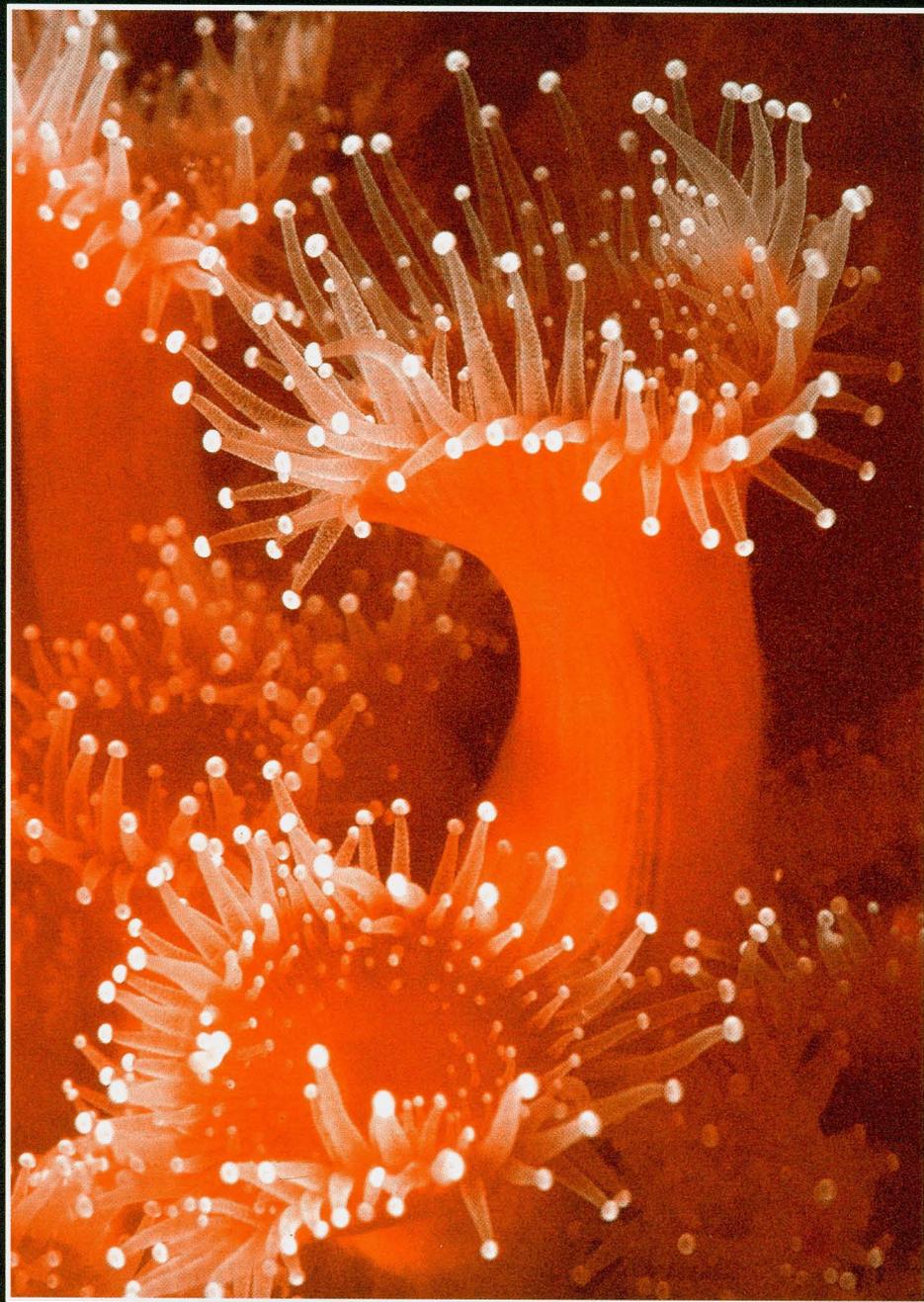


CALIFORNIA
COAST & OCEAN
VOLUME 16, NO. 1 SPRING 2000 • \$4.95



Ocean Wonders

Avila Oil Cleanup • New Foothold for Wiyot Tribe

Visit our Internet web site at:
www.coastalconservancy.ca.gov.

Our web site includes most of the articles from the print edition (some abridged), many color photos, back issues, and some supplemental information.

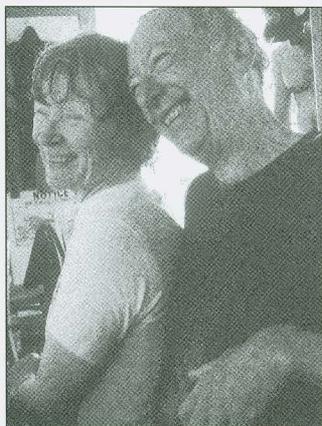


The Coastal Conservancy is a state agency that works with the people of California to preserve, improve, and restore public access and natural resources along the coast and around San Francisco Bay.

To subscribe to
CALIFORNIA COAST & OCEAN
for one year (four issues),
send a check (payable
to "Coastal Conservancy")
for \$18 to:

COAST & OCEAN
Coastal Conservancy
1330 Broadway, 11th Floor
Oakland, CA 94612

Cover photo:
Strawberry anemone,
Corynactis californica,
Monterey Bay.
Underwater
photographers Libby
and Lovell
Langstroth of Pacific
Grove have, over the
years, studied inti-
mately many of the
fascinating and
diverse animals of
Monterey Bay.



FRED HULSE

Back Cover photo:
A bryozoan, *Membranipora membranacea*

CONSERVANCY MEMBERS:

Gary A. Hernandez, Chairman
John J. Lormon, Vice-Chairman
Margaret Azevedo
Tim Gage
Larry Goldzband
Mary Nichols
Sara Wan

ALTERNATES:

Susan Hansch
Fred Klass
Patrick Wright

EXECUTIVE OFFICER:

William R. Ahern

CALIFORNIA COAST & OCEAN

California Coast & Ocean is published by the
Coastal Conservancy in association with
the California Academy of Sciences.

Rasa Gustaitis, Editor
Dewey Schwartzburg, Managing Editor
Hal Hughes, Associate Editor
Anne Canright, Wesley Marx, Contributing Editors

Design and page composition: Seventeenth Street Studios

Prepress and printing: University of California
Printing Services

CALIFORNIA COAST & OCEAN (ISSN 1052-5823) is published quarterly at \$18 for four issues. Copyright © 2000 Coastal Conservancy, all rights reserved. No part of this issue may be reproduced by any mechanical, photographic, or electronic process or otherwise copied for public or private use without written permission of the publisher. All opinions expressed are the responsibility of the authors, and do not necessarily reflect the positions, official or otherwise, of the Coastal Conservancy, the California Academy of Sciences, or the editors. Direct all correspondence, including editorial submissions and subscription requests, to:

CALIFORNIA COAST & OCEAN

1330 Broadway, 11th Floor
Oakland, CA 94612
(510) 286-0934, e-mail: calcoast@igc.org

Articles appearing in *California Coast & Ocean* are indexed in *Environmental Periodicals Bibliography*, *Biology Digest*, and *Environment Abstracts*.

Printed on recycled paper with soy-based ink.

CALIFORNIA
COAST & OCEAN
VOLUME 16, NUMBER 1
SPRING 2000



MARC BEYELER

- 3 Radical Surgery at Avila Beach**
Mark Beyeler
Waterfront razed to clean up underground oil
- 10 Pipes, Pumps, and the People**
Rasa Gustaitis
Democracy is alive and well in Los Osos
- 15 Other Shores: Strange and Familiar**
John Steere
A view from South Carolina's vast wetlands
- 16 Trouble in the Nearshore**
Wesley Marx
Live fish fishery adds to worries
- 22 Wiyot Will Dance Again on Indian Island**
Rasa Gustaitis
Tribe wins foothold on sacred ground
- 26 Interview: Libby and Lovell Langstroth**
Anne Canright
A second career beneath the tides
- 32 Intimate Beach Portraits**
Gary Taylor
Surfrider volunteers map coastal features

DEPARTMENTS

- 2 EDITOR'S NOTE**
Common Sense
- 34 EBB AND FLOW**
- Otay River Valley Protection
 - Los Angeles River
 - Cambria Challenge
 - Irish Hills
 - S.F. Bay Trail Keeps Growing
 - Steps toward the Humboldt Bay Trail
 - Summer on the Coastal Trail
 - Follow That Duck!

38 BOOKS



RASA GUSTAITIS



COMMON SENSE

WHEN THE COASTAL COMMISSION MET IN SAN LUIS Obispo in January 1998, the item making national news was the Hearst Corporation's resort development proposal for a gorgeous stretch of open coastline south of Big Sur. Also on the agenda was an item that, to most people present, looked like a routine local matter: permit approval for a new sewage treatment plant in the town of Los Osos. But there lay the big surprise.

Los Osos residents turned out en masse to argue passionately against the treatment plant proposed by the County and for one they wanted to build themselves, if the Coastal Commission would only give them a chance to do so. The system they wanted was basically a series of ponds engineered so that sunlight and algae would clean the wastewater collected from septic tanks. These ponds would be the centerpiece of a new park in the center of town. The designer of this alternative system was William Oswald, a retired professor from the University of California, Berkeley, who was applying the same concept in Benares, India, to help improve water quality in the Ganges.

All this sounded unrealistic to me, although it was rather amazing to hear. I recalled that in the 1970s the tiny coastal town of Bolinas, in Marin County, had built a wastewater pond system, simpler than this one, and had thereby held off development pressures. But Bolinas was smaller than Los Osos, and this was a new century.

Arcata Marsh also came to mind, built almost 20 years ago, when Arcata decided not to hook into a regional wastewater treatment system. Arcata's marsh (which has grown into a great wildlife reserve over the years) uses some wastewater flowing out of the city's secondary treatment plant.

These folks from Los Osos didn't have a chance, I thought. Septic tanks in Los Osos were being held responsible for high levels of nitrates in groundwater flowing into Morro Bay, affecting the health of shellfish. Regulatory agencies had waited ten years for this problem to be solved. The County was ready to build its plant, a standard model. The people who stepped to the microphone to speak fervently about their choice in sanitary engineering, however, were not dreamy-eyed, wild-haired, or crazed. They looked and sounded like down-to-earth citizens. Among them were small businessmen, retired homeowners, scientists, and engineers. Late in the day the Coastal Commission—exhausted after the previous day's meeting, which had gone right through dinner and well into the night—voted to give Los Osos the opportunity it so wanted.

To find out what had happened since, I went back to this little town on the edge of Morro Bay in March. What I came away with is a story of a community that united around a creative idea and accomplished something extraordinary.

This is also a story about appropriate technology—one that is as respectful as possible of living systems.

In this country, we still tend to target and attack problems directly, with maximum force. But gentler, more nature-friendly, and less energy-intensive approaches are gaining favor, largely because of ordinary people's support.

In Los Osos, citizens have redefined what is appropriate—what makes sense—for their community. Whether they will succeed in overcoming all the regulatory and bureaucratic obstacles still ahead remains uncertain. They are energetically optimistic, taking heart in their experience so far. To me, this is a great story (page 10).

Meanwhile, just downcoast, the town of Avila Beach (only six blocks long and four blocks wide) confronted a choice that was somewhat similar. Oil had been discovered under the waterfront, and two clean-up options were proposed: demolish the entire waterfront business district and the beach and excavate the oil, or try bioremediation, a slower-acting technique that would not require the destruction of downtown. Demolition was selected as the approach that promised to solve the town's problems most surely and speedily. In telling this story, Marc Beyeler poses the question: "Was the cure worse than the disease, and was it even a cure?" There is a difference of opinion on that (page 2).

Taken together, the Los Osos and Avila Beach experiences may be useful to other communities with pollution problems.

Meanwhile, on beaches in California and elsewhere in the nation, research is under way to lay the groundwork for repairing damage from structures built without the needed understanding of their side effects. Surfrider Foundation volunteers are mapping storm drains, sea walls, and other structures along beaches (page 32). Their efforts will help public agencies that are trying to restore habitat, keep sand on beaches, and protect the quality of water near shore. The Coastal Conservancy and other resource agencies, better funded since the passage of the parks and wildlife bond act last fall, are teaming up with citizen groups in common endeavors to protect the coast for the enjoyment of our growing and ever diversifying population. We at *Coast & Ocean* will continue to keep you informed.

—Rasa Gustaitis

COURTESY PETE KELLEY



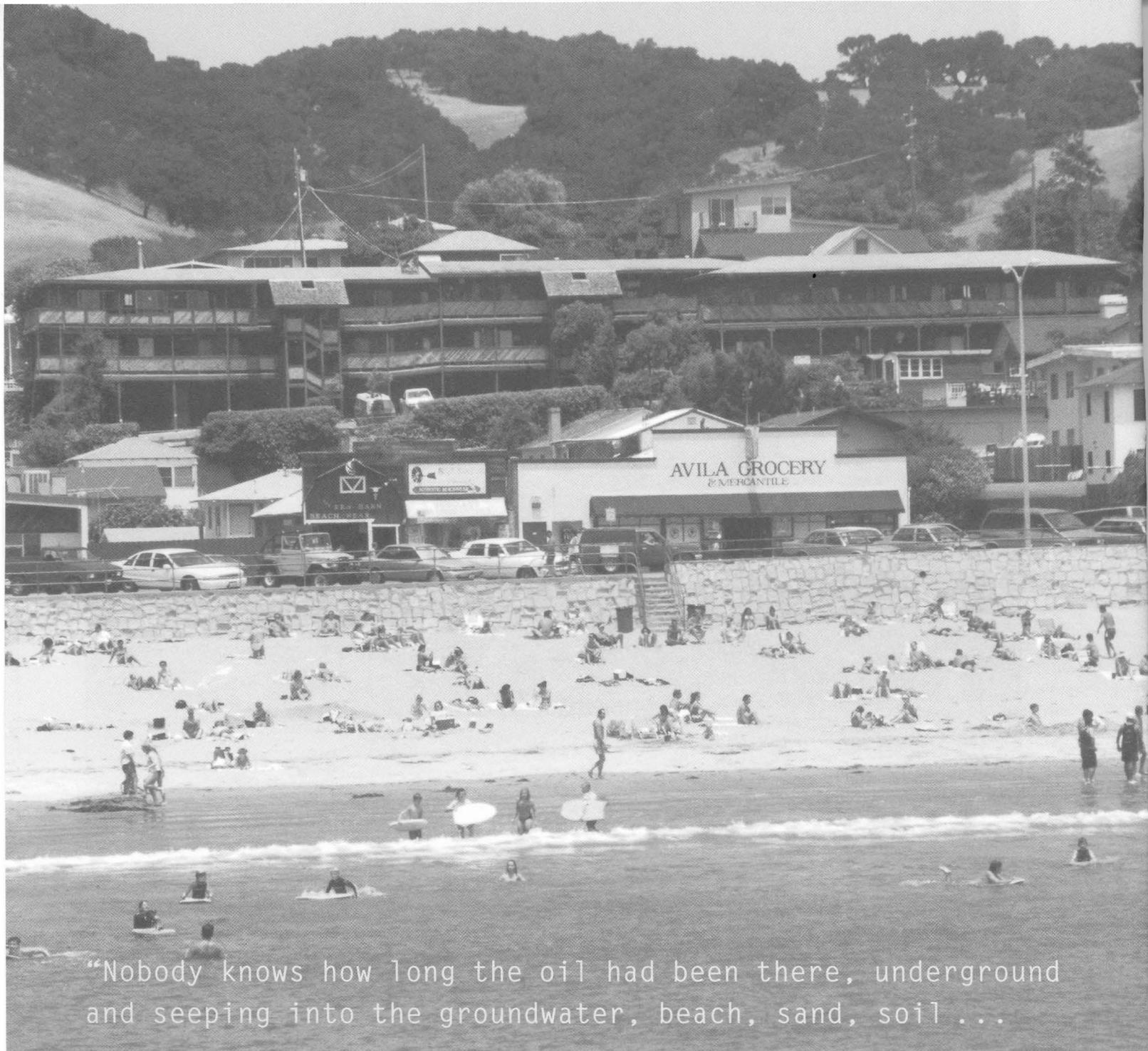
Pete Kelley at his old place on Front Street.

Radical Surgery at Avila Beach

Waterfront razed to clean up underground oil

MARC BEYELER

When I was a young boy living in Manhattan Beach, my family often took car trips “way up north” to San Luis Obispo County. En route, I always looked forward to our stop at “the beach” at Avila, with its warm sand and gentle waves. Much later, living in the San Francisco Bay Area, I took my own children on car trips, south, and “the beach” at Avila was their favorite stop, too.



"Nobody knows how long the oil had been there, underground and seeping into the groundwater, beach, sand, soil ...

Two years ago, we stopped in Avila only to find the beach fenced off and huge excavators removing the sand. Four blocks of Front Street, the heart of the town, had been demolished. Massive oil leakage had been discovered under the waterfront and beach sand. Our Avila Beach had been destroyed in the name of oil spill cleanup.

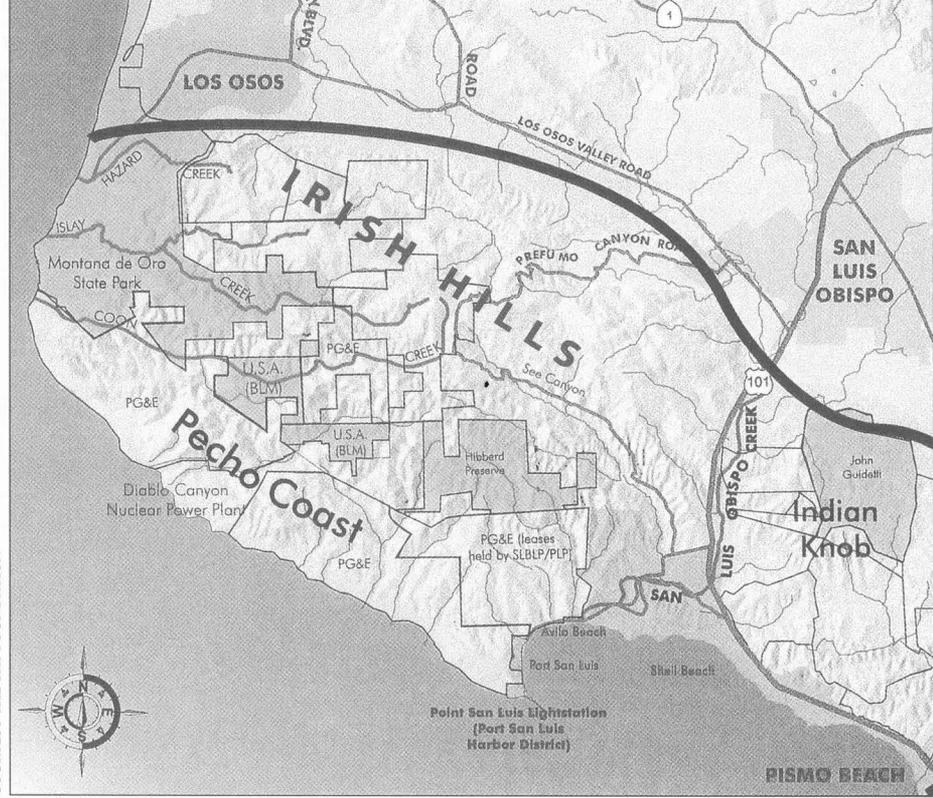
Nobody knows how long the oil had been there, underground and seeping into the groundwater, beach sand, and soil under Front Street. In 1977 an explosion in the basement of a Front Street restaurant closed the restaurant for a time, but did not start a search for related damage. Then in 1988, a Front Street property owner

found diesel fuel and crude oil during a routine soil test on a vacant lot opposite the pier, where he planned to build a shop.

The extent of the problem was not fully appreciated until the mid-1990s, when Unocal calculated that 400,000 gallons of petroleum products (crude oil, diesel fuel, and gasoline) had leaked from buried pipelines that connected an oil-storage tank farm with an offshore terminal for loading ships. An Environmental Impact Report (EIR) analyzed three options for cleaning up the underground pollution: solidification, bioremediation, and excavation. For a variety of reasons, authorities chose to remove the



COURTESY THE BAY FOUNDATION



Left: Old Avila's Front Street seen from the pier, early 1990s
Top: Behind the town are the Irish Hills, 50,000 acres of beautiful land.

