Overview
Watershed hydrology directly affects the biotic and abiotic processes within watersheds. Protecting functioning hydrologic processes in our watersheds is fundamental to protecting their ecological integrity. Implementing effective watershed planning policies and protection strategy requires an accurate understanding of where streams are. Water typing is the state-sanctioned process by which the locations of streams and fish habitats therein are mapped so that existing environmental regulations can achieve their conservation objectives. Because modeled regulatory maps often significantly misrepresent the presence, location, and extent of fish habitat, the effectiveness of state and local government fish habitat protection regulations is compromised. More information about the water typing process and its significance is available at: [http://wildfishconservancy.org/resources/maps/what-is-water-typing](http://wildfishconservancy.org/resources/maps/what-is-water-typing)

Wild Fish Conservancy (WFC) was contracted by Snohomish County Public Works (CC22-14) to perform a water type assessment within Woods Creek, a major tributary to the Skykomish River near Monroe, WA (Figure 1). At a WRIA 07 Planning Unit-scale, groundtruthed regulatory water type maps provide benefits that cross jurisdictional boundaries, benefiting local government regulation and planning effectiveness, as well as local or regional habitat restoration and protection planning efforts. The improved water type maps (and associated outreach) resulting from this project will have implications for City, County, and Regional Planning departments, substantially increasing the likelihood that their planning and critical area regulatory programs more effective. The outcomes realized by this project include improved Comprehensive planning, Land Use Zoning, Salmon Recovery planning, Forest Practices planning, and Critical Area planning. Providing fundamental data to improving these policies and processes will protect hydrologic processes by (a) helping to limit or prevent degradation of environmental conditions, (b) precluding or discouraging ecologically adverse changes in the type or intensity of land use, and (c) promoting adaptation to anticipated environmental changes by increasing system resilience.
Figure 1. In 2015 Wild Fish Conservancy performed a water type assessment within Woods Creek, a major tributary to the Skykomish River near Monroe, WA. The blue dots represent GPS points where field staff collected fish and wildlife data.
Methods
During the 2015 water type field season, Wild Fish Conservancy crews performed water type assessments within the Woods Creek drainage where landowner permission to perform the surveys was granted (Figure 2). The survey encompassed approximately 300 miles (whole watershed total) of streams. WFC conducted water type surveys using the protocols and definitions provided in WAC 222-16-031 and Section 13 of the Forest Practices Board Manual. WFC collected data only on properties where permission to do so was granted. During the project WFC requested permission from property owners to access 1,555 parcels. Of these, access for the WFC staff to perform the survey on their property was granted for 223 parcels (14 percent). Additionally, WFC had permission to access streams within right-of-ways on public roads, which were numerous in the watershed.

WFC documented stream channel location and characteristics, fauna, and riparian condition using GPS and photographs. Wetted width, bankfull width, channel gradient, and other data were recorded at each GPS point (Figure 3). During the project we collected 915 GPS points and 2,590 photographs.

Results
Fauna that WFC encountered during the surveys included cutthroat trout, possible rainbow trout, coho salmon, sculpin, brook lamprey, 3-spine stickleback, signal crayfish, northwestern salamanders, red-legged frogs, pacific tree frogs, rough skinned newts, and non-native bull frogs (Figure 4).

As expected based on previous Wild Fish Conservancy water type assessments, significant discrepancies existed between the Washington Department of Natural Resources (WDNR) regulatory maps and what we found on the ground (Figure 5). In addition to showing streams in the wrong location, WFC found many streams that were not on the maps at all. Over the study area WDNR had identified 258 miles of streams. WFC found that 5.67 miles of those WDNR mapped channels did not exist, but that an additional 30.8 miles of stream channels did exist that were not on the official WDNR water type maps.
Figure 2. WFC prepared a GIS representing where permission to survey was, and was not, granted by landowners. “Blank” parcels represent responses where the landowner did not grant nor deny access – as with “Call first” responses, blank responses required additional coordination via phone.
Figure 3. Measuring wetted width on a Woods Creek tributary.

Figure 4. A pair of juvenile Coho captured, documented, and released during the Woods Creek watertype assessment.
Figure 5. In some Woods Cr. tributaries, significant discrepancies exist between the Washington Department of Natural Resources (dashed lines) and WFC’s field-data based channel location and classification (solid lines). The blue dots represent GPS points where field staff collected fish and wildlife data.
Wild Fish Conservancy has made available all the data collected during this water type assessment project, including a GIS representing the corrected channel locations and classifications, a database with point and reach-level summaries of the physical and biological observations made during the surveys, and the photographs collected in the field and referenced in the database.

Organizations and agencies interested in the project, methodologies, or results, are encouraged to contact Wild Fish Conservancy’s Director of Science, Jamie Glasgow (Jamie@wildfishconservancy.org; 206.310.9302).