



California Department of
Fish and Wildlife

INSTREAM FLOW PROGRAM

WINTER 2016 UPDATE

COMMON METHODS AND MODELS FOR QUANTIFYING FLOW REGIMES FOR FISH AND WILDLIFE

The California Department of Fish and Wildlife Instream Flow Program supports the use of a variety of defensible methods to quantify flow regimes for fish, wildlife, and their habitats. The program recognizes that there are a large number of proven, acceptable, and defensible procedures available for quantifying flow needs. The challenge is selecting a suite of tools that provides the necessary flow regime information. Four key considerations are presented below.

1.

RIVERINE PROCESSES ARE DYNAMIC AND COMPLEX, AND THUS REQUIRE FLEXIBILITY IN METHOD SELECTION.

The evaluation of flow needs in terms of the five core riverine components (i.e., hydrology, geomorphology, biology, water quality, and connectivity) identifies processes and functions that are essential to preserving riverine ecosystem values (Annear et al., 2004).

It is critical to account for these riverine components in any flow regime quantification exercise. There is no established approach or methodology that addresses all five components - nor is there guidance on which individual components to study.



2.

THE USE OF MULTIPLE METHODS AND MODELS CAN HELP ADDRESS THE COMPLEX ECOLOGICAL RELATIONSHIPS OF A RIVERINE ECOSYSTEM.

When deciding which suite of methods (or models) is appropriate for an intended use, the user must take into consideration limitations and constraints. For example:

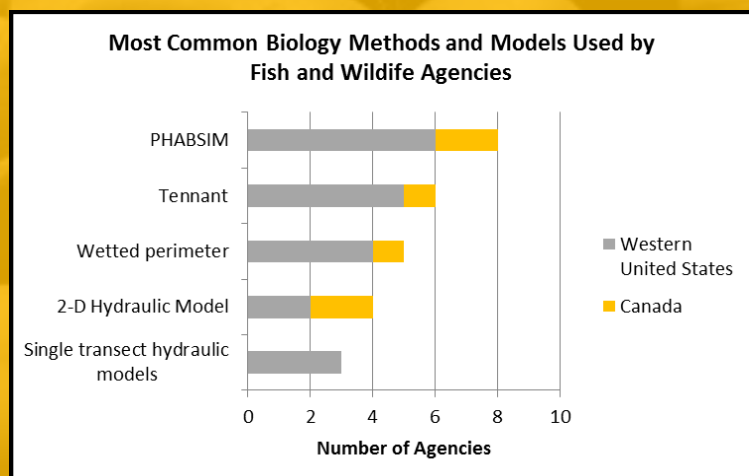


- Models manage uncertainty, they do not eliminate it.
- The relationship between flow and habitat is not linear and may differ between streams.
- A flow that is beneficial for one species may be detrimental to other species. For example, more flow is not always better (and may actually be worse).
- Model accuracy depends on the accuracy of the data input. Models have specified limits. Due to interactions not fully accounted for or understood, models only address a portion of a system, and may not be able to predict the precise behaviors or relationships of a whole system.

3.

THE VAST MAJORITY OF INSTREAM FLOW QUANTIFICATION METHODS ARE BASED ON SOME ASPECT OF BIOLOGY.

Biology methods identify how much water is needed to restore and protect the ecological functions of streams (e.g., flow needs for benthic invertebrate production, fishery life stage needs). Procedures used by California's Instream Flow Program are consistent with the five biological methods most commonly used by other state and provincial fish and wildlife agencies in the western U.S. and Canada (Annear et al., 2009).



Standard operating procedures and additional guidance may be found on the Instream Flow Program's website: wildlife.ca.gov/conservation/watersheds/instream-flow/sop.

4. THERE IS NO SINGLE BEST METHOD, MODEL, OR FLOW.

A flow prescription for fish and wildlife should provide for a flow regime based on the five core riverine components. For more information, visit the Instream Flow Council website:

instreamflowcouncil.org.

Modeling reports being submitted for approval must address the elements specified in the Instream Flow Program's *Instream Flow Study Results Checklist*:

wildlife.ca.gov/conservation/watersheds/instream-flow/sop.



ABOUT CALIFORNIA'S INSTREAM FLOW PROGRAM

California's Instream Flow Program collects and develops information on the instream flows required to maintain healthy conditions for aquatic and riparian species. We investigate the relationships between flow and available stream habitat for waterways throughout California.

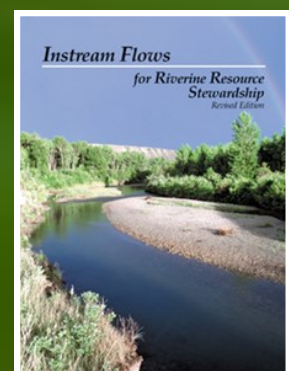
The program performs flow studies, collects field data, conducts outreach, develops quality assurance guidelines, and coordinates with other agencies and interested parties on program-related activities. The program is focused on the overall structure and function of the river system through the application of the Instream Flow Incremental Methodology. More information on the Instream Flow Program is available online:

wildlife.ca.gov/conservation/watersheds/instream-flow.

NEED MORE INFORMATION?

The Instream Flow Council has published a comprehensive resource covering all aspects of flow regime development. *Instream Flows for Riverine Resource Stewardship* is a valuable tool for anyone planning or executing an instream flow study. More information on the Instream Flow Council is available online:

instreamflowcouncil.org/resources/ifc-publications.



ABOUT OUR QUALITY ASSURANCE SYSTEM

Instream flow information is currently being collected throughout California by multiple agencies, consultants, and other organizations. It is therefore essential that the information be generated using scientifically- and legally- defensible data of known and documented quality.

To promote the generation of such data, the Instream Flow Program has been partnering with the Marine Pollution Studies Laboratory Quality Assurance Team (see below) to develop and implement a quality assurance system. So far, this system includes:

- Standardized data collection procedures
- Equipment checklists
- Technical guidance documents
- Templates for study plans and reports

Our quality assurance tools and resources may be found online:

wildlife.ca.gov/conservation/watersheds/instream-flow/sop.

THE MARINE POLLUTION STUDIES LABORATORY

Led by Beverly van Buuren, the Marine Pollution Studies Laboratory Quality Assurance Team has designed and implemented quality systems for:



- Bioassessment
- Chemistry
- Field measurements
- Instream flow
- Physical habitat assessment
- Population and food web studies
- Spill response
- Toxicity testing

More information is available online:

mpsml.mlml.calstate.edu/quality-assurance-services or
gahelpdesk@mlml.calstate.edu.

References

Annear, T., I. Chisholm, H. Beecher, A. Locke, and 12 other coauthors. 2004. *Instream Flows for Riverine Resource Stewardship, Revised Edition*. Instream Flow Council, Cheyenne, WY. 268 pp

Annear, T., D. Lobb, C. Coomer, M. Woythal, C. Hendry, C. Estes, and K. Williams. 2009. *International Instream Flow Program Initiative: A Status Report of State and Provincial Fish and Wildlife Agency Instream Flow Activities and Strategies for the Future, Final Report for Multi-State Conservation Grant Project WY M-7-T*. Instream Flow Council, Cheyenne, WY.