MARC BEVELER

contaminated soil. And this meant the destruction of Front Street.

"Why did they have to destroy Avila?" my kids have asked me. I try to explain that they had to destroy downtown to save it, but I also ask myself if the cure is worse than the disease and whether it is, in fact, a cure for the problem. As of now, there are no clear answers.

This much we do know: Even after beach sand is scooped back into place and smoothed down to resemble its former profile, after Front Street is rebuilt, the Avila we cherished will not return. Gone will be the charming haphazard juxtaposition of buildings and vacant lots, the measure of

funkiness we appreciated in Avila. Gone will be the "familiar"—like the feeling you get when you put on your favorite old t-shirt.

What will the "new" Avila be like? What will it feel like? I tell my kids that they are lucky to have so many great memories of the "old" Avila.

San Luis Obispo's Beach Town

With its public pier and its south-facing, safe swimming beach, Avila Beach enjoyed a reputation as a laid-back beach town, accessible to all, from college students and pier fishermen to moms with kids. It was San Luis Obispo County residents' warm seaside escape.

"Downtown" Avila Beach was established over several decades, starting in the early 1900s on the sand spit fronting San Luis Creek lagoon. The original town plat was laid out long before, in the 1870s, but it was the discovery of oil south of Avila in the Santa Maria Valley that led to Avila's growth. In 1906 the Union Oil Company of California built a pipeline to carry crude oil from fields in northern Santa Barbara County and constructed a tank farm to store the oil on the hillside just east of downtown Avila. A pipeline ran from the tank farm under Front Street to the end of Avila Pier, where it filled tankers carrying oil to Los Angeles and the San Francisco Bay Area.

In 1909, Union Oil participated in the construction of a 245-mile pipeline from the San Joaquin Valley. Later, the company built a new pier just west of downtown, and expanded the

tank farm to accommodate oil coming in from the Guadalupe Oil Field, to be processed at Union's Santa Maria refinery nearby. Between 1914 and 1922, San Luis Bay became the largest crude oil shipping port in the world.

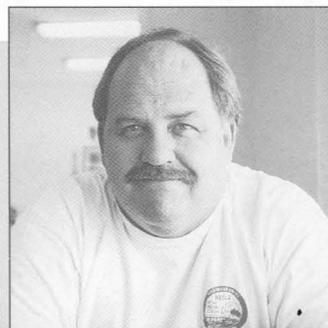
As oil activity grew, Front Street began to develop with wooden commercial buildings. The Avila Grocery, Front Street's oldest and most prominent structure, was built in 1917. The Old Custom House restaurant opened in 1927 and operated for nearly 75 years, a favorite haunt of locals and visitors. In 1937 the federal Works Progress Administration built a seawall between Front Street and the beach. In 1948 Avila changed its name to Avila Beach to attract out-of-county tourists. For the past 30 years, it has drawn ocean-swimming clubs, kayakers, body surfers, boogie boarders, and other water enthusiasts.

Union Oil continued to operate the system of underground pipelines beneath the town until the 1980s, moving oil from tank farm to tanker ships. In addition, gasoline and diesel fuel were pumped from tankers to the tank farm for distribution to customers in the area.

Underground Pollution Discovered

After the 1977 explosion under Front Street damaged the Chief's Gallery restaurant, the County Health Department and the volunteer fire department ordered an engineer to "seal" the foundation wall of the building before the restaurant reopened. There was no oil cleanup or investigation. People apparently thought, "Oh, well, leaking oil pipes—no big deal."

But by 1988, when the oil spill was detected in the ground on Front Street, attitudes had changed and new environmental laws were in effect. The Central Coast Regional Water Quality Control Board issued a Cleanup and Abatement Order (94-85) requiring Union Oil (in 1985 renamed Unocal) to determine the extent of contamination. The company found this contamination followed the alignment of pipes between the tank farm and both piers. As it studied the

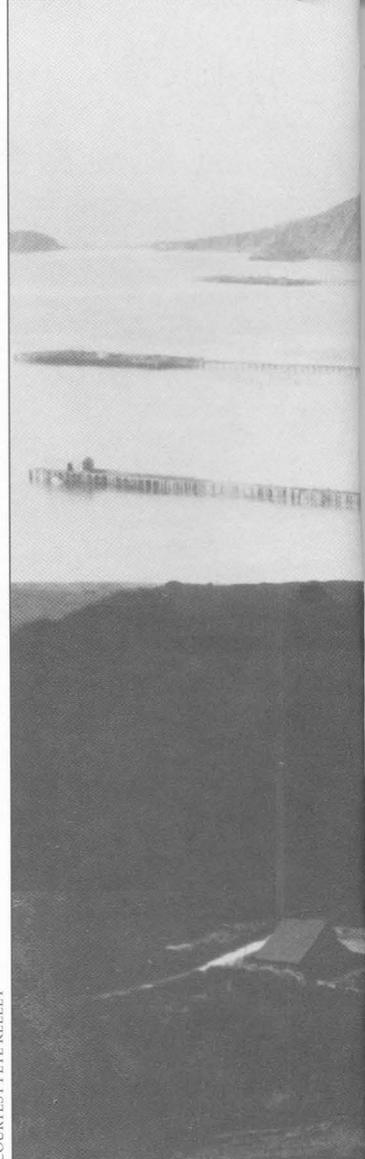


RASA GUSTAITIS

PETE KELLEY
CHANNEL SWIMMER, SURFER,
BUSINESSMAN

Avila was a village, but not a phony little village. Some people saw the town as a wonderful place, others saw it as a scumbag firetrap—and they owned the properties. On the oil cleanup, people rushed to judgement. If you said, "I don't think excavation is a good solution," you'd be called a Unocal lackey. But now Avila has been excavated and we can't go back. We should work together and make it a nice place again. There's a chance I will return and have a restaurant there again. There's a chance people can learn from this.

COURTESY PETE KELLEY



extent of the problem, Unocal also began to "remediate" it by installing a soil vapor-extraction system along Front Street. It operated this system for two years, removing volatile hydrocarbons from underground, filtering the vapors, and transporting them to the tank farm where they were burned.

Unocal maintained that threats to the environment and public health were minimal because the underground contamination was inert, "asphalt-like." But neither the public nor gov-

THE DANGEROUS HISTORY OF OIL IN AVILA

CA. 1920

The Avila Refinery explodes, burning to the ground.

1926

Lighting strike ignites fire at Union Oil tank farm south of City of San Luis Obispo. The subsequent explosions release more than 150 million gallons of burning oil, a portion

of which flows down San Luis Creek entering San Luis Bay at Avila Beach. Union Oil drains pipelines to the ocean, coating Avila and Pismo beaches with oil.

1942

Union Oil pipeline bursts on hillside above Avila, sending diesel fuel down streets and through yards. Crews collect oil in buckets and cover oiled streets with sand.

1954

Santa Lucia, a 100-ton oil tanker, burns while moored at Avila.



ernment agencies accepted the company's health-risk assessment. Continued analysis by the company confirmed large-scale contamination under most of Front Street and under the beach sands in front of downtown. As this information reached the news media, a clamor for cleanup arose. By 1997 the County had hired Alvin Greenberg, a noted toxicologist and public health specialist, to assess the situation. He concluded that the town's residents and beach visitors faced no immediate health risk.

The site of Avila Beach before 1900

Bioremediation vs. Excavation

Community pressure, publicity, and the extent of the pollution compelled the Regional Water Quality Board to direct Unocal to clean it up. The oil company recommended this be done by biosparging, a type of bioremediation, in which natural bacterial consumption of hydrocarbons is accelerated. It was estimated that this process could remove

1977

A leaking Union Oil fuel line causes an explosion on Front Street. Chief's Galley restaurant forced to close.

1983

Winter storm destroys Union Oil pier and an unknown quantity of oil spills in San Luis Bay.

1989

Oil in soil discovered during routine test for construction project on Front Street.

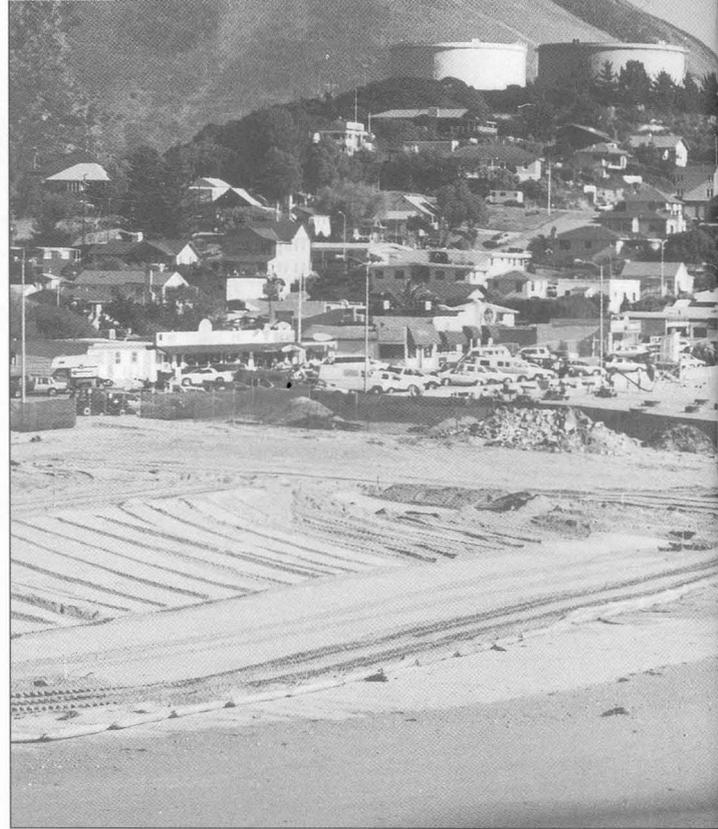
1992

Unocal pipeline along Cave Landing Road ruptures, sending an estimated 600 barrels of oil into San Luis Bay. Ocean clean-up recovers about one-third of spilled oil.

AVILA OIL TIMELINE COURTESY OF SAN LUIS OBISPO NEW TIMES, VOL. 12, NO. 51, AUGUST 6-13, 1998



RRM DESIGN GROUP

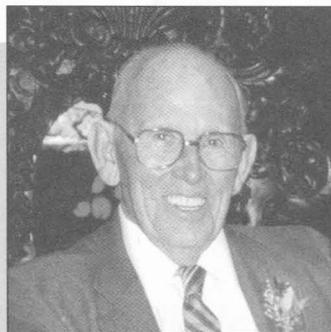


up to 80 percent of the underground oil, but would take at least a decade.

An EIR prepared by Arthur D. Little Associates at the request of the County, the water board, and the U.S. Army Corps of Engineers, however, recommended excavating the contaminated soil, as the best way to clean up the most contamination in the least time.

Because there was no evidence that the contamination posed immediate danger to human health or safety, bioremediation seemed worth considering. (It would be much cheaper, but this didn't matter to Avila since the oil company was picking up the bill.) Pete Kelley, owner of Pete's Seaside Cafe on Front Street from 1977 to 1985, was among those who did not want to sacrifice historic Front Street. Kelley was a surfer and long-distance ocean swimmer, he had appreciated the fine qualities of Avila Beach for 40 years, and he argued that "pollution problems 50 years or more in the making cannot necessarily be solved with short-term fixes such as the excavation project."

Yet because bioremediation had been proposed by the oil company, and might take ten years, it was met with suspicion by residents and business people who feared losing tourist dollars. According to County Supervisor Peg Pinard,



COURTESY JOHN GORMAN

JOHN GORMAN
RETIRED UNION OIL EMPLOYEE

I moved here in 1945, right after military service. I served both in Germany and in Japan, and for a while I was stationed at Camp San Luis. That's where I met the woman I married. Avila was small, and you could buy a lot for \$350. My father-in-law did, a block and a half from the beach. I worked for Union Oil for 36 years, it was well-paid work. I'm 80 years old now. I've had a good life. The company insisted on good public relations, so we were involved in the Scouts and the volunteer fire department. The town was like a big family. That ended when TV came in. Now I guess we'll experience something different. The oil spill? I don't know. It's been there for years and wasn't causing any harm to anything.

who represents Avila, "the residents of Avila were extraordinarily wary."

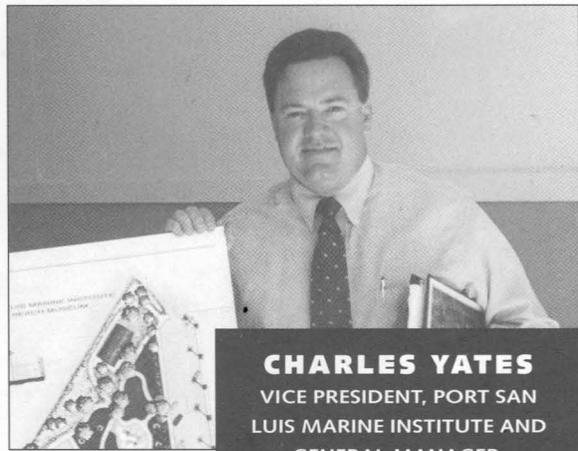
The die was cast for excavation when banks and other lending institutions made it clear that they would not fund any property improvements or new construction until cleanup was complete. Unocal offered two property loan programs through banks, with the company as guarantor, but only one property owner applied for each. "Excavation was the only alternative available which could provide total closure for residents and property owners and let them get on with their lives," explained Pinard.

There was another reason, unrelated to the oil spill, for citizens' unwillingness to accept a slow form of cleanup. When local property owner Mike Rudd struck oil in his Front Street lot, a 17-year moratorium on water hookups had just been lifted. All that time, nobody had been able to build. As a result, buildings stood empty and in disrepair, and vacant lots were gathering trash on Front Street. The moratorium was lifted when Avila Beach Community Services District (CSD) signed a contract for water from the State Water Project. Long-delayed improvements were at last on the horizon. The oil cleanup again stopped everything. People were getting impatient.

In the end, the combination of corporate stonewalling and scientific uncertainty made an objective analysis impossible, according to Bud Laurent, then a County supervisor, now head of the Community Environmental Council in Santa Barbara. "Uncertainty made people mistrustful," Laurent said, "therefore they



MARC BEVELER



RASA GUSTAITIS

CHARLES YATES
 VICE PRESIDENT, PORT SAN
 LUIS MARINE INSTITUTE AND
 GENERAL MANAGER,
 SYCAMORE SPRINGS RESORT

Left: Early stages of excavation, with Front Street still intact

Far left: How Avila Pier and Promenade will look after reconstruction.

Painful as it has been, I've been impressed with Unocal. They're concluding their business in a responsible manner. I was for excavation, but it was hard to see the heart of the town torn out. Now there are still a lot of unanswered questions, but I'm looking forward to seeing Avila rebuilt.

We're currently constructing a research facility at the Harford Pier, and planning for our marine science education facility on the waterfront. Our Institute is all-volunteer. Why did I get involved? I'm a fisherman and the father of two small children. I saw a need for increased awareness of the ocean and estuaries, creeks, and rivers. Now is the time for that. We can't wait till they're in college. What we do with the children is different from anything we see in schools.

demanded a solution that could bring an end to the uncertainty."

There were also other motives for favoring the demolition option. It opened the way for new development that might otherwise have faced community opposition. Money would flow into Avila for public works projects. Unocal would be encouraged to hire local contractors to do the work. Such incentives helped drive the decision to destroy the street and the beach.

The task was gigantic. Unocal bought up properties on Front Street, demolished some and moved others. Part of the public pier was demolished, the beach was fenced, and contaminated sand—100,000 cubic yards or 6,750 truckloads—hailed to a landfill west of Bakersfield. Unocal will pay in full (at an undisclosed cost). It has already paid a reported \$20 million to acquire property, in addition to cleanup costs, plus an \$18 million settlement to the government.

Will the Oil Really Be Cleaned Up?

In autumn 1999, immediately after the first phase of the excavation was completed, Regional Water Quality Control Board staff judged the outcome "even better than expected," with very low pollution levels in the excavated area. Groundwater will be monitored for a year. Clean sand has been brought in from the nearby Guadalupe Dunes and the Oso Flaco area of the Nipomo Dunes, and most of the beach is now open. The remainder, around the pier, will reopen when pier reconstruction is complete, probably in July.

When the cleanup is finished, will Avila Beach be free of oil contamination? The subtidal area immediately below the pier is still being studied, and the soil at and around the now-closed tank farm has not been examined.

As for the town, Front Street is to be completely rebuilt this year, with a new block-sized pedestrian plaza off-limits to vehicles, as well as a new community park and new seawall, landscaping, observation deck, pier plaza, public restroom, and lifeguard buildings. The original Avila Grocery and Yacht Club buildings will be returned to their former locations by the pier, but the single-story Old Custom House will be replaced by a new and bigger restaurant and bar seating 300 people altogether. Front Street is expected to be fully built out with private buildings in three to five years.

Unocal now owns at least 17 properties, mostly on Front Street, which it intends to sell to "responsible parties who are committed to the

continued on page 37



Pipes, Pumps, and the People

Democracy is Alive and Well in Los Osos

RASA GUSTAITIS



PHOTOS THIS PAGE: PANDORA NASH-KARNER



The Big Table at Carlock's

RASA GUSTAITIS

Every morning, as long as Debra Avila can remember—"I'm 40, and I've been here since I was three," she says—the regulars have gathered at the Big Table at Carlock's Bakery in Los Osos. Charles D. Fiorina painted a group picture 20 years ago, and you can see that some of the same people sit in the same places today. That's the kind of community Los Osos/Baywood Park is: friendly and unhurried. You might also say old-fashioned—if you didn't know what's been happening there lately.

This is a David and Goliath story in which the citizens of Los Osos/Baywood Park are David, confronting county, state, and federal agencies as Goliath. The battle revolves around a wastewater treatment plant, something an outsider might not consider particularly exciting. In a larger sense, however, it is a revolt of local citizens against pressures that have turned many coastal towns into high-priced enclaves for the wealthy.

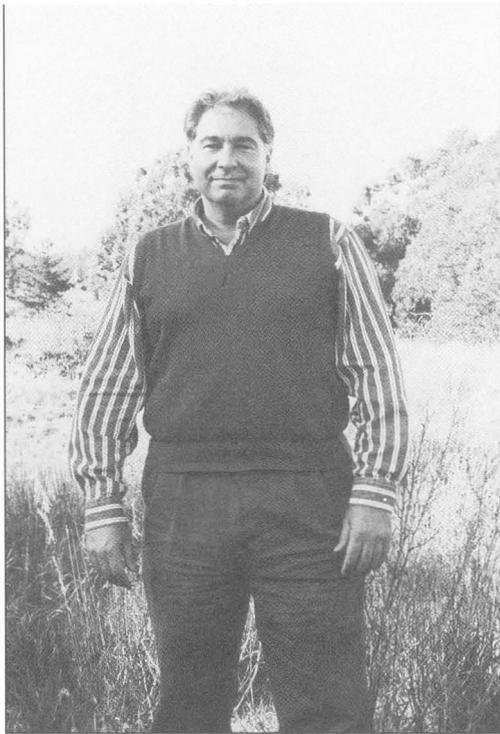
Los Osos/Baywood Park is certainly not wealthy. The 1990 Census showed that almost one-third of the 15,000 residents lived in households with "low" or "very low" incomes. It's not poor, exactly, either, for it is surrounded by natural beauty, which—along with affordable housing prices—has attracted retired people, university students, and assorted free spirits who forgo monetary gains so they can have time to do what they wish in a place they appreciate.

Snuggled on the southern shore of Morro Bay, three miles from the city of Morro Bay and a pleasant 20-minute drive from San Luis Obispo, this unincorporated community is easy to love. It offers tranquillity, great bay views, and ample access to hiking, fishing, and other recreation. The main street, Los Osos Valley Road, leads toward Montana de Oro State Park just above town. You can stand there on high seacliffs, watching pelicans and whales, or walk on blufftop meadows carpeted with yellow mustard in spring. It seems almost miraculous that with all this, the community has maintained its modest character for so long.

