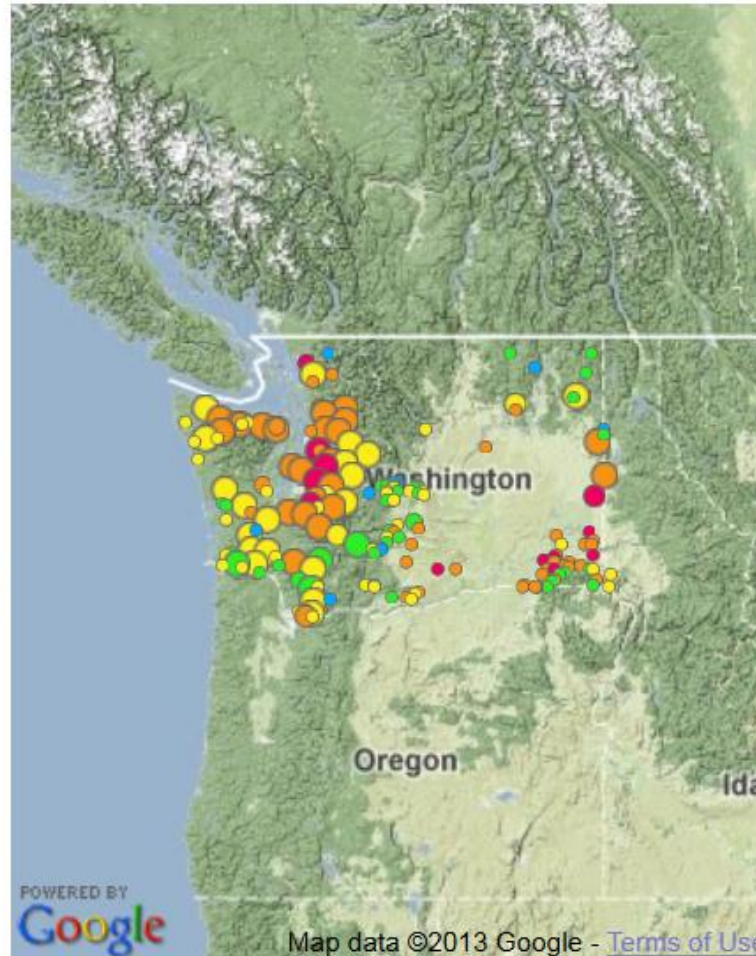
This site analyzes benthic macro-invertebrate community structure to determine the ecological health of streams. [Participating agencies](#) use this site to manage, analyze and share data from their ongoing stream monitoring programs.



Benthic macro-invertebrates, also known as stream bugs, are animals that can be seen with the naked eye, do not have backbones and live in the **stream benthos**—in or near the streambed. They include insects, crustaceans, worms, snails, clams, etc.

Benthic macroinvertebrates are monitored because they are good indicators of the biological health of stream systems and play a crucial role in the stream ecosystem.

Plotting Biotic Integrity



Click on biotic health markers for score details.

[Click here to customize chart.](#)

The BIBI Scoring System

We use the [Benthic Index of Biotic Integrity \(BIBI\)](#) scoring system to determine stream health. Since the BIBI is a standardized scoring system, it can be used to compare and rank the health of different streams.

BIBI has several variants, and we will support many of them over time. Currently, we are using Puget Sound Lowlands BIBI. This site allows you to filter the scores by a variety of parameters and then

- [Plot the scores on maps](#)
- [Show the scores in tables](#)

