2017 Year In Review

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

Instream Flow Program

2017 Year in Review

About the Instream Flow Program

The Instream Flow Program (IFP) is a Statewide Water Planning Program within Water Branch in the California Department of Fish and Wildlife (Department). The IFP conducts instream flow studies and develops ecological flow regime criteria needed for long-term protection, maintenance, and effective stewardship of fish and wildlife resources.

Water Branch Mission

To fulfill our public trust responsibility to the State of California by providing sound leadership in the balanced and integrated management of California's water resources, for the benefit of aquatic and terrestrial species and those habitats upon which they depend.

All photographs in this report were taken by Department staff.

This page: South Fork American River (El Dorado County)

Cover page, clockwise from top left: Mark West Creek (Sonoma County); Hollow Tree Creek (Mendocino County); Butte Creek (Butte County); Ventura River (Ventura County)

2017 Milestones:

Science, Policy, and Public Involvement

The Department's IFP develops instream flow studies to inform water managers about the flows needed for: ecological function; fish rearing, spawning, or migration; and/or habitat suitability. This Annual Report summarizes the Department IFP accomplishments in 2017.

The Instream Flow Council recognizes that effective riverine resource stewardship is achieved by integrating science, policy, and public involvement. Instream flow studies must be defensible and supported by sound science, and be consistent with state and federal policies and mandates. Collaboration, coordination, and consultation with other agencies and organizations strengthen the Department's instream flow efforts. The IFP team conducts tasks to inform instream flow management and to protect our public trust resources.

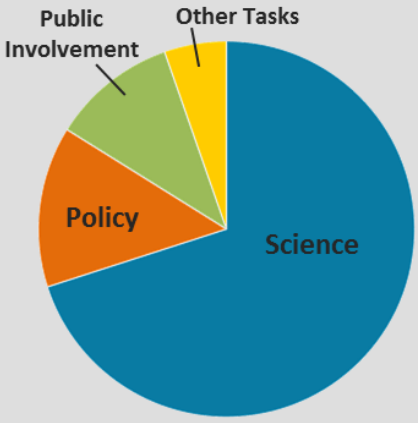
Specific activities completed in 2017 reflect the IFP's commitment to science, policy, and public involvement. Instream flow efforts primarily focused on studies supporting the California Water Action Plan (CWAP) and Public Resources Code (PRC) §10000-10005 mandates. Milestones include:

- Ventura River (Ventura County) study plan completion, data collection, and stakeholder meetings
- Mark West Creek (Sonoma County) coordination and habitat mapping
- South Fork Eel River watershed (Humboldt and Mendocino Counties) Habitat Suitability Criteria data collection and analyses
- Mill and Deer creeks (Tehama County) technical report finalization and Mill Creek public outreach
- Big Sur River (Monterey County) flow criteria finalization and submittal to the State Water Resources Control Board (State Water Board)
- Butte Creek (Butte County) public outreach
- Staff participation in Technical Advisory Committees for Antelope Creek (Tehama County), Carmel River (Monterey County), Navarro River (Mendocino County), Shasta River (Siskiyou County), Ventura River, and South Fork Eel River

San Antonio Creek (Ventura Co.)

The IFP Scientist workload was consolidated into categories to illustrate tasks undertaken in 2017. The four categories are:

- Science (70%): Study planning, field work, data entry and analysis, and report writing were the primary workload.
- Policy (14%): Staff evaluated flow policy and its effects on fish and wildlife, prepared and reviewed policy documents, and presented Department flow recommendations.
- Public Involvement (11%): Staff provided technical oversight of, and collected data for, non-Department flow studies; conducted stakeholder outreach; and completed grant proposal technical evaluations.
- Other Tasks (5%): Additional work included flow assessment briefings and instream flow training to develop or refine staff skills.



CA Water Action Plan: Study Updates

The California Water Action Plan (CWAP) was developed to revitalize the state's water management system. The Department and the State Water Board are implementing various actions under the CWAP, including the development of defensible, cost-effective, and time-sensitive approaches to establish instream flows. The IFP is developing flow criteria in five priority streams that support critical habitat for threatened and endangered anadromous salmonids.

In support of the CWAP, in 2017 the IFP collected South Fork Eel River Watershed habitat suitability criteria data, started study planning and habitat characterization in Mark West Creek, and completed the study plan and commenced field data collection in the Ventura River and its tributary San Antonio Creek.

