

# SCCWRP at 50



**A Look Back at Five Decades of Progress and Achievement**

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Southern California Coastal Water Research Project

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## Joint Study Pondered in Waste Water

San Diego, Los Angeles and three sanitation districts are considering a \$1.13-million research program to determine the effect of treated waste water on the ecology of coastal waters.

All of these agencies presently discharge the treated water into the ocean.

### Names Agencies

In a memorandum sent to the City Council yesterday, City Manager Walter Hahn said participating in the project would be the city, the City of Los Angeles, the Los Angeles County Sanitation District, and sanitation districts of Orange and Ventura counties.

Hahn said cost of the research project would be borne by the five agencies in proportion to the amount of waste released into the ocean.

This would mean San Diego would bear 9 to 10 per cent, Hahn said.

Talks are under way to determine the feasibility of establishing a joint powers agreement for a three-year program.

A preliminary draft of the agreement calls for a "Coastal Water Research Project Authority" composed of an elected official from each of the agencies.

### To Ask U.S. Funds

Hahn said an application for a research and development grant has been filed with the Federal Water Pollution Control Administration.

It may be possible to obtain federal funding for up to 70 per cent of the project cost, Hahn said.

San Di

San Diego newspaper article,  
April 5, 1969

# Overview and History



SCCWRP staff lowering a baited strobe camera into the ocean, 1978



Dr. Alan Mearns, left, and Michael Moore measuring the properties of an ocean water sample, 1970s

Since its inception in 1969, SCCWRP has staked its reputation on conducting high-quality research and translating this work into actionable guidance and recommendations that inform management decision-making. SCCWRP has found remarkable success in this arena, developing strategies, tools and technologies that the water-quality management community relies on to protect and enhance the ecological health of Southern California's coastal ocean and the watersheds that drain to it.

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SCCWRP science has served as the basis for discharge permits and watershed basin plans, runoff requirements for new development and redevelopment, biological objectives for aquatic life, sediment quality criteria, and microbial contamination standards for beach ocean water. SCCWRP also plays a key role in developing and facilitating regional monitoring programs, promoting stewardship of environmental data, and informing regional planning efforts.

#### SCCWRP's operating approach

SCCWRP's ability to make scientific research managerially relevant and actionable hinges on three core operating principles.

**Scientific credibility:** SCCWRP's adeptness at bringing next-generation science to the environmental management community is rooted in a foundation of scientific excellence. SCCWRP maintains scientific credibility by conducting research collaboratively and publishing prolifically in peer-reviewed journals. Since 1969, SCCWRP has authored 687 peer-reviewed journal and book publications.

**Consensus-building:** SCCWRP nurtures strong relationships with scientific partners worldwide, recognizing that managers are more likely to act when scientists have reached broad consensus on emerging research. SCCWRP amplifies its consensus-building capacity through scientific journal editorships, leadership positions in professional societies, and serving on advisory committees.



Dario Diehl demonstrating use of an autonomous underwater sampler, 2015

**Transitioning science to management:** To ensure water-quality managers optimally benefit from the latest science, SCCWRP prioritizes involving member agencies in its research and provides extensive, ongoing technical support – in the form of training, joint case studies, and intercalibration exercises that ensure proficiency with new tools and technologies. Involving member agencies early and often increases likelihood of management adoption.

#### Contributors to success

SCCWRP's effectiveness as an organization would not be possible without the dedication, talents and expertise of all the people who have contributed to its success.

**SCCWRP Commission:** More than just the organization's governing board, the Commission serves as a primary vehicle through which SCCWRP science gets translated into management actions,

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decisions and policies. Since the agency's founding, 152 individuals have served as Commissioners. **Page 92**

**Scientific Consulting Board and CTAG:** SCCWRP's Scientific Consulting Board (1969-1994) and the Commission's Technical Advisory Group (1982-present) have kept SCCWRP focused on high-quality science relevant to environmental managers. In all, 105 individuals have served on these scientific advisory bodies. **Page 94**

**Staff:** SCCWRP employees are the lifeblood of the agency. Since SCCWRP's founding, 298 full-time employees have contributed their talents to SCCWRP, including 51 who have given more than a decade of service. **Page 96**

**Partners:** In addition to its member agencies, SCCWRP relies on a global network of collaborators to partner on studies and help SCCWRP develop broad consensus on findings. Since its founding, SCCWRP has co-authored peer-reviewed publications with 1,408 individuals from 489 institutions. **Page 98**

#### Introduction to this book

SCCWRP's positive influence on environmental science and management – as well as on individual lives and careers – is profound and worldwide. *SCCWRP at 50* takes a look back at the people, progress and achievements that have made SCCWRP the organization it is today.

**SCCWRP history:** The agency's development over the past 50 years is chronicled in



Justin Vanderwal, left, and Lisa Zumwalde sampling a freshwater algal bloom, 2016

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a multi-part narrative that spans five major SCCWRP eras. **Page 6**

**Greatest hits:** Although SCCWRP has many accomplishments to its name, six rise above others as the most significant SCCWRP accomplishments of all time. **Page 42**

**SCCWRP's future:** As management needs and priorities shift, SCCWRP will need to evolve and grow in specific directions to remain relevant. **Page 56**

**Personal essays:** Nearly 50 people from diverse backgrounds reflect on what their relationship with SCCWRP has meant for them personally and professionally. **Page 62**



SCCWRP's Scientific Consulting Board on a toxicology lab tour with staff, 1970s

## PROJECT YEARS (1969-1972)

SCCWRP is conceived as a short-term, three-year project

SCCWRP was established on October 20, 1969 as a three-year, \$1.1 million project to understand how wastewater discharges were affecting the health of Southern California's coastal ocean. Southern California's five largest wastewater treatment agencies formed SCCWRP to ensure that wastewater dischargers would be

regulated based on scientific fact, not public sentiment.

SCCWRP was founded the same year that California's Porter-Cologne Water Quality Control Act of 1969 was passed. The law – which went on to serve as a template for the federal Clean Water Act of 1972



Dr. George Hlavka, SCCWRP's founding Director

– made sweeping changes to how wastewater discharges are monitored. Instead of end-of-pipe monitoring, wastewater dischargers became responsible for monitoring the holistic ecosystem impacts of their discharges.

Dr. George Hlavka, an engineer, was hired as SCCWRP's first Director. He selected an office in Westwood near the University of California, Los Angeles, as SCCWRP's first home, and hired a crop of recent graduates as SCCWRP's first scientists. SCCWRP's initial charge was to investigate the ecological condition of Southern California's coastal ocean and, three years later, report back to SCCWRP's five member agencies.

The findings of SCCWRP's three-year project were published in March 1973 in a report titled "Ecology of the Southern California Bight: Implications for Water Quality Management." The report concluded that while SCCWRP's findings did not support making immediate changes to waste disposal practices, there were "some undesirable, but reversible, conditions" that merited further study, especially near wastewater outfalls.

Today, the 566-page report is regarded as a seminal volume synthesizing scientific knowledge about the ecological condition of Southern California's coastal ocean. The report paved the way for SCCWRP's future, laying out a long-term vision for continued ecological investigations into the health of Southern California's coastal ocean. Recognizing the value and importance of continuing this work, the five founding member agencies renewed the agency's existence for three more years in September 1972 – six months before SCCWRP's three-year report was published.



Marjorie Sherwood conducting toxicity testing, 1970s

## Origins of SCCWRP



Dr. Erman Pearson

SCCWRP was conceptualized in the late 1960s during a joint retreat for leaders of Southern California's major wastewater treatment agencies. Also in attendance were other government and academic scientists, including Dr. Erman Pearson, a Professor of Environmental Engineering at the University of California, Berkeley. Pearson became a leading advocate for the creation of an independent, regional marine research organization that would become SCCWRP; he also was a founding member of SCCWRP's Scientific Consulting Board.



John Parkhurst

The Sanitation Districts of Los Angeles County led efforts to conceptualize and plan for SCCWRP. John Parkhurst, Chief Engineer and General Manager of the Sanitation Districts of Los Angeles County, directed the head of his R&D division – engineer Charles Carry – to draft SCCWRP's founding documents. The Sanitation Districts of Los Angeles County also led efforts to bring aboard SCCWRP's five founding member agencies. Carry went on to serve as a SCCWRP Commissioner from 1990 to 2000.



Charles Carry

## Signatories on SCCWRP's original Joint Powers Agreement

Southern California's five largest wastewater treatment agencies pooled their resources to set up SCCWRP as an independent Joint Powers Authority (JPA). SCCWRP's JPA was signed in mid-1969 by five member agencies.

At the time, the signatories were known as:

- » County Sanitation District No. 2 of Los Angeles County
- » City of Los Angeles
- » County Sanitation District No. 1 of Orange County
- » City of San Diego
- » Ventura County

JOINT POWERS AGREEMENT CREATING AN  
AGENCY TO BE KNOWN AS THE  
SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT AUTHORITY

THIS AGREEMENT, made and entered into this 20<sup>th</sup> day of October, 1969, by and between THE CITY OF LOS ANGELES, a municipal corporation, (hereinafter called "LOS ANGELES"), THE COUNTY SANITATION DISTRICT NO. 1 OF ORANGE COUNTY organized and existing by virtue of the laws of the State of California, to-wit: Division 5, Part 3, Chapter 3, Article 1 (commencing with Section 4700) of the Health and Safety Code, (hereinafter called "ORANGE COUNTY DISTRICT"), THE CITY OF SAN DIEGO, a municipal corporation, (hereinafter called "SAN DIEGO"), COUNTY SANITATION DISTRICT NO. 2 OF LOS ANGELES COUNTY organized and existing by virtue of the laws of the State of California, to-wit: Division 5, Part 3, Chapter 3, Article 1 (commencing with Section 4700) of the Health and Safety Code, (hereinafter called "LOS ANGELES COUNTY DISTRICT") and VENTURA COUNTY, a body corporate and politic of the State of California, (hereinafter called "VENTURA"):

## SCCWRP Commission

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At the time of its founding, SCCWRP was governed by a five-member Commission. Each of SCCWRP's five member agencies appointed one rep-



SCCWRP Commission, mid to late 1970s

resentative to the Commission, plus one alternate. For the first two decades, Commissioners consisted of local civic leaders and elected officials – typically those who also served on the governing boards of member agencies. The Commission also received counsel

from the independent SCCWRP Scientific Consulting Board, made up of five external scientists.

Over the years, the SCCWRP Commission has undergone several key changes to its structure and composition.

**1982:** To increase the involvement of senior executives who worked at each member agency, the Commission establishes a program review committee made up of the highest official from each member agency. The Commission also establishes the Sponsors' Technical Advisory Committee (STAC), a scientific advisory body made up of top scientists from each member agency. STAC complements the work of the SCCWRP Scientific Consulting Board.

**1986:** One of the five original member agencies – the Ventura Regional County Sanitation District, originally just Ventura County – withdraws from SCCWRP. The City of Oxnard joins SCCWRP the same year, then withdraws in 1990.

**1990:** The Commission expands to nine members as five water-quality regulatory agencies join SCCWRP.



SCCWRP Commission in 2008

During the transition, the civic leaders serving on the Commission step down, and are replaced by a top executive from each member agency; this change eliminates need for the Commission's program review committee. Also, STAC is reorganized as the Commission's Technical Advisory Group (CTAG).

**2003:** The first stormwater management agency – the Ventura County Watershed Protection District – joins SCCWRP as an Associate Member and gains a seat on the Commission. Three other stormwater management agencies join SCCWRP over the next three years.

**2007:** The California Ocean Protection Council joins SCCWRP, bringing the SCCWRP Commission to its present size of 14 members.



Santa Barbara oil spill, 1969

## Birth of the modern environmental movement

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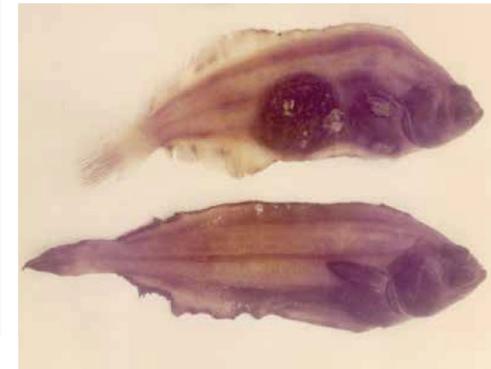
SCCWRP was formed at a time when Southern Californians were waking up to the need for improved environmental protections. Numerous high-profile developments helped focus public attention on how humans were impacting the health of aquatic ecosystems, including:

- » **Silent Spring:** Rachel Carson's best-selling 1962 book *Silent Spring* reported on the spread of pesticides through aquatic environments and how they were harming wildlife, particularly birds. The exposé accused the chemical industry of spreading misinformation, and public officials of turning a blind eye.
- » **Santa Barbara oil spill:** An oil platform blowout about six miles off the coast of Santa Barbara in early 1969 wreaked ecological

havoc on the region's ecosystems. Known at the time as the "mother of all spills," it became a rallying cry for environmental activists.

- » **Brown pelican collapse:** California's brown pelican populations collapsed in the late 1960s. Scientists discovered the culprit was widespread contamination of coastal waters by the pesticide DDT, which was subsequently banned.
- » **Fish tumors:** Scientists in 1969 began reporting on tumor-bearing fishes around wastewater outfalls and in polluted harbors in Southern California, which led to accusations that discharges into the coastal ocean were responsible.

It was against this backdrop of public outrage and finger-pointing that Southern California's wastewater treatment community recognized the need for an independent research organization – one that could help inform decisions about coastal ocean management based on scientific fact, not political pressure and activism.



Fish tumor, top, and fin erosion, bottom

## SCCWRP's Scientific Consulting Board, 1969-1994

SCCWRP's Scientific Consulting Board was a five-member advisory panel of outside academic and government scientists that provided guidance and direction on SCCWRP's research agenda during the agency's first 25 years. Established at the time of SCCWRP's founding, one of the Scientific Consulting Board's first roles was to lead the search for SCCWRP's first director. Initially, the Consulting Board interfaced directly with the SCCWRP Commission, providing recommendations for SCCWRP's overall research directions.

The first Chair of the Consulting Board was John Isaacs, a Professor at the Scripps Institution of Oceanography. Isaacs served as Chair from 1969 to 1980. The other four founding members were:

- » Dr. Donald Pritchard, Chesapeake Bay Institute



SCCWRP's original Scientific Consulting Board, 1970s

- » Dr. Erman Pearson, University of California, Berkeley
- » Dr. John Ryther, Woods Hole Oceanographic Institute
- » Dr. Richard Lee, University of Hawaii

With the addition of five water-quality regulatory agencies as SCCWRP member agencies in 1990, the need for an independent science review body was diminished. Meanwhile, another SCCWRP scientific advisory body founded in 1982 took on an increasingly prominent role in reviewing and vetting SCCWRP science. Initially known as the Sponsors' Technical Advisory Committee (STAC), the Commission's Technical Advisory Group (CTAG) saw its role grow as the Consulting Board's role waned.

The Consulting Board was disbanded in 1994. Individual members of the Consulting Board continued to work with SCCWRP, partnering on projects and providing ongoing advice and counsel.

## Dr. George Hlavka, SCCWRP's founding Director

Dr. George Hlavka was named SCCWRP's first Project Director in 1969. He was responsible for developing a research plan that would guide SCCWRP in executing a three-year project examining the ecological condition of Southern California's coastal ocean.

An engineer by training, Hlavka was hired following a nationwide search by the SCCWRP Scientific Consulting Board. Some 227 candidates were considered. In announcing his hire, SCCWRP cited his extensive background in analytical sciences, engineering and administration.

A native of Racine, Wisconsin, Hlavka studied engineering at the University of Wisconsin, Madison, then was awarded a graduate fellowship to



Dr. George Hlavka

pursue his Ph.D. in mechanical engineering and mathematics at the California Institute of Technology in Pasadena. After earning his Ph.D. in 1954, Hlavka spent much of his four-decade career working as an engineer in the aerospace industry, including for Garrett AirResearch, Comstat Corporation and Pasadena's Jet Propulsion Laboratory.

Hlavka's tenure at SCCWRP from 1969 to 1973 was a notable departure from his more engineering-focused roles. Hlavka passed away in 2012.



Dr. George Hlavka, center, at a press conference, early 1970s



Dr. Alan Mearns dissecting fish in the field, 1970s

## EARLY IMPACT YEARS (1972-1985)

### SCCWRP's scientific contributions begin having regional and national impact

When SCCWRP published its seminal "Ecology of the Bight" report in 1973, it marked the culmination of the agency's original three-year project. It also cemented SCCWRP's reputation as an independent, respected research entity that could produce rigorous, impactful science. The report methodically documented everything

that SCCWRP had learned about the effects of wastewater discharges on Southern California's coastal ocean, as well as the many areas that remained to be investigated. The report underscored the value of conducting ecological investigations at a regional scale, instead of focusing monitoring on the narrow outfall zone.

With the renewal of SCCWRP's Joint Powers Agreement in 1972, SCCWRP began tackling numerous follow-up investigations examining different aspects of water, marine life and seafloor sediment in the Bight. SCCWRP characterized the most significant sources of waste inputs, focusing on understanding their relative proportions, describing their transport and fate, and quantifying how marine life was responding.

By the mid-1970s, SCCWRP had gained a reputation in the broader environmental research community for doing innovative, impactful science. In particular, SCCWRP became known for developing ocean monitoring methods, including grab sampling for collecting seafloor sediment, fish trawling for collecting bottom-dwelling marine life, and laboratory analysis methods for quantifying toxic chemicals like PCBs and DDT in sediment and water. Many of these methods – which SCCWRP standardized and transitioned for use across Southern California and beyond – are still in use today.

As SCCWRP's scientific stature grew, the agency was routinely called upon to serve



Dr. M. James Allen examining a scorpion fish during a trawl, 1970s

on planning and review committees at the state, national and international levels, and its scientific manuscripts were being routinely accepted for publication in leading environmental journals.

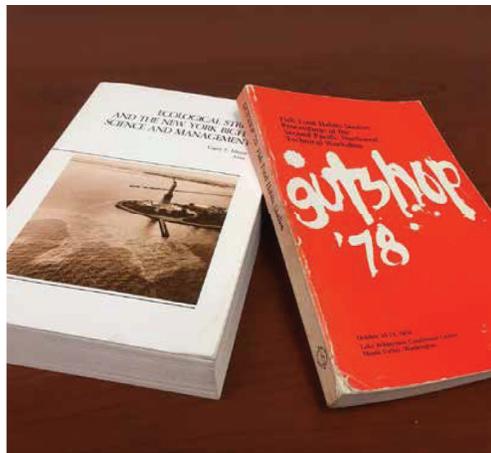
As SCCWRP built a comprehensive baseline characterization of Bight ecological health throughout the 1970s, this foundational research paved the way for SCCWRP to begin shifting to more focused biochemical and toxicological studies that examined the mechanistic processes by which pollutants were impacting water and sediment quality. SCCWRP also built a fish histology program to methodically track pollution's impacts on Bight fish health.

## SCCWRP's early scientific contributions

Almost from the outset, SCCWRP's expertise and perspective were called upon by the broader scientific and environmental management communities. Throughout the 1970s, SCCWRP was invited to participate in numerous regional and national environmental workshops, conferences and advisory bodies.

- » As early as 1974, SCCWRP Director Willard Bascom and another senior staffer attended a marine pollution conference in Italy.

- » In 1976 and 1978, SCCWRP participated in a pair of seminal technical workshops in the Pacific Northwest that focused on synthesizing the state of knowledge around West Coast fish communities; SCCWRP contributed six scientific articles to the workshops' published proceedings.
- » In 1979, SCCWRP scientists were invited to a national symposium in New York focusing on improving management strategies for the New York Bight and similar coastal ecosystems; SCCWRP staff chaired sessions and co-authored a dozen papers in the symposium's published proceedings.
- » By the late 1970s, SCCWRP was providing input on wastewater planning and monitoring programs across central and northern California and Washington state.



Two proceedings volumes featuring SCCWRP's 1970s work

## Commission's Technical Advisory Group (CTAG)

Established in 1982 as the Sponsors' Technical Advisory Committee (STAC), CTAG is a scientific advisory body that reviews and vets SCCWRP science, collaborates and partners with SCCWRP on emerging research initiatives, and works collaboratively with SCCWRP on long-term research planning. CTAG is made up of one representative from each member agency – typically, one of the agency's top scientists.

STAC's initial role was to facilitate the flow of technical information between the Commission and SCCWRP staff. Eight years after STAC was established, five water-quality regulatory agencies joined SCCWRP, gaining seats on both the SCCWRP Commission and the newly renamed CTAG. The regulatory agencies' presence rounded out the perspective and expertise that CTAG brought to its review and oversight roles.

CTAG has proven its value by keeping SCCWRP focused on the projects and priorities important to SCCWRP member agencies. SCCWRP's



CTAG in 2008

forward-looking, continuously updated Research Plan – which presents a unified, 10-year vision of SCCWRP's research directions and numbers more than 200 pages – is a seminal joint effort of SCCWRP staff and CTAG.

## Willard Bascom, SCCWRP's second Director

Willard Bascom served as SCCWRP's second Director and became one of its most influential, leading the agency through 12 formative years in the 1970s and 1980s. He replaced SCCWRP's founding Director, Dr. George Hlavka, just as it had become clear SCCWRP would outlive its original designation as a short-lived "project."

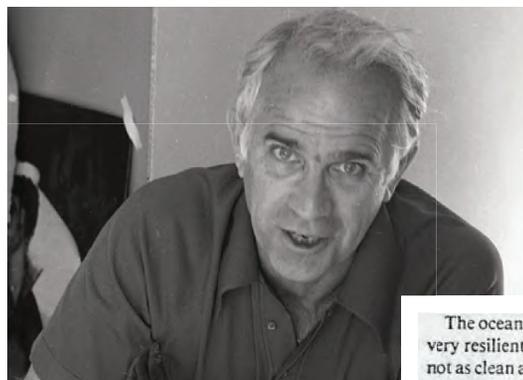
Professor John Isaacs for more than 25 years. Isaacs served as Chair of SCCWRP's Scientific Consulting Board from 1969 to 1980.

Bascom's passion was exploring deep-sea environments. In the early 1960s, he supervised a pioneering effort to drill in deep water through the Earth's crust. In 1962, he founded an undersea exploration company, Ocean Science and Engineering, that retrieved about 20 million carats of gem diamonds off Africa's southern coast. After leaving SCCWRP in 1985, he resumed his undersea exploration work, locating historic shipwrecks such as a Spanish galleon near the Bahamas and bronze statues near Greece.

Bascom was known for being an outspoken iconoclast and contrarian. During his time at SCCWRP, he penned multiple op-eds questioning orthodox viewpoints:

- » In a 1977 perspective piece for the journal *Marine Pollution Bulletin*, Bascom wrote: "The ocean is not dying nor is it frail. Life in the ocean is very resilient. Although a very small part of the ocean is not as clean as we would like it, it is rarely as dirty as some militant groups have led the public to believe."

Bascom came to SCCWRP in 1973 from the Scripps Institution of Oceanography, where he had been working as a research engineer under



Willard Bascom

The ocean is not dying nor is it frail. Life in the ocean is very resilient. Although a very small part of the ocean is not as clean as we would like it, it is rarely as dirty as some militant groups have led the public to believe. Man should thoughtfully go about improving areas that need attention, doing the things that scientific research shows to be necessary and avoiding the temptation to solve non-problems.

Excerpt of a perspective piece by Willard Bascom, *Marine Pollution Bulletin*, 1977

- » Opining on the need to upgrade wastewater treatment processes, Bascom wrote in a 1984 op-ed titled "Is the Emperor Crazy?" that human waste products "are largely composed of food particles and trace elements that are valuable to sea life. ... Is it possible that there is something wrong with putting food and nutrients in the sea?"
- » In a *Los Angeles Times* op-ed, Bascom characterized the risk of getting cancer from eating fish caught in Santa Monica Bay as "about 1/100th that of being murdered."

A native of New York City, Bascom studied at the Colorado School of Mines, then worked as a mining engineer in the 1940s before going to work for Isaacs. He passed away in 2000.

## Past SCCWRP member agencies

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The number of SCCWRP member agencies has grown from five at the time of SCCWRP's founding to 14 today. Additionally, a handful of organizations have come and gone as SCCWRP member agencies:

» **Ventura County:** Ventura County was a founding SCCWRP member agency. In 1975, the member agency of record became the Ventura Regional County Sanitation District. The district ended its membership in 1986. However, Ventura County re-joined SCCWRP in 2005 as a stormwater management agency.

» **City of Oxnard:** The City of Oxnard joined SCCWRP in 1986, the same year that the Ventura Regional County Sanitation District ended its membership. Oxnard ended its membership in 1990.

» **Three Associate Members:** In the 1980s, three Southern California wastewater treatment agencies joined as non-voting Associate Members; all three had ended their membership by 1990. They were the Encina Wastewater Authority (1983-1989), Southeast Regional Reclamation Authority (1983-1990) and Aliso Water Management Agency (1989-1990).



Steven Bay, left, and Darrin Greenstein performing fish dissections for a study on PCBs, mid 1980s

## PERSEVERANCE YEARS (1985-1990)

### Staff turnover and financial challenges threaten SCCWRP's viability

SCCWRP's technical accomplishments continued unabated throughout the 1980s, with scientists pursuing increasingly complex studies that shed light on different facets of how human activities were impacting the

ecological health of Southern California's coastal ocean.

By the mid-1980s, however, SCCWRP began experiencing significant challenges on

multiple fronts – largely self-inflicted wounds that would send the organization barreling into the darkest period in its history.

Although SCCWRP had staked its reputation on the strength of its scientific programs, the agency increasingly drifted into the policy world in the 1980s – in essence, becoming an advocate for how SCCWRP science should be interpreted and used by the environmental management community.

Nowhere was SCCWRP's policy advocacy role more apparent than in the public statements made by Director Willard Bascom, who had been leading SCCWRP since 1973. An engineer by training, Bascom viewed the coastal ocean as a vast practical depository for human waste. Moreover, Bascom did not believe that scientific evidence about the ecological health of Southern California's coastal ocean – including SCCWRP's own work – justified the need for costly upgrades to wastewater treatment processes, which SCCWRP's member agencies were being required to do at the time.

In presentations and in perspective pieces in scientific journals, Bascom was unequivocal that Southern California's coastal ocean was "not dying" and that SCCWRP findings



Dr. Robert Eganhouse measuring mercury in sediment and marine organisms, mid 1970s

showed that wastewater discharges were "very unlikely to damage sea life or cause a problem."

Such sweeping conclusions did not sit well with the rest of SCCWRP's staff, who wanted the technical findings to speak for themselves.