Improving Biological Monitoring Tools in the Puget Sound Region

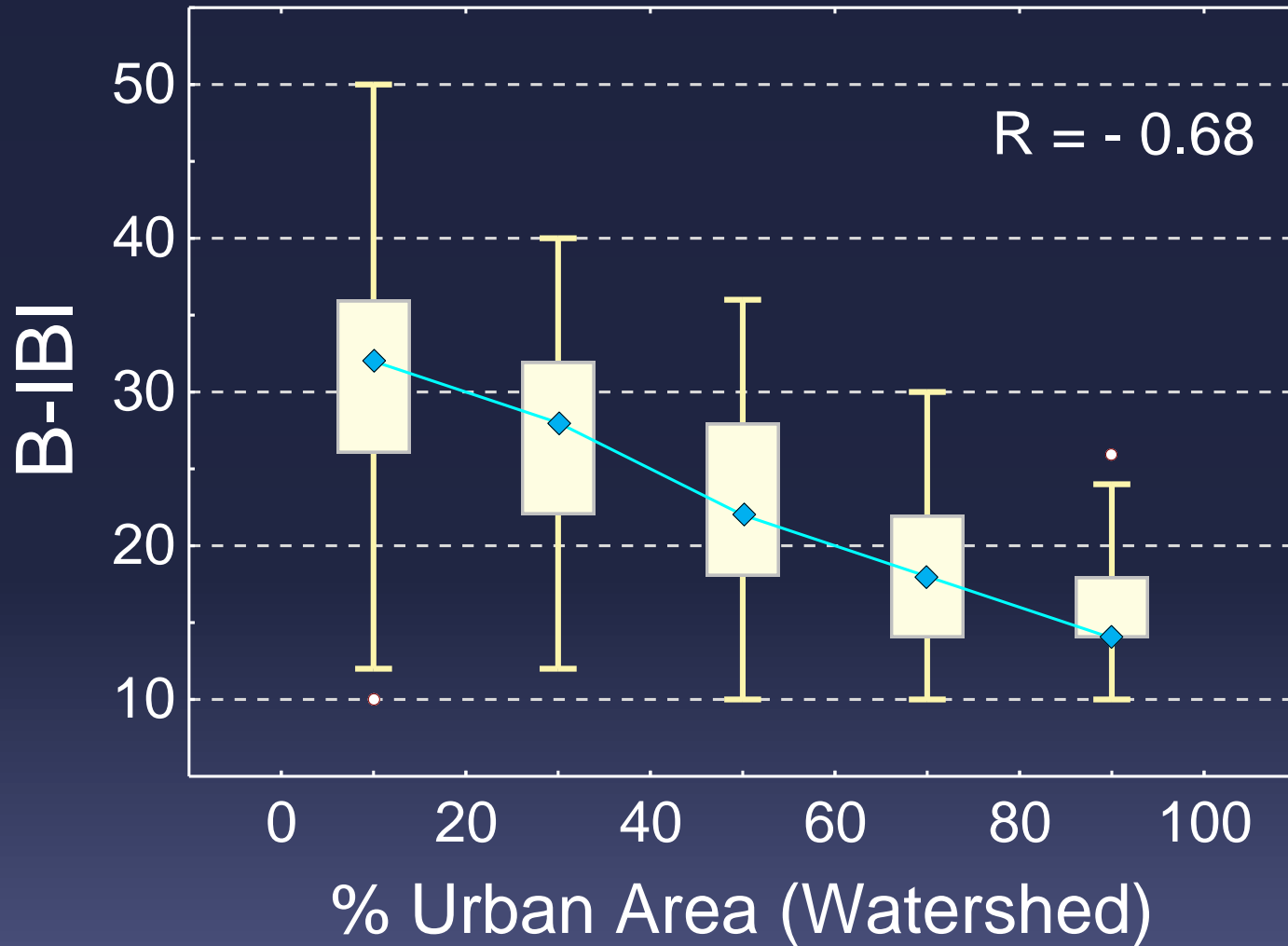
We are currently working to enhance benthic macroinvertebrate monitoring tools for the Puget Sound region. For more information and to view documents and other products please go to the [EPA grant project page](#).

