

SCCWRP's fact sheet series

Scott Martindale
Commission Meeting
September 5, 2025

- We spend multiple quarters working with CTAG on each fact sheet

Southern California Bight Regional Monitoring Program: Conducted in five-year cycles, the Bight program examines the health of about 1,500 square miles of coastal waters and includes more than 100 participating organizations. The seventh and newest cycle—Bight 23—features seven major study elements: Sediment Quality, Water Quality, Harmful Algal Blooms, Tramp Macrophages, Monitoring, and Saturated Aquatic Vegetation.

Southern California offshore seabird and a California Noddy

SMC Regional Watershed Monitoring Program: Founded in 2004, the Southern California Stormwater Monitoring Coalition (SMC) is a five-year program born from multiple aspects of the ecological restoration of more than 4,000 miles of streams that drain to Southern California's coastal ocean. The SMC's stream survey serves as the Bight program's freshwater counterpart, and is aligned with California's statewide stream assessment program.

A field crew for the SMC carries out stream monitoring.

Southern California is a floor sediment and a California halibut assessment program. A field crew for the SHC stream monitoring program

Regional monitoring

g

Regional monitoring

Ecohydrology fact sheet

- We received a Commissioner request last quarter to rework one sentence
 - CTAG agrees the concern has been resolved
- Can we get approval today?

Ecohydrology fact sheet (draft)


SCCWRP FACT SHEET

DRAFT

Balancing competing demands on limited flow resources

The science of ecohydrology is helping watershed managers take an informed, integrated approach to setting flow patterns that protect ecosystem health while balancing human uses for flowing water

Humans have made dramatic modifications to how water flows across landscapes statewide. These modifications bring drinking water and irrigation water to communities, power hydroelectric dams, provide cultural and recreational benefits, and promote the growth of diverse plant and animal life. But these flow modifications also can harm aquatic ecosystems. Against this backdrop, California's water resources management community is turning to the science of **ecohydrology** to identify solutions that balance the many human uses for flowing water with the need to protect ecosystem health.



Treated wastewater effluent is discharged into the Los Angeles River from a nearby water reclamation plant. These year-round flows support plant and animal life, but in drought-prone California, there's pressure to recycle some of these discharges for human uses instead.

What is ecohydrology?

This relationship between flow patterns and ecological health is an area of study known as ecohydrology. This relationship, which is complex and site-specific, is shaped by flow patterns at a given site over the course of the year, local topographic and environmental conditions, and the composition of aquatic life. Watershed managers use the science of ecohydrology to understand what flow patterns are necessary to protect the health of aquatic life that are sensitive to changes in flow patterns.

Flow alterations: A major source of ecological stress

The wide range of ways that humans have altered how water flows naturally through California has become a major source of ecological stress on waterways – a bigger stressor than common pollutants like heavy metals, pesticides and excess nutrients that degrade water quality.

Altered flows are the No. 1 cause of degradation to aquatic life in Southern California streams, according to foundational work published in 2015 by the Southern California Stormwater Monitoring Coalition (SMC).

California Environmental Flow Framework

California uses a standardized scientific approach known as the California Environmental Flows Framework (CEFF) to help managers make decisions about how to allocate limited flow resources that balance both human and ecosystem needs for flowing water.

- Unveiled in 2021, the approach consists of a methodical, multi-step process for determining the magnitude, duration and frequency of stream flows needed to protect ecological integrity, recreational opportunities and other beneficial uses.
- Instead of focusing narrowly on a single species at a specific life stage or a single beneficial use that may not be representative of overall ecosystem functioning, CEFF focuses on protecting the most ecologically significant attributes of a water body's flow patterns over the course of a year, such as the annual recession flow patterns generated by snow melt in the early spring that support breeding and migration. Researchers refer to the range of flow patterns necessary to support sensitive aquatic life and other uses for water as **environmental flows**.
- Among CEFF's key benefits is it gives managers a systematic, structured way to incorporate climate change, changing land-use practices, and changing water-use practices into long-term flow management planning.

Diverting flows via 1211 wastewater change petitions

As drought-prone California looks for opportunities to recycle and reuse more water, wastewater effluent that's being discharged into the coastal ocean and inland waterways is increasingly viewed as a strategic target. But diverting wastewater discharges can have ecological consequences – especially when this treated water for much of the year is the predominant source of flows supporting plant and animal life. That's why California requires wastewater treatment agencies to seek regulatory approval, under **State Water Code Section 1211**, to begin recycling effluent discharges. Ecohydrology modeling plays a key role in helping managers evaluate how much effluent, if any, can be diverted from streams without jeopardizing ecosystem health and other beneficial uses.

