Bugs and Stream Basin Health

King County uses stream macroinvertebrate data to help identify Puget Sound stream basins with the best health, and those that could be improved

By Kate Macneale

King County recently completed a grant-funded study that used environmental monitoring data to identify and prioritize stream basins across the Puget Sound region for restoration and protection. This work represents an exciting development: Instead of simply describing the conditions in streams and their contributing basins, the information derived from stream monitoring data are being used to define strategies to protect and restore these areas.

Assessing Stream Health

There are many ways to assess the health of a stream and its surrounding basin, but it turns out that one of the best ways is to look at the organisms that live there. The benthic macroinvertebrates (insects, crayfish, worms, and snails found living among the rocks in the streambed), are great indicators of stream health.

For example, in urban basins, the stream community typically includes organisms that can tolerate high stream flows and stormwater contaminants. In contrast, more sensitive organisms thrive in less developed, forested basins.

To make sense of the macroinvertebrate data, scientists use an index – the benthic index of biotic integrity (B-IBI) – that provides a score for a location based on the number and types of organisms found there. A very low B-IBI score indicates a stream basin is in “very poor” health; while a very high B-IBI score indicates “excellent” stream health.

Using Bugs to Prioritize Basins for Restoration and Protection

B-IBI scores are used by numerous jurisdictions and agencies throughout the region to characterize stream health. Recently the Puget Sound Partnership developed two recovery targets related to stream health based on B-IBI scores. The goal of the first target is to protect Puget Sound basins that have “excellent” B-IBI scores, while the second target is intended to restore 30 basins so their B-IBI scores improve from “fair” to “good.”

Nearly 1,300 sites across the Puget Sound region have been sampled by over 20 jurisdictions and agencies. As a result, the region has an enormous number of B-IBI scores that characterize stream health. But which basins with “fair” B-IBI scores would benefit most from restoration efforts, and what actions would be necessary to improve stream health? What actions are necessary to protect stream basins with “excellent” B-IBI scores? In 2013, King County received funding from the Washington Department of Ecology to start tackling these questions, to benefit both King County and the Puget Sound region as a whole.

A key project goal was to use the Puget Sound region B-IBI scores to identify and prioritize basins for restoration and protection. Additional goals were to describe and recommend strategies, and estimate costs to restore and protect these sites. The result is a rough blueprint for implementation.

The task was daunting: B-IBI scores had not previously been used to address these goals in the region. However, through discussions with regional experts, we developed a list of streams with “excellent” B-IBI scores to be protected and a list of streams with “fair” B-IBI scores to be prioritized for restoration.

Restoration and Protection Strategies

To identify strategies, we reviewed landscape and land use information for individual basins and consulted with local experts. Additional strategies included actions that reduce stressors that affect the ecological health of streams.

For instance, in basins with few trees in the riparian area, tree planting was a recommended restoration strategy. In basins with older developments likely built before stormwa-
Complete reports and associated data can be found at: www.kingcounty.gov/2014-restoration-priorities
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Kate is an aquatic ecologist with a keen interest in streams and the communities they support. Her work has focused on aquatic insects and salmonids, and the stressors that can affect them. Her most recent projects have focused on quantifying stormwater Best Management Practices effectiveness, studying possible thermal benefits of restoring wood to streams, and evaluating how macroinvertebrate communities can help inform the restoration and protection of stream basins.