South Fork Eel Watershed (Humboldt and Mendocino Counties)

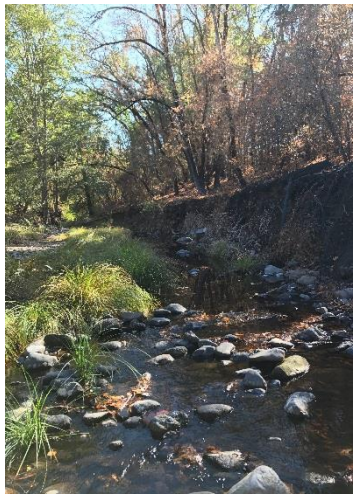
The South Fork Eel Watershed supports threatened Coho Salmon (*Oncorhynchus kisutch*), Chinook Salmon (*Oncorhynchus tshawytscha*), and steelhead (*Oncorhynchus mykiss)*. These populations are affected by altered flow regimes, increased water temperatures, and diminished habitat complexity. IFP staff are evaluating the flows needed to improve fish habitat in the South Fork Eel Watershed. In 2017, data collection focused on development of regional habitat suitability criteria (HSC) in Hollow Tree Creek, a relatively pristine tributary to the South Fork Eel River.

HSC development is a common approach used to determine juvenile salmonid flow requirements. Developing HSC involves identifying the suite of physical habitat conditions required by juvenile salmonids during specific life stages. To achieve this, information on fish habitat use/avoidance and physical stream attributes are collected via direct underwater observation. Primary physical stream attributes include water depth, water velocity, overhead and in-water cover, and substrate size. In 2017, a total of 472 juvenile Coho Salmon and 1,024 juvenile steelhead were observed during snorkel surveys. The IFP anticipates completing snorkel surveys in spring 2018. The findings from this study will support physical habitat assessments in Redwood Creek and other South Fork Eel River tributaries that provide critical habitat for anadromous salmonids.


Hollow Tree Creek snorkel survey

Mark West Creek (Sonoma County)

Mark West Creek provides important over-summer juvenile rearing habitat for threatened Central California Coast Coho Salmon and steelhead within the Russian River system. Low summer and fall baseflow was identified as a limiting factor to the maintenance and recovery of these species within Mark West Creek. In 2017, the IFP initiated the early phases of a Mark West Creek instream flow study. This effort included stakeholder discussions, study planning, and mesohabitat characterization.



Mark West Creek. Effects of fire activity seen on the right.

In September 2017, IFP staff began characterizing mesohabitat types within reaches identified by regional Department staff and stakeholders. Over several weeks in October 2017, the Tubbs Fire burned a considerable portion of the Mark West Creek watershed (approximately 37%). Following the fire, IFP staff evaluated the watershed damage and determined that the lowermost channel reaches of the potential study area could be temporarily unstable from post-fire disturbances (e.g., upslope sediment delivery and channel aggradation). The study scope was re-evaluated and narrowed to include only the reaches upstream of the burned area, where juvenile rearing is known to occur. In December 2017, this upper unburned section of Mark West Creek (approximately five miles) was surveyed with mesohabitat characterization completed. Data collection will commence after study planning and site selection processes conclude in early 2018.

Ventura River (Ventura County)

The Ventura River provides essential habitat for endangered Southern California steelhead. In 2017, the IFP finalized its study plan to identify the necessary flow regimes to protect steelhead life stages and their habitats in the Ventura River and its tributary San Antonio Creek. In response to stakeholder comments, the Department added 17 study sites in the lower Ventura River (i.e. the Live Reach). A study plan addendum was written and includes revisions that outline additional study objectives, the site selection process, and the methods used to evaluate this lower river study reach.

The Ventura River mainstem in dry conditions (top) and during the February storm event (bottom)

The IFP is applying several methods within the Ventura River study area. Activities include evaluation of existing data and habitat conditions, performing riverine topographical surveys, constructing several two-dimensional (2D) hydraulic habitat models, and measuring streamflows. In February 2017, a strong atmospheric river produced a significant volume of rain in Southern California. During this two-day period, the Ventura River rose swiftly and peaked at 20,000 cfs. Prior to this event, the IFP collected enough data to complete a “pre-storm” Ventura River mainstem 2D model. For comparison, additional surveys were conducted to produce a “post-storm” Ventura River mainstem 2D model. Data collection, processing, and analysis for the Ventura River and San Antonio Creek are underway.

The Big Sur River Study:

A Comprehensive Instream Flow Regime Assessment

The Big Sur River, Monterey County, is a fairly pristine watershed with high resource value. The Big Sur River supports South-Central California Coast steelhead, however populations are threatened by insufficient instream flows and increasing water rights pressure. The IFP conducted several technical studies as part of the Instream Flow Incremental Methodology (IFIM) process to assess steelhead flow needs in the Big Sur River. This comprehensive ecologically-based study used multiple components and rigorous quality assurance in study planning, design, data collection, and reporting to develop intra- and interannual flow regimes. In 2017 the study concluded and instream flow regime recommendations were submitted to the State Water Board. The diagram below illustrates elements of the Big Sur River assessment relative to phases of IFIM.