HF183 fact sheet

- This fact sheet has taken an unusually long time to reach you
 - We spent more than a year working on it with CTAG
 - Last quarter, we overhauled it to clarify some issues that we had confounded – this resolved CTAG’s concerns
- Does the fact sheet provide a useful overview of this fecal contamination detection tool?
 - Are you ready to approve it today?

HF183 fact sheet (draft)

SCCWRP FACT SHEET

DRAFT

Using HF183 to detect human fecal contamination

HF183, a genetic marker that distinguishes human from animal fecal sources, is a key tool for managing water quality

The many types of animal feces that can contaminate beaches are associated with different levels of illness risk. Human fecal sources are more likely to sicken humans, as they carry pathogens that are infectious to humans. That's why the genetic marker HF183 has become an important tool for the region's water-quality management community: HF183 distinguishes human from non-human sources of fecal pollution, enabling managers to prioritize the contaminated sites that pose the greatest public health risk.

What is HF183?

HF183 is a specific fragment of genetic material found in a ubiquitous human gut bacterium known as *Bacteroides*. When water-quality managers detect HF183 in waterways, it provides evidence – with 95% accuracy – that human fecal contamination is present.

How HF183 became a key tool for managing fecal contamination

Human fecal pollution is pervasive across Southern California waterways during wet weather, and isolated instances are found during dry weather as well. When managers initially focused on this challenge in the 1990s and early 2000s, their priority was reducing total fecal contamination levels – without regard for which animals are the major sources of contamination.

But this management paradigm fundamentally shifted following a landmark 2003 study that found that DNA-based methods could be used to reliably identify animal-specific sources of contamination.

As subsequent work zeroed in on HF183 as the most effective genetic tool for detecting human fecal sources, managers recognized that their limited resources would be better spent using HF183 to focus on human sources.

In 2019, following two decades of work to rigorously vet HF183's performance, the U.S. Environmental Protection Agency (EPA) formally approved an HF183-based method for detecting human fecal contamination at beaches and similar recreational environments.

The EPA's published HF183-based method for detecting human fecal sources



Water-quality managers use the genetic marker HF183 to help determine if fecal contamination at beaches like inner Cabrillo Beach in Los Angeles County, above, has a human signature. Human fecal sources present a significantly higher public health risk than most other animal sources.

Key management use cases for HF183

HF183 helps water-quality managers in two key ways:

- » **Prioritize sites for cleanup.** Because human fecal contamination presents a greater public health concern than fecal contamination from other animals, managers use HF183 to help identify which beaches and other sites should become priorities for clean-up and remediation actions.
- » **Target source reduction actions.** The types of actions that managers take to clean up contaminated sites depend on what type(s) of animal feces are present. Actions taken to reduce bird sources, for instance, are very different than if the fecal material is human. Thus, when HF183 and other genetic markers are used to identify different animal sources of fecal contamination, managers are able to take actions that effectively target the specific type(s) of animal sources present.

Pathogenicity of human fecal contamination

- » Scientists estimate that human fecal contamination is at least 100 times more pathogenic than the feces of other animals commonly found in urban settings, including wildlife, birds and household pets.
- » Cow feces is a notable exception: It is nearly as pathogenic as human fecal contamination.

Future fact sheets

- Last quarter, CTAG began reviewing the next fact sheet on coastal resiliency
 - Next quarter, CTAG will receive the Wastewater-Based Epidemiology (WBE) fact sheet
- CTAG has suggested reducing production frequency
 - How do you feel about producing just 2 per year?

SCCWRP fact sheets

Commission-approved list of topics

1. Rapid beach testing methods ✓
2. Water-quality modeling ✓
3. SCCWRP's value ✓
4. eDNA ✓
5. Regional monitoring ✓
6. Harmful algal blooms ✓
7. PFAS ✓
8. Microplastics ✓
9. Ocean acidification ✓
10. Ecohydrology (*today*)
11. HF183 (*today*)
12. Coastal resiliency (*in progress*)
13. Wastewater-based disease surveillance (*next quarter*)
14. Bioassays
15. Eutrophication
16. Bioassessment