Although SCCWRP scientists were reluctant to publicly challenge Bascom throughout much of his 12-year tenure, tensions finally came to a head in the mid-1980s. In a March 1985 letter to Bascom, SCCWRP staff expressed a lack of confidence in Bascom's leadership, declaring it was "time for a new Director." The letter cited "arbitrary changes in research plans without consulting staff" and "antagonism of funding agencies," among other accusations.

Two months later, Dr. David Brown, SCCWRP's head chemist since 1980, publicly accused Bascom of distorting SCCWRP scientific findings in a letter to a local State Assemblyman. An eight-member independent review panel was quickly convened to review Brown's accusations.

The panel cleared Bascom of wrongdoing, but the fallout was swift and consequential: Bascom took an immediate leave of absence and retired a month later. Dr. Jack Anderson, a biologist working at a private marine lab in the Pacific Northwest, was hired to replace him.

The disagreements between Bascom and the rest of the staff laid bare an unresolved, existential question for the agency: Was SCCWRP purely a science research organization, or a policy advocate as well?

As SCCWRP pondered its purpose and role, the agency fell into turmoil. Staff expressed disillusionment and confusion over SCCWRP's priorities and directions. Member agencies complained that SCCWRP was missing project deadlines and stretching its resources too thin. Numerous key personnel departed.

In 1987, SCCWRP began borrowing against future years' budgets to stay afloat; the deficit spending was justified as a necessary expense to recruit new talent to replace the staff who were leaving. By 1990, the agency's deficit had ballooned to \$400,000 – almost 40% of the agency's annual operating budget.

## Researcher Hid Severity of Bay Contamination, Aide Charges

By ALAN CITRON, Times Staff Writer

A high-ranking member of the Southern California Coastal Water Research Project has charged that the organization's director has distorted scientific findings and tried to censor staff members in order to mislead the public about the severity of toxic contamination in Santa Monica and San Pedro bays. David Brown, head of the project's chemistry department, said director Willard Bascom routinely withheld information that would have been damaging to the waste dischargers that fund the research organization. Brown also accused Bascom of using "random num-

bers" to justify his scientific conclusions. Brown's allegations came in a five-page letter to Assemblyman Tom Hayden (D-Santa Monica), head of a state task force investigating the bays. After reviewing the letter, Hayden called for Bascom's immediate resignation and said health officials should disregard his public testimony. Hayden forwarded a copy of Brown's allegations Tuesday to Robert Gharelli, director of the Los Angeles Regional Water Quality Control Board.

Please see BAYS, Page 3

Los Angeles Times, May 1985

## Official Cleared in Dispute Over Bays' Pollution

By ALAN CITRON, Times Staff Writer

A scientific panel Thursday cleared the director of the Southern California Coastal Water Research Project of charges that he withheld information about the severity of toxic contamination in Santa Monica and San Pedro bays. And it reprimanded the high-ranking aide who made the accusations. The panel said that it found no evidence that project director Willard Bascom "deliberately misled anyone, knowingly supplied false

Los Angeles Times, May 1985

Anderson resigned in 1990 amid the financial crisis. Meanwhile, SCCWRP member agencies determined that the only viable way to fix SCCWRP's deficit was simply to gift SCCWRP the money it needed. In fiscal year 1990-1991, they made a one-time payment to SCCWRP of \$400,000, on top of their annual dues.

## Dr. Jack Anderson, SCCWRP's third Director

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Dr. Jack Anderson was hired as SCCWRP's Director following the retirement of Willard Bascom in 1985. A biologist and native Southern Californian, Anderson took the reins at SCCWRP as the organization was still reeling from the highly publicized disputes between Bascom and the rest of the staff.

Perhaps Anderson's most important accomplishment was laying the groundwork for the addition of five water-quality regulatory agencies as SCCWRP member agencies in 1990. This expansion fundamentally

changed SCCWRP. As the regulatory agencies gained a voting majority on the SCCWRP Commission, their involvement helped dispel lingering concerns about SCCWRP's scientific impartiality and independence.

At the time he was hired to run SCCWRP, Anderson was working for the privately run Battelle Northwest Marine Lab in the Pacific Northwest. He had been there nine years, and also had been serving as an Affiliate Professor at the University of Washington. Before moving to the Pacific Northwest, Anderson worked as a tenured Associate Professor of Biology at Texas A&M University.

A native Southern Californian, Anderson earned his Ph.D. in biology from the University of California, Irvine and M.A. in biology from California State University, Long Beach. He passed away in 2007.

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Dr. Jack Anderson

## Frank Wada, SCCWRP's Interim Director

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Frank Wada served as SCCWRP's Interim Director for about a year following the 1990 resignation of Director Jack Anderson. A chemist by training, Wada had just retired from the City of Los Angeles Bureau of Sanitation after a 36-year career; he had managed the Terminal Island Treatment Plant.

Wada took charge of SCCWRP as the organization was still reeling from staff unrest and financial troubles. With the organization's finances still deep in the red, many key staff had recently departed or announced their departures.

**Wada acknowledged SCCWRP's challenges in a 1990 memo to staff shortly after taking the helm:** "It is acknowledged that the Staff has expressed disillusionment, a loss of goals, visions and teamwork, and a realization of current money problems. It's time to renew each individual's belief in SCCWRP as a unique

and important independent research agency essential to an understanding of cause and effect of waste dischargers to the marine environment. There is a need for everyone's support to work as a team, to demonstrate progress, and to prepare the way for a positive spirit of purpose and accomplishment to be carried over to the appointment of the next Director with hope, vision and enthusiasm."

Wada served as Interim Director for about a year; in 1991, SCCWRP's Dr. Jeffrey Cross replaced him.



Frank Wada



Sorting a fish trawl aboard a Sanitation Districts of Los Angeles County research vessel during the Southern California Bight Regional Monitoring Pilot Project, 1994

## RENAISSANCE YEARS (1990-2001)

### SCCWRP reinvents itself with renewed vision and purpose

The late 1980s were a particularly trying time for SCCWRP, with the agency hit by a double whammy of languishing staff morale and severe financial problems. But SCCWRP persevered, emerging from its darkest hour with newfound direction and purpose.

SCCWRP's renaissance in the 1990s would not have been possible without the unwavering faith and confidence that the SCCWRP Commission placed in SCCWRP. Not only did the Commission continue to invest in SCCWRP despite the organization's

challenges, but the Commission believed that the agency could be strengthened by an even broader base of support.

In 1990, the Commission made perhaps the most consequential and strategically important decision in the organization's history: SCCWRP invited five water-quality regulatory agencies that oversee discharges into Southern California's coastal ocean to become member agencies.

The addition of the regulatory agencies dramatically changed the structure and trajectory of the organization. Up until that point, the SCCWRP Commission had been made up entirely of the wastewater treatment agencies that had founded the organization; these agencies also provided the bulk of SCCWRP's funding.

The addition of the five regulatory agencies shifted the balance of power on the SCCWRP Commission, with the regulatory agencies outnumbering the wastewater agencies by a 5-4 voting margin.

The expanded Commission created a forum for both regulated and regulatory agencies to work collaboratively across the aisle to advance the science around stewardship of the coastal ocean.

The expansion of SCCWRP's member agencies also eliminated any perceptions that SCCWRP was biased in favor of the wastewater discharge community that created the agency.

The reorganization of SCCWRP's governance structure touched off an ambitious



Henry Schafer collecting stormwater samples, 1990

era of rebuilding and expansion. In particular, SCCWRP focused on strengthening its reputation as a convener and facilitator of high-quality, collaborative scientific research.

The most high-profile manifestation of this effort was the development of the Southern California Bight Regional Monitoring Program. Started as a pilot project in 1994, the program brought together dozens of environmental organizations from across Southern California to collaboratively examine how human activities are impacting the ecological health of the Southern California Bight. The program expanded on a 1970s-era regional monitoring effort developed by SCCWRP and its member agencies

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to understand coastal ocean conditions at a 60-meter depth.

Bight regional monitoring quickly became a crowning achievement for SCCWRP and its member agencies. Not only was the cyclical program held up as a national model, but the program reinforced for all of SCCWRP's member agencies the value of investing in an independent, regional science organization.

Also in the early 1990s, SCCWRP began broadening its research focus beyond Southern California's coastal ocean to also encompass the watersheds that drain to it. This expanded focus was a natural evolution of the management questions that SCCWRP was working to answer about coastal ocean conditions.

By the 1990s, considerable management effort that had been put into improving the health of Southern California's ocean. Wastewater treatment processes had undergone significant upgrades, source-control efforts had eliminated particularly egregious sources of pollution, and more discharges were being reclaimed. Consequently, coastal watersheds became responsible for an increasing share of overall pollution discharges to the coastal ocean.

Throughout the 1990s, SCCWRP conducted foundational research aimed at understanding the sources, transport and fate of runoff pollution in coastal watersheds. In the process, staff brought the stormwater management community more and more into the SCCWRP fold.

By the early 2000s, SCCWRP had begun

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discussing how to formalize its relationship with Southern California stormwater managers – beyond project-specific interactions. From these discussions, SCCWRP in 2001 facilitated the formation of the Southern California Stormwater Monitoring Coalition, a collaborative effort by the region's stormwater management community to improve runoff management practices through shared investments in science research.

Toward the end of 2001, SCCWRP held a seminal strategic planning retreat with the SCCWRP Commission to examine how the organization could become a more effective, managerially relevant research organization. Out of this day-long retreat emerged an ambitious, long-term vision for SCCWRP – one that would require SCCWRP to permanently shed its wastewater-centric focus and re-position itself as a comprehensive aquatic sciences research organization with international impact.



Dario Diehl extracting organic compounds, 1990s



Fish trawl during the Southern California Bight Regional Monitoring Program's pilot project, 1994

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### Water-quality regulatory agencies as SCCWRP member agencies

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In 1990, the Commission invited five water-quality regulatory agencies that regulate wastewater discharges into Southern California's coastal ocean to become SCCWRP member agencies. All five of these regulatory agencies remain member agencies to this day.

- » U.S. Environmental Protection Agency, Region 9
- » State Water Resources Control Board
- » Los Angeles Regional Water Quality Control Board
- » Santa Ana Regional Water Quality Control Board
- » San Diego Regional Water Quality Control Board

## Dr. Jeffrey Cross, SCCWRP's fourth Director

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Dr. Jeffrey Cross served as SCCWRP's Director from 1991 to 1995. He was an internal hire, having served as a SCCWRP biologist for 11 years prior.

Cross began working at SCCWRP in 1980, shortly after earning his Ph.D. in fisheries from the University of Washington. He spent much of his SCCWRP career studying the impacts of pollution on fish communities.

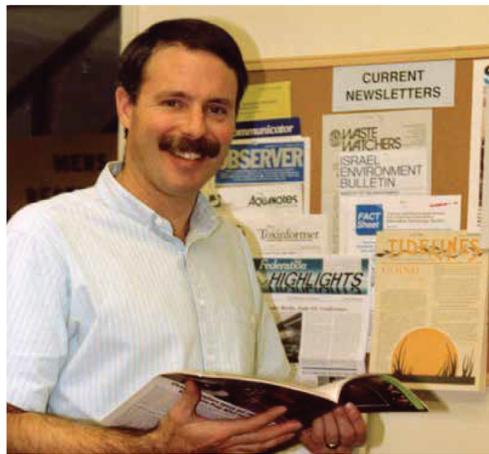
Initially, Cross took the top SCCWRP spot on an interim basis, following the

departure of Interim Director Frank Wada in 1991. He was named to the spot permanently the following year. In selecting Cross for the permanent post, the SCCWRP Commission cited his ability to learn fast and his first-hand knowledge of the agency and its challenges.

Under Cross's leadership, SCCWRP and its member agencies established the Southern California Bight Regional Monitoring Program as a pilot project in 1994. The ambitious collaboration quickly became one of SCCWRP's most respected, valued programs.

After leaving SCCWRP in 1995, Cross worked for the Fisheries Division of the National Oceanic and Atmospheric Administration in New Jersey, then as Science Center Director for Grand Canyon National Park.

Dr. Stephen Weisberg was hired in 1996 as Cross's replacement.



Dr. Jeffrey Cross

## CTAG's evolution ... and the Scientific Consulting Board's dissolution

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At the time five water-quality regulatory agencies joined SCCWRP in 1990 as member agencies, SCCWRP was receiving counsel from two scientific advisory groups: the Sponsors' Technical Advisory Committee (STAC), founded in 1982 and made up of top scientists from SCCWRP's member agencies, and the Scientific Consulting Board, a five-member panel of external scientists dating back to SCCWRP's 1969 founding.

Although the Scientific Consulting Board was not altered during the 1990 reorganization of SCCWRP, STAC was dramatically restructured. Each of the five regulatory agencies gained a seat on STAC, expanding the body to nine members, and STAC was renamed the Commission's Technical Advisory Group (CTAG).

The addition of the regulatory agencies brought important new perspective and expertise to CTAG, enabling the advisory body to take on a more prominent role in reviewing, vetting and shaping SCCWRP science.

As CTAG's role and influence grew, the Consulting Board's waned. The Consulting Board continued until 1994, at which point SCCWRP decided to disband it. Individual members of the Consulting Board continued to have close collaborative working relationships with SCCWRP.



Dr. Donald Reish, SCCWRP Scientific Consulting Board member, 1985-1991



Contaminants of emerging concern workshop, 2009

## PARTNERSHIP YEARS (2001-PRESENT)

### SCCWRP strengthens its interactions with the broader water-quality management community

When the SCCWRP Commission held a strategic planning retreat in 2001 to set long-term directions for the agency, it set in motion a new way of thinking and prioritizing at SCCWRP.

No longer could SCCWRP serve as the R&D arm for just one client (i.e., the Southern California wastewater treatment community

that founded the organization). Increasingly, SCCWRP recognized it needed to look outward, to become a more integrated – and integral – part of the broader water-quality science and management ecosystem.

SCCWRP's expanded mandate required the agency to build and strengthen strategic partnerships at the regional, state

and federal levels. In particular, SCCWRP recognized that managers at the state and federal levels would not take action based on the scientific findings of one research organization. SCCWRP needed to forge broad consensus within the scientific community to give managers the confidence they need to move forward on complex, potentially costly issues.

To achieve this goal, SCCWRP made a number of strategic operational changes. Instead of conducting science mostly on its own or with regional partners, SCCWRP moved increasingly to facilitating encompassing, multi-agency investigations spanning the nation and the globe.

Meanwhile, to position SCCWRP as an international scientific facilitator and consensus-builder, SCCWRP reshaped the composition of its staff, moving away from a technician-heavy workforce that focused on lab, field and analysis work to a scientist-dominated think-tank focusing on strategic project planning and scientific consensus-building. To achieve this goal, SCCWRP scientists were encouraged to become internationally recognized experts in their field.

SCCWRP also intensified its research planning efforts in collaboration with the Commission's Technical Advisory Group (CTAG), moving away from project-level



SCCWRP's Meredith Raith, right, training member agencies on use of rapid, DNA-based methods for detecting fecal contamination, 2013

planning and toward long-term, strategic planning on a 10-year horizon. In 2014, this work culminated with a redesigned, comprehensive Research Plan that provides clarity around insertion points for prospective research partners from around the world.

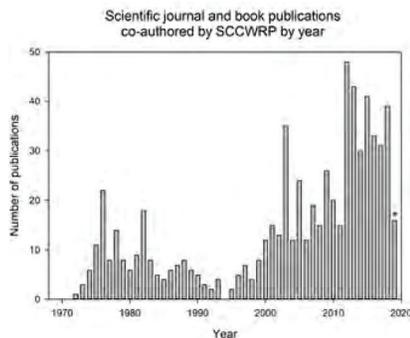
Finally, SCCWRP has prioritized partnerships by positioning itself as a regional meeting center. SCCWRP hosts external meetings and workshops three, four, sometimes five days a week. In bringing together broad cross-sections of scientists and managers, SCCWRP is able to maximize opportunities for dialogue and interaction among disparate organizations and sectors.

## California Ocean Protection Council

The California Ocean Protection Council became SCCWRP's 14th member agency in 2007. SCCWRP invited the Ocean Protection Council to become a member agency to strengthen SCCWRP's connections to the natural resources side of coastal ocean management.

Established in 2004, the Ocean Protection Council is a State agency

that coordinates multiple other State agencies to advance protection of California's coastal ocean resources. In particular, the agency forms a bridge between the California Environmental Protection Agency, of which the State Water Resources Control Board is a part, and the California Natural Resources Agency, which includes the California Department of Fish and Wildlife.



\* Partial year through September 2019

## SCCWRP's publication record

As SCCWRP has invested in strategic scientific partnerships with organizations worldwide, the number of scientific publications that SCCWRP has co-authored has soared.

## Stormwater managers as SCCWRP member agencies

SCCWRP's four member agencies from the stormwater management community joined SCCWRP over a four-year period in the mid-2000s. The addition of stormwater agencies to SCCWRP underscored the agency's commitment to build the scientific foundation for water-quality management across California and beyond.

- » Ventura County Watershed Protection District, 2003-present
- » Los Angeles County Flood Control District, 2004-present
- » Orange County Public Works, 2005-present
- » San Diego County Watershed Protection Program, 2006-present

SCCWRP invited the stormwater agencies to become SCCWRP member agencies after partnering with them for more than a decade on research aimed at understanding and reducing sources of contamination in runoff. The more SCCWRP learned about how runoff contributes to pollution of

the coastal ocean, the more obvious it became that stormwater managers needed to be in the room as the Commission engaged in discussions about long-term management of coastal ocean water quality.

SCCWRP's four stormwater management agencies indirectly represent a much broader swath of Southern California municipalities and other agencies that serve as their co-permittees on federally authorized National Pollutant Discharge Elimination System (NPDES) runoff discharge permits.



Stormwater runoff sample collection, 2007

## SCCWRP's Research Plan

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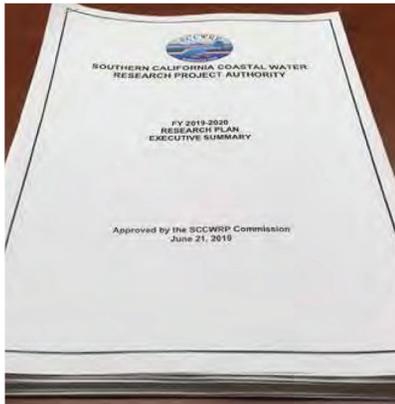
SCCWRP research has always been guided by a written Research Plan. The first Research Plan, developed eight months after SCCWRP's founding, provided a 38-page roadmap for executing the original "project" – SCCWRP's initial, three-year study investigating the impacts of wastewater discharges on the coastal marine environment.

For much of SCCWRP's existence, the Research Plan has described SCCWRP priorities and projects for the coming fiscal year. In 2014, in an effort to move away from project-level planning on

short-term annual cycles, SCCWRP staff worked with the Commission's Technical Advisory Group (CTAG) to radically rethink the Research Plan.

SCCWRP's present Research Plan is a forward-looking, visionary document that does not present the agency's work as a list of projects, but rather as an interconnected narrative that places past, current and future research projects within the context of SCCWRP's overarching research objectives.

Organized around nine thematic research areas and numbering more than 200 pages, SCCWRP's Research Plan is a living document that SCCWRP staff and CTAG jointly review and update in sections on an ongoing basis. This collaborative approach to research planning is essential for keeping SCCWRP research optimally responsive to the needs and priorities of the management communities that SCCWRP serves.



SCCWRP's thematic Research Plan

## Dr. Stephen Weisberg, SCCWRP's fifth Director

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Dr. Stephen Weisberg has served as SCCWRP's Executive Director since 1996, making him SCCWRP's longest-serving leader. Weisberg replaced Dr. Jeffrey Cross.

A biologist by training, Weisberg has led the transformation of SCCWRP from a regional science organization to an internationally respected R&D powerhouse. He has shepherded development of much of SCCWRP's expansive, cutting-edge research agenda, strengthened SCCWRP's partnerships with the broader scientific and management communities, and kept SCCWRP laser-focused on doing science to inform policy – but not to dictate policy. He also has mentored and trained scientific staff to become international leaders in their field.



Dr. Stephen Weisberg receiving his 20-year service award

Weisberg, whose background is in the design of environmental monitoring programs, was introduced to SCCWRP in the early 1990s while serving as a U.S. Environmental Protection Agency consultant. For two years, Weisberg traveled monthly to SCCWRP, working alongside Cross to adapt the EPA's national Environmental Monitoring and Assessment Program (EMAP) for Southern California – an effort that became the Southern California Bight Regional Monitoring Program. When Cross decided to leave SCCWRP in 1995 after a 16-year SCCWRP career, Weisberg was a natural choice to replace him.

An East Coast native, Weisberg earned his Ph.D. in biology from the University of Delaware in 1981.



Dr. Stephen Weisberg shortly after joining SCCWRP, mid 1990s

## SCCWRP's headquarters

SCCWRP has been at its Costa Mesa location since 2007. Centrally located close to freeways and John Wayne Airport, the 27,000-square-foot facility enables SCCWRP to serve as a regional meeting center bringing together broad cross-sections of scientists and managers.

SCCWRP's headquarters include four custom-designed conference rooms, the largest of which can seat more than

100 people and features wall-to-wall whiteboards and full videoconferencing capabilities. SCCWRP encourages its member agencies and other partners to host their meetings and workshops at SCCWRP to learn about, discuss and vet the latest science.

Throughout its history, SCCWRP has been housed at multiple locations, from west Los Angeles to Orange County.



Costa Mesa, 2007-present  
3535 Harbor Boulevard, Suite 110



Westwood 1, 1969-1970  
10845 Lindbrook Drive, Suite 105, Los Angeles



Westwood 2, 1970-1973  
1100 Glendon Avenue, Los Angeles



El Segundo, 1973-1979  
1500 E. Imperial Highway



Westminster, 1993-2007  
7171 Fenwick Lane



Long Beach, 1979-1993  
646 W. Pacific Coast Highway

# Greatest Hits

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Southern California Bight 1994 Pilot Project



Bioassessment field sampling, 2011



Toxicity testing

SCCWRP is an international leader in aquatic sciences research, with a comprehensive research agenda that spans a diverse array of water-quality issues confronting the environmental management community. SCCWRP's accomplishments over the past 50 years are as diverse as they are far-reaching. Some accomplishments, however, stand above others for their enduring relevance and impact.

SCCWRP surveyed the Commission, the Commission's Technical Advisory Group (CTAG) and staff to develop a list of the organization's most significant accomplishments since 1969. Although dozens of important SCCWRP accomplishments were advanced as candidates, six emerged as consensus picks with strong, across-the-board support. They have been classified as either a technical or organizational accomplishment on the pages that follow.

SCCWRP TECHNICAL ACCOMPLISHMENT

## REGIONAL MONITORING ASSESSMENTS

SCCWRP unifies disparate organizations around geographically encompassing ecological assessments of the coastal ocean and the watersheds that drain to it.



Sorting the contents of a fish trawl, 2016



Counting trash particles for a regional trash assessment, 2013

Regional monitoring calls on multiple agencies with overlapping responsibilities for protecting aquatic ecosystems to pool their resources and work together on more expansive, holistic scientific investigations than they could do on their own. Through regional monitoring, dozens of environmental management agencies and partners from academia, consulting firms and NGOs collaboratively assess the condition of

aquatic ecosystems across time and space, and speak with a unified voice about findings and implications.

SCCWRP has built a reputation for facilitating the conceptualization, design and execution of Southern California's signature regional monitoring efforts – the marine-focused Southern California Bight Regional Monitoring Program, which started as a pilot



Stream sampling, 2015

project in 1994, and its freshwater counterpart, the Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring Program, launched in 2009. These programs have become nationally recognized models for how to bring together diverse stakeholders to study pressing environmental issues of management concern.

Perhaps the most important ancillary benefit of regional monitoring is that it builds collegiality and trust within the water-quality management community. Participants work together to define study objectives, agree upfront on which investigations they most want to conduct, and commit to taking prescribed courses of action depending on outcomes. They also standardize data collection and analysis methodologies, perform intercalibrations to ensure all data generated are of consistently high quality, and test-drive next generation

methods and tools with multiple stakeholders in diverse settings.

In recognition of SCCWRP's visionary leadership in facilitating regional monitoring initiatives, the National Water Quality Monitoring Council recognized SCCWRP with its 2019 Vision Award.

SCCWRP TECHNICAL ACCOMPLISHMENT

## SEDIMENT QUALITY ASSESSMENTS

SCCWRP has brought standardization and quantitative rigor to how the ecological impacts of sediment contamination are assessed across coastal California.



Sediment grab sampling, circa 1970s

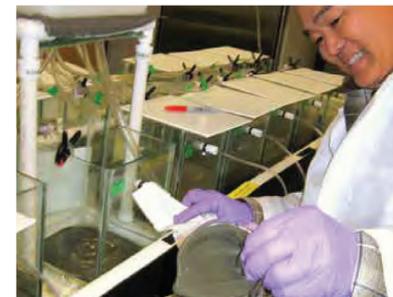


Ehren Doris and Jeff Brown processing sediment samples, 2002

Sediment quality assessments are an essential management strategy for understanding the ecological effects of chemical contamination in seafloor sediment, which is where most contaminants accumulate. Although multiple methods and tools have been used over the decades to assess sediment quality, their reliability and effectiveness have historically been limited, creating

uncertainty and disagreements over how to interpret findings.

SCCWRP is a pioneering leader in standardizing and bringing quantitative rigor to how California environmental managers conduct sediment quality assessments. Throughout the organization's 50-year history, SCCWRP has focused on developing robust field



David Tsukada conducting sediment toxicity testing, 2008

sampling methods, vetting and refining methods for conducting sediment chemistry and toxicity testing, and designing biology-based scoring tools to quantify sediment contamination's impacts on benthic macrofauna. SCCWRP also has led numerous intercalibration exercises with Southern California's environmental management community to improve quality and consistency of analysis methods.

SCCWRP's advancements in sediment quality science have been adopted at the local, regional, state and national levels. The most high-profile example is the California State Water Resources Control Board's decision to adopt a pair of SCCWRP-developed sediment quality assessment frameworks that define for environmental managers how to assess compliance with California's Sediment Quality Objectives (SQOs). The first SQO framework, adopted in 2008, focuses on protecting the animals that live in and on sediment. The second

framework, adopted in 2008, focuses on protecting humans from sediment contamination that bioaccumulates through food webs. California is the only state to have defined a consistent, unified approach for setting these SQO regulatory targets for enclosed bays and estuaries statewide.

