

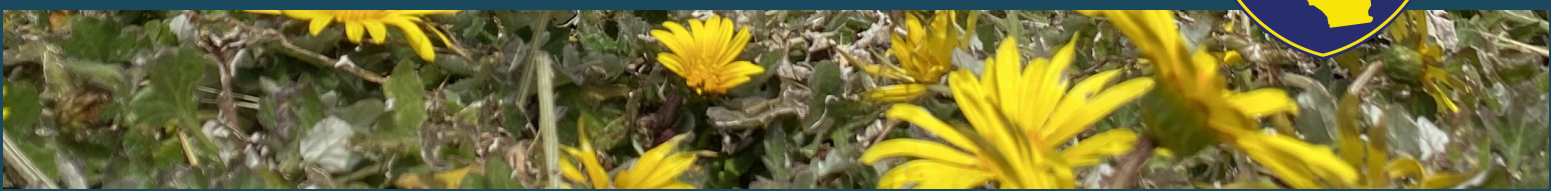
The California Department of Fish and Wildlife

INSTREAM

FLOW PROGRAM



2025 Year in Review



2025 Year in Review

The California Department of Fish and Wildlife (Department) Instream Flow Program (IFP) conducts instream flow studies and develops ecological flow criteria needed for long-term protection, maintenance, and effective stewardship of fish and wildlife resources.

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Figure 1. The five riverine components (from Annear et al. 2004¹).

All photographs in this report are owned by the Department or Department staff.

Cover page: IFP staff with a temporary control point near the North Fork Gualala River.

¹ Annear, T., I. Chisholm, H. Beecher, A. Locke, P. Aarrestad, C. Coomer, C. Estes, J. Hunt, R. Jacobson, G. Jobsis, J. Kauffman, J. Marshall, K. Mayes, G. Smith, R. Wentworth and C. Stalnaker (2004). Instream flows for riverine resource stewardship. Revised edition. Instream Flow Council, Cheyenne, WY.

Priority Streams Update

The IFP continues to develop flow criteria to protect public trust resources and meet legislative mandates in the CA Water Action Plan², the CA Salmon Strategy³, and the Public Resources Code Division 10⁴. In 2025, the IFP advanced studies to develop flow criteria to support fish, wildlife, and water management objectives in identified priority streams and rivers. For more information on priority streams, visit the IFP website⁵.

Each streamflow analysis (Figure 2) identifies instream flow criteria at key watershed locations using hydrologic models to characterize natural flows, functional flows, and ecosystem baseflows, supporting assessment of aquatic habitat over a range of flow conditions. Reports for the Mattole River, Navarro River, Dos Pueblos Creek, and Carpinteria Creek were completed in 2025. Mojave River and Santa Margarita River reports are in final review.

² CNRA, CDFA and CalEPA (2016). California Water Action Plan 2016 update. California Natural Resources Agency (CNRA), California Department of Food and Agriculture (CDFA), and California Environmental Protection Agency (CalEPA), Sacramento, CA. Available: http://resources.ca.gov/docs/california_water_action_plan/Final_California_Water_Action_Plan.pdf.

³ Office of Governor Newsom (2024). California Salmon Strategy for a Hotter, Drier Future: Restoring Aquatic Ecosystems in the Age of Climate Change. State of California. Available: <https://www.gov.ca.gov/wp-content/uploads/2024/01/Salmon-Strategy-for-a-Hotter-Drier-Future.pdf>.

⁴ Public Resources Code Division 10: <https://law.justia.com/codes/california/2010/prc/10000-10005.html>.

⁵ Instream Flow Program's website: <https://wildlife.ca.gov/Conservation/Watersheds/Instream-Flow>.



Figure 2. Map of priority watersheds.

Mattole River — Humboldt & Mendocino Counties

Located in the Department's Northern Region, the Mattole River Watershed features a drainage area of 297 square miles and supports Chinook salmon, Coho salmon, and steelhead trout. The IFP developed flow criteria for 42 reaches of the Mattole River watershed, including site-specific field data for five reaches.



Mattole River
HUMBOLDT COUNTY

Navarro River — Mendocino County

With a drainage area of 315 square miles in the Department's Northern Region, the Navarro River watershed supports Chinook salmon, Coho salmon, and steelhead trout. The IFP developed criteria for 16 reaches of the Navarro River watershed.



Navarro River
MENDOCINO COUNTY

Carpinteria Creek — Santa Barbara County

Located in the Department's South Coast Region, the Carpinteria Creek watershed features a drainage area of 15 square miles and supports steelhead trout. The IFP developed criteria for five reaches of the Carpinteria Creek watershed.