Correlation with B-IBI

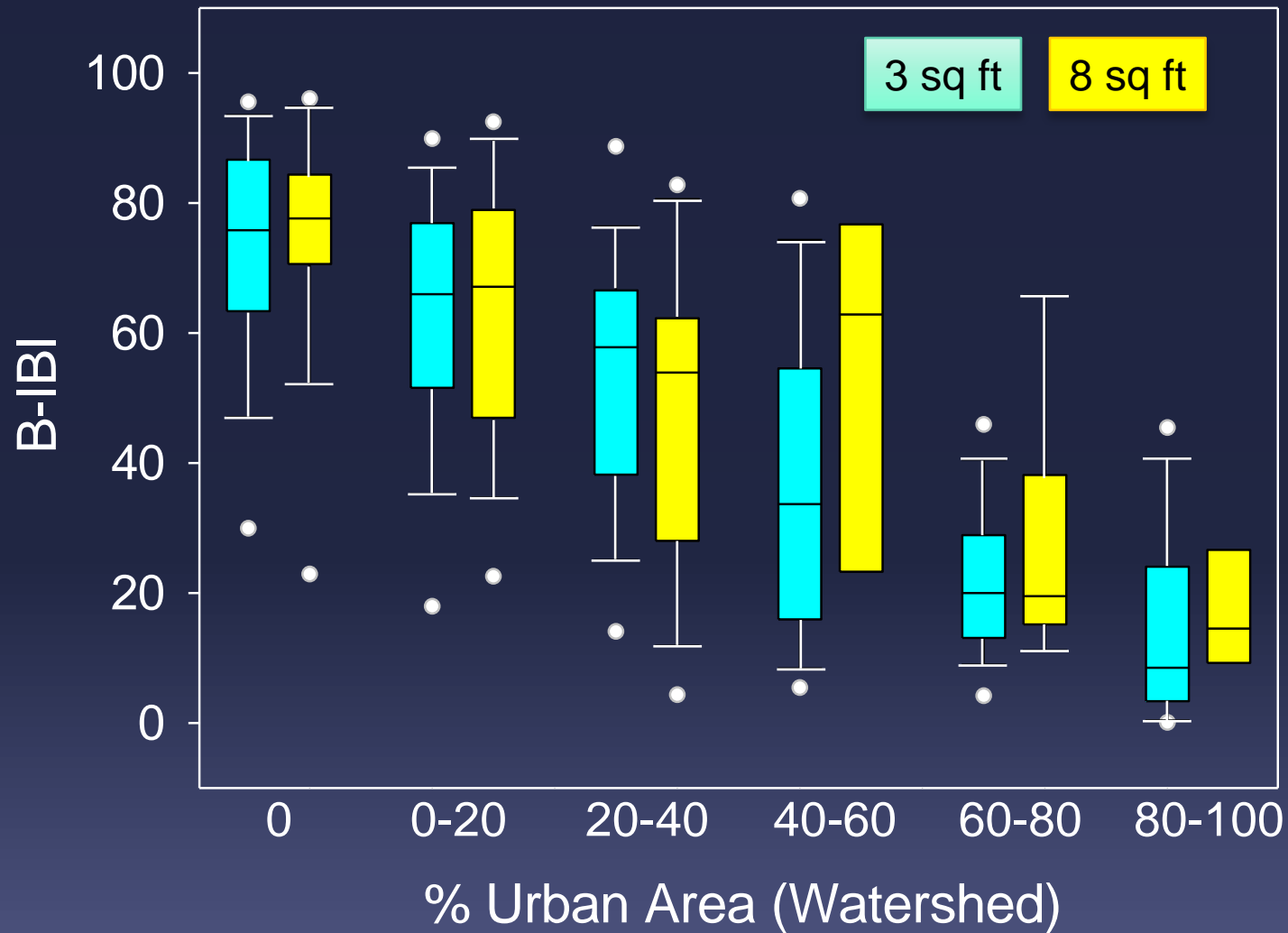


Disturbance measure	Correlation	PCA
PCA Factor 1	0.68	
% Urban (WS)	-0.68	*
% Urban (1km WS)	-0.67	*
Rd Density (WS)	-0.66	*
% Forest (WS)	0.65	*
Population (WS)	-0.64	*
% Urban (1km)	-0.61	*
% Urban (1km buff)	-0.57	*
Rd Crossings (WS)	-0.61	
Population (1km)	-0.59	
Rd Density (1km)	-0.59	
Rd Crossings (1km)	-0.46	