In addition to moving sediment science forward, SCCWRP has facilitated the transfer of these methods and tools to the management community, and offered its expertise on multiple state and national science advisory panels. As a result, managers have been able to largely move past discussion and debate about how to interpret sediment quality assessment data, and instead can focus on containing and remediating the ecosystem impacts of sediment contamination.

SCCWRP TECHNICAL ACCOMPLISHMENT

## PROTECTION OF BEACH WATER QUALITY

SCCWRP uses cutting-edge science to improve detection and management of waterborne microbial contamination at Southern California beaches.



Collecting ocean water for microbial testing, 2015



Dr. John Griffith sampling stormwater runoff, 2014

Advances in molecular microbiology in recent decades have paved the way for next-generation approaches to how water-quality managers detect, track and assess health risks associated with microbial contamination at Southern California's world-famous beaches. By vetting and transitioning the best of these methods and tools for use by the public health community, the scientific community can give

beachgoers and environmental managers alike increased confidence that it is safe to play, swim and surf in the coastal ocean.

SCCWRP is an international leader in developing incrementally stronger, more effective strategies for protecting beach water quality. Since the 1990s, SCCWRP has been conducting foundational studies that illuminate where Southern California beach



SCCWRP-led member agency training on use of DNA-based methods for detecting fecal contamination, 2013

water quality is relatively poor, where fecal contamination is coming from, and what level of health risk is associated with exposure to this contamination. From this seminal work, water-quality managers have been able to prioritize beach sites for cleanup and remediation, as well as make long-term decisions about how to manage persistent fecal contamination signals, particularly during wet weather.

SCCWRP also has provided managers with the latest, most effective approaches for detecting and measuring fecal contamination. By bringing together leading microbiologists from around the world to compare and vet emerging methods and technologies, SCCWRP has helped forge international consensus on the most efficient, reliable ways to protect beach water quality. Some of these approaches – like a SCCWRP-led investigation into the most effective approach to track beach fecal contamination signals to their upstream origin

points – have been adopted by California as definitive guidance for managers statewide.

SCCWRP's beach water-quality work also has prompted member agencies and others to invest in SCCWRP-vetted technologies for their own laboratories, including quantitative polymerase chain reaction (qPCR) and droplet digital PCR for routine water-quality testing. Southern California's water-quality management community also has coalesced around use of a SCCWRP-vetted genetic marker known as HF183 for tracking human fecal contamination across the region's waterways.

SCCWRP TECHNICAL ACCOMPLISHMENT

## BIOLOGICAL TOOLS FOR ECOLOGICAL HEALTH ASSESSMENTS

SCCWRP has harnessed the power of biology-based monitoring methods to gain unprecedented, quantitative insights into water body condition.



Collection of aquatic insects from a streambed, 2011

Biological communities living in aquatic environments offer some of the most revealing, relevant insights about a water body's overall health, making biological assessments – or bioassessment – foundational to effective management of aquatic ecosystems. SCCWRP has a long history of developing managerially relevant biological assessment tools, from its foundational fish histology work to more recent aspirational



Extraction of fish eggs and larvae, 2016

efforts to assess the biological effects of ocean acidification.

Where SCCWRP has been most effective, however, has been developing bioassessment tools that quantify the health of biological communities – instead of merely assessing the health of individual organisms. SCCWRP is an international leader in developing approaches to extract more



Identification and counting of organisms from a streambed, 2011

meaningful insights from biological community composition data. Since the 1970s, SCCWRP has been building tools known as indices of biotic integrity that simplify bioassessment data collected from a site into a single numerical condition score. Perhaps SCCWRP's most enduring success story in this regard is the development of the Benthic Response Index (BRI) in the mid-1990s. Still widely used by Southern California managers today, the BRI quantifies how coastal marine communities are being impacted by chemical contamination in seafloor sediment.

More recently, SCCWRP has developed a pair of stream condition assessment indices so powerful and widely applicable that they've already been incorporated into wadeable stream monitoring programs across California. Known as the California Stream Condition Index and the Algal Stream Condition Index, respectively, these freshwater indices are being used as a foundation for developing State and regional policies intended to extend greater protections to California's rivers, creeks and other streams.

Meanwhile, as rapid advances in molecular technologies transform the field of bioassessment, SCCWRP is growing and evolving its research programs in lockstep. Recognizing that DNA-based technologies have the potential to lower costs, improve speed and boost resolving power, SCCWRP has conducted foundational work to test, validate and standardize these technologies for bioassessment applications, including pilot testing with the end-user water-quality management community. SCCWRP also is laying the scientific groundwork to build bioassessment indices calibrated for molecular data.

SCCWRP ORGANIZATIONAL ACCOMPLISHMENT

## CONSENSUS-BUILDING AROUND EMERGING SCIENCE

SCCWRP invests in building and strengthening scientific partnerships – and then leveraging this network to develop broad consensus on emerging science.



Taxonomy intercalibration exercise, 2013

The water-quality management community that SCCWRP serves does not act on the findings of a single, isolated study or the recommendations of a single organization. Especially when emerging science has significant management and policy implications, managers' preference is to take action after the scientific community has reached consensus on the proper interpretation and application of that science.



Dr. Alvina Mehinto demonstrating bioanalytical screening, 2017

Recognizing the essentiality of consensus-building, SCCWRP has prioritized nurturing strong relationships with hundreds of external partners and collaborators – relationships that have enabled SCCWRP to work toward broad consensus in areas ranging from optimal methods for tracking fecal contamination signals to biology-based scoring tools for quantitatively assessing ecosystem health.



Harmful algal blooms workshop, 2017

SCCWRP has a high-profile track record in the scientific community for bringing leading scientists together to do innovative, impactful science, then translating the findings into actionable, relevant insights that inform management decision-making.

SCCWRP's commitment to consensus-building takes many forms and manifests itself in many ways. First, SCCWRP runs a visiting scholars program that encourages faculty and students from around the world to spend time working at SCCWRP. Second, SCCWRP jointly hires scientific staff who split their time with partner institutions; the practice, which dates back to 1997, encourages especially deep interactions with these partners. Third, SCCWRP encourages partners to use SCCWRP as a regional meeting center – for workshops, meetings and seminars, and as a home base for regional scientific societies.

Finally, SCCWRP expects its scientific staff to pursue collaborative studies with other institutions. Over the past 50 years, SCCWRP staff has co-authored journal and book publications with 1,408 individuals from 489 institutions. In the past five years alone, SCCWRP has co-published with 790 external collaborators. Also in the past five years, six SCCWRP scientists have guest-edited and served on the editorial boards of eight peer-reviewed journals.

## COLLABORATIVE MANAGEMENT FORUMS

SCCWRP has created a neutral, collaborative setting where water-quality managers with divergent viewpoints can come together to discuss and debate science.



SCCWRP Commission, 1970s



Ocean acidification modeling workshop, 2013

**Southern California's water-quality management community is divided into two main camps:** the agencies responsible for managing land-based inputs to the coastal ocean, including discharges of runoff and treated wastewater effluent, and the agencies that oversee and regulate these discharges. Because these two groups view issues through different lenses, there is potential for tension and distrust that can stymie progress and forward momentum.

SCCWRP has played an invaluable role in bringing these two groups together in a neutral, collaborative forum to advance the science around water-quality management. SCCWRP has proactively positioned itself as a "safe space" – a neutral, third-party forum where divergent management interests can come together during meetings, workshops and public forums to learn about, discuss and debate the management implications of the latest science.



Climate change workshop in collaboration with the National Oceanic and Atmospheric Administration, 2011

Nowhere is SCCWRP's success in cultivating management collaboration more apparent than in the SCCWRP Commission. Comprised initially of wastewater dischargers only, the Commission in 1990 invited the agencies that regulate the dischargers to join SCCWRP. Consequently, two sectors with often-diverging viewpoints became responsible for co-governing SCCWRP. Stormwater management agencies and the California Ocean Protection Council were added later, further broadening the Commission's diversity of perspectives.

Today, the SCCWRP Commission remains a highly effective forum for developing collective thought processes on pressing management challenges like climate change and pervasive fecal contamination of waterways. Virtually every Commissioner attends every Commission meeting – a testament to the value of this forum among the

leaders of Southern California's water-quality management community. Furthermore, the Commission and the Commission's Technical Advisory Group have been the driving force behind multiple spinoff initiatives, including collaborative regional monitoring efforts facilitated by SCCWRP.



SCCWRP Deputy Director Ken Schiff, 2017

## SCCWRP's Future

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SCCWRP's Dr. Joshua Steele, 2015



Dr. Ashley Parks in SCCWRP's dynamic exposure laboratory, 2019

A lot has changed in the past 50 years. At the time SCCWRP was established, oil was washing up on area beaches following the worst spill in California history. At some locations in the coastal ocean, more flatfish had tumors and fin rot than didn't. Species that had once been common were being reclassified as threatened and endangered.

Five decades later, the most alarming, 1960s-era environmental challenges have been largely reversed. Wildlife – from sea lions to brown pelicans – have seen their populations rebound. Biological communities that were once altered by seafloor sediment contamination are now routinely found in regional monitoring surveys to be healthy. These improvements are a long way to go in one lifetime, and SCCWRP is proud to have

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contributed its science to support strong environmental stewardship.

Although many older challenges are now well on their way to resolution, there are numerous issues on the horizon that promise to keep SCCWRP relevant for decades to come. Indeed, SCCWRP's enduring effectiveness lies in its ability to continually foresee the next generation of challenges confronting Southern California's water-quality management community. Below are three topical areas that SCCWRP envisions will challenge the organization to spread its wings in the coming years. SCCWRP's ability to evolve and grow in these directions will ensure the organization can continue to provide critical scientific information and insights needed by Southern California's environmental managers.

#### **Cheaper, faster, better**

For decades, SCCWRP's member agencies have consistently asked for environmental assessment tools that provide more complete information in less time. Advances in technology are positioning SCCWRP to make big leaps toward fulfilling these needs. One of the biggest advances is genomic methods. SCCWRP started down this path by developing DNA-based approaches that allow its member agencies to analyze beach water samples for fecal contamination in a



Dr. John Griffith pumping contents from an underground sewer pipe to study its microbial community composition, 2019

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matter of hours instead of days. SCCWRP then extended this technology by using genetic signatures to determine whether fecal contamination has originated from human sources vs. non-human sources, which, in turn, has enabled managers to zero in on the sources that pose the greatest potential health threats. In the coming decades, SCCWRP anticipates expanding genomic methods to include direct measurement of pathogens, more specific genetic signatures to geographically fingerprint specific fecal sources, and automating this technology so it is available as a continuous information stream.

SCCWRP also foresees using genomic methods to improve biology-based

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ecological assessment work, known as bioassessment. For generations, bioassessment has relied on highly trained taxonomists to manually count, sort and identify organisms under microscopes – a time-consuming but crucial science that SCCWRP has supported across Southern California since the 1970s. But with dramatic advances in molecular technology, manual taxonomic identifications will become increasingly obsolete. Eventually, biological communities will be identified and analyzed using their DNA signatures – in a matter of days instead of months.

SCCWRP also anticipates harnessing recent advances in supercomputing to build dynamic models that explain how the health of aquatic ecosystems is being affected – and will continue to be affected – by climate change, ocean acidification and multiple other factors. Unlike monitoring-based assessments that are limited to describing existing conditions at specified times and places, dynamic modeling can

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characterize the environment at times and places where no monitoring has been conducted. Furthermore, modeling enables assessments of future environmental conditions under a variety of alternate possible management scenarios, such as different potential strategies for addressing coastal acidification. Modeling these “what if” scenarios is crucial for giving managers the confidence they need to make decisions for an uncertain future.

#### **Unification of water-quality management around a One Water concept**

The One Water philosophy views all water – from wastewater to drinking water – as a vital community resource that should

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be managed holistically and sustainably. Already, wastewater reuse and stormwater capture have become goals for all SCCWRP member agencies, embedded within each organization's long-term capital improvement plans and incentivized by State water policy. The One Water concept will increasingly pervade and define management decision-making for SCCWRP and its member agencies.

In the coming decades, SCCWRP anticipates supporting this management direction in two main ways: First, SCCWRP will play a leading role in developing tools for assessing effectiveness of water-quality treatment processes, both as effluent leaves the treatment plant and before it is reintroduced to water supplies. SCCWRP already has begun developing new and automated tools for continuous measurements of pathogens, as well as tools for assessing the presence and toxicological effects of contaminants of emerging concern, such as hormone mimics, carcinogens and microplastics. SCCWRP will share this science with not only its member agencies, but also with water supply agencies with which SCCWRP has begun partnering.

The second primary way that SCCWRP will support the One Water concept is quantifying desirable environmental flow patterns for streams. As water use and reuse practices



Dr. Alvina Mehinto performing a bioanalytical assay to screen for contaminants of emerging concern, 2018

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change across drought-prone California, less treated wastewater effluent will be discharged into streams, and more stormwater will be captured; these reduced stream flows could conflict with the flow needs of vulnerable species and habitats. SCCWRP's anticipates that its ecohydrology research investments will provide a scientific foundation for mediating among these potentially competing demands.

#### **Developing and evaluating solutions**

SCCWRP has burnished a reputation for developing methods and tools that enable Southern California's environmental management community to quantify problems and identify threats to ecosystem

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and human health. As a result, SCCWRP's advances have helped managers focus their attention on the highest-priority issues. However, SCCWRP has had only limited involvement in developing engineering solutions for solving the problems it identifies. As member agencies prepare to spend billions of dollars on best management practices for enhancing runoff water quality, SCCWRP has begun building capacity to identify specific solutions that maximize the value of these pending, multi-decadal investments.

In the coming years, this new initiative will take SCCWRP's research in three key directions: First, SCCWRP will evaluate and improve engineering technologies. Second, SCCWRP will optimize maintenance schedules to ensure these stormwater solutions continue to perform optimally. And third, SCCWRP will optimize sizing and deployment strategies within watersheds to maximize effectiveness and minimize costs. This new research initiative will bring with it a deepening relationship between SCCWRP and its member agencies. Increasingly, SCCWRP will share in member agencies' challenge of finding solutions to complex engineering challenges, while simultaneously protecting the many beneficial uses of stormwater and maintaining flood control to protect lives and property.

#### ***Hope for the future***

SCCWRP is moving with confidence into its future. Over the decades, SCCWRP has honed its mission and vision, succeeded in collaborating with partners to achieve scientific consensus, and seen its work with member agencies get translated into tangible action. These strategies will continue to serve SCCWRP well in the years ahead. Moreover, SCCWRP continues to attract bright, dedicated staff who are as committed to SCCWRP's mission and vision as those who have come before. SCCWRP is confident this next generation of exceptionally talented staff will build upon the foundation that has already been laid – and make impacts that exceed what SCCWRP has achieved in its first 50 years.

## First-Person Reflections

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Steven Bay, SCCWRP staff, 1980s



Dr. David Young, former SCCWRP staff, 1970s



Robert Ferrante, SCCWRP Commissioner, 2016-present

SCCWRP has positively influenced the lives and careers of hundreds of individuals over the past five decades. From Commissioners to CTAG Representatives, from scientific partners to staff, the SCCWRP family is diverse and worldwide.

In celebration of the agency's 50th anniversary, members of the SCCWRP family were invited to submit a short personal essay reflecting on their relationship with the organization. Nearly 50 people from diverse backgrounds responded to the call; their heartfelt stories and thoughtful perspectives appear on the pages that follow.

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## Jim Stahl

### SCCWRP Commissioner, 2000-2006, Sanitation Districts of Los Angeles County

Celebrating the golden anniversary of any partnership is a very special event. That is especially true for SCCWRP, which has served as the premier scientific research body for the analysis and modeling of impacts of wastewater and stormwater discharges to the Southern California Bight for 50 years. My heartiest congratulations to the SCCWRP member agencies, its Commission, and certainly to Executive Director Steve Weisberg and his outstanding staff!

1969 was SCCWRP's inaugural year and also the year I became a member of the Sanitation Districts of Los Angeles County (LACSD) as a Project Engineer in Chuck Carry's Research and Development Section. John Parkhurst was the LACSD Chief Engineer and General Manager, and together with Walt Garrison, who was the Assistant Chief Engineer and ultimately followed John, they had the vision to partner with the Cities of Los Angeles and San Diego, Orange County Sanitation District and Ventura County to pool their resources to establish a science-focused organization to guide their marine environment decisions. I witnessed the hard work of Chuck as the prime author of the SCCWRP Joint Powers Agreement. The JPA was to be for three years, but the wisdom and power of a collaborative, science-based effort with SCCWRP that utilized the talents of the respective agency staffs set the stage for turning three years into 50 years.

In my LACSD career and in-depth involvement of the implementation of many innovative processes and approaches to treatment for ocean discharges, including solids processing, mitigation of DDT impacts and secondary treatment, the work of SCCWRP was an important element of the solution. Along the way, in 1990, Chuck as LACSD's Chief Engineer and General Manager was the lead supporter of expanding the SCCWRP Commission to include the State Water Resources Control Board, the Los Angeles, Santa Ana and San Diego Regional Boards, and EPA Region 9. The active participation of the regulatory community greatly enhanced SCCWRP's path of success. Between 2003 and 2006, during my tenure as Chief Engineer and General Manager, the coastal stormwater management agencies were added to the Commission. I retired from LACSD in 2007. I state without qualification that participation in SCCWRP was one of my most satisfying professional experiences. Here is to another 50 years of success for SCCWRP.

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## Robert Ferrante

### SCCWRP Commissioner, 2016-, Sanitation Districts of Los Angeles County

One of SCCWRP's most important roles is providing a forum for collaboration between member agencies, scientific institutions and other stakeholders. As a Commissioner, I have seen this in action among the leaders of these different groups. You need look no further than the Commission meetings, where the latest research conducted by SCCWRP staff, usually with scientific partners, is presented to the regulators and the regulated. At times, these two groups can be on opposite sides of issues. Well, honestly, this can happen frequently. However, SCCWRP staff presentations and the ensuing Commission discussions are conducted with the primary purpose of gaining a deeper scientific understanding of the issues in order to create common ground.

The common ground of unbiased science is what makes SCCWRP beneficial to all parties and allows it to be a respected source of information. We all share in the mission of protecting public health and the environment. The need for research and good data is why the Sanitation Districts of Los Angeles County was a founding member of SCCWRP and a strong supporter of its work. Congratulations to SCCWRP on 50 years!

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## Alan Langworthy

### SCCWRP Commissioner, 1990-1992, 1994- 2009, City of San Diego

I have been associated with SCCWRP in some manner since the mid-1970s. In the early years, it consisted of coordinating with the scientific staff, as I was involved with San Diego's wastewater treatment and ocean monitoring. My relationship changed when I was appointed the Deputy Water Utilities Department Director, working with our appointed SCCWRP Commissioners and eventually serving on the Commission myself. Although still very interested in the technical issues, I found myself also deeply involved in organizational issues as well.

As such, my recollections here focus not on any single scientific accomplishment, but rather on three important organizational moments in SCCWRP history. I had the privilege of being involved at these critical times and feel that they were significant in the evolution of SCCWRP to the preeminent scientific organization that it is today. First, in the late 1980s, management and financial considerations caused the then-five wastewater sponsoring agencies to consider folding the organization. But discussions among the Sponsors resulted in a renewed recognition of the high value of the scientific work, and decisions were made to assure funding and initiate management changes to secure SCCWRP's future. Second, in the early 1990s, the founding wastewater agencies reached out to federal and State agencies involved in wastewater regulation to join SCCWRP and provide a forum for the discharges and regulators to interface and investigate/discuss issues of concern. Third, by the early 2000s, SCCWRP again reached out to broaden participation by including stormwater agencies.

Whereas SCCWRP has always produced valuable scientific information, these management decisions carried SCCWRP through some early rough periods and significantly modified the course of the organization from its initial three-year mission in 1969 in support of the wastewater dischargers. As a result, today it is recognized as a premier, multi-agency research organization that produces information that can be used to make management decisions by its members and other interested parties. And because of SCCWRP's successful maturation over the last 50 years, it can be rightfully said that the ocean is better for it.

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## Dr. Mas Dojiri

### SCCWRP Alternate Commissioner, 2002-, City of Los Angeles

"Only by attracting the best people will you accomplish great deeds." –General Colin Powell

It has been my honor to have worked with SCCWRP for a total of over 22 years (4-1/2 years as CTAG Representative, and 17-1/2 years and counting as Alternate Commissioner for the City of Los Angeles). I also served as Commission Chair (two years) and Vice-Chair (two years), and have been serving on the Commission's Personnel and Finance Committee for over 17 years.

Over the last 22 years, I have come to realize that SCCWRP epitomizes Colin Powell's quote. I don't think it can be disputed that you cannot do great deeds without great people. From the staff at the front desk, to the administrative staff, technicians, scientists, senior scientists, and principal scientists, to executive management, I have always been impressed with the SCCWRP staff. SCCWRP has assembled technically expert staff who are extremely knowledgeable in their respective fields, well-known internationally, and at the forefront of cutting-edge science. But, beyond technical expertise, are the staff's excellent interpersonal skills, customer service, and friendly disposition. Whenever I have a question regarding specific science questions, I do not hesitate to shoot an email to the appropriate scientist or pick up the phone to talk to him/her directly; each conversation is like talking to a friend.

In the past, the City of L.A. used SCCWRP's Model Marine Monitoring Program to reduce its ocean and harbor monitoring programs by 50%, reducing costs significantly yet still obtaining the necessary data to make appropriate and meaningful assessments of two marine environments. I have worked closely with SCCWRP scientists on the Southern California Bight Regional Monitoring Program, rapid microbial methods, antibiotic-resistant bacteria, contaminants of emerging concern, harmful algal blooms, toxicity testing issue, ocean acidification, and hypoxia, among others, and am currently working with SCCWRP on an environmental flow study of the Los Angeles River. Each and every interaction and partnership have been informative, rewarding, and valuable, as well as enjoyable. Kudos to SCCWRP for its scientific expertise, innovative research, and exceptional achievements, and most of all, kudos to its staff who make it all possible.

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## Catherine Kuhlman

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### SCCWRP Commissioner, 2012-2016, California Ocean Protection Council

I have had the pleasure to work with SCWRP as a representative of three different agencies over three decades. In the early days, SCCWRP was seen as a dischargers' organization, but through thoughtful stewardship, SCCWRP is now widely recognized as a leader in impartial, cutting-edge water-quality science whose content expertise and process are sought after at local, state and national levels.

While at EPA and later at the North Coast Regional Water Board, I relied on SCCWRP to deliver the data and science needed to effectively regulate water quality; SCCWRP's approach and understanding of the issues was impeccable, making our jobs much easier. But I think my most rewarding experience was serving as one of SCCWRP's Commissioners during my tenure as California's Secretary of Ocean Policy. During this time, SCCWRP embarked on much more complex problems, including climate-driven ocean acidification and the impacts of nutrient loading on near-coastal waters. SCCWRP's forward-looking leadership and deeply competent and dedicated staff helped the State grapple with seemingly intractable problems.

We all owe SCCWRP a debt of gratitude. SCCWRP has taught us how to partner with one other effectively, how to advance science on behalf of solutions, and how to serve as a trusted, honest broker. It's been a pleasure to see SCCWRP's positive impact spread throughout the state. We are all the beneficiaries of SCCWRP's service.

It was an honor to be one of your Commissioners. Carry on!

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## Jonathan Bishop

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### SCCWRP Commissioner, 2004-2007, Los Angeles Regional Water Quality Control Board

### Alternate Commissioner, 2007-2010, State Water Resources Control Board

### Chief Deputy Director, California State Water Resources Control Board

My first interaction with SCCWRP is when I was "volunteered" to help with data management for the Microbiology portion of the Southern California Bight 1998 Regional Monitoring Program. That experience introduced me to SCCWRP and began relationships that continue today. In the late 1990s and early 2000s, I spent many a day in a SCCWRP conference room scoping out study plans. We worked together to tackle snapshot sampling and following storm drains into the Los Angeles and San Gabriel Rivers during dry weather, and how to quantify wet-weather loads for TMDLs. In my role leading the Los Angeles Regional Board's TMDL effort, I was always able to turn to SCCWRP for an approach that would meet the very tight timelines and be done in collaboration with the regulated community and NGOs.

In addition to working with the staff at SCCWRP, I have had the pleasure of taking the staff and their families on several whitewater rafting trips – getting to know them as friends, not just as scientists and colleagues.

In my current role, I look to SCCWRP to help address intractable problems, ranging from screening tools for CECs, to impacts of land-based sources on ocean acidification, to determining the minimum flow needed to support beneficial uses on the Los Angeles River. I look forward to continuing to work with SCCWRP in the future to provide the technical and scientific basis for how to protect and improve water quality using collaboration, partnership, and unbiased science to find solutions.

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## Darrin Polhemus

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### SCCWRP Commissioner, 2006-2018, California State Water Resources Control Board

### Deputy Director, Division of Drinking Water, California State Water Resources Control Board

"Welcome to SCCWRP! We just voted you the new Commission Chair!"

My introduction to SCCWRP left me feeling a little overwhelmed as the SCCWRP Commission quickly took advantage of my "new guy" status to vote me the Commission Chair, even before I knew most of their names. I was completely unprepared to argue against being Chair, and was also new to my position at the State Water Board as Deputy Director of the Division of Water Quality. I came from the State Water Board's financial assistance and enforcement programs, so had some casual familiarity with the Division of Water Quality's work, but certainly was not versed at the level of detail I would need. Let me just say, SCCWRP to the rescue.

It took only a couple of meetings and the direct outreach to me by many of SCCWRP's staff to offer their vast knowledge and expertise for me to realize the value of the resources I had just a phone call away. I felt much more confident knowing that we had a resource available that not only loved to answer questions about what they did know, but seemed to get even more excited when you asked a question they did not have an answer for. These lines of inquires became the most interesting because they would often lead to further studies or, in some cases, the creation of new science. Add to this the point that many of the discussions on important water-quality science issues were able to take place in front of both the regulators and regulated agencies, which made for a common understanding and created even more value for all the policymakers involved.

It became my pleasure during my time in the Division of Water Quality to answer the question "Where is your science group located?" with "I have something better than just internal science staff – I have SCCWRP too." I am very proud of my role as Chair of the SCCWRP Commission and thankful for the many levels of assistance SCCWRP provided to me and the public at large. From convening panels of experts to inventing new areas of science, SCCWRP is truly a world leader in the field and an example of how to have science intersect effectively with policy.