Dos Pueblos Creek — Santa Barbara County

With a drainage area of 8.4 square miles in the Department's South Coast Region, the Dos Pueblos Creek watershed supports steelhead trout. The IFP developed criteria for four reaches of the Dos Pueblos Creek watershed.



Santa Margarita River — Riverside & San Diego Counties

Spanning across the Department's South Coast and Inland Deserts Regions, the Santa Margarita watershed features a drainage area of 740 square miles and supports pacific lamprey, arroyo chub, and steelhead trout. The IFP developed criteria for 16 reaches of the Santa Margarita River.



Mojave River — San Bernardino County

With a drainage area of 1,818 square miles across the Department's Inland Deserts Region, the Mojave River watershed supports rainbow trout. The IFP developed criteria for 19 reaches of the Mojave River watershed.



Clear Lake Watershed

The IFP continued its work on the instream flow evaluation for Clear Lake Hitch (CLH) passage. The goal was to evaluate minimum instream flows by developing hydraulic habitat models to identify depth sensitive areas for CLH passage. Through 2025, IFP completed:

- Over 50 miles of high resolution lidar data and 71 topographic surveys.
- Over 30 instream structure surveys.
- Approximately 40 discharge measurements.
- Over 1,000 water's edge points.
- Over 600 validation points consisting of depth and velocity measurements.
- Approximately 40 pebble count surveys.

During 2025, the IFP processed the collected data and completed quality assurance, data analysis, and hydraulic habitat modeling. Additionally, the IFP went into the field to confirm depth sensitive areas identified by the models in Adobe Creek, Cole Creek, Kelsey Creek, Manning Creek, Middle Creek, and Scotts Creek (Figure 3). A technical report was developed and went through internal review.

For more information, see the *Instream Flow Evaluation for Clear Lake Hitch Passage in Tributaries of the Clear Lake Watershed* study plan on our program's website⁶.



⁶ SWRCB Clear Lake Hitch website: <https://waterboards.ca.gov/clearlakehitch/>.

