

The Science Behind Instream Flows - Quick Overview of Instream Flow Methods Used in Washington State

Method	Purpose & typical use	Constraints	Advantages	Cost	Time	Equipment needed
IFIM	<ul style="list-style-type: none"> • Describes the full fish habitat versus stream flow relationship for all fish species and lifestages. • Provides data on fish habitat at various stream flows, based on depth, velocity, substrate and cover. 	<ul style="list-style-type: none"> • Relatively date intensive (have to visit each site at least 3 times at the appropriate stream flow). • Takes a while (typically, because of the need for several measurements, it takes a week of field work spread over 3-4 months). • Specialized training needed. • Timeliness is crucial—when measurements have to be taken is highly contingent on how fast stream flows are falling. 	Generally recognized as “state of the art”— <i>i.e.</i> , it is generally an accepted method of determining stream flows needed for fish.	Relatively much more time intensive (more site visits; longer time to take measurements, run the computer model and write up the results).	Can take from six months to a year (flow measurements are needed for least 3 various stages of stream flow).	Relative to Toe-width, much needed. Rod, velocity meter, tape measure, surveying level and tripod, survey rod; personal computer and IFIM program, boat and associated measuring equipment (if working in unwadeable streams or rivers).
Toe-width	<ul style="list-style-type: none"> • Describes “peak habitat” for salmonids rather than the full range of habitat versus flow. • A quick method for obtaining data to look at spawning and rearing flows. 	Yields a single number for spawning and rearing flows (which makes it hard to balance between species and lifestages because it does not show the relationship between fish habitat and stream flow).	<ul style="list-style-type: none"> • Quick: many streams can be measured in one day. • Easy: the method can be learned in an hour or so. 	<ul style="list-style-type: none"> • Low cost per site (maybe an hour or two per site). • Most of the cost is the driving time to and between sites. 	Can take as little as a week from data collection through write-up.	Minimal (measuring tape and a calculator).
Wetted width	Identifies how the width of the stream changes with stream flow.	<ul style="list-style-type: none"> • Used to determine an “inflection point” which may not be apparent on some streams. • Provides a very minimal level of protection. 	Easy: the method can be learned in an hour or so.	Less costly than Toe-width but may be costly since as many as 10 field visits at different stream flows is often needed to determine an “inflection point.”	Will take months of field work since several visits to the site at different stream flows is needed (10 or more). Field time more than for IFIM.	Minimal (measuring tape and a calculator).
Hatfield and Bruce	Uses an equation based on existing IFIM study results to estimate stream flow that maximizes fish habitat (WUA) by species and lifestage.	A reconnaissance level office tool; not a substitute for detailed analysis of watershed and reach.	Quick, but need hydrological data. No field work required.	Low: some office time for the calculation.	Short amount of office time only.	Minimal (a computer or calculator).