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## Dr. Robert Ghirelli

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### SCCWRP Commissioner, 1990-1996, Los Angeles Regional Water Quality Control Board

### SCCWRP Commissioner, 1998-2018, Orange County Sanitation District

I had the opportunity to serve as a member of the SCCWRP Commission for more than 25 years representing two different organizations – one a regulatory agency, the other an operating agency. Despite the different perspectives – first as a regulator, then as senior staff member working for a regulated entity – there was a common thread that that ran through my time at SCCWRP. I am particularly proud of the steps taken by the Commission and staff to make SCCWRP into a collaborative organization focused on creating strategic partnerships with many local, state, federal and international organizations. The decision to offer Commission membership to stormwater management agencies, and SCCWRP's role in facilitating interdisciplinary scientific research and multi-agency investigations at a watershed level, further enhanced SCCWRP as a leader in coastal water-quality research.

This multidisciplinary approach to solving environmental problems is a cornerstone of the approach I believe must be taken to successfully take on the environmental challenges facing our planet. Today, SCCWRP is using its scientific reputation to draw scientists and policymakers from around the world to its location in Costa Mesa, California, to participate in meetings, symposia and conferences designed to encourage collaborative dialogue. That's how consensus gets built and, as a former Commissioner, it is gratifying to see SCCWRP leading the way.

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## Michael Moore

**SCCWRP Commissioner, 1998-2007, and CTAG Representative, 1985-1989, Orange County Sanitation District**

**SCCWRP Staff, 1974-1984**

SCCWRP's senior scientific staff, such as Drs. Alan Mearns and David Young and Consulting Board Member Professor John Issacs questioned our methods and made us better writers, better presenters, better leaders and ultimately better people. They pushed us out of our comfort zones, challenged us to think beyond the question at hand and the significance of the conclusions we drew. These great people prepared me to move on to lead OCSD's Ocean Monitoring Program and come back to be SCCWRP's first "alumnus" Commissioner.

One story I like to tell about the early years is that we were sitting around one afternoon discussing a SCCWRP Consulting Board meeting, and someone said, "I wonder what lives in the deep channels off the Southern California coast?" Soon thereafter, we were heading out to sea with a 16-millimeter movie camera set to take a short burst every 15 seconds, stuck in an untested underwater housing that we lowered in a baited frame to a depth of over 3,000 feet just west of San Clemente Island. After 48 hours, we retrieved the camera and spent weeks identifying the animals captured on film and writing papers. This sounds like we had money to burn back then, but that was not the case; once I was reprimanded for using too much air on a diving job we did on the offshore oil towers, and was refused reimbursement for glue to repair my personal wet suit. Every year, it was a struggle to get the grants to keep us all employed, but I can say without a doubt that my 10 years at SCCWRP were the most enjoyable and rewarding in my professional career.

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## Dr. M. Indira Venkatesan

**SCCWRP Scientific Consulting Board, 1992-1994**

**Research Professor, Institute of Geophysics and Planetary Physics, University of California, Los Angeles, retired**

Congratulations on your accomplishments over the last 50 years. Wishing you the best for continued success in your monitoring and research endeavors. The systematic scientific data generated from SCCWRP on water quality and the marine ecosystem in the Santa Monica Bay and Palos Verdes Shelf have been crucial for the regulatory agencies to strive for better health of the oceans.

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## Dr. Farhana Mohamed

**CTAG Representative, 2001-2004, City of Los Angeles**

During the early parts of my career with the Environmental Monitoring Division (EMD) of LA Sanitation & Environment, I interacted with SCCWRP and was appointed co-chair and member of various high-profile committees with environmental stewardship, including the Steering Committee for the Southern California Bight 2003 Regional Monitoring Program and CTAG. This greatly solidified my growth as an environmental professional. The intriguing power questions posed by the SCCWRP leadership for planning and execution of environmental projects not only paved the way for their success, but also played a crucial role in my understanding of the reasoning and benefits of regional monitoring programs (ocean and stormwater), NPDES and MS4 monitoring (use of model monitoring concept), and microbiological risk assessment via epidemiological studies, among others.

I was EMD's Project Manager for implementing and acquiring regulatory approval for the Chromogenic Substrate (CS) Bacterial Test Method in 2002. In the process, almost four years of hard work was put forth by EMD's Microbiology Unit with management support. The collaborative role of SCCWRP in this effort is worth mentioning. In 1998, EMD was the lead laboratory in conducting a parallel study of both CS and membrane filtration methods during the Southern California Bight 1998 Regional Monitoring Program conducted by SCCWRP. This greatly enhanced the quality and standardization of the collected data. After the Los Angeles Regional Water Quality Control Board (LARWQCB) incorporated the CS method at the Hyperion and Terminal Island Water Reclamation Plants, we started the process of seeking regulatory approval. During the process, SCCWRP Director Steve Weisberg personally guided me in devising strategy for approaching LARWQCB to get the required approval in December 2002. This project won a National Environmental Achievement Award from the National Association of Clean Water Agencies in 2004. To this day, the efficient and economical CS method is being used by LA Sanitation in detecting bacterial levels in receiving waters, especially for shoreline and TMDL monitoring and wastewater spills.

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## Dr. Jun Zhu

**CTAG Representative, 2017-2019, Los Angeles Regional Water Quality Control Board**

I first came across SCCWRP when I attended its annual symposium a few years ago, where I got to learn about the agency and the research that SCCWRP scientists were conducting. In 2017, I was promoted to Senior Environmental Scientist and became a CTAG Representative as well as the statewide Surface Water Ambient Monitoring Program (SWAMP) coordinator representing the Los Angeles Regional Water Quality Control Board.

I enjoyed working with Steve Weisberg, Ken Schiff, Eric Stein, Steve Bay, Alvina Mehinto, John Griffith, Rafi Mazor, Marcus Beck and many others on various research projects. I enjoyed attending the quarterly CTAG meetings and the intersessional meetings, which provided a great platform for dialogues among the water-quality regulatory agencies, the stormwater management agencies, and the wastewater treatment agencies. At those meetings, I was exposed to novel research ideas, cutting-edge technology and tools, and exercises to identify research priorities with a hypothetical million dollars in funding, which was fun. I also enjoyed attending several planning meetings and subcommittee meetings for the Southern California Bight 2018 Regional Monitoring Program, where multiple agencies were making an effort towards a better understanding of regional water quality and aquatic ecosystem health.

In 2019, I was promoted to Supervisor, and thus no longer served as a CTAG member for the Water Board. Despite my rather short tenure, I truly enjoyed interacting with SCCWRP scientists, fellow CTAG members, and representatives from other member agencies. I look forward to working with them again in the near future.

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## Dr. James Noblet

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### SCCWRP Staff, 2000-2003

**Professor, Environmental Chemistry, California State University, San Bernardino**

The three years I worked at SCCWRP were without question the most important and transformative of my career. I joined SCCWRP in 2000 after a three-year academic position in the University of Wisconsin System, where I gained knowledge and experience in small and large scale freshwater systems. Joining SCCWRP afforded me the opportunity to learn about the coastal marine environment and engage in world-class marine environmental chemistry research. Moreover, I had the opportunity to work with many talented scientists at academic institutions and agencies at all levels of government – local, state and federal. I developed relationships with colleagues from all over the country, many of which I maintain to this day. As a condition of my hiring, Executive Director Steve Weisberg assigned me the task of chairing the Sediment Chemistry Committee for the Southern California Bight 1998 Regional Monitoring Program, and being the principal author of the final report. It was a daunting task at first, and it took me a while to gain the requisite knowledge, experience and confidence to lead that effort. Throughout the steep learning curve, Dr. Weisberg maintained his confidence in me and provided mentorship and guidance as necessary. Over those three years, I experienced tremendous professional and personal growth. I decided to leave SCCWRP in 2003, but the knowledge and experience I gained there played a critical role in my being hired as a tenure-track faculty at CSU San Bernardino and my eventual, very successful career in academia.

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## Dr. Molly Leecaster

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### SCCWRP Staff, 1998-2000

**Research Associate Professor, Division of Epidemiology, University of Utah School of Medicine**

The experience of working at SCCWRP shaped my path. I was the staff statistician, and this was my first “real” job; it formed the basis of my expectations for research and collaboration. A few of these expectations I have been able to meet in other jobs – namely, research for the good of people and the Earth; work that is challenging, meaningful and fun; and collegial relationships with co-workers who are smart, hard-working and a joy to work with. Two things stand out because I have not experienced them since: First, Steve Weisberg actually did annual reviews; they lasted an hour, and I left feeling encouraged, motivated and valued. And second, our work consistently affected policy instead of just filling journals and file cabinets.

I was involved in so many impactful projects. We provided the EPA with our insights on how to monitor beaches to protect human health. We evaluated plans to monitor wastewater outfalls and storm drains. We mapped sediment grainsize in Santa Monica Bay. I could go on – and I was only at SCCWRP for three years! I have presented some of this work to high school math classes and STEM for Girls workshops. They were in awe of being involved in such important and interesting work.

SCCWRP is part of me, and I continue to share these experiences whenever possible. I wear an anklet made from plastic pellets recovered from the North Pacific Gyre, to support the efforts initiated by Captain Charles Moore while I was at SCCWRP. I am especially grateful when I receive the SCCWRP Annual Report and feel a connection to this impressive group. Namaste.

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## Dr. Christopher Solek

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### SCCWRP Staff, 2007-2015

**Environmental Resources Branch, U.S. Army Corps of Engineers Los Angeles District**

My first interaction with SCCWRP was actually not in a conference room or at a scientific meeting, but along the San Gabriel River in the San Gabriel Mountains as I was conducting research for my Ph.D. dissertation. It was here that I first met Dr. Eric Stein and his crew, who were gathering data for the San Gabriel River Regional Monitoring Program. I stayed in touch with Eric after this, and little did I know I would be working at SCCWRP a few years later as his wetland program manager.

I owe a great deal to SCCWRP both professionally and personally. From a professional standpoint, SCCWRP provided me an unparalleled opportunity to meet and work with wetland and freshwater science professionals at the local, regional, and statewide levels. The professional relationships I first established at SCCWRP have played and continue to play an important role in my career. It was at SCCWRP that I learned to be a better writer of scientific journal articles, a better presenter of scientific information, and a better facilitator of meetings and collaborative workgroups. All of these skills continue to benefit me on a daily basis. SCCWRP not only helped me hone my instincts as a professional scientist, but challenged me to think differently and apply myself in different ways.

From a personal level, the friendships I built with SCCWRP staff continue to endure and I know will be with me for a lifetime. Although I am no longer employed by SCCWRP, the organization continues to play a role in my life on so many levels. I am proud to have been affiliated with SCCWRP and will always consider myself part of the extended SCCWRP family.

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## Dr. Krista Kamer

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### SCCWRP Staff, 2000-2003

**Director, California State University Council on Ocean Affairs, Science & Technology**

Working at SCCWRP as a staff scientist was my first job upon finishing graduate school in 2000. I remember preparing for the interview with my advisor at UCLA and her telling me not to expect an offer, that this was the first round of interviews and she didn't want me to be disappointed. I also got lost on my way to the office in Westminster for the interview, but luckily I made it there in time, and then Steve Weisberg did actually make me an offer during the interview, which I of course accepted!

My position had been recently created to address issues around nutrient loading and eutrophication in coastal areas. I remember being in a meeting early on and I mentioned the scientific name of a type of algae. Someone asked me how to spell it, at which point I realized they were actually listening to me! That was a very exciting moment in my professional development – I was recognized as an authority on the topic of eutrophication, and it added to my confidence.

Throughout my next years at SCCWRP, I learned so much about water-quality regulations and decision-making that I hadn't been exposed to in graduate school. At first, I was a bit shocked to learn there was more involved in setting a TMDL than just the science, but over time I really came to appreciate the complex landscape and nuanced relationships of California's major dischargers and the regulators. I also learned a lot about constructive communication and mutually beneficial relationships based on trust. My experience at SCCWRP significantly shaped my career path and contributed to the success I enjoy today as the director of a CSU-wide program supporting marine and coastal research.

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## Dr. David Young

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### SCCWRP Staff, 1970-1980

#### U.S. Environmental Protection Agency, retired

How well I remember learning of SCCWRP in the summer of 1970. I was finishing up my dissertation at the Scripps Institution of Oceanography when my research advisor, Professor John D. Isaacs, first told me about the organization. My first comment was, "Who's sponsoring it – the polluters?" It was then that I learned of the critical structure that John, as head of the SCCWRP Scientific Consulting Board, had promoted for the Project. The Board would insulate the scientists from the Sponsors, so that the research could be conducted and reported independently.

During my ten years with SCCWRP's Chemistry Department, never once did I receive any pressure from the Sponsors to alter a report. In 1975, I was invited to participate in the European Summer School of the Environment, and one of my lectures focused exclusively on SCCWRP's organization, and how important this was to the success of the Project. This fact served me well during my subsequent years as an environmental consultant, and with academia and the U.S. Environmental Protection Agency.

With guidance from the Scientific Consulting Board, we tackled a wide variety of scientific questions regarding the ecology of the Southern California Bight. During this time, I learned just how important teamwork was on a project of this scale, and professional relationships were formed that have lasted throughout my career. I have always been grateful for the opportunities that SCCWRP provided me during the initial phase of my career, and I am immensely impressed by the scientific contributions that this unique research organization has made during the last half century.

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## Dr. Alan Miller

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### SCCWRP Staff, 1973-1974

#### Professor, California State University, Long Beach, retired

I worked briefly at the SCCWRP facility in El Segundo before taking a position at CSULB. As a marine ecologist, I was hired to start investigations into the intertidal and subtidal habitats associated with the L.A. County outfall off White Point. Besides the memory of jet fumes from the LAX runways wafting through the building, my favorite memory was the day Director Willard Bascom brought in some treasure recovered off the coast of the Bahamas by his undersea exploration company from the 1656 wreck of a Spanish galleon, *Nuestra Señora de la Maravillas*. Here, gleaming on a table, were solid gold ingots (several pounds each), Spanish coins and some jewels. Wow! It was being shipped to the Bahamian government. I am proud to have been part of the CSULB Marine Biology program that was important in a number of present and former SCCWRP employees' education.

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## Margie Sherwood Danz

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### SCCWRP Staff, 1971-1980

I first learned about SCCWRP through an article on the front page of the Los Angeles Times. Since I had a master's degree in zoology and had spent an entire summer studying marine ecology at Woods Hole, I thought SCCWRP would be a perfect place to work.

When I first met Dr. George Hlavka, the Project Manager, the first set of scientists had already been hired but had not yet started working on site. I was offered the only available position – that of secretary – with the promise of moving into a biologist position in the near future. Accepting this position was the right decision. My first significant assignment was to write and arrange for the printing of a brochure describing SCCWRP. The brochure was informative, but definitely not fancy. This turned out to be helpful because not everyone at the time was convinced that SCCWRP would become a scientific organization free of partisan pressures. Fortunately, SCCWRP had a Consulting Board of well-respected scientists headed by Professor John D. Isaacs and a Commission of local civic leaders and elected officials that reflected public concerns. I worked primarily on fish disease studies.

I loved working at SCCWRP because of the comradery and knowing that we were doing something important and interesting. At SCCWRP, I learned how to appreciate the importance of context in doing research. Professor Isaacs always emphasized that we needed to understand natural fluctuations in the oceanographic system in which we were working, and that we needed to explore all potential sources of pollutants in order to reach valid conclusions. Overall, I learned to value multidisciplinary expert input, that innovative approaches can be successful, and that trying something new can be worth the risk. All that I learned was important in helping me in my next job that focused on assessing quality of healthcare and healthcare quality improvement interventions.

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## Dr. Bruce Thompson

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### SCCWRP Staff, 1981-1993

#### Senior Scientist, San Francisco Estuary Institute, retired

I was hired right of graduate school by SCCWRP Director Willard Bascom to replace Jack Word. I chose SCCWRP instead of a research post-doc because I wanted to work on marine environmental issues that would hopefully benefit society. Our group completed two reference surveys (1985 and 1990), studies of the slope off Orange County, and a study on the recovery of Santa Monica Bay after the sludge outfall was turned off. We also worked on monitoring design and sediment toxicity to indigenous invertebrates.

All of those studies involved collegial and rewarding interactions with other SCCWRP staff, sponsoring waste discharge agencies and regulatory agencies. I participated on the Technical Committee for the Santa Monica Bay Restoration Project, the State's Bay Protection and Toxic Clean-up Project, and numerous work groups and committees that interacted with CTAG, regulatory agencies and environmental groups.

There were some difficult times as well, during the coming and going of two SCCWRP Directors. Those years at SCCWRP demonstrated to me the importance of providing independent scientific data and interpretation to facilitate policy discussions among stakeholders. It is an extremely important mission that I was fully committed to. I also believe that SCCWRP's focus on scientific studies and publication is very important. I know how hard it is to sustain those endeavors, and it is a testament to SCCWRP's leadership that these endeavors are still prominent pillars of the organization. I left in 1993 to work at a similar organization, San Francisco Estuary Institute, and retired in 2011.

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## Dr. Karen Setty

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SCCWRP Staff, 2007-2014

**ORISE Postdoctoral Fellow, Center for Public Health & Environmental Assessment, U.S. Environmental Protection Agency**

After finishing my master's in environmental science and management at UC Santa Barbara, I searched for a workplace where I could contribute at the boundary of water resources science and management. I found a providential match at SCCWRP, where I was exposed to a dizzying array of water research areas and thrived under the academic and strategic mentorship of Steve Weisberg. While providing communications support for staff, CTAG, and the Commission, I started up the SCCWRP Symposium, revamped the website, developed a fact sheet series, and coordinated two retrospective data collection and analysis efforts.

I remained content at SCCWRP as my personal life ramped up (marriage, home ownership, babies), and eventually felt the calling to more fully develop my research skills. Aided by SCCWRP contacts, I found a graduate program at the University of North Carolina's Gillings School of Global Public Health and moved across the country in 2015. There, I led some of the first public health impact evaluations of a drinking water safety intervention developed by the World Health Organization. As of May 2019, I'm officially "Dr. Karen," and recently began a postdoctoral position at the U.S. Environmental Protection Agency.

Beyond what I accomplished professionally, my most vivid memories are of the people I worked with every day and their random acts of kindness. One cold day in the office, Marlene Hanken gifted me a soft white blanket from her car that my kids and I still snuggle in. I regularly receive compliments on a pair of glass sea star earrings hand-crafted by Steve Bay. When the waves were up at Bolsa Chica, a few of us carved out time for "board meetings." And the list goes on ... I remain thoroughly grateful for all the ways the SCCWRP family has supported me.

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## Dr. Peter Miller

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SCCWRP Staff, 2008-2011

**Natural Resources Advisor, U.S. Agency for International Development**

I arrived at SCCWRP at an exciting time. Steve Weisberg had a vision for broadly implementing molecular biological methods as tools for enhanced environmental monitoring, and he brought me on board as Principal Scientist for SCCWRP's Biology Department to foster this effort. It was 2008, and new genetic methods were entering the mainstream for confidently and swiftly identifying species, particularly microbiota and invertebrates that were otherwise impossible to discriminate. At the same time, innovative genetic methods for determining organisms' level of physiological stress (an indication of environmental insult they had been subjected to) were being developed.

The accomplished team at SCCWRP – with its trusted position at the interface between regulators and the regulated, its track record for providing unbiased evaluations of new technologies, and its long history of conducting environmental assessments using traditional methods – was uniquely positioned to appraise the efficacy of these tools in marine and freshwater environments. Steve recruited me to lead these efforts and to build a new molecular biology laboratory. Unfortunately, the sudden economic downturn and recession that ensued at the end of 2008 meant that plans for a new molecular laboratory were put on hold, and funding to support transitioning to new methods was reduced.

At the same time, my own deep dive into the rapidly advancing field of DNA barcoding – using specific genetic markers to identify global biodiversity – resulted in my being recruited by the Canadian Centre for DNA Barcoding. Joining the international barcoding program was strongly attractive and, with difficulty, I made the decision to leave SCCWRP and join the Biodiversity Institute of Ontario as the Director of Barcoding Applications. In this role, I was particularly pleased to continue interactions with SCCWRP and many of its partners.

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## Dr. Steve Steinberg

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SCCWRP Staff, 2011-2018

**Geographic Information Officer, County of Los Angeles**

I joined SCCWRP after a 13-year career in academia and much to the surprise of my faculty colleagues. They wondered what would draw a tenured, full professor from the academic world to a small, public-sector Joint Powers Authority. The answer was simple: SCCWRP provided an opportunity to do work that would have a direct impact on policy and management – something that is rare in the academic world. Additionally, SCCWRP offered all the benefits of the academic model (multidisciplinary research, working with student interns, and publication and presentations in respected journals and professional conferences) without the less attractive parts (department meetings, battles with deans for resources and grading).

More importantly, I was particularly drawn to the truly collaborative nature of the organization, both internally among departments and externally among the wide array of member agencies, NGOs and academic institutions with whom we regularly had an opportunity to collaborate. The objective at SCCWRP was always about the quality of the work, not whose name was first on the publication.

Personally, my time at SCCWRP also provided me the opportunity to develop as a leader, manager and thinker in ways that were quite different than in the academic sector. I learned the language and processes core to the public sector and to local government in particular. My skills in making a compelling and concise presentation to a governing board or in defining and understanding the needs and opportunities within a government context were essential to my development and preparation for the position I was later offered with the County of Los Angeles. Through the opportunities and mentoring I received while with SCCWRP, I became much better prepared for the continuation of my career in local government, where I can continue to make a real difference for our environment and the communities we serve.

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## Jack and Cindy Word

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Jack Word, SCCWRP Staff, 1973-1980

Cindy Word, SCCWRP Staff, 1971-1972, 1974-1978

Our SCCWRP careers were the beginning of a long but exciting career in the study of aquatic environments throughout the world. Those careers that began in the study of the Southern California Bight eventually extended from the southeast corner of Brazil to the Chukchi and Beaufort Seas in the far north and to Europe, the Middle East and Far East. Our studies were always interdisciplinary (not multidisciplinary), and we learned the difference while at SCCWRP. When we look back at our time at SCCWRP, it is the people we think about and how important they were to both of us. SCCWRP Director Willard Bascom was a strong force, and he taught us the difference between discovering changes to the environment and establishing what that really meant by asking questions. Those questions eventually led to the creation of new research objectives to answer those "so what" questions; these questions and planned research also provided excitement as we gained a better understanding of processes. One of Willard's mantras was, "It is amazing what you can accomplish if you don't care who gets the credit." It was a hard concept to deal with as young scientists, but he was really correct in that thought.

Dr. Alan Mearns led the biological group at SCCWRP. The chemists were led by Dave Young, the physical oceanographers by Tareah Hendricks, the field coordination by Harold Stubbs, the engineering department by Jack Mardesich, business management by Charlie Halgren, and the editorial production by Robin Simpson. We were an extremely close group, led by individuals that adopted Willard's mantra. We shared our curiosity, and our work was better because of it. But SCCWRP was not just the organization in El Segundo/Long Beach and, earlier, Westwood. SCCWRP also consisted of the scientists at the various sanitation districts, numerous consulting groups that also worked in Southern California, and our Consulting Board (led by Professor John Isaacs). We spent a lot of time at sea as well in laboratories collecting information and working with these various groups to address our questions. What a great experience for all of us.

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## Jim Laughlin

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### SCCWRP Staff, 1978-1989

#### **Air, Acoustics and Energy Technical Manager, Washington State Department of Transportation**

I started at SCCWRP in 1978, working part time for Jack Word picking microscopic invertebrates out of a sample of screened sludge in El Segundo. It doesn't sound that glamorous now, but back then, I loved every minute. Eventually I became a marine invertebrate taxonomist, conducted toxicity tests with Steve Bay, wrote computer code, built test apparatus from scratch, traded pranks with Dave Tsukada and spent time at sea with Harold Stubbs. Every day, I couldn't wait to come to work and learn something new and experience new challenges. It was like eleven years at the best grad school.

The years I spent at SCCWRP were the most memorable in my career. It was much like a start-up company today, except the work we were doing was important. We all knew that we were part of something unique and what we were doing was cutting-edge. If we could imagine it and convince the board it was worthwhile, we were given latitude to make it happen.

For me, it was just as much about the people as it was the work we were doing. We were like family and established lifelong friendships. I met and married the love of my life, Sherry (Taylor Watson), at SCCWRP, and we still read every Annual Report together.

When I left SCCWRP to take on new challenges in the Seattle area, it was bittersweet. Like some others, I think for the rest of my career I was always searching for another SCCWRP, but could never find it. I feel very fortunate to be a part of SCCWRP's history during the early years and for the opportunity to work with pioneering researchers during that period.

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## Dr. Alan Mearns

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### SCCWRP Staff, 1971-1980

#### **Scientist Emeritus, Office of Response and Restoration, National Oceanic and Atmospheric Administration**

Although I spent only a decade as a marine ecologist and Biology Division leader at SCCWRP, that decade of experience greatly influenced the rest of my career at NOAA. I joined SCCWRP in 1971 after completing my Ph.D. at the University of Washington, declining a great offer with the National Marine Fisheries Service in Alaska. I grew up in Southern California, and had the privilege of working on my master's degree under Dr. Donald J. Reish at Cal State Long Beach.

My tenure at SCCWRP was during its formative years, and nearly all the issues we addressed dealt with the five major ocean outfalls. Our team spent many days at sea with colleagues from the sanitation districts, mapping out the distribution and ecology of fish and sediment invertebrate communities, developing the first regional coordinated monitoring campaigns, expanding "mussel watch," tracking coliform and viruses, and determining the causes of fish diseases. In the lab, we conducted some of the first toxicity tests with effluents and crunched tens of thousands of field data points – in the days before desktop computers, GPS, cell phones and the technology we take for granted today.

Several times a year, during weekend meetings, we were constantly challenged to look at new ways of asking questions by our nationally recognized Scientific Consulting Board, and constantly challenged by environmental groups, NGOs and sponsors. Our work helped re-define state water quality criteria, and provided nationally adopted standard field sampling methods. We witnessed how ecosystems responded to (or didn't respond to) changes in wastewater treatment. When I left for NOAA in 1980, I took with me not only technical knowledge and how to think through marine environmental problems, but also lifelong friendships that sustained me through my entire career.

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## Steven Bay

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### SCCWRP Staff, 1980-

My career at SCCWRP has been the central, and most significant, element of my professional life. I started my SCCWRP employment at the entry level, as a lab technician in the process of completing my master's thesis at CSULB, and my 39 years of employment coincided with most of the seminal events in SCCWRP's evolution into the unique institution it is today.

The reason that I chose to spend most of my professional career at SCCWRP is simple – I could not envision a better job at any other institution. While other jobs could have provided greater financial rewards or more exotic activities, SCCWRP provided me with things of greater value to me – that is, a stable and supportive environment in which to be creative in my research while also producing work of value to society. When describing SCCWRP to others, I like to compare it to a university in terms of the multi-disciplinary focus on research excellence, but without the political and administrative pressures that often counter productivity.