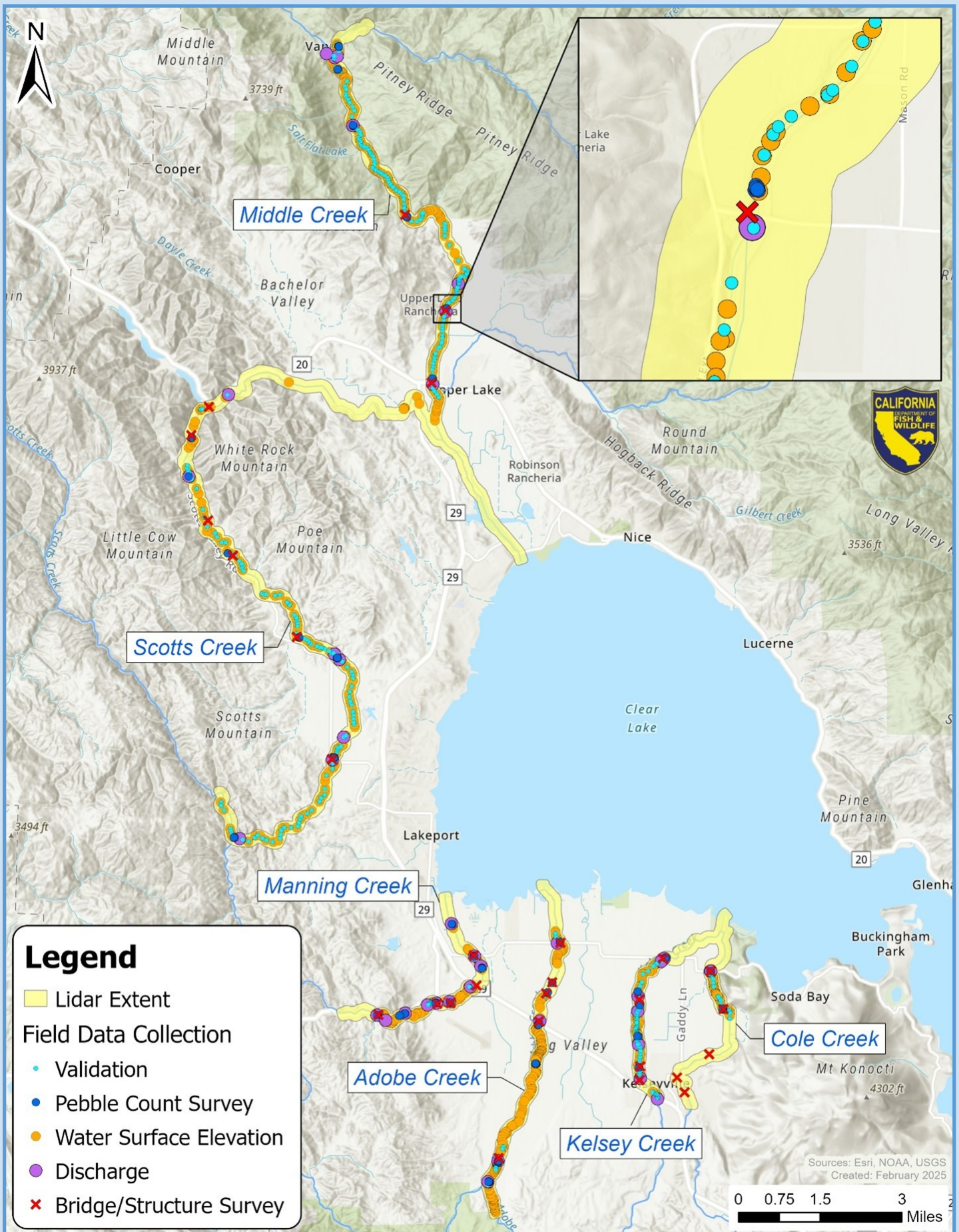


Figure 3. Map of the Clear Lake Watershed with field data collection points and Lidar extent. Area of inset provides an example of finer scale point density.

CEFF Technical Team

The IFP plays a central role on the California Environmental Flows Framework (CEFF) Technical Team and has contributed to CEFF development and implementation since 2018. The IFP applied practical methods from CEFF science to support the Governor's Water Resilience Portfolio (State of California 2020), which identifies the development of rapid, science-based environmental flow protections as a statewide priority. This includes leading the application of CEFF's functional flows approach (Yarnell et al. 2015; Yarnell et al. 2020) to develop watershed-wide instream flow criteria, documented in a series of Watershed-Wide Instream Flow Criteria Reports (CDFW 2021). These reports apply tools such as The Nature Conservancy's California Natural Flows Database (Zimmerman et al. 2023) and Functional Flows Calculator (CEFWG 2021; Qiu et al. 2021). Additionally, these efforts align with priorities in the California Salmon Strategy for a Hotter, Drier Future (Office of Governor Newsom 2024), which directs the Department to complete instream flow analyses for priority streams, coordinate with the State Water Resources Control Board on environmental flow protections, and advance CEFF-based rapid assessment methods statewide.



In 2024, the Department's Cannabis Restoration Grant Program awarded the Southern California Coastal Water Research Project (SCCWRP), a CEFF Technical Team partner, with funding to further advance CEFF tools, modeling, and implementation. This work includes refining statewide streamflow models to better represent groundwater and surface water dynamics, water quality interactions, and improve understanding of how water use (including cannabis cultivation) affects hydrologic and ecological systems. The project also supports development of technical guidance, synthesis of case studies, statewide inventories of environmental flow protections, and expanded training for state agency staff to promote consistent, science-based implementation of environmental flows. Collectively, these efforts strengthen the scientific foundation, technical capacity, and interagency coordination needed to advance CEFF and protect California's fish, wildlife, and aquatic habitats under increasing climate and water-use pressures.





CDFW (2021). Overview of watershed-wide instream flow criteria report methodology, Version 2. California Department of Fish and Wildlife, Instream Flow Program (CDFW), West Sacramento, CA. Available: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=177832&inline>

CEFWG (2021). California Natural Flows Database: Functional flow metrics v1.2.1. California Environmental Flows Working Group (CEFWG). Available: <https://rivers.codefornature.org>

Office of Governor Newsom (2024). California Salmon Strategy for a Hotter, Drier Future: Restoring Aquatic Ecosystems in the Age of Climate Change. State of California.

Qiu, L., N. Patterson and M. Parekh (2021). Functional Flows Calculator. GitHub. Available: <https://github.com/leogoesger/func-flow>

State of California (2020). Water resilience portfolio, in response to the executive order N-10-19. California Department of Water Resources, Public Affairs Office (DWR), Sacramento, CA. Available: <https://resources.ca.gov/Initiatives/Building-Water-Resilience/portfolio>

Yarnell, S. M., G. E. Petts, J. C. Schmidt, A. A. Whipple, E. E. Beller, C. N. Dahm, P. Goodwin and J. H. Viers (2015). Functional flows in modified riverscapes: Hydrographs, habitats and opportunities. *BioScience* 65(10): 963-972.

