

## Partnership of Fish Biologist and Fluvial Geomorphologist - The Benefits of Working Together

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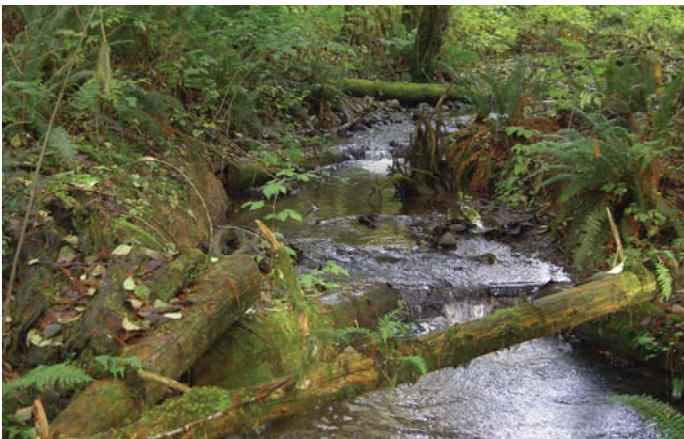
### Function follows Form

Fish habitat and river morphology are two sides of the same coin. It can be said that river morphology (form) creates fish habitat (function). Fish habitat is a product of the fluvial geomorphic process. Function follows form.

A growing number of fish biologists and fluvial geomorphologists are discovering the mutual benefit of blending their knowledge and experience. Let's examine the traditional paradigms of the fluvial geomorphologist and the fish biologists:

### *Fluvial Geomorphologist*

For the fluvial geomorphologist, river morphology is described in terms of channel dimension, pattern, profile, and bed materials. Rivers have a predictable central tendency to adjust channel morphology in response to conditions in the watershed. There are eight variables that effect channel morphologic adjustments: discharge, velocity, width, depth, slope, channel roughness, bed load size, and bed load volume. Streams are in a constant state of adjustment to balance these variables. Eventually, a stream channel will evolve to a condition of dynamic equilibrium, within natural range of variability.



### *Fish Biologist*

For the fish biologist, fish habitat is described in terms of fish biology, water quality, and physical habitat features. Fish biology is described in terms of fish physiology and behavior i.e. spawning, rearing, and adult activities. Water quality includes water temperature, pH, dissolved oxygen, and total dissolved solids that sustains fish physiology. Physical habitat features include channel bed features, bed materials, structure (wood and stone), macro-invertebrates (food) and vegetation that contribute to fish biological needs.



### **It's all about the fish**

For the fish, the measures of successful stream and fish habitat restoration are conditions that provide sustainable and productive fish habitat. The biologist understands fish behavior and knows what good fish habitat looks like. The goal of fish habitat restoration is to restore the biological, water quality, and physical conditions that benefit fish behavior. The biologist is looking for protective cover, sources of food, suitable bed materials for redds, proper water temperature, water quality, rearing conditions, flood refugia, shade, resting areas from high velocity, and other habitat structures.



### Benefits of working together:

The fish biologist benefits from understanding the geomorphic processes that naturally form good fish habitat. By working together the biologist can understand how watershed conditions are impacting fish habitat and how the equilibrium channel dimension, pattern and profile will complement and sustain good fish habitat.

The fluvial geomorphologist benefits from understanding fish behavior, water quality chemistry, and good fish habitat. By working together the geomorphologist can better design habitat features into the natural channel restoration.

### Questions for the fish biologists and fluvial geomorphologist to consider together:

- Where are local examples of productive fish streams?
- What fish habitat features are found in productive fish streams?
- What is the quantifiable morphology of these streams?
- What are the benefits of classifying streams by stream type?
- What fish habitat features can we expect from different stream types?

If you would like additional information, please contact Andrew Harris or Russ Lawrence at 503.655.1342.



The morphologist understands fluvial geomorphic processes and knows what a natural stream channel looks like. The goal of stream restoration is to restore these features within the context of a natural stream channel in equilibrium with existing watershed conditions. They determine and quantify the channel dimension, pattern, profile, and bed materials of the equilibrium channel within a natural range of variability. The equilibrium channel provides the stability and time needed for riparian vegetation to mature in order to supply large wood, shade, food, and protective cover.