One explanation is the moratorium on water hookups imposed by the Central Coast Regional Water Quality Control Board in 1988 after local septic tanks were found to be, at least in part, a cause of nitrate pollution in shellfish in Morro Bay. San Luis Obispo County struggled with the problem for years and prepared to build a wastewater treatment plant. The design was for a sequencing batch reactor system, a type that had been popular years earlier, when the federal government paid 85 percent of project costs. Now, however, the cost burden would fall on property owners. Monthly charges per household were estimated at \$100 or even higher.

It was not hard to imagine what this would mean to Los Osos. Homeowners who were just making ends meet would be forced to sell, and landlords would have to raise rents, driving out tenants living on fixed incomes. Small businesses would shut down. "I'm a single mom with

two teenagers," said Debra Avila, whose grandfather started Carlock's Bakery in 1958 and who expects to take over when her parents retire. "I thought: No way I can do this. I was having nightmares of having to move." Annie Mueller, former president of the Los Osos Chamber of Commerce put it this way: "The county plan addresses nitrates, but it would cost us our people."



RASA GUSTATIS

George Milanés

Local citizens had fought the County's plan from the beginning, arguing that its high costs would displace about one-third of the community. By 1997, they realized they had to do more than object. They pooled \$17,000 of their own money and organized the Solutions Group, to seek out experts who might be able to help them. William J. Oswald, professor emeritus at the University of California, Berkeley, and a pioneer in alternative wastewater treatment technologies, designed a project for them that would use solar energy and a system of engineered algae ponds to provide tertiary treatment. It promised to cost far less than the County's secondary treatment plant and, in addition, to provide a park, open space, water recharge, and complete water recycling. Oswald's plant is a modernized, state-of-the-art version of his Advanced Integrated Wastewater Pond System (AIWPS), originally constructed in 1966, which has been operating ever since in St. Helena, Napa County, and is still viewed as a model of engineering with nature.

The Solutions Group adopted a Community Plan, calling for the formation of a local Community Services District (CSD) that would build Oswald's system. It was late in the game. The County had already conducted numerous technical studies and five environmental reviews. It had a \$47 million low-interest construction loan commitment from the State Water Resources Board. It had all the needed permits except that of the Coastal Commission.

The Los Osos group defied the odds. On January 16, 1998, the Coastal Commission met in San Luis Obispo and heard the County's permit request. The meeting room was packed with Los Osos/Baywood Park citizens, who pleaded

for a comparative analysis of their Community Plan and the County's proposal, and an opportunity to form a CSD. A few property owners stepped up for the County's proposal, pointing out that the water hookup moratorium had been in effect for ten years already, but the majority prevailed. The Commission asked the County do a comparative study. This, in effect, allowed time for a vote on the CSD. (See "Five Dollars a Flush," *Coast & Ocean*, Spring 1998.)

On November 3, 1998, an unprecedented 76 percent of the Los Osos/Baywood electorate turned out, and 87 percent voted for a CSD, in effect creating a local government. On January 1, 1999, the new CSD assumed responsibility for the local water supply, fire and emergency services, stormwater response, lighting, septic tank maintenance, and building a treatment system. "It's such a relief that it will be affordable," said Debra Avila. "I only hope it works."

"The Obvious Next Thing"

George Milanés, chief operating engineer for the St. Helena Water Resource Recovery and Treatment Plant, was invited to take over as utilities systems manager at the Los Osos CSD. He did not hesitate. "It was the obvious next thing for me,"

he said over lunch recently in an outdoor cafe on the Los Osos waterfront. "That it happens to be on the coast was just icing on the cake."

Milanés had received numerous awards for his work in St. Helena, where he had not only operated the treatment plant but also instituted a program that demonstrates reuse potential by means of live exhibits. On the plant's grounds he had planted gardens, a vineyard, olive



PANDORA NASH-KARNER

Kim Smith

trees, and hundreds of redwood trees. "These trees now have thick trunks and can be seen from a distance," he said. He took countless schoolchildren and others on tours of the system. "In the last five years I was there, we had 1,300 visitors from 32 countries."

But Milanés was ready for new and greater challenges. He and Oswald had been teaching short courses for the American Society of Civil

Engineers, and had the opportunity to visit numerous types of facilities around the country. He was brimming with new ideas to try out, and Los Osos was fertile ground. "This project embraced all that Dr. Oswald and I had been doing for years," he explained.

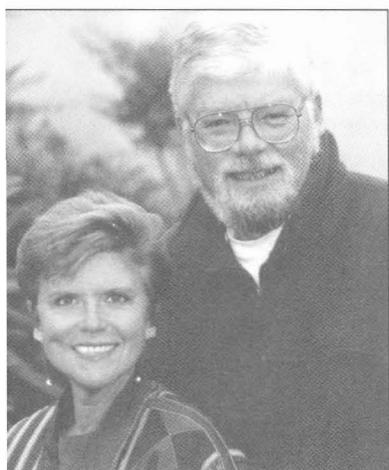
As now envisioned, the Los Osos project will create a Resource Park, built around five scientifically engineered ponds on 60 acres in the center of town, within view of the Bay, between Los Osos Valley Road, the public library, a residential area, and a mobile home park. Septic tanks will be retrofitted and connected with a modern collection system that will transport effluent to the ponds, where algae, sunlight, and filtration will purify wastewater to drinking water standards. Some of this clean water will be sold for landscape irrigation, the rest will be fed into gravity wells, thereby replenishing the groundwater supply. Some of the algae will be dried, and used as soil amendment. Milanés said the St. Helena plant produced no primary sludge in over 30 years of continuous operation (The County's plant would have produced one truckload a day.)

As Milanés was describing how trails and trees would surround the ponds, how schoolchildren would learn about the system and its function within the watershed, CSD vice president Pandora Nash-Karner, a prime mover in the Solutions Group, came by and picked up the story.

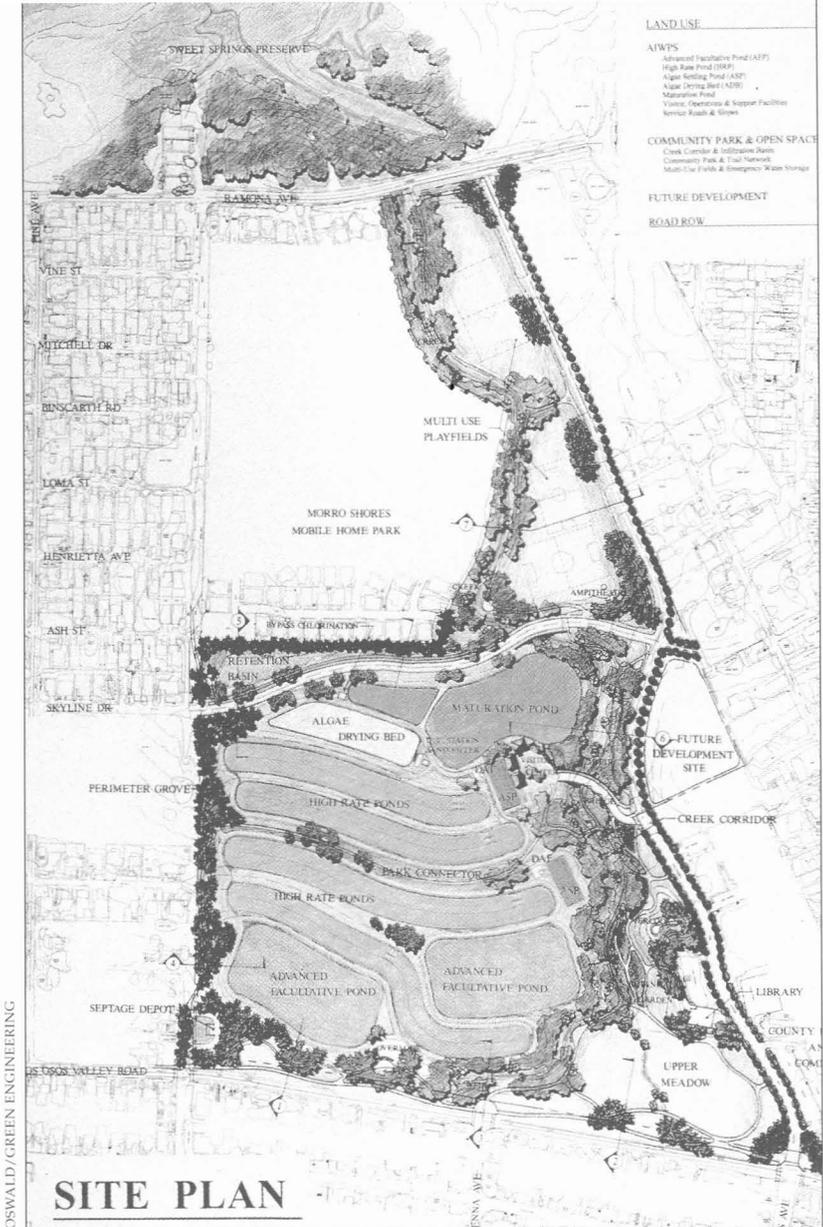
The State Water Board was reluctant to reassign the \$47 million loan commitment it had made to the County to this little novice CSD. Other projects that seemed more likely to succeed could use the money. So "we went to Sacramento and told them we can do the job. I'm surprised they didn't laugh at us. We didn't even have business cards yet." With 15 minutes to present its case, the CSD decided "to show them our project was not about pipes and pumps, it was about keeping people in their homes," she said.

Rather than offer facts and figures, the CSD team presented a slide show to convey a sense of the place and community. They had images of the natural beauty of the surroundings, a downtown with many vacancies because businesses could not grow under the water hookup moratorium, and people—diverse young

Pandora Nash-Karner and Gary Karner



PANDORA NASH-KARNER



Engineered ponds surrounded by trees and trails are planned.

families and older people, concluding with Kim Smith, the Nash-Karner's elderly neighbor, holding a rose at the gate of her lace-curtained little house.

"She's almost 90, a retired teacher, blind and almost deaf," Nash-Karner said. "She lives on \$1,000 a month. A hundred dollars more would make her move. We formed the Solutions Group because she wasn't going to beat down the doors to prevent that. Someone else had to do it."

Soon after, the Water Resources Board committed the \$47 million to the Los Osos CSD.

The project's estimated cost is \$55 million, compared to a 1998 estimate of \$72 million for the first phase of the County's three-phase project. Monthly charges are expected to be considerably less than half that of the County's plan, and homeowners will not have to pay for hookup costs. "It must be affordable; we can't displace even one family," said Nash-Karner.

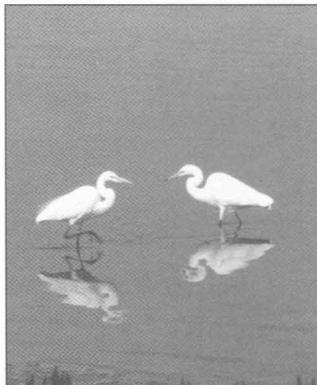
None of this is a sure thing, of course, until studies now under way are completed and permits are granted. Navigating through regulato-

ry mazes is a challenge. Some work was delayed five months by a wait for a permit from the U.S. Fish and Wildlife Service (FWS) to make borings at the site proposed for gravity wells. The permit was required because the site is habitat for the endangered shoulder-banded snail. To pay for the work now in progress, the CSD has been using transfers from its fire and water fund.

Sorrel Marks, sanitary engineering associate at the Regional Water Quality Board, said "it may turn out that [some of what the CSD now plans] may not be feasible." However, she added, "I'm optimistic."

The enthusiasm of the CSD and its supporters has proved infectious and generated support among staff in government agencies. With help from Congresswoman Lois Capps, the CSD team met with staff of the U.S. Fish and Wildlife Service in Sacramento, then trekked to Washington, D.C., to meet with national FWS staff to learn how to resolve endangered species and other issues related to the project, and to seek funding for some features of the Resource Park, such as trails.

The project manager is Montgomery Watson, a global firm. It was one of two firms to respond to the CSD's request for proposals, and showed an understanding of both the concept and the vision. "At first we were leery—concerned—



PANDORA NASH-KARNER

In March, the CSD called a town hall meeting—the first time the town was officially called together. "We presented the plan, with slide show and work done to date. Over 300 people came," said Milanés. "The directors were surprised. They anticipated some opposition, but they got only kudos. I thought that was remarkable in itself. There were a few questions, but we had answers. The level of confidence went up a lot."

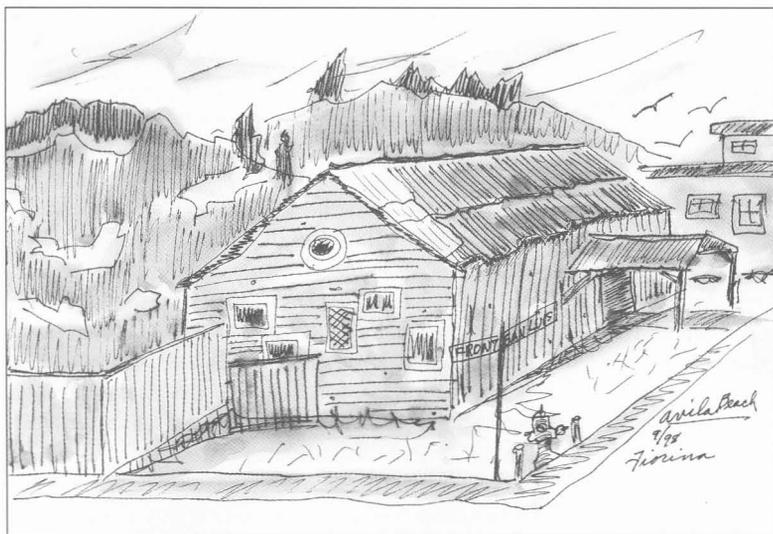
With hopes of an end to the water hookup moratorium rising, real estate prices have also gone up. How this will affect the residents of Los Osos, especially small businesses and renters, remains to be seen.

Looking toward the Future

Milanés took this visitor out to the proposed Resource Park site, a brushy open space with a stormwater drain running into it. An egret flew up as he talked. "I see aquaculture, botanical gardens, a visitor center, trails, all around. I see a world-class institution. I don't think there is any limit to what the people here want this to be." Already a fifth-grade teacher has approached him about turning his pupils into local experts on the Resource Park concept, so they can explain it to others. Milanés is delighted with the idea.

He has committed himself to five years, to see this project through. After that Los Osos may become his home base, although if opportunities arise to work with Oswald and take the resource park idea international, he may want to do that. When he first met Oswald in 1989 at the University of California, Berkeley, Oswald had just returned from a trip to Cuba; where he had seen lively interest in his system. Milanés was born in Cuba; he has relatives there he has not seen for decades. It's not a big stretch of his imagination to envision Cuba becoming a pioneer in Latin America in the use of natural treatment technologies like Oswald's system for sound and reliable water resource management.

He smiles as he considers new frontiers: Los Osos today, maybe Cuba tomorrow. But right now it's full speed ahead with Los Osos. In fact, he has to end the interview: there's a drainage committee meeting he must attend. This might sound boring to an outsider, but not to those who live here. Some people will probably come just to listen. Getting citizens to participate in the democratic process is not a problem in Los Osos/Baywood Park right now. They have the energy, confidence, and persistence that can make democracy work. ■



that this giant firm would come into a tiny town with a bunch of amateur politicians," said Nash-Karner. But she soon found Mark Ysusi, the project manager, "remarkable" in his commitment to the project and to seeing it through the regulatory maze. Ysusi has 30 years of experience in public works projects. Montgomery Watson is interested in George Oswald's patented AIWPS technology, and sees possibilities for its application elsewhere.

Charles Fiorina (fourth from left, photo on p. 11) sketched this building in Avila Beach. Later it was demolished for the oil cleanup.

STRANGE AND FAMILIAR:

A View from South Carolina's Vast Wetlands

JOHN STEERE

WE GATHERED ON A BLUFF overlooking the Edisto River at dusk as flocks of mergansers were flying home to bed down for the night in the shallow waters of Snuggedy Swamp and Tupelo Swamp. John Cook, the land-owner, swept the horizon with his gaze. "We're only 30 miles from Charleston," he said, "but it's a different world out here—the way it's meant to be."

The two swamps together comprise tens of thousands of acres and are part of a 350,000-acre estuary bounded by the Ashepoo, Combahee, and Edisto Rivers, referred to as the ACE Basin. This vast expanse is a weaving of fresh and tidewater wetlands with pine and hardwood uplands, barrier islands, and beaches. It is home to 267 species of birds, 83 species of reptiles and amphibians, 20 species of mammals, and 130 species of fish and shellfish.

We stood in awe beneath ancient live oaks, on the ruins of South Carolina's first, ill-starred settlement, Willtown. A group of poor Londoners had come here around 1680, hoping for easy living in the New World wilderness, and built homes on the bluffs. Though game was plentiful, they didn't know how to hunt. Only half a decade later, exhausted and starving, they abandoned the place, which survived undeveloped and is now part of one of the largest and most dramatic wild ecosystems on the Atlantic Coast.

This wetland geography is different from any I'd seen. I was accustomed to small wetlands of cordgrass and tule, bounded by rolling hills or houses. Here vast marshes extend to the horizon, punctuated by bald cypresses and bounded by upland stands of pines and oaks.

Around 1700, most of the hundreds of South Carolina tidewater wetlands were diked off to grow rice. Slaves

from the Caribbean dug channels, built dikes, and constructed ingenious wooden valves called "trunks" to control the flow of water in and out of the rice fields. After the Civil War, the rice-growing industry collapsed and never really recovered. It had already begun to fail even before the war, as mosquitoes, oppressive summer heat, and hurricanes took their toll. "Carolina Rice" is mostly the stuff of history.

The economic void left by the collapse of the plantation economy in the tidal wetlands was filled in small measure by wealthy sportsmen who bought plantations for hunting retreats and began to manage the former rice fields and adjacent uplands for a wide range of wildlife. Thus began a tradition of land stewardship that took on renewed meaning in 1991 when the ACE Basin became one of the first projects to be approved for funding under the North American Wetlands Conservation Act. It has received five grants from the North American Wetlands Council so far, totaling over \$5 million, to help protect and restore this unequalled natural treasure. The U.S. Fish and Wildlife Service has worked closely with the state's Department of Natural Resources, the Nature Conservancy, Ducks Unlimited, and local landowners toward this common goal. Well over 100,000 acres are under (mostly donated) conservation easements.

I was in South Carolina to attend a meeting of the Wetlands Council in a former hunting lodge in the middle of the Basin. Early one morning, I



CRAIG WATSON, ATLANTIC COAST JOINT VENTURE

watched scores of white ibises winging across the waters, and clusters of rare wood storks standing in the shallows. Beyond the storks, a couple of pine trees were crowded with great blue herons. Buffleheads and coots scudded about in old irrigation channels. Alligators lazed on marsh islands. The volume and variety of birds was beyond anything I'd encountered in the San Francisco Bay wetlands. It all seemed wondrous and strange.

Later that day I had a bird's-eye view of the ACE Basin from a helicopter. While the other two passengers were tracking the flight of a bald eagle, I was mesmerized by the tidal channel and river patterns—from this altitude many resembled patterns I'd seen on San Francisco Bay. In the salt ponds of south San Francisco Bay, diked waters trace the ghosts of tidal marsh meanders. The same seemed to be happening here in managed wetlands that once were rice fields. On both coasts it appears from an airborne perspective that the ancient salt marsh is just waiting to be set free. In San Francisco Bay and South Carolina—as in other places around the world—the deep and common impulse to renew natural processes is at work. ■

John Steere is the director of the San Francisco Bay Joint Venture.

Live Fish Fishery Adds to Worries

Trouble in the Nearshore

WESLEY MARX



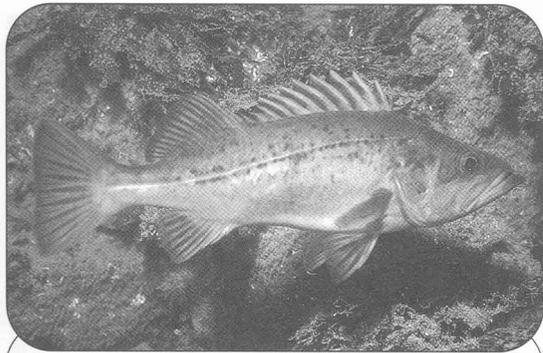
A DECADE AGO, DIVERS IN CALIFORNIA'S GIANT KELP FORESTS often saw the striking red and black sheephead. Today your best chance of seeing one of these distinctive fish alive is on a visit to an Asian seafood restaurant. There, in aquatic tanks, they stare out at diners who like their fish fresh. Very fresh.