Yarnell, S. M., E. D. Stein, J. A. Webb, T. Grantham, R. A. Lusardi, J. Zimmerman, R. A. Peek, B. A. Lane, J. Howard and S. Sandoval-Solis (2020). A functional flows approach to selecting ecologically relevant flow metrics for environmental flow applications. *River Research and Applications* 36(2): 318-324.

Zimmerman, J. K. H., D. M. Carlisle, J. T. May, K. R. Klausmeyer, T. E. Grantham, L. R. Brown and J. K. Howard (2023). California Unimpaired Flows Database v2.1.2. The Nature Conservancy, San Francisco, CA. Available: <https://rivers.codefornature.org>. Accessed: May 2, 2024

Cannabis Program Support

In 2025, the IFP continued its role in supporting the California Environmental Monitoring and Assessment Framework (CEMAF). The CEMAF aquatic team conducted field monitoring at 42 sites across 14 watersheds in CDFW Northern, North Central, and Bay Delta regions, including five new watersheds. Monitoring activities included streamflow and water quality measurements, snorkel surveys, aquatic bioassessment, and environmental DNA (eDNA) sampling. These efforts help establish baseline conditions and track changes in aquatic ecosystems over time.

Additionally, CEMAF expanded its monitoring capabilities by testing year-round pressure transducer installations, piloting Acoustic Doppler Current Profilers to safely measure high flows, installing permanent telemetered gages, and deploying time-lapse cameras to capture continuous visual records of stream conditions. Protocols for eDNA sampling were refined, and a stream condition index is being developed to link biodiversity data with environmental conditions. Together, these developments strengthen the program's ability to assess watershed health, guide restoration efforts, and provide useful information for managers across California.



Regional Assistance

The IFP assists in scientific efforts for the Department's regional programs and support flow assessment priorities, water management actions, and the Department's mission. During 2025, the IFP supported the following efforts:

North Fork Gualala River

The North Fork Gualala River in Mendocino County is a coastal watershed stream that supports steelhead trout and Coho salmon. In 2025, IFP staff evaluated fish passage conditions in a section of the North Fork Gualala River to assist Northern Region and better understand how flows support the movement of juvenile salmonids. Field surveys were conducted to assess hydrology and conditions over critical segments of the river, and data were analyzed using a two-dimensional (2D) hydraulic habitat model.



Golden Trout Wilderness, South Fork Kern River



IFP staff participated in a fish passage barrier assessment in the Golden Trout Wilderness, located in Tulare and Inyo counties. The Department's Conservation Engineering Branch is investigating a high gradient feature, the Ramshaw Barrier, as a potential impediment to Brown Trout intrusion into Golden Trout habitat⁷. IFP staff helped collect topographic survey data to update the Ramshaw Barrier hydraulic model.

⁷ Gard, M. and M. Meyers (2025). Golden Trout Barrier Assessment. California Department of Fish and Wildlife, Conservation Engineering Branch. West Sacramento, CA.

Silver King Creek

IFP staff assisted the North Central Region on a long-term Paiute cutthroat trout recovery project on Silver King Creek in the eastern Sierra Nevada. Field operations consisted of backpack electrofishing in the study reach to quantify the native Paiute cutthroat trout population recovery and remove invasive Rainbow trout.



North Yuba River

IFP staff assisted North Central Region's Fisheries Restoration and Reintroduction Unit with a juvenile Chinook Salmon snorkel survey on the North Yuba River in Sierra County to help quantify the success of reintroduction efforts.



Quality Assurance and Training

Quality Assurance and Quality Control

The IFP is committed to collecting, analyzing, and reporting high quality, consistent, and defensible data for use in decision making processes. In 2025, the IFP continued quality assurance (QA) efforts by implementing the Quality Assurance Program Plan, which comprehensively documents the IFP's QA system associated with project management, data generation and acquisition, assessment and oversight, and data validation and usability. QA activities included completing QA/Quality Control (QC) logs, conducting equipment inspections, updating data management plans, and ensuring program staff remain current on required trainings.

Staff Training

Safe practices are important in the IFP, especially when working in remote areas in and around streams. IFP staff completed a River and Stream Safety course in the South Fork American River to be better prepared for safe field work in riverine environments. Staff developed awareness of hazards for easier prevention of accidents, practiced skills in moving water and safe wading, and learned self-rescue techniques. In addition, IFP staff completed a Wilderness First Aid course to strengthen their ability to prevent and respond appropriately to medical emergencies in field settings. In this hands-on training, staff reviewed first aid concepts, practiced basic life support skills, and identified environmental and medical problems through integrated scenarios. Staff received first aid and CPR certifications, which meet Wilderness Medical Society, American Heart Association, and Occupational Safety and Health Administration standards.