Perhaps the greatest benefits that I gained from SCCWRP have been in the areas of communication, judgment and interpersonal relations. The hundreds of presentations and meetings that I have had while at SCCWRP have taught me the skills of effective communication, value of consensus, and to have patience and respect for persons with alternative viewpoints. To this day, I still remember the lack of credulity expressed by a SCCWRP Commissioner when I offered conclusions regarding wastewater toxicity based only on results for one sample. That early SCCWRP experience is one of many that has shaped my professional and personal life.

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## Dr. Rachel Noble

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### SCCWRP Staff, 1998-2001

#### **Distinguished Professor, Marine Sciences, University of North Carolina, Chapel Hill**

I completed my Ph.D. at the University of Southern California in 1998, and was lucky enough to interview with Steve Weisberg at SCCWRP for a postdoctoral research position with a single goal: to start the Microbiology Department at SCCWRP. Conversations across laboratories and municipalities and health directors were invigorating, illuminating and sometimes difficult. We charted new territory and paved the way for a "sea change" in the perception of water-quality protection.

During my time there as a scientist, we as a microbiology group accomplished much, and we learned how to work together as a research community to address microbiology-related issues along the coast, including building relationships and working hand in hand with nearly 30 other Southern California water-quality laboratories. We developed new methods, laid the original groundwork for addressing the differences between wet-weather and dry-weather conditions, conducted cross-calibration exercises, slogged through standardization and method acceptance meetings, and participated in first-ever regional assessments. We also were the first group to push the discussion around rapid, qPCR-based methods for recreational water quality, which became part of EPA's national criteria in 2012.

My work at SCCWRP defined my career, which has always included some of the key mentoring that I received from Steve Weisberg and others at SCCWRP, including Ken Schiff, Ananda Ranasinghe, Steve Bay, Liesl Tiefenthaler, Darrin Greenstein and Larry Cooper. My training at SCCWRP allowed me to be unique in academia, allowing me to find rare ways to work with stakeholders, municipalities, state governments and environmental consultants. I deeply appreciate the worldview that I gained at SCCWRP – and I hope to be able to continue working collaboratively with SCCWRP well into the future.

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## Andrew Jirik

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### SCCWRP Staff, 1990-2000

#### Environmental Specialist, Port of Los Angeles

I worked at SCCWRP first in the Benthic Department, and then the majority of my time was spent in the Toxicology Department. SCCWRP faced several challenges during that time period (e.g., changes in leadership, the Orange County bankruptcy, moving and constructing laboratory space in Westminster, and even adapting to the internet!). Through these changes, the quality research went on. Little did I know that some of the toxicity research projects and field collections that I worked on would directly influence the development of test/sampling protocols and regulations that now affect my career working on TMDLs at a regulated party (Port of Los Angeles).

I would like to highlight two aspects of my time at SCCWRP and the experience that I took with me. The first is the opportunity that was presented to me as a research technician to become part of the scientific community and travel to attend and present research at conferences. As part of this, I gained invaluable experience in public speaking, which is now a routine part of my job. I also gained confidence for later application in participation in working groups consisting of diverse parties.

The second aspect is the benefit of continuing to interact with SCCWRP colleagues in a new role after leaving SCCWRP. Most recently, SCCWRP, the State Water Resources Control Board, the Los Angeles Regional Water Quality Control Board and the Ports of L.A. and Long Beach were involved in a large-scale, multi-year effort to conduct special studies and modeling to achieve two purposes: improve the science of the Harbor Toxics TMDL for the reconsideration, and provide the first test case for application of Tier III site-specific Human Health SQO modeling. This collaborative effort directly aided the development of the Human Health SQO regulation, which was subsequently approved by the State Water Board and EPA.

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## Dr. Jerry Schubel

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### Chair, SCCWRP Programmatic Review Panel, 2014

#### President and CEO, Aquarium of the Pacific

I have been closely associated with SCCWRP since moving to Long Beach in the spring of 2002, but my knowledge of it goes back almost to its beginning. My Ph.D. advisor and mentor, Dr. Donald Pritchard, was one of SCCWRP's original science advisors and was very impressed by it.

My respect and admiration of SCCWRP has grown over the years. As Chair of SCCWRP's Programmatic Review Panel in 2014, I got a rare inside look at the organization. It confirmed my belief that SCCWRP is one of the – if not the – most outstanding regional marine monitoring programs in the world. It doesn't produce only data like a number of monitoring programs do, but also converts the data into information tailored to the needs of the sponsoring organizations and valuable to the scientific community. SCCWRP reports are clear and well-illustrated, and provide a rich chronicle of the changing conditions in the Southern California Bight. SCCWRP has developed a number of protocols for monitoring important water-quality parameters that have made existing protocols obsolete. SCCWRP benefits from strong and visionary leadership and an outstanding staff of scientists, engineers and educators. SCCWRP sets the bar for all regional marine monitoring programs, and has been a model for many of them.

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## Dr. Geoffrey Scott

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### Member, SCCWRP Advisory Panel for Contaminants of Emerging Concern (CECs) in California's Aquatic Ecosystems, 2009-2012

#### Professor and Chair, Environmental Health Sciences, University of South Carolina

I have had the great honor and privilege to work with SCCWRP for a long period of time when I was Director of the NOAA Center for Coastal Environmental Health and Biomolecular Research (CCEHBR). Our first interactions followed my meeting with Dr. Steve Weisberg of SCCWRP as part of a National Academy of Science Panel on Microbial Source Tracking. Steve and I both had a great passion for finding microbial pollution source indicator tools that could help reduce bacterial loadings into coastal waters, and so we worked collaboratively on the development of new tools and technology. CCEHBR participated with Steve and SCCWRP in what was the first interlaboratory calibration and comparison exercise in evaluating both library-dependent and library-independent microbial source tracking technologies. The findings from this SCCWRP study led to numerous publications as the field of microbial source tracking moved forward to library-independent methods, which are used today.

Later, Steve served on our External Advisory Board for NOAA's Hollings Marine Laboratory, providing great insight into the future directions of research at NOAA, including extensive collaborations with Mussel Watch and contaminants of emerging concern. In 2009, I joined SCCWRP's Science Advisory Panel for Contaminants of Emerging Concern (CECs) in California's Aquatic Ecosystems and worked with the CEC team to develop new methodologies to assess risks of CECs in aquatic ecosystems in California. That SCCWRP panel did some of the most pioneering research on CECs to date, developing methods for assessing the risk of CECs that often lacked complete toxicology and chemistry monitoring data, identifying a dirty dozen list of CECs for future monitoring, and developing novel risk assessment methods for antibiotic resistance that were employed by other researchers following publication of our report in 2012.

The greatest thing about working with SCCWRP is you know you are always working on the cutting edge of science, no matter what the scientific issue is. SCCWRP scientists and leadership are always out front in adopting and developing new technologies that provide more effective and accurate assessments of environmental risk within coastal environments, enabling us to better protect both ecosystem and human health.

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## Dr. Charles Hagedorn

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### SCCWRP sabbatical, 2012-2013

#### Professor, Microbiology, Virginia Tech, retired

It has been my privilege to watch SCCWRP grow and develop into the dominant organization in the field of microbial source tracking (MST). My involvement with SCCWRP began in the late 1990s, evaluating the many different MST approaches that were emerging at that time. Then, I participated in SCCWRP's method comparison study in 2003-2004 that largely established the framework for the ultimate success of DNA-based MST methods and discontinued use of most others.

Even after the comparison study, SCCWRP continued to investigate, fund and explore new MST methods and applications as they appeared in the literature. SCCWRP conducted multi-investigator meetings that were international in scale and worked with federal agencies to examine and evaluate additional new MST methodologies in turn. I participated in many of these meetings, and my experience with SCCWRP culminated with an eight-month sabbatical in 2012-2013.

SCCWRP filled a leadership void early in the MST field and became the organization that stepped forward to make sense of the 40+ MST methods that had been published by 2002, and to determine their applicability to California beaches. We owe SCCWRP a debt of gratitude for this undertaking, as the entire water quality field benefited from identification of which of many MST methods could be used with some degree of confidence. After the recognition that DNA-marker based methods were the most reliable, the publication of new markers for different sources then came in a flood. So SCCWRP established yet another large multi-investigator comparison study to assess and determine how well each marker worked. The results from this DNA-based study are the basis for the MST methods that are used today. The integrity, openness and lack of bias that SCCWRP exhibited throughout its history with the many researchers and regulators in the MST field meant that the results could be trusted completely. And SCCWRP scientists were always willing to help any investigator or agency who was having difficulty with either the methods or interpreting the findings. My sabbatical with SCCWRP was a blast; I was treated like royalty, and it was one of the very high points of my career. Thank you.

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**Dr. Francis Chan**

Associate Professor, Department of Integrative Biology, Oregon State University

It seems a bit early to be looking back at the evolution of the ocean acidification (OA) science and policy landscape, but much has happened, particularly on the West Coast. It wasn't that long ago that we in the research community were just trying to make good measurements. The thought of providing answers on what policymakers and the rest of society should be doing seemed remote, if not a bit mortifying, to be honest. Yet today, California, Oregon and Washington all have formal action plans to guide state responses to OA.

As a former Co-Chair of the West Coast Ocean Acidification and Hypoxia Science Panel, I had to opportunity to see the unique role SCCWRP played in shaping how the OA research community is responding to the needs of concrete decision-making. SCCWRP leadership and team were early in "looking around the corner" to think through what the emergence of OA meant for their constituents and the state. Importantly, because the culture of putting management-relevant answers and advice first is in SCCWRP's DNA, conversations that ran the risk of devolving into academic "what we don't know" exercises instead focused on answers and actions.

I recall early meetings at SCCWRP with scientists, managers and stakeholders that formed the California Current Acidification Network and the collaborative approach to solutions-building that would be the hallmark of how California and the region address OA. There aren't many institutions like SCCWRP, but the model of solutions-driven science and science-driven solutions is one that we should see spread.

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**Dr. Jack Colford**

Professor, Epidemiology, University of California, Berkeley

My collaboration with SCCWRP over the past 10 years has been one of the most valuable academic interactions I have experienced. This is true for so many reasons. The team at SCCWRP is laser-focused on high-quality research. I have worked with SCCWRP on numerous projects with complex human subject and research designs built to meet strict NIH and federal funding and human subjects requirements. I have, in every situation, found the SCCWRP team to be fully committed to carrying out this work with a striking dedication to sound science and professional project management.

The SCCWRP team is filled with problem-solvers intent on getting projects done on time, within budget, and with complete fidelity to underlying scientific goals. I am privileged to collaborate around the world with numerous governments, NGOs, and U.S. agencies, and my interactions with SCCWRP are consistently the smoothest. It's clear the SCCWRP team has a love for the work they do – and cares about doing it well. This has been my repeated experience with SCCWRP on multiple projects that required the enrollment of thousands of swimmers, surfers and non-swimmers in longitudinal cohort studies. SCCWRP creatively designed and executed advanced participant tracking software using a personal phone app, for example, in our surfer study that permitted detailed follow-up data collection from widely geographically scattered participants. SCCWRP saw the need for this in our project and designed it in house, in a way that would rival what could have been provided by a traditional field survey research firm. This is one of many examples of SCCWRP's prowess in field research that I have seen. It's also a pleasure to publish numerous peer-reviewed manuscripts with SCCWRP – another example of the organization's clear commitment to the scientific process that flows down from the leadership to all levels of the SCCWRP team.

I'm excited to share the 50th anniversary celebration with my colleagues at SCCWRP and have no doubt they will continue to make meaningful contributions to science for the next 50 years. Congratulations to the SCCWRP team on its 50th anniversary!

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**Dr. Libe Washburn**

Professor, Oceanography, University of California, Santa Barbara

I have had the privilege of working with the scientists at SCCWRP for almost 20 years now. One of the most valuable experiences for me has been the application of oceanography and marine science to benefit society. I feel that these experiences have greatly broadened my perspective on the value of applying basic science to the many challenges facing coastal communities in Southern California and on the West Coast of the U.S. I have always been impressed with the broad range of scales addressed by SCCWRP scientists, which range from the smallest bacteria to the effects of very large-scale processes associated with changes in climate and Pacific Ocean circulation.

Many of my collaborations with SCCWRP have focused on marine pollution and water quality. In recent years, SCCWRP has adapted to study important, emerging challenges due to climate change, including ocean acidification, hypoxia and harmful algal blooms. These collaborations have developed over the years through the many meetings, workshops, conferences and research publications that I have participated in with SCCWRP scientists.

Over the past 10 years, SCCWRP has been a valuable contributor to the development of the Southern California Coastal Ocean Observing System. The marine science community has been very fortunate to have SCCWRP as a partner in working to understand and sustain California's coastal ocean environment. Congratulations to SCCWRP on its 50th anniversary! I wish SCCWRP all the best as it works toward its 100th anniversary!

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**Dr. Fred Holland**

SCCWRP Programmatic Review Panel, 2014  
Director, Hollings Marine Laboratory, National Oceanic and Atmospheric Administration, retired

As someone who has worked on regional and national monitoring and assessment efforts for 40+ years, I am honored to have been part of both SCCWRP program and management reviews. These reviews made apparent the leadership role SCCWRP plays in planning, designing and sustaining aquatic monitoring partnerships in Southern California. SCCWRP staff demonstrates an understanding of the importance of regional monitoring for assessing the impacts of human activities on aquatic ecosystems, as well as determines if current environmental policies are working. By facilitating and coordinating these programs, SCCWRP ensures monitoring efforts have clearly defined objectives, use flexible and unbiased sample designs, and apply standardized methods across diverse organizations. Finally, SCCWRP assists its partners in converting the collected data into informative products that result in appropriate management actions and policies.

As part of its monitoring activities, SCCWRP also provides a platform for standardizing and calibrating new measurement approaches and technologies (e.g., pathogen indicators) and builds scientific consensus for incorporating new tools and approaches into ongoing monitoring activities. As a result, SCCWRP and its partners have become an unbiased and trusted source of coastal water quality science. Every region would benefit from SCCWRP-like leadership that builds trust among stakeholders (e.g., the regulated community, governmental agencies, scientists, the public) and transfers the best science available to decision-makers. Such an action would help conserve our coasts for future generations and is needed to address complex future environmental problems, such as climate change, flooding and land use.

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## Dr. Heliana Teixeira

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### Assistant Researcher, Universidade de Aveiro

I am a Portuguese benthic ecologist who had the privilege to spend some months at SCCWRP in 2008 during my Ph.D. training, which would lead to further research collaborations. Steve Weisberg offered me the opportunity to know and work with great scientists from several different institutions in Southern California and from all the U.S.

I was surprised by what I could achieve and learn in such a short period. In those days, Europe was going through challenging and structuring years that would change international collaboration practices for its Member States regarding water-quality and environmental policies. That U.S. experience was definitely a great eye-opener to me! At SCCWRP, I encountered an ambitious and meticulous research environment, and witnessed the commitment to developing useful and robust science for supporting environmental conservation and management.

Such capacity to influence environmental policies and decision-making grew on me and determined many of my career choices, including my three years at the European Commission Joint Research Center, working at the science-policy interface for the EU Marine Strategy. Now, more than 10 years later, I often look back and cannot thank Steve Weisberg and Ananda Ranasinghe enough for the great supervision they offered me, the fruitful discussions and the support received in that crucial stage of my career. I wish SCCWRP and its very nice staff a bright future and hope it brings more opportunities to collaborate so that I can continue to be part of your story. Happy 50th anniversary!

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## Dr. Michael Connor

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### Executive Director, San Francisco Estuary Institute, 2002-2008

### General Manager, East Bay Dischargers Authority, 2008-2018

As valuable as SCCWRP has been to its Southern California members, it's been very important to the development of other regional monitoring programs around the United States. Having an early example of regional coastal monitoring gave managers in other parts of the country the confidence that such a program could work in their jurisdiction. SCCWRP served as an important model for two coastal monitoring programs that I worked on that have also been active for many years: Boston Harbor/Massachusetts Bay (27 years) and San Francisco Bay (47 years).

Regional monitoring programs receive public support from the dischargers, regulators, NGOs and ratepayers if it is clear how the information they collect is used to make more cost-effective decisions. As a result, they require an imaginative "push-pull" regulatory approach. Besides permit requirements, regional monitoring programs need a strategy that shows the discharge community funders that they will be able to prioritize their capital budgets to address well-documented problems, rather than a series of cascading, worst-case risk assessment assumptions. In Boston, regional monitoring helped justify the reduction of capital investment in secondary treatment that reduced capital costs by several hundred million dollars. The San Francisco Bay program continually offered dischargers reductions in permit compliance monitoring and regulatory limits based on overly conservative, worst-case assumptions.

Environmental managers' needs change over the years, depending on the changing ecosystem and the evolution of national debates. Regional monitoring must change to continue to be relevant. SCCWRP and the San Francisco Estuary Institute have iteratively coordinated with the State Water Board to change their monitoring emphases away from solids and dissolved oxygen as driven by secondary treatment decisions to non-point sources, emerging contaminants and eutrophication. Facilitating a consensus among their regulatory and local agency partners and stakeholders has demonstrated the importance of regional monitoring, and allowed their influence and budgets in California to grow.

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## Nicholas Martorano

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### Director, California Water Quality Monitoring Council, State Water Resources Control Board

I have been working for the State Water Resources Control Board for the last 13 years in various capacities, primarily focusing on improving water quality throughout the state. My first interaction with SCCWRP came when I began working on water quality standards development. The amount of knowledge and expertise that SCCWRP housed in a seemingly innocuous building in Costa Mesa was simply astounding to me. The group of scientists across disciplines made a very complicated and onerous process much less painful and even enjoyable.

Beyond the scientific expertise, SCCWRP also provided an open space to discuss and develop complex programs across the regulator-regulated divide that I have found to be crucial to success and ultimately achieving improvements and changes to water-quality management. Now as the director of a multi-sector, legislatively mandated council, I have the pleasure of not only working with SCCWRP staff as leads and key experts on our theme-specific workgroups, but I also get to pick the brains of Steve Weisberg and Ken Schiff. I am constantly impressed with the genuine passion they bring to almost every discussion and how they find a way to cut to the core of issues to get people focused on solutions.

In short, I count myself lucky to interact with SCCWRP and feel that it is a key element to the success of the State Water Resources Control Board, and I look forward to a continued partnership well into the future. Congratulations on 50 years, and here's to 50 more.

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## Grant Sharp

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### Manager, South Orange County Watershed Management Area, Orange County Public Works

A heartfelt congratulations to all of the current and former staff of SCCWRP on reaching an incredible milestone. Throughout my nearly 20-year career with Orange County Public Works, having an organization like SCCWRP in my own backyard has been a true gift. Making program management decisions to help improve the environment is never easy, but when there is good science and research supporting you, and a team of amazingly talented individuals developing tools to help make those decisions, it does wonders for your confidence.

Having the opportunity to work closely with the SCCWRP team on so many challenging projects over the years has been a highlight of my career. There is a dedication, passion and energy for good, sound science and data-driven decision-making that is shared by everyone at SCCWRP whom I have ever had the pleasure to work with, and it inspires me to explore the boundaries of what is possible to achieve.

I could go on and on about all of the scientific studies, reports and data analytical tools generated by SCCWRP that make my job a whole heck of a lot easier, but what I cherish more than the work products are the relationships that have been built over the years. In my experience, the team at SCCWRP has always been among the most trustworthy, reliable, professional individuals you could ever hope to work with – a direct reflection of the quality of the leadership. Congratulations on 50 years, SCCWRP!

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## Dr. Tim Wade

**Chief, Epidemiology Branch, U.S.  
Environmental Protection Agency, Chapel Hill,  
North Carolina**

It has been a distinct pleasure to have had the opportunity to work with SCCWRP, on and off, for nearly 20 years. Our collaborations have primarily been focused on large, complex epidemiological and water-quality studies of recreational waters, which extended from my pre- and post-doctoral work at UC Berkeley through my research career at the US EPA.

The SCCWRP and UC Berkeley team were instrumental in ensuring the work done in California would complement and could be directly integrated with the studies we were doing at EPA. As a result of these efforts, we have developed a unique and incredibly valuable data set of water quality and beachgoer health from over 13 beaches across the United States. This work has directly influenced state and national policy and resulted in well over 20 publications.

Throughout my collaborations with SCCWRP, I have deeply admired the organization's strong work ethic, unparalleled professionalism, and dedication to producing the highest-quality science and research. But above all, it is SCCWRP's clear passion and pride for its work that drives and sets the tone for the organization. Despite working in the always challenging arena of science and policy, SCCWRP has not become cynical or defeated. SCCWRP is always ready for the next new environmental challenge and to help advance and inform the scientific basis needed for sound environmental policy and regulation. I wish I could be there to celebrate the 50th anniversary and to tip a few back with Steve Weisberg, Ken Schiff, John Griffith and many others. Hope to see you at the 75th!

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## Dr. Alexandria Boehm

**Professor, Department of Civil and  
Environmental Engineering, Stanford  
University**

I first started working with SCCWRP as a graduate student at UC Irvine, when SCCWRP's offices were in Westminster. I remember attending my first meeting at SCCWRP in a cramped conference room with white walls. It was about the Huntington Beach water quality problems in the 1990s.

I have worked with SCCWRP almost continuously since then. I appreciate the openness of the staff and the collaborative atmosphere. I always have a great time working with John Griffith and love that we can always make projects way too big! I have learned a lot from Steve Weisberg. I remember when we wrote our first paper together in the 2000s. He told me I was not a very good writer. Haha. It still makes me laugh. I appreciate Steve's frankness and no-nonsense attitude – something I hope I emulate as well.

I've met a lot of people who have been great collaborators and life-long friends through my work with SCCWRP. When I think about what else I could do besides work at Stanford, or where I would like to do a sabbatical, I always think of SCCWRP. Here's to another 50 years! Thank you!

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## Dr. David Caron

**USC Associates Captain Allan Hancock  
Endowed Chair in Marine Science, Department  
of Biological Sciences, University of Southern  
California**

My engagement with SCCWRP began almost immediately after I re-established my research program from the East Coast to USC in 1999, and my collaborative ties to the organization have continued to thrive and expand through the years. Toxic events caused by harmful algal blooms (HABs) were just coming onto the radar as significant and recurrent events in the region, resulting in mass strandings and mortality events of marine mammals and seabirds.

SCCWRP Director Steve Weisberg grasped the potential connection between human activities along the coastline and coastal nutrient enrichment contributing to those algal blooms. He and his research group actively fostered research activities to expand our understanding of the nature of these toxic events, and characterize the relative importance of natural vs. anthropogenic nutrient sources that give rise to toxic algal blooms. SCCWRP has been instrumental in establishing coastal monitoring programs, developing methods for toxic phytoplankton identification, toxin detection and quantification, and making that knowledge available to stakeholders, legislators and the public.

Throughout our numerous collaborative efforts, I have had the privilege of working with a wealth of first-rate researchers at SCCWRP during these nearly 20 years, and I have been honored and pleased that several of my technicians, graduate students and postdoctoral investigators have gone on to work for SCCWRP.

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## Dr. Angel Borja

**Marine Research Division, AZTI Tecnalia, Spain**

My first interaction with SCCWRP was in 2007, when I organized a special session at a Coastal & Estuarine Research Federation conference in Providence, Rhode Island, with Ananda Ranasinghe on "Assessing Ecological Integrity: Using Multiple Indices and Ecosystem Components" after some contacts with Steve Weisberg.

This has been a common interest of our two institutes, since we both work on monitoring and assessing marine waters and developing cost-effective tools for that purpose. Since then, we have co-organized three additional sessions at international conferences, including one scheduled in Mobile, Alabama in November 2019 with David Gillett and Eric Stein on the use of molecular tools for assessment. We have shared projects such as the calibration and validation of biotic indices (AMBI, M-AMBI) in the U.S. (with EPA scientists and David, Ana, and Steve from SCCWRP); the application of metabarcoding tools for assessing marine waters; the integrative assessment of marine systems, including the ecosystem-based approach, for better management of oceans (with Ana and Steve, but also other European and U.S. scientists); and in assessing coastal ecological condition, we also have used best professional judgment, trying to develop consensus across North America and Europe. For doing this, we "shared" a Ph.D. student, Heliana Teixeira, who allowed us to strengthen the collaboration.

Always, our objective has been providing the scientific community and managers with the best, cost-effective tools for monitoring. Since 2007, Ana and I have co-edited a special issue of *Marine Pollution Bulletin* and co-authored a book chapter and six scientific papers in top-ranked journals, including with many researchers from SCCWRP. This research partnership has been very important in both sides, contributing to the international success of SCCWRP and AZTI as key actors in developing assessment tools for marine waters.

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## Dr. Anthony Michaels

**Entrepreneur and Former Wrigley Institute Director, University of Southern California, 1996-2008**

My interaction with SCCWRP began at just about the same time in 1996 as Steve Weisberg started his leadership. That year, I began a 12-year stint as the first Director of the newly formed Wrigley Institute for Environmental Studies at the University of Southern California, and as the fifth Director of the Wrigley Marine Science Center on Catalina Island.

This was an interesting time in the evolution of academic environmental programs – the beginning of a transition to a much more proactive and pragmatic set of goals. Universities had to move beyond the pure scholarship and begin to be actively involved in the execution of programs and actions that were the logical outcomes of the research itself. The Wrigley Institute was, at that time, a leader in this new effort to push the scholarship to action.

We could not have found a more perfect partner than the team at SCCWRP. SCCWRP had been working at that same interface for almost three decades already, from the application side, and saw the need for a greater integration with the state-of-the-art in the basic science. Both of our programs had an emphasis on coastal water quality. We worked together on issues as varied as stormwater on beaches, coastal pathogens, regional monitoring and climate change. SCCWRP funded postdoctoral fellows that worked 50-50 for SCCWRP and the Wrigley Institute, and Steve and I partnered on a variety of outreach to public policy activities and funding agencies.

I think that both organizations became stronger through the collaboration. Some of the people who moved on to academic positions were profoundly strengthened by their time working at the interface of the two programs, and others are still in leadership positions at SCCWRP today! Congratulations to SCCWRP on 50 very productive and valuable years.