PHASES OF IFIM

Problem Identification

- ✓ Institutional & legal analysis
  - Scoping meetings
  - PRC §10000-10005
- ✓ Hydrological & physical analysis
  - Baseline hydrology

Study Planning and Objectives

- ✓ Target species identification
  - Steelhead juveniles & adults
- ✓ Management objectives
  - Rearing, spawning, & migration flows
- ✓ Sampling frequency & timing
  - Multiple seasons
  - Target calibration flows
- ✓ Methods & models
  - Documented methods & standard operating procedures
  - 1D & 2D models
  - Critical riffle analysis
  - Wetted perimeter method
- ✓ Resources & budgets
- ✓ Products
  - Peer reviewed study plan, technical reports, journal articles, & recommendation

Study Implementation

- ✓ Mesohabitat mapping
  - Habitat inventory & maps
- ✓ Consideration of five riverine components
  - Hydrology
  - Biology
  - Connectivity
  - Geomorphology
  - Water quality
- ✓ Site-specific suitability criteria
  - Rearing HSC development
    - Three seasons
    - Three juvenile size classes
- ✓ Hydraulic habitat modeling (micro- & macrohabitat)
  - Rating curve development
  - Simulation flows
- ✓ Quality control/quality assurance
  - Model calibration & validation
- ✓ Additional considerations
  - Low flow threshold
  - Channel forming flows
  - Reach gains and losses

Analysis of Alternatives

- ✓ Time series of alternatives
  - Flow regimes by month & water year type

Problem Resolution

- ✓ Stakeholder/public outreach
- ✓ Department submits flow regime recommendation to State Water Board

6,576	**Steelhead observations**
1,152	**Random habitat availability points**
117	**1D Model transects**
13,857	**2D Model site-specific topographical data points**


Steelhead

Instream Flow Program Training

The IFP is committed to collecting high quality, consistent and comparable, and defensible data for use in decision making processes. Since 2012, the IFP has worked with the Quality Assurance Team at the Marine Pollution Studies Laboratory (MPSL) at Moss Landing Marine Laboratories. The MPSL assisted the IFP in developing a documented, systematic quality assurance program for instream flow data collection, analysis, and reporting. In support of quality assurance, IFP staff executed a two-day refresher training and workshop. The training objective was to calibrate and align staff on IFP-adopted core procedures and methods.

The two-day refresher training consisted of presentations and field exercises. On day one, staff reviewed concepts and procedures in a workshop format. Presentation topics included field roles and responsibilities, standard operating procedures, Quality Assurance/Quality Control (QA/QC), data collection and entry, and equipment care and maintenance. Activities provided staff with opportunities for collaboration, discussion, and alignment regarding data assessment approaches.

Field team at refresher training

The second day, at a local stream, IFP staff applied their training skills during practical field exercises. Staff collected complete and scientifically sound data sets required for a defensible IFP project using multiple standard instream flow methods. Teams were observed in action, from field work preparation and equipment calibration to comprehensive data collection and processing. The IFP plans to continue refresher trainings regularly to provide procedural updates, foster staff development, and maintain consistency and accuracy in instream flow assessments.

As part of the IFP's commitment to team safety, in October 2017 staff completed a two-day course in swift water rescue led by Sierra Rescue International. During the course, IFP staff braved the icy waters of the South Fork American River to gain skills needed to recognize potential hazards in the field. The training emphasized speedy, low-tech, and improvised rescue techniques that are effective, and require minimal equipment. Topics taught included knot-tying, river crossing techniques, self-rescue methods, and team work, as well as team and individual safety. Staff practiced many different rescue techniques in a variety of riverine environments to simulate situations that can arise when working in and around swift moving water.

Swiftwater rescue training, South Fork American River

Presentations, Publications, & Outreach

Presentations

Cowan, W. (2017). Butte Creek Instream Flow Study Technical Results and Findings Overview. Stakeholder Meeting. September 6, 2017. Chico, CA.

Drescher, B. (2017). Ventura River Instream Flow Study Plan Update. Ventura Watershed Council Meeting. May 4, 2017. Ventura, CA

Haas, D. (2017). Overview of the CDFW Instream Flow Program. North Coast Stream Flow Coalition Meeting. October 21, 2017. Willits, CA.

Haas, D., P. Uttley, W. Cowan, and M. Gard. (2017). Instream Flow Evaluation: Passage Assessment for Salmonids in Mill Creek, Tehama County. CDFW Science Symposium. November 3, 2017. Davis, CA.