Presentations and Publications

CDFW (2025). Watershed-Wide Instream Flow Criteria for Carpinteria Creek. California Department of Fish and Wildlife Instream Flow Program. Report No. 2025-03.

CDFW (2025). Watershed-Wide Instream Flow Criteria for Dos Pueblos Creek. California Department of Fish and Wildlife Instream Flow Program. Report No. 2025-04.

CDFW (2025). Watershed-Wide Instream Flow Criteria for the Mattole River. California Department of Fish and Wildlife Instream Flow Program. Report No. 2025-01.

CDFW (2025). Watershed-Wide Instream Flow Criteria for the Navarro River. California Department of Fish and Wildlife Instream Flow Program. Report No. 2025-02.

Cowan, W., T. Carlin, and M. Gard (2025). Comparing RIVER2D and HEC-RAS Hydraulic Parameters Generated for Coho Salmon and Steelhead Rearing Flow-Habitat Indices in Mark West Creek, Sonoma County, California. River Research and Applications. 1-13.

Milward, A. and K. Van Der Velde (2025). Mojave River Flow Criteria. Virtual Presentation at the South Coast and Inland Deserts regions Watershed Criteria Report coordination meeting. April 9, 2025.

Milward, A. and L. McDougall (2025). Mattole River and Navarro River Flow Criteria. Virtual presentation at the Northern Region Watershed Criteria Report coordination meeting. January 10, 2025.

Obkirchner, G. (2025). Santa Margarita River Flow Criteria. Virtual Presentation at the South Coast and Inland Deserts regions Watershed Criteria Report coordination meeting. December 17, 2025.

Ralston, I. and K. Van Der Velde (2025). Carpinteria Creek and Dos Pueblos Creek Flow Criteria. Virtual Presentation at the South Coast Region Watershed Criteria Report coordination meeting. August 12, 2025.

Rinde, J. (2025). Update on the Instream Flow Evaluation for Clear Lake Hitch Passage in Tributaries of the Clear Lake Watershed. Presentation at the Clear Lake Hitch Summit—Science Sessions. December 5, 2025.

2026 Performance Objectives

Instream Flow Program activities in 2026 will focus on completing reporting for studies already underway, continuing efforts to develop watershed-scale flow criteria for priority streams, and providing regional support in the face of climate uncertainty. Continued coordination with regional staff, stakeholders, and other project collaborators will be critical to completing ongoing projects.

- ⇒ Continue instream flow analyses on priority streams⁸ to protect and enhance public trust resources consistent with Governor Newsom's Salmon Strategy⁹.
- ⇒ Perform instream flow assessments to support watersheds impacted by cannabis cultivation through the California Environmental Monitoring and Assessment Framework (CEMAF).
- ⇒ Provide hydrological and flow-related technical support to regional staff by assisting with field work, trainings, and data analyses, and by participating in technical advisory committees.
- ⇒ Continue to participate in the California Environmental Flows Framework (CEFF) workgroup and partnership to further refine available instream flow tools and application of the CEFF statewide.
- ⇒ Maintain quality assurance activities, document generation, and training in support of consistent, comparable, and defensible flow studies and information development.
- ⇒ Continue coordination and outreach efforts with the State Water Resources Control Board, US Fish and Wildlife Service, the Regional Water Quality Control Board, and other agencies.
- ⇒ Support public and stakeholder engagement by continuing outreach efforts.
- ⇒ Participate in and present instream flow study findings at meetings and workshops across the state.
- ⇒ Continue to build partnerships with California Native American Tribes to support streamflow enhancement for native species.

Background photos in this report

Page 3: Kelsey Creek, Lake County

Page 15: South Fork American River, El Dorado County

Back Cover: North Fork Gualala River, Mendocino County

⁸ [Public Resources Code Division 10](#) streams and [Executive Order N-5-23](#) for Clear Lake watershed.

⁹ California Salmon Strategy for a Hotter, Drier Future: <https://www.gov.ca.gov/wp-content/uploads/2024/01/Salmon-Strategy-for-a-Hotter-Drier-Future.pdf>.

*“Water is life. It is
the first medicine.”*

*-Oren Lyons,
Onondaga Nation*



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of Fish and Wildlife

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