Developing Watershed-Wide Instream Flow Criteria Using a Rapid Approach to Inform Water Management Decisions

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CALIFORNIA DEPARTMENT OF FISH & WILDLIFE — Water Rights | Instream Flow | Groundwater

The California Department of Fish & Wildlife INSTREAM FLOW PROGRAM

The mission of the California Department of Fish and Wildlife is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public.

BACKGROUND

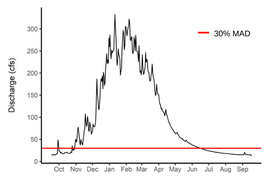
Over-allocation of freshwater resources, climate change, and limited information create complex challenges for freshwater ecosystem management. To inform water management decisions and protect fish and wildlife, the Department is developing a rapid instream flow assessment approach by incorporating traditional site-specific methods and recently developed regional and watershed level flow assessment tools to identify instream flow regime prescriptions for California watersheds.

ANALYSIS APPROACH

The flow criteria resulting from our varied analyses can be tailored to the specific ecological management goals for a stream or watershed allowing for a diversity of water management applications depending on the individual or combined management goals of species, habitat, and ecological integrity.

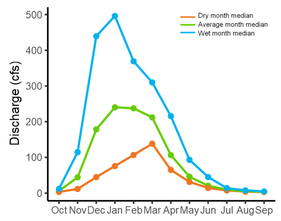
Low-Flow Threshold

The Low-Flow Threshold is a flow floor based on Natural Flow. When instream flow falls below this threshold, fish and wildlife may be particularly sensitive to stressors[2].




South Fork Eel River
MENDOCINO COUNTY

Natural Flows

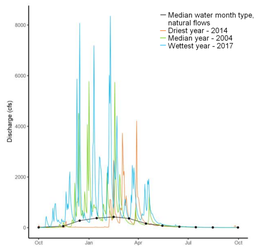


Natural Flow is monthly streamflow data by water month type[7,8]. These data are the input dataset for these analyses.

Flow Variation

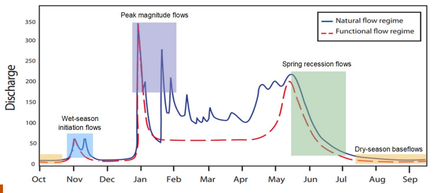
Annual and interannual variation in flows is critical to long-term ecological functioning[1].

This is an example of natural stream variation in Vanauken Creek (Humboldt County) at a lower flow (left) and a higher flow (right).



Functional Flows

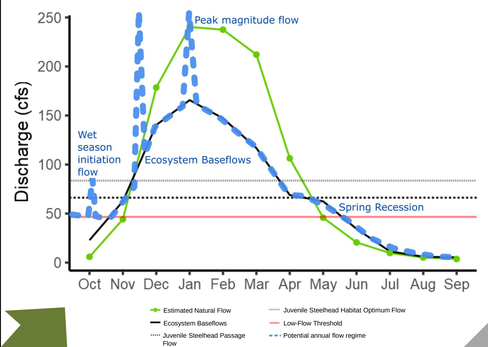
Functional Flows perform key ecological and geomorphic functions. Metrics of key Functional Flows can help protect important seasonal variation[6].

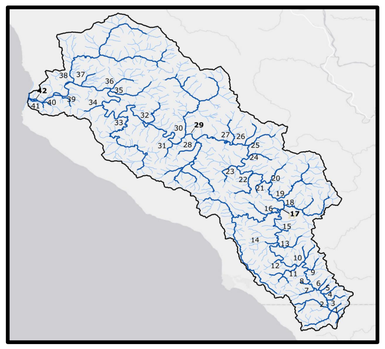



Ventura River
VENTURA COUNTY

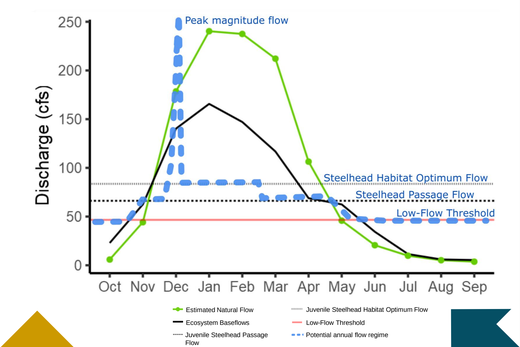
POTENTIAL FLOW CRITERIA

Potential Ecological Flow Regime



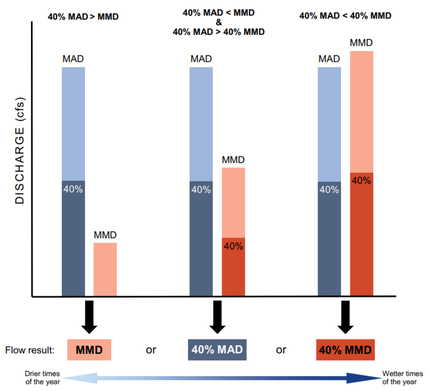


Potential Salmonid Flow Regime

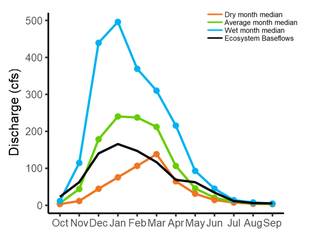


Ecosystem Baseflows

A monthly baseflow to protect aquatic resources. Baseflows are calculated as a percentage of monthly and annual Natural Flows[5].



MAD = Mean Annual Discharge
MMD = Mean Monthly Discharge



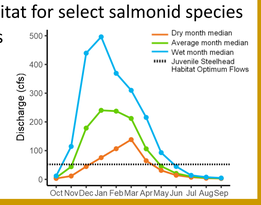
Additional Data

Further develop the flow regime by adding other data.

- Water quality data
- Geology
- Species-specific data
- Other

Salmonid Habitat Optimum Flows

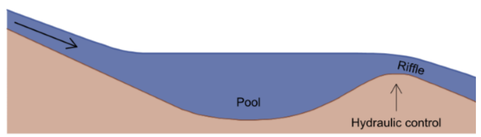
One optimal discharge to provide access to preferred habitat for select salmonid species and life stages for a stream reach[4].

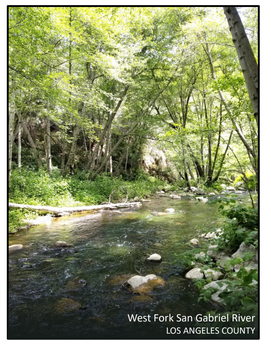


Salmonid Passage Flows

These flows provide enough water for salmonids to cross riffles, which are typically the shallowest part of a channel[3]. Based on species body depth criteria.

Species (life stage)	Minimum Average Depth (ft)
Chinook Salmon (adult)	0.9
Coho Salmon (adult)	0.7
Steelhead (adult)	0.7
Trout (adult, including age 1-2+ juvenile steelhead)	0.4
All salmonids (young-of-year)	0.3




West Fork San Gabriel River
LOS ANGELES COUNTY

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