The Asian preference for live fish has sparked the explosive growth of California's newest and fastest-growing commercial fishery. In 1989 there were only 76 participants; today over 1,000 are licensed. Going out in small boats, they are catching a wide variety of fish for live delivery to Asian restaurants and markets.

The live-fish fishery is one major reason, though by no means the only reason, why marine life has thinned out in California's nearshore ecosystem. The sport-fishing fleet and, to a lesser degree, the regular commercial fleet compete for many of the same fish stocks. The cumulative impact of such fishing pressure can disrupt the biological links that sustain this remarkable ecosystem.

PHOTOS THIS SPREAD: WESLEY MARX





DANIEL W. GOTTSCHALL

BOCACCIO

(*SEBASTES PAUCISPINIS* [= "FEW SPINES"])

THESE PINKISH-BROWN FISH, up to three feet long, are quite distinctive with their underslung lower lip. As adults they live over rocky reefs and soft bottoms, generally at depths between 150 and 1,000 feet, and feed on fishes and squids. In southern California they are by far the most important rockfish caught by sport fishers. They are also a major part of the commercial rockfish catch, being taken by trawl, gillnet, and hook and line. Along with chilipeppers and bank rockfish, bocaccio have a longer shelf life as fresh fish than many other rockfishes.

Live fish can fetch triple the price paid for fresh-caught dead fish, and a small aluminum skiff and a rod and reel will put you in business. Some intrepid souls go forth in kayaks and even on surfboards. Surfboards and other small vessels allow fishermen to exploit shallow reefs beyond the safe reach of larger vessels, but could capsize in heavy surf. Some live-fish fishermen have drowned off the rugged central coast. Onshore, you only need an aerated aquatic tank to keep the fish alive. Dealers move up and down the coast in vans to rendezvous with fishermen and transport the catch to the big markets in Los Angeles and the San Francisco Bay Area. Over 50 near-shore fish species, including California halibut, cabezon, leopard shark, and several rockfish species, are being caught to meet market demands. In 1998 this booming fishery landed a record 670 tons.

Before the live-fish fishery came onto the scene, sport and commercial fishermen, joined by divers with spearguns, were already testing the limits of the productive nearshore ecosystem. Fishing pressures on one prominent resident, the large black sea bass, escalated to 250,000 tons a year and then tailed off. By 1980, its populations had been depleted so severely that California banned further takes. The ban remains in effect, since rebuilding stocks of slow-maturing resident fish like black sea bass or rockfish can take 30 years or more. The advent of the live-fish fishery has accelerated such drastic declines. In the early 1980s sport fishermen reported landing 1,800 sheephead a year in a kelp bed near San Diego. By 1994, with the live-fish fishery also present, they reported only 145. Now there is great concern about rockfish, the major catch of the sport-fishing fleet in northern and central California, and the major winter catch in southern California. Between 1997 and 1998, the sport catch of rockfish in southern California dropped by 10 percent, that of cabezon by 50 percent. A 1998 report to the California Cooperative Oceanic Fisheries Investigation (CalCOFI) noted: "In much of the southern California Bight, inshore rockfishes are no longer present, or their numbers are sharply reduced."

The regular commercial fishery mainly targets rockfish stocks in offshore waters, using trawl nets. There is still some overlap between the

ROCKFISH

ROCKFISHES MAY BE CALLED "snapper" or "Pacific snapper" in markets and restaurants—a misnomer that often causes confusion, since true red snapper is an East Coast fish. They are "classic" fish, with big mouths and lots of fins; some species also sport small spines on the top of the head. They come in virtually all the colors of the rainbow, may be striped or blotchy, and are among the most difficult marine fishes to identify to species. Even experts sometimes get stumped. There are some 70 rockfish species in the Eastern Pacific.

Rockfishes belong to the family Scorpaenidae (which includes the venomous tropical lionfish and scorpionfish), and most are in a single genus: *Sebastes*, from the Greek word *sebastos*, meaning "magnificent." Thornyheads, a very

long-lived (up to 147 years in the case of one species) deep-sea rockfish, are in a separate genus, *Sebastolobus* (meaning "lobed *Sebastes*").

Rockfish inhabit very diverse habitats, from rocky shorelines, to shallow bays and estuaries, to mid-depth and deep-water environments. *Sebastes* are viviparous, meaning that they give birth to live young, while thornyheads are oviparous: they release tens of thousands of eggs, which float for some time on the surface before hatching. Larval rockfish spend varied amounts of time in the water column; juveniles tend to move into deeper water as they age, often undergoing physiological changes to adapt to higher pressures.

The most commonly fished rockfishes along the California coast are bocaccio,

Pacific Ocean perch (not a true perch), black, yellowtail, chilipepper, canary, and widow. Of these, says biologist Milton Love of the Marine Science Institute at UC Santa Barbara, "the bocaccio might be listed as an endangered species if it were a land animal, since the populations have dropped to 8–10 percent of their 1960 numbers." The IUCN (World Conservation Union) has listed the bocaccio as a "critically endangered species," which means that there has been at least an 80 percent reduction in the population of this fish over the last ten years, or three generations. Other rockfishes are faring poorly as well, partly because of fishing pressures but also because of ocean warming, which decreases the food supply for larvae.

different fisheries, and the result can be more overfishing. For instance, the nearshore fishery catches one popular rockfish species, the bocaccio, in its younger stage, while trawlers catch older adults that migrate to deeper waters. According to the National Marine Fisheries Service (NMFS), the bocaccio is now considered overfished and subject to a rebuilding plan that may take 50 years.

As fish stocks diminish, fishermen are expending more effort to catch smaller and smaller rockfish in the Monterey Bay area and southern California, according to studies by scientists with NMFS and the University of California at Santa Barbara. In the process, the very structure of the reef community is being undermined. In a 1998 report for CalCOFI, Milton Love and his colleagues at the Marine Science Institute at UC Santa Barbara and the Pacific States Marine Fisheries Commission reported: "From our submersible surveys, we have noted that heavily fished reefs often have large numbers of small fishes, particularly squarespot and pygmy rockfish. It is possible that removing most of the large, predatory rockfishes has increased the survival of these dwarf species."

The cumulative impact of these multiple fisheries undermines the very nature of the nearshore marine ecosystem, California's premier life-giving marine environment. The submarine forests and rock reefs along our coastline may not be as glamorous as coral reefs in tropical waters, but they are just as productive. Some 800 species of marine animals and 130 species of marine plants flourish in the nearshore zone, the watery realm that extends a mile out from shore and includes a mile around offshore rocks and islands. The remarkable diversity of this zone is sustained by seasonal upwelling, which recharges surface waters with nutrients. It is supported by the kelp, which rises from its rocky hold-fasts as high as 80 feet to and along the surface, growing at a rate of up to

M.R. BAIRD-COURTESY OCEANSIDE HISTORICAL SOCIETY



BLACK SEA BASS

(*STEREOLEPIS GIGAS* [=GIANT])

THE BLACK SEA BASS is also called the giant sea bass, with good reason. It can grow to 500 pounds or more. Older adults have a uniform blackish coloration, while younger adults display large black spots over a grayish body. Historically, it ranged from central California south into the Gulf of California, Mexico, and was common in kelp forests and reef areas. Overfishing has severely reduced its numbers. In 1980, California banned fishing for black sea bass.

CABEZON

(*SCORPAENICHTHYS MARMORATUS*
[="SCORPION FISH" + "MARBLED"])

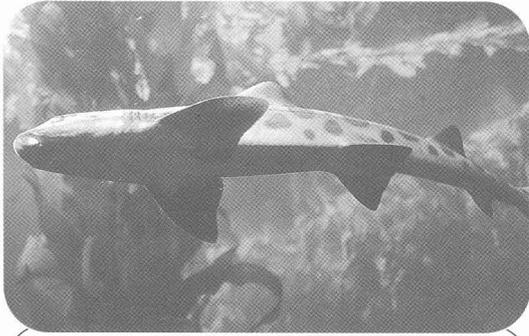
CABEZON ARE LARGE, scaleless, brown, red, or green sculpins (males tend to be reddish, females green). Reaching 30 inches and living to 13 or more years, they are found over natural and artificial reefs, commonly to depths of about 90 feet. They lay eggs in nests that are guarded by the males; because the eggs are poisonous, not only to humans but also to many mammals and birds, they can lay their eggs in very shallow water

and rest assured that no raccoons, crows, or other critters will bother them. Young, silvery cabezon are common under drifting kelp mats; they then move to tide pools, and ultimately settle on deeper reefs, where they lead a rather sedentary life. Adults feed heavily on crabs, as well as fish, abalone, chitons, and octopuses. Cabezon are important sport fish, in part because they are relatively easy to take



KIP EVANS

from shore. Their commercial value has also been rising in recent years, largely because of the live fish fishery. Cabezon have blue flesh, which may come from copper-based compounds in the shellfish they consume; the color is harmless and disappears when the meat is cooked.



KIP EVANS

LEOPARD SHARK

(*TRIAKIS SEMIFASCIATA*
[=HALF-STRIPED])

THE LEOPARD SHARK has dark bars across its back and spots along its sides and tail. It cruises shallow inshore waters slowly, with a snake-like motion, hunting for crabs, shrimp, and clams. It can grow as long as seven feet and live 25 years. Females bear litters of five to 28. During summer leopard sharks gather in loose schools in waters so shallow that waders can see them. These sharks are harmless, and viewing them close up is a favorite pastime at one congregating area near La Jolla. This congregating behavior expedites capture by both sport and live-fish fishermen. There is a minimum size limit of 36 inches, and sport fishermen can bag no more than three a day. There is no bag limit for commercial fishermen. Because very little is known about the leopard shark, its ability to withstand increased fishing pressure remains an open question.

two feet a day, and providing food and shelter for myriad life forms, from bottom-dwelling sea urchins to seabirds that dive below the kelp canopy to snare small rockfish and other forage items.

Critical links bind this diverse community together. The sheephead, with its canine-like teeth, crushes and grinds up the bottom-dwelling sea urchin, which feeds on kelp. By controlling the sea urchin population, the sheephead benefits the kelp. Rockfish are important to the survival of seabirds. In their early life stage rockfish feed on plankton near the surface and become a major forage source for seabird breeding colonies on the Channel and Farallon Islands. The long-term stability of the near-shore ecosystem depends on such critical relationships.

"The changes to sheephead populations suggest that outbreaks of destructive [kelp forest] grazing by the minimally exploited purple sea urchin will become more frequent," warn marine ecologists Mia Tegner and Paul Dayton of the Scripps Institution of Oceanography in the May 1997 issue of *Reef Information Bulletin*.

Seabirds are also affected. In the early 1990s there were some 2,000 nesting tufted puffins on the Farallon Islands. Today the population numbers between 80 and 120 birds. Depletion of rockfish and other forage fish is considered a major factor in the decline of the puffin population.

A New Lease on Life

Mounting concern over the condition of our nearshore habitat led the California legislature to enact the Marine Life Management Act in 1998. In 1999, Governor Gray Davis signed legislation that provides \$5.2 million from the general fund to implement the Act. The new law requires the Fish and Game Commission to adopt a comprehensive fishery management plan by January 1, 2002, to ensure that nearshore stocks are fished at a sustainable level. In determining these levels, the ecosystem role of target species is taken into account—the first time this is part of the formula. Enough sheephead would have to be left in the kelp forests to control grazing urchins, and enough forage fish to sustain seabirds and other natural predators. To reduce the take of immature fish that fetch a premium price, the Act imposes a minimum size limit on sheephead, cabezon, and six nearshore rockfish species. To help improve catch accounting, the Act requires nearshore commercial fishermen to buy special permits. The funds collected are to be used for more monitoring and enforcement.

To make sure there will still be enough fish around to plan for, the Act empowers the Commission to adopt interim nearshore regulations. The Commission is considering a ban on issuance of new permits and limiting participants to those who held permits at the end of 1999 (some 1067). The Commission has reserved the right to consider further reductions. The Pacific Coast Federation of Fishermen's Associations, a commercial fishing organization, supports this "limited entry" program.

The Commission is also considering 16 interim management alternatives



WESLEY MARX

HELP WITH SEAFOOD CHOICES

THE MONTEREY BAY AQUARIUM OFFERS A SEAFOOD WATCH CHART THAT tells what the Aquarium will buy right now, what it avoids, and why. This chart may help consumers who want to make choices that cause no harm to ocean species. It shows where some popular seafoods come from, whether the species is wild or farmed, and what "level of fishing" is involved ("low" to "depleted"). Posted on the Aquarium's Seafood Watch web site, and updated as new information becomes available, this chart (available wallet-size) is at: www.mbayaq.org/efc/efc_oc/dngr_food_watch.asp.

that range from a statewide ban on sale of live finfish to better catch accounting measures. One alternative would further limit the use of commercial fishing gear. Currently, a commercial fisherman can deploy up to 150 hooks and 50 traps. A recreational fisherman is limited to one line and three hooks. Also being considered is the establishment of a system of nearshore no-take reserves. (See *Coast & Ocean*, Winter 1999–2000.) The Commission plans to create a nearshore advisory committee with sport, commercial, and environmental representatives to help review these alternatives.

In conjunction with the federal Pacific Fishery Management Council, the Commission has adopted a seasonal closure on fishing of rockfish, both near-shore and beyond. The closure was in effect January and February in waters south of Point Lopez in Monterey County to the Mexican border, and went into effect in March and April north to Cape Mendocino. Such closures give stressed rockfish stocks a breather during winter spawning periods. However, they can also intensify fishing pressures on other stocks. Nearshore, sport and commercial fishermen shift their attention to California halibut, sheephead, leopard shark, sculpin, cabezon, and other fish not covered by the closure or by federal quotas on rockfish species.

The live-fish fishery presents a special management problem because it is so mobile. Commercial fishermen must document the number and type of fish they catch. Catch receipts enable the Department of Fish and Game to monitor trends in the relative abundance of fish species. Fishery managers also periodically sample the catch to ensure compliance with regulations, such as minimum size. All this is difficult with live-fishery fishermen. "The swiftness of landing transactions, mobility of receivers, and concern of fish damage due to sampling efforts make information gathering and enforcement capabilities extremely challenging," reports Kimberley McKee-Lewis of California Fish and Game. Using mobile phones, some fishermen will shift locations to avoid samplers. In the San Francisco Bay Area, live finfish are offloaded at over 80 locations. Without adequate catch accounting, the full impact of the booming live-fish fishery cannot be effectively assessed, much less controlled.

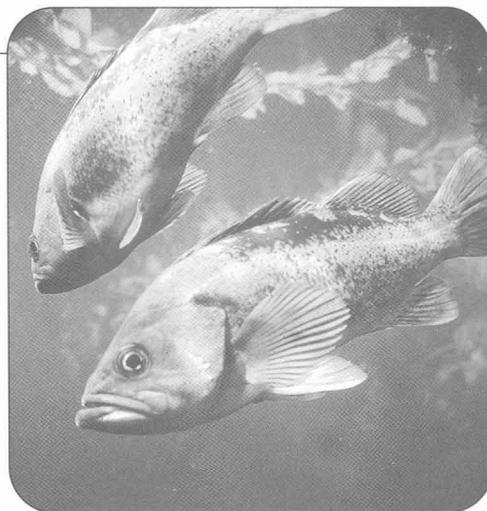
Further complicating attempts to manage fishing in California's

continued on page 37

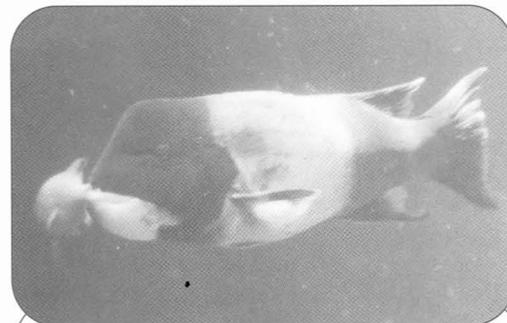
BLACK ROCKFISH

(*S. MELANOPS*)
[="BLACK FACE"])

FAIRLY SLIM, bass-shaped fish up to two feet in length, black rockfish are common from central California to southeastern Alaska. In their northern range they move over reefs in schools numbering in the thousands. Adults are most abundant in waters with bottom depths of 40–300 feet. Divers take substantial numbers, as do pier and rocky shore anglers. In some locations off northern California and Oregon black rockfish may make up 37 percent of the total marine recreational catch. From Oregon north, they are also an important segment of the commercial rockfish catch, though their filets have a relatively short shelf life under refrigeration.



KIP EVANS



WESLEY MARX

CALIFORNIA SHEEPHEAD

(*SEMICOSSYPHUS PULCHER*)
[="BEAUTIFUL"])

THE MOST IMPRESSIVE THING about sheephead is their sex life—or rather, their sexy lifestyle—or . . . well, let's put it this way: they don't do things quite the way we humans do. All sheephead are born female. At about seven or eight years of age—sometimes later, or even never, depending on population or habitat pressures—females change into males, a process that takes about a year to complete. At this stage, the smallish reddish-brown fish becomes chunkier in build, develops a big bump on its head, and takes on a striking black and red coloration. Both sexes have large, canine-like teeth, which they use to feed on hard-shelled and encrusting animals. Sheephead reach three feet in length, and males have been aged to 53 years, females to 30. The Chumash people enjoyed their taste; they are the dominant fish species in the middens on San Clemente Island. In the late 1800s, Chinese fishers caught and dried large quantities of sheephead. In modern times, sport anglers disdained them until recently. Commercially, as the accompanying article makes clear, they have been targeted by the live fish fishery. Sheephead are members of the wrasse family, a type of fish popular in tropical aquariums.

—Wes Marx & Anne Canright

Tribe Wins Foothold on Sacred Ground

Wiyot Will Dance Again on Indian Island

RASA GUSTAITIS

If you stand on the Eureka waterfront and gaze out at Humboldt Bay, you might notice a low-lying island, spanned by the causeway that links the city with the Samoa Peninsula. If you ask, you will learn that it's called Indian Island and that most of it is a wildlife preserve. Today, many local residents are unaware that only two lifetimes ago one of the most brutal massacres in California was committed here, only a few hundred yards from the county seat.

"An Indian festival had been in progress for a whole week, ending in a dance on Saturday night [February 25, 1860]," wrote Llewellyn L. Loud in his "Ethnogeography and Archeology of the Wiyot Territory," published in 1918 in *American Archeology and Ethnology* (A. L. Kroeber, ed.). "While the dance was in progress, white visitors came over from Eureka, and among them spies who learned the exact situation and made their plans. . . . About four o'clock Sunday morning five or six

men came to the island armed with hatchets. . . . A few, mostly men, escaped to the bushes, while the others were caught in their homes like rats in a trap. Mercilessly the hatchet descended on all alike, old and young, women, children, and infants. Their skulls were cleft, their spines severed, their bodies thrust with bowie-knives. . . . The work of destruction was finished in a few minutes, and while the dead and dying lay strewn over the ground, the fires from one of the burning cabins lit up the ghastly scene."

The next morning only one survivor was found on the island, an infant boy at the breast of his dead mother. Three other Indian settlements were attacked that same night. According to a report by Major G.J. Rains, Commander at Ft. Humboldt, about 188 Indians, mostly women and children, were murdered.

Bret Harte was then a reporter and sometime editor of a local paper, the *Northern Californian*. In the February 29, 1860 issue he reported: "When the bodies [from Indian Island] were land-

Wiyot Chief Ki-We-Lat-Tah, as painted in 1852 by Stephen William Shaw for L.K. Wood, one of the goldminers who discovered Humboldt Bay on December 20, 1849. The chief crossed the bay by canoe the next day to greet the visitors. In his diary, Wood recorded that "he appeared very friendly and seemed disposed to afford us with every comfort in his power." The hat in this painting is in the Clarke Memorial Museum in Eureka.

