CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

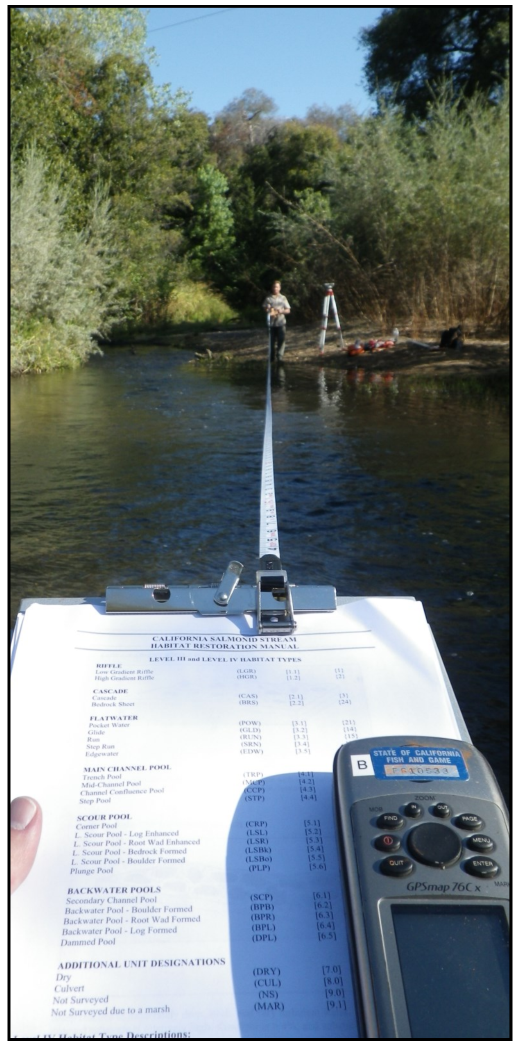
INSTREAM FLOW PROGRAM

Mesohabitat Delineation Guidance for Instream Flow Hydraulic Habitat Analysis

Objective

The primary goal of mesohabitat delineation as part of an instream flow study is to identify all mesohabitat unit types (e.g., pools, riffles, and runs) in the reaches of the river and tributaries of interest. Delineations are made based on the reach's physical attributes and the location's suitability for hydraulic habitat modeling. The resulting mesohabitat "inventory" may be used as a basis for selecting study sites and/or transects for one- (1D) or two-dimensional (2D) hydraulic habitat analysis.

The specific objective of mesohabitat delineation is to create a computer spreadsheet database and summary of all mesohabitat unit characteristics by type and distance within designated reaches of the river and tributaries of interest.



To Identify Mesohabitat Types for Inclusion into Hydraulic Habitat Sampling and Analysis:

Step 1: Segment the river and tributaries of interest into generally homologous study reaches using criteria such as hydrology, geomorphology, and gradient. The study areas for mesohabitat delineation encompass those mainstem and tributary reaches proposed for assessment using hydraulic habitat modeling methods or related studies. Mesohabitat delineation should be conducted under flow conditions when mesohabitat types are readily apparent. Excessively low or high flows should be avoided when conducting mesohabitat delineation.

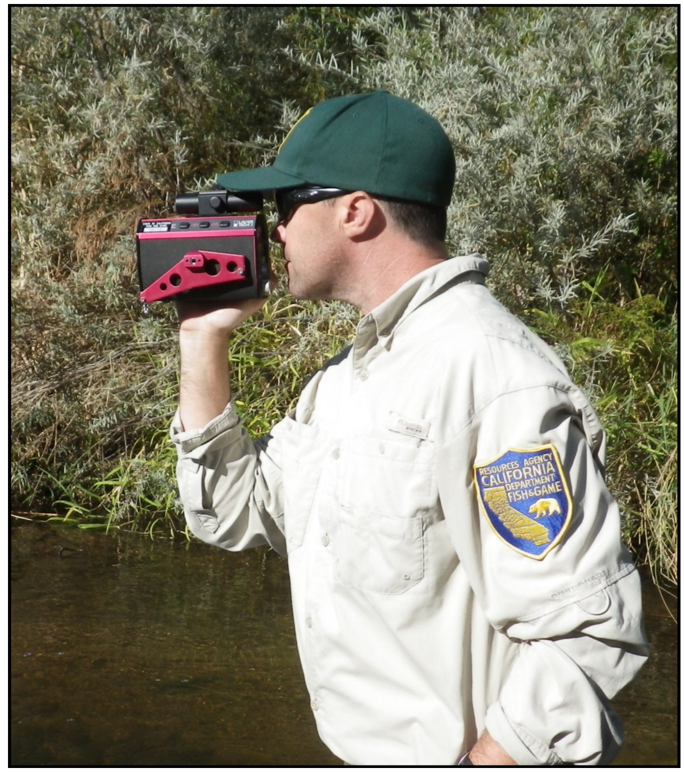
Step 2: The preferred delineation approach is by on-the-ground surveys, consisting of identification of habitat types using specified level-IV typing criteria (Flosi et al 2010). Measurements of habitat unit lengths, channel widths, water depth, and identification of other features (e.g., access points, road crossings, bridges, culverts, and any stream bank alterations) are also necessary to acquire a complete inventory of existing mesohabitat conditions. If aerial images are used, on-the-ground validation is required.

Continued on Next Page...

Identifying Mesohabitat Types for Inclusion into Hydraulic Habitat Sampling and Analysis (Continued)

Step 3:

On-the-ground mesohabitat delineation is conducted following procedures described in Flosi et al. (2010) - by wading within or adjacent to the reach and working in a downstream-to-upstream direction while measuring distance with either a hand-held fiberglass tape measure, range finder, or hand-held GPS device.



Data can be recorded in either a water-resistant field notebook or using water-resistant paper printed with the standard data forms available from Flosi et al. (2010). Using this protocol, the following data are collected at a minimum: unit number (working downstream-to-upstream), latitude, longitude, unit type, length, substrate composition (dominant and subdominant) and comments. Additional data may include the following as measured in pool habitat types: maximum depth, depth of pool tail crest, and pool tail embeddedness. Ambient flow conditions should also be recorded during the surveys.

Step 4: For safety purposes, field surveys should be conducted by teams of at least two field technicians familiar with salmonid habitat requirements. They should have experience or recent training in habitat delineation and hydraulic habitat modeling. Biological technicians (or higher) are specified due to their ability to recognize habitat features important to rearing and spawning salmon and steelhead.

Step 5: Upon completion of habitat delineation, all data are entered into spreadsheets for quality control review and summary analyses, and may be used to guide identification and location of transects for hydraulic habitat modeling (see *Guidance for Selection and Location of Transects for 1D or 2D Hydraulic Habitat Modeling Analyses).* Mesohabitat units that are hazardous to sample or difficult to model (e.g., cascades, chutes, and high gradient riffles) should be identified, and may need to be excluded from any summary calculations depending on study objectives. Also, rare mesohabitats (i.e., those defined as constituting less than 5% of the total linear distance of the reach) may need evaluation for biological significance in further 1D and/or 2D hydraulic habitat modeling analyses.

Literature Cited:

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 2010. California salmonid stream habitat restoration manual. 4th Edition. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California. 525 p.