

## ***Puget Sound Stream Monitor – Number 3, January 2013***

*News about biological monitoring and reporting from around Puget Sound.*

Work continues at King County and with our partners to update the benthic index of biotic integrity (B-IBI) and standardize reporting of biological condition of Puget Sound streams. In this newsletter:

- Results of side-by-side sampling to evaluate differences in sampling methods,
- Revisions to the taxa attributes and associated metrics,
- Recalibration of the B-IBI metrics,
- Other news including B-IBI as a regional indicator in Puget Sound Partnership's State of the Sound report.

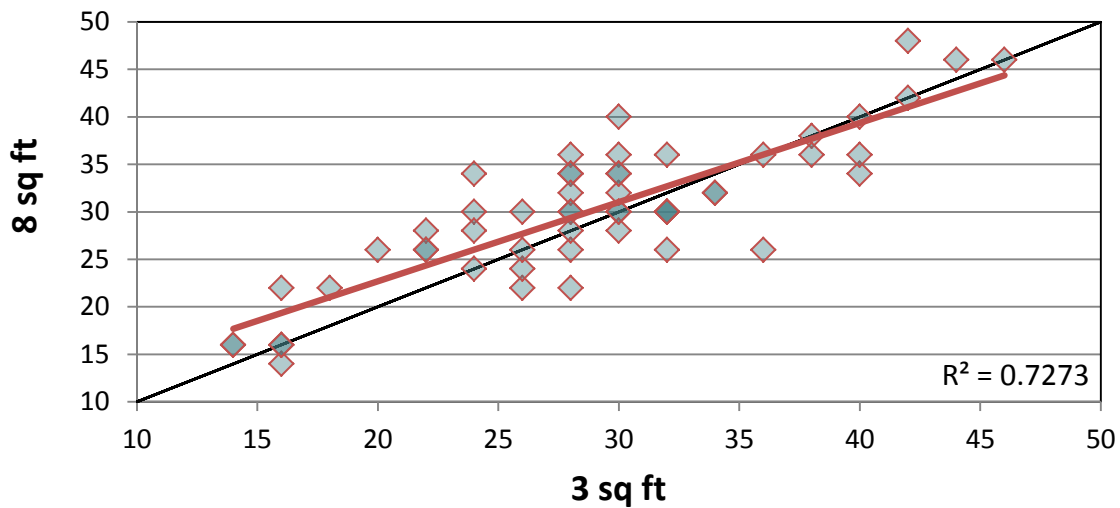
### **Results of Side-by-Side Sampling**

As most of you know, during the summer of 2011, we partnered with 9 Puget Sound agencies to collect stream invertebrates at 55 sites. Samples were collected using WA Department of Ecology's protocol (8 ft<sup>2</sup> area) and the protocol of the local jurisdiction (3 ft<sup>2</sup> or 9 ft<sup>2</sup> area). Our hypothesis was that sample collection from a greater surface area would result in significantly more taxa and an overall increase in B-IBI scores; however, we were surprised to find this wasn't the case. In fact, the results were comparable regardless of surface area. This result was probably due to the subsampling protocol we used to select 500 individuals as the standard count. This "normalization" reduces the impact of a larger or smaller sample area.

When comparing 3 and 8 ft<sup>2</sup> surface areas, we found that:

- B-IBI values were highly correlated,  $R^2 = 0.73$ ,
- Taxa richness metrics were highly correlated ( $R^2 > 0.5$  for the 6 richness metrics),
- Some taxa richness metrics for the 8 ft<sup>2</sup> samples were slightly higher (overall taxa, stonefly, clinger richness)
- B-IBI scores were highly correlated in our side-by-side sampling and B-IBI values were not biased by different surface areas for other Puget Sound samples; therefore, we are not recommending any kind of "cross-walk" or adjustment to translate scores between samples collected from 3 and 8 ft<sup>2</sup> for a standard 500 count.

## B-IBI scores: 3 vs. 8 ft<sup>2</sup> side by side sampling



### Revisions to the Taxa Attributes

The B-IBI was developed in the 1990's with the best available science of the time. Since then, site visits to over 1000 locations in the Puget Sound region provide new data for us to test which local taxa are most sensitive and most tolerant of human disturbance. These taxa are used to calculate the intolerant taxa richness and percent tolerant individuals which are two of the component B-IBI metrics.

With help from Bob Wisseman (Aquatic Biology Associates), taxa lists used to calculate long-lived, clinger and predator metrics were updated based on new natural history information. Wease Bollman and Sean Sullivan (Rhithron) helped us identify terrestrial and marine taxa which are now excluded from B-IBI calculations.