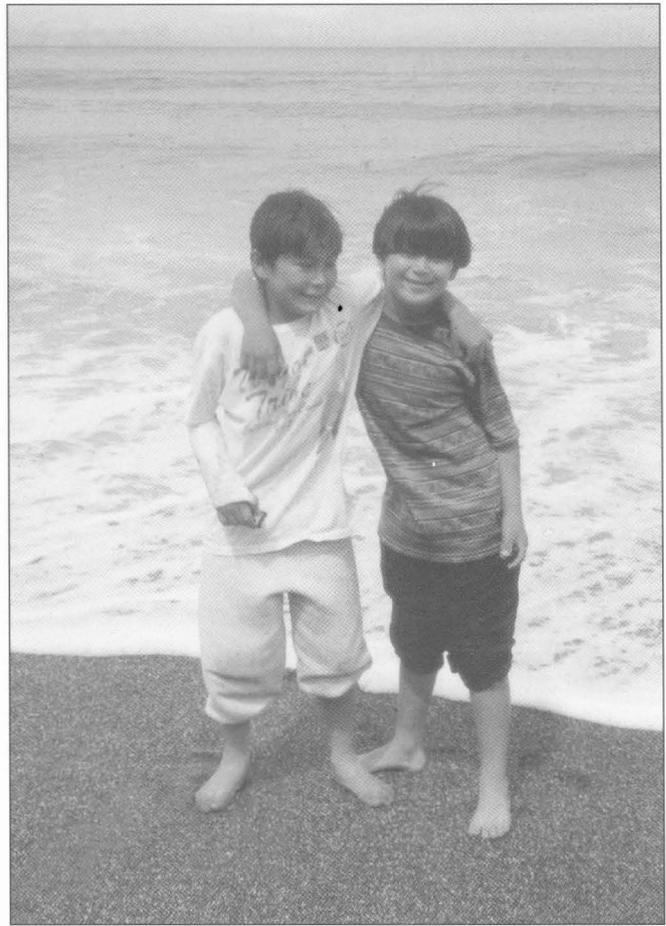
ed at Union [the early name for Arcata] a more shocking and revolting spectacle never was exhibited to the eyes of a Christian and civilized people. Old women, wrinkled and decrepit, lay weltering in blood, their brains dashed out and dabbled with their long gray hair. Infants scarce a span long, with their faces cloven with hatchets and their bodies ghastly with wounds. . . . No resistance was made, it is said, to the butchers who did the work, but as they ran or huddled together for protection like sheep, they were struck down with hatchets."

Harte also wrote an editorial, predicting: "It is the beginning of the end. . . . A spirit has been raised that nothing



HUMBOLDT BAY HARBOR RECREATION AND CONSERVATION DISTRICT

Above: There is no access to Indian Island (center) from the causeway that connects Eureka with the Samoa Peninsula. The accessible, smaller Woodley Island is just below. Right: Wiyot buddies. Below: A former boatyard (far left) is on the parcel newly reacquired by the Wiyot Tribe. An eroding edge of the ancient shell midden is in the foreground.



COURTESY WIYOT TRIBE



MARC RICARDS

but blood will appease." Shortly afterwards, he left for San Francisco.

Nobody was ever arrested or held responsible. Humboldt County Sheriff B. Van Nest said he had no knowledge of who the killers might have been. But he observed, in a newspaper article, that Indians had been killing white men's cattle, and ranchers, "heavy taxpayers," were getting desperate. In April, a grand jury reported that "after a strict examination of all the witnesses, nothing was elicited to enlighten us as to the perpetrators."

By this time, ranchers had driven most of the indigenous people in the County into the mountains, where food was scarce. Some drifted back. There were reports, amplified by rumors, that Indians were killing hundreds of cattle. Ranchers were demanding that the Army respond by killing all the Indians. When Major Rains refused to consider killing anyone who was not found guilty, there were calls for volunteers. "All the newspapers during the years previous to 1860 teemed with the words *annihilation* and *extermination*," wrote Loud. The word genocide did not yet exist.

The coastal Wiyot, according to Major Rains, "killed nobody, troubled nobody and troubled nobody's cattle, were useful furnishing fish and clams for the whites, often helping them in their domestic concerns, living apart by themselves. . . ." Much like the Tolawa, Yurok, and other north coast people, they lived in small communities on the shore and at river mouths, built redwood houses, hunted, fished, and collected nuts and wild herbs.

After the massacre, all Indians who had survived on Humboldt Bay, Mad River, and the Eel River were rounded up, and 440 were sent with military escort to the Yurok reservation on the Klamath River, where they found a cold welcome. In 1862, a flood devastated that reservation, and everyone there was moved still farther north, to the Smith River. Many died of hunger and disease. Remnants of the coastal tribes returned to their ancestral lands. There were about 3,000 Wiyot people before 1860. The tribe now counts about 350 members. The language and cultural memory are gone.

Back to the Island

YOU WILL NOTICE CHERYL SEIDNER when she walks into a room, even if you don't know she is the chair of the Wiyot Tribe. Standing solid on the ground, she has a warm, round face, an easy laugh, and a friendly way that readily includes a stranger. This evening she is meeting with this reporter in a Eureka restaurant, taking a break between her day's work at Humboldt State University and her evening's work for the Tribe. She talks about the way the Tribe is making sure the young people get to go to college, hiring tutors for them if they need extra help. And she tells of Irving Foster James, born November 30, 1900, who was the eldest elder when he passed away March 18, 2000 at age 99.

He had a passion for Harley-Davidson motorcycles, she says. When he was in his 70s, he frightened his family by taking off for a ride. Last August, the Hog Club surprised him with an early 100th birthday present. Several men and women and one little girl arrived at the Tribal Community Center riding their Harleys single-file, and they took him out for a ride. "By the time he finished telling that story, he was driving and one of his daughters was riding in back," says Seidner, laughing. "His daughter told the Hog Club they had fulfilled a dream he had

not even known he had." She sighed. "At least we have his oral history."

Irving James was Cheryl Seidner's granduncle. He was also the son of Jerry James, the infant found on Indian Island after the massacre, who lived until 1929. "When you think of that," she says, her face darkening, "it's all so close."

She continues: "We always knew about the tragedy on the island. My parents said: 'It's part of your history. You know it, and you go on.' Now some people say, 'Why bring that up?' I tell them: 'If you forget the atrocities, they happen again and again.' I don't mean we have to dwell on it. But we have to remember, to commemorate, so that when we see it coming again we recognize it."

Toward that end, to remember and to go on, the Wiyot have been trying to get back the island, the center of their spiritual and cultural world. An ancient shell mound testifies to their long presence, but the island has been off limits to them. About 90 percent of its 275 acres are a wildlife reserve owned by the City of Eureka, and can only be visited with a special permit. The rest is small private lots.

Recently, one of the privately owned properties, a 1.5-acre abandoned boatyard, came up for sale. The Wiyot established the Sacred Site Fund and, in March, bought it for \$106,500. This now gives them a foothold. For the



COURTESY WIYOT TRIBE

first time in 140 years, they will be able to hold a world renewal ceremony on the sacred ground.

"There hasn't been a dance since 1860," says Seidner. "No new songs have come for decades. The language is gone. My grandfather made a very conscious decision not to pass on the language. He said *Dequa* [whites] were here to stay." Others decided likewise, and within another generation no one spoke the Wiyot language. Then, in 1958, the Eisenhower Administration dealt what looked like a final blow



COURTESY WIYOT TRIBE

with its tribal termination policy, designed to incorporate Indians into society at large. That just about wiped out what remained of the tribe, then living mostly at Table Bluff, southeast of Eureka, on 20 acres bought by a Christian organization in 1910 for homeless Indians.

"Federal agents came to us and said: We'll build roads to the upper acres, give you water that's drinkable, we'll give each of you a deed to your property," said Seidner. So Dad met with everyone and they agreed to accept the deal. He signed last because he was the tribal chairman. Then we waited and nothing happened, nothing that had been promised, at least not until after Dad was killed in a logging accident when I was 16." Her mother died ten years later, leaving Cheryl, her three sisters, and a brother.

In 1968, she went to San Francisco to enroll in Heald College of Business. There she discovered that her people appeared to have been erased from the official landscape. While filling out a form for a student loan, she was given



RASA GUSTAITIS

a choice of ethnic identity. "The options were Afro-American, Asian-American, Caucasian, or Other," she said. "I wanted to write 'Indian.' But the man there said, 'Just write Caucasian.' I said, 'My great grandfather was German but that's the only Caucasian I've got. That's how I got my last name. But I'm Indian. You mean if I put down 'Indian' I won't get the loan?'" She wrote "Indian," got the loan, and became one of the few from her tribe to attend college.

That year she became aware of her identity in a new way. Watching hippies in feathers and deerskin jackets identifying with Indians, "trying to get a hold of something and make it their

own," she realized that "we had something—we just had to bring it out." When she returned home to Table Bluff, she joined a movement to reclaim federal recognition for her tribe. A suit was filed in 1980 against the United States, and "my name was on it as the youngest of three people in the class action suit. In 1990 we won in District Court in San Francisco."

Today the Wiyot Tribe lives on 88 acres at Table Bluff. Following a court order, the federal government built 26 homes. A Community Center and three more homes were built with other funds. The Tribe will build three more homes this year. But without their songs and dances, without their own language, without their ancient sacred place, how are the young people to know who they are? Tribal members feel it is essential that they return to the island. The purchase of the boyard is "the first step," said Seidner. "This may not happen in my lifetime, but we'll get the whole island back."

Much has to be done before the first dance can begin. "The first job will be to clean the place up, get rid of the debris, restore the site to a natural state. We might put up a few [traditional] redwood houses, leave the rest

continued on page 39



MARC RICARDS

Opposite: Foster James, the eldest elder, riding with a Hog Club member, 1999. Left: Foster James in 1995, at age 95. Above: The California Conservation Corps repaired El Niño damage to the shell mound in 1999 by placing geo-tech bags filled with donated oyster shells on its eroding edge. This was a collaborative effort by the Tribe, the Humboldt Bay Harbor Recreation and Conservation District, and the City of Eureka. Below: Tribal Chair Cheryl Seidner

Libby and Lovell Langstroth

A Second Career beneath the Tides: An Interview

ANNE CANRIGHT

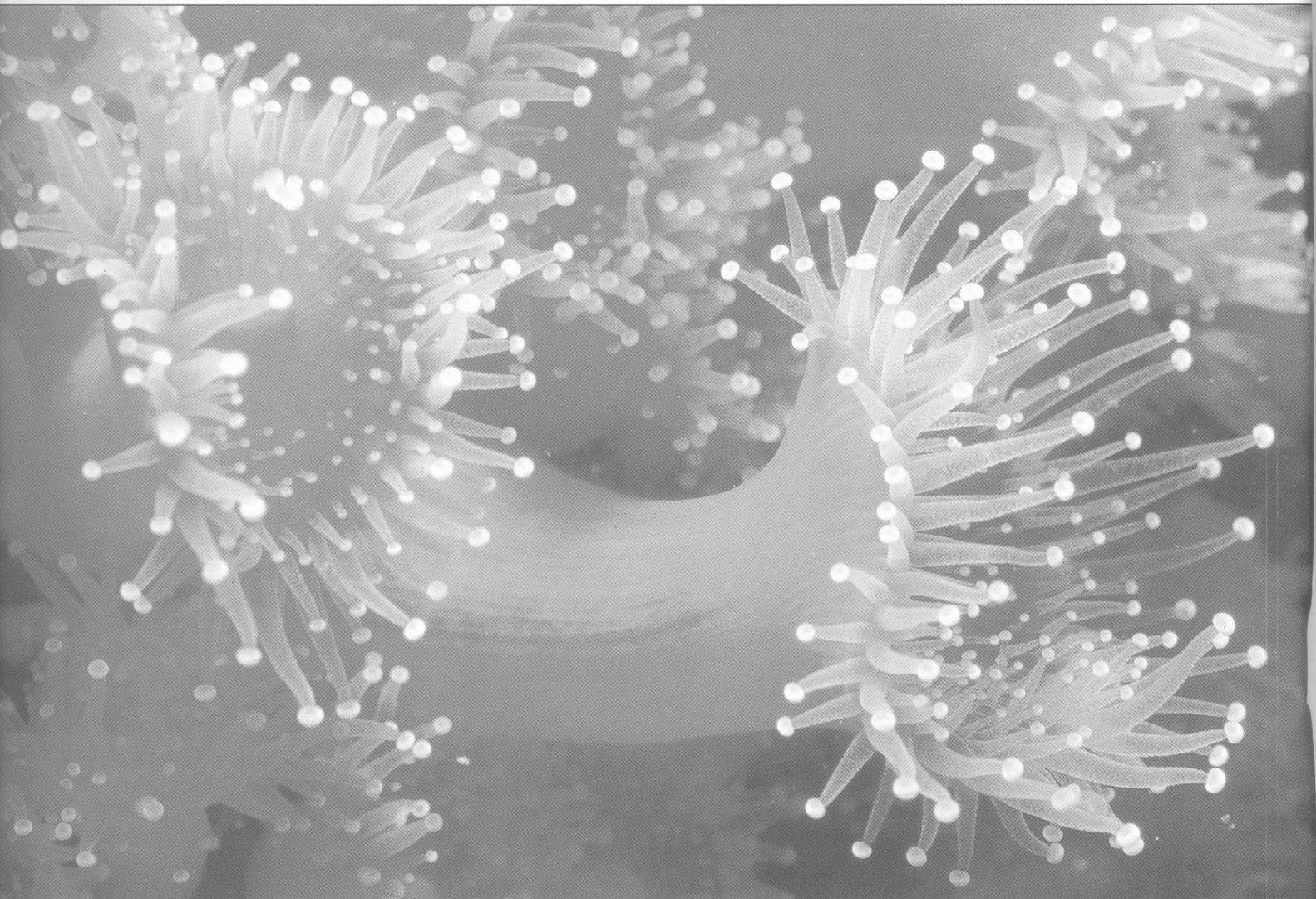
PHOTOS BY LIBBY &
LOVELL LANGSTROTH

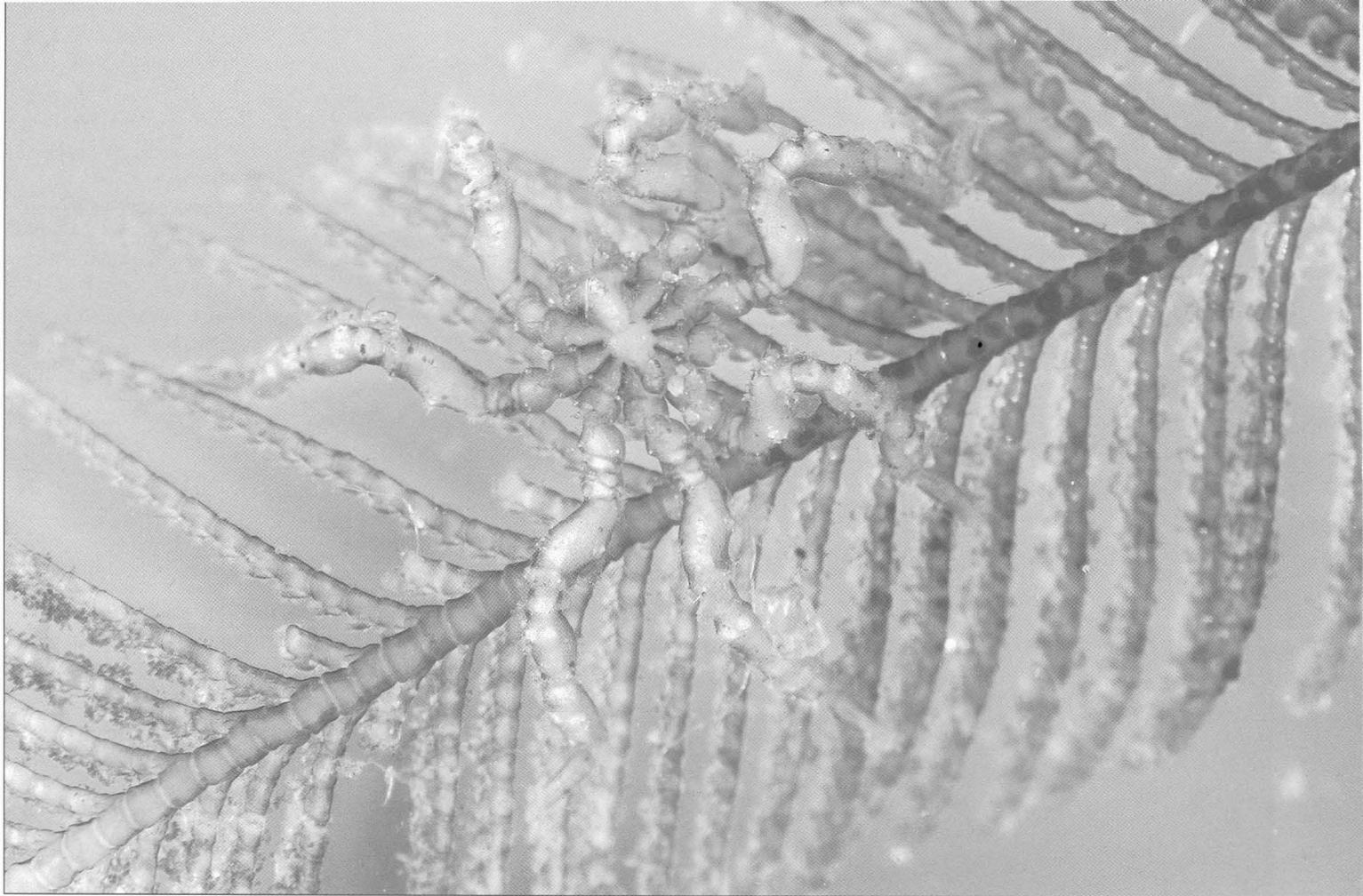


Below: Strawberry anemone, *Corynactis californica*, photographed at about 26 feet deep in Monterey Bay. It measures about half an inch across the tentacles.

Opposite top: This sea spider, *Tanystylum duospinum*, is hard to find because it's so tiny—less than a quarter-inch across. Here it's perched on a hydroid, *Aglaophenia*.

Opposite bottom: This stately, gorgeous medusa, *Pelagia colorata*, normally lives in the open ocean. When currents sweep it into the Bay, a rockfish may eat it.



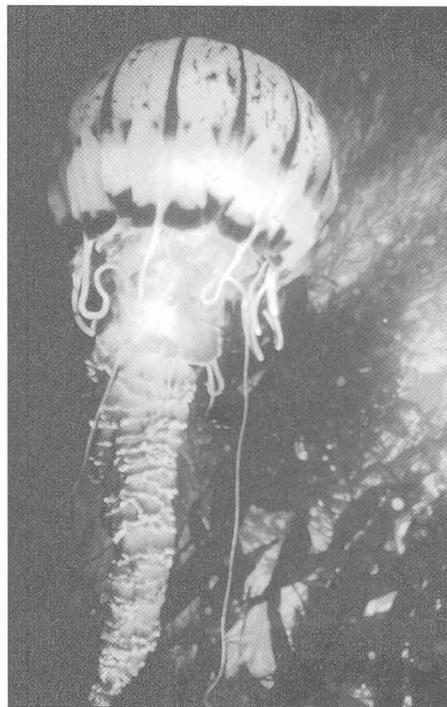


In January 1989, I joined the ranks of volunteer guides at the Monterey Bay Aquarium. I decided to volunteer for a pretty simple reason: I'd just moved to the area and wanted to get involved, plus I lived only four blocks from the aquarium and figured I'd be able to get there every week. Little did I know, when I crept shyly into the volunteer lounge for my first day "on shift," that I was about to join an embracing family.

In that family are all sorts of people who inspire me for various reasons—for their intelligence and curiosity, for their warmth and gentle good spirits, for their enthusiastic energy. Two people who epitomize all those characteristics have become special inspirations to me. Their names are Libby and Lovell Langstroth, and at 78 and 83 years old, respectively, they have a lot more on the ball than many people I know who are half their age.