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## Dr. Julie Kinzelman

**Laboratory Director/Research Scientist, City of Racine Public Health Department**

**Affiliate Scientist, School of Freshwater Science, University of Wisconsin, Milwaukee**

It has been my pleasure to participate with SCCWRP scientists on several projects related to the protection of public health in the context of water recreation. In 2010, SCCWRP and the City of Racine conducted method implementation studies related to, and comparative analyses of, approved culture-based methods and real-time qPCR for the enumeration of *E. coli* and enterococci in ambient waters. The first of their kind in the U.S., these studies generated data from high-priority Great Lakes and marine coastal beaches with respect to regulatory concordance and timely public notification. These studies were instrumental in the process that has led to the approval and utilization of rapid molecular methods at multiple sites nationwide, including Racine, Wisconsin in 2012, enhancing our ability to protect public health through same-day notification of recreational water quality.

Since 2010, SCCWRP has continued to partner with the U.S. EPA and other expert laboratories to more closely examine the suitability of rapid molecular methods over a range of conditions and instrument platforms, as well as the applicability of fecal indicator bacteria in general and their relationship to probable human health effects based on originating source. SCCWRP scientists have also had an excellent publication record, and I have been honored to co-author published works that have materially contributed to the science surrounding water-quality assessment.

Perhaps my favorite memory, however, is of having to collect a series of samples in February 2007 for a USEPA-sponsored qPCR validation study. I received a picture of Dr. John Griffith smiling and waving from his jet ski. Racine obviously got the short end of that stick!

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## Geoff Brosseau

**Executive Director, California Stormwater Quality Association**

The study, regulation and management of stormwater is a relatively young discipline, having started in earnest with EPA promulgating the stormwater regulations on November 16, 1990 – less than 30 years ago. SCCWRP was already 20 years old at the time, and a review of its list of publications since then shows that as of September 2019, SCCWRP has 126 publications on the topic of stormwater and urban runoff.

The data and insights presented in those publications has been a significant and much-needed benefit to the stormwater discipline for a couple of reasons. First, we had a lot to learn because almost all of our discharge research before 1990 was conducted on wastewater originating from human-made and relatively predictable closed systems, and stormwater originating from natural and unpredictable open systems is a fundamentally different kind of discharge. Second, stormwater programs need data on which they can make decisions and adaptively manage their programs, and that is exactly the kind of data that SCCWRP provides through its applied research. In fact, it is right in the first few words of SCCWRP's mission statement: "To enhance the scientific foundation for management ..."

As the discipline of stormwater management continues to develop and mature, and its need for high-quality scientific information that can be acted upon remains as acute as ever, the California Stormwater Quality Association will continue to look to and trust SCCWRP to carry out that mission – and by doing so, help us all to sustainably manage stormwater. Congratulations SCCWRP on your first 50 years! And we look forward to your accomplishments in the next 50!

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## Dr. Bruce McCain

**Northwest Fisheries Science Center, National Marine Fisheries Service, retired**

During the mid-1970s, observations of fin erosion in benthic marine fish brought together researchers working at SCCWRP and the Northwest Fisheries Science Center (NWFS), a regional science center in Seattle for NOAA's National Marine Fisheries Service. In Puget Sound, I worked at NWFS as a Cooperating Investigator employed by the Department of Medical Pathology at UC Davis (I joined NOAA in 1977).

With funding from the regional water utility King County Metro, my team and I identified fin erosion in starry flounder (*Platichthys stellatus*) and English sole (*Parophrys vetulus*) from the Duwamish River (prevalence up to 15%), which flows through one of the most industrialized portions of Seattle. SCCWRP researchers Marjorie Sherwood and Alan Mearns reported high prevalence fin erosion in Dover sole (*Microstomus pacificus*) from the Palos Verdes shelf and in Santa Monica Bay (up to 39%), which were sites of major municipal wastewater outfalls. Anthropogenic contaminants were suspected etiologic agents in both instances. In Duwamish River sediments and flatfish from the Duwamish, polychlorinated biphenyls (PCBs) occurred in high concentrations, while Palos Verdes and Santa Monica sediments and fish contained high levels of PCBs and chlorinated hydrocarbons, especially dichlorodiphenyltrichloroethane (DDT). These correlations and experimental exposures supported this hypothesis, and were corroborated by the correspondence of cessation of DDT-contaminated waste into Santa Monica Bay and decreased occurrence of fin erosion in Dover sole.

As it turned out, Montrose Chemical Corporation, a producer of DDT since 1947, had been dumping its DDT waste into the L.A. County Sanitation Districts' sewer system, for an estimated 1,700 tons from the late 1950s to early 1970s. On the other hand, Seattle City Light stored PCB-containing electrical transformers adjacent to the Duwamish, with several transformer spills occurring directly into the river. With widespread efforts over the past several decades to clean up marine environments and reduce pollutants in stormwater and wastewater, fin erosion declined in both areas. These researchers from SCCWRP and NWFS in Seattle interacted extensively during their studies, with each group pointing out the impacts of anthropogenic contaminants on animals in important marine ecosystems.

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## **Dr. Daniel Schlenk**

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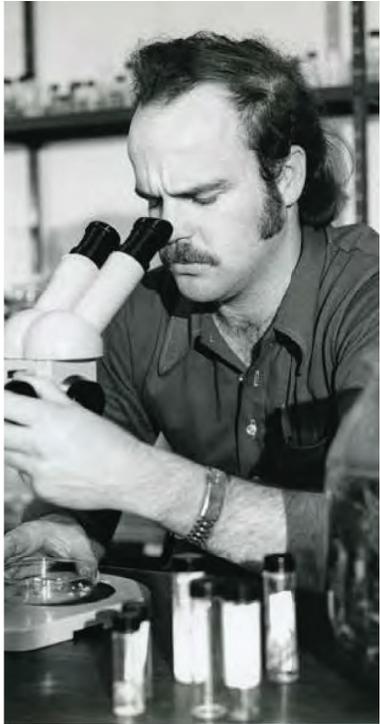
**Professor, Department of Environmental Sciences, University of California, Riverside**

When I think of my relationship with SCCWRP, partnership is the first word that comes to mind. In 2000, after my move to the University of California, I was fortunate to meet Steve Bay through the Southern California chapter of the Society of Environmental Toxicology and Chemistry. Through that interaction, we started an extensive collaboration with SCCWRP that began with selenium thresholds, stretched through Bight-wide monitoring for endocrine disruption in fish, and also included assessing the risks of emerging contaminants to human and environmental health. Through this partnership, my students have had the opportunity to conduct research that we could not have done on our own. SCCWRP initiated regional programs and multi-institutional consortia that allowed us to publish multiple papers based upon the best science of that time.

In addition to the collaborative research we have done together, I have also had the opportunity to serve on several advisory panels over the years with Keith Maruya through SCCWRP. It has been such a pleasure to work with Keith and his staff on several projects dealing with not only issues related to the marine and aquatic environments, but also human health regarding water quality. I have always been treated with respect, and have felt that we have made a significant difference in how to assess the risks of environmental contaminants to humans and the environment.

It should be noted that I am only one of many academic institutions that have benefited from this partnership, and I am eternally grateful for the opportunities I have received and look forward to continued research and interactions. Congratulations to Steve Weisberg, Ken Schiff and the entire SCCWRP staff for the impacts your organization has made to the regulatory community as well as academia.

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Jack Word, former SCCWRP staff, 1970s

## Contributors to Success

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Bight regional monitoring kickoff meeting, 2008



Field evaluation of ocean pH sensors with SCCWRP member agencies, 2015

Hundreds of bright, dedicated, passionate people have helped make SCCWRP one of the world's foremost aquatic sciences research organizations. Their support, guidance and expertise have come via diverse avenues – the Commission, the Scientific Consulting Board, the Commission's Technical Advisory Group (CTAG), partnering agencies from around the world and, of course, SCCWRP staff. On the pages that follow are lists of many of the key players – both organizations and individuals – that have influenced and shaped the organization through the years.

## SCCWRP Member Agencies

Throughout its 50-year history, SCCWRP has been governed, guided and strengthened by the support of its member agencies. Collectively,

these organizations represent the preeminent group of public agencies responsible for aquatic ecosystems management in Southern California.

Sanitation Districts of Los Angeles County, 1969-  
 City of Los Angeles Bureau of Sanitation, 1969-  
 Orange County Sanitation District, 1969-  
 City of San Diego Public Utilities Department, 1969-  
 Ventura Regional Sanitation District, 1969-1986  
 City of Oxnard, 1986-1990  
 U.S. Environmental Protection Agency, Region 9, 1990-  
 State Water Resources Control Board, 1990-  
 Los Angeles Regional Water Quality Control Board, 1990-  
 Santa Ana Regional Water Quality Control Board, 1990-  
 San Diego Regional Water Quality Control Board, 1990-

Ventura County Watershed Protection District, 2003-  
 Los Angeles County Flood Control District, 2004-  
 Orange County Public Works, 2005-  
 San Diego County Watershed Protection Program, 2006-  
 California Ocean Protection Council, 2007-

### Associate Members

Encinita Wastewater Authority, 1983-1989  
 Southeast Regional Reclamation Authority, 1983-1990  
 Aliso Water Management Agency, 1989-1990

## SCCWRP Commission

SCCWRP's governing board serves as a primary vehicle through which SCCWRP science gets translated into management actions, decisions

and policies. The Commission meets quarterly; each SCCWRP member agency appoints one Commissioner and one Alternate Commissioner.

California Ocean Protection Council  
 Brian Baird, 2007-2011  
 Drew Bohan, 2007-2009  
 Mark Gold, 2019-  
 Deborah Halberstadt, 2016-2019  
 Justine Kimball, 2019-

Catherine Kuhlman, 2012-2016  
 Amber Mace, 2009-2012  
 Jennifer Phillips, 2015-2018  
 Clare Waldmann, 2014

City of Los Angeles Bureau of Sanitation  
 Robert Alpern, 1990-1993  
 Janet Barhydt-Garber, 1972-1990  
 Delwin Biagi, 1990-1996

Ing-Yih Samuel Cheng, 1993-1994, 1997-2002  
 Mas Dojiri, 2002-  
 Michael Miller, 1994-1996  
 William Peterson, 1969-1979  
 Rita Robinson, 2004-2007  
 Drew Sones, 1997  
 L. Timberlake, 1969-1972  
 Judith Wilson, 1997-2002  
 Enrique Zaldivar, 2007-  
 John Zoeger, 1979-1990

### City of Oxnard

Ann Johnson, 1986-1990  
 Dorothy Maron, 1986-1987  
 Timothy Nanson, 1987-1990

### City of San Diego Public Utilities Department

Roger Bailey, 2013  
 Jim Barrett, 2009-2010  
 Vic Bienes, 2017-2018  
 Helen Cobb, 1969-1971  
 Joseph Dietz, 1979-1990  
 Roy Dodson, 1979-1985  
 Jeffrey Frautschy, 1987-1990  
 Richard King, 1985-1987  
 Alan Langworthy, 1990-1992, 1994-2009  
 Shauna Lorange, 2019-  
 Bob Martinet, 1969-1979  
 Steve Meyer, 2009-2013  
 Milon Mills, 1992-1994  
 Maureen O'Connor, 1972-1979  
 Haifa Razak, 2013-2017  
 Tim Stebbins, 2013-2015  
 Peter Vroom, 2015-

### Los Angeles County Flood Control District

Paul Alva, 2018-  
 Diego Cadena, 2006-2009, 2012  
 Dean Etstathiou, 2008  
 Massood Eftekhari, 2014  
 Gail Farber, 2008-2014  
 Angela George-Moody, 2014-2018  
 Gary Hildebrand, 2013-2018  
 Daniel Lafferty, 2018-  
 Jeff Noyes, 2004  
 Mark Pestrella, 2009-2012  
 Brian Sasaki, 2004-2006  
 Don Wolfe, 2004-2008

### Los Angeles Regional Water Quality Control Board

Jonathan Bishop, 2004-2007  
 Dennis Dickerson, 1997-2004  
 Tracy Egoscue, 2007-2010  
 Robert Ghirelli, 1990-1996  
 Richard Harris, 1993-1994  
 Jenny Newman, 2019-

Renee Purdy, 2018-  
 Deborah Smith, 1999-2019  
 Catherine Tyrrell, 1994-1998  
 Sam Unger, 2010-2018

### Orange County Public Works

Amanda Carr, 2016-  
 Chris Crompton, 2007-  
 Larry McKenney, 2005-2007  
 Mary Ann Skorpanich, 2007-2016

### Orange County Sanitation District

Blake Anderson, 1990-1998  
 Michael Callahan, 1975-1976  
 Jim Colston, 2016-2018  
 Henry Duke, 1973-1975  
 Richard Edgar, 1985-1990  
 Donald Fox, 1981-1983  
 Robert Ghirelli, 1998-2018  
 Donald Griffin, 1983-1985  
 James Herberg, 2018-  
 Clifton Miller, 1969-1973  
 Michael Moore, 1998-2007  
 James Neal, 1985-1990  
 Margaret Nellor, 1995  
 Lindsley Parsons, 1969-1981  
 James Sharp, 1976-1985  
 Wayne Sylvester, 1990-1994  
 Edward Torres, 1994, 2007-2016  
 Nancy Wheatley, 1995-1998  
 Lan Wiborg, 2019-

### San Diego County Watershed Protection Program

Richard Crompton, 2010-  
 Kathleen Flannery, 2006-2008  
 John Snyder, 2008-2010  
 Todd Snyder, 2014-  
 Cid Tesoro, 2006-2014

### San Diego Regional Water Quality Control Board

David Barker, 2007-  
 Arthur Coe, 1990-2007  
 David Gibson, 2009-  
 Bruce Posthumus, 1990-1995  
 John Robertus, 1996-2009

### Sanitation Districts of Los Angeles County

Bert Bond, 1969-1979  
 Charles Carry, 1990-2000  
 Wallace Edgerton, 1979-1990  
 Robert Ferrante, 2016-  
 Philip Friess, 2007-2016  
 Robert Horvath, 1999-2007  
 Grace Hyde, 2012-2019  
 Steve Maquin, 2006-2012  
 Robert Miele, 1990-1999  
 T. D'Arcy Quinn, 1969-1990  
 Jim Stahli, 2000-2006  
 Martha Tremblay, 2019-

### Santa Ana Regional Water Quality Control Board

Gordon Anderson, 1990-1996  
 Kurt Berchtold, 2001-2017  
 Jayne Joy, 2018-  
 Steve Mayville, 1997-2001  
 Hope Smythe, 2013-  
 Gerald Thibeault, 1990-2010

### State Water Resources Control Board

Edward Anton, 1990-1991  
 James Bennett, 1990-1991  
 Jonathan Bishop, 2007-2010  
 David Cohen, 1991-1993  
 Jesse Diaz, 1991-1998  
 Greg Gearheart, 2016-  
 Ken Harris, 2005-2006  
 Elizabeth Haven, 2006-2007  
 Stan Martinson, 1996-2005  
 Karen Mogus, 2016-  
 Walt Pettit, 1992-1994  
 Darrin Polhemus, 2006-2018  
 Kurt Wasserman, 1994-1995  
 Vicky Whitney, 2010-2016

### U.S. Environmental Protection Agency, Region 9

Loretta Barsamian, 1990-1992  
 Ellen Blake, 2018-  
 Janet Hashimoto, 1990-2018  
 John Kemmerer, 2013-2016  
 Harry Seraydarian, 1992-1995  
 David Smith, 2018-  
 Alexis Strauss, 2003-2011  
 Nancy Woo, 2017-2018

### Ventura County Watershed Protection District

Arne Anselm, 2016-  
 Norma Camacho, 2009-2012  
 Tully Clifford, 2012-2016  
 Gerhardt Hubner, 2005-2016  
 Lawrence Jackson, 2004-2005  
 Jeff Pratt, 2002-2009  
 Glenn Shephard, 2018-  
 Darla Wise, 2005

### Ventura County/Ventura Regional County Sanitation District

David Eaton, 1979-1981  
 John Flynn, 1973-1975, 1983-1986  
 Franklin Jewett, 1972-1977  
 Thomas Laubacher, 1969-1972  
 Leslie Maland, 1977-1981, 1983-1986  
 John Melton, 1981-1983  
 John H. Miller, 1975-1979  
 H. Robinson, 1969-1972  
 Dorill Wright, 1981-1983

### SCCWRP Legal Counsel

B. Richard Marsh, 1969-2011  
 Wesley Beverlin, 2011-

## SCCWRP Scientific Consulting Board

The Scientific Consulting Board was a five-member advisory panel of outside academic and government scientists that provided guidance and direction

on SCCWRP research during the agency's first 25 years. The Consulting Board was disbanded in 1994 as CTAG took on a more prominent role.

**David A. Caccione**, 1988-1992  
U.S. Geological Survey

**Judith Capuzzo**, 1984-1987  
Woods Hole Oceanographic Institute

**Neal Castagnoli**, 1986-1989  
University of California, San Francisco

**Geraldine Cox**, 1979-1980  
National Oceanic and Atmospheric Administration

**Paul Dayton**, 1979-1984  
Scripps Institute of Oceanography

**Tom Dickey**, 1992-1994  
University of Southern California

**Edward D. Goldberg**, 1980-1983  
Scripps Institute of Oceanography

**Joel Goldman**, 1980-1982  
Woods Hole Oceanographic Institute

**John D. Isaacs**, 1969-1980  
Scripps Institute of Oceanography

**Ian R. Kaplan**, 1987-1989  
University of California, Los Angeles

**Reuben Lasker**, 1980-1982  
National Marine Fisheries Service

**Richard F. Lee**, 1989-1992  
Skidaway Institute of Oceanography

**Richard K.C. Lee**, 1969-1979  
Research Corporation of the University of Hawaii; Straub Clinic

**Samuel Luoma**, 1991-1993  
U.S. Geological Survey

**Perry McCarty**, 1979-1986  
Stanford University

**Alan J. Mearns**, 1993-1994  
National Oceanic and Atmospheric Administration

**Ralph Mitchell**, 1979-1980  
Harvard University

**William G. Pearcy**, 1983-1986  
Oregon State University

**Erman A. Pearson**, 1969-1979  
University of California, Berkeley

**Donald W. Pritchard**, 1969-1979  
Chesapeake Bay Institute

**Donald J. Reish**, 1985-1991  
California State University, Long Beach

**John H. Ryther**, 1969-1979  
Woods Hole Oceanographic Institute

**Richard C. Schwartz**, 1989-1994  
U.S. Environmental Protection Agency

**Thomas P. Singer**, 1982-1988  
University of California, San Francisco

**Robert B. Spies**, 1986-1989  
Lawrence Livermore Laboratory

**John Stein**, 1992-1994  
National Marine Fisheries Service

**Grover C. Stephens**, 1983-1985  
University of California, Irvine

**Usha Varanasi**, 1989-1992  
National Marine Fisheries Service

**Indira Venkatesan**, 1992-1994  
University of California, Los Angeles

## Commission's Technical Advisory Group (CTAG)

CTAG is a scientific advisory body that reviews SCCWRP science and helps shape the agency's research agenda. Established in 1982 as the Sponsors'

Technical Advisory Committee (STAC), CTAG is made up of one representative – typically, a top scientist – from each member agency.

### California Coastal Commission

Jack Gregg, 2001-2014

### California Ocean Protection Council

Amber Mace, 2007-2010  
Tom Maloney, 2016-2017  
Skylil McAfee, 2010-2015  
Jennifer Phillips, 2015-2017  
Liz Whiteman, 2015  
Holy Wyrer, 2017-

### City of Los Angeles Bureau of

#### Sanitation

Stan Asato, 2014-2016  
Curtis Cash, 2013-2014  
John Dorsey, 1982-1996  
Lucy Jao, 1996-2000  
Stacey Karnya, 2019-  
Denise Li, 2016-2019  
Gerald McGowan, 2005-2013  
Farhana Mohamed, 2001-2004

### City of Oxnard

Robert Montgomery, 1986-1990

### City of San Diego Public Utilities Department

Susan Hamilton, 1982-1987  
Ryan Kempster, 2019-  
Walter Konopka, 2001-2004  
Ami Latker, 2019  
Timothy Stebbins, 2005-2019  
Patricia Vainik, 1987-2000

### Los Angeles County Flood Control District

Paul Alva, 2014-  
Hector Bordas, 2009-2010  
Rossana DiAntonio, 2008-2011  
Angela George-Moody, 2011-2014

Terry Grant, 2007

Dan Lafferty, 2004-2007  
Scott Schales, 2007-2008

### Los Angeles Regional Water Quality Control Board

Emily Duncan, 2019-  
Michael Lyons, 1990-2017  
Steven Webb, 2017  
Jun Zhu, 2017-2019

### Orange County Public Works

Chris Crompton, 2005-

### Orange County Sanitation District

Jeff Armstrong, 2014-2017  
Samuel Choi, 2019-  
Ron Coss, 2012-2014

Tom Gerlinger, 1982-1984

Lisa Haney, 2018-2019

Irwin Haydock, 1989-1997

Michael Moore, 1985-1989

Dean Pasko, 2008-2012

George Robertson, 1997-2008, 2017-2018

### San Diego County Watershed Protection Program

Eric Klein, 2015-2016

Neil Searing, 2019-

Nancy Stalnaker, 2014-2015

Jo Ann Weber, 2005-2014, 2016-2019

### San Diego Regional Water Quality Control Board

Chad Loffen, 2017-

Pete Michael, 1997-1999

Peter Otis, 1992-1994

Bruce Posthumus, 1990-1992, 1994-1996, 2000-2017

### Sanitation Districts of Los Angeles County

Joe Gully, 2007-2017

Philip Markle, 2017-

Dave Montagne, 2000-2006

Jan Stull, 1982-2000

### Santa Ana Regional Water Quality Control Board

Gordon Anderson, 1990-1996

Jason Bill, 2019-

Linda Candelaria, 2000

Steve Mayville, 1996-1999

Doug Shiberu, 2017-2019

Wanda Smith-Cross, 2003-2017

Kenneth Theisen, 2001-2002

### State Water Resources Control Board

Maria de la Paz Carpio-Obeso, 2012-2014

Greg Gearheart, 2014-2018

Dominic Gregorio, 2005-2012

Frank Palmer, 1997-2004

Lori Webber, 2018-

Craig Wilson, 1990-1996

### U.S. Environmental Protection Agency, Region 9

Terry Fleming, 1997-

Janet Hashimoto, 1990-1996

### Ventura County Watershed Protection District

Arne Anselm, 2010-2012, 2015-2017

Dave Laak, 2017-

Tommy Liddell, 2008-2009

Bram Sercu, 2012-2015

David Thomas, 2005-2007

Darla Wise, 2001-2004

## SCCWRP's full-time staff

SCCWRP's staff is the lifeblood of the agency, conducting day-to-day work and setting long-term priorities and directions. While this list presents

the names of all full-time staff dating back to the agency's 1969 founding, numerous part-time staff also have contributed their talents to SCCWRP.

Alan Abati, 1977-1978  
 Drew Ackerman, 1999-2009  
 Nabiul Afrooz, 2017-2019  
 Jennifer Alfafara, 1981-1982  
 Carly Alger-Beck, 2008-2017  
 M. James Allen, 1971-1977, 1993-2009  
 Mariana Alonso, 2014-2015  
 Mario Alvarado, 1994-1995  
 Monica Ambriz-Mays, 2006-2010  
 Jack Anderson, 1985-1990  
 Art Barnett, 2006-2008  
 Virginia (Ginny) Barney, 1972-1973  
 Candice Barrett, 1991-1993  
 Willard Bascom, 1973-1985  
 Steven Bay, 1980-  
 Bruce Bealer, 2002-2013  
 Tara Beaton, 1986-1987  
 Marcus Beck, 2017-  
 Nina Bednarssek, 2017-  
 Lorianne Benton-Emler, 2012-2016  
 Mary Bergen, 1993-1998  
 Elliott Berkhiser, 1973-1977  
 Paul Berkman, 1979  
 Duane Beverly, 1998-1999  
 Alex Bolkhovitinov, 2000-2002  
 Christine Bondante, 1974  
 Emily Briscoe, 2000-2003, 2004  
 David Brown, 1980-1986  
 Jeffrey Brown, 1990-  
 Linda Burgner, 1979-1980  
 David Caldwell, 1998-1999  
 Paul Callinan, 1978  
 Yiping Cao, 2007-2017  
 Alfred Carsola, 1972  
 Marilyn Castillo, 1990-1995  
 Danuta Charwat, 1973-1975  
 Peter Chen, 2018-2019  
 Niels Christensen, 1986-1987  
 Linden Clarke, 2002-2003  
 Julia Coates, 2013-2014  
 David Compton, 1987-1988  
 Janet Conley, 1972  
 Larry Cooper, 1990-2015  
 Paul Costa, 1978  
 Kim Crawford, 1971  
 Jeffrey Cross, 1980-1995  
 Karla Crum, 1976-1979  
 Matthew Cullen, 2001-2002  
 Andrea Cullins, 1979-1980  
 Fran Cummings, 1992-1994  
 Lindsay Darjany, 2011-2012, 2017-  
 Cynthia Davis, 1978-1979  
 Dario Diehl, 1982-  
 Rachel Diner, 2019-  
 Nathan Dodder, 2010-2016  
 Ehren Doris, 2000-2002  
 Cheryl Doughty, 2015-2018  
 Bowen Du, 2017-  
 Roslynn Dunn, 2003  
 Corey Dzitzer, 1973-1974  
 Darcy Ebentier, 2008-2010  
 Robert Eganhouse, 1974-1977,  
 1987-1992  
 Mark Engeln, 2013-2015  
 Elizabeth Fassman-Beck, 2019-  
 Gary Ference, 1974-1975  
 Donna Ferguson, 2007-2013  
 Glen Ferreri, 2000-2003  
 Betty Fetscher, 2003-2015  
 Lisa Fong, 2011-2014  
 Karen Foreman, 1987-1988  
 Christopher Francisco, 1992-1998  
 Richard Gammon, 1971-1973  
 Linda Gangon, 1981-1983  
 Jill George, 1975-1976  
 David Gillett, 2010-  
 Jordan Golemo, 2017-2019  
 Maribel Gonzalez, 2006-  
 Marisol Gonzalez, 2001-  
 Ramona Gonzales, 1987-1990  
 Kim Goochey, 1980  
 Richard Gossett, 1977-1991  
 Charles Greene, 1973-1976  
 Darrin Greenstein, 1982-  
 John Griffith, 2001-  
 Madison Griffith, 2010-  
 Jackson Gross, 2007-2008  
 Ann Haeckl, 1981-1982  
 Charles Halgren, 1971-1985  
 Debbie Hallock-Elmore, 1992-2006  
 Michael Hang, 2010-2011, 2011-2013  
 John Harding, 1973  
 Leslie Harris, 1973-1983  
 Bradley Hartwell, 1978  
 Irwin Haydock, 1970-1973  
 Theodore Heeson, 1972-1979  
 Tareah Hendricks, 1970-1993  
 James Herring, 1977-1978  
 G. Patrick Hershelman, 1975-1990  
 Kevin Hill, 1981-1982  
 George Hlavka, 1969-1973  
 Minna Ho, 2017-  
 Youwei Hong, 2014-2015  
 Lance Horita, 1978-1982  
 Lori Hosaka, 1995-1996  
 Meredith Howard, 2007-2018  
 Liu Hu, 1979-1980  
 Andrea Huvard, 1985  
 Katherine Irving, 2019-  
 Larry Iwafuchi, 1978-1979  
 Madhurika Jain, 1989-1990  
 Tsu-Kai Jan, 1973-1980  
 Erica Jarvis, 2002-2008  
 Melissa Jarvis-Madison, 2005-2009  
 Andrew Jirik, 1990-2000  
 Joseph Johnson, 1971-1974  
 Randy Johnson, 1978