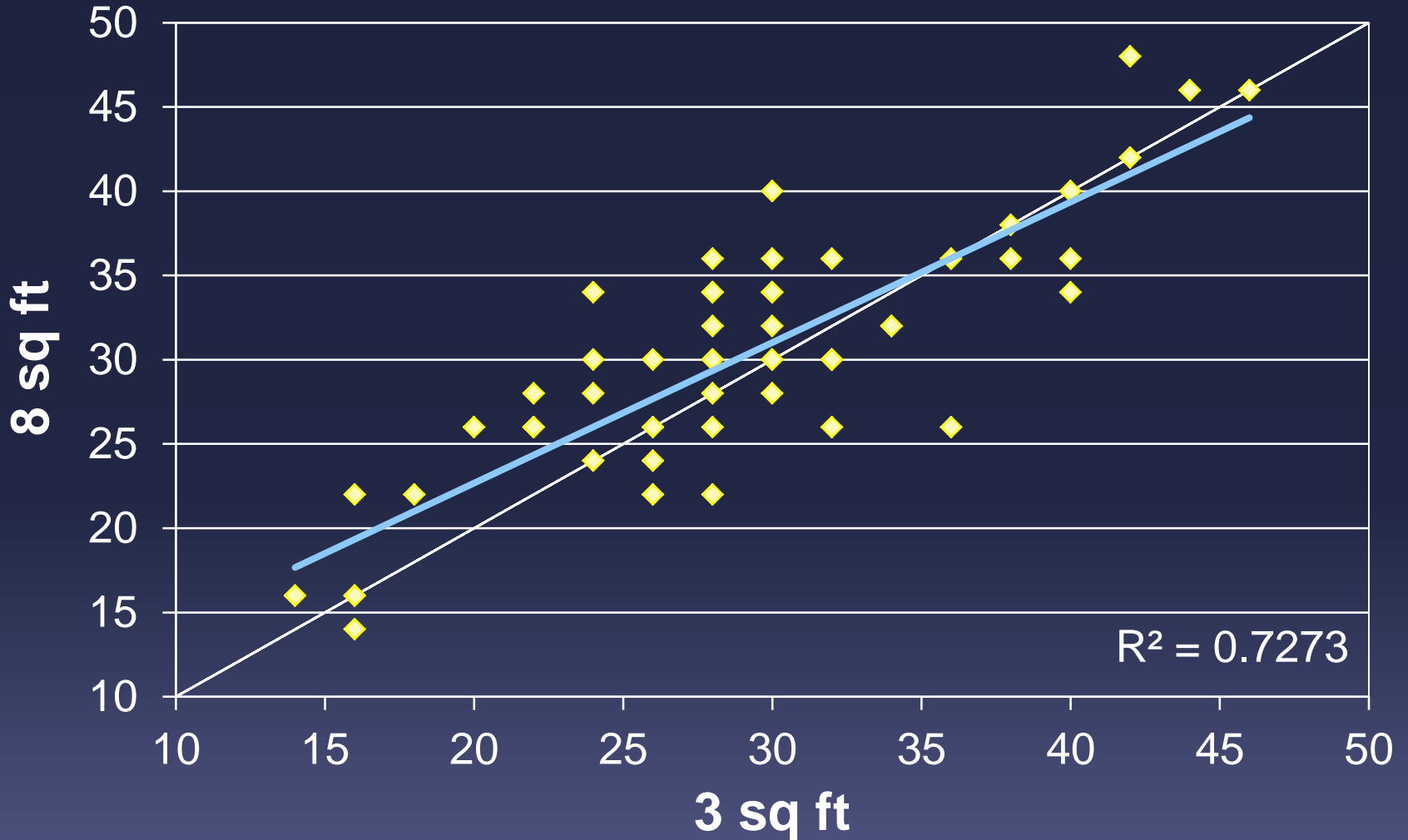
Primary Driver: Urbanization



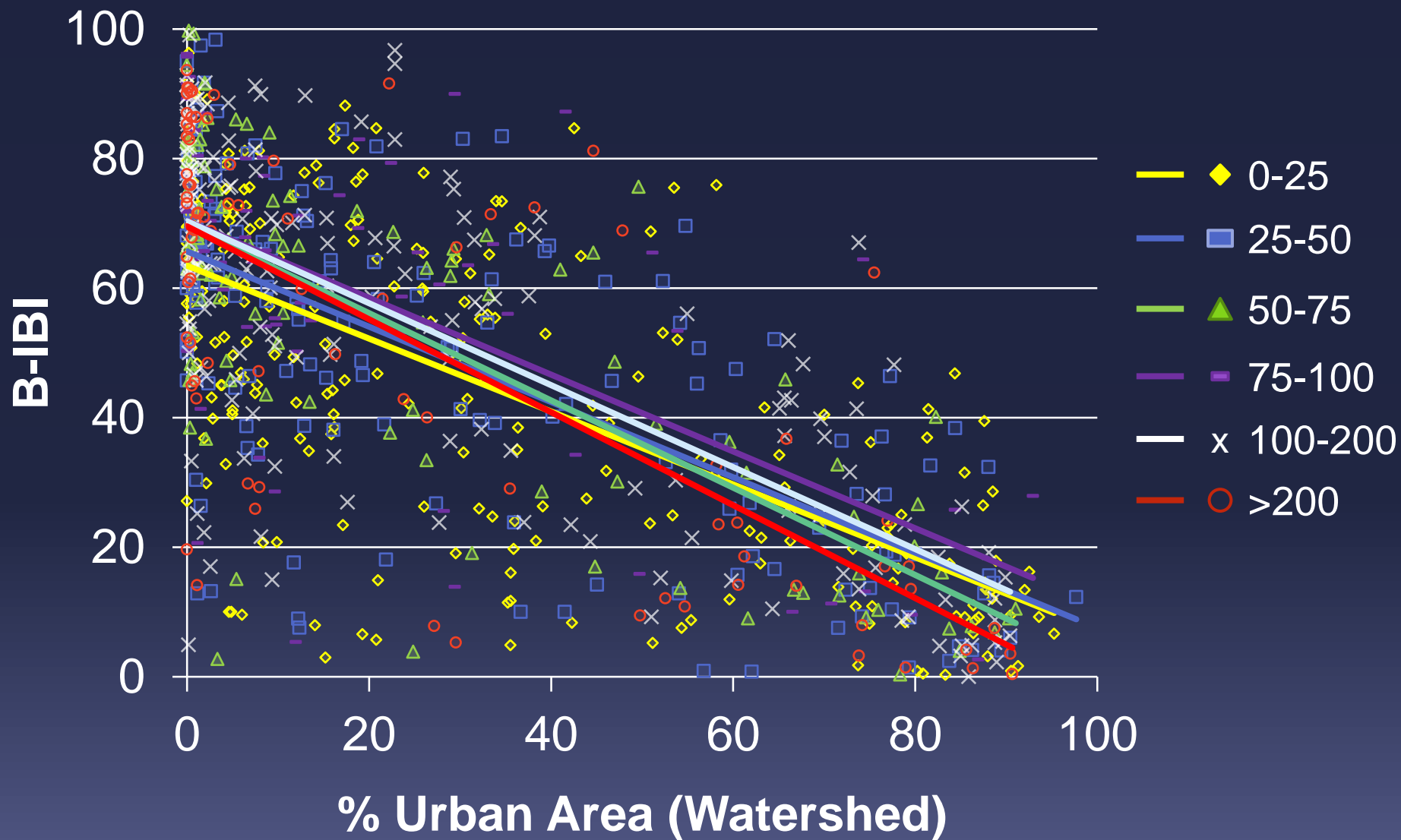
Collection Area



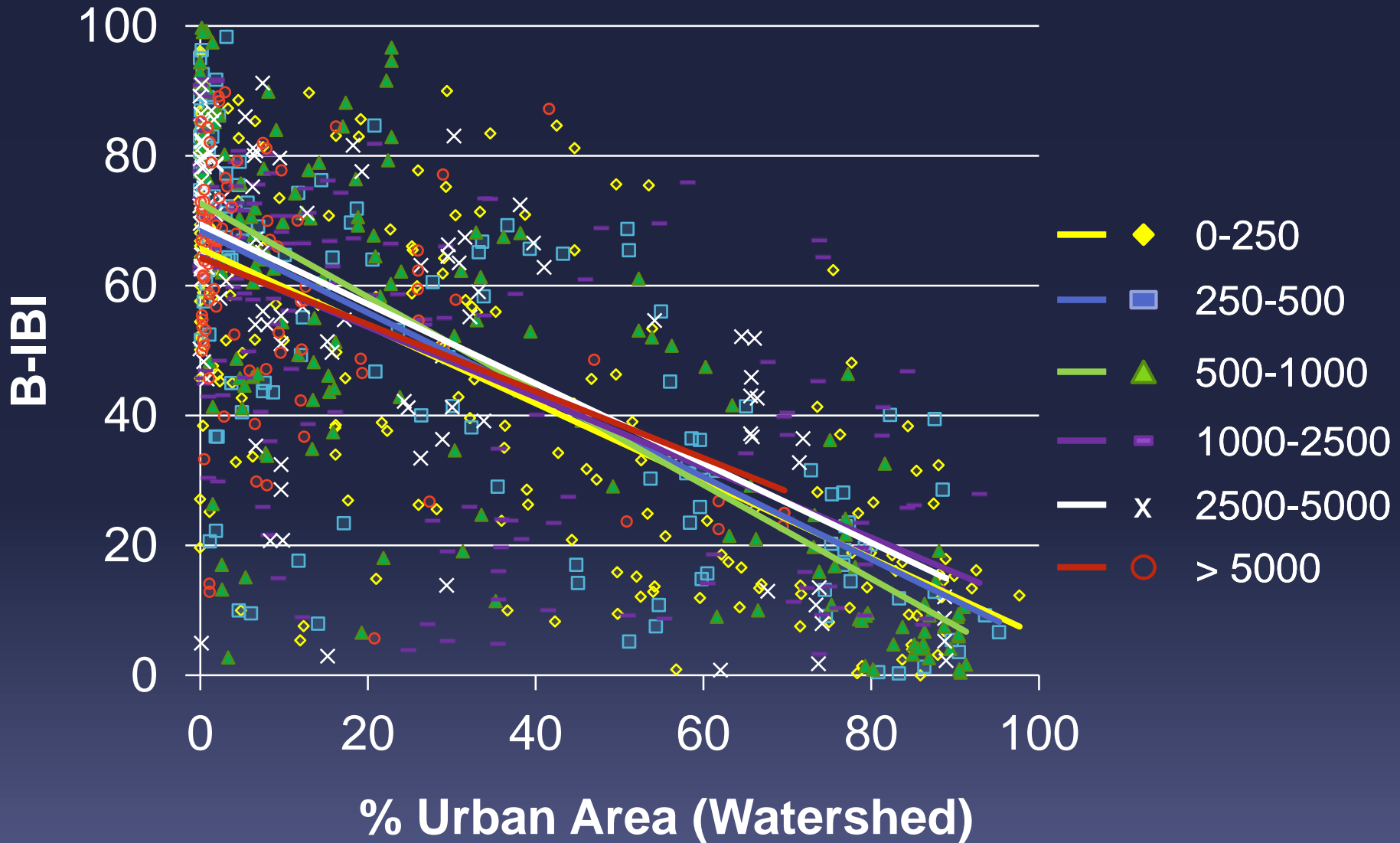
B-IBI Score: 3 vs. 8 sq ft



Elevation (m)



Watershed Area (hectares)



B-IBI Applicability

- Puget Sound Partnership
 - Dashboard Indicator
 - Action Agenda Targets
- WA Dept. of Ecology
 - NPDES Stormwater Permit
 - WQ Assessment – 303(d)
- Local Decision Making
 - Project prioritization
 - Basin planning



Acknowledgements



Federal

EPA
NOAA
USFWS
USGS

City

Bellevue
Bellingham
Bothell
Everett
Issaquah
Kirkland
Redmond
Seattle
Tukwila

County

Clallam
King
Kitsap
Pierce
Snohomish
Thurston

Tribal

Port Gamble Skallam
Snoqualmie Nation
Stillaguamish
Upper Skagit Indian

Academic

University of Washington

State

WA Ecology
PS Partnership

Private

Aquatic Biology Associates
Aquatic Entomology
Rhithron Associates, Inc.
Statistical Design

Non-profit

Pierce Stream Team
Lake Forest Park Streamkeepers

*A Project Funded by a US EPA Scientific Studies and
Technical Investigation Assistance Program Grant*

The background of the slide is a photograph of a stream. In the foreground, several dark, segmented aquatic insects, likely stoneflies, are crawling on a light-colored, textured rock surface. The water in the stream is shallow and clear, revealing a bed of smooth, rounded rocks of various sizes and colors, ranging from light tan to dark grey. The lighting is natural, creating soft shadows and highlights on the rocks and the insects.

Questions?

jo.wilhelm@kingcounty.gov

www.pugetsoundstreambenthos.org