

BEST PRACTICES



Stormwater Pollutants Cause of Fish Mortality in Pilot Study

Successful salmon reproduction is one of the most highly valued measurements of stream health in the Pacific Northwest. Since many of our streams and rivers flow through heavy industrial and urbanized areas it is essential that these waters are healthy to support salmon production and survival. Protecting the early life stages of salmon and the food on which they depend is the key to maintaining productive streams, especially in urban environments where urban stormwater can have toxic effects on fish populations.

It has been found that performing chemical analysis of stormwater or collecting water samples is inadequate by itself for evaluating environmental impacts. Many toxic pollutants cannot be detected through commonly available chemical analyses, and many of the chemicals that can be detected have little toxicity information available. Also, the toxic effect for combined chemicals is unknown. A more reliable method for evaluating instream chemical testing is using fish. Fish and other aquatic organisms can be used to analyze chemicals as these organisms have the ability to accumulate and concentrate chemicals found in streams in their tissues. Testing of tissue samples can then give an indication of pollutant type and exposure.

With the goal of better understanding water quality issues in our streams, researchers at the Washington State Department of Ecology conducted a pilot study on Indian Creek in Olympia during the spring of 2010. Rainbow trout eggs were used to assess stream health. Indian Creek was chosen for this study as it has been shown to be moderately impacted by stormwater runoff.

When placed in a stream test organisms, such as trout eggs, experience a realistic environmental exposure and respond to a broad spectrum of toxic chemicals and mixtures. The Indian Creek study included exposure of rainbow trout embryos in a hatchbox that simulated a natural redd or egg nest made from river gravel. The test lasted for thirty four days beginning with eyed eggs and ending with swim-up fry. Each life stage can be sensitive to different pollutants and was assessed for mortality, failure to hatch, abnormal development and reduced growth.

Of the two site exposures trout at the lower Indian Creek site showed toxicity through significant mortalities and several candidate chemicals were identified as the possible toxicants. Metals were the only pollutants that were clearly in higher concentrations at the lower monitoring station.

In spring of 2013 Ecology conducted a study to follow-up on the findings of the previous 2010 study. The 2013 study will soon be published. Stay tuned for a follow-up report in our next quarterly newsletter.

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