Robert Johnson, 1975-1976  
 James Jones, 1970-1971  
 Dovi Kacev, 2015-2018  
 Krista Kamer, 2000-2003  
 Karen Keele, 1986-1987  
 Andrew Kemmerer, 1972  
 Robert Kendall, 1972  
 Marcia Kerwitt, 1971  
 Faycal Kessouri, 2016-  
 Azra Khan-Hussain, 1989-1998  
 Gi Beum Kim, 2016-2017  
 Jay Kim, 1974  
 Bradley Kirst, 1979  
 Gary Kleppel, 1979-1981  
 Paul Konrad, 1989-1990  
 Leila Lackey, 2010-2012  
 William Lansford, 1978  
 Wenjian Lao, 2006-  
 Jimmy Laughlin, 1978-1990  
 Blythe Layton, 2010-2015  
 Nikki Leach, 1999-2000  
 Molly Leecaster, 1998-2000  
 Eugene Leong, 1970-1973  
 Wendy Littlell, 1970  
 Craig Liu, 1991  
 Angelica Longoria-Bajza, 2008-2013  
 Wayne Luke, 1975  
 Greg Lyon, 2004-2012  
 Enrique Manzanilla, 1979-1982  
 Lucy Mao, 2014-2016, 2016-  
 Jack Mardesich, 1973-1984  
 Scott Martindale, 2014-  
 Keith Maruya, 2004-2019  
 Rita Mattilla, 1987  
 Raphael Mazor, 2006-  
 Gregory McBride, 1978  
 Kenneth McCune, 2015-  
 Diedre McDermott, 1972-1976  
 Tom McDonnell, 1978  
 Dorothy McGlenn, 1971  
 Steve McGown, 1981-1982  
 Bill McKeon, 1978  
 Karen McLaughlin, 2007-  
 Megan McQuarrie, 2000-2001  
 Alan Mearns, 1971-1980  
 Alvin Mehinto, 2013-  
 Marlene Merchain-Hanken, 2010-2018  
 Alan Miller, 1973-1974  
 Karlene Miller, 2006-2013  
 Kim Miller, 1984  
 Nick Miller, 2006-2009  
 Peter Miller, 2008-2011  
 Dennis Missetich, 1978-1979  
 Floyd Mitchell, 1974-1975  
 Michael Moore, 1974-1984  
 Shelly Moore, 1994-  
 Robert Morris, 1975-1976  
 Donna Moscher, 1979  
 Edward Motola, 1974-1977  
 Raphael Mujeriego, 1974  
 Donald Musselwhite, 1978-1979  
 Brad Myers, 1975-1977  
 Bryan Nece, 1999-  
 Jacqueline Nelson, 1987-1989  
 Nikolay Nezin, 2002-2018  
 Marion Nipper, 1987-1988  
 David Nishina, 1978-1979  
 Rachel Noble, 1998-2001  
 James Noblet, 2000-2003  
 Diane O'Donohue, 1987-1992  
 Phillip Oshida, 1975-1982  
 Ashley Parks, 2016-  
 Dean Pasco, 1978  
 Carlos Patrickson, 1973-1976  
 Jian Peng, 2004-2007  
 Jack Petralia, 2004-2007  
 Christine Pham, 2012-2013  
 Paul Picard, 1978-1979  
 Molly Piedra, 2002  
 Ellina Preston, 1991-1992  
 Valerie Raco-Rands, 1979-  
 Meredith Raith, 2010-2017  
 Ananda Ranasinghe, 1999-2013  
 Olivia Rhoades, 2017-2018  
 Catherine Rice, 1980  
 Kerry Ritter, 2001-2012  
 Christina Rivas, 2013-  
 Miranda Roethler, 2017-  
 Jim Roney, 1979-1981  
 Karen Rosenthal-Engelhart, 1982-1989  
 Lisa Sabin, 2002-2010  
 Abel Santana, 2013-  
 Sophia Santy-McHugh, 1982-1983  
 Thomas Sarason, 1971-1974  
 Henry Schafer, 1974-1990  
 Becky Schaffner, 2007-2014  
 Ken Schiff, 1987-1991, 1996-  
 Herbert Schoenhoefler, 1990  
 Annette Schulman, 1980-1981  
 Elizabeth Scott, 2010-2012  
 Ashmita Sengupta, 2010-2017  
 Karen Setty, 2007-2014  
 Alan Seydoux, 1978  
 Eric Shearer, 2018-2019  
 Marjorie Sherwood, 1971-1980  
 Gerald Shiller, 1971-1973  
 Dana Shultz, 2018-  
 Robin Simpson, 1971-1975  
 Jayme Smith, 2018-  
 Lisa Smith, 1978  
 Paul Smith, 1999-  
 Lucinda (Cindy) Smith-Word, 1971-  
 1972, 1974-1978  
 Paul Smokler, 1974-1975  
 Chris Solek, 2007-2015  
 Michael Sonoda, 1978-1980  
 Joshua Steele, 2014-  
 Elizabeth Steiger, 1974-1979  
 Eric Stein, 2002-  
 Steve Steinberg, 2011-2018  
 Andrea Steinberger, 1999-2004  
 Douglas Stone, 1983  
 Pete Striplin, 1978-1980  
 Harold Stubbs, 1973-1998  
 Melissa Studer, 2013-2014  
 Valita Sturges, 1974-1976  
 Richard Surynt, 1974  
 Martha Sutula, 2001-  
 Peter Szalay, 1981-1989  
 Ileana Szpila-Cerreno, 1974-1975  
 Terry Tafto, 1978  
 James Taff, 1970-1972  
 Kris Taniguchi-Quan, 2018-  
 Jennifer Taylor, 2017-  
 Bruce Teter, 1981  
 Susie Theroux, 2016-  
 Bruce Thompson, 1981-1992  
 Liesli Tiefenthaler, 1993-  
 Barbara Trager, 1972-1975  
 Kim Tran, 1995-2000  
 Yuan-Yuan Tsai, 1970-1972  
 David Tsukada, 1978-2015  
 Sylvia Urbina, 1990  
 Sherry Valentine-Laughlin, 1983-1989  
 Meta Vander-Meydan, 1978  
 Darcy Vandervort, 2015-2016  
 Justin Vanderwal, 2016-2017  
 Marc Verhoughstraete, 2018-  
 Doris Vidal-Dorsch, 2002-2016  
 Cherrie Vista-Ramos, 1994-1998  
 Robert Voglin, 1973-1977  
 Miwa von Borstel, 1988-1989  
 Dawn Vuong-Yorba, 1994-1998  
 Frank Wada, 1990-1991  
 Erica Walthers-Ellertson, 1999-2000  
 Chung-Ching Wang, 1973  
 Yawei Wang, 2017-2018  
 David Wantless, 2018-  
 Charles Ward, 1980-1989  
 Stephen Weisberg, 1996-

Ellie Wenger, 2018-  
Alvin Wescott, 1983-1991  
Michael Westbrook, 1973-1975  
Cindy White, 1980  
Diane Wiley, 1983-1991  
Lisa Winter, 1980-1983, 1985-1990  
Charles Wong, 2019-

Jack Word, 1973-1980  
Jean Wright, 1974-1980  
Marianne Yamaguchi, 1997-2004  
Zeyu Yang, 2005-2006  
Vada Yoon, 2006-2007  
Chen-Shyong Young, 1972-1973  
David Young, 1970-1980

Diana Young, 1998-2011  
Charlie Yu, 1993-2000  
Joe Zarnoch, 1987  
Ann Zellers, 1995-1999  
Eddy Zeng, 1992-2000, 2001-2004  
Amy Zimmer-Faust, 2018-

## Institutional collaborators

SCCWRP has co-authored peer-reviewed journal and book publications with 489 organizations since its founding in 1969. Collaborative publications

are one of the key ways that SCCWRP forges and strengthens partnerships worldwide – and builds broad consensus on emerging science.

Access Research Corporation, 1 publication  
ADH Environmental, 1 publication  
AECOM, 1 publication  
Agilent Technologies, 1 publication  
Alexandria University (Egypt), 1 publication  
Alfred Wegener Institute (Germany), 1 publication  
Algalita Marine Research Foundation, 4 publications  
Amec Foster Wheeler, 2 publications  
Anderson Consulting Engineers, 1 publication  
Applied Marine Sciences, 2 publications  
Applied-Maths, 1 publication  
Aqua Contractors & Oceanographics, 1 publication  
Aquatic Bioassay & Consulting Laboratories, 8 publications  
Arcadis US, 3 publications  
Argonne National Laboratory, 1 publication  
ATTAGENE, 1 publication  
Australian Museum, 1 publication  
Australian Rivers Institute, 1 publication  
Australian Water Quality Centre, 1 publication  
AXYS Analytical Services (Canada), 1 publication  
AZTI Tecnalia (Spain), 7 publications  
Bangor University (UK), 2 publications  
Battelle Ocean Sciences, 2 publications  
Bay Foundation, 3 publications

Baylor University, 3 publications  
Beagle Bioproducts, 3 publications  
Bedford Institute of Oceanography (Canada), 1 publication  
Bermuda Institute of Ocean Sciences, 2 publications  
Bigelow Laboratory for Ocean Sciences, 1 publication  
BioDetection Systems (The Netherlands), 1 publication  
Boise State University, 1 publication  
Brock Bernstein, Independent Consultant, 4 publications  
Brookhaven National Laboratory, 1 publication  
Brown and Caldwell, 1 publication  
Bruce Steele, Independent sea urchin diver, 1 publication  
Bundesforschungs und Ausbildungszentrum für Wald (Austria), 1 publication  
Cabrillo Marine Aquarium, 1 publication  
California Academy of Sciences, 1 publication  
California Analytical Laboratories, 1 publication  
California Coastal Commission, 2 publications  
California Department of Fish and Wildlife, 17 publications  
California Department of Health Services, 1 publication  
California Environmental Protection Agency, 1 publication  
California Ocean Protection Council, 1 publication  
California Ocean Science Trust, 3 publications  
California State Coastal Conservancy, 1 publication  
California State Lands Commission, 1 publication

California State Polytechnic University, Pomona, 2 publications  
California State University, Channel Islands, 2 publications  
California State University, Chico, 2 publications  
California State University, Fullerton, 2 publications  
California State University, Long Beach, 29 publications  
California State University, Northridge, 3 publications  
California State University, San Marcos, 4 publications  
California State University, Stanislaus, 2 publications  
California State Water Resources Control Board, 9 publications  
California Wetfish Producers Association, 1 publication  
Cancer Research Institute (France), 1 publication  
Cardno ENTRIX, 1 publication  
Carnegie Mellon University, 1 publication  
Cawthron Institute (New Zealand), 1 publication  
Center for Conservation Biology, 1 publication  
Center for Urban Waters, 1 publication  
Central and Northern California Ocean Observing System, 1 publication  
Centre D' Investigació I Desenvolupament (Spain), 1 publication  
Centre d'Estudis Avançats de Blanes (Spain), 1 publication  
Centre de Recerca Ecològica i Aplicacions Forestals (Spain), 1 publication  
Centre de Synthèse et d'Analyse Sur la Biodiversité - Fondation pour la Recherche sur la Biodiversité (CESAB-FRB) (France), 1 publication  
Centre for Environment, Fisheries and Agriculture (UK), 2 publications  
Centre Tecnològic Forestal de Catalunya (Spain), 1 publication  
Centro de Investigación Científica y de Educación Superior de Ensenada, 1 publication  
Centro de Investigación y Docencia Económicas (Spain), 1 publication  
Centro de Investigación y Estudios Avanzados del Instituto Politécnico Nacional (Mexico), 1 publication  
Centro Interdisciplinario de Ciencias Marinas (Mexico), 1 publication  
CH2M HILL, 2 publications  
Channel Islands National Park, 1 publication  
Charles Stuart University (Australia), 1 publication  
Cheadle Center for Biodiversity and Ecological Restoration, 1 publication  
Chevron Energy Technology Company, 1 publication  
Chinese Academy of Sciences (China), 17 publications  
City and County of San Francisco, 2 publications  
City College of New York, 1 publication  
City of Encinitas, 1 publication  
City of Los Angeles, 31 publications  
City of Los Angeles Zoological Gardens, 1 publication  
City of Malibu, 1 publication  
City of Newport Beach, 1 publication  
City of Oxnard, 1 publication  
City of Racine Health Department, 3 publications  
City of San Diego, 28 publications

City of Santa Barbara, 1 publication  
City University of New York, 1 publication  
Claire Stern Associates, 1 publication  
Coastal Environmental Services, 1 publication  
Colgate University, 1 publication  
College of William and Mary, 6 publications  
Colorado School of Mines, 2 publications  
Colorado State University, Fort Collins, 6 publications  
Columbia Analytical Services, 1 publication  
Columbia University, 1 publication  
Commonwealth Scientific and Industrial Research Organisation (Australia), 4 publications  
Computer Sciences Corporation, 2 publications  
Connecticut Department of Environmental Protection, 1 publication  
Cornell University, 1 publication  
County of Los Angeles Department of Public Works, 1 publication  
County of Orange Department of Public Works, 1 publication  
County of Orange Public Health Laboratory, 3 publications  
County of Ottawa Health Department, 2 publications  
County of San Diego Department of Environmental Health, 1 publication  
County of Santa Barbara Public Health Department, 1 publication  
County of Santa Cruz, 1 publication  
County of Ventura Public Health Laboratory, 1 publication  
CSC Biomarker Laboratory, 1 publication  
Dames and Moore, 2 publications  
Dancing Coyote Environmental, 1 publication  
Delta Stewardship Council, 1 publication  
Deltares (The Netherlands), 2 publications  
Divers Involved Voluntarily in Environmental Rehabilitation and Safety, 1 publication  
Doug Diener, Independent Consultant, 1 publication  
Duke University, 2 publications  
E.V.S. Consultants (Canada), 1 publication  
Earth Island Institute, 1 publication  
East Carolina University, Greenville, 1 publication  
East China Normal University, 1 publication  
Ecoanalysis, 4 publications  
École Polytechnique Fédérale de Lausanne (Switzerland), 1 publication  
Ehime University (Japan), 2 publications  
Elkhorn Sough National Estuarine Research Reserve, 1 publication  
Elon University, 1 publication  
Emory University, 2 publications  
Environment Canada, 4 publications  
EOA, 3 publications  
ERL Environmental, 2 publications  
European Commission Joint Research Centre-Institute for Environment and Sustainability (JRC-IES) (Italy), 2 publications  
Experimental Pathology Laboratories, 1 publication

**Exponent**, 2 publications  
**ExxonMobil Biomedical Sciences**, 2 publications  
**Federal University of Rio de Janeiro (Brazil)**, 2 publications  
**Flinders University (Australia)**, 1 publication  
**Florida International University**, 1 publication  
**Florida Marine Research Institute**, 1 publication  
**Fordham University**, 3 publications  
**Frostburg State College**, 1 publication  
**GEOMAR Helmholtz Centre for Ocean Research**, 1 publication  
**Georgia Aquarium**, 1 publication  
**German Federal Environmental Agency**, 4 publications  
**Glendale Adventist Medical Center**, 1 publication  
**Goddard Earth Sciences Technology and Research**, 1 publication  
**Golder Associates (Canada)**, 1 publication  
**Gothenburg University (Sweden)**, 1 publication  
**Graduate School of the Chinese Academy of Sciences**, 1 publication  
**Griffith University (Australia)**, 3 publications  
**Hakai Institute**, 1 publication  
**Häme University of Applied Sciences (Finland)**, 1 publication  
**Harvard University**, 3 publications  
**Heal The Bay**, 3 publications  
**Helmholtz Centre for Environmental Research (Germany)**, 2 publications  
**Hillsborough Community College**, 1 publication  
**Hohai University (China)**, 1 publication  
**Hong Kong Baptist University**, 1 publication  
**Hong Kong Polytechnic University**, 1 publication  
**Humboldt State University**, 1 publication  
**HydroQual, Inc.**, 1 publication  
**Hydrozoology**, 1 publication  
**ICF International**, 1 publication  
**Idaho Cleanup Project**, 1 publication  
**Idaho National Engineering and Environmental Laboratory**, 4 publications  
**Indian Institute of Technology, Mumbai (India)**, 1 publication  
**Indian Institute of Technology, New Delhi (India)**, 1 publication  
**Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) (France)**, 5 publications  
**Institut Méditerranéen d'Océanologie (France)**, 1 publication  
**Institut National de la Recherche Agronomique (France)**, 1 publication  
**Institute for Sustainability Sciences – Agroscope (Switzerland)**, 1 publication  
**Institute of Biology of the Southern Seas (Ukraine)**, 1 publication  
**Instituto Nacional de Sau'de (Portugal)**, 1 publication  
**Interdisciplinary Center for Biotechnology Research**, 1 publication  
**International Bank for Reconstruction and Development**, 1 publication

**International Bird Rescue**, 1 publication  
**Interuniversity Cooperation Center Water and Health (Austria)**, 2 publications  
**Irstea (France)**, 2 publications  
**Irvine Ranch Water District**, 2 publications  
**IWW Water Centre (Germany)**, 1 publication  
**Jacobs University Bremen and Max Planck Institute for Marine Microbiology (Germany)**, 1 publication  
**James Madison University**, 1 publication  
**Japan Agency for Marine-Earth Science and Technology**, 1 publication  
**Jardon and Howard Technologies**, 1 publication  
**Jet Propulsion Laboratory**, 4 publications  
**Joseph L. Furnish, Independent Consultant**, 1 publication  
**Kaiser Permanente Division of Research**, 1 publication  
**King Abdullah University of Science and Technology (Saudi Arabia)**, 2 publications  
**Kinnetic Laboratories**, 1 publication  
**Korea Advanced Institute of Science and Technology**, 1 publication  
**Kuwait Institute for Scientific Research**, 1 publication  
**La Mer Taxonomic Consultants**, 1 publication  
**Laboratoire d'Océanographie Microbienne (France)**, 1 publication  
**Laboratoire d'Océanographie de Villefranche (France)**, 1 publication  
**Laboratoire d'Océanographie et du Climat (France)**, 1 publication  
**Lamar University**, 1 publication  
**Laurentian University (Canada)**, 1 publication  
**Lawrence Berkeley National Laboratory**, 3 publications  
**Lifespan Ambulatory Care Center**, 2 publications  
**Local Environmental Action Demanded (LEAD)**, 1 publication  
**Loma Linda University**, 1 publication  
**Los Angeles and San Gabriel Rivers Watershed Council**, 1 publication  
**Los Angeles Regional Water Quality Control Board**, 5 publications  
**Louis Calder Conservation and Ecology Study Center**, 1 publication  
**Louisiana State University**, 2 publications  
**Loyola Marymount University**, 4 publications  
**MacDonald Environmental Sciences Ltd. (Canada)**, 1 publication  
**Macquarie University (Australia)**, 2 publications  
**Management Unit of the North Sea Mathematical Models**, 1 publication  
**Marine Biological Consultants Applied Environmental Sciences**, 1 publication  
**Marine Mammal Care Center**, 1 publication  
**Marine Resources Research Institute**, 1 publication  
**Marine Scotland Science**, 1 publication  
**Masaryk University (Czech Republic)**, 3 publications  
**Massachusetts Institute of Technology**, 2 publications  
**Max Planck Institute for Chemistry**, 1 publication  
**MBC Applied Environmental Sciences**, 1 publication

**MEC Analytical Systems**, 2 publications  
**Mercer University School of Medicine**, 1 publication  
**Mercury Science**, 1 publication  
**Michigan State University, East Lansing**, 4 publications  
**Mississippi State University**, 2 publications  
**Monterey Bay Aquarium Research Institute**, 5 publications  
**Moss Landing Marine Laboratories**, 15 publications  
**Mote Marine Laboratory Center for Ecotoxicology**, 1 publication  
**Museo Nacional de Ciencias Naturales (Spain)**, 1 publication  
**Nanjing University (China)**, 3 publications  
**Nanyang Technological University (Singapore)**, 3 publications  
**National Academy of Science**, 1 publication  
**National Aeronautics and Space Administration (NASA)**, 2 publications  
**National Caucus and Center on Black Aging**, 1 publication  
**National Chung Hsing University (Taiwan)**, 1 publication  
**National Hydraulics and Environmental Laboratory (France)**, 1 publication  
**National Institute for Environmental Studies (Japan)**, 1 publication  
**National Institute of Environmental Health Services**, 1 publication  
**National Institute of Standards and Technology**, 2 publications  
**National Oceanic and Atmospheric Administration**, 69 publications  
**National Research Center**, 1 publication  
**National Resources Defense Council**, 1 publication  
**National Science Foundation**, 1 publication  
**National University**, 1 publication  
**Natural Resources Institute (Finland)**, 1 publication  
**Naturalis Biodiversity Center (The Netherlands)**, 2 publications  
**Nature Conservancy**, 1 publication  
**NatureServe**, 1 publication  
**Nautilus Environmental**, 2 publications  
**Naval Ocean Research and Development Activity**, 1 publication  
**New Jersey Marine Sciences Consortium**, 1 publication  
**New Jersey Natural Heritage Program**, 1 publication  
**New York City Department of Environmental Protection**, 1 publication  
**New Zealand Wildlife Service**, 1 publication  
**NewFields Northwest Port Gamble**, 1 publication  
**North Carolina State University**, 2 publications  
**North Coast Regional Water Quality Control Board**, 1 publication  
**North Dakota State University**, 1 publication  
**Northeastern University**, 1 publication  
**Northern Ireland Environment Agency (UK)**, 1 publication  
**Norwegian Geotechnical Institute**, 2 publications  
**Novia University of Applied Sciences (Finland)**, 2 publications

**Oak Ridge Institute for Science and Education**, 2 publications  
**Observatoire Océanologique de Banyuls (France)**, 1 publication  
**Occidental College**, 11 publications  
**Ocean Conservancy**, 1 publication  
**Ocean Imaging Corporation**, 1 publication  
**Ohio State University**, 2 publications  
**Old Dominion University**, 8 publications  
**Orange County Sanitation District**, 37 publications  
**Oregon State University**, 6 publications  
**Oyster Recovery Partnership**, 1 publication  
**P.P. Shirshov Institute of Oceanology (Russia)**, 4 publications  
**Pacific Marine Mammal Center**, 2 publications  
**Pacific Northwest National Laboratory**, 2 publications  
**Pacific Shellfish Institute**, 1 publication  
**PCR Services Corporation**, 1 publication  
**Penn Cove Shellfish**, 2 publications  
**Pennsylvania State University**, 1 publication  
**Pepperdine University**, 1 publication  
**Pierre and Marie Curie University (France)**, 1 publication  
**Point Blue Conservation Science**, 1 publication  
**Port Gamble S'Klallam Tribe**, 1 publication  
**Port of Los Angeles**, 2 publications  
**Questa Engineering**, 1 publication  
**Reef Check California**, 1 publication  
**Reinventing the Nation's Urban Water Infrastructure (ReNUWIt)**, 1 publication  
**Research Centre for Agrobiological and Pedology (Italy)**, 1 publication  
**Resource Conservation District of the Santa Monica Mountains**, 2 publications  
**Rice University**, 1 publication  
**Rio de Janeiro State University (Brazil)**, 2 publications  
**Robert Smith, Private Consultant**, 4 publications  
**Roberts Environmental and Conservation Planning LLC**, 1 publication  
**Rosenstiel School of Marine and Atmospheric Sciences**, 1 publication  
**Royal Belgian Institute of Natural Sciences**, 1 publication  
**Russian Academy of Sciences**, 1 publication  
**Sacramento-San Joaquin Delta Conservancy**, 1 publication  
**San Diego Regional Water Quality Control Board**, 6 publications  
**San Diego State University**, 12 publications  
**San Elijo Lagoon Conservancy**, 1 publication  
**San Francisco Bay Conservation and Development Commission**, 1 publication  
**San Francisco Bay Regional Water Quality Control Board**, 2 publications  
**San Francisco Estuary Institute**, 19 publications  
**San Francisco State University**, 4 publications  
**Sanitation Districts of Los Angeles County**, 43 publications  
**Santa Monica Bay Restoration Commission**, 1 publication  
**Santa Monica Bay Restoration Project**, 4 publications

**Santa Monica Baykeeper**, 1 publication  
**Savannah State University**, 1 publication  
**Science Applications International Corporation**, 3 publications  
**SEA Environmental Decisions (UK)**, 1 publication  
**SEAMOcean**, 2 publications  
**Seoul National University (Republic of Korea)**, 1 publication  
**Sierra Nevada Aquatic Research Laboratory**, 1 publication  
**Simon Fraser University, Burnaby (Canada)**, 1 publication  
**Smart Water Research Centre (Australia)**, 1 publication  
**Smithsonian Institution**, 2 publications  
**Soller Environment, LLC**, 2 publications  
**Sorbonne Universites (France)**, 1 publication  
**Source Molecular Corporation**, 2 publications  
**South Florida Water Management District**, 1 publication  
**Southern California Marine Institute**, 1 publication  
**Southern Illinois University**, 3 publications  
**Southern Nevada Water Authority**, 2 publications  
**Southwest Fisheries Science Center**, 1 publication  
**Springborn Life Sciences**, 1 publication  
**St. Cloud State University**, 1 publication  
**Stanford University**, 27 publications  
**State of Delaware Department of Natural Resources & Environmental Control**, 1 publication  
**State of Idaho Department of Environmental Quality**, 1 publication  
**State of Mississippi Department of Marine Resources**, 1 publication  
**State of Mississippi Chemical Laboratory**, 1 publication  
**State of New Jersey Department of Environmental Protection**, 1 publication  
**State of Oregon Coastal Management Program**, 2 publications  
**State of Oregon Department of Agriculture**, 1 publication  
**State of South Carolina Department of Natural Resources**, 2 publications  
**State of Washington Department of Ecology**, 4 publications  
**State University of New York, Stony Brook**, 1 publication  
**Stony Brook University**, 1 publication  
**Strand Scientific Intelligence**, 1 publication  
**Stroud Water Research Center**, 2 publications  
**Sultan Qaboos University (Oman)**, 1 publication  
**Surfrider Foundation**, 1 publication  
**Sustainable Streams**, 1 publication  
**Swedish University of Agricultural Sciences (Sweden)**, 1 publication  
**Swiss Centre for Applied Ecotoxicology**, 1 publication  
**Swiss Federal Institute of Aquatic Science and Technology (Eawag)**, 2 publications  
**Swiss Federal Office of Public Health**, 1 publication  
**Tampa Bay Estuary Program**, 1 publication  
**Taxon, Inc.**, 2 publications  
**Taylor Shellfish Hatchery**, 1 publication  
**TDI-Brooks International**, 2 publications  
**Technical University of Dresden (Germany)**, 1 publication  
**Technical University of Munich (Germany)**, 2 publications