Holmes, R. (2017). Question-Driven Flow Criteria: Overview of Regional and Site-Specific Approaches for Assessing Instream Flow Needs for Fish and Wildlife in California. Invited speaker for State Water Board Science Symposium Instream Flow Workshop. June 30, 2017. Sacramento, CA.

Villalobos, A., and B. Drescher. (2017). California Water Action Plan: Habitat and Instream Flow Evaluation for Steelhead in the Ventura River. Ventura Watershed Council Meeting. March 2, 2017. Ventura, CA.

Publications

CDFW. (2017). Critical Riffle Analysis for Fish Passage in California. California Department of Fish and Wildlife Instream Flow Program Standard Operating Procedure CDFW-IFP-001, 25 p. Updated October 2017.

CDFW. (2017). Instream Flow Evaluation: Temperature and Passage Assessment for Salmonids in Deer Creek, Tehama County. Report No. 17-2. California Department of Fish and Wildlife Instream Flow Program, Sacramento, CA.

CDFW. (2017). Instream Flow Evaluation: Temperature and Passage Assessment for Salmonids in Mill Creek, Tehama County. Report No. 17-1. California Department of Fish and Wildlife Instream Flow Program, Sacramento, CA.

CDFW. (2017). Instream Flow Regime Recommendations, Big Sur River, Monterey County. California Department of Fish and Wildlife Water Branch.

CDFW. (2017). Study Plan: Habitat and Instream Flow Evaluation for Steelhead in the Ventura River, Ventura County. California Department of Fish and Wildlife Instream Flow Program, Sacramento, CA.

CDFW. (2017). What is a Low-Flow Threshold? Instream Flow Program Fact Sheet, Winter 2017.

On May 18, 2017, Department Scientists Jason Hwan and Nicole Constantinedes led a Ventura River site visit. Interested stakeholders were met at the Ojai Valley Land Conservancy Confluence Preserve. The afternoon included visits to study sites and a discussion of methods used in the Ventura River Habitat and Instream Flow Evaluation as well as the study's connection to the CWAP.

2018 Performance Objectives

Instream flow activities in 2018 will be driven by priority CWAP streams and PRC studies, and through statewide coordination and implementation of projects with regional staff and other collaborators.

- Instream flow activities for the CWAP priority streams will continue.
  - South Fork Eel Watershed: Habitat Suitability Criteria data collection will be completed in Hollow Tree Creek, data QA/QC and analyses will be completed for Redwood Creek, and the technical report will be drafted.
  - Mark West Creek: Study plan finalization and field data collection will begin.
  - Ventura River: Data collection in the Ventura River and San Antonio Creek will be completed. Data QA/QC, data analyses, and model calibration and validation will continue.
  - Mill Creek: Following a January 2018 stakeholder meeting, the instream flow criteria report for fish passage will be finalized.
- The Butte Creek instream flow criteria report will be finalized and submitted to the State Water Board under PRC §10001-10002 for their consideration.
- An informational meeting will be held for Deer Creek, and the instream flow criteria report will be finalized.
- Quality assurance activities, including development of guidance documents, will continue in support of consistent, comparable, and defensible instream flow practices.
- Coordination and outreach efforts will continue on a regular basis with the State Water Board, National Marine Fisheries Service, US Fish and Wildlife Service, the Regional Water Quality Control Boards and other agencies. Public and stakeholder engagement will be supported by continuing outreach efforts.
- The IFP will continue to participate in and present instream flow study findings at seminars and workshops across the state. When feasible, study results will be submitted for publication in peer-reviewed literature.

COMING SOON!

FLOW 2018: IFP staff are participating in the Instream Flow Council's April 2018 workshop entitled Managing Rivers, Reservoirs, and Lakes in the Face of Drought: Practical Tools and Strategies for Sustaining and Protecting Ecological Values of Water. Training sessions will provide skills that integrate legal and policy elements with scientific understanding and public involvement strategies to effectively manage aquatic ecosystems during drought conditions.

Coastal Studies: From 2015 to 2017, IFP staff collected data on 46 coastal California streams (Ventura County to Siskiyou County) to develop flow criteria that support various steelhead life stages. For each stream and life stage, flow criteria were related to historic flow data to determine the frequency, timing, and duration each criterion was met or exceeded for different water year types (dry, normal, or wet). A comparison is underway to determine differences in water availability among regions throughout the state. Look for findings from this study to be finalized in 2018.

The man who is swimming **against the stream** knows the **strength** of it.

- Woodrow Wilson

California Department of Fish and Wildlife

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