Libby and Lovell moved to the Monterey Peninsula from Berkeley in 1980 for retirement. He had been a physician, she is an anthropologist. Once here, they avidly took up diving, and

availed themselves of resources at Stanford's Hopkins Marine Station and California State University's Moss Landing marine biology facility. In essence, they made a second career out of marine biology, epitomizing the



word *amateur*: they simply loved everything about this rich subtidal world. Each of them logged more than 650 dives on the Monterey Peninsula—with Libby starting this new pursuit at the age of 54. In the course of learning all they could about the creatures of this environment, they perfected their photographic skills.

Recently, I had the privilege of working with them on a book of photographs and descriptive essays about some of the fascinating animals of Monterey Bay with which they became acquainted. *A Living Bay*, due out from the University of California Press in October, will be a stunning guide to the subtidal world of central California. It features photos that Libby and Lovell shot both on the spot and in a home darkroom equipped with a dissecting microscope, then printed themselves. Their prints, together with captions describing the lives of creatures ranging from strawberry anemones to slipper snails to sea urchins, have been exhibited at the California Academy of Sciences, Pacific Grove Natural History Museum,

“People were taking pictures that electrified me to see what was going on down there.”



Opposite: Libby in the magical kelp forest, holding enclosure with Lovell's Nikon camera, taken by Lovell with a Nikonos with a wide-angle lens.

Lawrence Hall of Science, and Museum of Nature in Ottawa. Many of their photographs are part of the displays at the Monterey Bay Aquarium as well.

Early this year Libby and Lovell moved from a beautiful big home overlooking Point Lobos, south of Carmel, into a retirement apartment in Pacific Grove. They still have a microscope set up in their kitchen (who needs a Kitchen-Aid anyway?), and friends of theirs living nearby acquired much of their darkroom equipment, so they're still able to print. They stopped diving, however—Lovell's heart just isn't what it used to be—at the ages of 75 and 80. But there's still warm-water snorkeling. Within the next few months, in fact, they're headed for Hawaii, where they're looking forward to snorkeling every day. The sea and its creatures are definitely in their blood.

Not long ago, I sat down and chatted with Libby and Lovell about their

careers as divers and underwater photographers. What follows are some of their stories and a small sampling of their photographs. (The originals, of course, are in color—so if you like what you see here, take a look at the *Coast & Ocean* web site, and by all means, check out their book once it's released in the fall.)

C&O: How did you get interested in the ocean and decide to get certified as divers?

Libby: I've always been interested in the ocean. When I was a girl we had a sailboat; we sailed in San Francisco Bay all the time, and once we sailed down the coast to the Channel Islands and down to Mexico just a touch, to the Todos Santos Islands. We went up to Tomales Bay, and we'd go up the river and the delta during the summer. And during that time I used to read Beebe. [William Beebe was a pioneer of deep-sea exploration of the 1930s.] And what I wanted to do was become an ichthyologist. I used to tell people

that when I was a little girl, and they would *laugh*. Anyway, I soon gave up on that.

C&O: Why?

Libby: I remember my brother once said, when I said I wanted to be an ichthyologist—I was ten or eleven—“You're not going to be that.” And I said, “What do you mean?” He said, “You know what you're going to do when you grow up?” And I said, “What?” He said, “You're going to get married and you're going to have children.” And I thought, “By golly, he's probably . . .” He said, “That's what all women do, that's what all girls do,” and he said, “That'll happen to you.” And he was right, obviously. [Libby married at age 25, and had 3 daughters.]

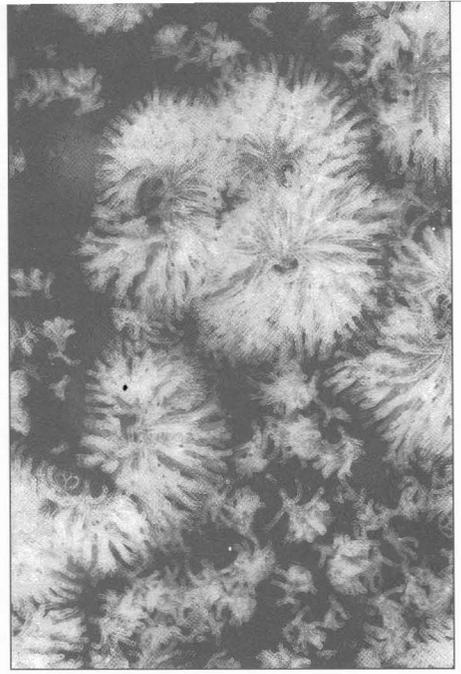
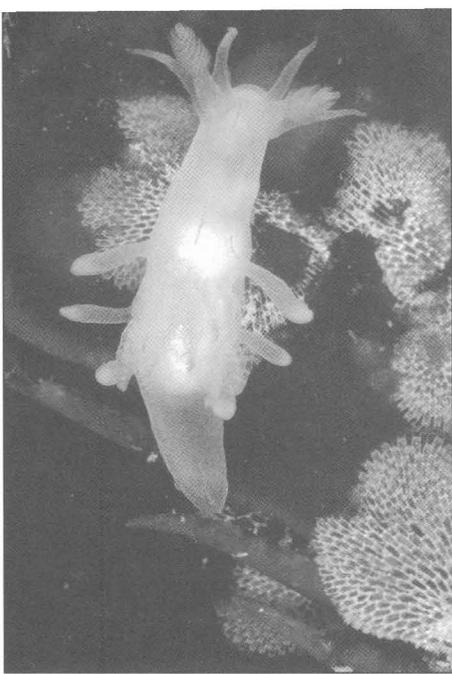
But then I went into anthropology and I banged around in that for quite a while. And then when [husband] Ted died, I remember one of my close friends said, “Have you ever thought of going back to school and going into what you always wanted to do, ichthyology?” But of course I didn't. But then [in 1975] I met Lovell—somebody who was a diver and who was interested in those sorts of things.

C&O: So Lovell, how did you get into diving?

Lovell: Well, I used to like backpacking and river touring and ski touring and all of that. And I carried a camera and took snapshots. And then I became aware that there was a marine environment, and people were taking pictures that electrified me to see what was down there. So I got into diving.

C&O: When?

Lovell: I think it was in the 1950s. And at that time, diving was new—sports diving, regulators and wet suits, and all of that. Also new were enclosures



FRED HULSE

Top left: A nudibranch, *Ancula pacifica*, on a blade of kelp next to a bryozoan, *Membranipora membranacea*

Top middle: Female skeleton shrimp, *Caprella* sp., broods her young in her spotted marsupium (pouch). While they're little, they stay near mom, who is barely half an inch long.

Top right: A bryozoan, *Tubulipora pacifica*, growing on a blade of kelp

Below: Libby and Lovell about 15 years ago

for cameras. The first one that I became aware of was something called a Rolleimarin, and it was a beautiful big enclosure that was designed in Germany by Hans Hass for a twin-lens Rollei. So I got into diving and immediately got that.

In those days I was still practicing medicine, and diving meant coming down to Monterey a couple of weekends a year and going out on a chartered boat with some of my diving buddies. We'd go out on the *Bottom*

Scratcher or *Sand Dollar*—those were dive boats out of San Diego—or go out of Santa Barbara and dive the Channel Islands, and I'd be shooting with the Rollei. I feel some of my best images were taken with that set-up, the two-and-a-quarter format. But when Lib and I got into diving here, visibility often was not good, and we got interested in little things beyond the capability of the twin-lens Rollei. That's when I went to a Nikon with an enclosure.

C&O: And when was that?

Lovell: In 1980. That's when we really got into diving. Well, then all these doors opened to us, these incredible opportunities. One of them was at the Hopkins Subtidal Ecology course. There were 30 students in the class—28 undergraduates from Stanford and the two of us. It was a five-week summer course. We dove every day except Saturday and Sunday, we had two hours of lecture a day, and we had lab. We had to be in our wet suits at eight o'clock every morning, and we went until about six in the afternoon. And we'd go home and we'd be too tired to eat dinner, so we'd have a bowl of corn flakes and crash because we had to be up at six o'clock the next morning!

Libby: Yes, because you had to be down at Hopkins at about seven, seven thirty, to pull on your *wet* wet suit. And I always thought because we were the oldest in the class, the least we could do was to always be there on time, you know, not drag everybody back because we're late.

Lovell: And we dove every reef on the Peninsula, from Partington Cove to the shale beds here, and that really built our confidence.

C&O: And Libby, you had been a photographer already?

Libby: No. Well, you know, snapshots. But no, I hadn't done photography. And then Lovell got me this Nikonos, mostly because if you dive with a photographer, you spend an awful lot of time just sitting there waiting while he's fiddling around. And underwater you get colder and colder just sitting there, and you want to walk around the corner, but you're supposed to be with your buddy. Of course, many times we didn't stick together the way you should.

Lovell: Oh, we'd separate and split all the time.

Libby: Right, and the minute you lose your partner you're supposed to go up to the surface if you can't find them.

Lovell: We never did.

Libby: Well, we'd lose ourselves at the beginning of a dive and not look around until we hit the surface half an hour later.

Lovell: Once we were diving in Peleliu, the northern part of Palau, where there are a lot of gray reef sharks. I was down on this wall, probably down around sixty feet, looking at little tiny things with my nose buried in the reef, and there were a bunch of these sharks milling around in back of me. And Lib sat there and watched for a while, and she finally split . . .

Libby: I kept poking him and everyone else had gone up.

Lovell: . . . She went up to the surface and waited for me to finish getting my little pictures.

Libby: Well, I just went on top of the reef, I could still see him. Anyway, I think that's why he got me the Nikonos, because it gave me something to do. And then I got into it.

C&O: Did you find that you were

focusing on the same sorts of things when you were taking your photographs?

Libby: Well, I had extension tubes, so I could get two-to-one magnification right on the spot. And I had a 15mm lens, for wide-angle stuff. So I could take all those big kelp forest shots.



Libby at about age 13, with her brother Dexter, with a diving helmet modeled after William Beebe's. He dove with it at the Berkeley Marina as she stood by pumping air.

Lovell used to stick more to the medium range. So the very very small and the very very big would be mine.

Lovell: Although I could put a teleconverter on a macro lens, which allowed me to preserve working distance and get the strobes in. Whereas if you use a lens that has to focus very closely, you can't get the illumination in.

Libby: Of course, then we got involved in bringing things in and photographing them in the lab.

C&O: And how did you set that lab up?

Libby: Well, *first* we had it at Hopkins; one building had small labs in it for visiting professors or students. We had one of those, with running seawater and aquaria.

Lovell: We could keep our animals and study them.

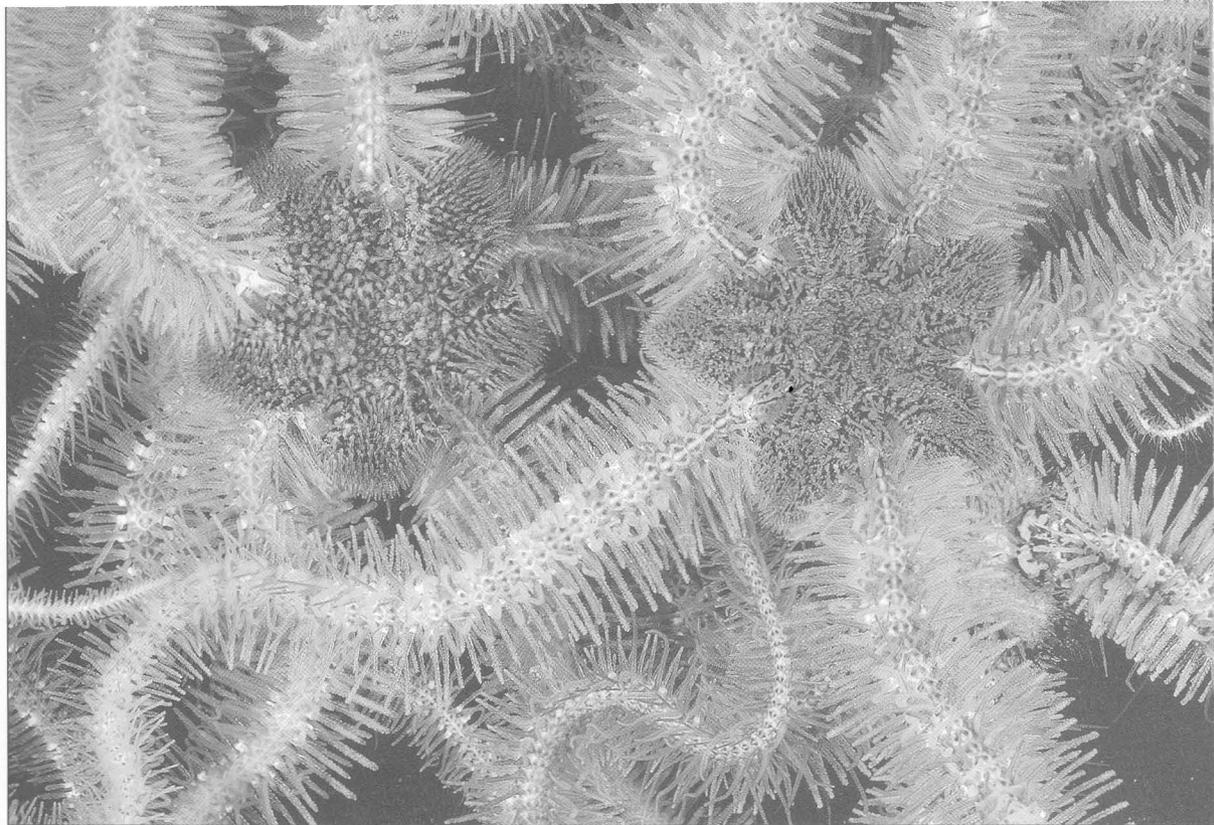
Libby: There was a refrigerator out in the hall, so you could keep your animals cold all night. And so we would do the collecting and keep the animals in the aquaria and take their pictures. Well, then when they got some new professors, they gutted that whole lab and we were out, and that was very sad. But then we took pictures in our darkroom, and we'd bring jars of saltwater home; you could keep the animals for three, maybe four days. We had a bubbler, and we'd add fresh saltwater every so often.

Lovell: Then [Moss Landing Marine Lab instructor] Jim Nybakken turned us on to the Olympus system for macrophotography, in which you have a stand and enlarging lenses and bellows, and we could get up to 14 times enlarged. That set-up enabled us to get pictures of [the encrusting bryozoan] *Membranipora* spawning, and that sort of thing. And that opened up a whole new

world to us. For quite a while we were interested in organisms that encrust the blades of kelp—they're on a flat substratum, so you don't have to deal with depth-of-field problems. If you have little tiny things on a flat surface, that lends itself to magnification. Whereas if they were crawling around on some upright structure, then you'd have much more trouble photographing them. So for many years we'd go out in our Zodiac and collect blades of kelp and bring them back to the lab, and then we'd look at all the things that live on them. They play an important role in our book.

C&O: So you'd study them through a

“It’s
just
incredi-
ble
what
you’d
find,
it’s a
whole
world.”



The brittle star, *Ophiothrix spiculata*, has mucus on its rays that helps pick up plankton and other food. It's colorful, hides by day, and measures about one inch across.

microscope and find interesting things that you hoped to capture on film.

Libby: Yes, we'd bring blobs of stuff—a piece of substrate or a bunch of algae—and spend hours looking at that through a dissecting scope. Because as you'd poke along, more little creatures would poke their heads out. It was just fantastic.

Lovell: Little tiny tube worms sticking their noses out, and little tiny amphipods crawling around. It's just incredible what you'd find, it's a whole world.

Libby: You could spend all day just looking.

C&O: So your world went from the very big scale down to the very small scale.

Lovell: Both.

Libby: People take photographs through microscopes, and then they have electron microscopy, but what we took was about 14 times magnification, and no one has touched that.

C&O: That's your own unique niche.

Libby: Yes, this 14 times is sort of an “in between.”

C&O: Did you have specific photographic projects that you'd be working on?

Libby: Sometimes. Often we'd just see what we could find. For a while we were shooting *Epiactis* [proliferating anemone] over in a channel between Whalers and Bluefish Coves [at Point Lobos], 30 feet deep.

Lovell: You can only get over there when it's quiet, so we'd look out the window of our home, and if it was quiet, we'd put the Zodiac on the car and chase down to Whalers.

Libby: Once we were looking for a nudibranch that feeds on *Epiactis*. And one time we found it, and took a few pictures, and then we ran out of film. So I had in the pocket of my BC [buoyancy compensator vest] this red ribbon, an old Christmas ribbon, and I tied it on this piece of kelp so we could find it again. We had to go all the way home to get more film, and came back and looked for the red ribbon.

C&O: And was the nudibranch still there?

Libby: Oh, yes. So we got some pictures of that, which was good. And then once we were going after *Crepidula*, the little slipper snail that rides along on another

snail. Well, then we looked for those and took pictures madly.

Lovell: Over years we did that. We learned about these things in that subtidal course, and so whenever we got interested, we'd keep shooting those animals.

Libby: Then we spent a lot of time collecting that kelp curler that makes little nests in the tops of kelp. We'd go out in our inflatable and hunt around in the canopy and open the curled-over kelp blades up a little bit, and if there was somebody inside we'd close it up and bring it home, then open it where we could take the picture.

Lovell: That got us into publishing for the first time: we had two articles in *Natural History*, one on *Epiactis* and one on *Crepidula*. That was a big breakthrough for us.

C&O: Is there anything you'd like to say about the changes you've noticed, as far as diving goes, along the California coast?

Libby: The only thing we really noticed was that there aren't as many fish locally. We used to see lots of big lings and big cabezons, and even leopard sharks, even though you couldn't

continued on page 39

Surfrider Volunteers Map Coastal Features

INTIMATE BEACH PORTRAITS

GARY TAYLOR

Surfer Paul Jenkin was strolling along one of the most famous surfing beaches in the world, but he wasn't thinking of riding the waves of Rincon Point. This particular afternoon was dedicated to Beachscape, a project of the Surfrider Foundation which has called on surfers and their allies to help create a composite portrait of the natural and manmade features of the nation's coasts.

Jenkin was carrying a questionnaire, topographical map, tape measure, and camera. Working with several other volunteers, he was measuring outfall

pipes, seawalls, and other beach features along one stretch of the Ventura County shoreline. This group would collect information that would be compiled with what hundreds of volunteers were gathering at other locations.

Surfrider is an organization of surfers and ocean advocates dedicated to preserving the world's coastlines and, with them, good surfing. The goal of the ambitious Beachscape project is to increase the amount of baseline information available to coastal management agencies and municipalities that make critical decisions involving development, pollution and erosion control, beach access, shoreline armoring, recreational resources, and other issues.

"A given public agency will always prefer to do its own studies," says

Chad Nelsen, the national coordinator for Beachscape, "but they are becoming more interested in volunteer-collected data, because they are realizing that it's getting too expensive to do it themselves. We are compiling a record of statistics that doesn't exist anywhere. There's so much information that has not been documented."

Beachscape is one of a growing number of projects nationwide in which nonprofit organizations have enlisted volunteers to gather information about the natural environment, under professional guidance. Creek advocates and school children have long been monitoring water quality in local streams. Heal the Bay moni-

tors water quality in Santa Monica Bay and issues an annual "Beach Report Card," published on signs and on their internet site:

www.healthebay.org/healthebay. Surfrider's Blue Water Task Force has been monitoring water quality at many surfbreaks for the sake of surfers' health.

Steve Aceti, executive director of the Coastal Coalition, says "the information being developed by the Beachscape project will be very useful to the state in carrying out the mandate of the California Public Beach Restoration Act of 1999, AB 64 (Ducheny). This new law allocated funds for beach nourishment and also required that two state agencies, the Department of Boating and Waterways and the Coastal Conservancy, prepare a report that discusses ways to increase natural sediment supply, including an analysis of specific locations where structures might be removed or modified." The Coalition is an advocacy group for beach and wetland restoration comprised of local and regional governments and others.

It took much longer than we expected," said Jenkin, an avid surfer who has a master's degree in ocean engineering. "Every hundred yards or so there was a storm drain coming off the highway, and every one had to be described, photographed, and documented. It took us three hours just to map about a one-mile stretch of beach."

Surfrider's Ventura chapter is one of 48 regional chapters nationwide involved with the Beachscape project on various levels. Some are providing simple observations noted on questionnaires, while others are undertaking extensive geographic mapping and monitoring using Geographic Information Systems (GIS) and Global Positioning Systems (GPS).