**Tetra Tech**, 10 publications  
**Texas A & M University**, 2 publications  
**Texas Tech University**, 2 publications  
**The World Bank**, 1 publication  
**Tijuana River National Estuarine Research Reserve**, 2 publications  
**Tim Welch, Technical Consultant**, 2 publications  
**TRAC Laboratory**, 1 publication  
**Trout Unlimited**, 1 publication  
**Universidad Autonoma de Baja California (Mexico)**, 2 publications  
**Universidade do Porto (Portugal)**, 1 publication  
**Università Politecnica delle Marche (Italy)**, 2 publications  
**Universitat de Barcelona (Spain)**, 1 publication  
**Université Bordeaux**, 1 publication  
**Université de Lille (France)**, 1 publication  
**Université de Toulouse (France)**, 2 publications  
**University College, Cork (Ireland)**, 1 publication  
**University College, Dublin (Ireland)**, 4 publications  
**University of Aberdeen (UK)**, 1 publication  
**University of Adelaide (Australia)**, 1 publication  
**University of Alaska, Fairbanks**, 1 publication  
**University of Alberta, Edmonton (Canada)**, 1 publication  
**University of Amsterdam (The Netherlands)**, 1 publication  
**University of Arizona**, 8 publications  
**University of Brighton (UK)**, 1 publication  
**University of British Columbia (Canada)**, 4 publications  
**University of Cadiz (Spain)**, 1 publication  
**University of Caen Basse Normandie (France)**, 1 publication  
**University of California, Berkeley**, 23 publications  
**University of California, Davis**, 17 publications  
**University of California, Irvine**, 12 publications  
**University of California, Los Angeles**, 68 publications  
**University of California, Merced**, 2 publications  
**University of California, Riverside**, 28 publications  
**University of California, San Diego**, 32 publications  
**University of California, Santa Barbara**, 27 publications  
**University of California, Santa Cruz**, 16 publications  
**University of California, Sierra Nevada Aquatic Research Laboratory**, 1 publication  
**University of Camerino (Italy)**, 1 publication  
**University of Coimbra (Portugal)**, 3 publications  
**University of Colorado, Boulder**, 3 publications  
**University of Copenhagen (Denmark)**, 1 publication  
**University of Córdoba**, 1 publication  
**University of Crete (Greece)**, 1 publication  
**University of Delaware**, 3 publications  
**University of East Anglia (UK)**, 2 publications  
**University of Eastern Finland**, 1 publication  
**University of Florida**, 15 publications  
**University of Georgia**, 14 publications  
**University of Girona (Spain)**, 1 publication  
**University of Gothenburg (Sweden)**, 2 publications

**University of Guelph (Canada)**, 7 publications  
**University of Hawaii, Manoa**, 3 publications  
**University of Hull (UK)**, 1 publication  
**University of Illinois, Chicago**, 1 publication  
**University of Illinois, Urbana-Champaign**, 2 publications  
**University of KwaZuluNatal, Durban (South Africa)**, 1 publication  
**University of Liege (Belgium)**, 1 publication  
**University of Macao (China)**, 1 publication  
**University of Maine**, 1 publication  
**University of Maryland, Baltimore**, 2 publications  
**University of Massachusetts, Boston**, 6 publications  
**University of Melbourne (Australia)**, 7 publications  
**University of Miami**, 7 publications  
**University of Minnesota, Duluth**, 2 publications  
**University of Minnesota, Twin Cities**, 8 publications  
**University of Missouri**, 1 publication  
**University of Montana**, 1 publication  
**University of Münster (Germany)**, 1 publication  
**University of Nebraska, Lincoln**, 1 publication  
**University of Nevada, Las Vegas**, 1 publication  
**University of New Brunswick (Canada)**, 1 publication  
**University of New Mexico**, 1 publication  
**University of North Carolina, Chapel Hill**, 22 publications  
**University of North Carolina, Charlotte**, 1 publication  
**University of Oxford (UK)**, 1 publication  
**University of Pavia (Italy)**, 1 publication  
**University of Plymouth (UK)**, 1 publication  
**University of Puerto Rico**, 2 publications  
**University of Queensland (Australia)**, 2 publications  
**University of Rhode Island**, 4 publications  
**University of Salento (Italy)**, 1 publication  
**University of San Francisco**, 2 publications  
**University of Saskatchewan (Canada)**, 1 publication  
**University of South Carolina, Columbia**, 4 publications  
**University of South Florida, St. Petersburg**, 1 publication  
**University of South Florida, Tampa**, 7 publications  
**University of Salento (Italy)**, 1 publication  
**University of Southern California**, 43 publications  
**University of Southern Mississippi**, 3 publications  
**University of St. Thomas**, 2 publications  
**University of Sydney (Australia)**, 1 publication  
**University of Texas, Austin**, 2 publications  
**University of Texas, Tyler**, 1 publication  
**University of Tokyo (Japan)**, 1 publication  
**University of Turku**, 1 publication

**University of Vienna (Austria)**, 1 publication  
**University of Washington**, 10 publications  
**University of West Florida**, 1 publication  
**University of Western Australia**, 1 publication  
**University of Winnipeg (Canada)**, 1 publication  
**University of Wisconsin, Madison**, 2 publications  
**University of Wisconsin, Milwaukee**, 2 publications  
**University of Wollongong (Australia)**, 2 publications  
**University of Sydney (Australia)**, 1 publication  
**Uppsala University (Sweden)**, 1 publication  
**US Army Engineer Research and Development Center**, 3 publications  
**US Carbon Cycle Science Program**, 1 publication  
**US Department of Agriculture**, 4 publications  
**US Department of Energy**, 1 publication  
**US Environmental Protection Agency**, 68 publications  
**US Fish and Wildlife Service**, 2 publications  
**US Forest Service**, 1 publication  
**US Geological Survey**, 36 publications  
**Utah State University**, 4 publications  
**Utrecht University (The Netherlands)**, 2 publications  
**Vanderbilt University**, 1 publication  
**Versar Inc. ESA**, 4 publications  
**Virginia Polytechnic Institute and State University**, 7 publications  
**Waipā Foundation**, 1 publication  
**Waltjay Consulting**, 1 publication  
**Washington Natural Heritage Program**, 1 publication  
**Washington Sea Grant**, 1 publication  
**Wayne State University**, 2 publications  
**West Coast Ocean Data Portal**, 2 publications  
**West Virginia University**, 1 publication  
**Weston Solutions**, 2 publications  
**Whiskey Creek Shellfish Hatchery**, 2 publications  
**Windward Environmental**, 1 publication  
**Woods Hole Oceanographic Institution**, 3 publications  
**Worcester Polytechnic Institute**, 1 publication  
**WorldFish Centre (Malaysia)**, 1 publication  
**WPS Environment and Energy**, 1 publication  
**Xiamen University (China)**, 1 publication  
**Yale University**, 1 publication  
**Yellow Springs Instruments**, 1 publication  
**Yonsei University, Seoul (Korea)**, 1 publication  
**Zhongshan University (China)**, 1 publication

## SCCWRP publication co-authors

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SCCWRP has co-authored peer-reviewed journal and book publications with 1,408 individuals since its founding in 1969. This list presents the names of

all external co-authors who have published three or more publications with SCCWRP; hundreds more have co-authored one or two publications.

---

Stephen Adams, 3 publications  
Clark Alexander, 3 publications  
George Alexander, 3 publications  
Simone Alin, 3 publications  
David Alvarez, 3 publications  
Richard Ambrose, 6 publications  
Paul Anderson, 3 publications  
Benjamin Arnold, 8 publications  
Brian Badgley, 3 publications  
Michael Baker, 5 publications  
Elisenda Balleste, 3 publications  
Chris Beegan, 3 publications  
Jade Benjamin-Chung, 3 publications  
Brock Bernstein, 4 publications  
A Denene Blackwood, 7 publications  
Brian Bledsoe, 6 publications  
Alexandria Boehm, 22 publications  
J Ashley Booth, 5 publications  
Angel Borja, 7 publications  
Suzanne Bricker, 3 publications  
Robert Burgess, 9 publications  
Susan Burns, 4 publications  
Lilian Busse, 5 publications  
Muruleedhara Byappanahalli, 3 publications  
Donald Cadien, 13 publications  
Mark Cantwell, 3 publications  
David Caron, 10 publications  
Curtis Cash, 6 publications  
Michael Cashman, 3 publications  
Susan Chivers, 3 publications  
Ross Clark, 3 publications  
John Colford Jr, 10 publications  
R Christina Colli-Dula, 3 publications  
Joshua Collins, 5 publications  
Reagan Converse, 4 publications  
Jordan Crago, 3 publications  
Ann Dalkey, 4 publications  
Kerri Danil, 3 publications

Daniel Dauer, 7 publications  
Nancy Denslow, 15 publications  
Robert Diaz, 3 publications  
Andrew Dickson, 4 publications  
Paul DiGiacomo, 9 publications  
Nathan Dodder, 4 publications  
Mas Dojiri, 3 publications  
John Dorsey, 6 publications  
Jörg Drewes, 4 publications  
Alfred Dufour, 3 publications  
Darcy Ebentier, 4 publications  
Robert Eganhouse, 4 publications  
Jared Ervin, 7 publications  
Richard Feely, 9 publications  
Peggy Fong, 7 publications  
Jiamo Fu, 3 publications  
Jed Fuhrman, 5 publications  
Michael Fulton, 3 publications  
Edward Furlong, 3 publications  
Jay Gan, 9 publications  
Alyssa Gellene, 4 publications  
Mark Gold, 5 publications  
Kelly Goodwin, 8 publications  
Michele Gourmelon, 5 publications  
Stanley Grant, 3 publications  
Dominic Gregorio, 5 publications  
Jason Gregory, 3 publications  
Joshua Gruber, 3 publications  
Joseph Gully, 10 publications  
Charles Hagedorn, 5 publications  
Kaitlyn Hanley, 4 publications  
Gary Hardiman, 5 publications  
Valerie Harwood, 5 publications  
Richard Haugland, 5 publications  
Charles Hawkins, 3 publications  
Robert Hawley, 3 publications  
Kendra Hayashi, 4 publications  
Jacqueline Hayes, 3 publications  
Kay Ho, 3 publications

Terri Hogue, 3 publications  
Eunha Hoh, 7 publications  
Patricia Holden, 14 publications  
Alex Horne, 3 publications  
Jo Hose, 7 publications  
Jeffrey Hyland, 4 publications  
Jennifer Jay, 13 publications  
B Sumith Jayasinghe, 3 publications  
Kenneth Jenkins, 7 publications  
Sunny Jiang, 3 publications  
Scott Johnson, 6 publications  
Burton Jones, 12 publications  
Gilbert Jones, 5 publications  
Krista Kamer, 4 publications  
David Katz, 3 publications  
Thomas Kauwling, 4 publications  
Kevin Kelley, 6 publications  
Catherine Kelty, 5 publications  
Julie Kinzelman, 3 publications  
Terrie Klinger, 3 publications  
Susan Klosterhaus, 3 publications  
Raphael Kudela, 11 publications  
Peter Landrum, 3 publications  
Ami Latker, 8 publications  
Gwendolyn Lattin, 3 publications  
Sim-Lau Lau, 3 publications  
Gunnar Lauenstein, 4 publications  
Christine Lee, 3 publications  
Molly Leecaster, 5 publications  
Frederic Leusch, 3 publications  
Jeong Lim, 3 publications  
Roberto Llansó, 3 publications  
Edward Long, 3 publications  
Laurence Lovell, 3 publications  
Michael Lyons, 3 publications  
Susan Mackintosh, 3 publications  
Bixian Mai, 3 publications  
Joao Marques, 3 publications  
Jason May, 3 publications

Raphael Mazor, 4 publications  
Charles McGee, 18 publications  
John McLaughlin, 3 publications  
Wim Meijer, 4 publications  
Aroon Melwani, 3 publications  
Michael Mengel, 9 publications  
Peter Miller, 6 publications  
David Montagne, 12 publications  
Charles Moore, 3 publications  
Jan Newton, 4 publications  
Rachel Noble, 19 publications  
James Oakden, 3 publications  
Peter Ode, 11 publications  
Lindsay Peed, 4 publications  
Edwin Perkins, 3 publications  
Curtis Phinney, 4 publications  
Erik Pilgrim, 4 publications  
Daniel Pondella II, 3 publications  
Harold Puffer, 3 publications  
Andrew Reher, 7 publications  
Donald Reish, 12 publications  
Vincent Resh, 4 publications  
Jesus Reyes, 4 publications  
George Robertson, 8 publications  
Joan Rose, 3 publications  
Steven Rossi, 4 publications  
Hodon Ryu, 4 publications  
Michael Sadowsky, 5 publications

Brett Sanders, 3 publications  
Jorge Santo Domingo, 4 publications  
Yelena Sapozhnikova, 3 publications  
Roman Sasik, 3 publications  
Lauren Sassoubre, 3 publications  
Daniel Schlenk, 16 publications  
Astrid Schnetzer, 3 publications  
Alexander Schriewer, 6 publications  
Geoffrey Scott, 4 publications  
Bridget Seegers, 3 publications  
Erica Seubert, 6 publications  
Orin Shanks, 11 publications  
Robert Sheath, 4 publications  
Guoying Sheng, 3 publications  
Christopher Sinigalliano, 6 publications  
Mano Sivaganesan, 6 publications  
Peter Slattery, 3 publications  
Deborah Smith, 3 publications  
Robert Smith, 8 publications  
Stephanie Smith, 4 publications  
Shane Snyder, 9 publications  
L James Sprague, 3 publications  
Rosalina Stancheva, 4 publications  
Alex Steele, 5 publications  
Jill Stewart, 7 publications  
Keith Stolzenbach, 6 publications  
Cristopher Stransky, 3 publications  
Janet Stull, 4 publications

Avery Tatters, 3 publications  
Heliana Teixeira, 3 publications  
Laura Terriquez, 3 publications  
Kim Tran, 3 publications  
Laurie Van De Werfhorst, 8 publications  
Ronald Velarde, 12 publications  
Christopher Vulpe, 3 publications  
Timothy Wade, 7 publications  
Dan Wang, 9 publications  
David Wanless, 3 publications  
Jonathan Warrick, 3 publications  
Libe Washburn, 5 publications  
David Weller, 3 publications  
Richard Whitman, 5 publications  
Frank Wilkes, 3 publications  
Edward Wirth, 3 publications  
Catherine Wright, 4 publications  
Stefan Wuertz, 5 publications  
Kevan Yamahara, 4 publications  
Ze-Yu Yang, 3 publications  
Vincent Yau, 3 publications  
David Young, 3 publications  
Eddy Zeng, 11 publications  
Gan Zhang, 3 publications  
Amity Zimmer-Faust, 3 publications

## Contributors to the Southern California Bight Regional Monitoring Program

Dozens of agencies from diverse sectors participate in each five-year cycle of the SCCWRP-facilitated Southern California Bight Regional

Monitoring Program. Founded in 1994, the collaborative program examines how human activities have affected the health of the coastal ocean.

**AES Corporation**  
Bight '98

**Algaita Marine Research and Education**  
Bight '98, Bight '13, Bight '18

**Aliso Water Management Agency**  
Bight '98

**AMEC Foster Wheeler/Wood**  
Bight '03, Bight '08, Bight '13, Bight '18

**Anchor OEA**  
Bight '13, Bight '18

**Aquatic Bioassay and Consulting Laboratories**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**B&B Laboratories**  
Bight '08

**Bioaccumulation Oversight Group**  
Bight '18

**California Coastkeeper Alliance**  
Bight '13, Bight '18

**California Department of Fish and Wildlife**  
Bight '08, Bight '13, Bight '18

**California Ocean Science Trust**  
Bight '08, Bight '13

**California Regional Water Quality Control Board, Los Angeles Region**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**California Regional Water Quality Control Board, San Diego Region**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**California Regional Water Quality Control Board, Santa Ana Region**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**California Regional Water Quality Control Board, Central Coast Region**  
Bight '98, Bight '08

**California Regional Water Quality Control Board, Central Valley Region**  
Bight '08

**California State University, Channel Islands**  
Bight '08, Bight '18

**California State University, Fullerton**  
Bight '13

**California State University, Long Beach**  
Bight '03, Bight '08, Bight '18

**California State University, San Bernardino**  
Bight '03

**California State Water Resources Control Board**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**California Sea Grant**  
Bight '98, Bight '13

**Catalina Sea Ranch**  
Bight '18

**Center for Environmental Cooperation**  
Bight '98

**Channel Islands National Marine Sanctuary**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Chevron USA Products Company**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**City of Carson**  
Bight '18

**City of El Segundo**  
Bight '18

**City of Encinitas**  
Bight '13, Bight '18

**City of Escondido**  
Bight '13, Bight '18

**City of Hawthorne**  
Bight '18

**City of Inglewood**  
Bight '18

**City of Laguna Beach**  
Bight '08

**City of Lawndale**  
Bight '18

**City of Lomita**  
Bight '18

**City of Long Beach**  
Bight '98, Bight '03

**City of Los Angeles**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**City of Malibu**  
Bight '08, Bight '13

**City of Newport Beach**  
Bight '08

**City of Oceanside**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**City of Oxnard**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**City of San Diego**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**City of Santa Barbara**  
Bight '98, Bight '03

**City of Ventura**  
Bight '98, Bight '03

**Columbia Analytical Services**  
Bight '98

**Computer Sciences Corporation**  
Bight '98

**CRG Marine Laboratories**  
Bight '94, Bight '98, Bight '03, Bight '08

**Dancing Coyote Environmental**  
Bight '13, Bight '18

**Divers Involved Voluntarily in Rehabilitation and Safety**  
Bight '98

**Dominguez Channel Watershed Management Group**  
Bight '18

**Eastern Municipal Water District**  
Bight '08

**Ecoanalysis**  
Bight '94

**EcoAnalysts**  
Bight '13, Bight '18

**Encina Wastewater Authority**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Eurofins Calscience Environmental Laboratories**  
Bight '13, Bight '18

**Facultad de Ciencias Marinas**  
Bight '98

**Goleta Sanitation District**  
Bight '98

**Greater Los Angeles and Long Beach Harbor Waters Regional Monitoring Coalition**  
Bight '13, Bight '18

**Heal the Bay**  
Bight '08, Bight '13, Bight '18

**Houston Industries**  
Bight '98

**Justice and Associates**  
Bight '08

**Los Angeles County Department of Beaches and Harbors**  
Bight '98, Bight '03, Bight '08

**Los Angeles County Department of Public Works**  
Bight '03, Bight '08, Bight '13, Bight '18

**Los Angeles Department of Water and Power**  
Bight '18

**Los Angeles County Department of Health Services**  
Bight '98, Bight '03

**Los Angeles County Natural History Museum**  
Bight '08, Bight '13, Bight '18

**Los Angeles Waterkeeper**  
Bight '13, Bight '18

**Loyola Marymount University**  
Bight '03

**MACTEC**  
Bight '08

**Marine Corps Base Camp Pendleton**  
Bight '98

**Marine Taxonomic Services Ltd.**  
Bight '13

**MBC Applied Environmental Sciences**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**MEC Analytical**  
Bight '94, Bight '98, Bight '03

**Merkel and Associates**  
Bight '08, Bight '13

**Montrose Settlements Restoration Program**  
Bight '08

**Moss Landing Marine Laboratories**  
Bight '08, Bight '18

**National Aeronautics and Space Administration Jet Propulsion Laboratory**  
Bight '03

**National Fisheries Institute of Mexico**  
Bight '98

**National Oceanic and Atmospheric Administration**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**National Park Service**  
Bight '08

**Nautilus Environmental**  
Bight '03, Bight '08, Bight '13, Bight '18

**NES Energy**  
Bight '03, Bight '08

**NRG Energy**  
Bight '98, Bight '03, Bight '08

**Occidental College Vantuna Research Group**  
Bight '03, Bight '08, Bight '13, Bight '18

**Orange County Coastkeeper**  
Bight '03, Bight '13, Bight '18

**Orange County Department of Public Works**  
Bight '08, Bight '13, Bight '18

**Orange County Public Health Department**  
Bight '98, Bight '03, Bight '13, Bight '18

**Orange County Public Works**  
Bight '03, Bight '13, Bight '18

**Orange County Sanitation District**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Pace Analytical Laboratories**  
Bight '94

**Pacific EcoRisk**  
Bight '18

**Partnership for Interdisciplinary Studies of Coastal Oceans**  
Bight '08

**Pepperdine University**  
Bight '13

**Physis Environmental Laboratories**  
Bight '13, Bight '18

**Port of Long Beach**  
Bight '03, Bight '08, Bight '13, Bight '18

**Port of Los Angeles**  
Bight '03, Bight '08, Bight '13, Bight '18

**Port of San Diego**  
Bight '03, Bight '08, Bight '13, Bight '18

**Reef Check California**  
Bight '08, Bight '13, Bight '18

**Reliant Corporation**  
Bight '03, Bight '08

**Resource Conservation District of the Santa Monica Mountains**  
Bight '08

**Riverside County Flood Control and Water Conservation District**  
Bight '98, Bight '18

**San Bernardino County Flood Control Department**  
Bight '98

**San Diego Coastkeeper**  
Bight '03, Bight '08, Bight '13, Bight '18

**San Diego County Department of Environmental Health**  
Bight '98, Bight '03, Bight '13, Bight '18

**San Diego County Public Works**  
Bight '08, Bight '13, Bight '18

**San Diego Regional Harbor Monitoring Program**  
Bight '08, Bight '13, Bight '18

**San Diego State University**  
Bight '08, Bight '13

**San Elijo Conservancy**  
Bight '08

**San Elijo Joint Powers Authority**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Sanitation Districts of Los Angeles County**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Santa Barbara Channelkeeper**  
Bight '13, Bight '18

**Santa Barbara County Public Health Department**  
Bight '98, Bight '03

**Santa Monica Baykeeper**  
Bight '03, Bight '08

**Santa Monica Bay Restoration Commission**  
Bight '94, Bight '98, Bight '08, Bight '18

**Science Applications International Corporation**  
Bight '98

**Secretaria de Marina (Mexico)**  
Bight '98

**Southeast Regional Reclamation Authority**  
Bight '98

**South Orange County Wastewater Authority**  
Bight '03, Bight '08

**Southern California Coastal Ocean Observing System**  
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**Southern California Edison**  
Bight '98, Bight '08

**Southern California Marine Institute**  
Bight '03

**Surfrider Foundation**  
Bight '98, Bight '03

**Texas A&M University**  
Bight '94

**Tijuana River National Estuarine Research Reserve**  
Bight '08

**U.S. Bureau of Ocean Energy Management**  
Bight '03, Bight '08, Bight '18

**U.S. Environmental Protection Agency, Region 9**  
Bight '94, Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**U.S. Environmental Protection Agency Office of Research and Development**  
Bight '94, Bight '98, Bight '03, Bight '08

**U.S. Fish and Wildlife Service**  
Bight '13, Bight '18

**U.S. Geological Survey**  
Bight '98, Bight '03, Bight '08

**U.S. Naval Facilities Engineering Command Southwest**  
Bight '98, Bight '13, Bight '18

**Universidad Autónoma de Baja California**  
Bight '98, Bight '18

**University of California, Davis Granite Canyon Marine Pollution Studies Laboratory**  
Bight '94, Bight '98, Bight '03, Bight '08

**University of California, Irvine**  
Bight '98, Bight '03, Bight '13, Bight '18

**University of California, Los Angeles**  
Bight '03, Bight '08, Bight '13, Bight '18

**University of California, Riverside**  
Bight '03, Bight '18

**University of California, San Diego Scripps Institution of Oceanography**  
Bight '03, Bight '08, Bight '13, Bight '18

**University of California, Santa Barbara**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**University of San Diego**  
Bight '13

**University of Southern California**  
Bight '98, Bight '03, Bight '08, Bight '13, Bight '18

**Ventura County Public Health Laboratory**  
Bight '03, Bight '13, Bight '18

**Ventura County Watershed Protection District**  
Bight '03, Bight '08, Bight '13

**Weck Laboratories**  
Bight '13, Bight '18

**Weston Solutions**  
Bight '03, Bight '08, Bight '13, Bight '18

## Contributors to the Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring Program

Founded in 2009, the SCCWRP-facilitated Southern California Stormwater Monitoring Coalition Regional Watershed Monitoring

Program examines the ecological health of the region's watersheds. Dozens of partners have contributed to the cyclical program.

**Aquatic Bioassay & Consulting**  
Associated Laboratories  
**Babcock Environmental Science**  
Cal Science  
**California Department of Fish and Wildlife**  
**California Regional Water Quality Control Board, Los Angeles Region**  
**California Regional Water Quality Control Board, San Diego Region**  
**California Regional Water Quality Control Board, Santa Ana Region**  
**California State University, Long Beach**  
**California State University, San Marcos**  
**California State Water Resources Control Board**  
City of Los Angeles  
City of San Diego  
**Council for Watershed Health**  
**CRG Marine Laboratories**  
EcoAnalysts  
Kalina Myalov  
Los Angeles County Flood Control District

**Los Angeles Watershed Regional Monitoring Program**  
Michael J. Klinefelter  
Moss Landing Marine Laboratories  
Nautilus Environmental  
Orange County Public Works  
Physis Environmental Laboratories  
Rhithron  
Riverside County Flood Control and Water Conservation District  
San Bernardino County Public Works  
San Diego County Public Works  
San Gabriel River Regional Monitoring Program  
Sanitation Districts of Los Angeles County  
Sierra Environmental Monitoring  
U.S. Environmental Protection Agency  
U.S. National Parks Service  
Ventura County Watershed Protection District  
Weck Laboratories  
Weston Solutions  
Wood Environment and Infrastructure Solutions



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