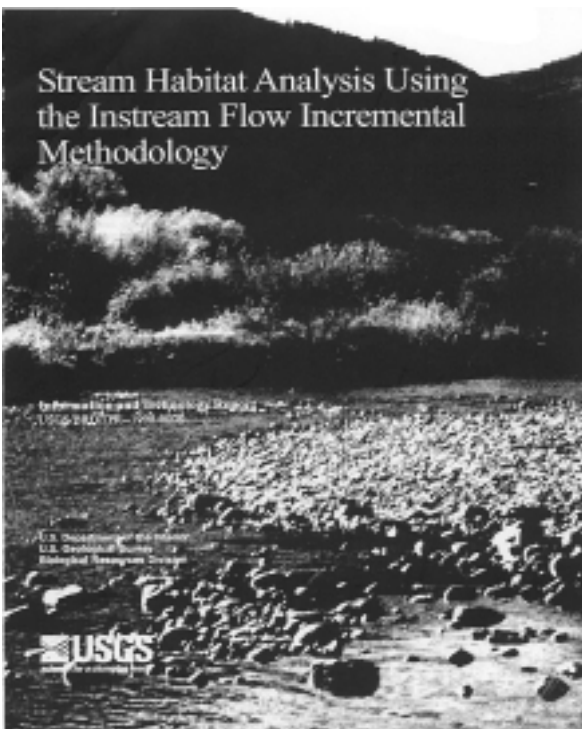


## Document No.: 33

### Stream Habitat Analysis Using the Instream Flow Incremental Methodology

**Citation:** Bovee, K. D., B. L. Lamb, J. M. Bartholow, C. B. Stalnaker, J. Taylor, and J. Henriksen. 1998. Stream Habitat Analysis Using the Instream Flow Incremental Methodology. U.S. Geological Survey, Biological Resources Division Information and Technology Report USGS/BRD-1998-0004. viii + 131 pp.



**Source:** U.S. Geological Survey  
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**Abstract:** This document is intended to update the concepts and ideas first presented in Information Paper 12, the first attempt to describe the Instream Flow Incremental Methodology (IFIM) in its entirety in 1982. This publication serves as a comprehensive introductory textbook in IFIM for training courses. It contains the most complete and comprehensive description of IFIM in existence today.

This manual should also serve as an official guide to IFIM in publication to counteract the misconceptions about the methodology that have pervaded the professional aimed at the decisionmakers of management and allocation of natural resources in providing them an overview; and to those who design and implement studies to inform the decision makers. There should be enough background on model concepts, data requirements, calibration techniques, and quality assurance to help the technical user design and implement a cost-effective application of IFIM that will provide policy-relevant information.

Some of the chapters deal with basic organization of IFIM, procedural sequence of applying IFIM starting with problem identification study planning and implementation, and problem resolution.

**Target Application:** Management

**Suitable for Volunteers:** No; authors strongly recommend an interdisciplinary team approach to the use of IFIM.

**Training Recommended:** Not applicable; interdisciplinary team approach.

**Monitoring Focus:** IFIM's modeling approach has been developed considering major human-induced impacts to river systems that fall into five major categories:

- 1) flow regime – description of habitat variability under baseline and alternative flow regimes

- 2) habitat structure – quantification of the amount of microhabitat available for a target species over a wide range of discharges, combining empirical descriptions of the structural features of the channel, simulated distributions of depth and velocity, and habitat suitability criteria for the target species.
- 3) water quality – IFIM studies generally incorporate water quality models in common use by the water resource or public health agency of the region.
- 4) food energy source – incorporates simulations of microhabitat area for use by benthic macroinvertebrates in streams inhabited by trout and salmon.
- 5) biotic interactions – examination of interspecific competition as a consequence of flow management. This pathway according to the authors has been most neglected and is in a need of further development. The authors offer a few new concepts that need to be sorted out and applied to IFIM modeling. Among them are simulated historical temperature and flow patterns, unfavorable temperature during spawning and incubation, or unfavorably high velocities during fry emergence.

**Geographic Scale:** Basin, sub-basin, stream reach, project site. The fundamental accounting habitat unit used in IFIM is a segment. How the component of IFIM are assembled and combined depends on the nature of the problem and the objectives of the study.

**Methods:** Office

**Level of Data Quality:** Level 3 & 4

**Equipment and Tools (*list*):** Data requirements, data collection strategies, sampling protocols descriptions and evaluations, and most widely available sources are listed under each pathway in chapter 3 and 4 of the report.

**Data Forms:** Not applicable

**Examples of Filled-in Data Forms:** Not applicable

**Key References:** Literature Cited section page 111, suggested reference materials at the end of each chapter.