Besides gathering information, the Beachscape project presents an opportunity for surfers and other California residents to get better acquainted with their favorite beaches and to play an active role in protecting them from



To learn more about Beachscape or to volunteer, contact Surfrider Foundation, 122 South El Camino Real, PMB#67, San Clemente, CA 92672; (949) 492-8170; www.surfrider.org.

harm. And who better to take on this role than those who spend the most time at the beach: surfers.

"These are people who have intimate knowledge of tides, weather, winds, sand bars, and changes to the beach topography," says Nelsen, who has a master's degree in environmental management from Duke University. "We call them surfer-scientists. In a sense they are amateur naturalists."

The process works like this: A given coastline is identified and broken up into individual "beach boxes," one- or two-mile stretches determined by natural and manmade factors such as rocky promontories or beach parks.

The volunteers get a brief training session from a beach captain assigned by Surfrider. Then they are equipped and sent out to observe, measure, and record. They look for beach width and type, adjacent land use (public, private, urban, etc.); beach access points, and whether a fee is charged; shoreline structures like sea walls, jetties or piers; coastal outfalls (storm drain, industrial, etc.), including their length, width, and flow rate (dry outfalls are so noted); signs of erosion and its threat to coastal structures; natural features such as wetlands and important or endangered wildlife and plants; and the presence of surfing or other recreational activities.

Findings are recorded on questionnaires and on a USGS topographic map of the given quadrant. In some cases volunteers use a GPS device to pinpoint features within three feet. Nelsen says Beachscape is still experimenting with its mapping procedure, which also includes volunteers pacing off large features such as sea walls and breakwaters: "We're looking for gross estimates at this point," he explains.

Surfrider chapters in Massachusetts, New Jersey and Texas are among the most active participants. Among California's dozen or so chapters, Ventura is in the lead, having mapped about 90 percent of its 16-mile-long coast by early April. The chapter is awaiting permission to map the remaining seg-



PHOTOS THIS SPREAD: PAUL JENKIN

Above: Members of Camarillo High School's Aquarian League helped in Hobson State Park, Ventura County. **Opposite:** A Surfrider volunteer in northern Ventura County.

ment, at the Navy Pacific Missile Test Center at Pt. Mugu.

In San Francisco, volunteers set forth in mid-March from Ocean Beach, focusing on sea walls, jetties, revetments, and other manmade structures. "We will be using information collected from Beachscape to implement our long-term goals of managed [coastal] retreat and restoration of the area," explains Mike Paquet, an environmental consultant and San Francisco's Beachscape coordinator. "Our progress so far has been to stop an emergency plan for more rocks without environmental review or public comment."

Eight chapters rallied over 300 volunteers during three weekends in April.

Ultimately, Beachscape's maps will provide a detailed picture of the coastline for a variety of government agencies. Will mainstream bureaucracy accept and use data compiled by surfer volunteers, many of whom have clearly defined political agendas? "We care about coastal armoring, erosion, and pollution, but these interests will not influence the method in which the data is compiled," responds Nelsen. "If a given beach box is eroded, polluted, or shut off from proper public access, those are the facts."

Robin McCraw, environmental specialist for the State Water Resources Control Board, is among public officials

who are enthusiastic about Surfrider's project. McCraw prepares an annual report identifying beach pollution hot spots, based on beach closure information submitted to her by coastal counties. Beachscape's work "is a very good piece of information that I have been missing," she says. "It will help me better identify problem areas, and where the state might want to focus additional resources to fix the problems."

Beachscape grew out of a study by Surfrider's San Diego chapter, which mapped and took pictures of all the stormdrain outfalls on San Diego beaches. "The County of San Diego actually got their own copy made because it was the most comprehensive, current record of storm drains," says Nelsen. "They didn't have the time or resources to do it all themselves."

The project is considered a work in progress. Data collection methods will continue to improve, based on feedback from volunteers. Changes in individual beach boxes will be monitored over time, perhaps annually, according to Nelsen. Ideally, Beachscape will paint a living picture of the nation's beaches, and provide a dynamic benchmark for future stewards of the coastline. ■

Gary Taylor is a surfer and freelance writer working out of Encinitas, San Diego County.



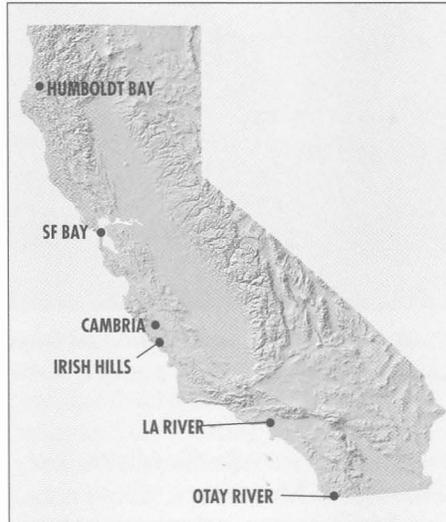
COASTAL CONSERVANCY NEWS

OTAY RIVER VALLEY HABITAT PROTECTION

WITH \$2.6 MILLION FROM the Coastal Conservancy, the City of San Diego will acquire eight parcels, totaling 90 acres, in the Otay River Valley for habitat protection and public access. This acquisition will consolidate public ownership of most of the habitat along the river between I-5 and I-805. The valley links coastal habitats with inland hills and lakes, creating a corridor for wildlife and recreation. In 1999, the state legislature appropriated \$3.25 million to the Conservancy for Otay Valley Regional Park, responding to a strong effort by Assembly Member Denise Moreno Ducheny and Senator Steve Peace.

The parcels to be purchased lie in the wide, thickly vegetated river floodplain from just east of highway I-805 to I-5, bordering heavily urbanized land in the Cities of San Diego and Chula Vista. The habitat will be a critical part of the City of San Diego's Multiple Species Conservation Program (MSCP), through which the City plans to establish a 172,000-acre wildlife preserve in southwestern San Diego County.

The City's MSCP is one of several sub-regional plans in San Diego Coun-



ty that comprise the County's part of the state's Natural Community Conservation Planning (NCCP) program. The NCCP program is intended to protect endangered habitats and species and promote continued regional biodiversity by creating a network of large, interconnected habitat preserves throughout southern California. The acquired properties will be managed by the Cities of San Diego and Chula Vista.

The Coastal Conservancy has been working with local agencies and citizens to protect and restore the Otay River

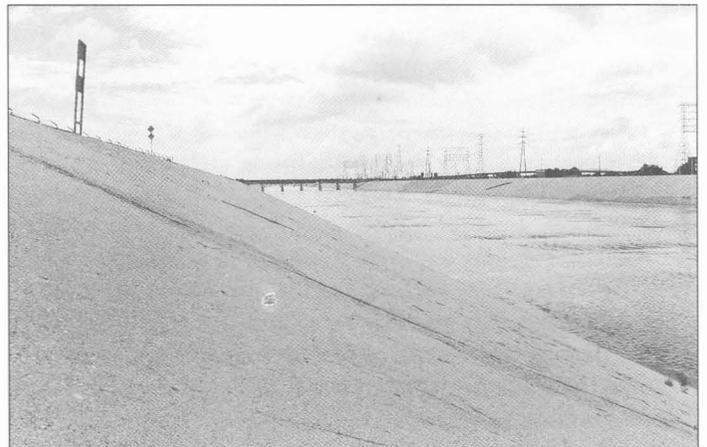
Valley since the late 1980s, and has previously provided over \$4.7 million for planning and property acquisitions.

LOS ANGELES RIVER

THE 51-MILE-LONG Los Angeles River flows through 16 cities. Some 10 million people live in its watershed. The Coastal Conservancy's work on the river began in 1993, when it produced an inventory of riverside recreational opportunities. In 1997, the legislature appropriated \$2 million to the Conservancy for use in access and habitat development projects. Three projects were approved in February:

The City of Paramount will acquire about one acre beside the River, between Ralph C. Dills Park and San Antonio Avenue, with the help of \$400,000 from the Conservancy, matched by \$500,000 from the City and the Mountains Recreation and Conservation Authority. This property will become part of the Park and a staging area for public access to the riverside Lario Trail, which links the San Gabriel Mountains and the Rio Hondo and San Gabriel River bike trail systems. This project is part of an effort to create a greenway along the river.

Friends of the Los Angeles River



Left: Local citizens planted trees and riparian vegetation, creating DeForest Park. Right: The park is just inland of the Los Angeles River levee.

SEAN WOODS

will implement a River Watch Program, with the help of \$55,000 from the Conservancy, matched by about \$64,000 from the Water Resources Control Board and the City of Los Angeles. The program will gather basic information on habitat and water quality. No comprehensive ongoing evaluations of river biota, water quality, or of trash in the river exist now.

Despite its degraded state, the river and surrounding natural areas provide habitats critical to wildlife in the region. The Conservancy is funding the biota component of this effort.

Long Beach will prepare feasibility studies for two potential restoration sites along the lower river with a Conservancy grant of \$300,000. One site of about 60 acres extends about a mile south of DeForest Park. The other, at Sixth Street, lies next to a city park and around an overpass.

CAMBRIA CHALLENGE

THE COASTAL CONSERVANCY in March provided a \$3.5-million challenge grant to the American Land Conservancy toward the purchase of the 400-acre East West Ranch in Cambria, San Luis Obispo County, for public access and natural resource restoration. The Conservancy's funds will be matched by \$1.5 million from the Cambria Community Services District and more than \$2 million in expected private donations.

Development plans for this land have long been controversial. The Land Conservancy has until December to raise the rest of the money needed for the \$10.7-million purchase. It plans to transfer the ranch, now used for grazing, to the Cambria Community Services District for long-term management. A local nonprofit organization will hold a conservation easement. The Conservancy has received more than 600 letters of support for this acquisition.



Looking north toward Morro Bay from the Irish Hills

CAROL ARNOLD

IRISH HILLS

THE CONSERVANCY GRANTED \$85,000 to the Bay Foundation to prepare a conservation plan for the Irish Hills, 50,000 acres of beautiful coastal land in San Luis Obispo County. The plan will identify major scenic and natural resources of the area, which is largely undeveloped, and will set out a long-range preservation strategy. It will also evaluate public access potential.

S.F. BAY TRAIL KEEPS GROWING

THE COASTAL CONSERVANCY approved a total of \$1.2 million in April to advance the completion of the half-finished San Francisco Bay Trail, a 400-mile shoreline trail network. The funds will go to the Association of Bay Area Governments, which administers the Bay Trail Project, and will enable nine local governments to construct, improve, and prepare new trail sections. Recipients will provide almost \$3 million toward these projects.

The Conservancy's funds come from a \$2.5-million addition to its budget authorized by the legislature and governor in 1999. It is expected that the remaining \$1.3 million will be allocated later this year. These projects were approved in April:

To the City of Mountain View,

\$30,000 to complete a feasibility study and pre-construction planning for a 0.75-mile trail extension across the northern end of Moffett Field, from Stevens Creek to Crittenden Marsh, on Midpeninsula Regional Open Space District land.

To the City of Sunnyvale, \$55,000 to open one mile of trail on a levee west of Sunnyvale Baylands Park. This project could become a catalyst for a link between Sunnyvale and Mountain View, through Moffett Field.

To Santa Clara County, \$150,000 to build trails and improve public access facilities at Alviso Marina County Park, including a new boardwalk across the silted-in old marina.

To the City of San Leandro, \$60,000 to plan a 300-foot bicycle/pedestrian bridge and a 600-foot bicycle/pedestrian path on the northern end of Oyster Bay Regional Shoreline.

To the Port of Oakland, \$250,000 to construct 1.1 mile of Bay Trail consisting of bicycle lanes on Doolittle Drive and a separated path along Airport Drive and around the west side of Lew Galbraith Golf Course. This new trail segment will connect to the trail along the Martin Luther King, Jr., Regional Shoreline and run south to Oyster Bay Regional Shoreline.

To the City of Richmond, \$400,000 to build five miles of Bay Trail from Marina Bay to Wildcat Creek and a spur trail to a staging area at Miller-Knox Regional Shoreline. The alignment for this piece of the Bay Trail is along city streets. The project includes landscaping, signing, improvements to streets and sidewalks, and creation of bike lanes.

To the East Bay Regional Park District, \$100,000 to construct a 0.5-mile stretch of the Bay Trail in Pinole and Hercules, linking Pinole Shores Regional Park and San Pablo Bay Regional Park. The new trail segment will consist of a paved pathway along a levee, bike lanes, and a bridge over Pinole Creek.

To the City of American Canyon, \$15,000 to develop a conceptual plan for realigning 2.7 miles of Bay Trail along the edge of the bay wetlands, avoiding sensitive habitats along the east side of the Napa River. This would replace the current alignment, along Highway 29.

To the City of San Rafael, \$140,000 to build and landscape 1,000 feet of Bay Trail in Shoreline Park. This project will include an asphalt path along the bay, a parallel gravel jogging path, and landscaping.

Many of the grant recipients will employ the California Conservation Corps to build, landscape, and maintain the trails.

STEPS TOWARD THE HUMBOLDT BAY TRAIL

THE DREAM OF A TRAIL CIRCLING the entire Humboldt Bay shoreline moved toward realization in April when the Coastal Conservancy approved \$107,000 to the Redwood Community Action Agency (RCAA) for a comprehensive study of such a trail, as well as other potential public access opportunities along the 48-mile Bay shoreline.

There are trails along Humboldt Bay now, totalling about 15 miles, but they are not continuous. Getting from one to another generally requires a car. A regional Humboldt Bay Trail would provide for non-motorized recreation



CARRIE GRANT

This land near Ferndale in Humboldt County may be purchased by the Conservation Fund. The Coastal Conservancy will help fund evaluation of this and other nearby properties.

and commuting and promote associated recreational improvements that would support the region's economy.

The Humboldt Bay Trail study, which is expected to take 18 months to complete, will look at trail options atop levees, railroad right-of-ways, streets, and roads. It will consider urban walkways, bike paths, and facilities for camping and picnicking. There will be public meetings in several communities. A wide range of local organizations, educational institutions, and government agencies will participate in the planning process.

The RCAA study will build on other regional public access efforts, including extension of the Hammond Coastal Trail, existing trails around Arcata Marsh, the Manila Dunes Trail Plan, the Humboldt Bay Area Bike Map (developed by the RCAA), and the trails component of the county's general plan.

OTHER NEWS

SUMMER ON THE COASTAL TRAIL

THIS YEAR AGAIN, COASTWALK is offering a range of shoreline hikes to promote the enjoyment of the coast and encourage the completion of the California Coastal Trail. Among the options are an unhurried family

walk—with lots of swimming opportunities—in San Diego County, a weekend excursion in Point Reyes, and a 40-mile hike along isolated beaches and through ancient redwoods in Del Norte County.

On Saturday, June 3, Coastwalk will lead a special four-mile hike across the Golden Gate Bridge, from the Marin Headlands to San Francisco's Baker Beach, to celebrate the new honor bestowed on the California Coastal Trail. The National Millennium Trails program has selected it as California's Millennium Legacy Trail. For information contact Coastwalk: (800) 550-6854; or coastwalk@sonic.net.

FOLLOW THAT DUCK!

YOU CAN TRACK NORTHERN pintail ducks day by day on their spring migrations from California's Central Valley if you have access to the internet. As part of a study by Ducks Unlimited, the California Waterfowl Association, and the U.S. Geological Survey, female pintails have been fitted with backpack satellite transmitters. Check out the Discovery for Recovery web site: www.werc.usgs.gov/pinsat/. The site also features a biologist's journal and an online forum. More about all this is at www.ducks.org/news/pintail_study.asp.

AVILA

continued from page 9

area, are a known entity, and take the process of redevelopment as seriously as Unocal does," according to Mark Smith, general manager of the company's Central Coast Group.

The county has also approved the Avila Beach Specific Plan, which is to govern the public spaces. Its stated goal is to "retain the character of the old Avila Beach while offering common amenities found in newer beach towns." Although many people loved old laid-back Avila, there were also those who felt it had been frozen in time, first by the water hookup moratorium and then by the discovery of the spill.

One thing seems certain: as so often happens with redevelopment, a new dynamic is now at work that will dictate a higher cost of living. With the water issue and the oil pollution ostensibly solved, the charms of Avila Beach are certain to attract high-priced development interest.

The rising cost of water will also determine who can afford to live in Avila Beach. During the past five years, Unocal paid the \$90,000 annual charge for State Water Project water. Now the Community Services District will have to foot the bill. Water and sewer service per household amounted to \$300 a month before the state water contract. That cost may well triple.

Living with Uncertainty

The story of Avila offers lessons that may be valuable in other California coastal communities—such as Guadalupe, El Segundo/Manhattan Beach, and cities along the East Bay shoreline of Contra Costa County—given the age of many oil company facilities.

It is possible Front Street did not have to be sacrificed, but the fact that bioremediation was tainted as Unocal's preference and could take a decade or more, meant it was not a viable political option.

In the beginning, with no data of their own, local agencies had to rely on oil company information, and the pub-

lic came to believe that the problem was being downplayed. Even information from an independent toxicologist was disdained, though it showed no significant health risk. Perhaps it was done too late. As things turned out, fatigue and politics, rather than science, carried the day. Assessment of California's aging oil pipeline network should be a high priority for state agencies. With such information, it might have been possible to gauge public health risks when contamination was discovered in Avila.

Whether anyone who loved coming to "the beach" as it used to be will feel at home in the new Avila remains to be seen. However, on a recent visit I found children playing in the sand, couples and families strolling along the water's edge, and outrigger canoes returning from a row on the bay. On that morning I was buoyed by the feeling that "the beach" at Avila will be there for my children's kids. ■

Marc Beyeler, a longtime Conservancy staffer, has been visiting Avila Beach for decades.

NEARSHORE

continued from page 21

nearshore ocean is the cyclical temperature variation of the water. Each cycle can persist for two decades or more. During warm cycles, upwelling is less vigorous, kelp forests recede, and replenishment of fish stocks declines. We have been in a warm cycle since the early 1970s. With global warming, it could extend indefinitely. The increase of fishing pressures during this less productive cycle may accelerate stock declines.

As regulations on wild fish become stricter, Asian markets have found a way to adjust. They buy more live catfish, tilapia, and carp raised in aquaculture ponds in the Imperial and Coachella Valleys. (Unlike farmed salmon and shrimp, these species do not subsist on fishmeal derived from marine forage stocks such as sardines and anchovies.) The response to tighter regulations of some live-fish fishers is to fish off southern Oregon. In a differ-

ent tack, United Anglers of Southern California, a sport-fishing organization, has supported the creation of a marine hatchery in Carlsbad that raises California halibut and white seabass for release into coastal waters. How much this hatchery will replenish wild stocks remains to be seen.

Other human impacts on the nearshore ecosystem are only beginning to be addressed. These include harmful runoff with heavy silt loads and the entrainment of nearshore fish in power-plant intakes. To mitigate entrainment losses and damage to a nearby kelp bed, the Commission has required the San Onofre nuclear plant to build an artificial reef and to contribute funds to the marine hatchery at Carlsbad. (Also see *Coast & Ocean*, Winter 1999–2000, p. 11.) The Coastal Commission and the Regional Water Quality Control Boards now require new developments to control harmful runoff more efficiently. In January, the Commission held up approval of a large coastal development proposed by the Irvine Company in Orange County pending further review of runoff control plans.

In northern San Diego County, lobstermen and NMFS have expressed concern that sand replenishment projects to restore beaches can degrade shallow-water reefs and surfgrass areas. This issue has come to the fore in a draft Environmental Impact Report (EIR) prepared by the San Diego Association of Area Governments (SANDAG) for a major replenishment project released in March. This draft EIR claims such impacts can be avoided by placing sand on beaches that do not adjoin reef areas.

For too long, California's nearshore ecosystem has been at the mercy of competing resource users. Today new management initiatives promise to give this critically important ecosystem a new lease on life. The day may come when the sheephead will once more become a common sight in its natural home. ■

Wesley Marx is author of The Frail Ocean. The fourth edition was published in 1999 by Hartley & Marks Publishers. He can be contacted by e-mail at wmarx@primenet.com.



