

# Improving coordination of California's flow management programs

*A workgroup of technical experts is developing a statewide framework to improve how environmental flow targets are set.*

## The challenge

Multiple state and local agencies across California share responsibility for setting flow targets that protect and improve the ecological health of California's water resources. These approaches historically have not been coordinated at the statewide level, resulting in fragmented and siloed flow management programs. Consequently:

- Environmental flow data are not readily available or comparable across the state
- Agencies tend to focus on site-specific solutions, instead of holistically managing the health of California watersheds

Improving coordination across California, however, is a challenge. Environmental conditions and pressures vary widely, as do the priorities and capacities of agencies responsible for the management of water resources.



» Streams like the San Diego River, flowing through the community of Mission Valley, would benefit from a coordinated, consistent approach to how water resources managers set ecologically optimal flow targets.

## Technical workgroup formed to develop statewide strategy for flow management

To enhance coordination among agencies, a workgroup of technical experts self-organized in 2016 to pool knowledge, reconcile differences in technical approaches and methods, and ultimately develop a statewide strategy for advancing the science and management of environmental flows in California. This strategy has been codified in a two-tiered flow management framework.

### California Environmental Flow Management Framework

The two-tiered framework will provide flow targets for all streams in California. The framework builds off a statewide stream classification system that assigns streams to one of nine classes based on dominant hydrologic flow characteristics.

**Tier 1:** Use flow regimes from reference streams to rapidly set preliminary flow targets for stream sites of interest

» *Low-cost, widely applicable approach to set initial flow targets*

**Tier 2:** Use site-specific information and endpoints of management relevance to set more detailed, precise flow targets

» *More intensive, tailored approach that incorporates context specific factors and priorities*

### Key features of framework

- Avoids a "one size fits all" approach
- Offers a cost-effective, rapid method and guidance on more intensive methods for setting flow targets
- Focuses on specific functional elements of flows linked to ecosystem health and other beneficial uses
- Can be applied to gauged and ungauged streams
- Enables use of multiple ecological targets (e.g., fish and invertebrates)
- Assumes competing demands on limited water resources

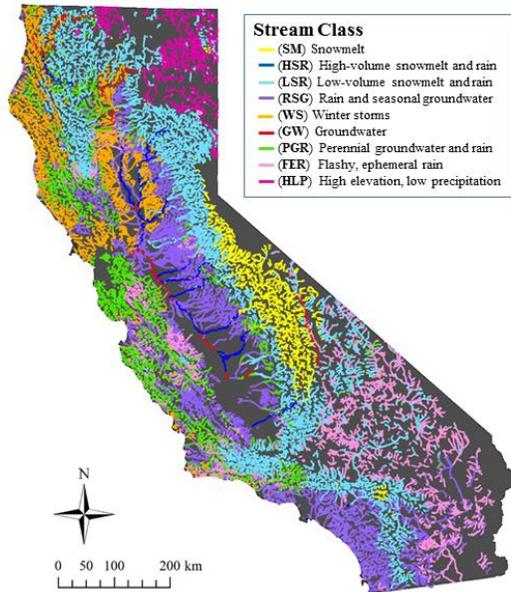
### Importance of optimizing flow management

When stream flows are disrupted by human intervention, they can affect a wide range of physical and biological processes, triggering fundamental changes to habitat condition, ecosystem services, and the distribution, diversity and abundance of species. Flow alterations have been shown to be a significant driver of species population declines and biodiversity loss in California and globally.

## Tier 1 approach for setting preliminary flow targets

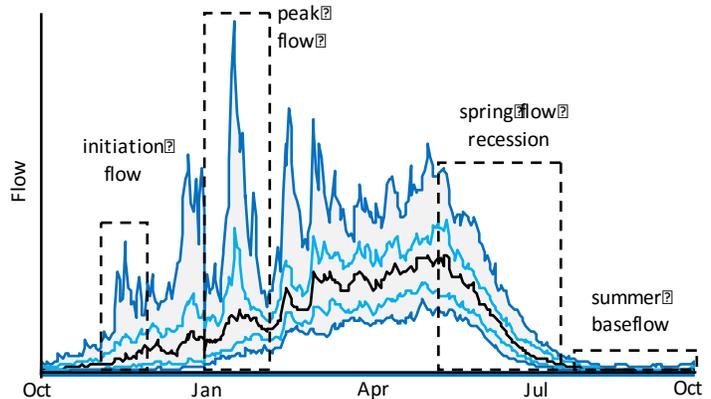
### 1) Stream classification

Tier 1 of the framework relies on a stream classification system, which defines nine distinct types of streams in California based on their flow regime characteristics.



### 2) Identify functional flow components

For each stream class, reference hydrographs are generated and the statistical properties of key functional flow components are quantified.



» Example reference hydrograph for the low-volume snowmelt and rain stream class, showing the range of daily flows over the period of record. Four flow components are identified that have important functional roles in sustaining ecosystem health: wet-season initiation flow, peak winter flow, the spring snowmelt recession and summer baseflows.

### 3) Quantifying flow targets

Reference hydrographs are estimated for streams of interest and the statistical properties of flow components are calculated. Analyses may focus on flow components that have general functional roles, or those that are relevant to particular ecological endpoints of interest (e.g., salmonids).

	Functional flows	Salmonids	Amphibians	Invertebrates
Peak magnitude	X	X		X
Recession rate	X		X	X

## Tier 2 approach for refining flow targets

In some cases, Tier 1 targets are sufficient. Tier 2 provides tools and approaches where additional detail or specificity is needed

### 1) Identify locally relevant assessment endpoints and methods

Select the most appropriate ecological endpoint based on management needs (e.g. fish, amphibians, riparian habitat, water quality). Choose the modeling and assessment approaches most relevant to local questions

### 2) Implement local or regional environmental flow study

Conduct a flow study using set of recommended assessment methods and generate site specific data to inform flow targets. Targets are based local hydrologic, geomorphic and ecological conditions.

### 3) Create shared information repository

Compile and upload study data to an open-source, web-based platform for water resources managers to share data, models, flow metrics and case study information

## Ongoing Coordination

The technical workgroup will continue communicating and collaborating with diverse partners at the state and local level engaged in flow management.