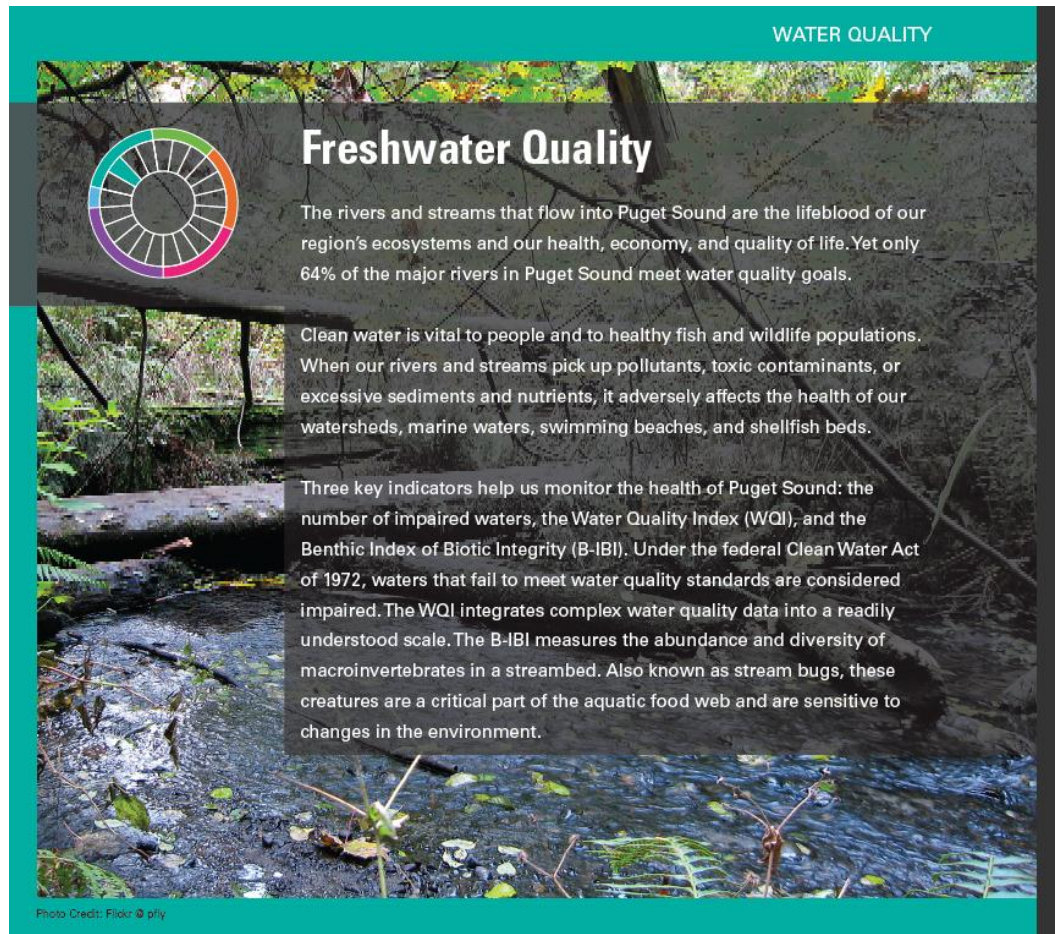
The updated taxa attributes, called 'Fore, Wisseman 2012' are now available on the [Puget Sound Stream Benthos](#) (PSSB) for B-IBI metric calculation. Marine and terrestrial taxa are excluded from B-IBI calculations on the PSSB.

### Recalibration of the B-IBI metrics

Recent metric updates changed the range of expected values for some metrics; for example, the number of intolerant taxa has increased slightly because the list of intolerant taxa has expanded. Metric scoring rules are being adjusted to reflect these changes. Individual metrics will be scored continuously from 0-10 (instead of 1, 3, 5) to increase B-IBI precision. The recalibrated B-IBI will range from 0-100 instead of from 10-50.

## Other News

- The Puget Sound Partnership recently released the [2012 State of the Sound](#) report. For the first time, B-IBI was included as one of the regional indicators for reporting the condition of Puget Sound streams. See the chapter on [Freshwater Quality](#) for more information.



The infographic features a circular gauge icon on the left, divided into segments of various colors (green, yellow, orange, red, purple). The background is a photograph of a stream flowing through a forest. The text is overlaid on a dark, semi-transparent background.

WATER QUALITY

### Freshwater Quality

The rivers and streams that flow into Puget Sound are the lifeblood of our region's ecosystems and our health, economy, and quality of life. Yet only 64% of the major rivers in Puget Sound meet water quality goals.

Clean water is vital to people and to healthy fish and wildlife populations. When our rivers and streams pick up pollutants, toxic contaminants, or excessive sediments and nutrients, it adversely affects the health of our watersheds, marine waters, swimming beaches, and shellfish beds.

Three key indicators help us monitor the health of Puget Sound: the number of impaired waters, the Water Quality Index (WQI), and the Benthic Index of Biotic Integrity (B-IBI). Under the federal Clean Water Act of 1972, waters that fail to meet water quality standards are considered impaired. The WQI integrates complex water quality data into a readily understood scale. The B-IBI measures the abundance and diversity of macroinvertebrates in a streambed. Also known as stream bugs, these creatures are a critical part of the aquatic food web and are sensitive to changes in the environment.

Photo Credit: Flickr @ pfly

- We've been busy sharing results of our work at various conferences and meetings:
  - ✓ The National Water Quality Monitoring Conference (May '12, Portland, OR)
  - ✓ Puget Sound Science Panel meeting (June '12, Seattle, WA)
  - ✓ Northwest Biological Workgroup annual meeting (Oct '12, Boise, ID)
  - ✓ The Society of Environmental Toxicology & Chemistry (Nov '12, Long Beach, CA)
  - ✓ The King County Science Seminar (Nov '12, Seattle, WA)

## Contact Us/Stay Involved

A key goal of the EPA grant is to promote communication and collaboration across the region. How are you using benthic data to protect and restore streams? Please let us know. Contact Deb Lester at [Deborah.Lester@kingcounty.gov](mailto:Deborah.Lester@kingcounty.gov) and we will include your news in our next issue.