The Redwood Forest: History, Ecology, and Conservation of the Coast Redwoods, edited by Reed F. Noss and Save-the-Redwoods League. Island Press, Washington D.C. and Covelo, California, 1999. 352 pp., \$30 (paper).

IT IS ALWAYS ASTOUNDING how little is known about the secrets of the coastal redwoods. This provocative book packs a lot of scientific information about this complex ancient ecosystem into its compact size. The most recent literature and previously unpublished research findings from 33 contributors are organized into eight chapters. A final chapter advocates renewed conservation efforts. Checklists of species, a glossary of technical terms, and a bibliography of literature cited complement the text, along with pertinent figures and tables. The highlighted boxes are also well chosen.

Some chapters are, however, much weaker than others. Chapter 2 is one of the poorest. The paleoecology is confusing in text and organization. Many of the evolutionary hypotheses presented remain controversial and subject to re-interpretation. Questions of taxonomy and interpretations of the fossil record are still unsettled. The history of human impacts and the redwood preservation movement are inadequately covered.

In chapter 3 the description of vegetation units is also confusing. Current California vegetation classification (Sawyer and Keeler-Wolf 1995, Zinke 1988) generally does not reflect significant environmental parameters or seral stages. The delicate patterns locally influencing climate (fog), past disturbance (fire, flooding, landslide), soil moisture, and nutrients are not reflected in this vegetation classification. Reliance upon remote (GIS) mapping systems is paramount. Ground-based all-inclusive vegetation inventories, listing of key plant indicators, and soil profile descriptions are lacking due to lack of funding, manpower, or expertise.

Chapter 4 incorporates valuable new information about the redwood forest ecosystem. Of particular interest are studies on redwood canopies, fog relations, and fire impacts. Chapters 5 and 6 are the most comprehensive and well-documented, with a rare integration of various disciplines indicating shortcomings in protecting resources.



The serious impacts of the various forest practices are well illustrated.

Chapter 7 develops a framework for intensive environmental surveys, monitoring of ecological and evolutionary processes, conservation of native biodiversity, and adaptive human uses and impacts upon the redwood landscape. Regional conservation goals, regional conservation planning, and new trends in applied silviculture and their long-term consequences are emphasized. The development of 10 criteria is a major step forward for ecosystem management and effective monitoring.

Chapter 8 deals with managing redwood ecosystems for optimal human use. Short-rotation plantations or tree farms, patch cuts with variable green-tree retention, and flexible adaptive management systems are touted. These promising practices lack an adequate data base, however, because they are so new. Complete stand-structure inventories—from small seedlings (zero-diameter trees) to the largest tree diameters—are needed to create a forest continuum. Disregard of the forest-riparian-aquatic-ocean continuum may eventually destroy its viability and sustainability.

This useful volume would have been enriched by a discussion of *Plenterung*, a radically different, centuries-old forest management approach that

has been well-tested in Central Europe. Every timber harvest is preceded by a complete stand-structure inventory and comparison with the previous inventory. Over time this practice establishes an empirical database for that particular stand. *Plenterung* is highly adaptive and indefinitely sustainable, because the timber harvest is always regulated by timber regrowth during the previous harvesting interval. Habitat and resource diversity is maintained, and ecosystems are protected through intensive monitoring. Cumulative benefits accrue to self-sustaining human communities without added chemical or genetic inputs. A good English-language reference on *Plenterung* is Chapter 15 of *Forest Mensuration*, by H. Arthur Meyer (1959).

Rudolf W. Becking is professor emeritus of forestry and natural resources at Humboldt State University in Arcata.

TIFFANY MANCHIP

Noted

OCEAN POLLUTION STUDIES

Clean Coastal Waters: Understanding and Reducing the Effects of Nutrient Pollution, by the National Research Council. National Academy Press, Washington, DC, 2000. 377 pp., \$44.95 (paper).

THE AMOUNT OF NITROGEN in the environment more than doubled between 1960–1990, with much of it entering coastal waters through agricultural runoff. The use of synthetic fertilizers, burning of fossil fuels, and other human activities have led to increased algal blooms, contaminated shellfish, reduced biodiversity, and caused other problems. This report, based on studies by the Committee on the Causes and Management of Coastal Eutrophication (nutrient over-enrichment), examines both the sources and effects of excess nitrogen

continued on page 40

WIYOT

continued from page 25

as a wildlife reserve. We're working on the language and on the regalia. We'll have to make some things up as we go along. We're pretty much starting from scratch. The Wiyot, Hupa, Tolawa, Yurok, and Karok are similar: we're all people from the ocean, the bay, the streams, the hills."

She is silent for a moment, then tells this story: "The other day, I was going across the Elk River Bridge, and I said, 'Creator, it would be so good if you could give me a song—my own.' And just a little bit later a song came. I sang it all the way home so I would not for-

get it and could record it. Then, on another day, I was looking out on our little creek, Salmon Creek—it's polluted and the salmon no longer go up it—and I thought: Creator, it would be so good if we could have a song for this creek and bring it back. And the song came. This time I had my tape recorder. When I got home I called three or four people and asked them: 'Have you heard this song before?' I didn't want to be taking someone else's song. But they said they had not heard it. I'm really happy now. I have two songs. I gave them to my grandniece and grandnephew, and I told them to learn them so we have them when we're ready to dance again.

"And those songs are not from the

year 1910. They came in the year 2000," she points out.

On the following day, this reporter had an opportunity to visit Indian Island. The wind blew across the dry brush growing over a vast shell mound. Two geese flew up and circled in alarm and warning. It was good to know that the Wiyot will return here before long. "My only regret," Seidner said, "is that Irving Foster James, our eldest elder, didn't live to see it. I so wanted him to be there so we could take him to the place where his father was found." But regret is not where she lives. Everything she and the Tribe are now doing is for the young people, so they can continue to learn who they are and who they can be. ■

LANGSTROTH

continued from page 31

get close enough to get their pictures. And the last few years you just didn't see those things around.

Lovell: Our memory was that early on, when you'd dive along the coast here there'd be rockfish, fish in almost all the little cracks, some of them moderate-sized fish. Now you don't see that. And it made us strong supporters to the idea of having that no-take zone, but that got shot down. [In 1997 the Edward Ricketts Underwater Park was formally established by the City of Monterey. A no-take provision was watered down in the end: fishing is presently permitted, as is kelp harvesting. The Monterey Bay Aquarium has imposed a voluntary prohibition on collecting in the park in keeping with the spirit of the no-take concept.]

One thing we haven't covered yet is how wonderful it was for us to acquire that little ten-foot Zodiac. If it was a reasonably calm day we could put that thing on the top of the car and put our junk in the back and off we'd go, the two of us on our own. Fortunately, we didn't have enough power and size to take us up and down the open coast, because I'm sure we would've drowned ourselves if we'd tried doing that. But we did do things like launch at Whalers and cross Carmel Bay over to Pescadero Point, which is very, very interesting;

it's a little deeper to see interesting things there, down around 80, 90 feet. Then we'd go from the [Monterey] breakwater out as far as Point Pinos. We dove those areas repeatedly in that little Zodiac, and that was just wonderful.

C&O: Do you have any particularly memorable dives that you still talk about?

Libby: Well, there's the one when Lovell's weight belt came off.

C&O: What happened?

Libby: We were out at the Pinnacles [in the open ocean off Pebble Beach]. The top of the Pinnacles is at about 80 feet, and then it drops off suddenly on both sides to 120 or so, and on down. And I was puttering around, when all of a sudden here comes Lovell tearing down, with his weight belt in one hand, going shhhhh, down to the bottom. And I reached out, because he had his camera in the other hand, and I was going to take his camera, at least, so he'd have two hands. But he went tearing on down past me, so I went tearing down after him of course, and thank heavens, he landed on a flat spot rather than going on down.

Lovell: I got my weight belt back on.

Libby: Yeah, he hit the bottom and sort of stretched out on his stomach with his weight belt, and I sort of sat on his back to hold him down while he got it hooked up.

Lovell: I was short of breath from the struggle.

C&O: How did it come off?

Lovell: Well, it was one of those buckles. We got rid of that in a hurry. We got one of those rubber things that are a clasp, and they never come off. I never, ever, would dive with one of those buckles again.

Lovell: I think some of the dives in the Indo-Pacific were fantastic.

C&O: For the animal life that you saw?

Libby: The animal life and the beauty of it.

Lovell: But they were hairier dives, a lot of them, because of the current. Terrific current.

Libby: Only once have we had that current here, and that was out at North Point [the outer point of Point Lobos]. I should have realized, because we'd always hang our cameras off a lanyard from the boat, and then you'd drop in and pick up your camera and take it on down. And I remember seeing Lovell's camera out over *here*, you know, not down there. I thought, yes, quite a bit of current, but it didn't occur to me that maybe we shouldn't go in.

Lovell: Well, we learned finally that if the kelp bed isn't there, don't go in the water, because the kelp is lying flat on the bottom.

Lovell: You learn a lot when you dive. Little experiences all the way along. About the power of the ocean. It's bigger than we are, and that's the first thing you learn. ■

and phosphorus in coastal waters. It recommends that a comprehensive national strategy be developed to address this pollution. The report can be also downloaded from the publisher's web site: national-academies.org.

Study of the Impact of Stormwater Discharge on Santa Monica Bay, by Steven Bay, Burton H. Jones, and Kenneth Schiff. University of Southern California Sea Grant, Los Angeles, 1999. 16 pp., \$5 (paper).

THE "URBAN OCEAN" off the Los Angeles and Orange County coast is the focus of the University of Southern California's Sea Grant Program. This study assesses the impacts of contaminants borne by urban stormwater runoff upon the marine ecosystem. It examines the characteristics of stormwater plumes, and the biology of the seafloor and the

water column. This and related studies can be ordered from USC Sea Grant Program, Los Angeles, CA 90089-0373; (213) 740-1961; FAX (213) 740-5936; seagrant@usc.edu; or www.usc.edu/go/seagrant.

Muddy Waters: The Toxic Wasteland Below America's Oceans, Coasts, Rivers and Lakes, by Beth Millemann and Cindy Zipf. Coast Alliance, Washington, DC, 1999. 152 pp. \$25 (paper).

MUDDY WATERS IS A CITIZEN'S guide to problems caused by toxic sediments and to ways of solving them. It includes a case study of ocean dumping in New Jersey, but the book's combination of fact, science, law, and policy is intended to provide a practical basis for citizen action anywhere in the United States. Order from Coast Alliance, 600 Pennsylvania Avenue SE, Suite 340, Washington, DC 20003; (202)

546-9554; FAX (202) 546-9609; e-mail coast@coastalliance.org. *Muddy Waters* can also be downloaded from the publisher's web site: www.coastalliance.org.

HELP FOR ENVIRONMENTAL NEGOTIATORS

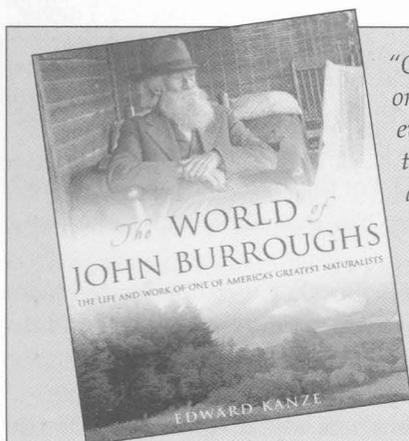
Negotiating Environmental Agreements: How to Avoid Escalating Confrontation, Needless Costs, and Unnecessary Litigation, by Lawrence Susskind, Paul F. Levy, and Jennifer Thomas-Larmer. Island Press, Washington, DC, 2000. 337 pp., \$35 (paper).

Using Assisted Negotiation to Settle Land Disputes: A Guidebook for Public Officials, by Lawrence Susskind and the Consensus Building Institute. Lincoln Institute of Land Policy, Cambridge, MA, 1999. 23 pp., \$12 (paper).

Resolving Land-Use Conflicts through Mediation: Challenges and Opportunities, by David Lampe and Marshall Kaplan. Lincoln Institute of Land Policy, Cambridge, MA, 1999. 84 pp., \$14 (paper).

LAURENCE SUSSKIND IS A director of both the MIT-Harvard Public Disputes Program and the Consensus Building Institute. *Negotiating Environmental Agreements* outlines and illustrates his "mutual gains approach" to negotiations, developed to achieve more fair, efficient, stable, and wise results. *Using Assisted Negotiation* offers step-by-step advice based on case studies. *Resolving Land-Use Conflicts* is an analysis of some of the same case studies.

Dam Removal Success Stories: Restoring Rivers through Selective Removal of Dams That Don't Make Sense, published by Trout Unlimited, presents case studies of 25 dam removals in 15 states that have resulted in effective river restorations, and one case in which mistakes were made that led to negative impacts. The report is available on-line at www.tu.org/library/conservation.html (Warning: it takes a long time to download.)



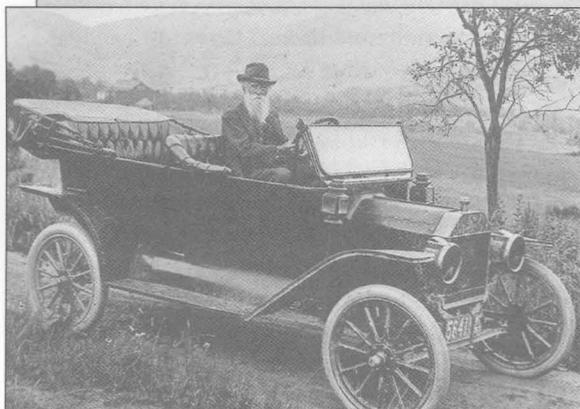
"One has only to sit down in the woods or fields, or by the shore of the river or the lake and nearly everything of interest will come round to him—the birds, the animals, the insects; and presently, after his eye has got accustomed to the light and shade, he will probably see some plant or flower that he has sought in vain. . . . So, on a large scale, the student and lover of nature has this advantage over people who gad up and down the world, seeking some novelty or excitement; he has only to stay at home and see the procession pass."

"The more time we save, the less we have. The hurry of the machine passes into the man. . . . More work is done, but in what does it all issue? Certainly not in beauty, in power, in finer men and women; but mostly in giving wealth and leisure to people who use them to publish their own unfitness."

—John Burroughs, *Indoor Studies*, 1889

Quoted in *The World of John Burroughs*, by Edward Kanze, with historic photos and color photos by the author. Sierra Club Books, San Francisco, 1999. 160 pp., \$29.95 (paper).

John Burroughs was a pioneer of the American conservation movement who published 28 books on the natural world. He was a friend of Walt Whitman, Theodore Roosevelt, Thomas Edison, and John Muir.



Baiji

A flashing white fin appears
Then vanishes
Into the muddy, light brown waters of the Yangtze River.
Unknown to human kind,
Before Three Gorges Dam began.
The dam in central China on the Yangtze River
Will produce much electricity

But will produce no good for this dolphin.
It swims upstream back to its birthplace on the same river,
To nurture its young,
Much like the salmon.
It cannot see,
But uses vibrations.
The most endangered dolphin in the world.
It will be wiped off the face of the earth
Within a few decades.

The Three Gorges Dam will block off the passage
which these dolphins swim through
to get to the nurturing ground.

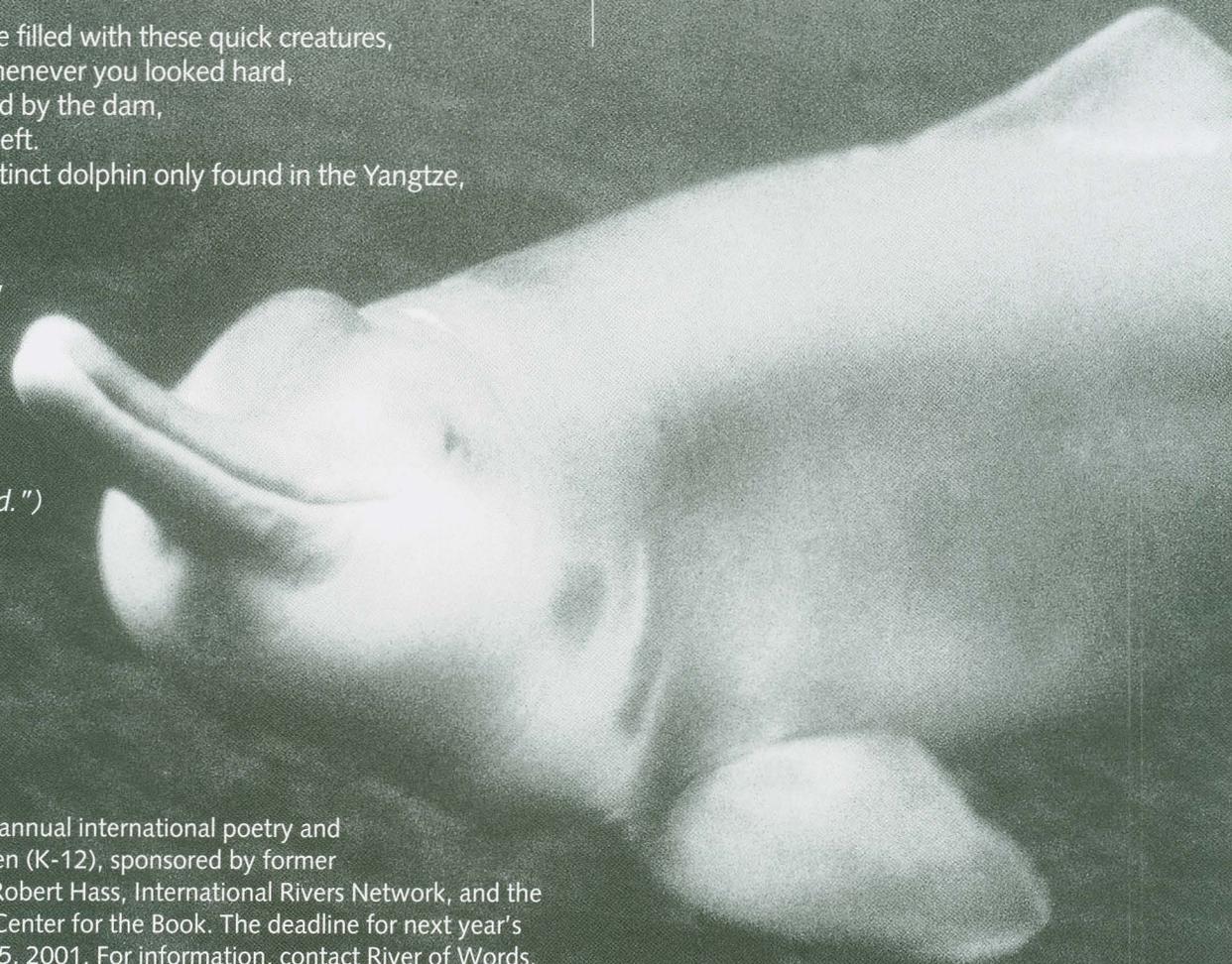
The water was once filled with these quick creatures,
Streaks of white whenever you looked hard,
But now, threatened by the dam,
Fewer than 50 are left.
This soon-to-be-extinct dolphin only found in the Yangtze,
This white flash,
Flag bearer,
This dying creature,
Is, indeed,
The Baiji.

*(In Mandarin
Baiji means
"the flag bearer
that was left behind.")*

Christin Yin, age 13
Guangzhou,
Peoples' Republic of China
International grand prize winner
5th Annual River of Words Contest



*Temple at Nanjin, Xiling Gorge,
above Three Gorges Dam*



River of Words is an annual international poetry and art contest for children (K-12), sponsored by former U.S. Poet Laureate Robert Hass, International Rivers Network, and the Library of Congress Center for the Book. The deadline for next year's contest is February 15, 2001. For information, contact River of Words, P.O. Box 4000-J, Berkeley, CA 94704; e-mail row@irn.org; www.riverofwords.org.



Coastal Conservancy

CALIFORNIA COASTAL CONSERVANCY

1330 BROADWAY, 11TH FLOOR

OAKLAND, CA 94612

BULK RATE
U.S. POSTAGE PAID
PERMIT NO. 1
BERKELEY, CA

Also in this issue:

Los Osos — The People Speak

Surfers Survey Beaches

New Trail Actions

